Extracorporeal Membrane Oxygenation (ECMO)

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Application:	All participating hospitals and providers
Page Number(s):	1 of 7

Disclaimer

Highmark Health Options medical policy is intended to serve only as a general reference resource regarding coverage for the services described. This policy does not constitute medical advice and is not intended to govern or otherwise influence medical decisions.

POLICY STATEMENT

Highmark Health Options may provide coverage under the medical-surgical benefits of the Company's Medicaid products for medically necessary benefits.

This policy is designed to address medical necessity guidelines that are appropriate for the majority of individuals with a particular disease, illness or condition. Each person's unique clinical circumstances warrant individual consideration, based upon review of applicable medical records.

The qualifications of the policy will meet the standards of the National Committee for Quality Assurance (NCQA) and the Delaware Department of Health and Social Services (DHSS) and all applicable state and federal regulations.

DEFINITIONS

Extracorporeal Membrane Oxygenation (ECMO) – This is extracorporeal life support technique providing prolonged cardiac and respiratory support to persons whose heart and lungs are unable to provide an adequate amount of gas exchange or perfusion to sustain life.

Highmark Health Options (HHO) – Managed care organization serving vulnerable populations that have complex needs and qualify for Medicaid. Highmark Health Options members include individuals and families with low income, expecting mothers, children, and people with disabilities. Members pay nothing to very little for their health coverage. Highmark Health Options currently services Delaware Medicaid: Delaware Healthy Children Program (DHCP) and Diamond State Health Plan Plus LTSS (DSHP Plus LTSS) members.

POLICY POSITION

Extracorporeal membrane oxygenation (ECMO) provides extracorporeal circulation and physiologic gas exchange for temporary cardiorespiratory support in cases of severe respiratory and cardiorespiratory failure. ECMO can be used in clinical situations in which there is respiratory or cardiac failure in which death would be imminent unless medical interventions can immediately reverse the underlying disease process, or physiologic functions can be supported for long enough that normal reparative processes or treatment can occur.

ECMO FOR ADULTS

The use of ECMO in adults may be considered medically necessary for the management of acute respiratory failure when performed in a facility that meets the Extracorporeal Life Support Organization (ELSO) guidelines for ECMO and ALL of the following criteria are met:

- Respiratory failure is due to a potentially reversible etiology; and
- Respiratory failure is severe, as determined by EITHER of the following:
  - A standardized severity instrument such as the Murray score (see table attachment); or
  - ONE of the following criteria for respiratory failure severity:
    - Uncompensated hypercapnia with a pH less than 7.2; or
    - PaO_2/FIO_2 of less than 100 mm Hg on fraction of inspired oxygen (FIO_2) greater than 90%; or
    - Inability to maintain airway plateau pressure (Pplat) less than 30 cm H_20 despite a tidal volume of four (4) to six (6) mL/kg ideal body weight; or
    - Oxygenation Index* greater than 30: or
    - CO_2 retention despite high Pplat (greater than 30 cm H_2O).

*Oxygenation Index = FIO2 x 100 x MAP/PaO2 mm Hg (where FIO2 x 100 = FIO2 as percentage; MAP = mean airway pressure in cm H2O; PaO2 = partial pressure of oxygen in arterial blood).

AND NONE of the following contraindications is present:

- High ventilator pressure (peak inspiratory pressure greater than 30 cm H_2O) or high fraction of inspired oxygen (greater than 80%) ventilation for more than 168 hours; or
- Signs of intracranial bleeding; or
- Multisystem organ failure; or
- Prior (i.e., before onset of need for ECMO) diagnosis of a terminal condition with expected survival less than six (6) months; or
- A do-not-resuscitate directive; or
- Cardiac decompensation in an individual who has already been declined for ventricular assist device or transplant; or
- Known neurologic devastation without potential to recover meaningful function; or
- Determination of care futility**

****Assessment of ECMO futility:** Individuals undergoing ECMO treatment should be periodically reassessed for clinical improvement. ECMO should not be continued indefinitely if ANY of the following criteria are met:

- Neurologic devastation as defined by the following:
  - Consensus from two (2) attending physicians that there is no likelihood of an outcome better than persistent vegetative state at six (6) months; and
  - At least one of the attending physicians is an expert in neurologic disease and/or intensive care medicine; and
  - Determination made following studies including computed tomography, electroencephalography, and exam; or
- Inability to provide aerobic metabolism, defined by the following:
  - Refractory hypotension and/or hypoxemia; or
  - Evidence of profound tissue ischemia based on creatine phosphokinase or lactate levels, lactate-to-pyruvate ratio, or near-infrared spectroscopy; or
- Presumed end-stage cardiac or lung failure without “exit” plan (i.e., declined for assist device and/or transplantation).
- A shared decision-making process between providers and family has taken place.

