

Chapter 38, Transport Operations

Table of Contents

1. Introduction to Emergency Medical Transport A
2. Ambulance Design and Equipment A
3. The Nine Phases of an Ambulance Call: Preparation and Dispatch A
4. The Nine Phases of an Ambulance Call: En Route and Arrival at the Scene A
5. The Nine Phases of an Ambulance Call: Patient Transfer and Transport A
6. The Nine Phases of an Ambulance Call: Delivery, En Route to Station, and Post-Run A
7. Safe Emergency Vehicle Operations: Driver Characteristics and Practices A
8. Safe Emergency Vehicle Operations: Siren Use, Anticipation, and Blind Spots A
9. Safe Emergency Vehicle Operations: Speed, Vehicle Size, and Road Conditions A
10. Safe Emergency Vehicle Operations: Laws, Regulations, and Hazards A
11. Safe Emergency Vehicle Operations: Distractions and Fatigue A
12. Air Medical Operations: Types of Air Ambulances and Medevac Criteria A
13. Air Medical Operations: Establishing a Landing Zone and Safety A
14. Air Medical Operations: Special Considerations and Issues A

1. Introduction to Emergency Medical Transport

- An **ambulance** is a vehicle used for treating and transporting patients who need **emergency care** to the hospital.
- Emergency medical transport aims to provide effective preparation for transport.
- It also focuses on safe emergency vehicle operations.
- Appropriate transport decisions are covered.
- Safe patient transfer techniques are a key part.
- A responsible approach to patient care during transport is emphasized.
- EMTs play a vital role in each phase of an ambulance call.

2. Ambulance Design and Equipment

Type of Design	Description
Type 1	Basic ambulance design
Type 2	Basic ambulance design
Type 3	Basic ambulance design

- Modern ambulances are designed based on **nfpa 1917**, the standard for automotive ambulances.
- Designs incorporate suggestions from the ambulance industry and EMS personnel.
- Components include a driver's compartment.
- There is a patient's compartment large enough for two EMTs and at least one supine patient.
 - Additional patients can be seated on the bench or swivel seat with safety restraints.
- Equipment and supplies are needed for emergency medical care at the scene and during transport.
 - Supplies also safeguard personnel and patients from hazardous conditions.
 - They also carry out light extrication procedures.
- A two-way radio is included for communication.
- Equipment and supplies should be durable and standardized.
- They are stored according to how urgently and often they are used.
 - Items for life-threatening conditions are placed within easy reach.
 - Items for cardiac arrest, bleeding, and blood pressure are placed at the sides of the stretcher.
- Cabinets and drawers should have transparent fronts and be labeled.
 - They should open easily and close securely.
- Medical equipment includes basic supplies, PPE, sharps containers, airway and ventilation equipment, wound supplies, splinting, childbirth supplies, AED, patient transfer equipment, medications, and communications.
- Airway and ventilation equipment includes OPAs and NPAs for different ages, CPAP equipment, and advanced airway equipment.

- Portable artificial ventilators that operate independently of oxygen are needed.
- Bag valve masks, non-rebreathers, nebulizer masks, and suction units are included.
- At least two types of oxygen supply units, portable and installed, are required.
- CPR equipment includes a CPR board and potentially a mechanical device for chest compressions.
- Patient transfer equipment includes stretchers, stair chairs, backboards, and immobilization devices.
- A jump kit is a five-minute kit with everything needed within the first five minutes, except the AED.
- Safety equipment includes warning devices, fire extinguishers, hard hats, floodlights, and flashlights.
- Navigational aids like GPS and MDTs are used.
 - Detailed street maps should also be kept as backup.
- extrication equipment is kept in an outside compartment for simple light extrication.
- At least one EMT should be in the patient compartment during transport.

