GLOBAL EMERGENCY MEDICAL REGISTRY

gemr.org

SAMPLE

Specialty Care Transport (SCT) and Interfacility Transport (IFT) Guidelines

for the GEMR Paramedic (PM) and GEMR Advanced Practice Paramedic (APP)

Supervising Physician Treatment Guidelines for GEMR-certified Paramedics and Advanced Practice Paramedics performing Specialty Care and Interfacility Transport during official patient care activities.

Version 1.0

July 2026

Scheduled for review by the GEMR Medical Directors Committee

Table of Contents

Right-click anywhere in this table and choose "Update Field" (or select the table and press F9) to generate or refresh the contents.

Introduction and Authorization

These Specialty Care Transport (SCT) and Interfacility Transport (IFT) Guidelines are to be utilized only by GEMR-certified Paramedics (PM) and Advanced Practice Paramedics (APP) who hold current clinical privileges with an authorized transport program and who have completed the training, competency evaluation, and skills attestations associated with this level of practice. Dr. _____, or an authorized designee, will deliver all associated training and evaluation.

These Guidelines are to be used only during official patient care activities on behalf of an authorized SCT/IFT program and are not to be applied by personnel who are off duty or working for an unaffiliated agency or business.

Whenever these Guidelines are utilized, the provider will complete a patient care report consistent with the transport program's documentation policy. These Guidelines are the tertiary source for patient care decision-making during SCT/IFT events; the personnel utilizing them are GEMR-certified PMs and APPs acting within the scope of practice privileges delineated by their certification level, as further outlined in Section 4.

For these Guidelines to be current, the dated signature of the Physician Medical Director must appear below.

_____ _____

(Print Name of Physician Medical Director Here) *Date*

1. Purpose and Scope

This document establishes standardized operational and clinical guidelines for the specialty care transport (SCT) and interfacility transport (IFT) of patients by GEMR-certified Paramedics and Advanced Practice Paramedics. It is intended to complement, not replace, the GEMR Resuscitation and Stabilization Treatment Guidelines, an authorized program's medical director-approved protocols, and applicable local, state, or national regulation governing critical care and interfacility transport programs.

These Guidelines apply to ground, rotor-wing, and fixed-wing transport of patients between healthcare facilities, and to transport of patients from a scene or referring facility to a higher level of definitive care, when performed by personnel credentialed at the GEMR Paramedic or GEMR Advanced Practice Paramedic level. They do not apply to routine emergency 911 response, which is governed by an agency's primary EMS protocols.

> *Where local law, an agency having jurisdiction (AHJ), or a Medical Program Director's protocols impose a more restrictive standard than what appears here, the more restrictive standard governs.*

2. Definitions

- Interfacility Transport (IFT) — the transport of a patient from one healthcare facility to another for continued care, whether or not the patient is critically ill or injured.
- Specialty Care Transport (SCT) / Critical Care Transport (CCT) — interfacility transport of a critically ill or injured patient requiring medically necessary care and monitoring beyond the scope of a standard advanced life support (ALS) response, including but not limited to mechanical ventilation, titrated vasoactive or other high-alert infusions, invasive hemodynamic monitoring, or maintenance of indwelling drains and mechanical circulatory support devices.
- Offline (Remote) Medical Control (RMC) — physician extension and direction of care through specific treatment guidelines approved by the PMs or APPs Physician Medical Director.
- Online Medical Control (OLMC) — direct, real-time contact with the Medical Program Director, a designated supervising physician, or an established medical resource control center.

- Referring (Transferring) Physician — the physician at the sending facility who determines that transfer is clinically indicated, that the benefits of transfer outweigh the risks, and who bears responsibility for pre-transport stabilization and compliance with accepted standards of practice for interfacility transfer.
- Sending Facility / Receiving Facility — the facility from which, and to which, the patient is transported.
- Tier 0–3 Medications and Procedures — the GEMR medical control categorization described in the Resuscitation and Stabilization Treatment Guidelines, extended in Section 5 of this document to the SCT/IFT context.

3. Guiding Principles

Interfacility and specialty care transport concentrates critically ill and injured patients into high-volume centers of expertise, but that benefit is not without risk: patients may deteriorate en route because of the underlying disease process, the physiologic stress of movement, equipment failure, or breakdowns in communication between sending, transporting, and receiving teams.

A systematic review of interfacility transport of mechanically ventilated adults found that adverse events during transport are common enough, and communication remains among the leading sources of transport-related error, that deliberate pre-transport planning and structured handoff are not optional add-ons but core patient-safety interventions.

Two principles anchor every section that follows:

1. Match the level of monitoring, therapy, and provider training to the patient's actual physiologic instability and anticipated trajectory, not merely to the equipment already attached to the patient.
2. Treat every transition of care, bedside to stretcher, sending unit to transport unit, transport unit to receiving unit, as a discrete safety event requiring a structured handoff (Section 10).

These Guidelines were informed by a comparative review of critical care and interfacility transport protocols currently in use across several EMS systems (see References, Section 14), reconciled against the GEMR Paramedic and GEMR Advanced Practice Paramedic scopes of practice published at gemr.org.

4. Levels of Practice for SCT/IFT

GEMR certifies two provider levels relevant to SCT/IFT: the GEMR Paramedic (PM) and the GEMR Advanced Practice Paramedic (APP). Table 1 summarizes the scope elements most relevant to transport practice, drawn from the current GEMR PM and APP occupational statements (gemr.org/paramedic; gemr.org/app). It is a summary for transport planning purposes only, the full scope-of-practice statements at gemr.org remain controlling.