The use of ECMO in adults may be considered medically necessary as a bridge to heart, lung, or combined heart-lung transplantation for the management of respiratory, cardiac, or combined cardiorespiratory failure refractory to optimal conventional therapy.

The use of ECMO in adults not meeting the criteria as indicated in this policy is considered not medically necessary.

ECMO FOR CHILDREN

The use of ECMO in children may be considered medically necessary for the management of acute cardiac and/or respiratory failure when performed in a facility that meets the Extracorporeal Life Support Organization (ELSO) guidelines for ECMO and ALL of the following criteria are met:

- The child is greater than 28 days old and less than 18 years old; and
- The child has ONE of the following:
- Lack of response to conventional mechanical ventilation and/or other forms of rescue therapy; or
- Elevated ventilator pressures; or
- Cardiac arrest not amendable to high-quality cardiopulmonary resuscitation as defined by the American Heart Association; or
- Hemodynamic compromise requiring significant inotropic support; or
- Pneumonia; or
- Sepsis; or
- Bridge to heart, lung, or combined heart-lung transplantation; or
- Post-operative cardiac surgery care; or
- Cardiogenic shock unresponsive to standard medical therapies. (Persistent systemic systolic pressure less than 50mm Hg, urine output 30% in cyanotic congenital heart disease, an altered mental status due to low cardiac output may all be indicators of cardiogenic shock in children); and
- NONE of the following contraindications is present:
    - Lethal chromosomal disorder (includes trisomy 13, or other lethal anomaly; trisomy 21 is not a contraindication to ECMO)
    - Irreversible brain damage; or
    - Uncontrolled bleeding; or

Assessment of ECMO futility: Individuals undergoing ECMO treatment should be periodically reassessed for clinical improvement. ECMO should not be continued indefinitely if ANY of the following criteria are met:

- Neurologic devastation as defined by the following:
    - Consensus from two (2) attending physicians that there is no likelihood of an outcome better than persistent vegetative state at six (6) months; and
    - At least one of the attending physicians is an expert in neurologic disease and/or intensive care medicine; and
    - Determination made following studies including computed tomography, electroencephalography, and exam; or
- Inability to provide aerobic metabolism, defined by the following:
    - Refractory hypotension and/or hypoxemia; or
    - Evidence of profound tissue ischemia based on creatine phosphokinase or lactate levels, lactate-to-pyruvate ratio, or near-infrared spectroscopy; or
- Presumed end-stage cardiac or lung failure without “exit” plan (i.e., declined for assist device and/or transplantation) or
- Pulmonary fibrosis; or
- End-stage malignancies or advanced AIDS; or
- Severe acquired or congenital immunodeficiency; or

- Major burn; or
- Advanced liver failure; or
- Post cardiac surgery (initiated for temporary support); or
- ARDS or MIS-C due to COVID-19; and
- A shared decision-making process between providers and family has taken place.

The use of ECMO in children is considered experimental/investigational and therefore non-covered when the above criteria are not due to lack of supporting scientific evidence.

ECMO FOR NEONATES

The use of ECMO in neonates may be considered medically necessary for the management of acute cardiac and/or respiratory failure when ALL of the following criteria are met:

- ONE of the following conditions:
  - Congenital diaphragmatic hernia; or
  - Meconium aspiration syndrome; or
  - Persistent pulmonary hypertension; or
  - Sepsis; or
  - Respiratory distress syndrome; or
  - Lack of response to conventional mechanical ventilation and/or other forms of rescue therapy (e.g., high frequency oscillatory ventilation (HFOV), inhaled nitric oxide, prone positioning); or
  - Barotrauma; or
  - Severe myocardial dysfunction refractory to inotropes or vasopressors: and
- ONE of the following:
  - Oxygenation Index* greater than 40 or Oxygen Saturation Index greater than 20 for greater than four (4) hours; or
  - Failure to wean from 100% oxygen despite prolonged (greater than 48 hours) maximal medical therapy or persistent episodes of decompensation; or
  - Severe hypoxic respiratory failure with acute decompensation (PaO2 less than 40) unresponsive to intervention; or
  - Severe pulmonary hypertension with evidence of right ventricular dysfunction and/or left ventricular dysfunction; or
  - Pressor resistant hypotension.

