

# **Connecticut IFT Education 2025**

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## Statement of Purpose

CT EMS Advisory Board - Education & Training Committee

**Purpose:** To provide guidance for Sponsor Hospitals, Instructors, Training Officers, and Preceptors regarding items in the CT EMS Protocols and Scope of Practice that:

- Require specific additional training and/or approval under the oversight of a service's Sponsor Hospital and Medical Director,
- Represent recent significant changes to the protocols or scope of practice, or
- Would be benefit from consistency in the education and training of providers statewide.

*Limitation: Credentialing to perform any skill as an EMS provider is overseen by the service's Sponsor Hospital Medical Director and additional training or other requirements may exist at their discretion. This document serves only as a guide in the development of education and training programs and does not replace appropriate medical oversight.*

## Recommended Education Modules (by level)

The recommended modules are meant to be the minimum required.

A service’s Sponsor Hospital may require more.

BLS	Paramedic	Optional (Sponsor Hospital Dependent)
Transport Operations	Transport Operations	Arterial Lines
BLS IFT Module	Medical/Legal	Transvenous Pacing (Cardiac)
Medical/Legal	Devices	Select devices from Devices module
Devices Module (as applicable)	NIV Management	Pediatrics
	Neurology	OB/Neonate (high risk)
	Sepsis	
	Cardiac	
	Endocrine/Metabolic	
	Respiratory	
	Toxicology	
	Trauma	
	Blood	
	OB/Neonate	
	Pediatric	
	Ventilator Management	

### Scenario Resources

Air & Surface Transport Nurses Association. (2019). *Human patient simulation for transport environments*.

Coffey, D., Corbett, P., Holleran, R. S., Picanzo, J. L., Wall, J., Smith, D. T., Wicinski, S., Wolfe, A. C., Bailey, S. L., & Celeski, D. (2019). *Human patient simulation for transport environments vol. 2*. Air & Surface Transport Nurses Association.

## Frequently Asked Questions (FAQs)

### 1. Are there a set number of hours required?

**A:** No. The primary objective of this program is to ensure competency. The time required to achieve this may vary by individual provider.

- For reference, the previous SCT program included 24 hours of instruction, *not including experiential “ride time.”*
- Services that already provide some related education should conduct a **gap analysis** to identify and address any additional educational needs.

### 2. Does this program require a clinical experience?

**A:** Yes, **clinical experience should be included.** This may involve:

- Time in the ICU or Emergency Department,
- Ride time with a provider who is already IFT-trained,
- Experience under direct medical oversight.

### 3. Who should instruct this program?

**A:** The program should be instructed by one or more of the following:

- Subject Matter Experts (SMEs)
- Critical Care Paramedics
- Anyone approved by the service’s Sponsor Hospital

### 4. What qualifies as successful completion of this program?

**A:** Any program should include competency validation in knowledge, skill and synthesis and application, and provider comfort. This should be decided upon between a service and their Sponsor Hospital.

### 5. Is a service required to complete this education in order to do IFT calls?

**A:** This is best answered in two parts:

- **Patient Safety:** To provide the highest level of safety for patients, paramedics should receive the additional training offered by this program.
- **Billing Requirements (SCT):**  
If a service wishes to bill for **Specialty Care Transport (SCT)**, the paramedic must have received *“additional training that a state or locality requires a paramedic to complete in order to furnish specialty care to critically ill or injured patients during an SCT transport.”*  
— (American Ambulance Association, 2023 Medicare Reference Manual)

**6. How are the Inter-facility Transport (IFT) protocols integrated into the education program?**

**A.** The IFT protocols are designed as a checklist to help providers ensure safe and effective patient transport. Instructors should incorporate relevant protocols when teaching each module to reinforce their practical application.

**7. Will continuing education (CE) credits be offered for the IFT education program?**

**A.** Yes, one CME number will be assigned to the entire IFT program. The number of CE hours awarded will reflect each student's actual instructional and clinical time, allowing for flexibility based on individual learning paths.

## IFT Educational Supplement Module 1 - Transport Operations

Last Reviewed: 2025-September

Sponsor Hospital Approval: Paramedic

### Cognitive Objectives

Participants will:

1. **Review Types of Transport & Modalities**
  - Ground (IFT), CCT, Air, Specialty (i.e. neo-natal, pediatric)
  - Differences in standard equipment
  - Advantages vs disadvantages of each modality
2. **Understand EMTALA and Related Case Law (Further discussed in Module 2)**
  - Concepts: stabilization, transfer risks/benefits
  - Key legal references and implications for transport decisions
3. **Master Transport Preparation Protocols**
  - Pre-transport assessment (history, condition)
  - Review CT Interfacility Transport Protocols
  - Communication with healthcare teams
    - Obtaining orders
    - Who to contact (sending v. receiving)
  - Logistics: contact numbers, patient documentation, transport info
4. **Understand Patient and Safety Advocacy**
  - Determining appropriate destination
  - Diversion criteria and risk mitigation
  - Knowing when NOT to transport
5. **Identify Transport Stressors**
  - Environmental: temperature, noise, vibration, humidity
  - Physiological implications for patients
  - Provider stressors: Self Imposed DEATH or I.M. S.A.F.E.
6. **Understand Team Member Roles per Transport Type**
  - Roles of EMT, paramedic, RN, RT, physician as applicable
7. **Learn Team Dynamics & Crew Resource Management (CRM)**
  - Communication, leadership, shared mental models
8. **Familiarize with IFT specific Transport Equipment**
  - Ventilators, infusion pumps, I/O devices, chest tubes
9. **Discuss Goals of Care During Transport**
  - Managing hospice patients
  - Medications: continuation, titration, palliative approaches
  - Obtain written orders for care during transport
10. **Utilize Cognitive Offloading Tools**
  - Broselow tape, RSI checklist, transport guides, medication calculators
  - Securing medical devices safely during transport
11. **Understand appropriateness of “just in time” training**

## 12. Documentation During Interfacility Transport (IFT)

Student will understand how to properly document all critical elements during interfacility transport, ensuring continuity of care, legal compliance, and accurate handoff to the receiving facility. This includes:

- **IV Site Assessment & Documentation**
  - Verify and document patency, site condition, dressing integrity, and securement
  - Note infusion type, rate, concentration, dose and fluid volume at start and end of transport
- **Neurological Status & Timed Interventions**
  - Perform and document Glasgow Coma Scale (GCS), pupil size/reactivity, and motor response at **regularly scheduled intervals** or as per protocol
  - Clearly note time-stamped neuro checks, including any changes or interventions taken in response to patient status
- **Ventilator Settings**
  - Record full ventilator settings upon assumption of care and at any time changes are made
  - Include mode, FiO<sub>2</sub>, PEEP, tidal volume, respiratory rate, and alarms
  - Document EtCO<sub>2</sub> and SpO<sub>2</sub>, RASS trends throughout transport
- **BiPAP/CPAP Settings**
  - Note device settings at time of patient pickup: IPAP, EPAP, FiO<sub>2</sub>, and flow rate if applicable
  - Monitor and document any pressure adjustments or mask/interface issues during transport
- **Vital Signs**
  - Obtain and document vital signs at **clearly defined intervals**, including:
    - HR, BP, RR, SpO<sub>2</sub>, EtCO<sub>2</sub>, temperature (if available), BGL
  - Ensure **time-stamped entries** with any deviations, trends, or interventions noted
- **Additional Considerations**
  - Document medication administration, response to treatment, and any procedural interventions (e.g., suctioning, repositioning)
  - Include times of patient transfer of care, delays, or route changes
  - Clearly document communication with sending/receiving providers and any orders received during transport

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### Psychomotor Objectives

Students will:

1. Demonstrate use of pre-trip checklist and equipment setup
2. Explain transport types and pros/cons via case-based discussion
3. Describe team member roles and their scope of practice
4. Reference EMTALA legal cases during scenario decision-making
5. Set up and secure transport equipment safely and appropriately
6. Document an example patient care report for an IFT

## Affective Objectives

1. Given a scenario the student can effectively communicate needs or concerns to hospital care team pre trip
2. Demonstrate teamwork and collaboration with multidisciplinary providers
3. Given a scenario the student is able to make informed decisions regarding type of transport, benefits vs risks of transport, and conduct pre-trip checklist for determining if IFT transport is applicable.
4. Employ cognitive offloading strategies effectively under pressure
5. Given a scenario with an unfamiliar medication and/or equipment student will justify if “just in time” training is enough to safely take the transport.

## Instructor Notes

### 1. Documentation Expectations

- **Instructor Requirement:**  
Provide a general overview of documentation best practices in each course.
- **Instructional Focus:**
  - Emphasize that **each module must include a dedicated review** of documentation specific to that clinical topic (e.g., obstetric, cardiac, neurological).
  - Teach **legal and clinical importance** of thorough, objective, and timely documentation.
  - Review common documentation elements:
    - Patient condition pre-/post-transport
    - Vital signs and trending data
    - Treatments/interventions
    - Communication with medical control
    - Consent and transfer form

### 2. Safety and Preparation

- **Priority Emphasis:**  
Instructor-led sessions must prioritize crew safety, patient safety, and transport preparation throughout all modules.
- **Instructional Focus:**
  - Reinforce the “**safety-first**” approach in:
    - Pre-transport planning and checklist use
    - Scene safety and infection control
    - Proper securing of equipment and patients
  - Highlight the importance of:
    - Vehicle preparation
    - Crew readiness
    - Load planning for high-risk transports
  - Include discussion of:
    - Contingency plans for deterioration during transport
    - Backup communication options
    - Safety drills and documentation of readiness

- CT Interfacility transport protocols

### Related Protocols

Prehospital	IFT
<ul style="list-style-type: none"> <li>• N/A</li> </ul>	<ul style="list-style-type: none"> <li>• 8.0 Staffing Guidelines</li> <li>• 8.1 Routine IFT Care</li> </ul>

### CQI Performance Metrics

- Yearly scenario review/practice
- Review of IFT patient transports and hand offs

### Resources

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- Mauldin, L., & Smetana, C. (2020). *Flight medical provider study guide: Current concepts in critical care transport*. IAMed.
- Sheikhtaheri, A. (2014, June). Near misses and their importance for improving patient safety. PMC Home. <https://pmc.ncbi.nlm.nih.gov/articles/PMC4475608/>
- Skelly, C., McMahon, K., & Munakomi, S. (2023, August 13). Adverse events - StatPearls – NCBI bookshelf. National Center for Biotechnology Information. <https://www.ncbi.nlm.nih.gov/books/NBK558963/>
- *Statewide EMS protocols*. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>
- Wolfe, A. C., Santiago, J., Frakes, M. A., & Farmer, S. (2022). *Critical care transport core curriculum* (2nd ed.). Air & Surface Transport Nurses Association.

### Suggested/Required Equipment

- Ventilator and settings trainer
- IV pumps with drips
- IFT stretcher with high-fidelity manikin
- Chest tube training model
- Broselow tape, RSI kit, PEEP valves, suction

**IFT Educational Supplement**  
**Module 2 - Legal & Ethical Concepts**

**Last Reviewed:** 2025-September

**Sponsor Hospital Approval:** Paramedic

**Cognitive Objectives**

By the end of this course, the student will be able to:

1. Describe the roles of various IFT/CCT team members.
2. Summarize the history and evolution of COBRA into EMTALA.
3. Explain how EMTALA applies specifically to interfacility transfers.
4. Differentiate between IFT scenarios where EMTALA does and does not apply.
5. Define legal concepts including negligence, abandonment, and consent.
6. Identify patient rights during an IFT.
7. Determine who holds medical direction during an IFT, emphasizing the importance of communication between paramedics, physicians, family and caregivers.
  - Who is responsible for medical direction during transport
  - Expert consultation during transport (receiving)
8. Document written and oral orders for care during IFT.
9. Recognize and interpret documentation that satisfies EMTALA compliance.
10. Identify risks commonly associated with IFTs.
11. Describe strategies to mitigate risks in the transport environment.
12. Analyze case law related to EMTALA enforcement and EMS liability.
13. Articulate the roles and responsibilities of all personnel involved in an IFT.
14. Classify patients using the NHTSA 2006 IFT guide and CT State EMS Protocols.

**Psychomotor Objectives**

Upon successful completion, the student will be able to:

1. Apply EMTALA law in a simulated transport scenario.
2. Modify a given transport plan to reduce or eliminate legal and operational risks.
3. Identify and articulate "Safety STOP" points where patient care or provider safety may be compromised.

**Affective Objectives**

Upon completion, the student will:

1. Critically challenge a scenario or case position using EMTALA-related knowledge.
2. Dispute or defend the proper application of EMTALA in complex or ambiguous transport situations.
3. Advocate for a patient's appropriate level of care during transport.
4. Justify the decision to accept or decline an interfacility transport based on ethical and legal principles.

## Instructor Notes

1. Describe the roles of various IFT/CCT team members.
  - **Teaching Focus:** Role clarity (Paramedic, RN, MD, RT, receiving team).
  - **Method:** Use a case study with a diverse transport team.
  - **Notes:** Emphasize scope of practice and interprofessional respect.
2. Summarize the history and evolution of COBRA into EMTALA.
  - **Teaching Focus:** Timeline (1980s-present), key legal events.
  - **Method:** Timeline handout or interactive lecture with visuals.
  - **Discussion Prompt:** Why was EMTALA necessary?
3. Explain how EMTALA applies specifically to interfacility transfers.
  - **Teaching Focus:** Stabilization, appropriate transfer, accepting facilities.
  - **Method:** Use CMS language in slide decks.
  - **Key Point:** EMTALA applies until the patient is accepted and received.
4. Differentiate between IFT scenarios where EMTALA does and does not apply.
  - **Teaching Focus:** Clarify hospital responsibility pre-transfer.
  - **Method:** Scenario comparisons (e.g., specialty clinic vs ED).
  - **Tip:** Use a decision tree or flowchart.
5. Define legal concepts: negligence, abandonment, and consent.
  - **Teaching Focus:** Clear legal definitions with examples.
  - **Method:** Small-group breakout and report-back.
  - **Example:** What qualifies as abandonment in a transport context?
6. Identify patient rights during an IFT.
  - **Teaching Focus:** Autonomy, informed consent, privacy (HIPAA).
  - **Method:** Role plays with patient/family interaction.
  - **Case Point:** Unstable refusal or withdrawal of consent.
7. Determine who holds medical direction during an IFT.
  - **Teaching Focus:** Sending vs receiving provider authority.
  - **Method:** Annotate sample IFT flowcharts with medical control points.
  - **Key Emphasis:**
    - Sending MD initiates orders.
    - Transport crew operates under delegated authority.
    - Receiving MD may provide consultative input.

8. Document written and oral orders for care during IFT.

- **Teaching Focus:** Clarity, completeness, accuracy.
- **Method:** Provide samples of good/bad documentation.

9. Identify risks commonly associated with IFTs.

- **Teaching Focus:** Clinical deterioration, communication gaps, equipment failure.
- **Method:** Risk matrix or FMEA (Failure Modes and Effects Analysis).
- **Prompt:** Which patient type is most high-risk and why?

10. Describe strategies to mitigate risks in the transport environment.

- **Teaching Focus:** Checklists, redundancy, communication protocols.
- **Method:** Interactive exercise – “Build a Risk Mitigation Plan.”
- **Example Strategy:** Double-verification of meds/equipment.

11. Analyze case law related to EMTALA enforcement and EMS liability.

- **Teaching Focus:** Landmark cases and their precedents.
- **Method:** Brief case summaries followed by debate/discussion.
- **Assessment:** Group presentation on assigned case.

12. Articulate the roles and responsibilities of all personnel involved in an IFT.

- **Teaching Focus:** Responsibility at hand-off, chain of command, crew roles.
- **Method:** Group role simulation.
- **Prompt:** Who’s in charge if the patient condition changes during transport?

13. Classify patients using the NHTSA 2006 IFT guide and CT State EMS Protocols.

- **Teaching Focus:** Priority levels, acuity, and transport mode.
- **Method:** Patient scenarios – assign classification.
- **Resource:** Distribute pocket guides or flowcharts.

14. Identify and articulate “Safety STOP” points.

- **Method:** Use a transport checklist that includes STOP points.
- **Examples:** Equipment failure, patient decompensation, traffic delay.
- **Assessment:** Student must pause simulation and identify STOP.

15. Advocate for a patient’s appropriate level of care during transport.

- **Method:** Use ethical dilemma scenarios.
- **Focus:** Up-triaging a stable patient who deteriorates mid-transport.

## Related Protocols

Prehospital	IFT
<ul style="list-style-type: none"><li>6.4 Communications Failure</li></ul>	<ul style="list-style-type: none"><li>8.0 Staffing Guidelines</li><li>8.1 Routine IFT Patient Care</li></ul>

## CQI Performance Metrics

### 1. Documentation Accuracy & Completeness

- Metric:** 100% of transport records should include clear, legible, and complete documentation of:
  - Patient condition at pickup and during transport
  - Interventions performed
  - Vital signs and monitoring data
  - Equipment used (e.g., ventilator settings, arterial line status)
  - Medication administration (dose, route, time)
  - Signatures (crew, sending/receiving facility)
  - Medical orders that fall outside of protocol.
- Audit Frequency:** 100% of charts or random 10–20% monthly audit

### 2. Legal Exposure and Incident Reporting

- Metric:** Incident reports filed for all:
  - Equipment failures
  - Line dislodgement or bleeding
  - Missing documentation or signature
  - Discrepancies in reports between sending and receiving teams
- Goal:** 100% of reportable incidents are filed, followed up, and resolved

### 3. HIPAA and Patient Privacy Compliance

- Metric:** 100% of transports must be free from:
  - Unauthorized sharing of PHI
  - Improper documentation storage
  - Breaches in patient privacy during handoff or transport

## Resources

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- U.S. Department of Health and Human Services - Office of Inspector General. (2024, December 16). *The emergency medical treatment and labor act (EMTALA)*. Office of Inspector General | Government Oversight | U.S. Department of Health and Human Services. Retrieved September 4, 2025, from <https://oig.hhs.gov/reports/featured/emtala/>

- *Statewide EMS protocols.* (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>
- Wolfe, A. C., Santiago, J., Frakes, M. A., & Farmer, S. (2022). *Critical care transport core curriculum* (2nd ed.). Air & Surface Transport Nurses Association.

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**Suggested/Required Equipment**

- Handouts: EMTALA law excerpts, case summaries
- NHTSA 2006 IFT Patient Classification Guide
- CT State EMS Protocols (latest edition)
- Sample IFT documentation and transfer forms
- Safety STOP Checklist

## IFT Educational Supplement

### Module 3 - Medical Devices and Specialty Equipment

**Last Reviewed:** 2025-September

**Sponsor Hospital Approval:** Paramedic

#### Scope of Devices Covered

- Vascular Access Devices (Midline, Central Lines, Ports, PICCs, Swan-Ganz, Dialysis catheters)
- Medication Pumps (Infusion & PCA)
- Chest Tubes & Heimlich Valves
- Foley Catheters & Continuous Bladder Irrigation (CBI)
- Tracheostomies
- Medical Drains

#### **Excluded Devices (Covered in Other Curricula)**

- NG/OG Tubes, Blakemore Tubes (*GI/GU*)
- Arterial Lines
- Ventilators
- CPAP/BiPAP (*NIV*)
- HFNC (*Respiratory*)
- Transvenous Pacers, LifeVest, LVAD (*Cardiac*)

Device	ALS/BLS
Arterial Line	<b>IFT</b> Trained Paramedic
CBI	<b>IFT</b> Trained Paramedic
Chest tube	<b>IFT</b> Trained Paramedic
CPAP/BiPap	<b>ALS</b>
Foley Catheter	<b>BLS</b>
Heimlich Valve	<b>BLS</b> (not on suction) <b>ALS</b> (if on suction)
HFNC	<b>IFT</b> Trained Paramedic
Drains	<b>BLS</b>
Lifevest	<b>BLS</b> (as long as no cardiac monitor needed)
LVAD	<b>BLS</b> (if not monitor) <b>ALS</b> (if on monitor or LVAD malfunction)
Medication Pumps - Infusion	<b>ALS</b>
Medication Pumps - PCA	<b>BLS</b>
Nasogastric Tube (NG)	<b>BLS</b> (not on suction) <b>ALS</b> (on suction)
Orogastric Tube (OG)	<b>ALS</b>
Tracheostomies	<b>BLS</b> (not recently placed, no need for deep suction.) <b>ALS</b> (recent placement, deep suction regularly required)
Transvenous Pacer	<b>IFT</b> Trained Paramedic or <b>CCT</b>
Vascular Devices <b>(NO SWAN-GANZ for either)</b>	<b>BLS</b> (if nothing running) <b>ALS</b> (if fluids/medications running)
Ventilator	<b>ALS</b> (even if patient's own vent)

## Section 1: Infusion Pumps (Infusion & PCA)

### Cognitive Objectives

1. Describe mechanical function and programming of infusion pumps.
2. Identify compatible tubing types and medication requirements.
3. Recognize and resolve common technical issues.

### Psychomotor Objectives

1. Program medication dose on pump.
2. Load tubing correctly.
3. Troubleshoot:
  - Air in line
  - Kinked tubing
  - Power failure

### Affective Objectives

1. Evaluate whether medications can be safely continued via gravity or require pump.
- 

## Section 2: Foley Catheters

### Cognitive Objectives

1. Understand Foley catheter purpose and indications.
2. Identify proper function and complications.
3. Review infection prevention and maintenance strategies.

### Psychomotor Objectives (*Skills Demo Required*)

1. Assemble Foley catheter.
2. Troubleshoot common issues: clogging, kinks, premature removal.
3. Demonstrate aseptic handling.

