GEORGIA TRAUMA COMMISSION

# EMS Trauma Care Related Equipment Grant
# GTC-Approved Equipment List

**Revised 10/21/2024**

ALS Equipment

- IV Fluid Warming System
- Equipment for Prehospital Blood Products Administration
- Chest Decompression Needles
- Disposable CPAP units
- Emergency Cricothyrotomy Kit
- Impedance Threshold devices (ITD)
- Infusion Pumps
- Intraosseous Supplies
- EtCO2 Monitoring Equipment
- Pressure Infusion bags
- Transport Ventilator
- Video Laryngoscopy

Patient Movement, Extrication, Transport

- Ambulance Child Restraint devices
- Bariatric Ambulance Ramp
- Combi Extrication Tool
- Eject Helmet Removal System
- Portable, lightweight, patient lifting device (Binder Lift)
- Rescue/Evacuation Litter
- Scoop Stretcher
- Stair Chair
- *Spine Board

Other Approved Trauma Equipment Purchases

- **Automatic Chest Compression System
- *Commercially made Chest Seals
- Commercially made Eye Irrigation Devices
- Commercially made Pelvic Stabilization Devices
- Commercially made Tourniquet Devices
- External Blood Clotting Supplies
- *Extremity Immobilization Devices
- Jump Bags
- Narcotics Lock Box
- Patient Warming Devices
- Pulse oximeters and probes
- Resuscitation Items
- *RTF/MCI Triage bags
- *Traction Splint

Technology Equipment

- Image Trend Kno2 Software
- Laptop/Toughbook
- Motorola Monitor VI Pagers
- Replacement AVLS Antennae
- Tablets
- Two-way Radios
- Batteries and Battery Chargers-for cardiac monitors, stretchers, two-way radios, etc.

Training Equipment

- Adult & Pediatric Airway Trainers
- Advanced Life Support Skill Mannequin Trainer
- Driving Simulator

* Indicates an item added to the original approved list
**Unless contraindicated

# Georgia Office of Emergency Medical Services and Trauma

Vehicle Inspection Form: ***Ground Ambulance***

| Service Name: | Tag#: | Type: |
|---|---|---|
| VIN # | Call Sign: | VID#: |

Inspection Type: ☐ Initial ☐ Anniversary ☐ Renewal ☐ Unscheduled

| | | |
|---|---|---|
| VID # displayed on ***Left*** and ***Right*** side of vehicle:(No less than 3") | ☐ Yes | ☐ No |
| Service name displayed on ***Left*** and ***Right*** side of vehicle:(No less than 3") | ☐ Yes | ☐ No |
| **Interior - Cab** | | |
| Odometer Reading: / Make: / Model: | | |
| Windshield free of cracks, starbursts, or spider webbing greater than 3" (GA Code § 40-8-73 (2010)) | ☐ Yes | ☐ No |
| Proof of insurance (GA Code § 40-6-10 (2020)): | ☐ Yes | ☐ No |
| Air Conditioner Operational (Front): | ☐ Yes | ☐ No |
| Heating Operational (Front): | ☐ Yes | ☐ No |
| Doors Operational from the inside and outside: | ☐ Yes | ☐ No |
| Door Locks Operational (Front): | ☐ Yes | ☐ No |
| Seatbelts Operational (Driver): | ☐ Yes | ☐ No |
| Seatbelts Operational (Passenger): | ☐ Yes | ☐ No |
| Two-Way Communication System: | ☐ Yes | ☐ No |
| Vehicle Horn Operational | ☐ Yes | ☐ No |
| Wipers Operational | ☐ Yes | ☐ No |
| Mirrors Visible and without defect (Driver and Passenger side) | ☐ Yes | ☐ No |
| **Exterior Lighting** | | |
| Headlights Operational (Left and Right) High and Low beam | ☐ Yes | ☐ No |
| Turn Signal Operational (Front - Left and Right) | ☐ Yes | ☐ No |
| Turn Signal Operational (Rear - Left and Right) | ☐ Yes | ☐ No |
| Hazard Lights Operational (Front and Rear) | ☐ Yes | ☐ No |
| Tail Lights Operational (Left and Right) | ☐ Yes | ☐ No |
| Reverse Light Operational (Left and Right) | ☐ Yes | ☐ No |
| Brake Lights Operational (Left, Right, Center if applicable) | ☐ Yes | ☐ No |
| Reverse/Back up Alarm Operational | ☐ Yes | ☐ No |
| **Safety - Tires/Brakes** | | |
| Tire Tread depth greater than 2/32" per DOT recommendation(Left - Front) | ☐ Yes | ☐ No |
| Tire Tread depth greater than 2/32" per DOT recommendation(Right - Front) | ☐ Yes | ☐ No |
| Tire Tread depth greater than 2/32" per DOT recommendation(Left - Rear Outside) | ☐ Yes | ☐ No |
| Tire Tread depth greater than 2/32" per DOT recommendation(Left - Rear Inside) | ☐ Yes | ☐ No |
| Tire Tread depth greater than 2/32" per DOT recommendation(Right - Rear Outside) | ☐ Yes | ☐ No |
| Tire Tread depth greater than 2/32" per DOT recommendation(Right - Rear Inside) | ☐ Yes | ☐ No |
| Brakes Operational | ☐ Yes | ☐ No |
| Rear Bumper and Step intact and operational | ☐ Yes | ☐ No |
| **Emergency Lights/Siren** | | |
| All Warning Lights Operational (All Sides) | ☐ Yes | ☐ No |
| If blue warning lights are used, a valid DPS Permit must be present | | |
| Scene/Flood Lights Operational (All Sides) | ☐ Yes | ☐ No |
| Siren Operational | ☐ Yes | ☐ No |

| Interior - Patient Compartment | | |
|---|---|---|
| Air Conditioner Operational (Rear): | □ Yes | □ No |
| Heating Operational (Rear): | □ Yes | □ No |
| All Doors Operational from the inside and outside: | □ Yes | □ No |
| All Door Locks Operational (Rear): | □ Yes | □ No |
| Seatbelts Operational (All patient compartment seats): | □ Yes | □ No |
| All Patient Compartment Lights Operational (Hi/Lo) | □ Yes | □ No |
| Exhaust Fan Operational | □ Yes | □ No |
| Cleanliness of Interior (Area should be free of blood, dirt, and debris, etc) | □ Yes | □ No |
| All equipment and supplies must be maintained in working order and shall be stored in an orderly manner so as to protect the patient and be readily accessible when needed. | □ Yes | □ No |