3. The Nine Phases of an Ambulance Call: Preparation and Dispatch

- An ambulance call has **nine different phases**.
- The first phase is **preparation**.
- In the preparation phase, all equipment and supplies are checked and made ready.
- New equipment is placed only after proper instruction and medical director consultation.
- Equipment should be durable and standardized.
- Daily inspections are part of the preparation phase.
 - Inspections include checking fuel, oil, transmission fluid, engine cooling, batteries, and brake fluid.
 - Wheels, tires, interior, and exterior lights are checked.
 - Windshield wiper fluid, horn, siren, and air conditioner are checked.
 - Communication systems must work.

- Windows and mirrors must be clean.
- Medical and safety equipment is inspected for cleanliness, quality, and function.
- Standard traffic safety rules are reviewed.
- Safety devices like seat belts must be working properly.
- Oxygen tanks and all equipment must be secured appropriately.
- The second phase is **dispatch**.
- Dispatch must be accessible 24 hours a day.
- The dispatcher gathers information about the call.
 - This includes the nature of the call, the caller's name, location, and callback number.
 - The exact location, number of patients, severity of conditions, and other pertinent information are gathered.

4. The Nine Phases of an Ambulance Call: En Route and Arrival at the Scene

- The third phase is **en route**.
- The en route phase to the scene is often the most dangerous.
- Crashes cause many serious injuries.
- **Always fasten seat belts and shoulder harnesses** before moving the ambulance.
- Review dispatcher information and prepare to assess and care for the patient.
- Assign specific duties and scene management tasks.
- Decide which equipment to take to the patient.
- The fourth phase is **arrival at the scene**.
- If first on scene, perform a **scene size-up** and report findings to dispatch.
- Look for **safety hazards** for all personnel, bystanders, and the patient.
- Evaluate the need for additional units or assistance.
- Determine the mechanism of injury or nature of illness.
- Evaluate the need for spinal precautions.
- Follow standard precautions for mass casualty incidents.
- Estimate and communicate the number of patients to the incident commander.

- Park safely at the scene.
 - Choose a position that allows efficient traffic flow.
 - Park 100 feet before or past a crash to create a barrier.
 - Do not park alongside the scene as it may block other vehicles.
 - Park uphill and upwind of smoke or hazardous materials.
- Leave warning lights or devices on.
- Keep a safe distance from operations at the scene.
- Stay away from fires, hazards, downed wires, and unstable structures.
- Set the parking brake.
- Park as close as possible to facilitate care and transport.
- If blocking traffic is necessary, do so quickly and safely.
- Traffic control is for orderly flow, warning other drivers, and preventing another crash.
 - Place warning devices like reflectors on both sides of a crash as soon as possible.

5. The Nine Phases of an Ambulance Call: Patient Transfer and Transport

- The fifth phase is the **transfer of the patient**.
- The patient must be prepared for transport.
- This includes securing the patient to a backboard, scoop stretcher, or wheeled ambulance stretcher.
- Properly lift the patient into the patient compartment.
- Secure the patient with at least three body straps.
- Use deceleration or stopping straps over the patient's shoulders.
 - This is especially important if the patient is lying flat or on a backboard.
- The sixth phase is **en route to the receiving facility**, also called **transport**.
- Provide dispatch with information when ready to leave.
 - This includes the number of patients and the destination.
 - Beginning mileage may also be reported in some jurisdictions.
- Monitor the patient en route.
 - Recheck stable patients every 15 minutes.
 - Recheck unstable patients every 5 minutes.

- Contact the receiving facility to inform them of arrival.
- Do not abandon the patient emotionally.
- Be aware of the patient's level of need.
- Use common sense and defensive driving techniques.