Capability	GEMR Paramedic (PM)	GEMR Advanced Practice Paramedic (APP)
Airway	ETI, surgical/needle cricothyrotomy, CPAP/BiPAP, mechanical ventilator initiation and management	All PM airway skills, plus video laryngoscopy/bronchoscopy and RSI with sedative and paralytic agents
Vascular access	Peripheral IV, IO; access to indwelling catheters and implanted ports	All PM access skills, plus central venous access, arterial cannulation, and ultrasound-guided vascular access
Chest / thorax	Needle thoracostomy; maintain, monitor, adjust, and replace chest tube drainage systems	All PM chest skills, plus initiation of needle, simple, and surgical (tube) thoracostomy, chest drain management, and escharotomy

Capability	GEMR Paramedic (PM)	GEMR Advanced Practice Paramedic (APP)
Cardiac	Cardioversion, transcutaneous pacing, 3/5/6/12/24-lead ECG interpretation	All PM cardiac skills, plus central cannulation for ECMO/REBOA and ultrasound-guided pericardiocentesis
Blood / medications	Prepare and administer blood products for emergency transfusion; administer medications under written protocol or transferring-physician order	All PM privileges, plus preparation/administration of any medication or blood product by any route under written protocol or transferring-physician order
Diagnostics	BLUE and RUSH point-of-care ultrasound exams	All PM diagnostics, plus any diagnostic test or device authorized by the Medical Director
Sedation	Not independently privileged for procedural sedation beyond RSI-adjacent dosing under protocol	Moderate and deep procedural sedation for airway, respiratory, cardiac, orthopedic, and emergency surgical indications

Table 1. Selected GEMR PM and APP scope elements relevant to SCT/IFT (summarized; full statements at gemr.org/paramedic and gemr.org/app govern).

4.1 Assigning a Transport to PM vs. APP Staffing

As a practical planning matter, most programs make benchmark staffing decisions against the complexity of the therapies the patient requires, not solely the receiving diagnosis. A structural pattern seen consistently across the protocol systems reviewed for this document, is to reserve single-titratable-infusion, non-ventilated transports for standard ALS/PM staffing, and to require APP-level (or equivalent critical-care-trained) staffing once a transport involves mechanical ventilation, more than one concurrently titrated high-alert infusion, invasive hemodynamic monitoring, or mechanical circulatory support.

A retrospective single-program review of helicopter transports of patients supported by an intra-aortic balloon pump or Impella device found that patients with an Impella device required a condition change necessitating critical care evaluation in 100% of transports and critical care intervention in 100% of transports, versus 42% and 53% respectively for IABP, underscoring that device category, not merely the presence of a device, should drive the staffing decision.

Level	Representative transport scenario	Minimum SCT/IFT staffing
IFT / Basic SCT	Stable patient; no titrated infusion or a single non-vasoactive maintenance drip; no advanced airway	GEMR PM, plus EMT driver
SCT — Tier 1	Ventilator, one or more infusion pumps administering non-titratable medication drips, and/or maintenance of an existing chest tube	GEMR PM with documented SCT/IFT competency, or GEMR APP, remaining with the patient at all times, plus EMT driver
SCT — Tier 2/3	Titrated vasoactive or antiarrhythmic infusions, invasive hemodynamic monitoring, mechanical circulatory support (IABP/Impella/ECMO), post-RSI ventilator management, or blood product administration in progress	GEMR APP, remaining with the patient at all times, plus one GEMR EMT and a driver

Table 2. Suggested staffing tiers for SCT/IFT assignment. Programs should formalize their own tiering in a Medical Director-approved SCT/IFT Program Plan.

5. Medical Control and Tiered Authority

These Guidelines adopt the medical control categorization already established in the GEMR Resuscitation and Stabilization Treatment Guidelines, applied here to the SCT/IFT context:

- Tier 0 and Tier 1 medications/procedures may be utilized at the provider's discretion, per protocol, without prior contact.
- Tier 2 medications/procedures may be utilized per protocol, but require the provider to confirm dosing, preparation, or the procedural plan with another qualified healthcare professional or a guidelines reference before administration or initiation.
- Tier 3 medications/procedures require Online Medical Control (OLMC) contact before initiation or specific privileges from PMD.

For SCT/IFT specifically, the following are treated as Tier 2 at minimum, regardless of whether the infusion was already running at the sending facility: vasoactive infusions (e.g., norepinephrine, dopamine, epinephrine), antiarrhythmic infusions, neuromuscular blocking agents, and total parenteral nutrition. The following are treated as Tier 3 and require OLMC contact for initiation, rate change outside a pre-authorized titration range, or discontinuation: thrombolytics, glycoprotein IIb/IIIa inhibitors (e.g., eptifibatide), and any medication or blood product not addressed by the transporting program's written guidelines.

> *A drip that was started at the sending facility and is simply being continued unchanged is not, by itself, an escalation of tier, but any deviation from the sending facility's ordered rate or parameters is and should trigger the corresponding tier requirement.*

6. Patient Selection, Stability Assessment, and Right to Decline

The decision to transfer a patient rests with the referring physician, who must determine that the benefits of transfer outweigh the risks, ensure the patient is properly stabilized prior to departure to the extent that the sending facility's capabilities allow, and take responsibility for compliance with accepted community standards regarding interfacility transfer. The transport team's role is to independently verify that stability at the point of departure, and to communicate any disagreement to OLMC before departure rather than after.

6.1 Structured Deterioration Screening

Programs are encouraged to incorporate a validated early warning score (e.g., NEWS2) or shock index into the pre-transport assessment, alongside the physical exam. In a large prehospital cohort, early warning scores such as NEWS, MEWS, and the Queensland Adult Deterioration Detection System substantially outperformed shock index alone at predicting adverse events, though even the best-performing scores in that study showed only moderate sensitivity — supporting their use as an adjunct to, not a replacement for, clinical judgment. A separate prospective cohort similarly found NEWS2 to be a strong predictor of early mortality when applied by advanced life support crews transporting to a receiving emergency department.

6.2 Right to Decline Transport

An SCT/IFT team may decline or delay a transport assignment when any of the following apply:

- Accepting the assignment would leave the transporting agency unable to meet its primary emergency response obligations because of staffing or equipment limitations.
- The patient is judged, after consultation with the Medical Director or OLMC, not to be stable enough for the mode of transport requested.

- The safety of the patient or crew is at significant risk (e.g., weather, road or flight conditions, an agitated or violent patient) that cannot be mitigated.

Any disagreement between the sending physician and the transport team about readiness for transfer should be escalated to OLMC before departure and documented regardless of outcome.