### Affective Objectives

1. Discuss hygiene, fluid tracking, and risk of improper Foley bag positioning.
- 

## Section 3: Continuous Bladder Irrigation (CBI)

### Cognitive

1. The student will learn the purpose for CBI
  - Blood clot removal
  - Lessen irritation
  - Medication administration
  - Dissolve bladder stones
2. Provider will learn the parts of a CBI system
  - 2 bags of sterile saline (3000-4000mL)
  - Catheter tubing
  - Ports
  - Empty bag

- Syringe

3. Provider will learn transport considerations for CBI

- Hang saline bags 24-36" above bladder
- Ensure the IUC is secured to the patient's thigh to minimize catheter movement
- Considerations for stopping infusion (obstruction)
- Measuring I & O
- Fluid temperature
- Pain control

4. Provider will learn to Identify and correct problems

a. Catheter Obstruction

- Diminished or absent urine flow, assuming adequate hydration
- Suprapubic distention
- Severe lower abdominal discomfort
- Fluid leakage at the perineal area, which is evidence of fluid bypassing the urinary catheter
- Diaphoretic, tachycardic, hypotensive signs and symptoms, with vasovagal episodes that can occur with advanced bladder distention

b. Catheter displacement

c. Pain

- Is tubing kinked or compressed
- Is their adequate output
- Is there bladder distention

d. Leakage

- Assess for obstruction
- Assess for bladder spasm.
- Avoid cold irrigation fluid.

5. Provider will review evaluation of system during its use

- Check the color of the urine.
- Control the drip and flow of the sterile solution, speeding it up or slowing it down as needed.
- Empty the drainage bag frequently.
- Measure urine output (how much comes out).
- Monitor blood, clots or debris in the urine.
- Replace a bag of sterile saline when it's empty.

**Psychomotor Objectives**

1. Identify and label CBI components.
2. Set up system and replace irrigation bags.
3. Troubleshoot CBI complications during use.

### **Affective Objectives**

1. Determine when to stop CBI during transport and justify actions.
2. Provider will learn the importance of maintaining sterility and asepsis while handling a CBI system.

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### **Section 4: Chest Tubes / Heimlich Valves**

#### **Cognitive**

1. The student will learn the indications for chest tube/Heimlich valve placement
2. The student will learn the physiology of how a chest tube works.
3. The student will learn the reasons for a Heimlich valve.
4. The student will learn the parts associated with a chest tube set up
  - Tubing
  - Water seal chamber
  - Suction
5. The student will understand what a “normally” operating chest tube looks like.
  - Proper “bubbling” in the water seal chamber
  - Securing of tubing at chest
  - Suctioning
6. The student will understand how to “troubleshoot” the following problems:
  - Abnormal bubbling in water seal chamber
  - Chest tube is removed from chest
  - Drainage system tips over and spills
  - Drainage system is damaged/broken open
  - Tension Pneumothorax
7. The student will learn what the following “bubbling” types indicate:
  - Tidaling (gentle rise/fall with patient’s breathing)
  - Continuous (air leak from tube connection or patient’s chest)
  - Intermittent (Intermittent leak from patient’s chest)
  - No bubbling (No air leak)

#### **Psychomotor (*Skills Demo Required*)**

1. The student will confirm that chest tube is properly secured to patient.
2. The student will demonstrate the proper placement of the drainage unit during patient movement and transport.
3. The student will successfully attach chest tube to suction and set suction to appropriate setting.
4. The student will either demonstrate or state how to correct the following problems:
  - Abnormal bubbling in water seal chamber
  - Chest tube is removed from chest
  - Drainage system tips over and spills
  - Drainage system is damaged/broken open
  - Tension Pneumothorax

**Affective**

1. The student will justify the use of a Heimlich valve instead of a chest tube.
2. The student will explain why “clamping off” the chest tube isn’t recommended.
3. The student will explain why proper positioning of the drainage unit is important.
4. The student will explain what can happen if the following problems aren’t corrected:
  - Abnormal bubbling in water seal chamber
  - Chest tube is removed from chest
  - Drainage system tips over and spills
  - Drainage system is damaged/broken open
  - Tension Pneumothorax

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**Section 5: Vascular Access Devices****Cognitive**

1. The student will learn the uses, advantages and disadvantages of various central venous access devices.
2. The student will learn proper placement of the above listed vascular access devices.
3. The student will learn the possible complications for the listed vascular devices.
  - Unexpected removal
  - Shortness of breath
  - Infection
  - Occlusion (specifically if Swan-Ganz catheter is present)
4. The student will learn how to properly access the above listed vascular access devices.
5. The student will understand how to correctly flush a central line.
6. The student will learn how to identify the ports on lines with multiple access.

**Psychomotor (Skills Demo Required)**

1. The student will demonstrate proper aseptic technique while accessing a central line.
2. The student will successfully identify/label the parts of a given central line.

**Affective Objectives**

1. Justify use of central over peripheral access.
2. Analyze transport scenarios for appropriate line access decision-making.

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**Section 6: Tracheostomies****Cognitive**

1. Student will review types/parts of tracheostomy tubes.
  - Cuffed v. Non-cuffed
  - Fenestrated v. Non-Fenestrated
  - Inner cannula
  - Pilot balloon
  - Plug

- Bivona
2. Student will review reasons tracheostomies are placed
  3. Student will review common issues and their causes with tracheostomy tubes
    - Plugged
    - Infection
    - Dislodged
    - Cuff Seal/Patency/Inflation
  4. Student will review how to correct issues with a tracheostomy tube.
    - Suctioning
    - Replacement (w/ ETT or trach tube)
    - Cuff adjustment

**Psychomotor Objectives (*Skills Demo Required*)**

1. Identify tracheostomy components.
2. Demonstrate suctioning technique.
3. Replace tracheostomy with ETT or new tube if needed.

**Affective Objectives**

1. Justify tube replacement or maintenance decisions.
2. Analyze ventilator performance in context of tracheostomy.
3. Emphasize importance of device reporting and documentation.
4. Student will appreciate why equipment is necessary to safely transport a patient with a tracheostomy.

**Section 7: Medical Drains**

**Chest & Abdominal Drains**

**Cognitive Objectives**

1. Indications: pleural effusion, ascites, malignancy.
2. Identify drain components.
3. Know safe fluid removal volumes:
  - Chest:  $\leq 1000\text{mL}$
  - Abdomen:  $\leq 2000\text{mL}$
4. Troubleshoot flow issues: loculation, occlusion, vacuum loss.
5. Respond to complications: dislodgement, leaks, SOB.

**Pericardial Drains**

**Cognitive Objectives**

1. Indications: effusion, tamponade.
2. Identify drain components.
3. Assessment: Beck's Triad, AMS, fluid changes.
4. Understand drainage types: intermittent vs. continuous.
5. Troubleshoot blockage causes.
  - Kinked tubing

- Tubing positioning
- Loose connection
- Drainage system position (dependent to insertion point)
- Stopcock position

**Psychomotor Objectives**

1. Identify root cause of drain issues.
2. Demonstrate proper handling and repositioning techniques.

**Affective Objectives**

1. Appreciate risks during transport.
2. Justify when ALS transport v. BLS transport is required.

**Instructor Notes**

- Central Venous Devices
  - ✓ Midline, Hickman, Broviac, Groshong
  - ✓ Dialysis
  - ✓ Internal jugular, Subclavian, Femoral
  - ✓ Port
  - ✓ PICC
  - ✓ Swan-Ganz: Should be transported by CCT
- It is important that the instructor differentiate level of provider for each device (i.e. BLS v. ALS)
- Instructor should be comfortable with the parts and use of listed devices
- Instructor should ensure that students are able to have “hands on” experience with devices listed that state “skills demonstration required.”

**Related Protocols**

Prehospital	IFT
<ul style="list-style-type: none"> <li>● 5.10 Tracheostomy Care</li> <li>● 6.3A Central Line Access</li> </ul>	<ul style="list-style-type: none"> <li>● 8.0 Staffing Guidelines</li> <li>● 8.1 Routine IFT Patient Care</li> <li>● 8.5 Continuous Bladder Irrigation</li> <li>● 8.6 Central Venous Access (Tunneled &amp; Non-tunneled catheters)</li> <li>● 8.7 Chest Tubes</li> </ul>

**CQI Performance Metrics**

- Yearly scenario review/practice
- Review any reports of device failures/malfunctions

**Resources**

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- Agency for Clinical Innovation Urology Network. (2020). *Bladder irrigation: Management of haematuria* (3rd ed.). Agency for Clinical Innovation. <https://www.aci.health.nsw.gov.au/>
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.

- Cath Lab Digest. (2024, April). *Conversations in cardiology: Management of pericardial drains*. <https://www.hmpgloballearningnetwork.com/>. Retrieved August 5, 2025, from <https://www.hmpgloballearningnetwork.com/site/cathlab/clinical-editors-corner/conversations-cardiology-management-pericardial-drains>
- CareFusion Corporation. (2014). *PleurX clinical practice guidelines*. [https://www.edutracker.com/trktrnr/Presentation/jh\\_newcastle\\_pa/N9PLEURX.pdf](https://www.edutracker.com/trktrnr/Presentation/jh_newcastle_pa/N9PLEURX.pdf). [edutracker.com](https://www.edutracker.com)
- Cleveland Clinic. (2022, March 16). *Continuous bladder irrigation: Purpose & procedure*. Cleveland Clinic. Retrieved May 2, 2024, from <https://my.clevelandclinic.org/health/treatments/22597-continuous-bladder-irrigation>
- Continuous Bladder Irrigation: Purpose & Procedure ([clevelandclinic.org](https://my.clevelandclinic.org/health/treatments/22597-continuous-bladder-irrigation))
- Kern, M. E. (2025, April 22). *78: Pericardial catheter management*. Clinical Gate. <https://clinicalgate.com/78-pericardial-catheter-management/>
- Sagrista-Sauleda, J., Merce, A., & Soler-Soler, J. (2026, May 26). *Diagnosis and management of pericardial effusion*. PMC Home. <https://pmc.ncbi.nlm.nih.gov/articles/PMC3110902/>
- *Statewide EMS protocols*. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>
- Walsh, K., & Caple, C. (2017, April 5). *Urinary catheter caring for in patients following turp*. UNIMIB.it. Retrieved May 2, 2024, from [https://elearning.unimib.it/pluginfile.php/677864/mod\\_resource/content/1/Urinary%20Catheter%20Caring%20for%20in%20Patients%20Following%20TURP.pdf](https://elearning.unimib.it/pluginfile.php/677864/mod_resource/content/1/Urinary%20Catheter%20Caring%20for%20in%20Patients%20Following%20TURP.pdf)
- Wolfe, A. C., Santiago, J., Frakes, M. A., & Farmer, S. (2022). *Critical care transport core curriculum* (2nd ed.). Air & Surface Transport Nurses Association.

**Suggested/Required Equipment**

- Pump(s) and tubing
- Examples of Central lines
- Picture or actual CBI set up
- Chest tube with water seal
- Tracheostomy with manikin for practice
- Drains

## IFT Educational Supplement Module 4 - Cardiac Management

Last Reviewed: 2025- September

Sponsor Hospital Approval: Paramedic

### Cognitive Objectives

Upon completion of this course, the student will be able to:

#### 1. Tachyarrhythmia Treatment During IFT

- Identify appropriate pharmacologic interventions:
  - Sodium Channel Blockers
  - Beta Blockers
  - Calcium Channel Blockers
  - Potassium Channel Blockers
  - Digoxin (unknown mechanism)
  - Electrolyte repletion
- Understand indications and considerations for synchronized cardioversion.

#### 2. Bradyarrhythmia Treatment During IFT

- Recognize appropriate treatments:
  - Atropine
  - Epinephrine infusion
  - Dopamine
  - Transcutaneous/Transvenous pacing
  - Isoproterenol
  - Calcium gluconate/chloride

#### 3. Acute Coronary Syndrome (ACS) in IFT

- Differentiate STEMI vs. NSTEMI
  - OMI (Occlusive myocardial infarction)
  - NOMI (non-occlusive myocardial infarction)
- Interpret EKG findings (e.g., Sgarbossa, Wellens, Brugada, etc.)
- Analyze lab results: troponins, CK/MB, PT/INR, proBNP, lactic acid
- Understand pharmacologic and procedural interventions:
  - Antiplatelets, thrombolytics, analgesics, vasodilators/constrictors, PCI

#### 4. Return of Spontaneous Circulation (ROSC)

- Manage airway and hemodynamics post-ROSC
- Targeted Temperature Management (considerations for maintaining it during transport)

#### 5. Aortic Dissection

- Classify using DeBakey and Stanford systems
- Apply HR and BP control strategies (e.g., esmolol, nicardipine, analgesics, nitroprusside)

## 6. Aneurysms

- Outline treatment strategies including: Rate & BP control, pain, blood products and surgical consideration
- AAA v. Thoracic

## 7. Pulmonary Embolism

- Review treatment modalities: heparin, thrombolytics, thrombectomy
- proBNP, lactate, imaging
- Evidence of right heart strain?

## 8. Pericardial Infections (viral/bacterial)

- Acute Myocarditis / Endocarditis/Pericarditis
- Recognize clinical presentation and management

## 9. Pericardial Effusion and/or Tamponade

- Understand the role of pericardiocentesis in the IFT setting
- Common EKG findings: electrical alternans, low voltage
- Common medical causes: uremia/missed dialysis and malignant pericardial effusion
- Trauma: blood
- Size of the effusion matters less than the rate of accumulation of the fluid as far as risk of developing tamponade

## 10. Cardiogenic Shock

- Define hemodynamic criteria (Reference: [SCAI Shock Stages](#))
  - Severe reduction of cardiac index
  - Elevated ventricular filling pressure/ Elevated left end diastolic pressure (LVEDP)
- Describe treatment modalities
  - Oxygen
  - Vasopressors
  - Inotropes
  - Stent/ CABG
  - Mechanical circulatory support (IABP, ECMO, VAD, RV Impella)
  - Heart transplant

## 11. Patient pacemaker failure

- Apply PACER and HEARTS mnemonics in troubleshooting

## 12. Cardiac Devices During Transport

- Review indications, settings, complications of:
  - Transcutaneous and transvenous pacing
  - Life Vest ([Life Vest](#))
  - VADs (HeartMate II/III, HeartWare, Jarvik)

- Impella, IABP, ECMO, epicardial TVP (**CCT only**)
- Assess transport considerations and complications
- Review medications common in VAD patients (e.g., anticoagulants, antibiotics)

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### Psychomotor Objectives

- Given a scenario student will demonstrate assessment and care management of an IFT for the patient with cardiac chest pain
- Given a scenario student will demonstrate correct considerations/treatments for IFT of a patient with ROSC.
- Given a scenario the student will demonstrate the ability to manage/ maintain transvenous pacing (TVP).
- The student will demonstrate appropriate assessment techniques for a VAD patient.
  - Contact VAD Coordinator and/or family familiar with patient/device
  - Monitor LOC, ECG, SpO2%, and ETCO2 (may not have palpable pulse)
  - NIBP may or may not register (monitor MAP if possible)
  - Auscultate for VAD motor operation
- The student will demonstrate appropriate troubleshooting of VAD failure.
  - Alarms
  - Driveline
  - Battery
  - System controller
- Given a scenario the student will be able to correctly identify all equipment that should be transported with a VAD patient.

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### Affective Objectives

- The student will appreciate the risk of CVA and bleeding for VAD patients
- Value the critical importance of safe and complete equipment transport with VAD patients.
- Demonstrate an appreciation for the risks of overcorrection of arrhythmias.
- Exhibit confidence and clinical judgment in high-acuity, device-assisted patient scenarios.
- Respect the complexity and uniqueness of each cardiac device and pathology in the IFT context.

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### Instructor Notes

#### 1. Dysrhythmias

- Calcium used to treat bradycardia in the case of hyper K

#### 2. ACS

- **NSTEMI:** Be aware of other potentials, i.e. PE, cardiogenic shock, gi bleed, obtain accurate history
- **OMI/NOMI:** Traditional STEMI criteria is only about 43% sensitive for ACUTE CORONARY OCCLUSION (ACO), for which the “gold standard” for diagnosis is the left heart cath. The point of OMI/NOMI is use of other criteria to increase the sensitivity (and specificity) of patients who have ACO and would benefit from an emergent cath.
- **Troponins** – There are various reasons why some patients will not have a normal troponin at baseline (example ESRD) and so if the troponin is rising, that is when we care/get worried for NSTEMI. It is also important to know that the scale for troponin and high-sensitivity troponin is totally different so that’s apples to oranges comparison.

### 3. High-Risk ECG Patterns in Acute Coronary Syndromes

- **Sgarbossa Criteria** (*LBBB / ventricular paced rhythms*)
  - Review original and modified Sgarbossa criteria.
  - Use side-by-side ECGs of LBBB and LBBB with ischemia.
  - Reinforce: Proportional discordance **vs** concordant STE.
- **Wellens Syndrome**
  - Deep symmetrical T-wave inversion or biphasic T waves in V2-V3.
  - Occurs during pain-free periods – critical LAD stenosis.
- **Brugada Syndrome**
  - Pseudo-RBBB with ST elevation in V1-V3.
  - Sudden cardiac death in young males; do not treat as STEMI.
- **de Winter's T-waves**
  - Upsloping ST depression in precordial leads with tall, symmetric T-waves.
  - Signifies proximal LAD occlusion – equivalent to anterior STEMI.
- **New Onset RBBB**
  - **Especially concerning when new or with anterior changes → may indicate proximal LAD occlusion.**
- **STE in aVR > V1 with diffuse ST depression**
  - **Suggests** left main or triple-vessel disease.
  - High mortality → rapid cath lab activation.
- **Hyperacute T-Waves**
  - Early sign of MI, often taller and wider than typical peaked T-waves.
  - Seen before overt STE appears.
- **Pathologic Q-Waves**
  - Q-waves with subtle STE that cannot be attributed to old infarct = possible missed OMI.
- **Terminal QRS Distortion**
  - No S-wave or J-point – strong indicator of anterior OMI.
- **Reciprocal ST Depression / T-Wave Inversion**
  - Recognize patterns in aVL when inferior STE is present.
- **Subtle STE Not Meeting Criteria**
  - Teach students to be suspicious when subtle STE is accompanied by symptoms or abnormal Q-waves.
- **STD Maximal in V2–V4 → Posterior MI**
  - Consider posterior leads (V7–V9) or infer posterior occlusion from reciprocal changes.
  - No elevation doesn't preclude the presence of a posterior MI.
- **STE in Inferior Leads with STD in aVL**
  - aVL is a reciprocal lead to inferior wall – strong indicator of inferior OMI.

### 4. Pericardial Disease

- ST-Elevation throughout EKG
- Change in pain due to positioning
- Pain radiation patterns

- Common antibiotics for treatment

## 5. Aortic Dissection Management

- **Primary Teaching Focus:**
  - Goal-directed therapy to reduce shearing force on the aorta:
    - HR < 60 bpm
    - SBP < 120 mmHg
- **Medications:**
  - Esmolol – first line for rate control. Rate control is priority
  - Nicardipine / Nitroprusside – add after beta blockade if BP remains elevated

- **Pain management**

## 6. Cardiogenic shock

- Cardiogenic shock can be present with a normal blood pressure, a better definition is end organ dysfunction secondary to poor cardiac function (heart can't pump effectively to keep up with perfusion demands)

## 7. Pacemaker Management During Transport

- **Trouble shooting guidance:** <https://emergencymedicinescases.com/ecg-pacer-approach-pacemaker/>
- **Complications:**
  - Dislodgement
  - Infection
  - Thrombosis
- **Settings to Know:**
  - Rate
  - Amplitude (output)
  - Sensitivity
  - Mode: Asynchronous/Triggered/Inhibited (PSR Code)
- **Pre-Transport Checklist:**
  - Confirm placement and mechanical capture
  - Document current settings and mode
  - Ensure securement of wires and generator
  - Prepare for loss of capture or dislodgement
- **Failure Mnemonic – BLED:**
  - **B**attery failure
  - **L**ead wire failure
  - **E**xternal pulse generator failure
  - **D**islodgement
- **Uncorrectable Failure:**
  - If troubleshooting fails, initiate backup strategy (e.g., transcutaneous pacing, CPR if needed)

## 8. Ventricular Assist Devices (VADs)

- **Patient Populations:**
  - Heart failure patients who are:
    - Non-transplant candidates
    - Transplant candidates awaiting organs
    - Palliative care or DNR status with VAD in place
  - Device Overview:
    - HEARTMATE II
    - HEARTMATE 3
    - HeartWare HVAD
    - JARVIK 2000
  - **Assessment Challenges:**
    - No palpable radial pulse
    - BP often measured via Doppler MAP
    - SpO<sub>2</sub> may not be reliable
    - ETCO<sub>2</sub> preferred
    - VAD motor should be auscultated (hum)
  - **Assessment Must-Knows:**
    - Evaluate peripheral perfusion
    - Look for signs of shock without ECG abnormalities
  - **Device Complications:**
    - Most Common:
      - Low battery
      - Battery failure
    - Other Failures:
      - System controller failure
      - Driveline fault
      - Percutaneous lead damage
  - **When CPR May Be Required:**
    - Refer to State Protocol 6.21
    - Be prepared to initiate chest compressions if:
      - Unconscious
      - No signs of life
      - Loss of perfusion with no VAD function
  - **Low Flow State in VAD Patients**
    - If ECG shows arrhythmia: Treat with ACLS protocols
    - If ECG is normal:
      - Assume hypovolemia
      - Begin volume resuscitation
      - Check:
        - Battery status
        - Driveline connection

- VAD alarms
- **Transport & Equipment Considerations for VAD Patients**
  - Always Bring:
    - Extra batteries
    - Backup system controller
    - Driveline tools
    - VAD-specific transport bag (manufacturer provided)

