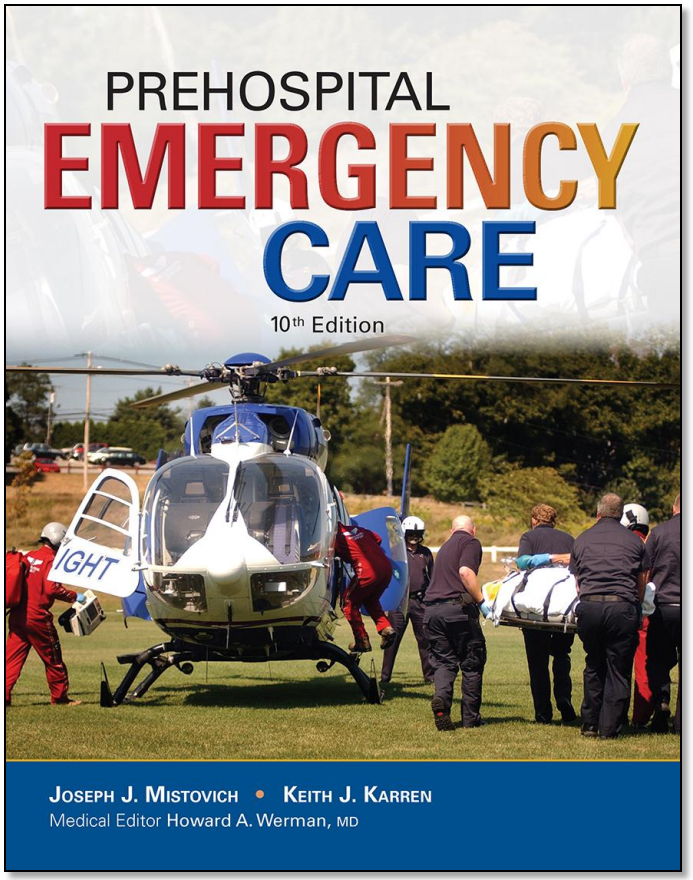
PREHOSPITAL EMERGENCY CARE

TENTH EDITION



CHAPTER 42

Ambulance Operations and Air Medical Response

Learning Readiness

- EMS Education Standards, text p. 1155

Learning Readiness Objectives

- Please refer to page 1155 of your text to view the objectives for this chapter.

Learning Readiness Key Terms

- Please refer to page 1155 of your text to view the key terms for this chapter.

Setting the Stage

- Overview of Lesson Topics
  - Driving the Ambulance
  - Warning Devices
  - Roadway Incident Safety
  - Phases of an Ambulance Call
  - Air Medical Transport
  - Security and Safety

Case Study Introduction

EMTs Gary Farmer and Harold Begay are completing their pre-shift vehicle inspection when they are dispatched for a report of a vehicle collision.

Case Study

- What steps do Gary and Harold need to take before heading to the scene?
- How will Gary and Harold decide the best route to travel to reach their destination?
- What actions must they take to minimize their chances of being in a collision during the response?

Introduction

- An ambulance should be a place of comfort and support to patients.
- There are 5,000 ambulance crashes each year in the United States.
- EMTs must be able to skillfully operate an ambulance.

Driving the Ambulance

- Laws, regulations, and ordinances apply to the operation of ambulances.
- Certain privileges are afforded to ambulance operators.
- It is never justified to operate an ambulance unsafely.

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Driving the Ambulance

- Generally, an ambulance may do the following in an emergency:
  - Exceed the posted speed limit as long as lives or property are not endangered.
  - Drive the wrong way down a one-way street or drive down the opposite side of the road.

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Driving the Ambulance

- Generally, an ambulance may do the following in an emergency:
  - Turn in any direction at any intersection.
  - Park anywhere as long as lives or property are not endangered.
  - Leave the ambulance standing in the middle of a street or intersection.

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Driving the Ambulance

- Generally, an ambulance may do the following in an emergency:
  - Cautiously proceed through a red light or red flashing signal.
  - Pass other vehicles in no-passing zones.

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Driving the Ambulance

- To exercise emergency privileges, you must:
  - Have a valid driver's license and possibly complete a driving course.
  - Be responding to an emergency.
  - Use warning devices.

continued on next slide

Driving the Ambulance

- To exercise emergency privileges, you must:
  - Exercise due regard for the safety of others.
  - Follow additional guidance from your EMS system.

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Driving the Ambulance

- Good driving basics
  - Wear seatbelts.
  - Hold the steering wheel with both hands.
  - Practice with the vehicle you will be driving.
  - Respond to weather and road conditions.