| Respiratory Equipment | | | |
|---|---|---|---|
| Quantity | Item/Description | Compliant | |
| 1 | Fixed Suction unit or a Mounted Electric Suction unit that works on vehicle power and battery power. The aspirator system shall achieve a minimum of 5.8 psi (300mmHg) vacuum within 4 seconds after the suction tube is closed. Mounted devices must meet the requirements of SAE J3043 (Ambulance Equipment Mount Device or Systems). | □ Yes | □ No |
| 1 | Portable Suction - Mechanical or Battery Powered, If battery powered the aspirator system shall achieve a minimum of 5.8 psi (300mmHg) vacuum within 4 seconds after the suction tube is closed | □ Yes | □ No |
| 4 | Sterile Suction Catheters - assorted sizes | □ Yes | □ No |
| 2 | Rigid Suction Catheters in original sealed packaging | □ Yes | □ No |
| 2 | Suction tubing in original sealed packaging | □ Yes | □ No |
| 2 | Bag Valve Mask Resuscitator - Adult, disposable, with transparent adult mask and tubing. The valve must operate in cold weather, and the unit must be capable of use with an oxygen supply. The unit must be capable of delivering approximately 100% oxygen. | □ Yes | □ No |
| 2 | Pediatric Bag Valve Mask Resuscitator -BVM with ***Infant AND Pediatric Mask*** , disposable with tubing. *(Can be 2 of each, Infant BVM and Pediatric BVM or Can be 2 Pediatric BVM with 2 infant mask and 2 pediatric masks)* The valve must operate in cold weather, and the unit must be capable of use with an oxygen supply. The unit must be capable of delivering approximately 100% oxygen. | □ Yes | □ No |
| 4 | Adult Oxygen Mask with Reservoir | □ Yes | □ No |
| 4 | Pediatric Oxygen Mask with Reservoir | □ Yes | □ No |
| 3 | Nebulizer Kit each having the ability to provide aerosolized treatment for adult and pediatric patient. | □ Yes | □ No |
| 4 | Nasal Cannula | □ Yes | □ No |
| 1 each | Nasopharyngeal Airways - assorted sizes, must include 20F, 24F, 28F, 30F, 32F, 34F, with water soluble lubricant | □ Yes | □ No |
| 1 each | Oropharyngeal Airways - assorted sizes, must include 40mm (00), 50mm (0), 60mm (1), 80mm (3), 90mm(4), 100mm (5), 110mm (6) | □ Yes | □ No |
| 1 each | Blind Insertion Airway Devices (device not intended to be placed into trachea) in assorted adult sizes per manufacturer (i.e. Combi tube sizes 37mm, 41mm OR King Airway sizes 3, 4, 5, OR i-gel sizes 3, 4, 5 or LMA sizes 3, 4, 5 or equivalent per Service Medical Director) to include water soluble lubricant | □ Yes | □ No |

| Respiratory Equipment (continued) | | | |
|---|---|---|---|
| Quantity | Item/Description | Compliant | |
| 1 | Oxygen: Fixed system with at least two wall-mounted oxygen outlets and one flowmeter. The system shall also include a yoke, pressure reducer gauge and an approved cylinder-retaining device that meets DOT standards. The system shall have a capacity of at least 2,000 liters of oxygen and be capable of delivering an oxygen flow of at least 15 liters per minute OR If oxygen system is not a fixed system; the vehicle must have capacity of at least 2,000 liters of oxygen, 2 regulators with pressure gauge and flowmeter capable of delivering an oxygen flow of at least 15 liters per minute with access to the oxygen operational control in the patient care compartment. Each cylinder must have no less than 600 psi. All Cylinders must be secured using a comercially manufactured device. Ambulances manufactured after 2014 must meet Ambulance Manufacturers Division (AMD) 028 and/or SAE J3043. | □ Yes | □ No |
| 1 | Oxygen: portable unit consisting of at least a "D" cylinder or equivalent, yoke, regulator with pressure gauge and flowmeter, and cylinder wrench or hand wheel. The cylinder must have no less than 600 psi. The unit shall be capable of delivering an oxygen flow of at least 15 liters per minute. Cylinder holders with a quick release fitting shall be furnished to allow the use of the portable unit outside the vehicle. All Cylinders must be secured using a comercially manufactured device. Ambulances manufactured after 2014 must meet Ambulance Manufacturers Division (AMD) 028 and/or SAE J3043. | □ Yes | □ No |
| 1 | Oxygen: full spare cylinder for use with the above portable oxygen unit of at least a "D" cylinder for use with the above portable oxygen unit. All Cylinders, including those in bags or carrying cases must be secured using a comercially manufactured device. Ambulances manufactured after 2014 must meet Ambulance Manufacturers Division (AMD) 028 and/or SAE J3043. | □ Yes | □ No |
| **Bandaging/Dressings** | | | |
| Quantity | Item/Description | Compliant | |
| 2 | Triangular Bandages | □ Yes | □ No |
| 2 | Universal Dressings approximately 10 inches by 30 inches | □ Yes | □ No |
| 2 | Clean wrapped sheets or sterile burn sheets | □ Yes | □ No |
| 12 | Non-sterile gauze pads, 4 inches by 4 inches | □ Yes | □ No |
| 6 | Bandages, soft roller, self adhering type, assorted sizes (2 inch - 6 inch) (Minimum 4 yards/each) | □ Yes | □ No |
| 4 | Bandages, elastic, of assorted sizes (2 inch-6 inch) | □ Yes | □ No |
| 2 | Occlusive dressing, sterile, individually wrapped, minimum of 4 inches by 3 inches | □ Yes | □ No |
| 4 | Adhesive Tape – Rolls, Assorted Sizes minimum 1 inch wide | □ Yes | □ No |
| 2 | Commercially made Arterial Tourniquet | □ Yes | □ No |
| 1 | Heavy Duty Bandage Shears | □ Yes | □ No |
| **Diagnostic Equipment** | | | |
| Quantity | Item/Description | Compliant | |
| 1 each | Manual Aneroid Sphygmomanometer, with pediatric, adult, ***AND*** large adult size cuffs | □ Yes | □ No |
| 1 | Stethoscope | □ Yes | □ No |
| 1 | Glucose monitoring instrument, with minimum 5 each of strips, lancets, alcohol preps | □ Yes | □ No |
| 1 | Pulse oximetry device with adult and pediatric size clips | □ Yes | □ No |
| 1 | Non-Mercury Thermometer; if patient contact type must have disposable covers or be disposable. | □ Yes | □ No |
| 1 | Penlight | □ Yes | □ No |
| **Immobilization/Extraction Devices** | | | |

