

Ventilator Modes Cheat Sheet

A one-glance clinical reference to VCV, PCV, SIMV, PSV and CPAP — what you set, what you get, and when to use each mode.

VCV

PCV

SIMV VC

SIMV PC

PSV

CPAP

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Key Concepts

- Every mode delivers breaths — the difference is *who* triggers them and *what* is guaranteed.
- You set the goals; the ventilator does the mechanical work.
- For each mode, know exactly what you set, what you get in return, and what you must monitor.
- Always monitor: V_T , RR, PIP, Pplat, FiO₂, and SpO₂ — regardless of mode.

Common Setting Ranges

- FiO₂: 21% – 100%
- Tidal Volume (V_T): 6–8 mL/kg predicted body weight
- Respiratory Rate: 10–20 /min
- PEEP: 0–15 cmH₂O
- I:E Ratio: 1:2 to 1:3
- PIP target: < 30 cmH₂O | Pplat safe limit: < 30 cmH₂O

★ Clinical Pearl

Start with the simplest mode the patient needs. As the patient improves, move progressively toward more spontaneous modes.

★ Exam Shortcut

- VCV → you set Volume
- PCV → you set Pressure
- SIMV → mix of mandatory + spontaneous
- PSV → patient drives, you support

VCV Volume Controlled Ventilation

Delivers a set tidal volume with every breath. The ventilator varies inspiratory pressure as needed to achieve that volume.



YOU SET

- Tidal volume (V_T)
- Respiratory rate (RR)
- FiO_2
- PEEP
- I:E ratio
- Flow pattern



YOU GET

- V_T — fixed (set)
- RR — fixed (set)
- PIP — varies
- Pplat — varies



BEST USED FOR

- General anaesthesia
- Post-op / surgical patients
- ARDS (lung-protective strategy)
- Normal lung mechanics

Clinical pearl — Guarantees minute ventilation, but watch pressures — non-compliant lungs can drive PIP dangerously high.

PCV Pressure Controlled Ventilation

Delivers each breath until a set inspiratory pressure is reached and holds it. Tidal volume varies with compliance and resistance.



YOU SET

- Inspiratory pressure (P_{insp})
- Respiratory rate (RR)
- FiO_2
- PEEP
- I:E ratio



YOU GET

- V_T — varies
- RR — fixed (set)
- PIP = P_{insp} + PEEP
- Pplat — limited by setting



BEST USED FOR

- ARDS
- Obstructive lung disease
- Poor / variable compliance
- Barotrauma-risk patients

Clinical pearl — Pressure is protected, but volume can swing with every breath — monitor exhaled V_T closely.

SIMV (VC) Synchronized Intermittent Mandatory Ventilation — Volume Control

Delivers a set number of synchronized, volume-set mandatory breaths, while allowing the patient to take additional spontaneous breaths in between.



YOU SET

- V_T (mandatory)
- RR (mandatory)
- FiO_2
- PEEP
- Pressure support (optional)

YOU GET

- Mandatory V_T — fixed
- Spontaneous V_T — varies
- Total RR $\geq$ set RR

BEST USED FOR

- Weaning
- Partially awake / cooperative patients
- Mixed mandatory + spontaneous support

Clinical pearl — A useful bridge mode — but prolonged SIMV weaning can increase work of breathing versus PSV.

SIMV (PC) Synchronized Intermittent Mandatory Ventilation — Pressure Control

Delivers a set number of synchronized, pressure-set mandatory breaths, while allowing spontaneous breaths in between.



YOU SET

- P_{insp} (mandatory)
- RR (mandatory)
- FiO_2
- PEEP
- Pressure support (optional)

YOU GET

- Mandatory P_{insp} — fixed
- Spontaneous V_T — varies
- Total RR $\geq$ set RR

BEST USED FOR

- Weaning with obstructive airway disease
- When pressure control is preferred over volume

Clinical pearl — Combines the pressure protection of PCV with a spontaneous-breathing pathway toward weaning.

PSV Pressure Support Ventilation

The patient initiates every breath; the ventilator supports it with a set pressure until flow cycles off. No mandatory breaths.