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Driving the Ambulance

- Good driving basics
  - Select the best route for safe travel.
  - Maintain a safe following distance.
  - Use headlights.
  - Exercise caution when using warning devices.

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A number of factors can cause an operator to lose control of the ambulance. (Courtesy Canandaigua Fire and Rescue)

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Driving the Ambulance

- Maintaining control of the vehicle
  - Go the posted speed limit unless the situation is critical.
  - Avoid sudden braking.
  - Minimize distractions; realize other drivers may be distracted.

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Driving the Ambulance

- Maintaining control of the vehicle
  - Avoid driving while fatigued.
  - Be cautious at railroad crossings and when approaching school buses, bridges, or tunnels.
  - Anticipate traffic patterns for weekdays and weekends.

continued on next slide

Driving the Ambulance

- Maintaining control of the vehicle
  - Be aware of the road surface.
  - Use caution when backing.
  - Be aware of aggressive drivers.
  - Do not use escorts.

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Driving the Ambulance

- When driving at higher speeds:
  - Be cautious with curves that lead to populated areas, and those that crest hills.
  - Brake before you enter the curve, not in the curve; enter the curve at the outside.
  - Accelerate carefully as you leave the curve.

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Driving the Ambulance

- When driving at higher speeds:
  - Use a lower gear when going down a long hill.
  - Brake smoothly.

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Driving the Ambulance

- Intersection collisions
  - Slow down at each intersection to make sure that it is clear.
  - If you are crossing against the light, come to a complete stop, proceed only when traffic is clear stopped.

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Driving the Ambulance

- Intersection collisions
  - When there are two emergency vehicles:
    - Maintain a safe distance between your vehicle and the one in front of you, but follow closely enough so that the motorist can see both.
    - Do not use the same siren mode on both vehicles.

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Driving the Ambulance

- Intersection collisions
  - Vehicles may block your view of crosswalks.
  - Slow down and anticipate pedestrians.

continued on next slide

Driving the Ambulance

- Inclement weather
  - An ambulance requires twice the stopping distance on wet pavement, and five times as much on sleet or ice.
  - Maintain a safe following distance.

continued on next slide

Driving the Ambulance

- Inclement weather
  - Wet weather
    - Wet roads can lead to hydroplaning.
    - Keep mirrors cleared of water.
    - Avoid sudden braking and sudden steering changes.

continued on next slide

Driving the Ambulance

- Inclement weather
  - Wet weather
    - Slow down and turn on wipers before driving through large puddles; tap the brakes to dry them out.
    - If you are hydroplaning, keep the steering wheel steady and gently pump the brake.

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Driving the Ambulance

- Inclement weather
  - Winter weather
    - Ensure the vehicle is in good working order
    - Carry emergency equipment (chains, shovel, etc.)
    - Use snow tires, if possible

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Driving the Ambulance

- Inclement weather
  - Winter weather
    - Stay aware of the temperature
    - Avoid sudden movement of the steering wheel and sudden braking

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Driving the Ambulance

- Inclement weather
  - Poor visibility
    - Slow down, but avoid sudden deceleration.
    - Watch the road ahead and behind.
    - Turn on your lights, using low beams.
    - If you slow to 15 mph below the speed limit, use four-way flashers.

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Driving the Ambulance

- Inclement weather
  - Poor visibility
    - Use the defroster to keep fog off the windshield
    - If you need to slow down, tap the brake pedal to warn motorists behind
    - Anticipate that vehicles behind you will come to a sudden stop

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Driving the Ambulance

- Night driving
  - The risk of fatal collisions is higher at night.

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Take extra care when driving at night. (© Mark C. Ide)

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Driving the Ambulance

- Night driving
  - Quartz-halogen headlights provide more light.
  - Have headlights on whenever you are traveling in an emergency.
  - Keep headlights clean and properly aimed.

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Driving the Ambulance

- Night driving
  - Replace burned-out bulbs immediately.
  - Dim high beams within 500 feet of an approaching vehicle or within 300 feet of a vehicle in front of you.
  - Never stare into the high beams of another car.

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Driving the Ambulance

- Night driving
  - Do not flick high beams up and down to remind another driver to dim his lights.
  - Never use high beams going into a curve.
  - Keep the windshield clean, inside and out.
  - Keep the instrument panel dim.

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Driving the Ambulance

- Night driving
  - Keep your eyes moving; avoid focusing on any one object.
  - If the washing solution does not leave the glass clean after ten wiper cycles, replace the blades.
  - Be rested before you begin a night driving shift; be alert to impaired drivers.

Warning Devices

- Warning devices can save time, but have risks.
- Follow protocols for use of warning devices.
- Warning devices only request the right of way; they do not guarantee it.
- You must exercise due regard when using warning devices.

