Medical Policy

Extracorporeal Membrane Oxygenation

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Policy Number: 726
BCBSA Reference Number: 8.01.60
NCD/LCD: N/A

Related Policies

- Inhaled Nitric Oxide as a Treatment of Hypoxic Respiratory Failure in Neonates, #100

Policy

Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity
Medicare HMO BlueSM and Medicare PPO BlueSM Members

ECMO for newborn and children up to 18 years of age may be MEDICALLY NECESSARY.

The use of extracorporeal membrane oxygenation (ECMO) in adults may be considered MEDICALLY NECESSARY for the management of adults with acute respiratory failure when all of the following criteria are met:

- Respiratory failure is due to a potentially reversible etiology AND
- Respiratory failure is severe, as determined by one of the following:
  - A standardized severity instrument such as the Murray score*;
  - OR
  - One of the criteria for respiratory failure severity**
    AND
- None of the following contraindications are present:
  - High ventilator pressure (peak inspiratory pressure >30 cm H2O) or high FIO2 (>80%) ventilation for more than 168 hours;
  - Signs of intracranial bleeding;
  - Multisystem organ failure;
  - Prior (ie, before onset of need for ECMO) diagnosis of a terminal condition with expected survival <6 months;
  - A do-not-resuscitate (DNR) directive;
  - Cardiac decompensation in a patient already declined for ventricular assist device (VAD) or transplant;
  - KNOWN neurologic devastation without potential to recover meaningful function;
  - Determination of care futility***.
*Murray Score*

One commonly used system for classifying the severity of respiratory failure is the Murray scoring system, which was developed for use in ARDS but has been applied to other indications. This score includes 4 subscales, each of which is scored from 0 to 4. The final score is obtained by dividing the collective score by the number of subscales used. A score of 0 indicates no lung injury; a score of 1 to 2.5 indicates mild or moderate lung injury; and a score of 2.5 indicates severe lung injury, eg, ARDS. Table 2 shows the components of the Murray scoring system.

Table 2: Murray Lung Injury Score

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Criteria</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest x-ray score</td>
<td>No alveolar consolidation</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Alveolar consolidation confined to 1 quadrant</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Alveolar consolidation confined to 2 quadrants</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Alveolar consolidation confined to 3 quadrants</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Alveolar consolidation in all 4 quadrants</td>
<td>4</td>
</tr>
<tr>
<td>Hypoxemia score</td>
<td>PaO2/FIO2 &gt;300</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>PaO2/FIO2 225-299</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>PaO2/FIO2 175-224</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PaO2/FIO2 100-174</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PaO2/FIO2 ≤100</td>
<td>4</td>
</tr>
<tr>
<td>PEEP score (when ventilated)</td>
<td>PEEP ≤ 5 cm H2O</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>PEEP 6-8 cm H2O</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>PEEP 9-11 cm H2O</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>PEEP 12-14 cm H2O</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>PEEP ≥15 cm H2O</td>
<td>4</td>
</tr>
<tr>
<td>Respiratory system compliance</td>
<td>Compliance &gt;80 mL/cm H2O</td>
<td>0</td>
</tr>
<tr>
<td>score (when available)</td>
<td>Compliance 60-79 mL/cm H2O</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Compliance 40-59 mL/cm H2O</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Compliance 20-39 mL/cm H2O</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Compliance ≤19 mL/cm H2O</td>
<td>4</td>
</tr>
</tbody>
</table>

CPAP: continuous positive airway pressure; FIO2: fraction of inspired oxygen; PaO2: partial pressure of oxygen in arterial blood; PEEP: peak end expiratory pressure.

**Alternative Respiratory Failure Severity Criteria**

Respiratory failure is considered severe if the patient meets one or more of the following criteria:

- Uncompensated hypercapnia with a pH less than 7.2; or
- PaO2/FIO2 of <100 mm Hg on fraction of inspired oxygen (FIO2) >90%; or
- Inability to maintain airway plateau pressure (Pplat) <30 cm H2O despite a tidal volume of 4 to 6 mL/kg ideal body weight (IBW); or
- Oxygenation Index >30: Oxygenation Index = FIO2 x MAP/PaO2 mm Hg. [FIO2 x 100 = FIO2 as percentage; MAP = mean airway pressure in cm H2O; PaO2=partial pressure of oxygen in arterial blood]; or
- CO2 retention despite high Pplat (>30 cm H2O).

***Assessment of ECMO Futility***

Patients undergoing ECMO treatment should be periodically reassessed for clinical improvement. ECMO should not be continued indefinitely if the following criteria are met:

- Neurologic devastation as defined by the following:
  - Consensus from 2 attending physicians that there is no likelihood of an outcome better than “persistent vegetative state” at 6 month, **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 CT, EEG 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 (CPK) or lactate levels, lactate-to-pyruvate ratio, or near-infrared spectroscopy (NIRS) **OR**
  - Presumed end-stage cardiac or lung failure without “exit” plan (ie, declined for assist device and/or transplantation).