| Quantity | Item/Description | Compliant | |
|---|---|---|---|
| 4 | Extremity Immobilization Devices: 2 full arms and 2 full legs. Must be capable of immobilizing the joint above and the joint below the fracture. | □ Yes | □ No |
| 1 | Short Spinal Extrication Device (KED or equivalent) | □ Yes | □ No |
| 1 | Pediatric Immobilization device (must be manufactured for pediatric use only) with at least 3 straps | □ Yes | □ No |
| 2 | Spine Boards, Long (at least 16 inches wide by 72 inches long), each with at least 3 straps or equivalent - one Spine Board may be replaced with a scoop stretcher | □ Yes | □ No |
| 2 | Lateral Cervical Immobilization Devices (may be commercial devices, foam blocks, or sheet rolls) | □ Yes | □ No |
| 6 | Cervical Immobilization collars, hard type, 4 adult assorted sizes/adjustable and 2 pediatric assorted sizes/adjustable | □ Yes | □ No |
| 2 | Traction Splints, universal lower extremity adjustable OR one adult and one pediatric lower extremity adjustable | □ Yes | □ No |
| 1 | Equipment for the safe transport of pediatric patients, as approved by the local Medical Director with guidelines provided by the Department | □ Yes | □ No |
| 1 | Spring Loaded Center Punch | □ Yes | □ No |
| 1 pair | Gloves, work gloves or leather gloves | □ Yes | □ No |
| 1 each | Flathead and Phillips screwdriver, minimum 6 inches | □ Yes | □ No |

## Patient Safety/Comfort/Care

| Quantity | Item/Description | Compliant | |
|---|---|---|---|
| 1 | Multi-Level Stretcher with at least one complete set of shoulder/chest straps, and two sets of lower extremity straps. (Buckels must be metal "seatbelt type" and straps must not be cut, frayed, or have holes) Must be capable of securing adult and pediatric patients. Safety/Catch hook must be in place and functional. Mattress must be impervious and free of rips and tears. | □ Yes | □ No |
| 4 | Mattress covers; disposable or fabric sheets | □ Yes | □ No |
| 1 | Pillow, disposable, or pillow with single use covers. Rolled sheets are acceptable substitutes | □ Yes | □ No |
| 2 | Blankets | □ Yes | □ No |
| 1 | Waterproof Patient Covers (Water impervious blankets will count as both blankets and waterproof patient covers) | □ Yes | □ No |
| 2 | Emesis basins or emesis bags | □ Yes | □ No |
| 4 | Restraints, 2 ankle and 2 wrist, leather or nylon or disposable | □ Yes | □ No |
| 1 | Urinal | □ Yes | □ No |
| 1 | Bedpan | □ Yes | □ No |
| 6 | Surgical face masks | □ Yes | □ No |
| 1 | Nonporous Infant Insulating Device, foil swaddler, foil bunting, silver swaddler or equivalent | □ Yes | □ No |
| 1 | Obstetrical Kit: Receiving blanket, sterile bulb aspirator, sterile scissors or scalpel blade, 4 inch gauze pads, 2 cord clamps, plastic bag for placenta, APGAR scoring card. All items are to be in a container with identifying label showing contents. | □ Yes | □ No |

## Provider Safety

| Quantity | Item/Description | Compliant | |
|---|---|---|---|
| 1 | Flashlight | □ Yes | □ No |
| 1 | Sharps container, minimum 1 quart size or equivalent | □ Yes | □ No |
| 1 | Fire Extinguisher, 10 pound ABC type or functional equivalent, charged, with current NFPA inspection tag, secured with appropriate restraint device | □ Yes | □ No |
| 6 | N95 Particulate mask, minimum of 2 sizes | □ Yes | □ No |

## Provider Safety (continued)

| Quantity | Item/Description | Compliant |
|---|---|---|

| | | | |
|---|---|---|---|
| 4 | Personal Protection Equipment sets to include: face shield/goggles, surgical masks, gowns/coveralls | □ Yes | □ No |
| 60 | Nitrile (non-latex) Exam gloves, 30 each of at least 2 sizes | □ Yes | □ No |
| 1 | U.S. Department of Transportation Emergency Response Guidebook, current edition (Hard copy or electronically stored on ambulance computer) | □ Yes | □ No |
| 1 | FEMA Job Aid or other Resource Handbook providing information on chemical, biological, nuclear agents (Hard copy or electronically stored on ambulance computer) | □ Yes | □ No |
| Min 2 | ANSI compliant Reflective safety wear for each crewmember | □ Yes | □ No |
| **Miscellaneous Equipment** | | | |
| Quantity | Item/Description | Compliant | |
| 1 | Automatic or Semi-automatic External Defibrillator with Adult and Pediatric pads or Pediatric Dose Attenuator. (cardiac monitor/defibrillator for Cardiac Technician or Paramedic staffing) | □ Yes | □ No |
| 1 | Sealed and/or locked IV Solution/Medication Kit. The contents and expiration date of each pharmaceutical within the kit must be immediately available physically or electronically. The EARLIEST expiration date must be affixed to the outside of the kit or immediately electronically available. This kit must be maintained in a temperature controlled environment and not be left unsecured. | □ Yes | □ No |
| 1 | A length-based resuscitation tape or reference material that provide appropriate guidance for pediatric drug dosing and equipment sizing based on length or age | □ Yes | □ No |
| 1 | Agency Protocol Manual (Hard copy or electronically stored on ambulance computer) | □ Yes | □ No |
| 2 | Irrigation Liquids 1000ml or equivalent packaging | □ Yes | □ No |
| Min 10 | Triage Tags- SMART compliant | □ Yes | □ No |
| 1 | Disinfectant solution | □ Yes | □ No |
| **Advanced Life Support Equipment - Cardiac Technician or Paramedic** | | | |
| Quantity | Item/Description | | Compliant |
| **The ambulance must have all of the above required equipment. When staffed by at least one Cardiac Technician or Paramedic the additional equipment listed below is required if specified by Medical Director Approved Protocols.** | | | |
| 1 | ALS Airway Kit with assorted Endotracheal tubes (minimum of 3.0, 4.0, 5.0, 6.0, 7.0, 8.0), laryngoscope handle with appropriately sized blades (for infants, children, adults - disposable blades must remain in manufacturer's packaging until use), 10cc syringes, water soluble lubricant, Magill Forceps, End Tidal Carbon Dioxide monitoring device (quantitative and/or qualitative) | □ Yes | □ No |
| 1 | Cardiac Monitor/Defibrillator (with print out), configuration and supplies, that is capable of delivering defibrillation, cardioversion, pacing, and EKG monitoring for adult and pediatric patients. Must be secured in a manner to prevent injury while vehicle is in motion. Cardiac monitors must be capable of 12 lead ECG acquisition by 2025. | □ Yes | □ No |
| 1 | Sealed and/or locked Drug Kit. The contents and expiration date of each pharmaceutical within the kit must be immediately available physically or electronically. The EARLIEST expiration date must be affixed to the outside of the kit or immediately available electronically. This kit may be combined with the Medication Kit listed above. Must be maintained in temperature-controlled environment and must not be left unsecured. | □ Yes | □ No |