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Warning Devices

- Colors and markings
  - Colors and markings provide for quick identification of ambulances and make them visible in traffic.

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(a) Colors and markings are typically designed to provide quick identification that the vehicle is an ambulance and (b) to maximize visibility in traffic.

continued on next slide

(a) Colors and markings are typically designed to provide quick identification that the vehicle is an ambulance and (b) to maximize visibility in traffic.

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Warning Devices

- Warning and emergency lights
  - Activate emergency lights on emergency calls.
  - Use headlights, even in daylight.
  - Lights are placed at various locations on the ambulance for visibility.

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Warning Devices

- Warning and emergency lights
  - White lights are more visible than red and blue.
  - Minimize lights in fog and when parked.

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Warning Devices

- Sirens
  - Siren noise is greatly reduced on the inside of vehicles.
  - Do not startle drivers with sudden siren noise.
  - Siren noise is stressful for patients.

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Warning Devices

- Sirens
  - Ambulance operators drive faster when sirens are on.
  - The siren can prevent you from hearing other emergency vehicles.

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Warning Devices

- Air horns
  - Consider using the air horn when you need to clear traffic quickly.
  - Do not sound the horn when you are close to other vehicles.

Case Study

Gary and Harold spot the collision just ahead of them, and Gary notifies dispatch that they are on the scene.

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Case Study

- What should Gary and Harold consider in determining how and where to park the ambulance?
- What steps should the EMTs take to make the scene as safe a working environment as possible?
- What responsibilities must be completed to carry the ambulance call to completion?

Roadway Incident Safety

- EMS personnel must set up a safe environment when working on or near a roadway.
- Poor visibility and impaired, distracted, or inexperienced drivers are all factors in roadway incident injuries.

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Roadway Incident Safety

- High-visibility apparel
  - EMTs and other rescue personnel responding to emergencies on or near a roadway must wear approved high-visibility apparel.
  - EMTs must wear apparel that meets the Class 2 or 3 standards of ANSI/ISEA 107-2004 or the Public Safety Vest standard ANSI/ISEA 207-2006.

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Roadway Incident Safety

- Safety benchmarks
  - Do not trust approaching traffic.
  - Do not turn your back on approaching traffic.
  - Use the first-arriving emergency vehicle to create a barrier between traffic and the scene.

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Roadway Incident Safety

- Safety benchmarks
  - Wear personal protective equipment and ANSI high-visibility vests.
  - At night, turn off vision-impairing lights
  - Use other emergency vehicles to slow and redirect traffic.

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Roadway Incident Safety

- Safety benchmarks
  - Use advance warning signs and traffic control measures upstream of the scene.
  - Use traffic cones to divert traffic.
  - Assign a person to monitor traffic.
  - Place vehicles uphill/upwind when hazardous materials may be involved.

Phases of an Ambulance Call

- The major phases are:
  - Daily prerun vehicle and equipment preparation
  - Dispatch
  - En route to the scene
  - At the scene

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Phases of an Ambulance Call

- The major phases are:
  - En route to the receiving facility
  - At the receiving facility
  - En route to the station
  - Post run

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Phases of an Ambulance Call

- Daily prerun vehicle preparation
  - Basic ambulance maintenance includes oil and filter changes, transmission and differential checks, wheel bearing check, brake check, and tie rod end inspection.
  - Know your service's policies and procedures for reporting and correcting vehicle problems.

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Phases of an Ambulance Call

- Daily prerun vehicle preparation
  - Includes checking the vehicle and ensuring all supplies and equipment are present and in working order

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Check tires for inflation, wear, or danger spots.

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TABLE 42-1 Daily Ambulance Inspection

Items Typically Included in a Daily Ambulance Inspection Checklist

Fuel
Oil
Fluid circulation system
Batteries
Brakes
Tires and wheels
Shoreline power connectors
Headlights
Brake lights
Turn signals
Emergency lights
Wipers
Horn
Siren
Windows
Door closing and latching devices
Power systems
Air-conditioning, heating, and ventilation systems
Radiator hoses and fan belts
Seat belts
Dash lights
Radio
Supplies
Interior and exterior cleanliness

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TABLE 42-2 Basic Ambulance Supplies

Medical Supplies

Basic supplies
Patient transfer equipment
Airways
Suction equipment
Artificial (positive pressure) ventilation devices
Oxygen inhalation equipment
Automated external defibrillator (AED)
Basic wound care supplies
Splinting supplies
Childbirth supplies
Medications

Nonmedical Supplies

Personal protective equipment (Standard Precautions)
High-visibility safety vests
Preplanned routes, comprehensive street maps

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Make sure all lights are functional.

continued on next slide

Check all belts and hoses.