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 adults with respiratory, cardiac, or combined cardiorespiratory failure refractory to optimal conventional therapy.

The use of ECMO in adult patients is considered **INVESTIGATIONAL** when the above criteria are not met, including but not limited to acute and refractory cardiogenic shock and as an adjunct to cardiopulmonary resuscitation.

NOTE: Extracorporeal membrane oxygenation (ECMO) is considered investigational for most cases of cardiogenic shock. However, in individual clinical situations, ECMO may be considered beneficial/lifesaving for relatively short-term support (ie, days) for cardiogenic shock refractory to standard therapy in specific situations when shock is thought to be due to a potentially reversible condition, such as ST elevation acute myocardial infarction, acute myocarditis, peripartum cardiomyopathy, or acute rejection in a heart transplant, AND when there is reasonable expectation for recovery.

**Prior Authorization Information**

Pre-service approval is required for all inpatient services for all products. See below for situations where prior authorization may be required or may not be required. Yes indicates that prior authorization is required. No indicates that prior authorization is not required. N/A indicates that this service is primarily performed in an inpatient setting.

<table>
<thead>
<tr>
<th>Outpatient</th>
</tr>
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<tbody>
<tr>
<td>Commercial Managed Care (HMO and POS)</td>
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<tr>
<td>Commercial PPO and Indemnity</td>
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<tr>
<td>Medicare HMO BlueSM</td>
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<tr>
<td>Medicare PPO BlueSM</td>
</tr>
</tbody>
</table>

**CPT Codes / HCPCS Codes / ICD Codes**

Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member’s contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.

Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.

*The following codes are included below for informational purposes only; this is not an all-inclusive list.*

**The above medical necessity criteria MUST be met for the following codes to be covered for Commercial Members: Managed Care (HMO and POS), PPO, Indemnity, Medicare HMO Blue and Medicare PPO Blue:**

<table>
<thead>
<tr>
<th>CPT codes</th>
<th>Code Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>33946</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; initiation, veno-venous</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>33947</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; initiation, veno-arterial</td>
</tr>
<tr>
<td>33948</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; daily management, each day, veno-venous</td>
</tr>
<tr>
<td>33949</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; daily management, each day, veno-arterial</td>
</tr>
<tr>
<td>33951</td>
<td>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)</td>
</tr>
<tr>
<td>33952</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; insertion of peripheral (arterial and/or venous) cannula(e), percutaneous, 6 years and older (includes fluoroscopic guidance, when performed)</td>
</tr>
<tr>
<td>33953</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; insertion of peripheral (arterial and/or venous) cannula(e), open, birth through 5 years of age</td>
</tr>
<tr>
<td>33954</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; insertion of peripheral (arterial and/or venous) cannula(e), open, 6 years and older</td>
</tr>
<tr>
<td>33955</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; insertion of central cannula(e) by sternotomy or thoracotomy, birth through 5 years of age</td>
</tr>
<tr>
<td>33956</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; insertion of central cannula(e) by sternotomy or thoracotomy, 6 years and older</td>
</tr>
<tr>
<td>33957</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; reposition peripheral (arterial and/or venous) cannula(e), percutaneous, birth through 5 years of age (includes fluoroscopic guidance, when performed)</td>
</tr>
<tr>
<td>33958</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; reposition peripheral (arterial and/or venous) cannula(e), percutaneous, 6 years and older (includes fluoroscopic guidance, when performed)</td>
</tr>
<tr>
<td>33959</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; reposition peripheral (arterial and/or venous) cannula(e), open, birth through 5 years of age (includes fluoroscopic guidance, when performed)</td>
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<tr>
<td>33962</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; reposition peripheral (arterial and/or venous) cannula(e), open, 6 years and older (includes fluoroscopic guidance, when performed)</td>
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<tr>
<td>33963</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; reposition of central cannula(e) by sternotomy or thoracotomy, birth through 5 years of age (includes fluoroscopic guidance, when performed)</td>
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<tr>
<td>33964</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; reposition central cannula(e) by sternotomy or thoracotomy, 6 years and older (includes fluoroscopic guidance, when performed)</td>
</tr>
<tr>
<td>33965</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; removal of peripheral (arterial and/or venous) cannula(e), percutaneous, birth through 5 years of age</td>
</tr>
<tr>
<td>33966</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; removal of peripheral (arterial and/or venous) cannula(e), percutaneous, 6 years and older</td>
</tr>
<tr>
<td>33969</td>
<td>Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; removal of peripheral (arterial and/or venous) cannula(e), open, birth through 5 years of age</td>
</tr>
</tbody>
</table>
Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; removal of peripheral (arterial and/or venous) cannula(e), open, 6 years and older

Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; removal of central cannula(e) by sternotomy or thoracotomy, birth through 5 years of age

