



Performance Standard		7308
Effective April 1, 2018	Expires March 31, 2019	
Category I Skill – Low Frequency/High Risk: Post-ETI Confirmation and Monitoring	Approval: Medical Director Reza Vaezazizi, MD	Signed
Applies To: PM, MICN, BHP, EMS System	Approval: REMSA Director Bruce Barton	Signed

Terminal Performance Objective

Secure placement of an endotracheal tube (ETT) in the trachea to ensure a patent open airway allowing effective positive pressure ventilation throughout the entire prehospital period of care.

After placement, paramedics must continuously maintain the ETT within the trachea by performing all of the following:

1. Verify symmetrical rise and fall of the chest with ongoing PPV.
2. Auscultate all lung fields to confirm the presence of airflow to the lower airway during PPV.
3. Auscultate over the epigastrium to confirm the absence of airflow to the stomach during PPV.
4. Monitor PETCO₂ for appropriate waveform morphology and target CO₂ levels:
 - a. The target range for PETCO₂ level is between 30 – 45 mmHg if spontaneous circulation is present.
 - b. In cardiac arrest, metabolic derangements will significantly alter PETCO₂ values and waveform morphology. Target range for PETCO₂ levels is between 15 mmHg – 45 mmHg during CPR.
 - c. Recognize that in a patient with traumatic brain injury, PETCO₂ less than 35 mmHg due to hyperventilation may actually cause harm. Minute volume should be adjusted accordingly while maintaining optimal oxygenation, reserving hyperventilation for those patients showing signs of cerebral herniation only.¹
 - d. If the waveform capnography monitor malfunctions, a colorimetric end tidal CO₂ detector shall be used, and the malfunction reported to the organization’s QI Coordinator.
5. Directly visualize ETT placement with laryngoscope blade to ensure tracheal placement as clinically indicated.
6. Utilize pulse oximetry to evaluate for adequate O₂ saturation during PPV.
 - a. Target range is a SpO₂ greater than 95% if spontaneous circulation is present.
 - i. In patients with COPD/pulmonary disease, it may not be possible or desirable to attain a SpO₂ of 95%.
7. Confirm the absence of gastric contents in the ETT during PPV.
8. Ensure the ETT remains inserted at the correct depth within the trachea during PPV.
9. Stabilize patient’s airway and prevent tube migration by using a device to prevent rotation, flexion, or extension of patient’s head.
10. Continuously monitor and re-verify tube placement after each and EVERY move, looking for signs of tube dislodgement and migration out of the trachea.
11. Rapidly identify 100% of the occurrences when an ETT is misplaced or an ETT has migrated out of the trachea after placement.
12. Once identified as misplaced, or if there is significant doubt of the tube’s placement, remove the tube at once and provide PPV.
13. Re-intubate or consider insertion of a Rescue Airway if unable to control the airway with BLS adjuncts.
14. Record and print the waveform PETCO₂ strip following initial placement, after every patient movement and prior to transfer of care to the hospital staff and with any change in patient condition. Attach the recording strips to the completed PCR, alternatively clinicians may import the capnograms and electronically attach the images to the ePCR. A procedure to ETCO₂ monitoring MUST be created for each capnogram, and capnogram(s) MUST be attached to the ePCR.

¹ The Brain Trauma Foundation’s Guidelines for Prehospital Management of Severe Traumatic Brain Injury, Second Edition

Critical Success Targets for Endotracheal Intubation (ETI)

1. ETT securely placed in the trachea followed by effective PPV
2. Chest rise and fall with each ventilation cycle
3. SpO₂ greater than 95%
4. Limited interruption of PPV (30 seconds maximum)
5. Evaluation and Documentation of PETCO₂ morphology and values

System Benchmark

- ETT securely placed in the trachea within 2 attempts in 90% of the indicated patients.
- 100% of the misplaced or dislodged ET tubes are identified and corrected.
- 100% documentation of clinically required waveform capnography procedures
- 100% attachment of clinically required capnograms to ePCR

Applicable Protocols

The REMSA Universal Patient Treatment Protocol, and any other policy authorizing orotracheal intubation or transfer of an intubated patient, and post intubation confirmation and monitoring.