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Check all fluid levels and keep them up.

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Phases of an Ambulance Call

- Dispatch
  - A message from the communications center will start you on your run.
  - Ask the dispatcher to repeat any information that seems unclear.

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Phases of an Ambulance Call

- En route to the scene
  - Quickly check the vehicle before leaving for the scene.
  - Fasten your seatbelt.
  - Verify dispatch information.
  - Listen for status updates.
  - Anticipate the equipment you will need.

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Phases of an Ambulance Call

- En route to the scene
  - Drive responsibly.
  - Determine what the crew members will do at the scene.
  - Request ALS, if necessary.

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Phases of an Ambulance Call

- At the scene
  - Notify dispatch of arrival.
  - Park in the most appropriate location.
  - Perform a scene survey.

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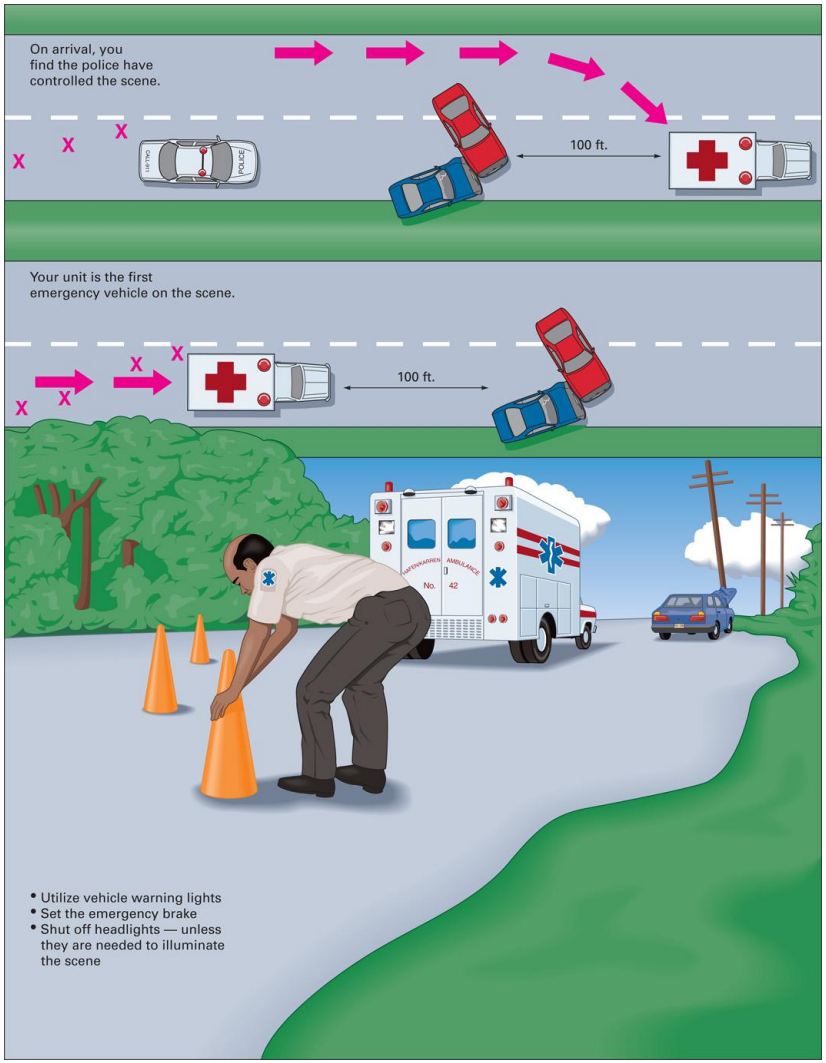
Safety at the scene.