Comments:

Prehospital Emergency Care

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# Recommended Essential Equipment for Basic Life Support and Advanced Life Support Ground Ambulances 2020: A Joint Position Statement

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# Recommended Essential Equipment for Basic Life Support and Advanced Life Support Ground Ambulances 2020: A Joint Position Statement

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Abstract

In continued support of establishing and maintaining a foundation for standards of care, our organizations remain committed to periodic review and revision of this position statement. This latest revision was created based on a structured review of the *National Model EMS Clinical Guidelines Version 2.2* in order to identify the equipment items necessary to deliver the care defined by those guidelines. In addition, in order to ensure congruity with national definitions of provider scope of practice, the list is differentiated into BLS and ALS levels of service utilizing the National Scope of Practice-defined levels of Emergency Medical Responder (EMR) and Emergency Medical Technician (EMT) as BLS, and Advanced EMT (AEMT) and Paramedic as ALS. Equipment items listed within each category were cross-checked against recommended scopes of practice for each level in order to ensure they were appropriately dichotomized to BLS or ALS levels of care. Some items may be considered optional at the local level as determined by agency-defined scope of practice and applicable clinical guidelines. In addition to the items included in this position statement our organizations agree that all EMS service programs should carry equipment and supplies in quantities as determined by the medical director and appropriate to the agency's level of care and available certified EMS personnel and as established in the agency's approved protocols. **Key words:** EMS; equipment; ambulance; ALS; BLS

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## Introduction

The National Association of EMS Physicians along with these coauthoring associations: American Academy of Pediatrics, American College of Surgeons Committee on Trauma, EMS for Children Innovation and Improvement Center, Emergency Nurses Association, and National Association of State EMS Officials, and as also endorsed by the National Association of Emergency Medical Technicians, believe that the delivery of high-quality and effective EMS care is dependent on several factors, including but not limited to the presence of:

- providers who have been credentialed to ensure they demonstrate appropriate cognitive knowledge, affective ability, psychomotor skills, and critical thinking (1)
- clinical protocols or guidelines that are supported by the best available scientific evidence
- equipment and supplies necessary to deliver appropriate care as directed by clinical protocols/guidelines for patients of all ages

Several documents, including previous versions of this joint position paper, the *National Model EMS Clinical Guidelines Version 2.2*, the *2018 National EMS Scope of Practice Model*, the *Clinical Credentialing of EMS Providers*, *Physician Oversight of Pediatric Care in Emergency Medical Services*, *Pediatric Readiness in Emergency Medical Services Systems*, and core performance measures from the U.S. Dept of Health and Human Services Health Resources and Services Administration EMS for Children (EMSC) Program have been developed to lay the foundation of several of the concepts noted above (1–9).

Ensuring that EMS providers are properly equipped to perform their clinical duties is an important function of oversight in EMS systems. In the past this regulatory oversight has been based on the publication of minimum recommended equipment standards, including prior versions of this document (2–4). These efforts have attempted to provide a listing of the minimum items recommended for Basic Life Support (BLS) and Advanced Life Support (ALS) ground ambulances.

The field of EMS medicine continues to evolve and the *EMS Scope of Practice Model* continues to undergo important longitudinal revisions, reflecting ongoing

improvements in clinical technology and practice (5). In effect, these advancements have caused many interventions, once limited to the scope of advanced providers, to begin transitioning into the scope of basic providers. Additionally, interventions that were once considered outside the scope of EMS medicine continue to find appropriate places in the EMS setting of care. These contemporary updates make the delivery of EMS-based interventions safer and easier for EMS providers to perform.

In 2019 our organizations undertook a review and revision of the 2014 version of this joint position statement. Part of this revision process also included review of equipment lists established by individual state/territory rules and statutes for all 56 U.S. states and territories. Our review identified that portions of either the 2014 document and/or state/territory-level equipment lists required items that:

- are no longer clinically recommended because they have been demonstrated to be either harmful, lacking efficacy, or have been replaced by clinically superior options. [ex: Military Anti Shock Trousers (MAST), syrup of ipecac];
- are no longer correctly dichotomized to BLS vs ALS levels of care [ex: CPAP, nebulized medications];
- fail to include equipment that evidence-based guidelines suggest should be available on ground ambulances [ex: Commercial arterial tourniquets are currently lacking on 29 state/territory lists]; and that
- require arbitrary quantities of items.

Establishing recommended equipment standards has value in helping build consistency across the EMS system of care. Documents such as this can be used to help guide both agency leadership and frontline staff in evaluating whether their agency is properly equipped to provide care that meets recommended community requirements. However, the process of creating and revising rules, statutes, and other legislative mechanisms at the state level of government is often onerous, time consuming, and can sometimes have unpredictable results and generate unintended consequences.