7. Pre-Transport Checklist

Before departure from the sending facility, the transport team should confirm:

- The patient's airway is definitively secured, if indicated and not accomplished, and confirmed by waveform capnography.
- Vascular access is adequate for the anticipated therapies, and infusing lines are traced from bag to catheter hub.
- The patient is adequately sedated/analgesed prior to movement if intubated, according to the transport program's guidelines.
- History of illness or injury, onset of symptoms, relevant diagnostic results, and time of last treatment have been obtained from the sending team.
- A baseline, transport-team-performed physical exam and vital signs have been documented.
- Concentrations of all infusing medications have been verified against the pump's medication library and against the sending facility's orders.
- Titration parameters and stop/escalation criteria for each infusion have been discussed with the sending physician or nurse, including who to contact if a parameter is exceeded en route.
- Sufficient extra doses of ordered medications, and sufficient oxygen supply (calculated against worst-case transport time, including weather, construction, or vehicle failure contingencies), are on board.
- The receiving facility has affirmatively accepted the patient and is prepared for arrival.
- Contact information for family members or caregivers has been obtained in case the patient's status changes en route.
- All available documentation — run sheets, demographic face sheet, labs/imaging (including images on portable media if applicable), and provider/nursing notes, has been collected.

> *This checklist is a floor, not a ceiling. It should be adapted into the transporting program's own written Pre-Transport Checklist and integrated into the electronic or paper patient care report.*

8. Equipment and Vehicle Standards

At minimum, a unit performing SCT above the basic IFT level should carry: a transport ventilator with waveform capnography; a minimum of two programmable infusion pumps or syringe drivers (smart pumps with dose-range alerts preferred for high-alert infusions); a cardiac monitor/defibrillator with pacing, SpO_2, and $EtCO_2$ capability; point-of-care ultrasound where APP-level privileges are in use; a blood warmer and administration set if the program transfuses blood products; and an onboard AC power supply sufficient to operate all required medical devices for the anticipated duration of transport plus a contingency margin for weather, construction, or mechanical delay.

Programs should benchmark ambulance and response-unit equipment against the current GEMR Sample BLS Ambulance Equipment and Supplies Regulation and the GEMR Sample APP Ambulance or Response Unit Equipment and Supplies Regulation, both available at www.gemr.org.

9. Transport Device and Therapy Management

9.1 Mechanical Ventilation

Prehospital and interfacility mechanical ventilation has historically been characterized by high tidal volumes, high FiO_2, and low PEEP — a pattern associated with ventilator-induced lung injury. A 2019 review concluded that lung-protective ventilation, with avoidance of hyperoxia, should be the default goal strategy for essentially all patients requiring prehospital or interfacility mechanical ventilation, achieved through low tidal volume delivery with stepwise, concurrent titration of FiO_2 and PEEP. A large multi-center registry study of air medical transport patients (the AIR-VENT study) similarly found that low tidal volume ventilation is frequently under-delivered in transport, and that early adherence to lung-protective settings predicts continued adherence after ICU arrival — reinforcing that the transport phase is not a therapeutic pause but an active opportunity to protect the lung.

Transport teams managing a ventilated patient should: verify ventilator settings match the sending physician's order and the patient's predicted body weight-based tidal volume target; confirm placement and ongoing function with continuous waveform capnography; hyperoxygenate before any suctioning and limit suctioning events; monitor for and promptly troubleshoot high- and low-pressure alarms; and maintain a functioning bag-valve device and airway rescue equipment within reach for the duration of transport.

9.2 Vasoactive and Titratable Infusions

All medications requiring a defined or titrated infusion rate must be administered via an infusion pump; estimating drip rates by gravity or manual count is not an acceptable substitute during SCT/IFT. High-alert infusions (vasopressors, antiarrhythmics, neuromuscular blocking agents, heparin) should be independently double-checked by a second qualified team member before initiation or rate change, verifying patient identity, concentration, indication, dose calculation, pump programming, and line placement.

Traditional practice has favored central venous administration of vasopressors because of concern for extravasation injury; however, a retrospective review of 202 patients receiving vasopressors through a peripheral line found an extravasation rate of 4%, with all events managed conservatively and none requiring an antidote or surgical intervention, and a subsequent institutional protocol study found that structured peripheral vasopressor protocols — including ultrasound-guided placement, a defined proximal/large-bore site, and scheduled line assessment — reduced extravasation events. Under GEMR's tiering (Section 5), initiating or titrating a vasoactive infusion is a Tier 2 skill; transport teams administering vasopressors peripherally should follow a written peripheral-vasopressor protocol specifying acceptable sites, maximum concentration, and assessment interval, consistent with the sending or transport program's Medical Director-approved guidance.

9.3 Chest Tube and Thoracostomy Drainage Management

Transport teams assuming care of a patient with an existing chest tube should document the drainage system type (water-seal wet suction, water-seal dry suction, or dry-seal dry suction), the ordered suction level, and the presence or absence of tidaling in the water-seal chamber before departure. During transport, the collection unit should be kept below chest level and in an upright position at all times; the chest tube should not be routinely clamped, and should never be "stripped," because both practices can precipitate a tension pneumothorax or cause tissue trauma. If the tube is inadvertently dislodged, an occlusive dressing taped on three sides (to allow trapped air to vent) should be applied immediately, vital signs reassessed every 10 minutes, and the receiving facility notified of the need for tube replacement on arrival.

9.4 Blood and Blood Product Administration

Under GEMR's occupational scope, both the PM and APP may prepare and administer blood products for emergency transfusion; the APP additionally may initiate and manage transfusion as part of a broader damage-control resuscitation strategy. Evidence for prehospital transfusion in hemorrhagic shock continues to evolve: a matched cohort of trauma patients found that prehospital whole blood transfusion was associated with greater improvement in shock index and

lower trauma-bay mortality compared to no prehospital transfusion, while the 2026 TOWAR trial — a pragmatic, cluster-randomized comparison of prehospital whole blood against component transfusion — found no statistically significant difference in 30-day mortality between the two strategies, with similar adverse event rates. Programs should therefore treat prehospital/interfacility transfusion capability (whole blood or components) as a Medical Director-defined program decision rather than a universally superior default and should ensure providers are competent in blood administration set priming, warmer use, reaction recognition, and reaction management regardless of which product the program carries.

9.5 Mechanical Circulatory Support and Other Invasive Devices

Transport of patients supported by an intra-aortic balloon pump, Impella device, or ECMO circuit is an APP-level activity requiring device-specific training beyond core APP certification. As noted in Section 4.1, device category materially changes the likelihood that critical care intervention will be required en route, and staffing and crew configuration should be planned accordingly as a multiple personnel transport, rather than defaulting to a single-APP or PM/APP pairing regardless of device.