6. The Nine Phases of an Ambulance Call: Delivery, En Route to Station, and Post-Run

- The seventh phase is **arrival at the receiving facility and patient delivery**.
- Inform dispatch as soon as you arrive at the hospital.
- Report your arrival to the triage nurse or other arriving personnel.
- Physically transfer the patient.
- Present a complete verbal report.
- Complete a detailed patient report.
- The eighth phase is **en route to the station**.
- Restock items used during the call if not done at the hospital.
- Inform dispatch of your status and location.
- The ninth phase is **post-run**.
- Clean and disinfect the ambulance and equipment if not done at the hospital.
- Restock supplies if not done at the hospital.
- The post-run phase includes completing and filing any additional reports.
- Inform dispatch of your status, location, and availability.
- This is the appropriate time for debriefing following the call.
- Routine ambulance inspections can be performed.
- Refuel the vehicle.
- cleaning removes dust, dirt, blood, or visible contaminants.
- Disinfecting kills pathogenic agents with chemical.
- High-level disinfection uses potent means to kill pathogens.
- Sterilization removes microbial contamination, often using heat.
- After each call, strip used linens and place them in plastic bags.
- Discard medical waste in appropriate receptacles.
- Wash contaminated areas with soap and water.
- Disinfect all non-disposable equipment used.

- Clean the stretcher and spillage with an EPA-registered solution or bleach/water mix.

7. Safe Emergency Vehicle Operations: Driver Characteristics and Practices

- Certain **driver characteristics** are needed to operate an emergency vehicle.
- **Physical fitness and alertness** are necessary.
- Drivers should not be driving if taking medications that cause drowsiness or slow reaction time.
- Driving under the influence of alcohol is prohibited.
- Driving after long or multiple consecutive shifts should be avoided.
- Notify your employer if you feel unable to safely operate the vehicle due to a previous shift.
- **Emotional maturity and stability** are necessary to operate under stress.
- Drivers cannot drive based on personal preference just because lights and sirens are on.
- The vehicle must be operated with **due regard for safety** of others and preservation of property.
- **Safe driving practices** are essential.
- All drivers and passengers **must wear seatbelts and shoulder restraints**.
- If removed for care, fasten the seatbelt again as soon as possible.
- Unrestrained patients and equipment can become airborne during a collision.
- Become familiar with how your vehicle accelerates, corners, sways, and stops.
- On a multi-lane highway, stay in the extreme left or fast lane.
 - This allows other motorists to move right when they see or hear you.

8. Safe Emergency Vehicle Operations: Siren Use, Anticipation, and Blind Spots

- The decision to use emergency lights and sirens depends on several factors.
- These include local protocols and patient conditions.
- The anticipated clinical outcome of the patient is considered.
- Consider the patient's condition before activating lights and sirens as they

may increase anxiety.

- **Driver anticipation** is crucial.
- Always assume motorists have not heard or seen you until proven otherwise.
- Look at the direction of other vehicles' front tires for early indication of their turn.
- Always drive defensively.
- Maintain a **cushion of safety** by keeping a safe following distance.
- Avoid being tailgated from behind.
- Ensure blind spots in mirrors do not prevent seeing other vehicles or pedestrians.
- To distance yourself from a tailgater, slow down or contact police.
- Never get out of the ambulance to confront a driver.
- There are **three blind spots** around the ambulance.
 - The rearview mirror creates a blind spot in front of the driver.
 - The rear of the vehicle cannot be fully seen through the mirror.
 - There are blind spots on the sides of the vehicle.
- Scan mirrors frequently for hazards.
- Use a spotter and predetermined hand signals when backing up.

9. Safe Emergency Vehicle Operations: Speed, Vehicle Size, and Road Conditions

- **Excessive speed** is unnecessary, dangerous, and does not increase patient survival chances.
- It makes providing care in the back difficult.
- Excessive speed hinders the driver's reaction time.
- It increases the time and distance needed to stop.
- siren syndrome may cause drivers to drive faster due to anxiety.
- A siren requests drivers to yield, but they do not always do this.
- **Vehicle size and distance** are critical for maneuvering, driving, and parking.
- Preventable accidents often happen when backing up.
 - Always use a ground guide outside the ambulance when backing.
- Vehicle size and weight greatly influence braking and stopping distances.
- Road positioning refers to the vehicle's position on the roadway.