Our review of existing state and territory EMS equipment regulations showed that 39 states and territories had statutory EMS equipment lists that were more than five years old. Equipment lists should serve to facilitate advances in the delivery of quality and cost-effective EMS care, not to create a barrier to EMS system improvement and development. In light of this, we offer the following recommendation to governmental entities with jurisdiction involving the practice of EMS medicine–

*Ensure that legislative and/or administrative mechanisms that establish equipment standards for ground ambulances:*

- *avoid requiring arbitrary minimum amounts of equipment list items;*
- *reflect expert and evidence-based recommendations such as those provided in this document;*
- *undergo review and updates at intervals not to exceed five years;*
- *do not create unnecessary barriers to implementation of new technology at the local level;*
- *allow for flexibility and adaptability in order to make rapid unplanned changes in response to unpredicted equipment or medication shortages affecting local EMS agencies; and*
- *reinforce that all EMS agencies should carry the age-appropriate equipment, supplies, and medications necessary for their clinical providers to effectively carry out patient care as defined by the clinical protocols and guidelines that are applicable to each agency.*

It cannot be overemphasized that the mere presence of certain pieces of equipment on an ambulance does not equate to individual EMS provider competence in the use of that equipment or to an EMS program's practice of high-quality and effective EMS medicine. In addition to establishing minimum equipment standards we also recommend that states consider establishing standards requiring local EMS agencies to demonstrate that their EMS providers are competent in their use of the equipment and supplies necessary to administer care within their scope of practice as defined or allowed by locally applicable clinical protocols or guidelines. Such assessment of provider competency in use of equipment has been established as a key component of EMS readiness in the joint position paper, *Pediatric Readiness in Emergency Medical Services Systems,* and also as a core performance measure by the U.S. Dept of Health and Human Services Health Resources and Services Administration through its EMS for Children (EMSC) Program (8, 9).

Furthermore, though the implementation of equipment lists at the state level is an important level of system oversight, it remains critically important that EMS agency medical directors evaluate that the equipment available on their agency's ambulances is appropriate for the delivery of care and transport of both pediatric and adult patients in their service area. Each agency's physician medical director should have direct involvement in the selection, approval, and deployment of the devices each agency chooses to fulfill both the clinical and regulatory equipment requirements that are germane to their agency.

In continued support of establishing and maintaining a foundation for standards of care, our organizations remain committed to periodic review and revision of this position statement. This latest revision was created based on a structured review

of the *National Model EMS Clinical Guidelines Version 2.2* in order to identify the equipment items necessary to deliver the care defined by those guidelines (6). In addition, in order to ensure congruity with national definitions of provider scope of practice, the list is differentiated into BLS and ALS levels of service utilizing the *National Scope of Practice*-defined levels of Emergency Medical Responder (EMR) and Emergency Medical Technician (EMT) as BLS, and Advanced EMT (AEMT) and Paramedic as ALS (5). Equipment items listed within each category were cross-checked against recommended scopes of practice for each level in order to ensure they were appropriately dichotomized to BLS or ALS levels of care. Some items may be considered optional at the local level as determined by agency-defined scope of practice and applicable clinical guidelines.

In addition to the items included in this position statement our organizations agree that, as modeled in the Iowa Administrative Code, "all EMS service programs shall carry equipment and supplies in quantities as determined by the medical director and appropriate to the agency's level of care and available certified EMS personnel and as established in the agency's approved protocols." (10)

Finally, in addition to taking steps to determine that appropriate equipment is routinely available and that EMS providers are competent in using this equipment, our organizations also recommend that all EMS agencies include in their routine quality assurance practices efforts to evaluate that:

- their EMS providers are outfitted with all of the equipment necessary for them to perform clinical care;
- all equipment and supplies undergo appropriate preventative maintenance and routine function checks; and that
- malfunctioning or missing equipment issues are rapidly mitigated in order to preserve readiness to respond and provide patient care continuously.

# List of Recommended Essential Equipment for Basic Life Support and Advanced Life Support Ground Ambulances, 2020

## General Principles

This document is intended to represent minimum essential equipment recommendations and should not be used to limit the addition of items to a service's repertoire. Carriage of items that supplement those listed herein should be based on local clinical and operational needs, including the needs of specialty transport teams, and should be left to the discretion of the physician medical director and other agency administrative and operational officers.

a. Equipment should always be appropriate for the size/age of patients. Availability and use of appropriate pediatric-sized equipment is necessary, not discretionary.
   - Adult-sized items should not be substituted or adapted for use on pediatric patients except where available pediatric-focused equipment has malfunctioned and where failure to provide further intervention by adapting an adult device for pediatric use would result in serious harm to the pediatric patient.

b. Several items that were included in previous versions of this list, including items previously listed as "optional," are not included in this revision. Their absence from this list demonstrates lack of sufficient evidence to support inclusion of these items universally for all BLS and/or ALS ground ambulances but should not be interpreted to mean that such items should not be carried on *any* BLS and/or ALS ground ambulance. Local clinical protocols and scope of practice may dictate that such items are prudent and proper to carry.

c. Evidence supporting inclusion of specific items in this recommended equipment list is cited where available.

d. Certain items are included in this list based on sound judgment and logic (i.e. "portable reusable light source") rather than based on the presence of supporting evidence.

e. Several items were identified on review of existing state/territory equipment lists or in previous versions of this document that should no longer be carried on ground ambulances due to evidence of harm or proven lack of efficacy. These items have been identified in a section that is new in this revision of this joint position paper.

f. Equipment specifications exist for several items contained in this document. The sources for those specifications are cited.

g. Latex-free items should be utilized whenever possible/practical.

h. Specific medication recommendations have been removed from this recommended equipment list due to the following:
   - The diversity of clinical protocols across the U.S., even across the same echelons of care, precludes development of an appropriately brief but comprehensive recommended medication list;
   - The frequency and unpredictable nature of medication shortages requiring frequent and rapid revision to local medication supplies preclude the development of a recommended medication list that would remain germane on a daily basis; and
   - The variability in the availability and use of therapeutic alternatives across EMS agencies precludes development of an appropriately brief but comprehensive recommended medication list.