10. Communication and Handoff

Communication failure is repeatedly identified in the literature as a leading contributor to adverse events and medical error during transitions of care, including patient transport. Transport teams should use a structured handoff format — Situation, Background, Assessment, Recommendation (SBAR) is the most widely endorsed, at both the sending facility bedside and on arrival at the receiving facility. SBAR was found in a narrative review to improve both the completeness and the perceived precision of handoff communication across acute care settings and is endorsed by multiple national patient-safety bodies.

At minimum, the SBAR handoff for an SCT/IFT patient should include: current situation and reason for transfer; relevant background including allergies, code status, and pertinent history; current assessment including vital signs, ventilator or infusion settings, and any change in condition during transport; and a clear recommendation or open item requiring the receiving team's immediate attention.

11. Documentation and Quality Assurance Program

Every SCT/IFT-credentialed program should maintain a written Quality Assurance (QA) Plan, approved by the Medical Director, that evaluates transport activity for medical appropriateness and thoroughness of documentation. At minimum, the QA Plan should review:

- Compliance with the transferring physician's orders, if any, and documentation of any deviation.
- Frequency of vital sign documentation and evidence that abnormal trends were detected and managed.
- Any complication (hypotension, dysrhythmia, altered mental status, extravasation, ventilator alarm event) and the appropriateness of the response.
- Any unanticipated discontinuation of a catheter, drain, or infusion, with rationale and outcome.
- All OLMC contacts and the direction received.
- Prompt (within 24 hours) internal reporting of any unusual occurrence, followed by root-cause analysis and a documented corrective action plan when care was inconsistent with these Guidelines.

New SCT/IFT programs should provide the reviewing Medical Director with quarterly QA summaries for the first 12 months of operation; the reporting interval thereafter is a program-level Medical Director decision, informed by whether deficiencies or adverse outcomes have been identified.

12. Education, Certification, and Competency Maintenance

SCT/IFT privileges build on, and do not substitute for, current GEMR PM or APP certification. Providers must maintain the continuing education and skills attestations required for their certification level, as detailed at gemr.org/paramedic and gemr.org/app, respectively. In addition, programs authorizing SCT/IFT practice should require and document annual, agency-specific competency verification, consistent with the annual competency model used across the benchmark protocol systems reviewed for this document, covering at minimum: mechanical ventilation and ventilator alarm troubleshooting, initiation and titration of high-alert infusions, chest tube/thoracostomy drainage management, and, where privileged, blood product administration and mechanical circulatory support device management.

Where a program uses loaned or unfamiliar equipment for a specific transport, the program (not the individual provider alone) is responsible for ensuring that all staff using that equipment have documented proficiency with it before the equipment is used in patient care.

13. Related GEMR Resources

- GEMR Resuscitation and Stabilization Treatment Guidelines (gemr.org/docs/GEMR-Resuscitation-and-Stabilization-Treatment-Guidelines.REVISION.2025.pdf) field resuscitation and stabilization guidance and the Tier 0–3 medication/procedure model referenced throughout Section 5.
- GEMR Sample APP Ambulance or Response Unit Equipment and Supplies Regulation (gemr.org/docs/GEMR-Sample-APP-Ambulance-or-response-Unit-Equipment-and-Supplies-Regulation-2025.pdf).
- GEMR Sample BLS Ambulance Equipment and Supplies Regulation (gemr.org/docs/GEMR-Sample-BLS-Ambulance-Equipment-and-Supplies-Regulation-2025.pdf).
- GEMR Paramedic (PM) and GEMR Advanced Practice Paramedic (APP) occupational statements and educational objectives — gemr.org/paramedic and gemr.org/app.

14. References

14.1 Literature

1. Fan E, MacDonald RD, Adhikari NKJ, et al. Outcomes of interfacility critical care adult patient transport: a systematic review. Crit Care. 2005;10(1):R6. doi:10.1186/cc3924

2. Singh JM, MacDonald RD. Pro/con debate: Do the benefits of regionalized critical care delivery outweigh the risks of interfacility patient transport? Crit Care. 2009;13(4):219. doi:10.1186/cc7883

3. Haydar B. Error Traps in the Intrahospital Transport of Critically Ill and Anesthetized Children. Paediatr Anaesth. 2025;35(7):497-503. doi:10.1111/pan.15112

4. Connelly KM, Winslow SE, Smith J, et al. Management of patients with Impella devices or intra-aortic balloon pumps during helicopter air ambulance transport in observational data. Perfusion. 2023;39(4):752-758. doi:10.1177/02676591231158273

5. Stephens RJ, Siegler J, Fuller BM. Mechanical Ventilation in the Prehospital and Emergency Department Environment. Respir Care. 2019;64(5):595-603. doi:10.4187/respcare.06888

6. Moy HP, Nayman BD, Olvera D, et al. Mechanical Ventilation Practices and Low Tidal Volume Ventilation in Air Medical Transport Patients: The AIR-VENT Study. Respir Care. 2022;67(6):647-656. doi:10.4187/respcare.09824

7. Lewis T, Merchan C, Altshuler D, Papadopoulos J. Safety of the Peripheral Administration of Vasopressor Agents. J Intensive Care Med. 2019;34(1):26-33. doi:10.1177/0885066616686035

8. Fabick AC, Hawn JM, Barwick K, et al. Comparison of extravasation events related to the peripheral administration of vasopressors prior to and following implementation of an institutional protocol. J Am Coll Clin Pharm. 2023;6(7):709-717. doi:10.1002/jac5.1844

9. Braverman MA, Smith A, Pokorny D, et al. Prehospital whole blood reduces early mortality in patients with hemorrhagic shock. Transfusion. 2021;61(S1). doi:10.1111/trf.16528

10. Sperry JL, Guyette FX, Cotton BA, et al. Prehospital Resuscitation with Type O Whole Blood for Trauma and Hemorrhage (TOWAR). N Engl J Med. 2026;394(23):2317-2328. doi:10.1056/nejmoa2602167

11. Shahid S, Thomas S. Situation, Background, Assessment, Recommendation (SBAR) Communication Tool for Handoff in Health Care — A Narrative Review. Saf Health. 2018;4(1):7. doi:10.1186/s40886-018-0073-1

