



# Montgomery County Fire and Rescue Service Division of Operations

## Emergency Medical and Integrated Healthcare Services

### *Office of Medical Oversight Clinical Practice Guideline*

<b>Title:</b>	<b>Advanced Ventilator Use</b>	<b>Number:</b>	2025 – 04
<b>Date:</b>	February 1, 2025		
<b>Issued by:</b>	Roger M. Stone MD, MS – MCFRS Medical Director		
<b>Purpose:</b>	To provide direction and incorporate advanced ventilators		
<b>Target Patient Population:</b>	<b><u>This CPG replaces and rescinds CPG 2024 - 09</u></b> Critically unstable patients over 8 years old with an endotracheal tube, extraglottic airway, or tracheostomy in place and a palpable pulse.		
<b>Guideline:</b>	<p><b><u>Background</u></b></p> <p>Unrestricted ventilation of patients with 100% oxygen through an advanced airway or tracheostomy has been shown to have detrimental effects on outcomes. The use of a ventilator allows for controlled delivery of tidal volume, rate, and positive-end expiratory pressure (PEEP) as well as fraction of inspired oxygen (FiO<sub>2</sub>). Furthermore, the ventilator allows for titration of these parameters based on physiologic values such as oxygen saturation (SPO<sub>2</sub>) and end-tidal carbon dioxide (ETCO<sub>2</sub>).</p> <p>The EMS Duty Officers have been equipped with advanced ventilators for this purpose. <b>This CPG does not refer to the simple transport (Autovent3000) ventilators.</b></p> <p><b><u>Procedure:</u></b></p> <p><u>All below treatment is to be consistent with MMP section 15.42 “Scene of an Emergency” Ventilated Patients.</u></p> <p><b><u>General:</u></b></p> <ul style="list-style-type: none"> <li>• In ROSC patients, transition to the advanced ventilator should occur during the post-ROSC stabilization period prior to patient movement.</li> <li>• When using a ventilator in patients other than those for whom ROSC is achieved, all other critical interventions should be completed prior to applying the ventilator.</li> <li>• Critically unstable patients, including those in the post-ROSC period who are chronically ventilated via a tracheostomy or other airway, would likely benefit from controlled mechanical ventilation using the advanced ventilator.</li> <li>• If a patient achieves ROSC prior to an advanced airway being placed, one should be placed prior to patient movement when clinically indicated.</li> <li>• The ventilator must not be used with ongoing chest compressions.</li> <li>• FiO<sub>2</sub> should be adjusted in 10% (0.1 FiO<sub>2</sub>) increments when titrating to SPO<sub>2</sub>.</li> <li>• Respiratory Rate should be adjusted in 2 bpm increments when titrating to ETCO<sub>2</sub>.</li> <li>• Ventilator setting titration should occur at no shorter than 5-minute intervals to allow for setting changes to realize their full effect.</li> </ul>		



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**When available, a ventilator will be deployed in critically unstable patients with an advanced airway or tracheostomy and a palpable pulse.**

A credentialed EMS Duty Officer (EMSDO) is responsible for setup and management of the ventilator, including adjustment of settings and titration based on physiologic parameters. ***An EMSDO must accompany the patient to the hospital.***

1. Set up the ventilator with the age-appropriate settings listed below.
2. Transition the patient to the ventilator.
3. Adjust settings to maintain physiologic parameters:

Maintain ETCO<sub>2</sub> of 40-45mmHg by decreasing the respiratory rate to increase ETCO<sub>2</sub> and increasing the respiratory rate to decrease ETCO<sub>2</sub>. The minimum respiratory rate for adults is 10 and the maximum is 20. The minimum respiratory rate for pediatrics is 20 and the maximum is 30.

Maintain SPO<sub>2</sub> 94-98% by increasing FiO<sub>2</sub> if SpO<sub>2</sub> is less than 94%. The minimum FiO<sub>2</sub> to be used is 0.5; this is the initial setting.

4. Treat agitation and bucking of the ventilator per protocol.
5. Disconnect the ventilator and resume BVM ventilation if:
  - Cardiac arrest occurs
  - The patient exhibits ventilation or oxygenation complications as demonstrated by deteriorations in SPO<sub>2</sub>, ETCO<sub>2</sub> waveforms, or lung compliance, without a rapid identification of cause and correction

Questions may be directed to the EMIHS Quality Management Battalion Chief.



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**Documentation:**

**Each time** the advanced ventilator is used it must be documented on the eMeds worksheet:



and as a procedure:

Procedure Name:

**Each change** to the ventilator settings requires a new worksheet entry noting the timestamp in the upper right of the worksheet:

Crew Member	Date	Time
<input type="text"/>	<input type="text"/>	<input type="text"/>

and as a procedure:

Procedure Name:



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### **Patients 13 years and older**

- Mode: Volume AC
- Tidal Volume: 7 mL/kg predicted bodyweight. Obtain the tidal volume setting using the provided approved measurement device, or by obtaining the patient's height and referencing the attached chart (Attachment C).
- Respiratory Rate: 16 breaths/min
- PEEP: 8 cm H<sub>2</sub>O
- FiO<sub>2</sub>: 0.5
- Inspiratory Time: 1 second
- Inspiratory Trigger: -5 cm H<sub>2</sub>O
- High-Pressure Alarm: 40 cm H<sub>2</sub>O
- Low-Pressure Alarm: 5 cm H<sub>2</sub>O

### **Patients aged 9-12 years**

- Mode: Volume AC
- Tidal Volume: 6 mL/kg actual bodyweight. Obtain the tidal volume setting using the provided approved measurement device.
- Respiratory Rate: 20 breaths/min
- PEEP: 8 cm H<sub>2</sub>O
- FiO<sub>2</sub>: 0.5
- Inspiratory Time: 0.75 seconds
- Inspiratory Trigger: -5 cm H<sub>2</sub>O
- High-Pressure Alarm: 35 cm H<sub>2</sub>O
- Low-Pressure Alarm: 5 cm H<sub>2</sub>O