| CATEGORY | BASIC LIFE SUPPORT (BLS) All ages | | ADVANCED LIFE SUPPORT (ALS) (*All BLS equipment PLUS the following*) All ages | |
|---|---|---|---|---|
| | **Adult-specific** | **Pediatric-specific** | **Adult-specific** | **Pediatric-specific** |
| **Airway, Ventilation, and Oxygenation** | • Oxygen supply, portable and on-board<br>• Devices capable of delivering oxygen in a titratable manner through nasal, partial face, or full-face mask routes in sizes to fit neonates through adults<br>• Oropharyngeal airways in sizes to fit neonates to adults<br>• Nasopharyngeal airways in sizes to fit neonates to adults<br>• Manual and/or powered suction device(s) with rigid oral and flexible pharyngeal/tracheal suction catheters in sizes to fit neonates to adults<br>• A device capable of providing non-invasive positive pressure ventilation (NIPPV)<br>• Self-inflating manual ventilation devices and masks to fit neonates to adults [11] [12] | ***PEDIATRIC SPECIFIC***<br>• Bulb suction | • Direct and/or Video laryngoscopy equipment appropriate for neonates to adults[a]<br>• Magill forceps<br>• Supraglottic airways in sizes to fit neonates to adults[b] | |
| **Bleeding, Hemorrhage Control, Shock Management, and Wound Care** | • Commercial arterial tourniquets<br>• Wound packing material[c]<br>• Gauze sponges<br>• Adhesive bandages<br>• Adhesive tape<br>• Occlusive dressing (aka "chest seal")<br>• Fluid for irrigation of wounds | | ***ADULT SPECIFIC***<br>• Chest Decompression needles 14g or larger diameter, **minimum length 3.25 inches (8.25cm)** or commercial chest decompression device [13] [14] [15] [16] [17] [18] [19] | ***PEDIATRIC SPECIFIC***<br>• Chest Decompression needles:<br>  • 14g diameter, **maximum length 1.5 inches (3.8 cm)** for patients less than 56 inches (144 cm) long [20]<br>  • 23g diameter, maximum length 0.75 inches (2cm) for newborns |
| **Cardiovascular & Circulation Care** | • Automatic External Defibrillator (AED) with adult and pediatric or combination pads | | • A device capable of performing automatic and/or manual defibrillation, cardiac rhythm monitoring (in at least three leads), 12 lead ECG acquisition, and transcutaneous pacing | |
| **Diagnostic Tools** | • Glucometer<br>• Pulse Oximeter with sensors to fit neonates to adults<br>• Stethoscope<br>• Blood Pressure Cuffs in sizes to fit neonates to adults<br>• Thermometer | | • Continuous waveform capnography | |

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| CATEGORY | BASIC LIFE SUPPORT (BLS) All ages | | ADVANCED LIFE SUPPORT (ALS) (*All BLS equipment PLUS the following*) All ages | |
|---|---|---|---|---|
| | **Adult-specific** | **Pediatric-specific** | **Adult-specific** | **Pediatric-specific** |
| **Infection Control** | • Items necessary for Universal & Standard Precautions [21]<br>  • Waterless hand cleanser<br>  • Sharps container<br>  • Supplies for collection or absorption of patient vomit, urine, and/or feces<br>  • Biohazardous materials collection bags<br>  • Products appropriate for cleaning and disinfecting surfaces and equipment<br>• Items necessary for the following Transmission-based Precautions [22] [23] [24]:<br>  • Contact precautions: examination gloves, eye protection, gowns<br>  • Droplet precautions: surgical masks and eye protection<br>  • Airborne precautions: N95 facemasks in provider-appropriate sizes AND eye protection OR Powered Air-Purifying Respirator (PAPR)<br>• General trash collection bags | | No additional ALS recommendations | |
| **Medications** | • Medications that are germane to approved agency BLS protocols | | • Medications that are germane to approved agency ALS (and/or higher level) protocols | |
| **Medication Delivery and Vascular Access** | • Devices and supplies needed to administer medications via routes (Oral, Inhaled, Intramuscular, Intranasal) included in locally approved scope of practice and locally applicable protocol(s) and in sizes to fit neonates to adults<br>• Supplies for application of antiseptic to skin | ***PEDIATRIC SPECIFIC***<br>• Tools that provide pre-calculated weight-based dosing and preclude the need for calculation by EMS providers can reduce dosing errors. [25] | • Devices and supplies needed to administer medications via routes (Oral, Inhaled, Intramuscular, Intranasal, Intravenous, Intraosseous) included in locally approved scope of practice and locally applicable protocol(s) in sizes to fit neonates to adults<br>• Isotonic crystalloid fluids and administration tubing capable of adjustable fluid delivery rate<br>• A device to provide pressure infusion of IV fluids | ***PEDIATRIC SPECIFIC***<br>• A device suitable for administering a fluid bolus to pediatric patients that limits risk for inadvertent over-administration of fluid |

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| CATEGORY | BASIC LIFE SUPPORT (BLS) All ages | | ADVANCED LIFE SUPPORT (ALS) (*All BLS equipment PLUS the following*) All ages | |
|---|---|---|---|---|
| | **Adult-specific** | **Pediatric-specific** | **Adult-specific** | **Pediatric-specific** |
| **Neonatal Care** | | ***PEDIATRIC SPECIFIC***<br>Newborn delivery supplies:<br>• 2 umbilical cord clamps<br>• Tool for cutting umbilical cord<br>• Bulb suction<br>• Infant head cover<br>• Towels<br>• Blanket<br>• Gauze dressings<br>• Material or device intended to maintain body temperature | No additional ALS recommendations | |
| **Orthopedic Injury Care** | • Splinting material or commercial devices for immobilization of orthopedic extremity injuries including but not limited to:<br>  • Femoral splinting materials which may include either simple non-traction devices or devices that provide femoral traction.[d] [26], [27]<br>  • Pelvic splinting materials which may include either a commercial pelvic circumferential compression device (PCCD) designed specifically to splint the pelvis, or a dedicated bedsheet and towel clips to perform circumferential pelvic antishock sheeting [28] [29] [30] [31] [32]<br>• Cold packs<br>• Elastic bandages | | No additional ALS recommendations | |
| **Patient Packaging, Evacuation, and Transport** | • Extrication board/device[e] [33]<br>• Materials or devices that can be utilized to provide spinal motion restriction of the cervical, thoracic, and lumbar spine for neonates to adults<br>• Portable stretcher or litter<br>• Collapsible “stair chair”<br>• Wheeled multi-level gurney | ***PEDIATRIC SPECIFIC***<br>• Pediatric-specific restraint system or age/size-appropriate car safety seat[6] [34] [35] | No additional ALS recommendations | |

