

Extracorporeal Membrane Oxygenation (ECMO)

Micro-Credential Test Plan

I. Indications (15%)

- Bridge to transplant
- Post-transplant
- Bridge to therapy (e.g., VAD)
- Cardiogenic shock
- Trauma induced and/or obstructive (e.g., MVC, pulmonary embolism, TRALI, etc.)
- Cardiac arrest
- Failure to wean from cardiopulmonary bypass
- Severe respiratory failure (e.g., hypoxia, hypercapnia)
- Contraindications of ECMO

II. Complications (25%)

- Thromboembolism
- Bleeding
- Hemolysis
- Heparin-induced thrombocytopenia (HIT)
- Perforation and/or dissection
- Dysrhythmias
- Cardiac arrest
- Stroke
- Distal perfusion to cannulation sites
- Reperfusion strategies
- Acute kidney injury
- Differential hypoxemia (e.g., Harlequin syndrome)
- Hemorrhage

III. Modalities (10%)

- Venovenous (VV)
- Recirculation
- Venovenous (VA)
- Central cannulation
- Peripheral cannulation
- Venovenous (VAV)
- Extracorporeal cardiopulmonary resuscitation (ECPR)
- Renal replacement circuit configurations (vascular and in-circuit)

Disclaimer: Successful completion of this exam does not increase your scope of practice.

IV. Management (50%)

- ECMO circuit (e.g., blood flow physiology, device/equipment management)
- Mechanical ventilation (e.g., ventilator rest setting)
- Left ventricular (LV) unloading (e.g., pharmacological, mechanical, iNO)
- Volume status and chattering
- Weaning and decannulation strategies
- Positioning and mobility
- Pharmacological interventions (e.g., hemodynamic, pain/sedation/NMB, anticoagulation)
- Drug sequestration
- Diagnostic testing (e.g., imaging, laboratory)

Bibliography

References used for item validation.

Brogan, Thomas, et al., editors. *ECMO Specialist Training Manual*, 4th ed., ELSO, 2018.

DellaVolpe, Jeffrey. *The ECMO Book*. Elsevier, 2023.

DellaVolpe, Jeffrey, et al. "Joint Society of Critical Care Medicine-Extracorporeal Life Support Organization Task Force Position Paper on the Role of the Intensivist in the Initiation and Management of Extracorporeal Membrane Oxygenation." *Critical Care Medicine*, vol. 48, no. 6, 2020, pp. 838-846.

"ECMO Education For Nurses." *Keystone Perfusion Services*, 2022,
<https://keystoneperfusion.com/ecmo-management-education/ecmo-education-for-nurses-outline/>.

Extracorporeal Life Support Organization (ELSO). <https://www.else.org/Home.aspx>. Accessed 2022-2023.

Gannon, Whitney, et al. "Curriculum to Introduce Critical Care Nurses to Extracorporeal Membrane Oxygenation." *American Journal of Critical Care*, vol. 29, no. 4, 2020, pp. 262-269.

Lawson, Thomas, and Belcher, Marcia. "Extracorporeal Life Support (ECLS) and Extracorporeal Membrane Oxygenation (ECMO)." *AACN Procedure Manual for High Acuity, Progressive, and Critical Care*, edited by Debra Wiegand, Elsevier, 2017, pp. 123-133.

Lorusso, Robert, et al. "ELSO Interim Guidelines for Venoarterial Extracorporeal Membrane Oxygenation in Adult Cardiac Patients." *American Society for Artificial Internal Organs*, vol. 67, no. 8, 2021, pp. 832-835.

MacLaren, Graeme, et al., editors. *Extracorporeal Life Support: The ELSO Red Book*. 6th ed., ELSO, 2022.

Mossadegh, Chirine, and Combes, Alain, editors. *Nursing Care and ECMO*. Springer, 2017.

Peeler, Anna, et al. "Extracorporeal Membrane Oxygenation: Opportunities for Expanding Nurses' Roles." *AACN Advanced Critical Care*, vol. 32, no. 3, 2021, pp. 341-345.

Petty, Michael. "Extracorporeal Life Support: RN Management of ECMO Patients." AACN, 2021. Webinar.
<https://www.aacn.org/education/webinar-series/wb0058/extracorporeal-life-support-rn-management-of-ecmo-patients>.

Sorajja, Paul, et al. *Kern's Cardiac Catheterization Handbook*. 7th Ed, 2019, Elsevier.