YOU SET

- Pressure support (PS)
- PEEP
- FiO₂
- Trigger sensitivity

YOU GET

- V_T — varies with effort
- RR — fully patient-driven
- PIP = PS + PEEP

BEST USED FOR

- Final-stage weaning
- Spontaneously breathing patients
- Reducing work of breathing

Clinical pearl — A good weaning-readiness gauge: if the patient can't maintain adequate V_T here, they likely aren't ready to extubate.

CPAP Continuous Positive Airway Pressure

Provides one constant positive pressure throughout the respiratory cycle. No mandatory or supported breaths — the patient does all the work.



YOU SET

- CPAP / PEEP level
- FiO₂

YOU GET

- Spontaneous V_T — patient-driven
- RR — patient-driven
- No pressure support

BEST USED FOR

- Oxygenation support
- Post-extubation support
- Sleep apnoea / spontaneous breathing trials

Clinical pearl — Tests true readiness for extubation — it's the closest in-circuit approximation of breathing unassisted.

1. Based on the Patient

- Lung mechanics — compliance and resistance
- Ability to trigger and sustain a breath
- Underlying disease and stability

2. Based on Goals

- Oxygenation vs. ventilation (CO₂ removal)
- Reducing work of breathing
- Progress toward weaning

3. General Approach

- Start with a controlled mode in the unstable patient
- Move to assisted modes as the patient improves
- Aim for spontaneous breathing as soon as safely possible
- Reassess and consider weaning daily

Advantages vs. Limitations of Mechanical Ventilation

Advantages

- Improves oxygenation and ventilation
- Reduces work of breathing in assisted modes
- Gives precise control over ventilation parameters
- Rests fatigued respiratory muscles during critical illness

Limitations & Risks

- Barotrauma / volutrauma risk
- Ventilator-associated pneumonia
- Hemodynamic effects (reduced venous return)
- Not a substitute for treating the underlying disease
- Requires close, continuous monitoring and frequent adjustment

Remember

- Controlled modes → ventilator does the work
- Assisted modes → patient does some of the work
- Support modes → patient does most of the work

★ Clinical Pearl

Match the mode to the patient — not the other way around. The best mode is the one the patient can eventually be weaned off of.

Quick Comparison Table

AT A GLANCE

MODE	MANDATORY BREATHS	PATIENT EFFORT	WHAT YOU CONTROL
VCV	Yes	No	Volume
PCV	Yes	No	Pressure
SIMV (VC)	Yes (some)	Yes	Volume (mandatory)
SIMV (PC)	Yes (some)	Yes	Pressure (mandatory)
PSV	No	Yes	Pressure support
CPAP	No	Yes	PEEP level

Safe Ventilation Checklist

- ☒ Right patient selected for the mode
- ☒ Right mode for the clinical goal
- ☒ Right settings for the patient's mechanics
- ☒ Continuous monitoring in place
- ☒ Settings adjusted as the patient changes
- ☒ Weaning goals reassessed daily

★ Exam Tip

"Best mode for weaning?" → PSV. "Best mode for ARDS (lung-protective)?" → VCV with low tidal volume, or PCV if pressures need tighter control.

Golden Rule

You set the *goal* in every mode — the ventilator does the *work* to achieve it.

Weaning Pathway — General Approach



★ Common Pitfalls

- Over-sedation delaying weaning readiness
- High FiO₂ maintained for too long
- Ignoring alarms or patient–ventilator asynchrony
- Not adjusting settings as the patient's condition changes

Memory Aid — "Very Passionate Students"

VCV (Volume) • PCV (Pressure) • SIMV (Synchronize) • PSV (Support) • CPAP (Continuous)

Abbreviations

V_T	Tidal Volume	RR	Respiratory Rate
FiO₂	Fraction of Inspired Oxygen	PEEP	Positive End-Expiratory Pressure
PIP	Peak Inspiratory Pressure	Pplat	Plateau Pressure
I:E	Inspiratory to Expiratory Ratio	PS	Pressure Support

This reference is intended as a study and bedside-recall aid for trained clinicians and trainees. It does not replace institutional protocols, manufacturer guidance, or clinical judgment at the bedside.