12. Bourke-Matas E, Doan T, Bowles KA, et al. A prediction model for prehospital clinical deterioration: The use of early warning scores. Acad Emerg Med. 2024;31(11):1139-1149. doi:10.1111/acem.14963

13. Martín-Rodríguez F, López-Izquierdo R, del Pozo Vegas C, et al. Accuracy of National Early Warning Score 2 (NEWS2) in Prehospital Triage on In-Hospital Early Mortality. Prehosp Disaster Med. 2019;34(6):610-618. doi:10.1017/s1049023x19005041

14. Guan G, Lee C, Begg S, et al. The use of early warning system scores in prehospital and emergency department settings to predict clinical deterioration: A systematic review and meta-analysis. PLoS One. 2022;17(3):e0265559. doi:10.1371/journal.pone.0265559

15. Troncoso R, Garfinkel E, Kaul K, et al. Safety of Nurse-Managed Inhaled Nitric Oxide During Critical Care Interfacility Transport. J Intensive Care Med. 2023;38(8):768-772. doi:10.1177/08850666231178710

Appendix A: Procedural Orders

The procedural orders below cover interventions specific to the SCT/IFT context and are meant to complement, not repeat, the field resuscitation procedural orders already contained in Appendix A of the GEMR Resuscitation and Stabilization Treatment Guidelines (e.g., cricothyrotomy, RSI intubation, synchronized cardioversion, transcutaneous pacing, gastric decompression). Each order lists the minimum GEMR certification level and medical control tier (Section 5) required to perform it; an authorizing Medical Director may set a more restrictive local standard but may not exceed the GEMR scope of practice for either level.

A.1 Transport Ventilator Initiation and Management

Level: GEMR Paramedic (initiate/manage) — Tier 1

Indications: Continuation or initiation of mechanical ventilatory support for a patient with an existing advanced airway, or transition from a facility ventilator/BVM to a transport ventilator prior to departure.

Contraindications / Precautions: Untreated tension pneumothorax; airway not yet definitively secured and confirmed.

Personnel: GEMR Paramedic or GEMR APP remaining with the patient at all times.

Equipment: Transport ventilator, waveform capnography, backup BVM with reservoir and appropriate mask/airway adjuncts, oxygen supply sufficient for transport time plus contingency margin.

Procedure:

1. Verify ordered ventilator settings (mode, tidal volume by predicted body weight, rate, FiO_2, PEEP) against the sending physician's order.
2. Confirm tube placement and depth; secure and document. Confirm continuous waveform capnography.
3. Set ventilator alarms (high/low pressure, low minute volume, apnea, disconnect) before disconnecting from the facility ventilator.
4. Transition the patient to the transport ventilator, auscultate bilaterally, and reassess SpO_2 and $EtCO_2$ within 2 minutes of transition.
5. Target lung-protective settings (low tidal volume, avoidance of hyperoxia) for all patients unless the sending physician's order specifies otherwise for a documented clinical reason.
6. Reassess with every position change, at every 15-minute vital sign interval, and immediately after any alarm.

Transport Monitoring: Continuous SpO_2 and waveform capnography; vital signs and ventilator settings documented at minimum every 15 minutes, or every 5 minutes if unstable.

Complications: Tension pneumothorax, hypotension from increased intrathoracic pressure, accidental extubation or mainstem intubation, ventilator malfunction, breath-stacking/auto-PEEP.

Medical Control: Tier 1 — provider discretion per protocol. Any deviation from the sending physician's ordered settings beyond a pre-authorized titration range is Tier 2 and requires confirmation with OLMC or a qualified second provider.

A.2 Chest Tube (Thoracostomy) Drainage System Maintenance

Level: GEMR Paramedic (maintain existing system) — Tier 1

Indications: Transport of a patient with an existing chest tube and drainage system (water-seal wet suction, water-seal dry suction, or dry-seal dry suction).

Contraindications / Precautions: None for maintenance of an existing, properly functioning system.

Personnel: GEMR Paramedic or GEMR APP.

Equipment: Existing drainage system; occlusive dressing and tape; spare drainage system if transport time is prolonged.

Procedure:

1. Before departure, document drainage system type, ordered suction level, tidaling in the water-seal chamber (or lung sounds if absent), and drainage character/volume.
2. Keep the collection unit upright and below chest level at all times during transport.
3. Do not clamp the tube routinely; do not strip the tubing.
4. Coil and secure tubing to the stretcher, avoiding dependent loops, kinks, or tension on the insertion site.
5. If the tube is dislodged: immediately apply an occlusive dressing taped on three sides to allow trapped air to vent, reassess vital signs every 10 minutes, and notify the receiving facility of the need for tube replacement.
6. If a connection disconnects or the system cracks: clamp momentarily as close to the insertion site as possible, or submerge the distal tube end in sterile saline to create a temporary water seal, while observing closely for tension pneumothorax; replace the system as soon as practical.

Transport Monitoring: Respiratory rate, SpO_2, breath sounds, and drainage volume/character reassessed at minimum every 15 minutes; document drainage level at departure and arrival.

Complications: Tension pneumothorax, air leak, tube dislodgement, occlusion by clot or kink, re-expansion pulmonary edema.

Medical Control: Tier 1 for maintenance of an existing system. Any suction-level change or troubleshooting beyond routine maintenance is Tier 2.

A.3 Tube Thoracostomy (Chest Tube Placement)

Level: GEMR Advanced Practice Paramedic — Tier 2

Indications: Simple or tension pneumothorax, hemothorax, or hemopneumothorax not adequately decompressed by needle thoracostomy; anticipated deterioration during a prolonged transport.

Contraindications / Precautions: Relative: coagulopathy not correctable in the time available; overlying infection at the planned insertion site. None are absolute in a decompensating patient.

Personnel: GEMR APP.

Equipment: Chest tube kit, local anesthetic, chlorhexidine prep, drainage system, occlusive dressing, suture or securement device, point-of-care ultrasound if available.