**Related Protocols**

Prehospital	IFT
<ul style="list-style-type: none"> <li>• 2.19 Pain Management</li> <li>• 2.23 Shock</li> <li>• 3.0 ACS</li> <li>• 3.1A/P Bradycardia</li> <li>• 3.2A/P Cardiac Arrest</li> <li>• 3.3 CHF</li> <li>• 3.4 Post Resuscitative Care</li> <li>• 3.5A/P Tachycardia</li> <li>• 6.19 TCP</li> <li>• 6.21 VAD</li> </ul>	<ul style="list-style-type: none"> <li>• 8.2 Aortic Dissection/Aneurysm</li> <li>• 8.15 Sedation &amp; Analgesia</li> <li>• 8.16 STEMI/NSTEMI</li> <li>• 8.18 Transvenous Pacing</li> </ul>

**CQI Performance Metrics**

- Yearly scenario review/practice
- 100% QA review of all TVP IFT
- 100% QA review of all ROSC IFT

**Resources**

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- Baran, D., Basir, M., Grines, C., Hall, S., Henry, T., Kapur, N., Naidu, S., O'Neill, W., Rao, S., & Trusdell, A. (2022, January 31). *SCAI SHOCK stages classification expert consensus update: A review and incorporation of validation studies*. SCAI.org. Retrieved August 19, 2025, from <https://scai.org/publications/clinical-documents/scai-shock-stages-classification-expert-consensus-update-review-and>
- Halligan, A., Kasianko, C., & Vempati, A. (2023, July 24). *Critical care device series: Transvenous pacemaker*. www.emra.org. <https://www.emra.org/emresident/article/device-series-tvp>
- International Consortium of Circulatory Assist Clinicians (ICCAC). (2020). *Mechanical circulatory support*. <https://www.mylvad.com/medical-professionals/resource-library/ems-field-guides>
- McLaren, J. (2022, October 11). *PACER mnemonic approach to pacemaker patients | ECG cases | EM cases*. Emergency Medicine Cases. <https://emergencymedicinecases.com/ecg-pacer-approach-pacemaker/>
- Nickson, C. (2023, April 17). *Temporary pacemaker troubleshooting*. Life in the Fast Lane • LITFL. <https://litfl.com/temporary-pacemaker-troubleshooting/>

- Society of Critical Care Medicine. (2021). *Fundamental critical care support* (7th ed.).
- *Statewide EMS protocols*. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>
- Strilka, R., Henderderson, J., Aguirre, J., Schmike, A., Roberts, S., Clark, A., & Anderson, N. et.al. (2020, January 30). *Transcutaneous and temporary transvenous pacing critical care air transport*. [https://jts.health.mil/assets/docs/cpgs/Transcutaneous\\_and\\_Temporary\\_Transvenous\\_Pacing\\_CC\\_AT\\_30\\_Jan\\_2020\\_ID50.pdf](https://jts.health.mil/assets/docs/cpgs/Transcutaneous_and_Temporary_Transvenous_Pacing_CC_AT_30_Jan_2020_ID50.pdf). Retrieved March 19, 2025, from <https://jts.health.mil/>

**Suggested/Required Equipment**

- Picture of VAD or manual
- Example rhythm strips
- Example labs
- Monitor with pacer pads
- Transvenous pacer

## IF Educational Supplement Module 5 - GI/GU

**Last Reviewed:** 2025-September

**Sponsor Hospital Approval:** Paramedic

### Cognitive Objectives

Upon completion of this course, the student will be able to:

#### 1. Review Pertinent GI/GU Pathophysiology and Assessment

- **Physical Exam Signs:**
  - Murphy's sign
  - Cullen's sign
  - Grey Turner sign
- **Abdominal Pain Differentials:**
  - Ischemic, necrotic, obstructed, or perforated bowel
  - Dissecting or ruptured abdominal aortic aneurysm (AAA) (*See Cardiac Module*)
  - Ruptured ectopic pregnancy
  - Appendicitis
  - Pancreatitis
  - Liver failure / cirrhosis
  - Acute cholecystitis / choledocholithiasis
  - Pyelonephritis
- **Gastrointestinal Bleeding:**
  - Upper GI sources (e.g., ulcers, esophageal varices)
  - Lower GI sources
- **Trauma-Related Emergencies:**
  - Hypovolemia and shock due to blunt or penetrating trauma
- **Other Critical Conditions:**
  - Intra-abdominal compartment syndrome
  - Mallory-Weiss and Boerhaave's tears

#### 2. Review Relevant GI/GU Pharmacology

- **Anti-emetics:**
  - Ondansetron, Prochlorperazine, Metoclopramide, Droperidol
- **Pain Control:**
  - Fentanyl, Hydromorphone, Morphine, Ketamine, Ketorolac/NSAIDs
- **Other Agents:**
  - Blood products (refer to supplemental objective handout)
  - Antibiotics for GI/GU infections
  - Proton Pump Inhibitors (PPIs), Octreotide, Vasopressin
  - Anticoagulant reversal agents

#### 3. Review GI/GU-Related Laboratory Values

- Complete Blood Count (CBC)
- BUN / Creatinine
- Chem 7 (Basic Metabolic Panel)

- PT/INR
  - Liver Function Tests (LFTs)
- 4. Review Common Devices Used in GI/GU Patient Transport**
- Nasogastric (NG) and Orogastric (OG) tubes
  - Urinary catheters (including Continuous Bladder Irrigation - CBI)
  - Gastrostomy (G-tubes) and Jejunostomy (J-tubes)
  - Surgical drains and wound vacs
  - Sengstaken-Blakemore tube (***CCT only***)

**Psychomotor Objectives**

Upon completion of this course, the student will be able to:

**1. Demonstrate Proficiency in Initiating and Monitoring GI/GU Devices:**

- **Nasogastric (NG) Tube:**
  - Proper placement and use with suction
- **Orogastric (OG) Tube:**
  - Proper placement and use with suction
- **Urinary Catheter:**
  - Monitor initial and ongoing urinary output
  - Recognize and respond to complications or intervention

**Affective Objectives**

Upon completion of this course, the student will be able to:

1. Given a transport scenario involving a patient with a GI/GU condition, assess the patient appropriately and develop a comprehensive transport and treatment plan, integrating pharmacologic, diagnostic, and device-based interventions as indicated.
2. Understand and appreciate the rationale behind the administration (or withholding) of anticoagulant reversal agents in the context of GI/GU pathology.

**Instructor Notes**

- Reinforce recognition and clinical implications of signs such as Murphy’s, Cullen’s, and Grey Turner.
- Labs are primarily for review; treatment decisions during transport are rarely lab-dependent except for critical H&H levels without transfusion.
- Be proficient in the use of transport-relevant devices (e.g., NG/OG tubes, urinary catheters, surgical drains,)
- Emphasize common antibiotics used in GI/GU infections and when they may be initiated during transport.
- Encourage interactive case-based discussions to strengthen clinical decision-making.

**Related Protocols**

Pre-Hospital	IFT
2.20A Abdominal Pain	8.0 Staffing Guidelines
2.14 Nausea/Vomiting	8.4 Blood Products
2.19A/P Pain Management	8.5 CBI
4.3 Prehospital blood product transfusion	8.12 NG/OG Tubes
6.7A Gastric Tube Insertion	8.15 Sedation & Analgesia

**CQI Performance Metrics**

- Yearly scenario review/practice
- Review of all IFT with blood running.
- Review of IFT with a medical device failure.

**Resources**

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- Farkas, J. (2023, April 13). *GI bleeding*. emcrit.org. Retrieved August 11, 2025, from <https://emcrit.org/ibcc/gib/#:~:text=medications%20&%20blood%20transfusion,Source%20control:>
- FCCS. (2012). *Fundamental critical care support* (5th ed.). Society of Critical Care Medicine.
- Mauldin, L., & Smetana, C. (2020). *Flight medical provider study guide: Current concepts in critical care transport*. IAMed.
- *Statewide EMS protocols*. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>
- Wolfe, A. C., Santiago, J., Frakes, M. A., & Farmer, S. (2022). *Critical care transport core curriculum* (2nd ed.). Air & Surface Transport Nurses Association.

**Suggested/Required Equipment**

- OG/NG tubes with manikin to practice evaluation and placement
- Pumps/tubing to practice adjusting medications as needed

**IFT Educational Supplement**  
**Module 6 - Metabolic/Electrolyte Disturbances**

**Last Reviewed:** 2025-September

**Sponsor Hospital Approval:** Paramedic

**Cognitive Objectives**

**A. Review of the Endocrine System**

Describe the function and role of the following glands:

1. Pineal
2. Pituitary
3. Thyroid
4. Adrenal glands / Kidneys
5. Stomach/Duodenum
6. Pancreas
7. Ovaries/Testes

**B. Metabolic Disorders**

- Differentiate between:
  - Type 1 vs. Type 2 Diabetes
  - Hypoglycemia vs. Hyperglycemia syndromes (DKA, HHS)
- Explain diagnostic criteria for DKA and HHS.
  - ABG, VBG, BMP, beta-hydroxybutyrate
- Understand treatment elements of DKA:
  - Fluid selection based on corrected sodium
  - Potassium repletion thresholds
  - Dextrose inclusion
  - Discuss the dangers of peri-intubation in DKA.

**C. Electrolyte Imbalances**

- Review the pathophysiology and clinical impact of:
  - Potassium (hypo-/hyperkalemia)
  - Magnesium
  - Sodium (hypernatremia/hyponatremia)
  - Calcium
- Understand treatment elements of electrolyte imbalances
- Recognize behavioral changes that occur and may require treatment

**D. Adrenal Abnormalities**

Define and differentiate:

1. Adrenal Insufficiency
2. Addison's Disease/Addisonian Crisis
  - Precipitating factors for crisis
  - SIADH in Addison's
  - Behavioral concerns

- Monitor Input/Output
3. Cushing's Syndrome

### **E. Thyroid Disorders**

Recognize clinical signs/symptoms and complications of:

- Hypothyroidism
  - SIADH
  - Myxedema coma
  - Monitor Input/Output
- Hyperthyroidism
  - Graves' disease
  - Thyrotoxic crisis (thyroid storm)
  - Behavioral concerns
- Review treatments

### **F. SIADH (syndrome of inappropriate antidiuretic hormone)**

- Review causes: increase production or secretion of ADH
- Recognize precipitating factors: tumors, head trauma, Addison's, hypothyroidism, chemotherapy.
- Fluid restrictions (Monitor Input/Output)
- Diabetes insipidus
  - Desmopressin (DDVAP)

### **G. Renal Disorders**

- Outline the stages of kidney failure.
- Understand:
  - Differences between hemodialysis and peritoneal dialysis
  - Dialysis fistula anatomy and potential complications
  - Indications for emergent dialysis (e.g., AKI, toxin ingestion)

### **H. Medications in Transport**

Describe mechanisms and indications for:

- Insulin (drips, subcutaneous, IV bolus)
- Potassium (IV/PO, peripheral/central)
- Steroids (stress-dose therapy, Addison's crisis)
- Sedatives
- Anti-seizure

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### **Psychomotor Objectives**

1. Demonstrate the proper evaluation of a patient receiving insulin during an IFT.
2. Demonstrate potassium monitoring protocols, including recognition of hyperkalemia signs and anticipated interventions.
3. Perform bleeding control techniques for an AV fistula using tourniquet-free strategies.

## Affective Objectives

1. Given a scenario the student will justify whether or not to intubate a patient in DKA.
2. Critically appraise the role of sodium bicarbonate in DKA management, acknowledging clinical controversies and attending-specific preferences.
3. Reflect on the implications of chronic alcohol use on glucose metabolism and transport risk.
4. Student will justify the importance of monitoring and reporting fluid output during transport.

## Instructor Notes

- DKA management is fundamentally about acid-base balance, not just glucose.
  - Treatment of DKA is three things – fluids, potassium, insulin. Fluids can be normal saline or half normal saline | with or without potassium | with or without dextrose.
  - Normal saline for a corrected sodium less than 137, half normal for a corrected sodium 137 or greater
  - Potassium is given when the K is less than 3.3
  - Dextrose is included when the glucose reaches 250 (or less).
  - Review what fluids substitutions would not be equivalent
  - The safety of insulin and potassium administration depends on timing, route, and patient condition.
- Transport clinicians must know what phase of treatment the patient is in and anticipate changes.
- Adrenal and thyroid pathologies can present subtly but become unstable quickly in transport.
- Dialysis patients are complex and require careful review of labs, medications, and current interventions.
  - Review catheter complications: peritonitis/fistula bleeding,
  - Review risks of missed dialysis,
  - Treatment of hypotension in the setting of recent dialysis
- Proficiency in airway/ventilator physiology and critical illness pathophysiology
  - Intubating a patient in DKA and should be avoided/be a last resort, patients have a high probability of coding peri-intubation if the DKA is untreated or the acidosis/low bicarb is still severe.
- Ability to contextualize endocrine dysfunction within broader critical care scenarios
  - AKI occurs in almost every sick patient, and when very severe (associated with profound acidosis, volume overload, electrolyte abnormalities), patients may need emergent dialysis.
- Emphasize:
  - HPA axis breakdown and steroid needs
    - Focus on the functional aspects related to disease – what happens when the hypothalamic/pituitary/adrenal axis breaks down and why steroid supplementation would be needed. Focus on thyroid, adrenal, pancreas
  - Steroids are commonly given in the setting of critical illness even without congenital or acquired adrenal insufficiency (patient on chronic steroids); commonly patients on two pressors will be given “stress dose” steroids
  - Diagnostic markers: beta-hydroxybutyrate, VBG, BMP
  - Logistics of interfacility transport of metabolically unstable patients
    - Recent labs
    - How long has the patient been on the insulin drip or on DKA protocol?

- Are any adjustments to fluids/insulin anticipated during transport (for example, is dextrose already infusing, is the patient at risk for hypoglycemia, are there enough fluids for the duration of transfer already prepared?)
- How has the patient’s mental status and respiratory status been?
- Reason the patient presents in DKA. Is there anything else aside from the DKA that might require attention during transfer?

**Related Protocols**

Pre Hospital	IFT
<ul style="list-style-type: none"> <li>• 2.1 Adrenal Insufficiency</li> <li>• 2.9 Hyperglycemia</li> <li>• 2.10 Hyperkalemia</li> </ul>	8.1 Routine IFT Patient Care

**CQI Performance Metrics:**

- Yearly scenario review/practice
- Review of selected % of calls involving metabolic and/or electrolyte imbalances.

**Resources**

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- Cleveland Clinic. (2024, April 12). *HPA Axis: The stress response system*. Cleveland Clinic. <https://my.clevelandclinic.org/health/body/hypothalamic-pituitary-adrenal-hpa-axis>
- FCCS. (2012). *Fundamental critical care support* (5th ed.). Society of Critical Care Medicine.
- McCarty, T., & Patel, P. (2023, June 22). *Desmopressin*. National Center for Biotechnology Information. <https://www.ncbi.nlm.nih.gov/books/NBK554582/>
- National Institute of Diabetes and Digestive and Kidney Diseases. (2018, May 16). *Cushing's syndrome*. Retrieved July 29, 2025, from <https://www.niddk.nih.gov/health-information/endocrine-diseases/cushings-syndrome>
- Sheng, J., Bales, N., Myers, S., Bautista, A., Roueminfar, M., Hale, T., & Handa, R. (2021, January 13). *The hypothalamic-pituitary-Adrenal Axis: Development, programming actions of hormones, and maternal-fetal interactions*. PMC Home. <https://pmc.ncbi.nlm.nih.gov/articles/PMC7838595/>
- *Statewide EMS protocols*. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>
- Wolfe, A. C., Santiago, J., Frakes, M. A., & Farmer, S. (2022). *Critical care transport core curriculum* (2nd ed.). Air & Surface Transport Nurses Association.

**Suggested/Required Equipment**

- Service specific airway/vent/NIV
- Pumps
- Example lab values

**IFT Educational Supplement**  
**Module 7- Neurologic Management**

**Last Reviewed:** 2025-September

**Sponsor Hospital Approval:** Paramedic

**Cognitive Objectives**

By the end of the course, students will be able to:

**1. Review the Anatomy & Physiology of the Nervous System**

- Describe the structure and function of the Central Nervous System (CNS) and Peripheral Nervous System (PNS)
- Identify and describe the functions of the cranial nerves
- Explain the autonomic nervous system (ANS) and its role in regulation
- Describe the cerebral vascular circulation, including key arteries and perfusion zones

**2. Review Pathophysiology of Neurologic Conditions**

- Intracranial and Intracerebral Hemorrhage
- Epidural, Subdural, and Subarachnoid Hematomas
- Spinal Cord Injuries (SCI)
  - Primary vs. Secondary injury
  - Complete vs. Incomplete syndromes
  - Autonomic dysreflexia
- Strokes
  - Ischemic: thrombus, embolism, septic emboli
  - Hemorrhagic: ICH
- Hydrocephalus
- Central Nervous System Infections – Meningitis, Encephalitis
- Seizures and Status Epilepticus
- Spinal Epidural Abscesses – Triad and urgent care implications
- CNS Infections: Meningitis & Encephalitis

**3. Neurologic Assessment Tools and Techniques**

- **Assessment:**
  - Airway maintenance and GCS
  - Neurologic exams: DTRs, cranial nerves, sensory and motor
  - Stroke Scales: Cincinnati, NIH, LAPSS, BE-FAST
  - Mental status assessment
  - Vital signs, temperature, blood glucose
- **Imaging review and interpretation basics:**
  - CT scan (CT v. CTA)
  - Cervical spine clearance imaging: CT scan
  - Role of MRI in neurologic diagnosis

#### 4. Pharmacologic Management of Neurologic Emergencies

- Antibiotics for infection
- Anti-emetics
- Pain control (opioid and non-opioid)
- Blood pressure management agents (labetalol, clevidipine, nicardipine)
- Tranexamic acid (TXA)
- **ICP management:** Mannitol, Hypertonic Saline
- Anticoagulation reversal (Kcentra, vitamin K etc.)
- Sedation protocols
- Seizure prophylaxis and treatment (e.g., benzodiazepines, phenytoin)
- Thrombolytic therapy indications and contraindications

#### 5. Neurologic Emergency Treatment Principles

- Airway protection and ventilation
- Prevention of the “Three Hs”: **Hypoxia, Hypotension, Hypercarbia**
- ICP monitoring (**CCT-level providers only**)
- Temperature control and fever reduction
- Blood pressure titration and permissive hypertension
- Seizure prevention and treatment
- Blood glucose management
- Anti-emetics and pain control
- Transport destination considerations: thrombectomy-capable centers

#### 6. Documentation During IFT

- Document frequency and detail of neurologic exams
- Recognize timing intervals (q15min) and triggers for escalation
- Accurately record baseline and trending neurologic status during transfer

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#### Psychomotor Objectives

Upon completion, students will demonstrate the ability to:

1. Perform a comprehensive neurologic transport assessment, including:
    - GCS, cranial nerves, and stroke scale integration
    - Reassessment intervals (e.g., q15 minutes)
  2. Manage ventilation in neurologically compromised patients, including proper EtCO<sub>2</sub> targeting.
  3. Given a scenario demonstrate proper procedure for medication adjustment.
  4. Identify and manage VP shunt malfunction, recognizing:
    - Clinical signs/symptoms
    - Emergency transport considerations
  5. Given a scenario the provider will have a discussion with the physician about airway protection and escalating to invasive airway.
-

## **Affective Objectives**

By the end of the course, the student will:

1. Justify blood pressure management decisions during neurologic emergencies (e.g., permissive hypertension vs. BP control)
2. Evaluate airway patency and determine the need for airway protection prior to transport.
3. Defend the importance of oxygenation and ventilation strategies in the outcome of patients with elevated ICP
4. Value the importance of consultation with DMO when patient condition changes.

## **Instructor Notes**

- The instructor must demonstrate **proficiency in neurological physiology and pathophysiology**, with a strong working knowledge of:
  - Central and peripheral nervous system function
  - Neurological assessment techniques
  - Common neurological emergencies and transport considerations

**The following key topics must be emphasized throughout the training:**

### **1. Pre-Transport Planning**

- Stress the importance of obtaining clear medical orders for any necessary medication adjustments prior to initiating transport, including:
  - Sedation or paralytics
  - Antiepileptic medications
  - ICP-lowering agents or antihypertensives
- Ensure learners understand how to:
  - Clarify transport protocols with the sending provider
  - Secure written or verbal standing orders to anticipate complications

### **2. Communication and Escalation**

- Instruct on the critical need to obtain direct contact information for:
  - Referring physician
  - Receiving provider
  - On-call specialist (neurology, neurosurgery, or critical care)
- Emphasize maintaining open communication lines for real-time guidance should the patient's condition deteriorate during transport

### **3. Prevention of Secondary Neurological Injury**

- Reinforce the avoidance of the 3 "H's" during transport:
  - Hypoxia
  - Hypotension (review blood pressure parameters and appropriate timing of blood pressure adjustment)
  - Hyperthermia
- Highlight how these factors contribute to poor neurological outcomes, especially in patients with:
  - Traumatic brain injury (TBI)
  - Stroke
  - Postictal states

- Intracranial hemorrhage

#### 4. Patient Positioning

- Review the **importance of proper positioning** during transport to:
  - Optimize cerebral perfusion pressure (CPP)
  - Minimize intracranial pressure (ICP)
  - Ensure airway patency and spinal precautions as needed
- Discuss techniques for:
  - Head-of-bed elevation
  - Neutral head alignment

#### 5. Imaging

- If the CT head without contrast (dry scan) shows no acute intracranial hemorrhage, we next do a CTA head and neck to identify a large vessel occlusion.
- If there is no large vessel occlusion, but the story and exam suggest ischemic stroke, the patient will get an MRI brain, which will give a definitive answer as to whether there was a stroke.
- MRI: “Gold Standard” – only test that definitively diagnoses an ischemic stroke, if transient neuro symptoms that resolve – it is still the only way to say stroke vs TIA; also important for looking for brain mass, brain abscess, etc.

