

Modes of Ventilation

Mode of Ventilation	Clinical Application	Nursing Implications
<p>CMV (aka AC or assist control). It delivers a preset tidal volume OR pressure in response to pt's inspiratory efforts and initiates breath if pt fails to do so within a preset time.</p>	<p>Volume-controlled CMV used for spontaneously breathing pts with weak respiratory muscles.</p> <p>Pressure-controlled CMV used for pts with decreased lung compliance or increased airway resistance.</p>	<ul style="list-style-type: none"> -Hyperventilation can occur in pts with increased RR. -Sedation may be necessary to limit # of spontaneous breaths -Patient on VC-CMV should be monitored for volutrauma -Patient on PC-CMV should be monitored for hypercapnia
<p>IMV (intermittent mandatory ventilation). Can be volume or pressure controlled. Also known as SIMV (synchronous intermittent mandatory ventilation). This mode delivers gas at preset Vt or pressure and rate while allowing pt to breathe spontaneously. Vent breaths are synchronized to pt's respiratory effort.</p>	<p>VC-IMV is used as a primary mode and in weaning.</p> <p>PC-IMV is used in pts with decreased lung compliance or increased airway resistance when the need to preserve the pt's spontaneous effects is important.</p>	<ul style="list-style-type: none"> -May increase the WOB and promote muscle fatigue -Pt should be monitored for hypercapnia, particularly with PC-IMV
<p>CPAP (constant positive airway pressure). Positive pressure is applied during spontaneous breaths. Pt controls respiratory rate, inspiratory flow and tidal volume.</p>	<p>Used in pts to increase FRC and improve oxygenation by opening collapsed alveoli. Also used for weaning.</p>	<ul style="list-style-type: none"> -SE include decreased cardiac output, volutrauma, increased ICP. -No vent breaths are delivered in PEEP or CPAP mode unless used with CMV or IMV.
<p>PS (pressure support). Preset positive pressure used to augment pt's inspiratory efforts. Helps overcome the increased WOB d/t the narrow airway of the ETT. Pt controls rate, inspiratory flow and tidal volume.</p>	<p>A spontaneous breathing mode used as primary mode of vent in pts with stable respiratory drive to overcome mechanical resistance.</p> <p>Also used with IMV to support spontaneous breaths</p>	<ul style="list-style-type: none"> -Pt should be monitored for hypercapnia -Advantages include reduced pt WOB and improved patient-ventilator synchrony

Ventilator Settings

Parameter	Description	Typical Settings	Goal Settings (Wean)
Respiratory Rate	Number of breaths delivered per minute	6-20 bpm	12-20
Tidal Volume	Volume of gas delivered to pt during each ventilator breath	6-10 mL/kg	
FiO ₂	Fraction of inspired oxygen delivered to pt	21%-100%	40%
PEEP	Positive pressure applied at end of exhalation to keep alveoli open and improve surface area for gas exchange	5-10 cm H ₂ O	
PS	Positive pressure used to decrease WOB (augments pt's inspiratory efforts)	10-20	7

Black, Joyce M., and Jane Hokanson Hawks. *Medical-Surgical Nursing: Clinical Management for Positive Outcomes - Single Volume (Medical Surgical Nursing- 1 Vol (Black/Luckmann))*. St. Louis: Saunders, 2009. Print.

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