

When invasive ventilation is initiated, the default standard of care should be to use lung protective, or low tidal volume, ventilation.

The aim is to reduce the incidence of iatrogenic lung injury through barotrauma, volutrauma and atelectorauma

How to set the ventilator

Step 1: Work out the patient's ideal body weight (IBW) based on their height and sex (programme this into ventilator)

Step 2: Set pressure support or inspiratory pressure to a level which will generate a volume of **6ml/kg IBW**

Step 3: Set the positive end expiratory pressure (PEEP) sufficient to maintain adequate saturations. If they frequently desaturate they may need a higher PEEP. PEEP level higher than 10cmH₂O should be reviewed by a doctor. Aim **plateau pressure <30cmH₂O**

Step 4: Take an arterial blood gas after 30 minutes. Aim for **paCO₂ <8kPa** (if pH >7.20) and **paO₂ >8kPa**.

- If paO₂ is too low, consider increasing PEEP / FiO₂ / I:E ratio
- If paCO₂ is too high, consider increasing respiratory rate.

If the patient continues to deteriorate in spite of lung protective ventilation, discuss this with the consultant intensivist and consider using **APRV** or **prone positioning**.

Important Exclusion: Potential **brain injury** (i.e. traumatic brain injury; post-cardiac arrest; following a period of profound hypotension or poor circulation to the brain; etc). In these cases you should prioritise **NEUROPROTECTION** aiming for paO₂ of 10 kPa and paCO₂ 4.5-6.0 kPa.

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ARDS (Acute Respiratory Distress Syndrome)

BERLIN DEFINITION: *ARDS is an acute diffuse, inflammatory lung injury, leading to increased pulmonary vascular permeability, increased lung weight, and loss of aerated lung tissue...[with] hypoxemia and bilateral radiographic opacities, associated with increased venous admixture, increased physiological dead space and decreased lung compliance.*

- Acute, i.e. onset over 1 week or less
- Bilateral opacities consistent with pulmonary oedema must be present and may be detected on CT or chest radiograph
- PF ratio <300mmHg with a minimum of 5 cmH₂O PEEP (or CPAP)
- “must not be fully explained by cardiac failure or fluid overload,” in the physician’s best estimation using available information — an “objective assessment“ (e.g. echocardiogram) should be performed in most cases if there is no clear cause such as trauma or sepsis.
- ARDS is categorized as being mild, moderate, or severe:

ARDS severity	PaO ₂ /FiO ₂ ratio	Mortality
Mild	200-300mmHg; 26.6 – 39.9kPa	27%
Moderate	100-200mmHg; 13.3 – 26.6kPa	32%
Severe	<100mmHg; <13.3kPa	45%

As measured on PEEP at least 5cmH₂O