Procedure:

1. Identify landmarks (typically 4th–5th intercostal space, anterior to mid-axillary line); confirm side clinically and, where available, with ultrasound.
2. Prep and anesthetize the site; make the incision and bluntly dissect over the superior rib border to avoid the neurovascular bundle.
3. Enter the pleural space, confirm with a rush of air or blood, and place the tube directed as clinically indicated (apically for air, posteriorly/basally for fluid).
4. Connect to the drainage system, confirm tidaling/bubbling as appropriate, secure the tube, and apply an occlusive dressing.
5. Obtain post-procedure breath sounds and, if available, imaging confirmation; document per Section 11.

Transport Monitoring: Continuous SpO_2, respiratory rate, and breath sounds; drainage volume/character at each vital sign interval.

Complications: Bleeding, organ injury, infection, incorrect tube position, re-expansion pulmonary edema, persistent air leak.

Medical Control: Tier 2 — confirm with OLMC or a second qualified provider before initiation when time allows; a decompensating patient in extremis should not have this procedure delayed to obtain contact.

A.4 Needle Thoracostomy (Chest Decompression)

Level: GEMR Paramedic and GEMR APP — Tier 1

Indications: Suspected tension pneumothorax with hemodynamic compromise (hypotension, severe hypoxia, absent/decreased unilateral breath sounds, jugular venous distension, tracheal deviation).

Contraindications / Precautions: None in a patient meeting the indication above.

Personnel: GEMR Paramedic or GEMR APP.

Equipment: Large-bore (10–14 ga) IV catheter of adequate length; chlorhexidine prep; occlusive/one-way valve dressing if available.

Procedure:

1. Identify the 2nd intercostal space, midclavicular line, or 4th–5th intercostal space, anterior axillary line (per program preference and needle length available).
2. Prep the site; insert the catheter over the superior rib border, angled perpendicular to the chest wall, until a rush of air is felt or heard.
3. Withdraw the needle, leaving the catheter in place; secure and apply a dressing.
4. Reassess breath sounds, SpO_2, and hemodynamics immediately; convert to tube thoracostomy as soon as APP-level personnel and equipment are available.

Transport Monitoring: Continuous SpO_2 and hemodynamics; reassess for recurrence of tension physiology, which can occur if the catheter kinks or is dislodged.

Complications: Failure to decompress (catheter too short for body habitus), laceration of lung or vessel, recurrence of tension pneumothorax if catheter occludes.

Medical Control: Tier 1 — provider discretion per protocol given the emergent, life-threatening indication.

A.5 Titratable High-Alert Infusion Initiation and Titration

Level: GEMR Paramedic (continue non-titrated drips) / GEMR APP (initiate or titrate vasoactive, antiarrhythmic, or neuromuscular blocking infusions) — Tier 2

Indications: Continuation of a vasoactive, antiarrhythmic, sedation/analgesia, or neuromuscular blocking infusion initiated at the sending facility; or initiation of such an infusion during transport per written guidelines or transferring-physician order.

Contraindications / Precautions: Per individual medication guideline; verify against the patient's allergies and current hemodynamics before any rate change.

Personnel: GEMR APP for initiation or titration; GEMR Paramedic may continue an infusion at an unchanged, previously verified rate under agency policy.

Equipment: Programmable (smart) infusion pump; medication library-verified concentration; secondary access if the infusion is incompatible with other medications.

Procedure:

1. Verify concentration, indication, dose calculation, pump programming, and line placement with a second qualified provider before initiating or changing a high-alert infusion (independent double-check).
2. Confirm the infusion is delivered via a dedicated or compatible line; never estimate a titrated rate by gravity or manual count.
3. Titrate only within the range and to the endpoint specified by the sending physician's order or the transport program's written guideline.
4. Reassess vital signs within 5 minutes of any rate change, then per the routine interval thereafter.
5. Document every rate change, the indication for it, and the reassessment that followed.

Transport Monitoring: Continuous cardiac monitoring and, where applicable, continuous or frequent blood pressure monitoring; vital signs at minimum every 15 minutes, or every 5 minutes if unstable or during active titration.

Complications: Extravasation (see peripheral vasopressor guidance, Section 9.2), dysrhythmia, hypo-/hypertension, oversedation, unintended bolus from pump misprogramming.

Medical Control: Tier 2 — confirm with a second qualified provider or OLMC before initiation or any titration outside a pre-authorized range. Thrombolytics and glycoprotein IIb/IIIa inhibitors remain Tier 3 (Section 5).

A.6 Central Venous Access and Line Management

Level: GEMR Advanced Practice Paramedic — Tier 2

Indications: Vasoactive infusion administration when peripheral access is inadequate or unobtainable; need for central venous pressure monitoring; anticipated large-volume or rapid transfusion.

Contraindications / Precautions: Coagulopathy uncorrected in the time available (relative); overlying infection at the planned site (relative).

Personnel: GEMR APP.

Equipment: Central line kit, ultrasound guidance where available, chlorhexidine prep, sterile technique supplies, securement device, transparent dressing.

Procedure:

1. Select site by clinical context and, where feasible, ultrasound guidance to reduce mechanical complication risk.
2. Maintain maximal sterile barrier precautions consistent with the setting.
3. Confirm venous (not arterial) placement before dilation and catheter advancement.
4. Secure, dress, and confirm/document placement per the transport program's policy before use for high-alert infusions.

Transport Monitoring: Site assessed for bleeding, hematoma, or malposition at each vital sign interval; continuous cardiac monitoring during placement given arrhythmia risk from guidewire advancement.

Complications: Arterial puncture, pneumothorax, arrhythmia, catheter malposition, infection.

Medical Control: Tier 2 — confirm with OLMC or a second qualified provider before initiation when time allows.

A.7 Arterial Line Placement and Invasive Hemodynamic Monitoring

Level: GEMR Advanced Practice Paramedic — Tier 2

Indications: Continuous blood pressure monitoring during vasoactive infusion titration; frequent arterial blood gas sampling anticipated during transport.

Contraindications / Precautions: Inadequate collateral circulation at the planned site (relative); overlying infection (relative).

Personnel: GEMR APP.

Equipment: Arterial line kit, pressure transducer/monitoring cable compatible with the transport monitor, ultrasound guidance where available.

Procedure:

1. Assess collateral circulation at the planned site before puncture.
2. Prep, cannulate under sterile technique (ultrasound-guided where available), and confirm pulsatile arterial waveform on the monitor.
3. Zero and level the transducer before relying on displayed pressures for titration decisions.
4. Secure and dress; label the line clearly as arterial to prevent inadvertent medication administration.