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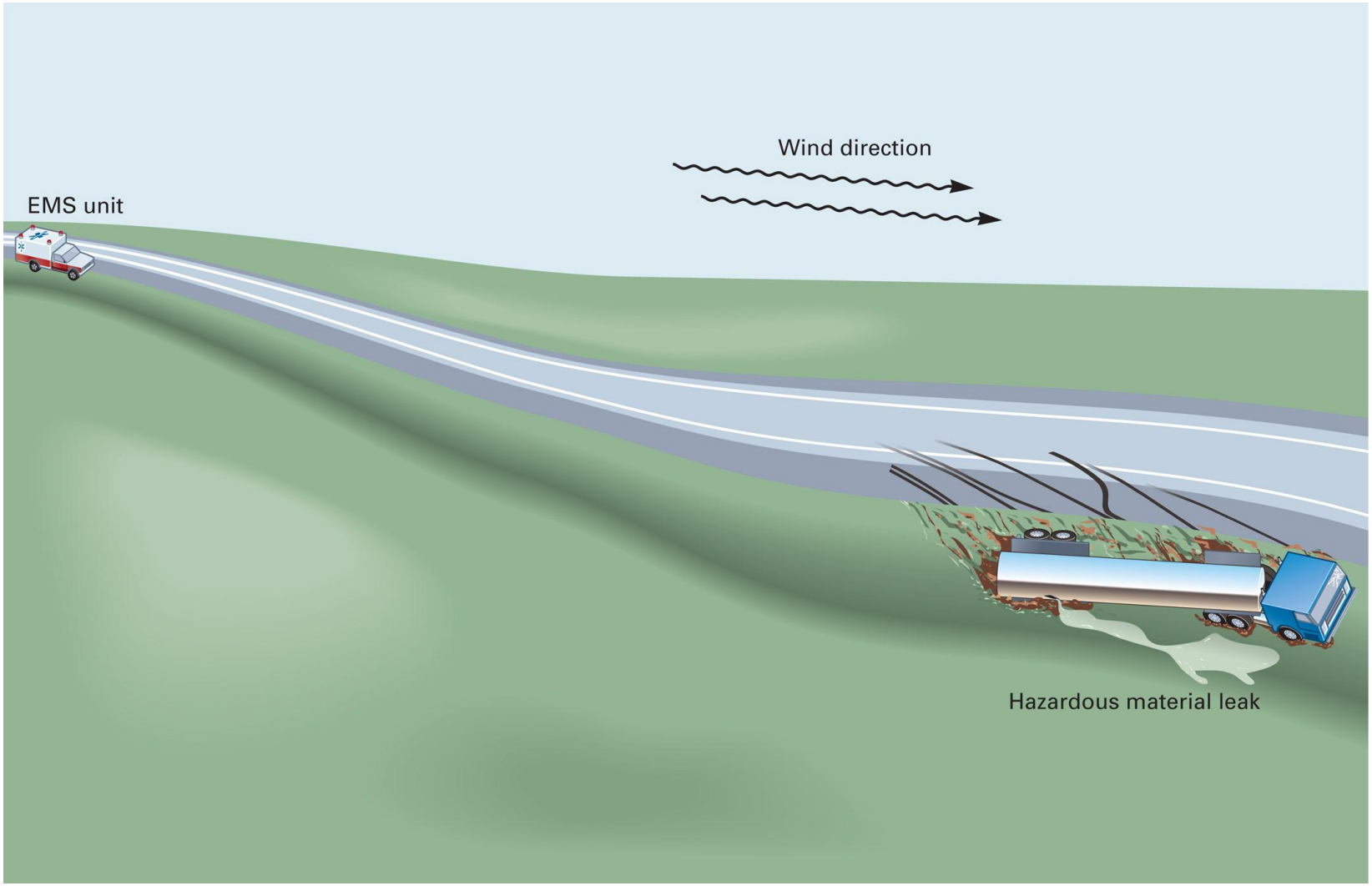
Park the EMS unit uphill and upwind from any leaking hazardous materials.



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Phases of an Ambulance Call

- At the scene
  - Put on high-visibility apparel for roadway scenes.
  - Take Standard Precautions.
  - Determine if it is safe to approach the patient.
  - Observe the scene, determine the nature of the problem/mechanism of injury.

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Phases of an Ambulance Call

- At the scene
  - Determine the number of patients.
  - Determine priorities of care.
  - If needed, gain access to the patient.
  - Provide treatment.
  - Move the patient to the ambulance, observing safety precautions.

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Phases of an Ambulance Call

- En route to the receiving facility

continued on next slide

Ensure that the patient is secure.

continued on next slide

Change to on-board oxygen.

continued on next slide

Perform reassessment.

continued on next slide

Document your history and other assessment findings.

continued on next slide

Communicate with medical direction and the receiving medical facility.

continued on next slide

Make the patient comfortable and reassure him.

continued on next slide

Notify dispatch when you are en route and when you have arrived at the receiving medical facility.

continued on next slide

Phases of an Ambulance Call

- At the receiving facility
  - Transfer patient care, with all records, personal belongings and an oral report
  - Assist in moving the patient
  - Exchange linen and equipment that may be left with the patient
  - Complete the patient care report

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Phases of an Ambulance Call

- En route to station or response area
  - Before leaving the hospital, clean, inspect, and restock the ambulance.
  - Wash your hands.
  - Notify dispatch.
  - Return to station.
  - Refuel if needed.

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Phases of an Ambulance Call

- Post run
  - Fill out and file any reports as required by local protocol.
  - After each run, check fuel.
  - Replace what you used during the run; clean and disinfect nondisposable equipment used.
  - Change soiled uniforms.