Contraindications include:

- Lethal chromosomal disorder (includes trisomy 13, ~~18~~ or other lethal anomaly**;** trisomy 21 is not a contraindication to ECMO); or
- Irreversible brain disease
- Severe neurological syndrome persisting after respiratory and metabolic resuscitation (i.e. stuporous, flaccid, and absent primitive reflexes); or
- Base deficit > 30 on 2 ABGs; or
- Uncontrolled bleeding; or
- Grade III or greater intraventricular hemorrhage; or
- Recent (Grade I germinal matrix hemorrhage); or
- Irreversible lung disease; or
- Cardiac lesion that cannot be corrected or palliated

The use of ECMO in neonates not meeting the criteria in this policy is considered not medically necessary.

Assessment of ECMO futility: ECMO should be discontinued when there is no hope for healthy survival (severe brain damage, no lung recovery, and no hope of organ transplant), as decided by the multidisciplinary team caring for the individual. This possibility of stopping should be explained to the family when consent for ECMO is

obtained. A reasonable deadline for organ recovery or replacement should be set early in the course. For lung failure, individuals may be supported for a prolonged period (days to months) awaiting recovery. The management of these individuals often requires consultation with other ECMO centers that have had similar experiences.

PROCEDURE CODES

CPT Codes	Description
33946	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; initiation, veno-venous.
33947	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; initiation, veno-arterial.
33948	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; daily management, each day, veno-venous.
33949	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; daily management, each day, veno-arterial.
33951	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; insertion of peripheral (arterial and/or venous) cannula(e), percutaneous, birth through 5 years of age (includes fluoroscopic guidance, when performed).
33952	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; insertion of peripheral (arterial and/or venous) cannula(e), percutaneous, age 6 and older ((includes fluoroscopic guidance, when performed).
33953	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; insertion of peripheral (arterial and/or venous) cannula(e), open, birth through age 5.
33954	Prolonged service in the office or other outpatient setting requiring direct patient contact beyond the usual service; first hour (list separately in addition to code for office or other outpatient evaluation and management service).
33955	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; insertion of central cannula(e) by sternotomy or thoracotomy, birth through age 5.
33956	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; insertion of central cannula(e) by sternotomy or thoracotomy age 6 and older.
33957	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; reposition peripheral (arterial and/or venous) cannula(e) percutaneous birth through age 5 (includes fluoroscopic guidance, when performed).
33958	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; reposition peripheral (arterial and/or venous) cannula(e) percutaneous, age 6 and older (includes fluoroscopic guidance, when performed).
33959	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; reposition peripheral (arterial and/or venous) cannula(e) open birth through age 5 (includes fluoroscopic guidance, when performed).
33962	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; reposition peripheral (arterial and/or venous) cannula(e) open age 6 (includes fluoroscopic guidance, when performed).

33963	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; reposition of central cannula(e) by sternotomy or thoracotomy, birth through age 5 (includes fluoroscopic guidance, when performed).
33964	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; reposition of central cannula(e) by sternotomy or thoracotomy, age 6 and older (includes fluoroscopic guidance, when performed).
33965	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; removal of peripheral (aterial and/or venous) cannula(e), percutaneous, birth through age 5.
33966	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; removal of peripheral (aterial and/or venous) cannula(e), percutaneous, age 6.
33969	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; removal of peripheral (aterial and/or venous) cannula(e), open, birth through age 5.
33984	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; removal of peripheral (aterial and/or venous) cannula(e), open, age 6.
33985	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; removal of central cannula (e) by sternotomy or thoracotomy birth through age 5.
33986	Extracorporeal membrane oxygenation (ecmo)/extracorporeal life support (ecls) provided by physician; removal of central cannula (e) by sternotomy or thoracotomy age 6 and older.
33987	Arterial exposure with creation of grafy conduit (e.g., chimney graft) to facilitate arterial perfusion for ecmo/ecls (list separately in addition to code for primary procedure).
33988	Insertion of left heart vent by thoracic incision (e.g., sternotomy, thoracotomy) for ecmo/ecls.
33989	Removal of left heart vent by thoracic incision (e.g., sternotomy, thoracotomy) for ecmo/ecls.

ELIGIBLE DIAGNOSIS CODES FOR PROCEDURE CODES: 33946, 33947, 33948, 33949, 33951, 33952, 33953, 33954, 33955, 33956, 33957, 33958, 33959, 33962, 33963, 33964, 33965, 33966, 33969, 33984, 33985, 33986, 33987, 33988, 33989

Codes						
J80	J95.821	J96.00	J96.01	J96.02	P22.0	

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POLICY UPDATE HISTORY

08/2021	Approved in Medical Policy Committee
09/2021	Approved in QI/UM
12/28/2022	Annual review; approved in Medical Policy Committee
01/03/2023	Approved in QI/UM