(*Continued*)

| CATEGORY | BASIC LIFE SUPPORT (BLS) All ages | | ADVANCED LIFE SUPPORT (ALS) (*All BLS equipment PLUS the following*) All ages | |
|---|---|---|---|---|
| | **Adult-specific** | **Pediatric-specific** | **Adult-specific** | **Pediatric-specific** |
| **Safety** | • Fire Extinguisher (5lb ABC) [36]<br>• ANSI Class 2 or 3 reflective vest or outerwear [37]<br>• Impact-resistant eye protection (ANSI Z87.1) [38]<br>• Nonflammable reflective and/or illuminated roadside warning devices<br>• Portable reusable light source | | No additional ALS recommendations | |
| **Temperature Management and Heat-loss Prevention** | • Blankets<br>• Towels<br>• Heat packs | | No additional ALS recommendations | |
| **Miscellaneous items** | • Bandage/trauma shears<br>• A device that allows for two-way communication between the field and EMS communications/dispatch centers, direct medical control, and receiving hospitals<br>• Triage Marking System (colored tape, tags, or other system) that is interoperable with other local healthcare system entities and that follows recommendations from the U.S. Dept of Health and Human Services Assistant Secretary for Preparedness and Response (ASPR) [39] | | No additional ALS recommendations | |
| **Items that should no longer be carried on BLS or ALS ground ambulances due to evidence of harm or proven lack of clinical efficacy** | | | | |
| • Military Antishock Trousers (MAST), aka Pneumatic Antishock Garment (PASG) [40]<br>• Syrup of Ipecac [41] | | | | |

[a]Laryngoscopy equipment is included to facilitate ALS provider identification and mechanical removal of upper airway foreign bodies using Magill forceps, regardless of whether the ALS agency includes pediatric or adult endotracheal intubation within their ALS provider scope of practice.

[b]Depending on locally approved scope of practice and locally applicable protocol(s) other invasive airways (endotracheal tubes, needle or surgical cricothyrotomy supplies) may also be carried but are not recommended to be universally required on all ALS ground ambulances.

[c]Wound packing material may include plain gauze and/or hemostatic dressings.

[d]Traction is not a necessary or required element of prehospital stabilization of suspected femur fracture(s) and is often contraindicated [26] [27].

[e]Devices used for extrication, such as backboards, should not be used for transport. Whenever feasible, patients should be removed from extrication devices prior to transport. Spinal Motion Restriction can be maintained by securing the patient to the transport stretcher. [33].

[f]Restraint devices should meet applicable crash-testing standards, as they are developed and published, and should appropriately meet individual patient weight, length, and developmental status needs [34] [35]