Core Competency Requirements to be covered during education/training on post-ETI confirmation and monitoring

1. Rapid assessment of endotracheal tube placement
2. Use of primary verification methods
3. Use of secondary verification methods
4. Positive pressure ventilation
5. Appropriate re-assessment of tube placement after each move
6. Rapid recognition of a misplaced tube
7. Removal of a misplaced tube
8. Alternate techniques for advanced airway management
9. Dislodgement, Occlusion, Pneumothorax, Equipment Failure (**DOPE**)
10. Consequences, risks and complications of failure to complete Post ETI confirmation and monitoring

Adjunctive Performance Standards

1. ALS Airways
2. Positive Pressure Ventilation (PPV)

Equipment Requirements

1. Personal Protective Equipment
2. NP/OP Airways
3. BVM
4. Stethoscope
5. Supplemental oxygen
6. Magill forceps
7. Laryngoscope(s)
8. Laryngoscope blades (multiple sizes)
9. Appropriate-sized ET tubes
10. Stylet(s)
11. Pulse oximeter
12. Waveform capnography
13. Suction device (both rigid and flexible catheters)
14. Cardiac monitor
15. Difficult Airway Kit/Rescue Airway Kit (including just in time training aids)

Instructor Resource Materials

1. Prehospital Trauma Life Support, Sixth Edition
2. AHA ACLS Provider Manual
3. AHA PALS Provider Manual
4. Current AHA Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care
5. NHTSA EMS Educational Instructor Guidelines for EMT and Paramedic

Post-Endotracheal Intubation Confirmation and Monitoring Validation

PERFORMANCE CRITERIA: 100% accuracy required on all items marked with an *

Points	Score	Performance Steps	Additional Information
1		Take or verbalize body substance isolation.	Selection: gloves, goggles, mask, gown, booties, P100 PRN
1		Verify symmetrical rise and fall of the chest with ongoing PPV. *	
1		Auscultate all lung fields to confirm the presence of airflow to the lower airway during PPV. *	
1		Auscultate over the epigastrium to confirm the absence of airflow to the stomach during PPV. *	
1		Utilize waveform capnography to evaluate for the presence of end tidal carbon dioxide (PETCO ₂) during PPV. *	<p>Monitor PETCO₂ for appropriate waveform morphology and target CO₂ levels.</p> <ul style="list-style-type: none"> The target range for PETCO₂ level is between 30 – 45 mmHg if spontaneous circulation is present. In cardiac arrest, metabolic derangement will significantly alter PETCO₂ values and waveform morphology. Target range for PETCO₂ levels is between 15 mmHg – 45 mmHg during CPR. Recognize that in a patient with traumatic brain injury, PETCO₂ less than 35 mmHg due to hyperventilation may actually cause harm. Minute volume should be adjusted accordingly while maintaining optimal oxygenation, reserving for those patients showing signs of cerebral herniation only. If the waveform capnography monitor malfunctions, a colorimetric end tidal CO₂ detector shall be used, and the malfunction reported to the organization's QI Coordinator.
1		Utilize pulse oximetry to evaluate for adequate O ₂ saturation readings during PPV. *	<p>Target range is a SpO₂ greater than 95% if spontaneous circulation is present.</p> <ul style="list-style-type: none"> In patient with COPD/pulmonary disease, it may not be possible or desirable to attain a SpO₂ of 95%.
1		Confirm the presence of misting of the ETT during PPV. *	
1		Confirm the absence of gastric contents in the ETT during PPV. *	
1		Ensure the ETT remains inserted at the correct depth within the trachea during PPV. *	
1		Stabilize the patient's head to avoid movement and possible ETT dislodgement during PPV.	Stabilize the patient's airway and prevent tube migration by using a device to prevent rotation, flexion, or extension of patient's head.

1		Continuously monitor and re-verify tube placement after each and EVERY move, looking for signs of tube dislodgement and migration out of the trachea. *	<ul style="list-style-type: none"> a. After moving the patient from the scene to the back board. b. After moving the patient into the gurney. c. When the patient is loaded into the ambulance. d. After any significant bumps en route to the hospital. e. When the patient is off-loaded from the ambulance. f. When the patient is moved from the ambulance gurney to the hospital gurney. g. Any time there is any concern that the tube might have become displaced.
1		Rapidly identify 100% of the occurrences when an ETT is misplaced or an ETT has migrated out of the trachea after placement. *	
1		Once identified as misplaced or if there is significant doubt of the tube's placement, remove the tube at once and provide PPV. *	
1		Re-intubate or consider insertion of a rescue airway if unable to control the airway with BLS adjuncts. *	
1		Maintain calm and effectively lead a team-based approach to resuscitation under all conditions. *	
1		Accurately document all assessment findings, therapeutic treatments, and the patient's response to therapy.	Record and print the waveform PETCO ₂ strip following initial placement and prior to transfer of care to the hospital staff. Attach the recording strips to the completed PCR.

Critical Failure Criteria

- ___ Failure to take or verbalize BSI appropriate to the skill prior to performing the skill
- ___ Failure to recognize an esophageal intubation
- ___ Failure to recognize a tube migrated out of the trachea
- ___ Failure to re-check the tube placement following each movement
- ___ Failure to immediately begin PPV following a missed or dislodged ETT
- ___ Interruption of PPV for greater than 30 seconds maximum
- ___ Failure to auscultate over all lung fields and epigastrium immediately following intubation
- ___ Any procedure that would have harmed the patient