Put all equipment in its proper place.

Make up the wheeled stretcher and lock it in place.

Complete an inventory of equipment and supplies. Replace necessary equipment so that the ambulance is fully stocked.

Clean and disinfect the patient compartment.

Click on the phase of an ambulance call during which EMTs complete checklists to ensure the vehicle is in working order and all equipment is available.

A. Post run

B. Prerun preparation

C. At the receiving facility

D. Dispatch

Air Medical Transport

- When to request air medical transport
  - Operational guidelines
    - The patient needs to be transported to a distant facility.
    - Prolonged extrication is expected for a high-priority.
    - Air transport will clearly save time over ground transport in a time-critical patient.

continued on next slide

Air Medical Transport

- When to request air medical transport
  - Operational guidelines
    - The patient is in a remote area unreachable by ground vehicles.
    - Ground ambulance transport is blocked.
    - The air transport crew possesses specialty medical skills, supplies, or equipment not available with the ground ambulance.

continued on next slide

Air Medical Transport

- When to request air medical transport
  - Medical guidelines
    - Time-critical illness or injury, such as:
      - Acute stroke
      - Head injury with altered mental status and signs of herniation
      - Chest or abdominal trauma with signs of respiratory distress or shock

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Air Medical Transport

- When to request air medical transport
  - Medical guidelines
    - Time-critical illness or injury, such as:
      - Serious mechanism of injury with unstable primary assessment findings or unstable vital signs
      - Penetrating injury to the body cavity with unstable primary assessment findings

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Air Medical Transport

- When requesting helicopter transport, provide:
  - Your name
  - Department name
  - Callback number
  - Nature of the incident
  - Exact location of the incident
  - Your radio frequency
  - Exact location of the landing zone

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Air Medical Transport

- Limitations of air medical transport
  - Weather/environmental limitations
  - Altitude limitations
  - Airspeed limitations
  - Aircraft cabin size

continued on next slide

Air Medical Transport

- Limitations of air medical transport
  - Terrain
  - Cost
  - Patient preparation
  - Noise-limited assessment

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Air Medical Transport

- Guidelines for setting up a landing zone
  - Make sure the landing area is clear of obstructions, flat, free of debris, and 150 feet from collision vehicles.
  - Minimum 60 feet by 60 feet for day; 100 feet by 100 feet for night

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Air Medical Transport

- Guidelines for setting up a landing zone
  - Stop traffic on both sides of a divided highway.
  - Consider the wind direction.
  - Mark the corners of the landing area.
  - Wet the area, if possible, if it is dry or dusty.

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Air Medical Transport

- Guidelines for setting up a landing zone
  - Keep clear of the downwash area.
  - Assign one person to guide the pilot in.
  - Follow the directions of the pilot and crew.
  - Be cautious of rotor blades and only approach or leave the aircraft at the pilot's direction.