## References


1. Clinical credentialing of EMS providers. Prehosp Emerg Care. 2017;21(3):397–8.
2. Equpment for ambulances: a joint position statement from the National Association of EMS Physicians, Americal College of Emergency Physicians, and the American College of Surgeons Committee on Trauma. Prehosp Emerg Care. 2007;11(3):326–9.
3. Equipment for ambulances. Prehosp Emerg Care. 2009;13(3): 364–9.
4. Equipment for ground ambulances. Prehosp Emerg Care. 2014;18(1):92–7.
5. National Highway Traffic Safety Administration.2018 National EMS Scope of Practice Model. 2018. [Online]. Available from: https://nasemso.org/wp-content/uploads/Prepublication-Display-Copy-2018-National-EMS-Scope-of-Practice-Model-20180929.pdf.
6. National Association of State EMS Officials (NASEMSO). National Model EMS Clinical Guidelines. 2019.
7. National Association of EMS Physicians. Physician oversight of pediatric care in emergency medical services. Prehosp Emerg Care. 2017;21(1):88.
8. Moore B, Shah MI, Owusu-Ansah S, Gross T, Brown K, Gausche-Hill M, Remick K, Adelgais K, Lyng JW, Rappaport L, et al. Pediatric Readiness in Emergency Medical Services Systems. Prehosp Emerg Care. 2020;24(2):175–9. doi:10.1080/10903127.2019.1685614.
9. HRSA EMSC U.S. Dept of Health and Human Services. EMS for Children Performance Measures. 1 March 2017. [Online]. Available from: https://www.nedarc.org/performanceMeasures/documents/EMS%20Perf%20Measures%20Manual%20Web_0217.pdf.
10. *Section 641 Public Health Department, Chapter 132 Emergency Medical Services - Service Program Authorization 132.8(4)(b)*, Iowa Administrative Code, 2016.
11. Kroll M, Jyoti D, Siegler J. Can altering grip technique and bag size optimize volume delivered with bag-valve-mask by emergency medical service providers? Prehosp Emerg Care. 2019;23(2):210–4. doi:10.1080/10903127.2018.1489020.
12. Siegler J, Kroll M, Wojcik S, Moy HP. Can EMS providers provide appropriate tidal volumes in a simulated adult-sized patient with a pediatric-sized bag-valve-mask? Prehosp Emerg Care. 2017;21(1):74–8. doi:10.1080/10903127.2016.1227003.
13. Aho JM, Thiels CA, El Khatib MM, Ubl DS, Laan DV, Berns KS, Habermann EB, Zietlow SP, Zielinski MD. Needle thoracostomy: clinical effectiveness is improved using a longer angiocatheter. J Trauma Acute Care Surg. 2016;80(2):272–7. doi:10.1097/TA.0000000000000889.
14. Butler F. Management of suspected tension pneumothorax in tactical combat casualty care: TCCC guidelines change. J Special Operat Med. 2018;18(2):19–35.
15. Harcke H, Pearse L, Levy A, Getz J, Robinson S. and, Chest wall thickness in military personnel: implications for needle thoracentesis in tension pneumothorax. Mil Med. 2007; 172(12):1260–3. doi:10.7205/milmed.172.12.1260.
16. Inaba K, Branco B, Eckstein M, Shatz D, Martin M. Optimal positioning for emergent needle thoracostomy: a cadaver-based study. J Trauma Acute Care Surg. 2011;71(5):1099–103.
17. Stevens RL, Rochester AA, Busko J, Blackwell T, Schwartz D, Argenta A, Sing RF. Needle thoracostomy for tension pneumothorax: failure predicted by chest computed tomography. Prehosp Emerg Care. 2009;13(1):14–7. doi:10.1080/10903120802471998.
18. Wernick B, Hon HH, Mubang RN, Cipriano A, Hughes R, Rankin DD, Evans DC, Burfeind WR, Hoey BA, Cipolla J, et al. Complications of needle thoracostomy: a comprehensive clinical review. Int J Crit Illn Inj Sci. 2015; 5(3):160–9. doi:10.4103/2229-5151.164939.
19. Zengerink I, Brink P, Laupland K, Raber E, and, et al. Needle thoracostomy in the treatment of a tension pneumothorax in trauma patients: What size needle? J Trauma. 2008; 64(1):111–4.
20. Mandt M, Hayes K, Severyn F, Adelgais K. Appropriate needle length for emergent pediatric needle thoracostomy utilizing computed tomography. Prehosp Emerg Care. 2019;23(5): 663–71. doi:10.1080/10903127.2019.1566422.
21. United States Department of Labor Occupational Safety and Health Administration, *Standard Number 1910 Subpart I: Personal Protective Equipment*.
22. United States Department of Labor Occupational Safety and Health Administration, *Standard Number 1910.1030: Bloodborne Pathogens.*
23. United States Department of Labor Occupational Safety and Health Administration, *Standard Number 1910.134: Personal Protective Equipment Respiratory Protection*.
24. Siegel J, Rhinehart E, Jackson M, Chiarello L. 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings. July 2019. Available from: https://www.cdc.gov/infectioncontrol/guidelines/isolation/index.html
25. Cicero MX, Adelgais K, Hoyle JD, Jr., Lyng JW, Harris M, Moore B, Gausche-Hill M. Medication dosing safety for pediatric patients: recognizing gaps, safety threats, and best practices in the emergency medical services setting. A position statement and resource document from NAEMSP. Prehosp Emerg Care. 2020. doi:10.1080/10903127.2020.1794085
26. Wood SP, Vrahas M, Wedel SK. Femur fracture immobilization with traction splints in multisystem trauma patients. Prehosp Emerg Care. 2003;7(2):241–3. doi:10.1080/10903120390936860.
27. Daugherty MC, Mehlman CT, Moody S, LeMaster T, Falcone RA. Significant rate of misuse of the hare traction splint for children with femoral shaft fractures. J Emerg Nurs. 2013; 39(1):97–103. doi:10.1016/j.jen.2012.10.008.
28. Pizanis A, Pohlemann T, Burkhardt M, Aghayev E, Holstein J. Emergency stabilization of the pelvic ring: clinical comparison between three different techniques. Injury Int J Care Injured. 2013;44(12):1760–4. doi:10.1016/j.injury.2013.07.009.
29. Bakhshayesh P, Boutefnouchet T, Totterman A. Effectiveness of non invasive external pelvic compression: a systematic review of the literature . Scand J Trauma Resusc Emerg Med. 2016;24:73–9. doi:10.1186/s13049-016-0259-7.
30. White CE, Hsu JR, Holcomb JB. Haemodynamically unstable pelvic fractures. Injury Int J Care Injured. 2009;40(10): 1023–30. doi:10.1016/j.injury.2008.11.023.
31. van Oostendorp SE, Tan ECTH, Geeraedts LMG. Jr, Prehospital control of life-threatening truncal and junctional haemorrhage is the ultimate challenge in optimizing trauma care; a review of treatment options and their applicability in the civilian trauma setting. Scand J Trauma Resusc Emerg Med. 2016;24(1):110–3. doi:10.1186/s13049-016-0301-9.
32. Coccolini F, Catena F, Moore EE, Ivatury R, Biffl W, Peitzman A, Coimbra R, Rizoli S, Kluger Y, Abu-Zidan FM, et al. Pelvic trauma: WSES classification and guidelines. World J Emerg Surg. 2016;11(1):1–18. doi:10.1186/s13017-016-0105-2.
33. Fischer P, Perina D, Delbridge T. Spinal motion restriction in the trauma patient – a joint position statement. Prehosp Emerg Care. 2018;22(6):659–661. doi:10.1080/10903127.2018.1481476
34. NASEMSO. Safe Transport of Children by EMS: Interim Guidance. National Association of State EMS Officials, Falls Church, VA, 2017.

35. National Association of State EMS Officials (NASEMSO). Pediatric Transport Products for Ground Ambulances V2.1, 2019. Available from: https://nasemso.org/wp-content/uploads/Pediatric-Transport-Products-for-Ground-Ambulances-v2.1.pdf
36. National Fire Protection Association (NFPA). Standard for Automotive Ambulances 1917-2019. 2019.
37. American National Standards Institute/International Safety Equipment Association. ANSI/ISEA 107-2015: American National Standard for High Visibility Safety Apparel and Accessories, 2015. Available from: https://safetyequipment.org/ansiisea-107-2015/.
38. American National Standards Institute/International Safety Equipment Association. ANSI/ISEA Z87.1-2015 Standard. 2015. Available from: https://safetyequipment.org/isea-standards/ansiisea-z87-accredited-standards-committee/ansiisea-z87-1-2015-standard/.
39. United Stated Department of Health and Human Services (U.S. DHHS) Assistant Secretary for Preparedness and Response (ASPR) Technical, Resources, Assistance Center, and Information Exchange (TRACIE). Healthcare Emergency Preparedness Information Gateway: Mass Casualty Trauma Triage Paradigms and Pitfalls. July 2019. Available from: https://files.asprtracie.hhs.gov/documents/aspr-tracie-mass-casualty-triage-final-508.pdf.
40. Roberts I, Blackhall K, Dickinson KJ. Medical anti-shock trousers (pneumatic anti-shock garments) for circulatory support in patients with trauma. Cochrane Database Syst Rev. 2000;(2):CD001856. doi: 10.1002/14651858.CD001856.
41. American Academy of Clinical Toxicology and European Association of Poisons Centres and Clinical Toxicologists. Position Paper: Ipecac Syrup. Clinical Toxicol. 2004;42(2):133–43. doi:10.1081/CLT-120037421.