Montgomery County Fire and Rescue Service
Division of Operations
Emergency Medical and Integrated Healthcare Services

Office of Medical Oversight Clinical Practice Guideline

Title:	**Advanced Ventilator Use**	**Number:**	2024 – 09
Date:	November 11, 2024		
Issued by:	Roger M. Stone MD, MS – MCFRS Medical Director		
Purpose:	To provide direction and incorporate advanced ventilators		
Target Patient Population:	Patients over 8 years old with an endotracheal tube or extraglottic airway in place and a palpable pulse.		
Guideline:			

Background

Unrestricted ventilation of patients with 100% oxygen through an advanced airway 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 (FiO2). Furthermore, the ventilator allows for titration of these parameters based on physiologic values such as oxygen saturation (SPO2) and end-tidal carbon dioxide (ETCO2).

The EMS Duty Officers have been equipped with advanced ventilators for this purpose. **This CPG does not refer to the simple transport (Autovent3000) ventilators.**

Procedure:

All below treatment is to be consistent with MMP section 15.42 “Scene of an Emergency” Ventilated Patients.

General:

- In ROSC patients, transition to the advanced ventilator should occur during the post-ROSC stabilization period prior to patient movement.
- 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.
- If a patient achieves ROSC prior to an advanced airway being placed, one should be placed prior to patient movement when clinically indicated.
- The ventilator must not be used with ongoing chest compressions.
- FiO2 should be adjusted in 10% (0.1 FiO2) increments when titrating to SPO2.
- Respiratory Rate should be adjusted in 2 bpm increments when titrating to ETCO2.
- Ventilator setting titration should occur at no shorter than 5-minute intervals to allow for setting changes to realize their full effect.

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When available, a ventilator will be deployed in patients with an advanced airway 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 ETCO2 of 40-45mmHg by decreasing the respiratory rate to increase ETCO2 and increasing the respiratory rate to decrease ETCO2. 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 SPO2 94-98% by increasing FiO2 if SpO2 is less than 94%. The minimum FiO2 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 SPO2, ETCO2 waveforms, or lung compliance, without a rapid identification of cause and correction

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

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 H2O
- *FiO2:* 0.5
- *Inspiratory Time:* 1 second
- *Inspiratory Trigger: -5* cm H2O
- *High-Pressure Alarm:* 40 cm H2O
- *Low-Pressure Alarm:* 5 cm H2O

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 H2O*
- *FiO2: 0.5*
- *Inspiratory Time: 0.75* seconds
- *Inspiratory Trigger: -5* cm H2O
- *High-Pressure Alarm:* 35 cm H2O
- *Low-Pressure Alarm:* 5 cm H2O