

	Department: Respiratory Services	Date Originated: September 2003 Date Reviewed/Revised: November 2010
PROCEDURE	Topic: <u>Critical Care</u> – Extracorporeal Life Support and Membrane Oxygenation - Ventilation Guidelines (Respiratory Therapy) Number: B-00-12-12045	Related Links:

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APPLICABLE SITES:

St. Paul's Hospital

GENERAL INFORMATION:

Extracorporeal membrane oxygenation (ECMO) or extracorporeal life support (ECLS) is a form of partial cardiopulmonary bypass used for long term support of cardiac and/or respiratory function.

ECMO may be indicated patients with acute, severe heart or lung failure with high mortality risk despite optimal conventional therapy. The primary insult should be reversible (unless the patient is considered for transplant).

ECMO is generally provided as either venoarterial (VA) or venovenous (VV):

- VA ECMO takes deoxygenated blood from a central vein or the right atrium, pumps it past the oxygenator, and then returns oxygenated blood, under pressure, to the arterial circulation. This form of ECMO helps support cardiac output.
- VV ECMO takes blood from a large vein and returns oxygenated blood back to a large vein. This form of ECMO does not support circulation.
- Hybrid forms of ECMO may be employed as necessary.

INITIAL VENTILATOR SETTINGS:

1. Mode:
 - Protective lung ventilation strategy, using volume or pressure control
2. Tidal Volume:
 - 4 - 6 mL/kg, keeping plateau pressures less than 25 cmH₂O
3. Respiratory Rate:

- 6 breaths/min
- 4. PEEP:
 - 5 - 10 cmH₂O
- 5. FiO₂:
 - Maintain FiO₂ less than 0.50
 - Perfusionist will adjust ECMO to meet PaO₂ and SaO₂ goals

LUNG RECRUITMENT MANEUVERS DURING ECMO:

- Recruitment maneuvers may be indicated in patients where lung collapse or derecruitment is known/suspected
- Recruitment maneuvers during ECMO should be considered after any acute lung inflammation has subsided
- A physician's order is required
- Refer to [Recruitment Maneuvers](#)

WEANING FROM EXTRA CORPOREAL LIFE SUPPORT:

- Ventilator settings may need to be adjusted as ECMO support decreases (when native organ function begins to return)
- When ECMO support is discontinued in its entirety, adjust ventilator as directed by the physician to those consistent with standard settings off ECMO

REFERENCES:

1. Extra Corporeal Life Support Organization (ELSO). General guidelines for all ECLS cases. Version 1.1; April 2009. Available at <http://www.else.med.umich.edu/Guidelines.html>.
2. Peek GJ, Mugford M, Tiruvoipati R, et al. Efficacy and economic assessment of conventional ventilator support versus extracorporeal membrane oxygenation for severe adult respiratory failure (CESAR): a multicentre randomized controlled trial. Lancet Oct 2009; 374: 1351-1363.
3. Mid Carolina Internal Medicine Association. An introduction to extracorporeal membrane oxygenation. Sept 2004. Available at <http://www.perfusion.com/cgi-bin/absolutenm/templates/articledisplay.asp?articleid=1807&z=3>
4. Doll N, Fabricius A, Borger MA, et al. Temporary extracorporeal membrane oxygenation in patients with refractory postoperative cardiogenic short – a single center experience. J Card Surg 2003; 18: 521-518.