- To keep the ambulance in the proper lane when cornering, enter high on the outside and exit low to the inside.
- Ambulances have a longer braking time and stopping distance.
- The uneven weight distribution makes ambulances prone to roll over.
- Be alert to changing **weather and road conditions**.
- **hydroplaning** can occur at speeds greater than 30 mph when tires lift off the road on water.
 - If hydroplaning occurs, gradually slow down without jamming the brakes.
- Wet brakes do not slow as efficiently and may cause the vehicle to pull.
 - Avoid driving through large puddles or moving water.
- Decrease visibility in fog, smoke, snow, or heavy rain requires slowing down to a safe speed.
 - Always use headlights and watch for stopped or slow-moving vehicles.
- On icy or slippery surfaces, good all-weather tires and appropriate speed reduce traction problems.
 - Consider using snow tires or chains if permitted by law.

10. Safe Emergency Vehicle Operations: Laws, Regulations, and Hazards

- Emergency vehicle drivers are exempt from some normal regulations during a call.
- However, certain **laws and regulations** must be followed.
- Motor vehicle crashes are a large source of lawsuits against EMS personnel and services.
- When on an emergency call with warning lights and sirens, certain actions may be allowed.
 - These include parking in an otherwise illegal location.
 - Proceeding through a red light or stop sign is allowed, but **never without stopping first**.
 - Driving faster than the posted speed limit may be permitted.
 - Driving against traffic on a one-way street or making an illegal turn might be allowed.
 - Traveling left of center for an otherwise illegal pass is possible.
- An emergency vehicle is **never allowed to pass a school bus** stopped with

flashing red lights.

- Warning lights and sirens are governed by three principles.
 - The call must be a true emergency.
 - Audible and visible warning devices must be used simultaneously.
 - The unit must be operated with due regard for the safety of others.
- State statutes often grant emergency vehicles the **right-of-way** to disregard rules.
- However, the operator must **not endanger other people or property** under any circumstances.
- Know your local right-of-way privileges and exercise them only when necessary for the patient's well-being.
- Police escorts should be used only on unfamiliar territory.
- Different tones should be used for warning lights or sirens.
- If being guided, follow at a safe distance.
- **Intersection crashes** are the most common and serious type involving ambulances.
- Always be alert when approaching intersections.
- If on an urgent call and unable to wait for the light, come to a complete stop.
 - Check for other motorists and pedestrians before proceeding.
- On highways, shut down lights and sirens until reaching the far left lane.
- Use the same procedure when exiting as when entering the highway.
- On paved roads, operate at a lower speed and maintain a firm grip on the steering wheel.
- It is unlawful to exceed the speed limit in **school zones**, regardless of patient condition.

11. Safe Emergency Vehicle Operations: Distractions and Fatigue

- When the ambulance is in motion, focus entirely on **driving** and anticipating roadway hazards.
- **Minimize distractions** from mobile dispatch terminals.
- Minimize distractions from mounted radios, stereos, cell phones, or eating/drinking.
- When driving alone, focus on figuring out the safest route and mentally preparing for the call.

- These situations demand complete attention and focus.
- Understand that **fatigue** is a risk.
- Recognize when you are fatigued and alert your partner or supervisor.
- You should be placed out of service until the fatigue has passed.
- You must be capable of operating the vehicle safely before returning to service.