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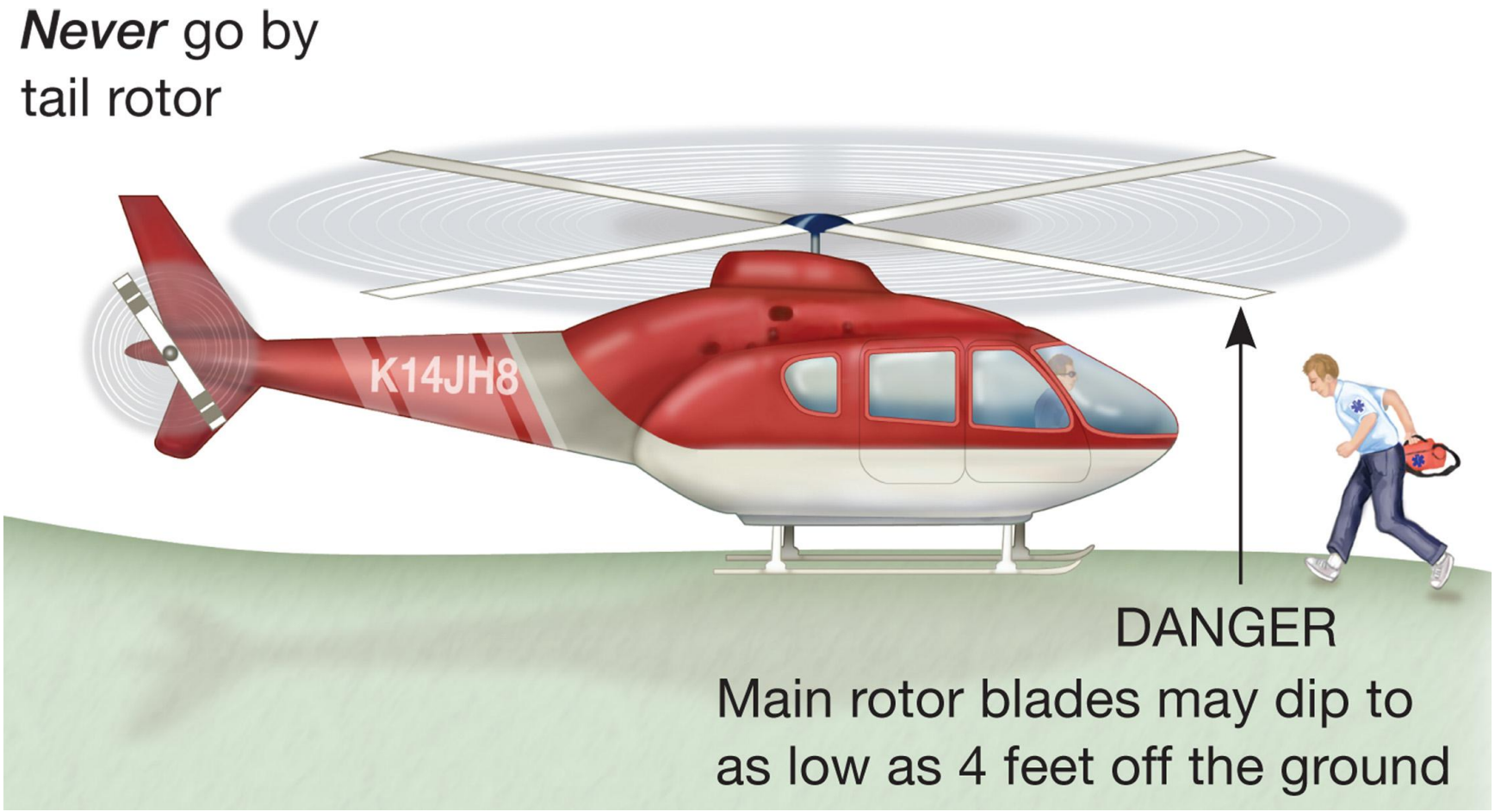
Always crouch when approaching or leaving a helicopter.



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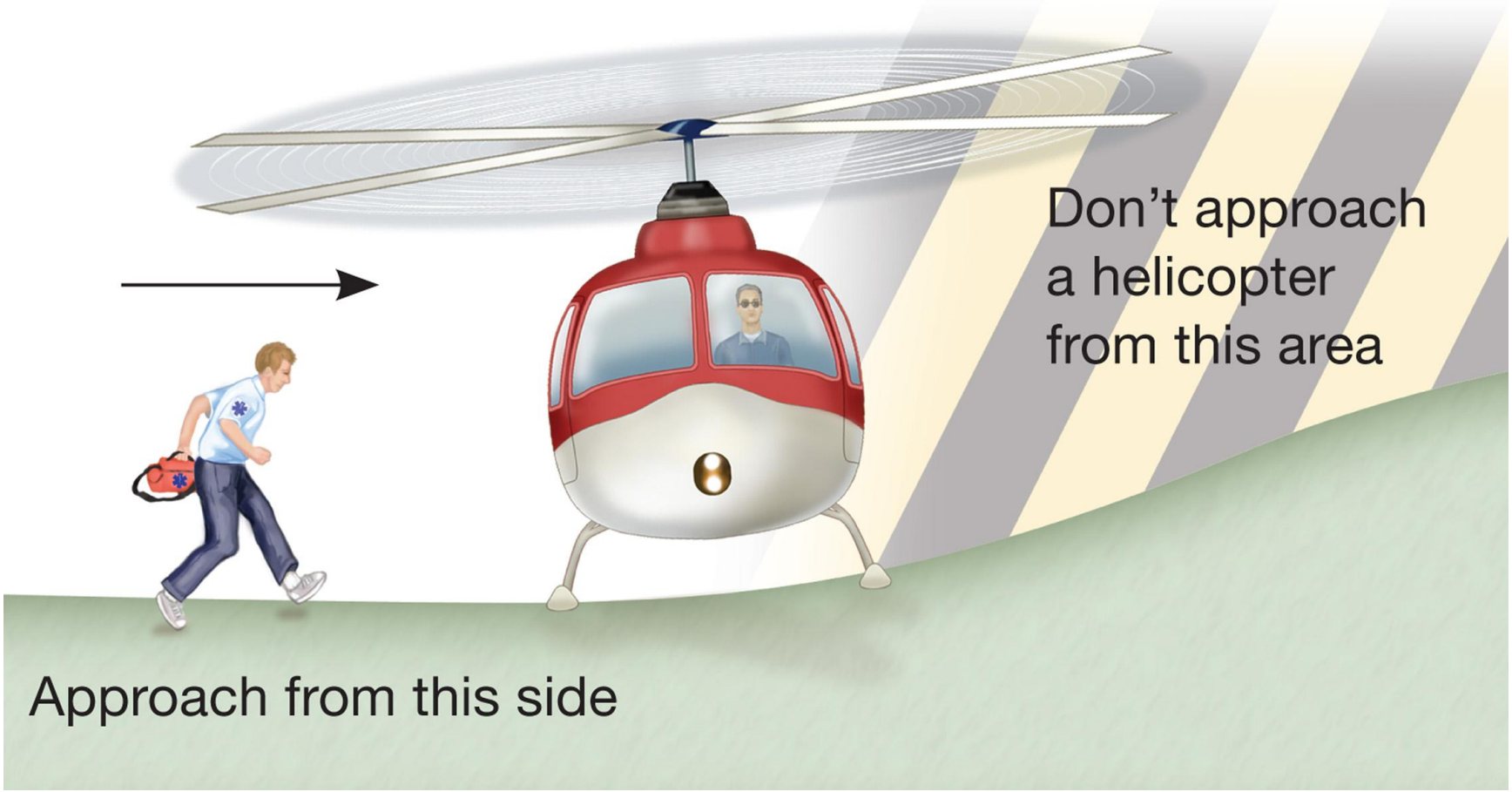
Approach a helicopter from downhill.