Transport Monitoring: Continuous arterial waveform and pressure; distal perfusion checked at each vital sign interval.

Complications: Distal ischemia, hematoma, infection, inadvertent intra-arterial injection if mislabeled.

Medical Control: Tier 2 — confirm with OLMC or a second qualified provider before initiation when time allows.

A.8 Blood and Blood Product Administration (Transfusion)

Level: GEMR Paramedic (administer per protocol) / GEMR APP (initiate and manage as part of damage-control resuscitation) — Tier 2

Indications: Hemorrhagic shock or other life-threatening anemia/coagulopathy per the transport program's written transfusion guideline.

Contraindications / Precautions: Known severe transfusion reaction to the specific product, where an alternative exists and time allows.

Personnel: GEMR Paramedic or GEMR APP.

Equipment: Program-approved blood product (whole blood or components per Medical Director policy), blood administration set, blood warmer, two-patient-identifier verification per program policy.

Procedure:

1. Verify product identity and patient identity per the transport program's two-identifier policy before spiking the unit.
2. Prime the administration set with the blood product (not saline, unless program policy specifies a compatible priming fluid).
3. Begin transfusion at the rate specified by protocol or physician order; reassess vital signs within 5–15 minutes of initiation.
4. Stop the transfusion immediately and disconnect from the patient (keeping the line open with saline via a separate set) if signs of a transfusion reaction occur — fever, chills, hives, dyspnea, flank pain, hemoglobinuria — and contact OLMC.
5. Document product identifiers, start/stop times, volume infused, and vital signs before, during, and after transfusion.

Transport Monitoring: Vital signs immediately before initiation, within 15 minutes of starting, and at minimum every 15 minutes thereafter; continuous cardiac monitoring in an unstable patient.

Complications: Acute hemolytic, febrile non-hemolytic, or allergic/anaphylactic transfusion reaction; transfusion-associated circulatory overload; hypothermia if not warmed.

Medical Control: Tier 2 — confirm with OLMC or a second qualified provider before initiation; any suspected reaction requires immediate OLMC contact.

A.9 Indwelling Central Port / Implanted Catheter Access

Level: GEMR Paramedic and GEMR APP — Tier 1

Indications: Need for vascular access or medication/fluid administration in a patient with an existing implanted port or indwelling central catheter, when peripheral access is inadequate or the device is already in active use.

Contraindications / Precautions: Signs of site infection; inability to confirm device type/patency.

Personnel: GEMR Paramedic or GEMR APP.

Equipment: Non-coring (Huber) needle for implanted ports where applicable, chlorhexidine prep, sterile technique supplies, appropriate syringe/flush.

Procedure:

1. Confirm device type (implanted port vs. tunneled/non-tunneled central catheter) and, where possible, the number and identity of lumens with the sending facility.
2. Access using sterile technique; confirm blood return and free flow before use.
3. Flush per device-specific protocol; do not force against resistance.
4. Document access site condition, patency confirmation, and any difficulty encountered.

Transport Monitoring: Site assessed for infiltration, redness, or swelling at each vital sign interval.

Complications: Infiltration, catheter fracture or malposition, infection, air embolism if lumens are mishandled.

Medical Control: Tier 1 for accessing and using an already-functioning device per protocol.

A.10 Orogastric / Nasogastric Tube Placement and Gastric Decompression

Level: GEMR Paramedic and GEMR APP — Tier 1

Indications: Gastric decompression in the ventilated patient; management of ileus, bowel obstruction, or persistent nausea/vomiting during transport.

Contraindications / Precautions: Suspected basilar skull fracture or significant midface trauma (use orogastric route instead of nasogastric); esophageal varices or recent esophageal/gastric surgery (relative — confirm with sending physician).

Personnel: GEMR Paramedic or GEMR APP.

Equipment: Appropriately sized OG/NG tube, water-soluble lubricant, syringe for confirmation, suction source or drainage bag, securement device.

Procedure:

1. Select route (oral vs. nasal) based on contraindications above and patient airway status.
2. Measure insertion length (nose/mouth to ear to xiphoid) before insertion.
3. Insert the tube smoothly; if the patient is not intubated and able to swallow, coordinate insertion with swallowing.
4. Confirm placement per program policy (aspirate gastric contents, auscultate air insufflation, or radiographic confirmation if already obtained at the sending facility) before use.
5. Connect to intermittent suction or gravity drainage as ordered; secure the tube.

Transport Monitoring: Drainage volume/character; abdominal distension; tube position at each vital sign interval.

Complications: Malposition (tracheobronchial or intracranial in trauma), epistaxis, aspiration, mucosal trauma.

Medical Control: Tier 1 — provider discretion per protocol.

A.11 Mechanical Circulatory Support Device Management During Transport (IABP / Impella)

Level: GEMR Advanced Practice Paramedic with documented device-specific training — Tier 3

Indications: Interfacility transport of a patient supported by an intra-aortic balloon pump or a percutaneous ventricular assist device placed at the sending facility.

Contraindications / Precautions: Transport by a crew without documented, device-specific competency is contraindicated regardless of the receiving facility's need.

Personnel: GEMR APP with device-specific training; a second critical-care-prepared provider should accompany any Impella transport and is strongly recommended for IABP transport, consistent with staffing evidence in Section 4.1.

Equipment: Device-specific transport console/battery, manufacturer-approved cabling and tubing, backup power supply, standard SCT monitoring equipment.

Procedure:

1. Obtain a complete device handoff from the sending team: console settings, augmentation/support ratio or flow rate, insertion site and limb perfusion status, anticoagulation status, and any device alarms or malfunctions during the sending facility's course.
2. Confirm battery/backup power sufficient for the full anticipated transport time plus contingency margin.
3. Reassess distal limb perfusion, device waveform/positioning indicators, and insertion site before departure and at every vital sign interval.
4. Do not adjust device settings outside the sending physician's parameters without OLMC contact.
5. Maintain immobilization of the insertion-site limb per device requirements throughout transport.

Transport Monitoring: Continuous device waveform/console monitoring, distal limb perfusion checks, and standard hemodynamic monitoring at minimum every 15 minutes, or every 5 minutes if unstable.