#### 6. Medication Notes

- If phenobarbital being administered – must have filtered tubing
- Clevidipine: looks similar to propofol, make sure it is clearly labeled.

#### Related Protocols

Prehospital	IFT
<ul style="list-style-type: none"> <li>• 2.21A/P Seizures</li> <li>• 2.25 Stroke</li> <li>• 4.6 Spinal Trauma</li> <li>• 4.8 TBI</li> </ul>	<ul style="list-style-type: none"> <li>• 8.1 Routine IFT Care</li> <li>• 8.9 Intracerebral Hemorrhage</li> <li>• 8.15 Sedation &amp; Analgesia</li> <li>• 8.17 Stroke</li> </ul>

#### CQI Performance Metrics

- Yearly scenario review/practice
- Review of IFT patient transports involving neurological emergencies.

#### Resources

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- Farkas, J. (n.d.). *Internet book of critical care*. <https://emcrit.org/ibcc/toc/>. Retrieved August 11, 2025, from <https://emcrit.org/ibcc/toc/>
- FCCS. (2012). *Fundamental critical care support* (5th ed.). Society of Critical Care Medicine.
- Mauldin, L., & Smetana, C. (2020). *Flight medical provider study guide: Current concepts in critical care transport*. IAMed.
- *Statewide EMS protocols*. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>

- Wolfe, A. C., Santiago, J., Frakes, M. A., & Farmer, S. (2022). *Critical care transport core curriculum* (2nd ed.). Air & Surface Transport Nurses Association.

**Suggested/Required Equipment**

- Neurologic manikin/simulator with adjustable GCS
- Intubation and airway management equipment
- Sample medications for simulation (mannitol, TXA, hypertonic saline, sedatives)
- Stroke scale documentation tools (NIHSS/Cincinnati forms)
- Vital sign monitors, EtCO<sub>2</sub> devices

**IFT Educational Supplement**  
**Module 8 - Respiratory Emergencies**

**Last Reviewed:** 2025-September

**Sponsor Hospital Approval:** Paramedic

**Cognitive Objectives**

By the end of this course, learners will be able to:

**1. Review the Anatomy & Physiology of the Respiratory System**

- Differentiate between **respiratory distress** and **respiratory failure**
- Describe the **four types of hypoxias**:
  - **Hypoxic hypoxia** – low atmospheric oxygen
  - **Hypemic hypoxia** – decreased oxygen-carrying capacity
  - **Stagnant hypoxia** – inadequate perfusion
  - **Histotoxic hypoxia** – inability of cells to utilize oxygen
- Understand the function and distinction between:
  - **Intrinsic vs. Extrinsic PEEP**
- Define and interpret:
  - **V/Q mismatch**
  - **Shunting**

**2. Review the Pathophysiology of Common Respiratory Conditions**

- Acute Respiratory Distress Syndrome (ARDS)
- Asthma
- COPD
- CHF
- COVID-19
- Croup
- Bronchiolitis
- Epiglottitis
- Influenza
- Pleural Effusion
- Pneumonia
- Pneumothorax (simple & tension)
- Pulmonary Embolism (PE)
- Pulmonary Hypertension
- RSV
- Status Asthmaticus

**3. Interpret Respiratory Status via Multiple Assessment Modalities**

- **Physical exam:**
  - Work of breathing
  - Accessory muscle use
  - Lung sounds
- **Diagnostic equipment:**
  - EtCO<sub>2</sub>

- SpO<sub>2</sub>
- Cardiac monitor
- Bedside ultrasound (if trained)
- **Lab values:**
  - ABG / VBG
  - BNP
  - CBC
  - Chem-7
  - D-dimer
  - PaO<sub>2</sub>
- **Imaging:**
  - Chest X-ray
  - CT scan

#### 4. Describe Pharmacologic Treatments for Respiratory Emergencies

- Antibiotics
- Anticholinergics
- Beta-2 Agonists
- Corticosteroids
- Epinephrine (IM/Nebulized)
- Heparin
- Ketamine
- Diuretics (Lasix, Bumex)
- Magnesium Sulfate
- Nitroglycerin (SL, IV, transdermal)
- Prostaglandins
- Racemic Epinephrine
- Thrombolytics (e.g., tPA, TNK)

#### 5. Explain Oxygen and Ventilatory Support Escalation

- **Oxygen Delivery Devices:**
  - Nasal cannula (w/oxygenizer)
  - Venturi mask
  - Aerosol mask
  - Non-rebreather (NRB)
  - Bag-valve mask (BVM) w/ PEEP
- **High-Flow Nasal Cannula (HFNC):**
  - FiO<sub>2</sub>, flow, O<sub>2</sub> consumption
  - Physiologic effects
  - Transport considerations
- **Non-Invasive Ventilation (NIV):**
  - CPAP
  - BiPAP: indications, contraindications
- **Ventilator - See Ventilator module**

## 6. Understand Transport-Specific Considerations

- Inability to auscultate lung sounds
- Heightened patient anxiety
- Equipment dislodgement or failure
- Oxygen consumption rate / medical air requirements
- Equipment compatibility and safety
- Staffing and clinical expertise required for various interventions

### Psychomotor Objectives

By the end of the course, learners will be able to:

1. Perform a **comprehensive assessment** of a respiratory-compromised patient.
2. Recognize clinical transition from **respiratory distress to failure**.
3. Interpret **laboratory data**, including ABG interpretation, to guide care.
4. Demonstrate the **correct assembly and use** of an **in-line nebulizer** system.
5. Analyze and interpret **capnography (EtCO<sub>2</sub>) waveforms** during ventilation.

### Affective Objectives

Upon completion, the learner will:

1. Recognize early clinical signs of **deterioration from distress to failure**, and intervene appropriately.
2. Justify **transport vs. delay** decisions for respiratory patients needing stabilization.
3. Value the importance of **EtCO<sub>2</sub> waveform trends** in managing ventilation and perfusion.
4. Demonstrate the importance of **cognitive offloading** techniques (e.g., checklists, crew roles) in complex respiratory cases.
5. Justify the decision to initiate **NIV (CPAP/BiPAP)** over **HFNC**, or vice versa, depending on the clinical scenario.
6. Given a scenario, paramedic will demonstrate use of effective “cognitive offloading” techniques.

### Instructor Notes

- Instructors must be proficient in **airway management, respiratory pathophysiology, and non-invasive ventilatory techniques**.
- Instructors must be familiar with **local protocols and equipment** (e.g., ventilators, HFNC systems, NIV).
- Encourage **real-time decision-making** during scenario-based training:
  - When to escalate care
  - How to adapt to noisy/limited transport environments
  - Managing O<sub>2</sub> consumption and backup strategies

**Related Protocols**

Pre-hospital	IFT
<ul style="list-style-type: none"> <li>• 2.5 A/P Asthma/COPD/RAD</li> <li>• 3.3 CHF (Pulmonary Edema)</li> <li>• 5.2 CPAP</li> <li>• 5.2.1 Bilevel</li> <li>• 5.7 Quantitative Waveform Capnography</li> <li>• Appendix 1 Adult Medication Reference</li> <li>• Appendix 2 Pediatric Medication Reference</li> </ul>	<ul style="list-style-type: none"> <li>• 8.0 Staffing Guidelines</li> <li>• 8.1 Routine Patient Care</li> <li>• 8.8 HFNC</li> <li>• 8.11 Mechanical Ventilation</li> <li>• 8.13 NIPPV</li> </ul>

**CQI Performance Metrics**

- Yearly scenario review/practice
- Review of IFT patient transports involving severe respiratory distress/failure
- 100% review of all pediatric IFT transports involving respiratory treatments

**Resources**

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- Allison, M. (2020, November 26). *How does high-flow nasal cannula (HFNC) work?* Medmastery | Build your clinical skills and become an expert. <https://www.medmastery.com/guides/noninvasive-ventilation-clinical-guide/how-does-high-flow-nasal-cannula-hfnc-work>
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- Farkas, J. (n.d.). *Internet book of critical care*. <https://emcrit.org/ibcc/toc/>. Retrieved August 11, 2025, from <https://emcrit.org/ibcc/toc/>
- Fratt, J. P., Courdroy, R., Marjanovic, N., & Thillie, A. (2017, July 5). *High-flow nasal oxygen therapy and noninvasive ventilation in the management of acute hypoxemic respiratory failure*. PubMed Central (PMC). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5537116/>
- FCCS. (2012). *Fundamental critical care support* (5th ed.). Society of Critical Care Medicine.
- Kedzierewicz, R., Derkenne, C., Fraudin, A., Vanhaecke, P., Jouffroy, R., Jost, D., & Prunet, B. (2021, March 21). *Logistical challenge with prehospital use of high-flow nasal oxygen therapy in COVID-19-Induced respiratory distress: A case report*. PMC Home: Journal of Emergency Medicine. <https://pmc.ncbi.nlm.nih.gov/articles/PMC7934666/>
- Mauldin, L., & Smetana, C. (2020). *Flight medical provider study guide: Current concepts in critical care transport*. IAMed.
- McCoy, A. M., Morris, D., Tanaka, K., Wright, A., Guyette, F. X., & Martin-Gill, C. (2022). Prehospital Noninvasive ventilation: An NAEMSP position statement and resource document. *Prehospital Emergency Care*, 26(sup1), 80-87. <https://doi.org/10.1080/10903127.2021.1993392>

- McEvoy, M. (2020, November 23). *Introduction to the high-flow nasal cannula*. EMS Airway. <https://emsairway.com/2020/11/23/introduction-to-the-high-flow-nasal-cannula/#gref>
- Nishimura, M. (2015, March 31). *High-flow nasal cannula oxygen therapy in adults*. BioMed Central. <https://jintensivecare.biomedcentral.com/articles/10.1186/s40560-015-0084-5>
- Pruitt, B. (2021, February 26). *The use of high-flow nasal cannula in patients with COVID-19*. Respiratory Therapy. <https://respiratory-therapy.com/department-management/clinical/the-use-of-high-flow-nasal-cannula-in-patients-with-covid-19/>
- Severin, A., Ozgular, A., Baer, G., Baer, M., & Loeb, T. (2021, April 5). *Use of high-flow nasal cannula in out-of-hospital setting*. American Journal of Emergency Medicine. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8020627/>
- Sharma, S., Danckers, M., Sanghavi, D., & Chakraborty, R. (2023, April 6). *High-flow nasal cannula - StatPearls - NCBI bookshelf*. National Center for Biotechnology Information. [https://www.ncbi.nlm.nih.gov/books/NBK526071/#:~:text=High%2Dflow%20nasal%20cannula%20\(HFNC,to%2060%20liters%20per%20minute](https://www.ncbi.nlm.nih.gov/books/NBK526071/#:~:text=High%2Dflow%20nasal%20cannula%20(HFNC,to%2060%20liters%20per%20minute)
- *Statewide EMS protocols*. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>
- Wolfe, A. C., Santiago, J., Frakes, M. A., & Farmer, S. (2022). *Critical care transport core curriculum* (2nd ed.). Air & Surface Transport Nurses Association.

#### **Suggested/Required Equipment**

- Service specific NIV/Vent or other respiratory care equipment
- HFNC unit to demonstrate
- Lung sound generator
- Test lungs/airway manikin

## IFT Educational Supplement

### Module 9 - Sepsis Management

Last Reviewed: 2025-September

Sponsor Hospital Approval: Paramedic

#### Cognitive Objectives

By the end of this course, the learner will be able to:

#### 1. Define Sepsis and Identify Clinical Indicators

- Recognize key signs and symptoms:
  - Fever ( $> 100.4^{\circ}\text{F}$ ) / Hypothermia ( $< 96.8^{\circ}\text{F}$ )
  - Altered mental status
  - Tachycardia (HR  $> 90$  bpm)
  - Tachypnea (RR  $> 20$  breaths/min or  $\text{EtCO}_2 < 25$  mmHg)
  - Hypotension (SBP  $< 100$  mmHg or MAP  $< 65$  mmHg)
  - Poor perfusion indicators (cool, clammy skin, delayed capillary refill)
  - Evidence of infection (confirmed or suspected)

#### 2. Differentiate Between SIRS, Sepsis, and Septic Shock

- SIRS criteria ( $\geq 2$  required)
  - Temperature  $> 100.4^{\circ}\text{F}$  or  $< 96.8^{\circ}\text{F}$
  - Heart rate  $> 90$  bpm
  - Respiratory rate  $> 20$  breaths/min or  $\text{PaCO}_2 < 32$  mmHg or  $\text{EtCO}_2 < 25$  mmHg)
  - WBC count  $> 12,000/\text{mL}$  or  $< 4,000/\text{mL}$ , or  $> 10\%$  immature (band) forms
- **Sepsis criteria:** Organ dysfunction, lactic acid  $> 4$  mmol/L, elevated procalcitonin, systemic inflammatory response
- **Septic shock:** persistent hypotension requiring vasopressors, elevated lactate, organ dysfunction

#### 3. Understand and Apply Screening Tools

- Utilize SIRS, qSOFA, SOFA, NEWS, and MEWS scoring systems

#### 4. Outline the Goals of Sepsis Care

- Maintain MAP  $\geq 65$  mmHg or SBP  $\geq 90$  mmHg
- Maintain  $\text{SpO}_2 \geq 94\%$
- Provide ventilatory support when indicated

#### 5. Explain the Importance of Monitoring

- Hemodynamic (invasive and non-invasive)
- Foley catheter for urine output (organ perfusion marker)
- Oxygenation and ventilation

#### 6. Identify Evidence-Based Treatments

- Administer isotonic IV fluids (up to 30 mL/kg)
- Consider prior fluid administration
- Initiate vasopressors, antibiotics, steroids, or blood products as appropriate

## 7. List Key Medications Used in Sepsis

- Crystalloids
- Vasopressors (e.g., norepinephrine)
- Methylene blue (specific cases)
- Broad-spectrum antibiotics
- Steroids (adrenal insufficiency protocols)
- Sedatives, analgesics, antipyretics

## 8. Interpret Relevant Laboratory Findings

- WBC, CBC, D-dimer, ABG, lactate, procalcitonin, glucose, BUN/creatinine, PT/INR/PTT

## 9. Recognize Special Considerations

- Comorbidities:
  - Adrenal insufficiency (consider TSH)
  - Diabetes
  - CKD
  - CHF

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## Psychomotor Objectives

By the end of the course, learners will be able to:

1. Demonstrate appropriate hemodynamic monitoring techniques:
  - Non-invasive (BP cuff, SpO<sub>2</sub>, EtCO<sub>2</sub>)
  - Invasive (arterial lines, central line monitoring—where applicable)
2. In a simulation scenario, initiate and titrate medications to maintain target MAP/SBP goals.
3. Review lab results and formulate a clinical communication to the referring or receiving physician, including transport or care concerns.

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## Affective Objectives

Upon course completion, the student will:

1. Appreciate the clinical and treatment distinctions between sepsis and septic shock
2. Understand the evolution from SIRS to sepsis, and the implications for care
3. Justify clinical decision-making:
  - Vasopressor use vs. continued fluid administration
  - Foley catheter placement or deferral
  - Escalation of care based on lab trends or clinical decline

### Instructor Notes

- **Device Caution:**  
Emphasize that **Swan-Ganz catheters and other LVEDP-measuring devices should NOT be transported** by IFT paramedics. Providers should be able to identify and defer management of these lines.
- **Lab Interpretation & Transport:**  
Prioritize **labs that influence immediate transport decisions** (e.g., lactate, ABG, creatinine, WBC). Encourage real-time decision-making about initiating, continuing, or deferring therapies based on trending data.
- **Clinical Judgment in Resource-Limited Settings:**  
Foster discussion about **balancing best practices with limited prehospital or transport resources**, and when to escalate to ALS/critical care team activation.

### Related Protocols

Pre-Hospital	IFT
<ul style="list-style-type: none"><li>• 2.22 A/P Septic Shock</li><li>• 6.3 Bloodborne/Airborne Pathogens</li><li>• 6.3A Central Line Access</li></ul>	<ul style="list-style-type: none"><li>• 8.0 Staffing Guidelines</li><li>• 8.1 Routine IFT Care</li><li>• 8.3 Arterial Line Maintenance (Non-transduced &amp; Transduced)</li><li>• 8.6 Central Venous Access</li><li>• 8.11 Mechanical Ventilation</li><li>• 8.13 Non-Invasive Positive Pressure Ventilation</li><li>• 8.15 Sedation &amp; Analgesia</li></ul>

### CQI Performance Metrics

- Yearly scenario review/practice
- Review of IFT of sepsis patients for proper management of MAP.

### Resources

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport :Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- FCCS. (2012). *Fundamental critical care support* (5th ed.). Society of Critical Care Medicine.
- Kalil, A., & Bailey, K. (2025, January 22). *Septic shock workup: Approach considerations, initial laboratory studies, microbiology studies*. Diseases & Conditions - Medscape Reference. <https://emedicine.medscape.com/article/168402-workup#c8>
- *Laboratory evaluation of sepsis - StatPearls - NCBI bookshelf*. (2023, August 27). National Center for Biotechnology Information. <https://www.ncbi.nlm.nih.gov/books/NBK594258/>
- Society of Critical Care Medicine. (n.d.). *Surviving sepsis campaign*. Society of Critical Care Medicine (SCCM). Retrieved March 21, 2025, from <https://www.sccm.org/survivingsepsiscampaign>

- *Statewide EMS protocols*. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>
- Wolfe, A. C., Santiago, J., Frakes, M. A., & Farmer, S. (2022). *Critical care transport core curriculum* (2nd ed.). Air & Surface Transport Nurses Association.

**Suggested/Required Equipment**

- Pump
- Medications
- Example lab values
- Central line

**IFT Educational Supplement  
Module 10 -Toxicology**

**Last Reviewed:** 2025-September

**Sponsor Hospital Approval:** Paramedic

**Cognitive Objectives**

1. Describe key pharmacological considerations relevant to toxicology, including:

- Drug clearance mechanisms
- Poison control protocols
- Common drug interactions (e.g., alcohol and sedatives; calcium and digoxin)

2. Identify and differentiate toxidromes, including associated clinical signs/symptoms and appropriate treatments for the following substances:

**A. Anticholinergics**

- Recognize symptoms such as hypertension, dry skin, mydriasis, psychosis, flushed skin, hyperthermia, and seizures
- Describe treatments including benzodiazepines and physostigmine (with caution regarding TCA overdose)

**B. Acetylcholinesterase and Cholinesterase Inhibitors**

- Recognize drugs such as Aricept, rivastigmine, and organophosphates
- Describe SLUDGEM and BBB symptom profiles
- Explain treatment protocols including atropine, benzodiazepines, and pralidoxime

**C. Sedatives and Hypnotics**

- Identify agents including benzodiazepines, barbiturates, and GABA agonists
- Describe associated symptoms and appropriate treatments (e.g., supportive care, flumazenil)

**D. Opiates**

- Recognize clinical effects such as CNS and respiratory depression, pinpoint pupils, and pulmonary edema
- Discuss treatment options including naloxone and supportive care

**E. Sympathomimetics**

- Identify substances including cocaine, amphetamines, MDMA, and caffeine
- Recognize symptoms such as tachycardia, hypertension, mydriasis, hallucinations
- Describe treatment including benzodiazepines and temperature regulation

**F. Acetaminophen**

- Outline toxicity phases, toxic doses, and diagnostic lab tests (e.g., acetaminophen nomogram)
- Describe treatment with N-acetylcysteine

### **G. Toxic Alcohols**

- Identify substances including methanol, ethylene glycol, and isopropanol
- Labs: ethanol levels
- Calculate and interpret anion and osmolar gaps
- Explain treatment strategies including fomepizole, ethanol, bicarbonate therapy, and dialysis

### **H. Beta Blockers**

- Identify common beta blockers
- Describe treatment options such as glucagon, vasopressors, insulin therapy, pacing, and ECMO

### **I. Calcium Channel Blockers**

- Differentiate between dihydropyridines and non-dihydropyridines
- Discuss treatments including calcium salts, insulin therapy, and advanced interventions like ECMO

### **J. Sodium Channel Blockers**

- Identify agents including TCAs, local anesthetics, propranolol, and antihistamines
- Describe clinical signs and appropriate treatments, including sodium bicarbonate and intralipid therapy

### **K. Salicylates**

- Recognize salicylate toxicity and explain treatment including urine alkalinization and dialysis
- Salicylate levels, ABGs

### **L. Carbon Monoxide**

- Identify causes of CO poisoning
- Describe treatment with oxygen and hyperbaric therapy, including identifying hyperbaric chamber locations

### **M. Cyanide**

- Identify cyanide sources
- Explain treatments such as hydroxocobalamin and sodium thiosulfate

### **N. Venomous Bites**

- Recognize envenomation from snakes (e.g., timber rattlesnake, copperheads) and spiders (e.g., black widow, brown recluse)
- Describe supportive and antivenin-based treatments
  - CroFab/Anavip
  - Antivenin for black widow spider
  - Antibiotics
  - Pain control
  - Airway

**3. Student will review the following medication reaction syndromes:**

**A. Serotonin Syndrome**

- Identify causes, apply Hunter Criteria, and distinguish key symptoms
- Describe appropriate treatment strategies

**B. Neuroleptic Malignant Syndrome (NMS)**

- Recognize causes, clinical presentation, and differentiate NMS from serotonin syndrome
- Serum electrolytes
- Describe appropriate treatment approaches

**C. Malignant Hyperthermia**

- Identify risk factors
- Signs and symptoms
- Treatments (cooling, correction of acidosis, dantrolene/ryanodex)

**4.** Recognize and accurately name a wide range of commonly encountered toxic substances and drugs, including prescription medications, illicit substances, and environmental toxins.

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**Psychomotor Objectives**

1. Demonstrate the initial steps to caring for a patient with a toxicological emergency.
2. Given a toxidrome student will identify substance.
3. Demonstrate the knowledge of ECG changes associated with toxicological emergencies.
4. Demonstrate the knowledge of the various labs that may be ordered for a toxicological emergency.