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Air Medical Transport

- Guidelines for setting up a landing zone
  - Secure loose items.
  - No smoking within 50 feet of the aircraft.
  - On an incline, approach the aircraft from the downhill side.
  - Do not point spotlights at the helicopter on its final approach.

Security and Safety

- There are recommended guidelines to avoid use of emergency vehicles in terrorist attacks and to reduce the risk of theft.

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Security and Safety

- Personnel
  - Conduct security briefings at the beginning of each shift.
  - EMS crews should be well-informed and allowed to participate in development of security measures.

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Security and Safety

- Vehicle
  - All vehicles must be tracked at all times.
  - EMS vehicles should not be left running or unattended with the keys in the vehicle.

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Security and Safety

- Tracking vehicle access
  - No access by unauthorized persons
  - Keeping a key log
  - Security measures to be followed during repairs
  - All markings must be destroyed when vehicles are sold or salvaged and warning devices must be removed.

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Security and Safety

- Uniforms and identification
  - Safeguard identification cards and patches from unauthorized persons.
  - ID cards and badges should be counterfeit resistant and have a photo of the provider.
  - Uniform stores must verify the identification of persons buying uniforms or identification items.

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Security and Safety

- Carbon monoxide in ambulances may come from:
  - The vehicle's exhaust
  - Equipment powered by gasoline or fuel
  - Exhaust of vehicles parked next to or traveling by the ambulance
  - Greater outside air pressure, which forces the CO into the ambulance

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Security and Safety

- Signs and symptoms of carbon monoxide poisoning include:
  - Yawning
  - Dizziness
  - Dimmed vision
  - Headache
  - Irregular heart rhythm
  - Nausea, vomiting
  - Seizures, coma, death

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Security and Safety

- To prevent carbon monoxide poisoning:
  - Have frequent engine tune-ups
  - Have an adequate exhaust system that discharges beyond the side of the vehicle
  - Keep rear windows shut
  - Make sure doors shut tightly

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Security and Safety

- To prevent carbon monoxide poisoning:
  - Cover any opening to the outside
  - Don't use ventilation exhaust fans or static roof vents
  - Keep the heater or air conditioner on
  - Don't use equipment powered by gasoline or fuel inside the ambulance

Case Study Conclusion

Gary and Harold park the ambulance and put on their reflective gear. They perform a careful scene size-up, and determine that they have a single patient.

After assessing the patient and beginning treatment, they begin transport to the hospital, where they transfer patient care to the emergency department staff.

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Case Study Conclusion

Gary finishes the patient care report, while Harold takes the steps necessary to return the ambulance to service.

Lesson Summary

- Ambulances crashes kill and severely injure many EMTs, patients, and others.
- EMTs must obey all laws and regulations when operating an ambulance, and must exercise due regard.

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Lesson Summary

- EMTs have specific responsibilities during each phase of an ambulance call.
- EMTs must take special steps in preparing to interact with an air medical transport crew

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Lesson Summary

- Safety and security issues with ambulances include safeguarding against improper use of ambulances and preventing carbon monoxide exposure