12. Air Medical Operations: Types of Air Ambulances and Medevac Criteria

- **Air medical operations** use air ambulances to evacuate medical and trauma patients.
- There are **two different kinds** of air ambulances.
- **Fixed wing units** are used for interfacility transfers over greater distances, like 200 to 250 miles.
- **rotary wing units**, which are helicopters, are efficient for shorter distances.
- Specially trained crews accompany air ambulance flights.
- EMT duties are limited to providing ground support.
- **Medical evacuation (medevac)** is performed exclusively by helicopters.
- Capabilities, protocols, and procedures vary between EMS systems.
- Reasons for calling a **medevac** include:
 - Transport time to the hospital by ground is too long.
 - Road traffic or environmental conditions prohibit ground ambulance use.
 - The patient requires advanced care beyond the EMT's capabilities.
 - Multiple patients may overwhelm hospital resources reachable by ground.
- Patients who may receive a medevac include those with **time-dependent injuries or illnesses**.
 - Patients suspected of stroke, heart attack, or spinal injury are candidates.
 - Patients found in remote areas may receive a medevac.
 - Trauma patients and candidates for limb replantation are included.
 - Patients needing a burn center, hyperbaric chamber, or venomous bite center may receive a medevac.
- Generally, the dispatcher should be notified first when calling for a medevac.
- In some regions, EMS can communicate with the flight crew after initiating the request.

13. Air Medical Operations: Establishing a Landing Zone and Safety

- Establishing a **landing zone** is crucial for air medical operations.
- The safest and most effective way to land and take off is similar to fixed-wing aircraft.
- Landing at a slight angle allows for safer operations.
- Establishing the landing zone is the responsibility of the ground EMS crew.
- An appropriate site should be a **hard or grassy level surface**.
- The recommended size is 100 by 100 feet, but no less than 60 by 60 feet.
- Clear all loose debris from the landing zone.
- The area should be cleared of overhead or tall hazards.
- Mark the landing site using weighted cones.
- An emergency vehicle can be positioned at a corner with headlights facing inward to form an X.
- Never use caution tape or ask people to mark the spot.
- Do not use flares.
- Move non-essential persons and vehicles to a safe distance outside the landing zone.
- Communicate the direction of strong wind to the flight crew.
- For **landing zone safety**, stay away from the helicopter unless directed by the pilot or crew.
- Keep a safe distance from the aircraft when it is on the ground or "hot" (blades spinning).
- Stay outside the landing zone perimeter unless directed to enter.
- If asked to enter, stay away from the tail rotor as the tips are invisible.
- Always approach the helicopter from the front.
- Approach only after the pilot or flight crew member signals it is clear.
- Enter only in the area between 10 o'clock and 2 o'clock.
- Never duck under the body, tail, or rear section of the helicopter.
- Walk in a crouched position when approaching the aircraft.
- Be familiar with your jurisdiction's helicopter hand signals.
- Make certain all patient care equipment and the patient are properly secured.

- Some helicopters load patients from the side, while others have rear loading doors.
- Smoking and open flames are not permitted within 50 feet of the aircraft.
- Wear eye protection at all times.

14. Air Medical Operations: Special Considerations and Issues

- There are **special considerations** for helicopter operations.
- For **night landings**, do not shine spotlights or flashlights into the air as they may temporarily blind the pilot.
- Direct low-intensity headlights or lanterns towards the ground at the landing site.
- Illuminate overhead hazards or obstructions if possible.
- If landing on **uneven ground**, use extra caution.
- The main rotor blade will be closer to the ground on the uphill side.
- Approach the aircraft from the downhill side only, or as directed by the flight crew.
- For a **medevac at a hazmat incident**, immediately notify the flight crew of the presence of hazardous material.
- Consult the flight crew and incident commander about the best approach and distance for the medevac.
- The landing zone should be uphill and upwind from the hazmat scene.
- Properly decontaminate patients before loading them into the helicopter.
- Several factors influence the decision to request a **medevac**.
 - These include access and the severity of the weather.
- Most helicopter services are limited to flying below 10,000 feet above sea level.
- medevac helicopters fly between 130 to 150 miles per hour.
- Due to the confined space in the cabin, assess the number and size of patients that can be safely transported.
- medevac flights are extremely expensive compared to ambulance transport.