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**Affective Objectives**

1. Student will appreciate why having a medication/substance reference is important for toxicological emergencies.
2. Appreciate why normal saline is preferred fluid for MH
3. Justify obtaining patient's magnesium level prior to administering dantrolene

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**Instructor Notes**

**1. Drug Clearance Mechanisms:**

- Hepatic (CYP450 metabolism), renal, biliary.
- Emphasize how organ dysfunction alters toxicity risk.
- Link to **dialyzable toxins** vs. non-dialyzable.

**2. Poison Control Protocols:**

- Always encourage **early consultation**.
- Provide **Poison Control contact info**.
- Discuss the role of toxicologists and regional resources.

**3. Common Drug Interactions:**

- **Alcohol + sedatives:** Synergistic CNS/respiratory depression.
- **Calcium + digoxin:** Increased risk for arrhythmias.
- Other examples: MAOIs + SSRIs → serotonin syndrome

4. Labs listed are those that may affect choice of treatments during IFT.

**5. Common Student Pitfalls to Address**

- Misidentifying toxidromes (especially cholinergic vs. anticholinergic).
- Forgetting **coingestants** (e.g., acetaminophen in polypharmacy overdose).
- Confusing **serotonin syndrome** vs. **NMS**.

**6. Key ECG Abnormalities to Cover:**

- **TCA toxicity:** Widened QRS, right axis deviation, terminal R in aVR.
- **Beta blockers / CCBs:** Bradycardia, AV blocks.
- **Hyperkalemia (e.g., digoxin overdose):** Peaked T-waves, wide QRS, sine wave.

7. Understand why normal saline is preferred over lactated Ringer’s in malignant hyperthermia (MH).

- LR contains calcium → interacts poorly with dantrolene, which may precipitate.

8. Appreciate the need for magnesium levels and magnesium presence when administering dantrolene.

- **Hypomagnesemia** can contribute to muscle rigidity, arrhythmias, and poor response to dantrolene.

**Related Protocols**

Prehospital	IFT
<ul style="list-style-type: none"> <li>● 2.2 Alcohol/Benzodiazepine withdrawal</li> <li>● 2.15A/P Nerve Agent/Organophosphate Poisoning</li> <li>● 2.20A/P Poisoning/Overdose/Substance Abuse Disorder</li> <li>● 2.24A/P Smoke Inhalation</li> </ul>	<ul style="list-style-type: none"> <li>● 8.10 Malignant Hyperthermia</li> </ul>

**CQI Performance Metrics**

- Yearly scenario review/practice

**Resources**

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- Cleveland Clinic. (2022, April 5). *Malignant hyperthermia: What it is, symptoms & treatment*. <https://my.clevelandclinic.org/health/diseases/17945-malignant-hyperthermia>
- *Statewide EMS protocols*. CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>

**Suggested/Required Equipment**

- Pump
- Medications
- Example lab values

**IFT Educational Supplement**  
**Module 11 - Ventilator Management**

Last Reviewed: 2025-September

Sponsor Hospital Approval: Paramedic

**Cognitive Objectives**

Upon completion, the student will be able to:

**1. Describe Indications for Mechanical Ventilation:**

- Compare injury-based vs. obstructive disease processes.
- Identify ideal tidal volumes based on patient's ideal body weight (IBW).
- Evaluate SpO<sub>2</sub> goals (≥94%) and FiO<sub>2</sub> titration.
- Assess EtCO<sub>2</sub> (normal range 35–45 mmHg) to determine MV adjustment needs.
- Verify ETT depth and proper placement.

**2. Understand Minute Volume:**

- Define and calculate MV in volume-control (Vt x RR) and pressure-control (Tve x RR) modes.
- Determine actual MV from ventilator display.

**3. Differentiate Ventilation Types:**

- Contrast pressure-controlled and volume-controlled ventilation.

**4. Describe Ventilator Modes (Adult & Pediatric):**

- Volume-control: CMV, AC/VC, PRVC, SIMV
- Pressure-control: PCV, AC/PC, P-SIMV
- Spontaneous: PSV
- Non-invasive: CPAP, BiPAP, NIV-ST
- Agency-specific ventilator modes

**5. Calculate Ideal Body Weight (IBW):**

- Adult: Male =  $50 + (2.3 \times \text{height in inches over } 5')$ , Female =  $45 + (2.3 \times \text{height in inches over } 5')$
- Pediatric: Use length-based tape tools (e.g., Broselow tape)

**6. Understand Dead Space Ventilation:**

- Anatomical =  $1.5 \times \text{IBW (lbs)}$
- Mechanical contributors: tubing, HME, inline suction, elbows

**7. Interpret ABGs in Ventilated Patients:**

- Assess oxygenation and ventilation status in conjunction with ventilator settings.

**8. Review Ventilator Equipment:**

- Identify essential components for both adult and pediatric mechanical ventilation.

**9. Explain the Role of PEEP:**

- Recruitment and maintenance of alveolar patency.

**10. Identify Safe Pressure Thresholds:**

- Peak Inspiratory Pressure (PIP) < 35 cmH<sub>2</sub>O; Plateau Pressure < 30 cmH<sub>2</sub>O

**11. Understand ETT Clamping:**

- Proper technique for transport transitions.

**12. Describe Function and Placement of HME/Viral Filters.**

**13. Review RASS Scale for Sedation Monitoring.**

**14. Calculate Oxygen Consumption During Ventilation.**

**15. Troubleshoot Ventilator Using SCOPE:**

- Suction, Connections, Obstructions, Pneumothorax, Equipment (SCOPE)

**16. Recognize and Describe Common Ventilator Medications:**

- Sedatives
  - Midazolam (Versed)
  - Lorazepam (Ativan)
  - Ketamine (Ketalar)
  - Propofol (Diprivan)
  - Dexmedetomidine (Precedex)
- Analgesia
  - Fentanyl (Sublimize)
  - Morphine
  - Ketamine (Ketalar)
  - Hydromorphone (Dilaudid)
- Induction Agents
  - Ketamine (Ketalar)
  - Propofol (Diprivan)
  - Etomidate
- Paralytics
  - Rocuronium
  - Succinylcholine
  - Vecuronium
  - Cisatracurium (Nimbex)

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**Psychomotor Objectives**

The student will demonstrate the ability to:

1. Perform complete assessment of a ventilated patient.
2. Connect and program ventilator circuits and input parameters.
3. Properly place HME and/or viral filters on ventilator circuits.
4. Safely transition a patient to a transport ventilator, including ETT clamping procedures.
5. Administer and titrate sedation per RASS goals and transport protocols.

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**Affective Objectives**

Given simulated scenarios, the student will:

1. Modify ventilator settings based on adult patient conditions and presentation.
2. Modify ventilator settings based on pediatric patient conditions and presentation.
3. Justify the appropriate level of transport (IFT vs. Specialty Team) based on patient acuity.
4. Resolve ventilator alarms (Pressure, Oxygen, Volume) using critical thinking and protocol.
5. Utilize cognitive offloading techniques (e.g., ventilator checklists).

6. Discuss sedation/analgesia titration in relation to RASS score.
7. Given a scenario, the student will discuss the safety of transport a mechanical ventilated patient, and critically think through a discussion with the sending provider to stabilize the patient to minimize risk during transfer, including a discussion about transport orders.

## Instructor Notes

### 1. Describe Indications for Mechanical Ventilation

- **Teaching Tips:** Use case-based comparisons (e.g., COPD vs. ARDS).
- **Visual Aids:** IBW & SpO<sub>2</sub> charts, EtCO<sub>2</sub> waveform examples.
- **Key Emphasis:** Indications (e.g., hypoxia, hypercapnia, fatigue), SpO<sub>2</sub> ≥94%, EtCO<sub>2</sub> 35–45 mmHg.
- **Check Understanding:** Give clinical scenarios with ABG, vitals, and ask: “Vent or not?”

### 2. Understand Minute Volume (MV)

- **Demonstration:** Hands-on ventilator practice to calculate MV.
- **Reinforce:** Difference between *set* and *delivered* MV.
- **Student Task:** Calculate MV for various ventilator settings.

### 3. Differentiate Ventilation Types

- **Instructional Focus:** Compare pressure vs. volume-control—benefits and risks.
- **Common Misconception:** Clarify that pressure control doesn’t guarantee tidal volume.

### 4. Describe Ventilator Modes (Adult & Pediatric)

- **Class Activity:** Create a mode comparison chart.
- **Highlight:** Pediatric mode differences and agency-specific nomenclature.
- **Ask:** “Which mode would you choose for X condition and why?”

### 5. Interpret ABGs in Ventilated Patients

- **Workshop:** ABG + vent setting interpretation.
- **Teach Mnemonic:** ROME (Resp Opp, Metabolic Equal).
- **Critical Thinking:** Link abnormal ABG to vent changes.

### 6. Identify Safe Pressure Thresholds

- **Emphasize:** PIP < 35 cmH<sub>2</sub>O, Plateau < 30 cmH<sub>2</sub>O.
- **Practice:** Identify pressure alarms & resolve.

### 7. Calculate Oxygen Consumption During Ventilation

- **Formula Focus:** FiO<sub>2</sub> × MV = Oxygen consumption (rough estimation).
- **Challenge Question:** “How long will this tank last?”

### 8. Troubleshoot Ventilator Using SCOPE

- **Mnemonic Drill:** Teach and practice SCOPE steps.
- **Simulation:** Trigger alarms, ask students to resolve using SCOPE.

### 9. Recognize and Describe Common Ventilator Medications

- **Breakdown by Category:** Sedatives, analgesics, paralytics.
- **Pearl:** Emphasize onset/duration of action, side effects.
- **Scenario:** Match meds to sedation goals (e.g., RASS -2 to 0).

### 10. Patient Assessment

- **Teach Observational Cues:**
  - Work of breathing
  - Synchrony with ventilator
  - SpO<sub>2</sub> and waveform capnography
  - Sedation level (RASS)
- **Bedside Checks:** ETT depth, cuff inflation, circuit integrity

### 11. Common Student Pitfalls

- Confusing pressure vs. volume modes
- Forgetting to adjust FiO<sub>2</sub> and PEEP after initial setup
- Misinterpreting ABGs without referencing current vent settings
- Setting Vt based on actual body weight instead of IBW
- Over-relying on alarms instead of doing hands-on assessment
- Underappreciating dead space (esp. added mechanical components)

### Related Protocols

Prehospital	IFT
<ul style="list-style-type: none"><li>• 5.7 Quantitative Waveform Capnography</li><li>• 5.8A/P RSI Adult/Pediatric</li><li>• 5.9 Suctioning of Inserted airway</li><li>• 5.11 Tracheostomy Care</li><li>• 5.12 Ventilator</li><li>• Appendix 5 Ideal Body Weight Chart</li></ul>	<ul style="list-style-type: none"><li>• 8.0 IFT Staffing Guidelines</li><li>• 8.11 IFT Mechanical Ventilation</li><li>• 8.15 IFT Sedation and Analgesia</li></ul>

### CQI Performance Metrics

- Yearly scenario review/practice
- 100% review of ventilator transports

### Resources

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- Bauer, E. (2015). *Ventilator management: A pre-hospital perspective* (2nd ed.). Createspace Independent Publishing Platform.
- FCCS. (2012). *Fundamental critical care support* (5th ed.). Society of Critical Care
- Kiser, A. (2022). *The flight medic's guide to mechanical ventilation*.

- NHBLI ARDS Network. (2014). *Ventilator protocol card*. NHLBI ARDS Network | About. Retrieved August 27, 2025, from <https://www.ardsnet.org/tools.shtml>
- Nickson, C. (2020, November 3). *ARDSnet ventilation strategy*. Life in the Fast Lane • LITFL. Retrieved August 27, 2025, from <https://litfl.com/ardsnet-ventilation-strategy/>
- Owens, W. (2018). *The ventilator book* (1st ed.). First Draught.
- *Statewide EMS protocols*. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>
- Wolfe, A. C., Santiago, J., Frakes, M. A., & Farmer, S. (2022). *Critical care transport core curriculum* (2nd ed.). Air & Surface Transport Nurses Association.

### **Suggested/Required Equipment**

- [http://www.ardsnet.org/files/pbwtables\\_2005-02-02.pdf](http://www.ardsnet.org/files/pbwtables_2005-02-02.pdf) (ARDSnet ventilation recommendations)
- Transport ventilator (agency-specific)
- Ventilator tubing, HME filters, and adapters
- Sedation/analgesia drug cards
- Pediatric and adult length-based tools (e.g., Broselow)
- ABG reference guide
- RASS scoring tool
- Ventilator quick reference guide (provided)

## IFT Educational Supplement Module 12 - NIV Management

**Last Reviewed:** 2025-September

**Sponsor Hospital Approval:** Paramedic

### Cognitive Objectives

By the end of this course, the student will be able to:

1. Describe disease processes that require CPAP/BiPAP therapy (oxygenation vs. ventilation).
2. Discuss specific pathophysiology's benefiting from NIV:
  - Obstructive (e.g., COPD, asthma)
  - Edema (e.g., CHF, pulmonary edema)
  - Lung tissue disease (e.g., pneumonia, ARDS)
  - Undifferentiated hypoxia
3. Identify absolute and relative contraindications for NIV use.
4. Explain the concept of lung-protective ventilation.
5. Calculate oxygen consumption during invasive and noninvasive ventilation to ensure adequate oxygen supply during transport.
6. Describe:
  - **ePAP/PEEP:** its role in alveolar recruitment, oxygenation, and increasing functional residual capacity.
  - **iPAP/Pressure Support:** its purpose in ventilation, tidal volume enhancement, and CO<sub>2</sub> elimination.
7. Understand NIV effectiveness assessment using:
  - Minute volume (MV, MVe)
  - Peak pressures (P<sub>peak</sub>/PIP)
  - FiO<sub>2</sub> and PEEP titration
  - EtCO<sub>2</sub> interpretation and ABG results for ventilator adjustments
8. Distinguish between common NIV modes:
  - CPAP
  - BiPAP
9. Define ventilator terms:
  - iPAP = Inspiratory Pressure
  - ePAP = PEEP
  - Delta Pressure = iPAP - ePAP
10. List all required equipment for NIV management, including masks, tubing, EtCO<sub>2</sub>, HME, in-line nebulizer
11. Define safe NIV pressure targets (e.g., PIP < 20cmH<sub>2</sub>O).
  - Pressures >20cmH<sub>2</sub>O can cause result in gastric insufflation
12. Describe troubleshooting techniques for:
  - Circuit/mask leaks
  - Patient compliance issues
13. Identify medications that may be administered in-line:
  - Bronchodilators (e.g., Albuterol, Racemic Epinephrine)
14. Understand pharmacology, dosing, and indications of common sedatives used during NIV:
  - Midazolam, Lorazepam, Diazepam
  - Ketamine

- Dexmedetomidine

15. Interpret the **Richmond Agitation-Sedation Scale (RASS)** for sedation monitoring.

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### Psychomotor Objectives

Students will demonstrate the ability to:

1. Set up mechanical NIV tubing and input ventilator settings appropriately.
  2. Administer in-line medications without interfering with the HME.
  3. Select and fit the appropriate face mask, minimizing air leaks:
    - Sizing: bridge of nose to chin
    - Vented vs. non-vented mask identification
  4. Safely transfer a patient from facility-based NIV to transport NIV equipment, converting ventilator parameters correctly.
  5. Demonstrate setting up “in-line” medication (ensuring they aren’t passing through HME).
    - Demonstrate how to select the proper size face mask.
    - Ensure minimum/no air leaks
    - Measure from bridge of nose to top of chin
    - Vented v. non-vented mask (maybe vent hose dependent)
  6. Perform ventilator adjustments to correct hypoxia (e.g., low SpO<sub>2</sub>) and hypercapnia (e.g., elevated EtCO<sub>2</sub>).
  7. Demonstrate understanding of sedative/analgesic medication preparation and administration.
  8. Respond appropriately to NIV alarms (pressure, volume, oxygen).
- 

### Affective Objectives

Given clinical and transport scenarios, the student will:

1. Demonstrate critical thinking in choosing initial NIV settings and making necessary adjustments.
  2. Recognize and respond appropriately to noninvasive ventilator alarms: (pressure, oxygen, volume)
  3. Justify continued NIV use vs. escalation to invasive ventilation, including pre-transport decision-making.
  4. Evaluate oxygen supply and patient status to determine the safety and viability of transport on NIV.
  5. Advocate for patient safety through proactive troubleshooting and escalation protocols when NIV fails.
- 

### Instructor Notes

#### 1. iPAP (Inspiratory Positive Airway Pressure)

- **Definition:** The pressure delivered during the inspiratory phase in BiPAP or other NIV systems.
- **Standalone Machines (e.g., BiPAP):**
  - iPAP is manually set by the **RT or MD** to support ventilation (CO<sub>2</sub> clearance).
  - Common range: 10–20 cmH<sub>2</sub>O depending on the patient's needs.
- **On a Ventilator:**
  - iPAP is **not a separate setting**—it is the sum of:
    - PEEP (ePAP) + Pressure Support
  - Therefore, when you see an inspiratory pressure on a vent, it's typically:
    - iPAP = Pressure Support + PEEP
  - Often referred to as inspiratory pressure, P<sub>insp</sub>, or target pressure depending on the machine.

## 2. ePAP (Expiratory Positive Airway Pressure)

- **Definition:** Baseline pressure maintained during exhalation.
- **Synonymous with:** PEEP (Positive End-Expiratory Pressure)
- **Purpose:**
  - Prevents alveolar collapse
  - Improves oxygenation
  - Reduces work of breathing

## 3. Delta Pressure ( $\Delta P$ )

- **Definition:** The difference between iPAP and ePAP.
  - $\Delta P = \text{iPAP} - \text{ePAP}$
- **Also Known As: Pressure Support**
- **Clinical Relevance:**
  - Larger delta = more support for ventilation (increased tidal volume, better CO<sub>2</sub> removal)
  - Smaller delta = less pressure support, useful for weaning

## 4. Clinical Teaching Tips

- **Whiteboard Demonstration:**
  - Write out sample settings and walk through calculations:
    - e.g., if iPAP = 18 and ePAP = 8 →  $\Delta P = 10$  cmH<sub>2</sub>O
- **Analogy:** Think of ePAP as the “floor” and iPAP as the “ceiling.” The **delta pressure** is the space the lungs can expand within.
- **Emphasize CO<sub>2</sub> Clearance:** Delta pressure drives ventilation; a low delta = poor CO<sub>2</sub> removal.
- **Sim Lab Activity:**
  - Set different iPAP/ePAP values and ask students to:
    - Calculate delta pressure
    - Predict patient response (oxygenation vs. ventilation)
    - Adjust for specific conditions (e.g., COPD vs. CHF)

## 5. Common Pitfalls to Address

- Confusing **ePAP** with **PEEP** (they are the same in function)
- Misinterpreting iPAP on a **ventilator** vs. a **BiPAP** machine
- Underappreciating the role of delta pressure in **CO<sub>2</sub> elimination**

## Related Protocols

Prehospital	IFT
<ul style="list-style-type: none"><li>• 5.2 CPAP</li><li>• 5.2.1 Bilevel Positive Airway Pressure (Adult)</li><li>• 5.7 Quantitative Waveform Capnography</li></ul>	<ul style="list-style-type: none"><li>• 8.13 Non-Invasive Positive Pressure Ventilation (NIPPV)</li><li>• 8.15 IFT Sedation and Analgesia</li></ul>

## CQI Performance Metrics

- Yearly scenario review/practice
- Review of selected number of transports

## Resources

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- Bauer, E. (2015). *Ventilator management: A pre-hospital perspective* (2nd ed.). Createspace Independent Publishing Platform.
- FCCS. (2012). *Fundamental critical care support* (5th ed.). Society of Critical Care
- Mauldin, L., & Smetana, C. (2020). *Flight medical provider study guide: Current concepts in critical care transport*. IAMed.
- Fratt, J. P., Courdroy, R., Marjanovic, N., & Thille, A. (2017, July 5). *High-flow nasal oxygen therapy and noninvasive ventilation in the management of acute hypoxemic respiratory failure*. PubMed Central
- McCoy, A. M., Morris, D., Tanaka, K., Wright, A., Guyette, F. X., & Martin-Gill, C. (2022). Prehospital Noninvasive ventilation: An NAEMSP position statement and resource document. *Prehospital Emergency Care*, 26(sup1), 80-87. <https://doi.org/10.1080/10903127.2021.1993392>
- *Statewide EMS protocols*. CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>
- Wolfe, A. C., Santiago, J., Frakes, M. A., & Farmer, S. (2022). *Critical care transport core curriculum* (2nd ed.). Air & Surface Transport Nurses Association.

## Suggested/Required Equipment

- O2 tank
- HME/In-line medication set up
- Agency-specific NIV devices and transport ventilators
- Patient simulators or task trainers
- NIV masks (assorted sizes, vented/non-vented)
- Medication simulation kits (bronchodilators, sedatives)
- EtCO<sub>2</sub> monitoring tools

**IFT Educational Supplement**  
**Module 13- Arterial Line Management**

**Last Reviewed:** 2025-September

**Sponsor Hospital Approval:** Paramedic

**Section 1: Non-Transduced Arterial Lines**

**Cognitive Objectives**

Upon completion of this section, the student will be able to:

1. Identify **indications** for arterial line placement, including continuous hemodynamic monitoring.
2. Describe **appropriate anatomical sites** for arterial line placement:
  - Radial
  - Brachial
  - Femoral
  - Axillary
  - Dorsalis pedis
3. Recognize **contraindications** to arterial line insertion:
  - Extremity ischemia
  - Infection at insertion site
  - Raynaud's disease
  - Prior vascular surgery at insertion site
4. Understand **potential complications** of arterial lines:
  - Thrombosis
  - Embolization
  - Hematoma
  - Infection
  - Median nerve neuropathy
  - Pseudoaneurysm
  - Ischemic necrosis
  - Limb ischemia
  - Hemorrhage
  - Air embolism
  - Arteriovenous (AV) fistula
  - Arterial aneurysm
5. Identify how to **manage a displaced or infiltrated** arterial line during transport.
6. Differentiate between **maintaining** an arterial line and **transducing** an arterial line:
  - **Maintaining:** Line connected to pressurized saline at 300 mmHg during transport, not connected to a monitor.
  - **Transducing:** Line actively connected to monitor for continuous hemodynamic data.