Complications: Limb ischemia, device migration or malposition, hemolysis, bleeding at the insertion site, device failure, arrhythmia.

Medical Control: Tier 3 — OLMC contact required for any device setting change; immediate OLMC contact required for any device alarm, malfunction, or limb ischemia.

A.12 Procedural Sedation for the Transport Patient (Moderate/Deep)

Level: GEMR Advanced Practice Paramedic — Tier 2

Indications: Facilitation of a transport procedure (e.g., line placement, thoracostomy) or ongoing comfort/synchrony for the mechanically ventilated patient, per written guideline or transferring-physician order.

Contraindications / Precautions: Hemodynamic instability uncorrected by volume/vasoactive support (relative — dose adjust or defer); inability to manage the airway if oversedation occurs.

Personnel: GEMR APP.

Equipment: Airway rescue equipment immediately available; continuous SpO_2 and waveform capnography; cardiac monitor.

Procedure:

1. Confirm indication, target sedation level, and any contraindication before administration.
2. Ensure airway rescue equipment and a plan for oversedation are in place before the first dose.
3. Titrate to the lowest effective dose for the intended purpose (synchrony, procedural facilitation, comfort), reassessing after each dose.
4. Document sedation level, medication, dose, and time with every administration and every reassessment.

Transport Monitoring: Continuous SpO_2, waveform capnography, and cardiac monitoring throughout; blood pressure at minimum every 5 minutes during active titration.

Complications: Respiratory depression, hypotension, oversedation, loss of airway protective reflexes.

Medical Control: Tier 2 — confirm with a second qualified provider before initiation or significant dose escalation.

14. References

14.1 Literature

1. Fan E, MacDonald RD, Adhikari NKJ, et al. Outcomes of interfacility critical care adult patient transport: a systematic review. Crit Care. 2005;10(1):R6. doi:10.1186/cc3924

2. Singh JM, MacDonald RD. Pro/con debate: Do the benefits of regionalized critical care delivery outweigh the risks of interfacility patient transport? Crit Care. 2009;13(4):219. doi:10.1186/cc7883

3. Haydar B. Error Traps in the Intrahospital Transport of Critically Ill and Anesthetized Children. Paediatr Anaesth. 2025;35(7):497-503. doi:10.1111/pan.15112

4. Connelly KM, Winslow SE, Smith J, et al. Management of patients with Impella devices or intra-aortic balloon pumps during helicopter air ambulance transport in observational data. Perfusion. 2023;39(4):752-758. doi:10.1177/02676591231158273

5. Stephens RJ, Siegler J, Fuller BM. Mechanical Ventilation in the Prehospital and Emergency Department Environment. Respir Care. 2019;64(5):595-603. doi:10.4187/respcare.06888

6. Moy HP, Nayman BD, Olvera D, et al. Mechanical Ventilation Practices and Low Tidal Volume Ventilation in Air Medical Transport Patients: The AIR-VENT Study. Respir Care. 2022;67(6):647-656. doi:10.4187/respcare.09824

7. Lewis T, Merchan C, Altshuler D, Papadopoulos J. Safety of the Peripheral Administration of Vasopressor Agents. J Intensive Care Med. 2019;34(1):26-33. doi:10.1177/0885066616686035

8. Fabick AC, Hawn JM, Barwick K, et al. Comparison of extravasation events related to the peripheral administration of vasopressors prior to and following implementation of an institutional protocol. J Am Coll Clin Pharm. 2023;6(7):709-717. doi:10.1002/jac5.1844

9. Braverman MA, Smith A, Pokorny D, et al. Prehospital whole blood reduces early mortality in patients with hemorrhagic shock. Transfusion. 2021;61(S1). doi:10.1111/trf.16528

10. Sperry JL, Guyette FX, Cotton BA, et al. Prehospital Resuscitation with Type O Whole Blood for Trauma and Hemorrhage (TOWAR). N Engl J Med. 2026;394(23):2317-2328. doi:10.1056/nejmoa2602167

11. Shahid S, Thomas S. Situation, Background, Assessment, Recommendation (SBAR) Communication Tool for Handoff in Health Care — A Narrative Review. Saf Health. 2018;4(1):7. doi:10.1186/s40886-018-0073-1

12. Bourke-Matas E, Doan T, Bowles KA, et al. A prediction model for prehospital clinical deterioration: The use of early warning scores. Acad Emerg Med. 2024;31(11):1139-1149. doi:10.1111/acem.14963

13. Martín-Rodríguez F, López-Izquierdo R, del Pozo Vegas C, et al. Accuracy of National Early Warning Score 2 (NEWS2) in Prehospital Triage on In-Hospital Early Mortality. Prehosp Disaster Med. 2019;34(6):610-618. doi:10.1017/s1049023x19005041

14. Guan G, Lee C, Begg S, et al. The use of early warning system scores in prehospital and emergency department settings to predict clinical deterioration: A systematic review and meta-analysis. PLoS One. 2022;17(3):e0265559. doi:10.1371/journal.pone.0265559

15. Troncoso R, Garfinkel E, Kaul K, et al. Safety of Nurse-Managed Inhaled Nitric Oxide During Critical Care Interfacility Transport. J Intensive Care Med. 2023;38(8):768-772. doi:10.1177/08850666231178710

14.2 Comparative Protocol Systems Reviewed

This document was informed by a comparative review of the following protocol and guideline systems, alongside the GEMR Resuscitation and Stabilization Treatment Guidelines. These sources are cited as institutional benchmarks; where GEMR guidance conflicts with a benchmark system's approach, GEMR guidance and the authorizing Medical Director's protocols govern.

16. Peoria Area EMS System. Critical Care Protocols (Tier I–III Critical Care Transport), per 77 Ill. Adm. Code 515.860.

17. Regions Hospital Emergency Medical Services. Critical Care Treatment Guidelines, effective March 1, 2016.

18. LifeFlight of Maine. Critical Care Transport Team Protocols, revised April 2019.

19. University Hospitals EMS/Critical Care Transport Protocols (algorithm-based, certification-level color-coded protocol format).

20. Global Emergency Medical Registry. Resuscitation and Stabilization Treatment Guidelines, Revision 2025.

This document does not become effective for a given transport program until adopted and dated-signed by that program's Physician Medical Director, per Section "Introduction and Authorization" above.