**Psychomotor Objectives**

Upon completion of this section, the student will be able to:

1. Identify and name the **components of an arterial line** system.
2. Troubleshoot a **displaced arterial line** during transport.

3. **Set up a non-transduced** arterial line correctly for interfacility transport.

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### Affective Objectives

Upon completion of this section, the student will be able to:

1. Justify when an arterial line should remain **transduced** vs. only **maintained** during transport.
2. Justify the appropriate use of **direct pressure** vs. **clamping** in managing displaced arterial lines.
3. **Demonstrate commitment to aseptic technique and equipment integrity**, recognizing the high risk of infection and complication associated with arterial access during movement.

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## Section 2: Transduced Arterial Lines

### Cognitive Objectives

Upon completion of this section, the student will be able to:

1. Identify all **components** of a transduced arterial line system:
  - Pressure bag
  - Transducer
  - Fast flush system
  - Stopcocks
  - Monitor cables
  - Cardiac monitor
  - Tubing
2. Describe the **zeroing process** for a transduced arterial line.
3. State **when zeroing is required** (e.g., after patient repositioning or changes in atmospheric pressure).
4. Confirm the **pressure bag is inflated to 300 mmHg** and describe the rationale for this pressure setting.
5. Define the **phlebostatic axis** as the correct leveling reference point:
  - 4th intercostal space, mid-axillary line
  - Steps: Stopcock off to the patient → remove cap → zero monitor → replace cap → turn stopcock back to patient
6. Describe and interpret the **square wave test**:
  - Optimal response: 1–2 oscillations
  - **Overdamped**: <2 oscillations, flat/rounded waveform
  - **Underdamped**: >2 oscillations
7. Identify **causes of over- and underdamping**.
8. Analyze the **invasive arterial line waveform**:
  - Mean arterial pressure (MAP)
  - Systolic/diastolic values
  - Dicrotic notch
  - Pulse pressure
9. Recognize **abnormal waveforms**:
  - Pulsus paradoxus
  - Pulsus alternans

- Pulsus bisferiens
  - Pulsus parvus et tardus
10. Troubleshoot **abnormal waveforms** and resolve issues with damping.
  11. Describe common **complications** of transduced arterial lines.
  12. Apply proper **documentation standards**:
    - Presence of dicrotic notch
    - Correlation with EKG
    - Notation of artifact
    - Zeroing confirmation
    - Documentation of any complications (e.g., hematoma, damping)

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### Psychomotor Objectives

Upon completion of this section, the student will be able to:

1. Identify and assemble all **components** of a transduced arterial line system.
2. Correctly **set up a transduced arterial line** for IFT transport.
3. Accurately perform **zeroing** of an arterial line.
4. Perform a **square wave test** and interpret the result.
5. **Troubleshoot** both overdamped and underdamped arterial waveforms.

---

### Affective Objectives

Upon completion of this section, the student will be able to:

1. Justify appropriate **clinical indications for arterial line placement**, especially in the context of hemodynamic monitoring during transport.
2. **Appreciate the clinical significance** of invasive hemodynamic data and incorporate it into real-time decision-making during critical care transport.
3. **Advocate for patient safety** by recognizing and addressing waveform abnormalities promptly during transport, and escalating concerns as clinically indicated.
4. **Demonstrate commitment to aseptic technique and equipment integrity**, recognizing the high risk of infection and complication associated with arterial access during movement.
5. **Prioritize clear communication** with sending and receiving facilities regarding the function, status, and findings of the transduced arterial line during handoff.
6. **Exhibit confidence and composure** in troubleshooting waveform issues and equipment malfunctions under the dynamic conditions of patient transport.

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### Instructor Notes

#### 1. Maintaining the Arterial Line

- During **non-transduced transport**, the arterial line must be:
  - Clearly **exposed and visually monitored** throughout transport.
  - Maintained on a **pressure bag at 300 mmHg** with continuous flow of normal saline to prevent clot formation.
  - Secured properly with transparent dressing and clearly labeled.

- Emphasize to students the **difference between “maintaining” vs. “transducing”** the line and when each is appropriate based on patient condition and transport needs.

## 2. Waveform Recognition and Clinical Relevance

- Students must be able to:
  - Identify **normal and abnormal waveforms** (e.g., presence of dicrotic notch, MAP estimation).
  - Understand **clinical implications** of waveform abnormalities:
    - E.g., **pulsus paradoxus** could indicate cardiac tamponade or severe asthma/COPD exacerbation.
    - **Pulsus alternans** may indicate left ventricular dysfunction.
- Reinforce the correlation between **arterial waveforms and cardiac cycle**, including the value of integrating with EKG monitoring.

### Related Protocols

	Pre hospital	IFT
N/A		8.0 Staffing Guidelines 8.3 Arterial Lines

### CQI Performance Metrics

- Yearly scenario review/practice
- 100% review of all calls with a transduced arterial line

### Resources

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- FoamFrat. (n.d.). *arterial-artline-lines-criticalcare-diagnosis-original.jpeg*. www.FOAMFRAT.com.
- Nursing Times. (2022). Essential critical care skills 3: arterial line care. *Nursing Times*, 118(1). [nursingtimes.net](http://nursingtimes.net)
- Society of Critical Care Medicine. (2021). *Fundamental critical care support* (7th ed.).
- *Statewide EMS protocols*. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>

### Suggested/Required Equipment

- Arterial line simulation kits
- Pressure bags, saline, and transducer sets
- Training monitors with waveform display
- Case study handouts
- Checklist for skill evaluation

**IFT Educational Supplement**  
**Module 14- Blood Products/Volume Expanders**

**Last Reviewed:** 2025-September

**Sponsor Hospital Approval:** Paramedic

**Cognitive Objectives**

By the end of this course, students will be able to:

**1. Indications & Contraindications for Blood Product Administration**

- Understand when blood product administration is appropriate in:
  - Trauma patients
  - Lab value abnormalities (e.g., low H&H, RBC indices)
  - Internal non-traumatic bleeding
  - Anemias (acute/chronic)
  - Clotting or bleeding disorders

**2. Blood Products: Composition, Indications & Considerations**

- Describe key aspects of:
  - **Packed Red Blood Cells (PRBCs)**
  - **Whole Blood**
  - **Platelets**
  - **Albumin**
  - **Fresh Frozen Plasma (FFP)/dried plasma**
  - **Tranexamic Acid (TXA)**
- Mass Transfusion Protocol (MTP)
- Understand relationship between citrate and calcium (and possible need for administration of calcium)

**3. Type & Screen / Crossmatch**

- Define a “**type and screen**” and when it is ordered
- Understand the **crossmatch** process and its role in transfusion safety
  - Understand when crossmatching may not be done

**4. ABO & Rh Factor Review**

- Describe **blood types (A, B, AB, O)** and **Rh factor**
- Understand antigens and antibodies relevant to transfusion compatibility

**5. Required Equipment for Transfusion**

- Identify essential equipment:
  - Large-bore IV/IO catheter (16–18 gauge)
  - Blood tubing with filter
  - Normal saline (only compatible fluid)
  - Fluid warmer

**6. Pre-Transfusion Protocol**

- Review standard procedures including:
  - Two-person verification (product, patient ID, documentation)
  - Confirm vital signs and patient consent
  - Pre-medication if indicated (e.g., antihistamines, antipyretics)

## 7. Transfusion Initiation Procedure

- Describe proper administration techniques:
  - Connect normal saline via Y-site for compatibility
  - Prime tubing with saline (ideally), but can use blood to cover filter
  - Begin infusion slowly, reassess at 15-minute mark, then titrate as needed
  - No other medications allowed in blood line

## 8. Transfusion Reactions: Identification

- Recognize signs/symptoms of:
  - Hemolytic reaction
  - Allergic or anaphylactic reaction
  - Febrile non-hemolytic reaction
  - **TACO** (Transfusion Associated Circulatory Overload)
  - **Sepsis** from contaminated product
  - **Exogenous complications** (hypocalcemia, hyperkalemia, hypothermia)

## 9. Transfusion Reactions: Management

- Describe interventions for each reaction type:
  - Immediate cessation of transfusion
  - Oxygen, airway support, medications (e.g., antihistamines, steroids, diuretics, epinephrine)
  - Notify receiving facility and document reaction

## 10. Reaction Handling Protocol

- Learn the procedural steps when a transfusion reaction occurs:
  - Stop infusion, disconnect tubing
  - Send blood product, tubing, and paperwork to receiving hospital
  - DO NOT dispose of blood products
  - Notify receiving hospital prior to arrival
  - Provide complete verbal handoff and written documentation

## 11. Non-Blood Volume Expanders

- Colloids
  - **Hetastarch, dextran, gelatin**
  - **Plasma Protein Fraction (PPF)**
  - **Hypertonic saline**

## 12. Documentation Considerations

- Start/stop time
- Product (be specific)
- S/S transfusion reactions (including pertinent negatives)

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## Psychomotor Objectives

Upon successful completion, students will be able to:

- **Demonstrate proper blood transfusion setup**, including:
  - Equipment assembly, priming, and flow control
  - Accurate product/patient verification
- **Demonstrate proper disposal/handling** of blood products when:
  - Transfusion is completed
  - Transfusion is stopped due to reaction
  - Infusion is discontinued for other reasons
- **Identify blood compatibility** using the **ABO system**, including emergency use of O-negative blood

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### Affective Objectives

Given clinical scenarios, the student will:

- Justify administration or withholding of a blood product based on presentation, lab values, and transport conditions
- Support the importance of temperature management of the blood product, patient and environment.
- Debate the continuation or cessation of a transfusion in the presence of symptoms suggestive of a transfusion reaction
- Demonstrate proper documentation of a transfusion IFT.

### Instructor Notes

#### 1. Indications & Contraindications for Blood Product Administration

- Use case-based discussions (e.g., trauma vs. GI bleed vs. anemia).
- Include current guidelines on transfusion thresholds (e.g., Hgb <7-8 g/dL).

**Emphasis:**

- Distinguish between acute vs. chronic needs.
- Contraindications: unnecessary transfusion risks, religious/cultural refusal
- Discuss how a patient may have normal H+H, but patient has other symptoms of bleed – provider should have discussion with sending facility about possibly giving blood

#### 2. Blood Products: Composition, Indications & Considerations

- Create a chart comparing components, storage, indications, shelf life.
- Include visuals/videos of bags for PRBCs, platelets, etc.

**Emphasis:**

- TXA mechanism and timing (<3 hours from trauma).
- Citrate toxicity and hypocalcemia: when to consider calcium.

**Assessment:** Interactive matching game or quick recall quizzes.

#### 3. Type & Screen / Crossmatch

- Use flowcharts to explain lab process.
- Discuss urgency vs. safety (e.g., trauma situations).

**Emphasis:** When type O-negative is used without crossmatch.

#### 4. ABO & Rh Factor Review

- Use a visual table of compatibility.
- Roleplay donor/recipient matching.

**Emphasis:** Rh sensitization and implications in transfusions.

**5. Required Equipment for Transfusion**

- Set up an equipment table for hands-on identification.  
**Emphasis:** Only **normal saline** can be used with blood.
- Importance of large-bore access for flow rate.  
**Assessment:** Equipment checklist exercise or timed scavenger hunt.

**6. Pre-Transfusion Protocol**

- Simulate the two-person verification process.  
**Emphasis:** Verification = critical safety step.
- Pre-meds for prior reactions or risk patients.

**7. Transfusion Initiation Procedure**

- Demonstrate priming and tubing setup live or via video.  
**Emphasis:** No meds through blood line.
- 15-minute reassessment window = highest reaction risk.

**8. Transfusion Reactions: Identification**

- Use a chart or table of signs/symptoms by reaction type.
- Roleplay symptom reporting by patient.  
**Emphasis:** Early recognition = lifesaving.
- Differentiate allergic vs. hemolytic vs. febrile.

**9. Transfusion Reactions: Management**

- Simulate management steps (e.g., stopping transfusion, giving O2).  
**Emphasis:** STOP FIRST, THEN treat/support.
- Communicate findings with receiving facility.

**10. Reaction Handling Protocol**

- Show real-world documentation examples.
- Include packaging procedure for blood product return.  
**Emphasis:** Importance of full documentation and reporting.  
**Assessment:** Verbal handoff simulation + written documentation exercise.

**11. Non-Blood Volume Expanders**

- Introduce colloids with pro/cons.  
**Emphasis:** When to use colloids vs. crystalloids vs. blood.  
Blood must never be left unmonitored or stored improperly during transit.

**Related Protocols**

Pre-Hospital	IFT
<ul style="list-style-type: none"> <li>• 2.3A/P Allergic reaction/anaphylaxis</li> <li>• 2.8A/P Fever</li> <li>• 4.3 Prehospital Blood Product Transfusion</li> <li>• 4.10 Hemorrhage Control</li> </ul>	<ul style="list-style-type: none"> <li>• 8.0 Staffing Guidelines</li> <li>• 8.4 Blood Products</li> </ul>

**CQI Performance Metrics**

- Yearly scenario review/practice
- 100% review of blood transfers

**Resources**

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.

- Allegheny Health Network. (n.d.). *What are non-blood volume expanders?* www.ahn.org. <https://www.ahn.org/services/medicine/bloodless-medicine/fag/non-blood-volume-expanders>
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- Lotterman, S., & Sharma, S. (2023, June 20). *Blood transfusion - StatPearls - NCBI bookshelf*. National Center for Biotechnology Information. <https://www.ncbi.nlm.nih.gov/books/NBK499824/>
- Mauldin, L., & Smetana, C. (2020). *Flight medical provider study guide: Current concepts in critical care transport*. IAMed.
- Prehospital Blood Transfusion Coalition. (2025, June 3). *Prehospital blood transfusion coalition clinical practice guideline for civilian emergency medical service*. <https://www.prehospitaltransfusion.org>. <https://prehospitaltransfusion.org/wp-content/uploads/2025/06/PHBTC-CPG-final-BOD-app-6-3-25.pdf>
- Society of Critical Care Medicine. (2021). *Fundamental critical care support* (7th ed.).
- *Statewide EMS protocols*. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>
- Teixeira, J. P., Van Sant, L. M., & Nielsen, N. D. (2023). Pharmacology and clinical use of plasma expanders. *Anaesthesia & Intensive Care Medicine*, 24(7), 421-427. <https://doi.org/10.1016/j.mpaic.2023.04.003>
- Wolfe, A. C., Santiago, J., Frakes, M. A., & Farmer, S. (2022). *Critical care transport core curriculum* (2nd ed.). Air & Surface Transport Nurses Association.

#### **Suggested/Required Equipment**

- Blood administration tubing and Y-sets (Use visual aids to compare tubing and pump setups.)
- Simulated blood products (non-biologic substitutes)
- Warmers, IV fluids, and compatible medication vials (mock)
- Scenario handouts, compatibility charts, and reaction response flowcharts

## IFT Educational Supplement Module 15 - Trauma

Last Reviewed: 2025-September

Sponsor Hospital Approval: Paramedic

### Cognitive Objectives

#### 1. Trauma Systems

- Identify and locate trauma centers by level within the state.
- Identify the locations and capabilities of verified burn centers.

#### 2. Burn Patients

- Review the functions of skin in the context of thermal injury.
- Classify burn types and estimate severity using TBSA tools (e.g., Lund-Browder chart).
- Describe systemic responses to burn injury (e.g., fluid shifts, inflammatory cascade).
- Burn “syndromes”: Eschar and compartment syndrome
- Recognize and manage inhalation injuries, including:
  - Carbon monoxide poisoning
  - Cyanide poisoning
- Evaluate transport considerations for burn patients:
  - Airway protection
  - Pain control
  - Fluid resuscitation (Parkland formula vs. modern guidelines)
- Analyze airway management needs and early intubation criteria.
- Develop safe and effective analgesia strategies for transport.

#### 3. Head Injury Patients

- Identify types and clinical features of cerebral hemorrhages:
  - Subdural Hematoma
  - Intracerebral Hemorrhage (ICH)
  - Subarachnoid Hemorrhage
  - Epidural Hematoma
- Discuss risk factors for neurological deterioration, including:
  - Arteriovenous malformations (AVMs)
  - Hypertension
  - Coagulopathy
  - Aneurysms
- Define and describe Diffuse Axonal Injury (DAI):
  - Mechanism and grading (Adams scale)
  - MRI vs. CT use in diagnosis
- Explain increased intracranial pressure (ICP):
  - Pathophysiology and signs of herniation
  - Relationship between MAP, ICP, and CPP
  - Detrimental effects of hypotension, hypoxia, and hypercarbia
  - Transport strategies for ICP management:
    - Head positioning
    - Ventilation targets

- Pharmacologic management (e.g., osmotic diuretics, sedatives)
- BP and perfusion goals
- Neuroprotective care

#### 4. Spinal Cord Injuries

- Differentiate between:
  - Primary and secondary SCI
  - Incomplete syndromes: anterior, central, Brown-Séquard, posterior
- Distinguish spinal shock from neurogenic shock.
- Conduct focused neurological assessments relevant to SCI.
- Discuss movement restrictions and spine precautions during transport.
- Review spinal clearance imaging protocols:
  - Pediatric: X-ray permissible
  - Adult: CT required
- Evaluate spinal stability and patient comfort during transport.

#### 5. Blunt Injury & Hemorrhage

- Recognize signs and transport considerations for:
  - Solid organ injury (liver, spleen)
  - Pneumothorax and hemothorax
  - Cardiac tamponade
  - Aortic disruption
  - Elevated intra-abdominal pressure
- Identify key interventions:
  - Chest tube placement
  - Blood product administration

#### 6. Trauma Pharmacology

- Review pharmacologic agents relevant to trauma care:
  - ICP control (e.g., mannitol, hypertonic saline)
  - Anti-hypertensives
  - Sedatives and analgesics
  - Seizure control medications
  - Blood products and fluid types
  - Antibiotics for prophylaxis
  - TXA (tranexamic acid)
  - Anticoagulant reversal agents
- Interpret and understand relevance of labs relevant in trauma management (e.g., INR, ABG, lactate).

#### Psychomotor Objectives

- **Head Injury Transport:** Demonstrate appropriate positioning to minimize ICP (e.g., head elevation, neutral alignment).
- **Ventilator Management:** Adjust ventilator settings to meet neurotrauma goals (avoid the “3 H’s”: hypotension, hypoxia, hypercarbia).
- **Medication Management:** Select and administer correct pharmacologic treatments in response to evolving clinical scenarios, including sedation, osmotherapy, and BP support.

***Case simulations should challenge learners on airway, fluid, and pharmacologic decision-making under pressure.***

**Affective Objectives**

- Justify clinical decisions to intubate or defer intubation in traumatic brain injury patients based on scenario specifics.
- Defend the need for early airway control in burn patients with suspected inhalation injury.
- Appropriately support the decision to divert transport to the nearest suitable trauma/burn/neuro center.
- Construct a comprehensive trauma transport plan addressing clinical, pharmacologic, and operational considerations.

**Instructor Notes**

**Trauma Systems**

**Key Points to Emphasize:**

- Clarify trauma system structure in your state (levels I–IV).
- Use printed maps or interactive tools to show verified trauma and burn centers.
- Reinforce differences in center capabilities (e.g., no neurosurgery at Level III).

**Burn Patients**

**Teaching Tips:**

- **TBSA Estimation:** Use interactive exercises with burn diagrams, or have students practice TBSA calculation using Lund-Browder charts.
- **Systemic Effects:** Explain SIRS and the immune response to thermal injury.
- **CO & Cyanide Poisoning:** Provide case vignettes; include car fire and house fire examples.
- **Airway & Transport Planning:** Emphasize the critical role of early airway protection.
- **Fluid Management:** Compare Parkland formula with newer guidelines advocating for conservative fluid strategies.

**Head Injury Patients**

**Teaching Tips:**

- Use radiologic images to highlight hemorrhage types.
- Use visuals/animations to explain DAI and ICP dynamics.
- Provide simple formulas for  $CPP = MAP - ICP$ , and explore how vital signs affect perfusion.
- Reinforce “3 H’s” (Hypotension, Hypoxia, Hypercarbia) as key contributors to secondary injury.
- Lead discussions on ventilator strategies and medication selection (osmotic agents, sedatives, anti-hypertensives).

**Case Scenario Ideas:**

- Trauma patient with rapid deterioration—herniation signs and ICP management steps.
- Intubated TBI patient—adjust ventilator and pharmacologic plan during transport.

## Spinal Cord Injuries

### Teaching Tips:

- Use anatomical charts to explain syndromes (central cord, anterior cord, Brown-Séquard).
- Clarify differences between spinal vs. neurogenic shock with BP/HR comparisons.
- Reinforce strict movement limitations during transfers.
- Review real imaging protocols and how CT/X-ray selection differs in adults vs. pediatrics.
  - Pediatric clearance: X-ray acceptable
  - Adult clearance: CT scan mandatory
  - Delayed radiology reads = maintain C-collar

## Blunt Injury & Hemorrhage

### Teaching Tips:

- Use ultrasound or CT images to illustrate injuries (splenic laceration, cardiac tamponade, etc.)
- Highlight signs of occult hemorrhage (e.g., hypotension, abdominal distention, tachycardia).
- Discuss trauma triage triggers for rapid transport or surgical consult.
- Clarify blood vs. crystalloid fluid use in active hemorrhage.

## Other

- Ensure EMS crews have:
  - Access to latest labs before transport
  - Electronic imaging access for receiving facilities
  - In the acute IFT setting the “trauma” labs obtained are not overly relevant to the transport itself and typically do not set treatment priorities.

## Related Protocols

Prehospital	IFT
<ul style="list-style-type: none"><li>• 2.19A/P Pain Management</li><li>• 2.24A/P Smoke Inhalation</li><li>• Section 4 – Trauma 4.0A-4.10</li><li>• Section 5 Airway 5.0-5.12</li><li>• 6.20 Trauma Triage &amp; Transport Decision</li></ul>	<ul style="list-style-type: none"><li>• 8.0 Staffing Guidelines</li><li>• 8.4 Blood Products</li><li>• 8.7 Chest Tubes</li><li>• 8.9 Intracerebral Hemorrhage</li><li>• 8.11 Mechanical Ventilation</li><li>• 8.15 Sedation and Analgesia</li></ul>

## CQI Performance Metrics

- Yearly scenario review/practice
- Review of IFT calls involving trauma

## Resources

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.

- Mesfin, F., Gupta, N., Shapshak, A., & Taylor, R. (2023, June 12). *Diffuse Axonal injury - StatPearls - NCBI bookshelf*. National Center for Biotechnology Information. <https://www.ncbi.nlm.nih.gov/books/NBK448102/>
- *Statewide EMS protocols*. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>
- Tenny, S., Das, J., & Thorell, W. (2024, February 17). *Intracranial hemorrhage - StatPearls - NCBI bookshelf*. National Center for Biotechnology Information. <https://www.ncbi.nlm.nih.gov/books/NBK470242/>

**Suggested/Required Equipment**

- Pump (for drip adjustment practice)
- Intubation equipment
- Ventilator – company specific
- Chest tube set up

**IFT Educational Supplement**  
**Module 16 - Obstetrics/Neonate**

**Last Reviewed:** 2025-September

**Sponsor Hospital Approval:** Paramedic

**Cognitive Objectives**

Upon completion of this course, the participant will be able to:

**1. Fetal and Maternal Physiology**

- Describe the stages of fetal development.
- Correlate fetal development with maternal physiological adaptations during pregnancy.

**2. Patient Stability Prior to Transport**

- Identify clinical indicators of stability in obstetric and neonatal patients.
- Determine the appropriateness and timing of transport based on patient presentation.

**3. Obstetric Patient Assessment**

- Differentiate between normal and abnormal obstetric findings via history and physical examination, including:
  - Prenatal care, Gravida/Para, gestational age, prior complications, and delivery types.
  - Uterine contractions (frequency, duration, strength), cervical dilation, and effacement.

**4. Neonatal Patient Assessment**

- Assess fetal and postnatal circulation.
- Identify fetal heart tones, movement, and position using Leopold maneuvers.

**5. Obstetrical Disorders**

Define, describe, and identify signs and implications of:

- Hypertensive syndromes (e.g., preeclampsia, HELLP syndrome)
- Vaginal hemorrhage, abruptio placentae, placenta previa
- PROM, placenta accreta, embolism, gestational diabetes

**6. Labor and Delivery Complications**

- Recognize and manage:
  - Preterm labor, breech presentation, shoulder dystocia, cord prolapse, uterine rupture
  - Postpartum hemorrhage, nuchal cord, multiple gestations, fetal demise

**7. Neonatal Distress**

- Understand etiology, pathophysiology, signs/symptoms, diagnostics, and management of:
  - Hypoglycemia, hypothermia, respiratory distress, and various forms of shock
  - Neonatal cardiac arrest and maternal resuscitation considerations
  - Differences in resuscitation for term vs. preterm neonates

## **8. Pharmacologic Interventions**

- Identify and understand safe medication use for OB and neonatal transport, including:
  - OB medications: Magnesium sulfate, Terbutaline, Labetalol, Hydralazine, Betamethasone
  - Neonatal medications as per NRP/STABLE protocols
  - Considerations in both medical and traumatic obstetric scenarios

## **9. Transport Considerations**

- Describe physical, legal, and logistical requirements for transport:
  - Local and federal regulations
  - Equipment/device selection and preparation

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## **Psychomotor Objectives**

**Note:** While CT IFT Paramedics may not perform all listed skills, a comprehensive understanding is required.

### **1. Obstetric Patient Physical Assessment**

- Assess fetal heart tones (via Doppler)
- Estimate gestational age

### **2. Neonatal Patient Physical Assessment**

- Conduct APGAR scoring
- Measure neonatal vital signs and blood glucose

### **3. Emergency Delivery Preparation**

- Prepare environment and equipment for emergency field or in-transit delivery

### **4. Management of OB Complications**

- Demonstrate response techniques for:
  - PIH, abnormal contractions, cord complications, placental abruption, trauma in pregnancy

### **5. Transport-Specific Techniques**

- Assess delivery risk during transport
- Safely transport obstetric and neonatal patients
- Perform neonatal resuscitation and manage fetal distress in line with NRP/STABLE

### **6. Umbilical Access Management**

- Maintain and troubleshoot pre-existing umbilical vein catheters

### **7. Neonatal Transport Safety**

- Demonstrate proper neonatal patient securing methods for transport

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## **Affective Objectives**

Upon course completion, the participant will be able to:

1. Value the importance of comprehensive lab and diagnostic evaluation in OB/neonatal disorders.
2. Recognize the need for appropriate crew configuration based on the nature and severity of the patient's condition.
3. Justify the rationale for transferring OB/neonatal patients between facilities.

4. Determine when delivery should be prioritized over transport, supporting the decision with sound clinical reasoning.
5. Apply structured, critical thinking to anticipate and manage complications during transport.

### Instructor Notes

- **Emphasize the Neonatal Resuscitation Triangle** as a foundational concept.
- Provide a legal overview of how **EMTALA** applies to obstetric transfers.
- Utilize scenario-based learning and simulation.
  - For scenarios, access: [SimBox](#)
- Encourage students to pursue/maintain **NRP** and **STABLE** certifications.

### Related Protocols

Prehospital	IFT
<ul style="list-style-type: none"> <li>• 2.17 Newborn Resuscitation</li> <li>• 2.18 Obstetrical Emergencies</li> </ul>	<ul style="list-style-type: none"> <li>• 8.0 Routine IFT Patient Care</li> <li>• 8.14 Obstetrics</li> </ul>

### CQI Performance Metrics

- Yearly scenario review/practice
- Review of all OB and/or neonate transports

### Resources

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- Athanasopoulou, S., Sanseau, E., Mielke, B., Montgomery, E., Auerbach, M., Kou, M., & Vora, V. (2024). *Simbox*. acep-simbox. Retrieved June 6, 2025, from <https://www.emergencysimbox.com/>
- Karlsen, D. K. (2024). *The S.T.A.B.L.E. Program learner manual: Post-resuscitation/pre-transport stabilization care of sick infants: Guidelines for neonatal caregivers* (7th ed.). American Academy of Pediatrics.
- Mauldin, L., & Smetana, C. (2020). *Flight medical provider study guide: Current concepts in critical care transport*. IAMed.
- *Rural obstetric life support project (OBLS) — NERHA*. (2025). NERHA. Retrieved March 21, 2025, from <https://www.nerha.org/obls>
- Society of Critical Care Medicine. (2021). *Fundamental critical care support* (7th ed.)
- Superville, S., & Siccardi, M. (2023, February 19). *Leopold maneuvers - StatPearls - NCBI bookshelf*. National Center for Biotechnology Information. Retrieved March 21, 2025, from <https://www.ncbi.nlm.nih.gov/books/NBK560814/>
- Weiner, G. M., Zaichkin, J., & Kattwinkel, J. (2021). *Textbook of neonatal resuscitation* (9th ed.). American Academy of Pediatrics & American Heart Association.
- Wolfe, A. C., Santiago, J., Frakes, M. A., & Farmer, S. (2022). *Critical care transport core curriculum* (2nd ed.). Air & Surface Transport Nurses Association.

**Suggested/Required Equipment**

- Infant or neonate manikin
- Neonatal appropriate equipment (i.e. airway, IO, bueretro, IVs, suction)
- Supplies for delivery
- OB delivery manikin
- Neonatal transport devices

## IFT Educational Supplement Module 17- Pediatrics

**Last Reviewed:** 2025-September

**Sponsor Hospital Approval:** Paramedic

### **Cognitive Objectives**

By the end of the course, the student will be able to:

1. Define pediatric classification as  $\leq 36$  kg, excluding neonates.
2. Apply the Pediatric Assessment Triangle when assessing a patient prior to transport.
3. Identify strategies for obtaining and interpreting unfamiliar pediatric diagnoses during transport.
4. Recall age-appropriate vital sign ranges and monitoring expectations for:
  - Heart rate
  - Respiratory rate
  - Blood pressure
5. Discuss pediatric airway management strategies, including:
  - Endotracheal intubation
  - CPAP/BiPAP
  - Supraglottic airways
  - High-flow nasal cannula
6. Understand pediatric pathophysiology related to:
  - **ALTE / BRUE**
  - **Respiratory Distress Syndromes:**
    - Asthma
    - Foreign body aspiration
    - Epiglottitis
    - Croup
    - RSV/Bronchiolitis
    - Pneumonia
  - **Congenital Heart Defects** (cyanotic and non-cyanotic)
  - **Cardiac Dysrhythmias:**
    - Prolonged QT
    - Interpretation of 12-lead ECGs
  - **Endocrine/Metabolic Conditions:**
    - Hyperglycemia
    - Age-specific hypoglycemia
  - **Temperature Emergencies:**
    - Hypothermia
    - Hyperthermia
  - **Pediatric Poisoning:**
    - Contacting poison control
    - Review of common toxins [CHOP Reference](#)
    - Toxic doses and routes of exposure

- **Seizure Management:**
  - New onset vs. known seizure disorders
  - Pharmacologic interventions
- **Sepsis Recognition and Management:**
  - Fluid resuscitation
  - Vasoactive medications
  - Timely antibiotic administration
- **Shock recognition and management**
- **Special Needs Pediatric Patients:**
  - Tracheostomy care (Devices Supplement)
  - Feeding tube maintenance (Devices Supplement)
  - Ventilator overview (Ventilator Management Supplement)
- **Pediatric Trauma Management:**
  - Isolated orthopedic injuries
  - Pediatric burns

**7. Outline transport considerations for pediatric patients, including:**

- Use of car seats and commercial transport devices
- Pediatric spinal motion restriction
- Management of an infant born during transport
- Communication with accompanying family members
- Custody concerns (i.e. DCF, familial disputes)
- Temperature regulation during transport

**Psychomotor Objectives**

Upon successful completion, the student will be able to:

1. Utilize pediatric-specific formulas and memory aids (e.g., Broselow, Handtevy) to:
  - Calculate minimum systolic blood pressure
  - Select proper ETT size
  - Calculate fluid boluses
  - Administer weight-based medications
2. Demonstrate securing pediatric patients (infant/child manikins) using:
  - Car seats
  - Commercial restraint systems (e.g., Pedi-Mate)
3. Perform invasive procedures on pediatric manikins:
  - IV access
  - Endotracheal intubation
  - Intraosseous insertion
  - NG/OG tube placement

## Affective Objectives

Upon course completion, students will be able to:

1. Formulate and justify a comprehensive treatment and transport plan during pediatric IFT scenarios.
2. Demonstrate confident use of cognitive offloading tools (e.g., Broselow, Handtevy, Pedi-Stat) to reduce cognitive load under stress.
3. Display compassionate and developmentally appropriate communication with pediatric patients and caregivers, shaping future EMS-family relationships positively.

## Instructor Notes

1. Pediatric Classification ( $\leq 36$  kg, non-neonate)
  - **Tip:** Introduce pediatric weight estimation tools. Emphasize neonate exclusion and transport-specific classification relevance.
2. Pediatric Assessment Triangle (PAT)
  - **Focus:** Explain appearance, work of breathing, and circulation to skin.
  - **Demo:** Show videos of pediatric patients with differing presentations.
3. Interpreting Unfamiliar Diagnoses
  - **Strategy:** Discuss using transport records, reaching out to sending facilities, and consulting with online medical control.
  - **Activity:** Provide sample unfamiliar diagnoses and group interpretation discussion.
4. Age-Appropriate Vital Signs
  - **Tool:** Introduce cognitive offloading references (PALS charts, Broselow).
  - **Practice:** Quick recall games or “normal vs. abnormal” case mini-scenarios.
5. Pediatric Airway Management
  - **Emphasize:** Anatomical differences, confirmation techniques, avoiding over-ventilation.
  - **Skill Check:** Show all devices on airway manikin; allow student practice.
6. Pediatric Pathophysiology (Subtopics)
  - **Teaching Method:** Use case-based learning for each system:
    - *Respiratory:* Use auscultation audio.
    - *Cardiac:* ECG strip interpretation exercises.
    - *Endocrine:* Glucose trends across age groups.
    - *Poisoning:* Use CHOP resources for common toxins.
    - *Sepsis/Shock:* Teach the “golden hour” timeline.
    - *Special needs:* Review device-specific care with actual hardware or detailed images.
7. Transport Considerations
  - **Hands-On:** Practice with actual transport gear.
  - **Simulation:** Include family communication roleplay in scenarios.
  - **Discussion:** Debrief safety considerations for transport (temperature, restraint, etc.).
8. Emphasize Safety and Advocacy
  - Reinforce EMS roles as both caregivers and patient advocates.
  - Emphasize that provider must understand when it would be safer for the patient to be transported by a specialty team.

<b>Related Protocols</b>	
<b>Prehospital</b>	<b>IFT</b>
<ul style="list-style-type: none"> <li>CT Statewide Emergency Medical Services Protocols</li> </ul>	<ul style="list-style-type: none"> <li>8.0 Staffing Guidelines</li> <li>8.1 Routine IFT Care</li> </ul>
<b>CQI Performance Metrics</b>	
<ul style="list-style-type: none"> <li>Review of all pediatric transports (see Best Practices Guide)</li> </ul>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>Air &amp; Surface Transport Nurses Association, Wolfe, A., Frakes, M., &amp; Nayman, D. (2024). <i>Patient Transport: Principles and practice</i> (5th ed.). Elsevier.</li> <li>American College of Emergency Physicians. (2022). <i>Critical care transport</i> (3<sup>rd</sup> ed.). Jones &amp; Bartlett Learning.</li> <li>The Children's Hospital of Philadelphia. (2019, March 14). <i>Six common and concerning childhood poisons</i>. Welcome   Children's Hospital of Philadelphia. Retrieved August 1, 2025, from <a href="https://www.chop.edu/news/health-tip/six-common-and-concerning-childhood-poisons">https://www.chop.edu/news/health-tip/six-common-and-concerning-childhood-poisons</a></li> <li>Chen, M., &amp; Dugdale, D. (2023, October 23). <i>Congenital heart disease: MedlinePlus medical encyclopedia</i>. MedlinePlus - Health Information from the National Library of Medicine. <a href="https://medlineplus.gov/ency/article/001114.htm#:~:text=CHD%20is%20often%20divided%20into,oxygen)%20and%20non%2Dcyanotic">https://medlineplus.gov/ency/article/001114.htm#:~:text=CHD%20is%20often%20divided%20into,oxygen)%20and%20non%2Dcyanotic</a></li> <li>Emergency Medical Services for Children. (2014). <i>Pediatric interfacility transfer guide</i>. Retrieved August 1, 2025, from <a href="https://emscimprovement.center/education-and-resources/interfacility-transfer/">https://emscimprovement.center/education-and-resources/interfacility-transfer/</a></li> <li>Karlsen, D. K. (2024). <i>The S.T.A.B.L.E. Program learner manual: Post-resuscitation/pre-transport stabilization care of sick infants: Guidelines for neonatal caregivers</i> (7th ed.). American Academy of Pediatrics.</li> <li><i>Statewide EMS protocols</i>. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <a href="https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols">https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols</a></li> <li>Wolfe, A. C., Santiago, J., Frakes, M. A., &amp; Farmer, S. (2022). <i>Critical care transport core curriculum</i> (2nd ed.). Air &amp; Surface Transport Nurses Association.</li> </ul>	
<b>Suggested/Required Equipment</b>	
<ul style="list-style-type: none"> <li>Pediatric reference charts (Broselow, Handtevy, Pedi-Stat)</li> <li>Sample pediatric transport devices (Pedi-Mate, car seat harnesses)</li> <li>Pediatric advanced life support equipment</li> <li>State and regional IFT protocols</li> <li>Current pediatric emergency guidelines</li> </ul>	

## IFT Educational Supplement

### Module 18 - IFT BLS

Last Reviewed: 2025-September

Sponsor Hospital Approval: EMT/Paramedic

#### Cognitive Objectives

Upon successful completion of this course, the EMT will be able to:

##### 1. IFT Levels and Guidelines

- Describe patient eligibility criteria for BLS-level IFT.
- Summarize the clinical indicators for stable transport (hemodynamic stability, patent airway, minimal risk).

##### 2. Legal Aspects of Transfer: EMTALA Overview

- Define EMTALA and explain relevant case law.
- Discuss stabilization requirements and the risks vs. benefits of transferring a patient.

##### 3. Transport Preparation

- Identify required documentation, patient history, and reasons for transfer.
- Describe communication responsibilities with sending/receiving facilities.
- Explain appropriate assessment and documentation prior to transport.

##### 4. Patient and Safety Advocacy

- Recognize when to delay or decline transport based on patient condition.
- Understand destination appropriateness and diversion criteria.
- Advocate for appropriate transport staffing and planning.

##### 5. Transport Stressors

- Given the patient's condition be aware of:
  - Environmental: temperature, noise, vibration, humidity
  - Physiological implications for patients

##### 6. Pre-existing Medical Device Management

- Recognize and describe common medical devices encountered during BLS IFT, including:
  - IV locks
  - Urinary catheters (Foley, suprapubic) – **Module 3 Devices**
  - Wound vacs
  - NG/OG tubes – **Module 5 GI/GU**
  - Enteral feeding tubes (non-running)
  - LVAD (Left Ventricular Assist Device)- **Module 4 Cardiac**
  - LifeVest (wearable cardioverter defibrillator) – **Module 4 Cardiac**
  - Oxygen devices (trach mask, venti mask, oximizer)
  - Dialysis access (fistula/graft/catheter)
- Central lines (non-running), Porta-Cath
- Tracheostomies – **Module 3 Devices**
- Restraints
- Patient-controlled infusion pumps (analgesia, prostaglandin, insulin, milrinone)

## 7. Documentation During Interfacility Transport (IFT)

Student will explain how to properly document all critical elements during interfacility transport, ensuring continuity of care, legal compliance, and accurate handoff to the receiving facility. This includes:

### Vital Signs

- Obtain and document vital signs at **clearly defined intervals**, including:
  - HR, BP, RR, SpO<sub>2</sub>, temperature (if available/relevant)
- Ensure **time-stamped entries** with any deviations, trends, or interventions noted

### Additional Considerations

- Document medication administration, response to treatment, and any procedural interventions (e.g., suctioning, repositioning)
- Include times of patient transfer of care, delays, or route changes
- Clearly document communication with sending/receiving providers and any orders received during transport

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## Psychomotor Objectives

By the end of this course, the EMT will demonstrate:

1. Proper setup of transport equipment for accessibility and safety.
2. Effective communication with hospital care team before transport.
3. Assessment and management of an IV lock.
4. Response to bleeding or dislodged venous access devices.
5. Safe handling of urinary catheter: emptying bag and measuring output.
6. Tracheostomy: List common complications and appropriate corrections (per protocol)
7. Identification of enteral feeding tubes.
8. Recognition of patient-controlled infusion devices.
9. LVAD Management:
  - List 3 complications
  - Identify 4 troubleshooting steps
  - Describe 4 actions during LVAD failure

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## Affective Objectives

At the conclusion of the course, the EMT will:

1. Initiate professional discussion regarding IV medication needs vs. capped access.
2. Differentiate passive monitoring from active interaction with patient devices.
3. Analyze scenarios to determine if staffing is appropriate for safe transport.
4. Exhibit appropriate demeanor and disposition for patient care during BLS IFT.
5. Demonstrate appropriate communication and problem-solving skills when faced with a challenge to ensure that BLS IFT is successful.

**Instructor Notes**

- Provide real-life case examples for each device and scenario.
- Emphasize communication pathways between EMTs and medical teams.
- Refer to local/regional protocols when applicable (e.g., tracheostomy management, IFT staffing).
- Reinforce non-invasive monitoring responsibilities and limitations of BLS personnel.
- Encourage ethical discussion regarding patient refusal.
- Review concerns for IFT of behavioral patients:
  - History of violence
  - Current demonstration of aggression etc.
  - Considerations for transporting patient restrained (i.e. will receiving facility take them?)

**Related Protocols**

Prehospital	IFT
If patient condition changes – use appropriate protocol	8.0 Staffing Guidelines 8.1 Routine IFT Patient Care

**CQI Performance Metrics**

- Yearly scenario review/practice
- Review 10-20% of BLS IFT transports

**Resources**

- Air & Surface Transport Nurses Association, Wolfe, A., Frakes, M., & Nayman, D. (2024). *Patient Transport: Principles and practice* (5th ed.). Elsevier.
- American College of Emergency Physicians. (2022). *Critical care transport* (3<sup>rd</sup> ed.). Jones & Bartlett Learning.
- *Statewide EMS protocols*. (2024, March 3). CT.gov - Connecticut's Official State Website. Retrieved May 2, 2024, from <https://portal.ct.gov/dph/emergency-medical-services/ems/statewide-ems-protocols>

**Suggested/Required Equipment**

- IV with saline lock
- Pictures or actual pieces of equipment
- Tracheostomy
- French suction
- NG/OG tubes

## **Skills Appendix**

Arterial Line – Non-Transduced

Arterial Line- Transduced

Chest Tube

Infusion/Pump

Transvenous Pacing

Ventilator

<b>IFT Arterial Line Competency Checklist (Non-Transduced)</b> Paramedic: _____ Evaluator: _____ P/NR (Circle One)	Pass	Needs Remediation
<b>Pre-Transport</b>		
Check the arterial line insertion site: <ul style="list-style-type: none"> <li>✓ Bleeding or hematoma development,</li> <li>✓ Kinking or dislodgment,</li> <li>✓ Signs of infection,</li> <li>✓ Dressing is occlusive and the line is sutured in place</li> <li>✓ Line is free of air bubbles/clots</li> </ul>		
Assess limb perfusion distal to the insertion site: <ul style="list-style-type: none"> <li>✓ Capillary refill</li> <li>✓ Skin temperature</li> <li>✓ Pulse quality</li> <li>✓ Sensation</li> </ul>		
Ensure the arterial line is secured at a secondary anchorage point to reduce the risk of accidental removal		
Ensure limb is immobilized		
Check connections and caps: <ul style="list-style-type: none"> <li>✓ Tight</li> <li>✓ Luer-locked</li> <li>✓ Exposed</li> </ul>		
Check that the flush solution is pressurized to 300mmHg and that line has been flushed		
Ensure flush solution is set to 3cc/hour		
<b>Transport</b>		
Learner should verbalize the following items to be done during transport: <ul style="list-style-type: none"> <li>✓ Assess limb perfusion q15min.</li> <li>✓ Ensure line is visible during entirety of transport</li> </ul>		

Task Description IFT Arterial Line Competency Checklist (Non-Transduced)		Pass	Needs Remediation
Troubleshooting			
Issue	Paramedic Action		
Lock fills with blood	Fast Flush with 5 mL NS using aseptic technique		
Continuous backflow of blood	Verify pressure bag inflated to 300 mmHg; check for leaks or disconnections		
Bleeding at site	Apply pressure with sterile gauze, notify sending facility and medical control		
Loss of distal pulses	Stop transport if safe, assess for occlusion, notify medical control immediately		

**Critical Actions**

- \_\_\_\_ Student must use aseptic technique
- \_\_\_\_ Student must check arterial line for bleeding, kinking, dislodgement and signs of infection
- \_\_\_\_ Student must assess limb perfusion distal to insertion site.
- \_\_\_\_ Student successfully troubleshoots all listed problems

<b>IFT Arterial Line - Transduced</b>	<b>Pass</b>	<b>Needs Remediation</b>
<b>Paramedic Name:</b> _____ <b>Evaluator:</b> _____ <b>P/NR (Circle One)</b>		
<b>Pre-Transport</b>		
Verify arterial line site is secure and free from signs of infection or bleeding		
Ensure pressure bag is inflated to 300mmHg and flush system is functioning <ul style="list-style-type: none"> <li>• Caps should be luer-locked / tight (not loose)</li> </ul>		
Obtain MAP goal/range with sending provider		
Connect transport monitor with arterial waveform capability		
<b>Confirm transducer is zeroed and leveled at phlebostatic axis</b>		
<b>Steps:</b> <ul style="list-style-type: none"> <li>• Identify the phlebostatic axis (4th ICS at midpoint between A/P chest)</li> <li>• Position patient supine or at &lt; 60 head elevation</li> <li>• Align transducer to level with the phlebostatic axis using leveling device</li> <li>• Turn stopcock at the transducer off to the <b>patient</b> and open to <b>air</b></li> <li>• Remove the cap</li> <li>• Press “zero” or “zero all” on monitor, wait for confirmation</li> <li>• Once zeroed, replace and lock cap, return stopcock open to the <b>patient</b> and closed to <b>air</b></li> <li>• Confirm return of arterial waveform on monitor</li> <li>• Reassess waveform quality and MAP</li> </ul>		
Interpret a “square wave test”		
Compare arterial line MAP with manual cuff BP at initial setup		
Student should identify when it is appropriate to re-zero the line		
<b>Transport</b>		
Confirm stopcocks are properly oriented and secured		
Have backup BP monitoring available		
Position and pad arm to protect A-Line during movement <ul style="list-style-type: none"> <li>✓ Line must be visible during transport and checked at least every 15 minutes.</li> <li>✓ Secure all tubing with luer-locks and ensure they are taped and protected from snagging.</li> </ul>		
Monitor waveform and site during transport		
Repeatedly assess distal limb perfusion and waveform quality		
Compare arterial line MAP with manual cuff BP periodically during transport.		
<b>Waveforms (Student should identify the following waveforms)</b>		
Optimal (1-2 oscillations) Overdamped (< 2 oscillations, flat/rounded waveform) Underdamped (>2 oscillations)		

IFT Arterial Line – Transduced Task Description			Pass	Needs Remediation
Troubleshooting				
Issue	Possible Cause	Corrective Action		
Flatline/no waveform	Stopcock closed, loose connection, pressure bag deflated	Verify stopcocks, tighten connections, re-inflate to 300 mmHg		
Overdamped waveform	Air bubbles, clot, kinked tubing	Remove bubbles, flush system, straighten tubing		
Underdamped waveform	Excess tubing, overly stiff tubing, poor leveling	Shorten tubing, verify correct leveling		
Sudden high/low reading	Patient movement, line kinked, transducer shifted	Reassess patient and setup, re-zero if needed		

**Critical Actions**

- \_\_\_ Student obtains MAP goals prior to transport
- \_\_\_ Student is able to state what they are looking for when inspection the line
- \_\_\_ Student successfully “zeros” the line
- \_\_\_ Student successfully interprets “square wave test”
- \_\_\_ Student demonstrates or verbalizes proper securing of line for transport
- \_\_\_ Student correctly identifies the listed waveforms
- \_\_\_ Student successfully troubleshoots identified issues

IFT - Chest Tube/Heimlich Valve Competency	Pass	Needs Remediation
Paramedic Name: _____ Evaluator: _____ P/NR(Circle One)		
<b>Patient</b> ✓ Reason for chest tube ✓ When placed ✓ Water seal or suction		
<b>Preparation</b>		
Ensure portable suction unit is fully charged		
Obtains baseline patient status (vitals, lung sounds, ETCO2, SPO2 etc.)		
Confirm chest tube is sutured to patient and/or Heimlich valve is in place <i>Patient should be in an upright or semi-fowlers position</i>		
Confirm chest tube are connected to drainage unit <ul style="list-style-type: none"> <li>• No dependent loops or kinks – straight path from patient to collection chamber</li> <li>• Tape the gaps or junctions together if possible</li> </ul>		
Place unit distal too and lower than the chest.		
Stabilize unit using the floor stand attached to the device – When transporting – ensure unit is secured so it doesn't tip over. <i>(Student must verbalize or demonstrate how they would secure unit)</i>		
Ensure water seal is filled with appropriate amount of sterile water <ul style="list-style-type: none"> <li>• Tidaling is expected with respirations</li> <li>• No tidaling be suspecting for an obstruction or healed/expanded lung)</li> </ul>		
Ensure chest drain is securely connected to patient prior to initiating suction		
Connect chest drain to suction		
Turn suction to at least 80mmHG or per hospital orders– observe effectiveness of suction <i>(Student should ask "provider" the amount of suction the patient requires).</i>		
Evaluate suction and suction settings on the specific device's "suction regulator" for safety and effectiveness. <i>(Student may verbalize how to check if suction is correct)</i>		
Observe the unit for bubbling, either constant or intermittent <i>(Student must verbalize why they are evaluating the bubbling, and what it indicates)</i> <ul style="list-style-type: none"> <li>• Normal = tidaling (gentle rise and fall of water with patient's breathing)</li> <li>• Continuous = air leak from tube connection or patient's chest</li> <li>• Intermittent = intermittent air leak from patient's chest</li> <li>• No bubbling= No air leak</li> </ul>		
Marks patient drainage prior to transport with a marker and time		

IFT - Chest Tube/Heimlich Valve Competency Task Description			Pass	Needs Remediation
<b>Transport</b>				
Ensures drainage unit is properly secured in ambulance				
Switches patient to on board suction				
Performs re-assessment of patient at appropriate intervals based on patient status				
<b>Troubleshooting</b> Learner should identify problems, their causes and corrective actions				
Problem	Likely cause(s)	Action		
<b>Continuous vigorous bubbling</b> in water seal	Large <b>air leak</b> (connection leak or intrathoracic)	Check all connections; briefly <b>pinch proximal tubing</b> to localize leak; if patient deteriorates → contact DMO, prepare for decompression per protocol		
<b>No bubbling</b> with pneumothorax on suction	<b>Resolved air leak</b> or <b>obstruction/kink</b>	Inspect tubing for kinks, ensure suction at set level; reassess lung sounds/SpO <sub>2</sub>		
<b>No tidaling</b>	Obstruction, lung fully expanded, device not upright	Check positioning, tubing patency, patient assessment; confirm device level below chest		
<b>Sudden ↑ bright-red drainage</b> (>200 mL/hr adult or rapid surge)	Active hemorrhage	Support ABCs, large-bore IV, notify medical control/receiving; prepare for massive transfusion activation at receiving		
<b>Device tips/spills</b>	Handling/transport movement	Keep device <b>upright below chest</b> ; if compromised, <b>do not re-use contaminated system</b> —follow “Do not reconnect” guidance; contact medical control		
<b>Chest tube dislodged</b>	Traction/securement failure	Apply <b>occlusive dressing</b> (vented for suspected pneumothorax) and <b>immediately notify</b> medical control; monitor for tension physiology		
<b>Drain detached from tube</b>	Connection failure/contamination	<b>Do not reconnect</b> ; cover end with sterile dressing, call for orders; monitor for respiratory distress		
<b>Heimlich Valve</b> <ul style="list-style-type: none"> <li>✓ Confirm Flow Direction (arrow to collection)</li> <li>✓ Ensure no occlusive dressings distal to valve</li> <li>✓ Ensure no clamp distal to valve</li> <li>✓ Verbalizes “do not connect to suction unless ordered by physician)</li> </ul>				

**Critical Actions**

- \_\_\_ Must ensure tube is secured to chest
- \_\_\_ Must place unit distally
- \_\_\_ Must secure unit so it doesn't tip during transport
- \_\_\_ Must be able to verbalize what different "bubbling" indicates
- \_\_\_ Must be able to verbalize solutions for 4 "problems" noted

<b>IFT - Infusion Checklist</b>	<b>Pass</b>	<b>Needs Remediation</b>
<b>Paramedic Name:</b> _____ <b>Evaluator:</b> _____ <b>P/NR (Circle One)</b> <b>Pump Name:</b> _____		
<b>Pre-Transport Infusion may already be running</b>		
Verify medication orders <input checked="" type="checkbox"/> Name <input checked="" type="checkbox"/> Concentration <input checked="" type="checkbox"/> Dosage <input checked="" type="checkbox"/> Titration (as needed)		
Confirm IV access <input checked="" type="checkbox"/> Location <input checked="" type="checkbox"/> Patency <input checked="" type="checkbox"/> Type <input checked="" type="checkbox"/> Need for additional access <input checked="" type="checkbox"/> Labels lines		
Back-Up Equipment <input checked="" type="checkbox"/> Spare pump <input checked="" type="checkbox"/> Spare tubing <input checked="" type="checkbox"/> Flushes		
Verification of Current Infusion <input checked="" type="checkbox"/> Learner independently verifies/cross-checks dose to be infused <input checked="" type="checkbox"/> If medication is weight based, verify patient's weight.		
Titration Protocols <input checked="" type="checkbox"/> Learner obtains guidance for titration (this should include who they contact for titration orders)		
<b>Setting up Infusion</b>		
<b>Starting Pump</b>		
Turns system on		
Selects new or same patient		
Selects appropriate drug library		
<b>Loading Administration Set</b>		
Selects correct set		
Properly loads set		
<b>Programming Primary Infusion</b>		
Input the following settings: <ul style="list-style-type: none"> <li>• Norepinephrine</li> <li>• 134kg patient</li> <li>• 4mg/250mL</li> </ul>		
Selects proper medication		
Verbalizes understanding of alert		
Selects proper concentration		
<b>Task Description</b>	<b>Pass</b>	<b>Needs Remediation</b>
Enters correct dose		

Enters correct VTBI ✓ Ensures that there is a “safety limit” programmed as well.		
Initiates infusion		
<b>Titration</b>		
Verbalizes understanding of limits		
Increases dose by an appropriate amount		
<b>Transport</b>		
Ensure pump is securely mounted in ambulance		
Confirm battery status – connects to electrical supply		
Ensures lines are not tangled and easily accessible		
Monitors and documents: ✓ Infusion rate and total volume infused ✓ Vital signs and response to medication ✓ Changes made to infusion rates or titrations with accurate time stamps. ✓ Reason for titration changes		
Explains procedure for finished infusion		
<b>Trouble Shooting</b>		
<b>Alarm Management</b>		
Silences alarm		
Occlusion ✓ Differentiates between upstream v. downstream occlusion ✓ Resolves upstream occlusion ✓ Resolves downstream occlusion		
Resolves air in line		
Resolves battery (power) alarms		
<b>Pump Failure</b> ✓ Switch to spare pump or gravity drip ✓ Contact sending and receiving facility		
<b>Access infiltration/extravasation</b> ✓ Stops infusion ✓ Mark site ✓ Remove IV		
<b>Technical</b>		
Locate external power source connection		
States policy/procedures for disinfection ✓ Identifies proper hand hygiene prior to handling lines and access ✓ Ensures use of approved cleaner		

**Critical Actions**

- \_\_\_ Verifies medication orders
- \_\_\_ Verifies dosing/concentration
- \_\_\_ Obtains titration orders
- \_\_\_ Successfully sets up a “new infusion”
- \_\_\_ Successfully troubleshoots pump alarms and pump failure

IFT Transvenous Pacemaker Skill Sheet		Pass	Needs Remediation
Paramedic Name: _____ Evaluator: _____			
P/NR (Circle One)			
<b>Preparation</b>			
Verify settings: mode, target rate, output and sensitivity			
Perform Patient Assessment BP, palpable pulses or not, underlying rhythm, perfusion status, etc.			
Confirm capture (Mechanical and electrical)			
<ul style="list-style-type: none"> <li>• <b>Electrical capture:</b> Pacing spike followed by QRS complex on EKG.</li> <li>• <b>Mechanical capture:</b> Corresponding palpable pulse or arterial line waveform.</li> </ul>			
Secure pacing wires and connections (tape, label prevent tension and/or dislodgement)			
Ensure pacemaker box is functioning and securely attached to patient			
Prepare defibrillator and medications			
Set up EKG (ensure proper lead placement)			
<b>Transport</b>			
Continuously monitor EKG and vitals, capture during transport			
Ensure gentle patient handling			
Maintain clear communication with sending and receiving team			
Documentation: Student should be to state what needs to be documented: Type, settings, issues, underlying rhythm, evidence of capture			
<b>Trouble shooting</b>			
<b>Problem</b>	<b>Possible Cause</b>	<b>Action</b>	
Loss of capture	Lead dislodgement, low output setting	Increase output, check connections, call medical control	
Failure to sense	Sensitivity too high/low, poor lead placement	Adjust sensitivity, assess leads	
Continuous pacing despite intrinsic rhythm	Oversensing/undersensing	Adjust sensitivity per protocol	
Sudden asystole or no pacing	Battery failure, loose connections	Switch to external pacing, verify wires and box	

**Critical Actions**

- \_\_\_\_\_ Places defibrillator pads prior to transport
- \_\_\_\_\_ Checks for electrical and mechanical capture
- \_\_\_\_\_ Confirms TVP settings prior to transport
- \_\_\_\_\_ Successfully troubleshoots pacing problems

IFT- Ventilator Checklist		Pass	Needs Remediation
Paramedic Name: _____ Evaluator: _____			
P/NR (Circle one)			
Preparation for Operation			
Patient Airway			
<b>ETT</b>			
<ul style="list-style-type: none"> <li>✓ Has placement been confirmed</li> <li>✓ Depth</li> <li>✓ Cuff pressure</li> <li>✓ In-line suction present and working?</li> </ul>			
<b>Trach</b>			
<ul style="list-style-type: none"> <li>✓ Size</li> <li>✓ Inner cannula ?</li> <li>✓ Cuff Pressure</li> <li>✓ Spare trach</li> </ul>			
Vent Set Up			
<i>Ensure using service ventilator specific recommendations/charts.</i>			
Assemble & properly attach circuit.			
Assemble & properly attach gas lines.			
Assemble & properly attach gas supply.			
Plug in & power on ventilator.			
Complete a device check.			
Select proper range for circuit.			
Proper "rescue" equipment readily available (BVM, OPA, suction, 10cc luer lock syringe)			
Perform "mode cross walk"			
Example: Learner articulated the difference in settings in AC/VC v. SIMV			
Ensure appropriate O2 supply. Learner should calculate O2 usage for the trip based on their service's ventilator.			
In-Line Nebulizer – learner should demonstrate how to set up an in-line nebulizer on the vent			
Patient			
Order and Patient Verification			
<ul style="list-style-type: none"> <li>✓ Confirm vent mode (Vt, RR, FiO2, PEEP, Trigger, etc.)</li> <li>✓ Sedation and analgesia goals (RASS)</li> <li>✓ Obtain "ranges" for each setting from RT or physician</li> </ul>			
Verbalize tidal volume based on ideal body weight (paramedic to calculate)			

IFT- Ventilator Checklist Task Description	Pass	Needs Remediation
<p><b>Input ventilator settings.</b> May use the below settings, a scenario with different settings or scenario that requires the paramedic to determine appropriate settings:</p> <ul style="list-style-type: none"> <li>• <b>Mode:</b> Assist Control – Volume Control</li> <li>• <b>Trigger</b> (sensitivity): Vent dependent</li> <li>• <b>Tidal Volume of</b> 7mL/kg for a 5’5”, 200 lb female</li> <li>• <b>Frequency:</b> 20 bpm</li> <li>• <b>PEEP:</b> 5 cmH<sub>2</sub>O</li> <li>• <b>I:E</b> ratio: 1:2</li> <li>• <b>P<sub>max</sub>:</b> 30 cmH<sub>2</sub>O</li> </ul>		
<p>Ensure Complete monitoring “bundle” in place</p> <ul style="list-style-type: none"> <li>✓ ETCO<sub>2</sub></li> <li>✓ EKG</li> <li>✓ SPO<sub>2</sub></li> <li>✓ Blood pressure</li> </ul>		
<p>Initiate mechanical ventilation</p>		
<b>Transport Operations</b>		
<p>Secure vent and vent circuit</p> <ul style="list-style-type: none"> <li>✓ Avoid circuit loops</li> <li>✓ Ensure adequate circuit “slack”</li> <li>✓ HOB 30-45 degrees as tolerated</li> </ul>		
<p>Movement Checks</p> <ul style="list-style-type: none"> <li>✓ Student demonstrates or verbalizes process to confirm tube depth and line connections after patient moves</li> </ul>		
<b>Alarm/Complication Management</b>		
<p>Identify area on screen for alarm condition indicators</p>		
<p>Explain alarm hierarchy/priority (vent dependent)</p>		
<ul style="list-style-type: none"> <li>• Hemodynamic Deterioration <ul style="list-style-type: none"> <li>✓ Cardiac arrest</li> <li>✓ R/O tension pneumothorax</li> <li>✓ High PEEP effects</li> <li>✓ Hypovolemia</li> </ul> </li> <li>• Apnea alarm (for applicable modes I.e. NIV) <ul style="list-style-type: none"> <li>✓ Ensure backup apnea ventilation enabled (vent dependent)</li> <li>✓ Oversedation v. circuit issue</li> </ul> </li> <li>• Low pressure alarm <ul style="list-style-type: none"> <li>✓ Open circuit</li> <li>✓ Tubing/O<sub>2</sub> line disconnection</li> </ul> </li> <li>• High pressure alarm <ul style="list-style-type: none"> <li>✓ Kinking, biting, secretions</li> <li>✓ Bronchospasm, cough</li> <li>✓ pneumothorax</li> </ul> </li> <li>• Low O<sub>2</sub> volume or Low tidal volume alarm <ul style="list-style-type: none"> <li>✓ Check connections (connected or loose)</li> <li>✓ Dislodgement</li> <li>✓ Ruptured cuff or cuff leak</li> </ul> </li> </ul>		

IFT- Ventilator Checklist Task Description	Pass	Needs Remediation
<b>Technical</b>		
Locate internal battery		
Locate external power source connection		
Explain conditions for swapping out internal batteries		
State policy/procedures for disinfection of ventilator		

### Critical Actions

- \_\_\_ Verifies IBW
- \_\_\_ Confirms airway positioning and cuff pressures
- \_\_\_ Ensures enough O2 for transport
- \_\_\_ Recognizes and appropriately addresses life threatening ventilator alarms
- \_\_\_ Ensures continuous, appropriate patient monitoring
- \_\_\_ Reassess patient after all patient movements and/or settings change

Problem	Likely Cause	Action
High Ppeak, normal Pplat	Secretions, kink, bronchospasm	Suction, unkink, <b>bronchodilator</b> , increase insp. flow/prolong E-time
High Ppeak & Pplat	Low compliance (ARDS, pneumothorax)	Check for tension PTX, optimize PEEP, reduce Vt, call med control
Low Vt/Low P	Disconnect, cuff leak, extubation	Reconnect, check cuff, verify position; <b>BVM + PEEP</b> if unresolved
Auto-PEEP/dynamic hyperinflation	Inadequate E-time (COPD/asthma)	↓RR, ↑E-time (I:E 1:3–1:4+), allow permissive hypercapnia
Sudden hypoxia	Mucus plug, displacement, pneumothorax	Suction, verify tube, consider needle decompression per protocol