Extracorporeal membrane oxygenation (ECMO)/extracorporeal life support (ECLS) provided by physician; removal of central cannula(e) by sternotomy or thoracotomy, 6 years and older

Arterial exposure with creation of graft conduit (eg, chimney graft) to facilitate arterial perfusion for ECMO/ECLS (List separately in addition to code for primary procedure)

Insertion of left heart vent by thoracic incision (eg, sternotomy, thoracotomy) for ECMO/ECLS

Removal of left heart vent by thoracic incision (eg, sternotomy, thoracotomy) for ECMO/ECLS

ICD-9 Procedure Codes

<table>
<thead>
<tr>
<th>ICD-9-CM procedure code:</th>
<th>Code Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.65</td>
<td>Extracorporeal membrane oxygenation (ECMO)</td>
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</tbody>
</table>

ICD-10 Procedure Codes

<table>
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<tr>
<th>ICD-10-PCS-procedure codes:</th>
<th>Code Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5A15223</td>
<td>Extracorporeal Membrane Oxygenation, Continuous</td>
</tr>
</tbody>
</table>

**Description**

ECMO provides extracorporeal circulation and physiologic gas exchange for temporary cardiorespiratory support in cases of severe respiratory and cardiorespiratory failure. ECMO devices use an extracorporeal circuit, combining a pump and a membrane oxygenator, to undertake oxygenation of and removal of carbon dioxide from the blood.

ECMO has been investigated as an intervention since the late 1960s following the development of the first membrane oxygenator for extracorporeal oxygenation. ECMO has been widely used in the pediatric population, particularly in neonates with pulmonary hypertension and meconium aspiration syndrome.

Over time, interest has developed in the use of ECMO for cardiorespiratory support for adult conditions. Early studies of the use of ECMO for adult respiratory and cardiorespiratory conditions, particularly severe ARDS, including 1 RCT conducted in the United Kingdom in the 1970s which showed poor survival and high rates of complications due to the anticoagulation required for the ECMO circuit. Over time, with improvements in ECMO circuit technology and methods of supportive care, interest in the use of ECMO in adults has resurfaced. In particular, during the period of 2009-2010 H1N1 pandemic influenza the occurrence of cases of influenza-related ARDS, particularly in relatively young, generally healthy people prompted a resurgence in the interest of ECMO for ARDS.

ECMO has generally been used in clinical situations in which there is respiratory or cardiac failure, or both. In these situations, 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 (eg, resolution of ARDS or treatment of infection) or other life-saving intervention can be delivered (eg, provision of a lung transplant).

**Disease-Specific Indications for ECMO**
Venoarterial (VA) and venovenous (VV) ECMO have been investigated for a wide range of adult conditions that can lead to respiratory or cardiorespiratory failure, some of which overlap clinical categories (eg, H1N1 influenza infection leading to ARDS and cardiovascular collapse), which makes categorization difficult. However, in general, indications for ECMO can be categorized as follows:

- **Acute respiratory failure due to potentially reversible causes.** Acute respiratory failure refers to the failure of either oxygenation, removal of carbon dioxide, or both, and may be due to a wide range of causes. In these cases, ECMO is most often used as a bridge to recovery. Specific potentially reversible or treatable indications for ECMO may include ARDS, acute pneumonias, and a variety of other pulmonary disorders.

- **Bridge to lung transplant.** Lung transplant is used for management of chronic respiratory failure, most frequently in the setting of advanced chronic obstructive pulmonary disease (COPD), idiopathic pulmonary fibrosis, cystic fibrosis, emphysema due to alpha-1-antitrypsin deficiency, and idiopathic pulmonary arterial hypertension. In the end stages of these diseases, patients may require additional respiratory support while awaiting an appropriate donor. In addition, patients who have undergone a transplant may require retransplantation due to graft dysfunction after the primary transplant.

- **Acute-onset cardiogenic or obstructive shock** is defined as shock that is due to cardiac pump failure or vascular obstruction, refractory to inotropes and/or other mechanical circulatory support. Examples of this category include postcardiotomy syndrome (ie, failure to wean from bypass), acute coronary syndrome, myocarditis, cardiomyopathy, massive pulmonary embolism, and prolonged arrhythmias.

- **ECMO-assisted cardiopulmonary resuscitation (E-CPR).** ECMO can be used as an adjunct to CPR in patients who do not respond to initial resuscitation measures.

### ECMO: Technology Description

The basic components of ECMO include a pump, an oxygenator, sometimes referred to as a “membrane lung,” and some form of vascular access. Based on the vascular access type, ECMO can be described as VV or VA.

More recently, these include ventilation support devices that provide oxygenation and removal of CO2 without the use of a pump system or interventional lung assist devices (eg, iLA® Membrane Ventilator, Novalung GmbH); these are beyond the scope of this policy.

### Venovenous ECMO

#### Technique
In venovenous extracorporeal membrane oxygenation (VV ECMO), the ECMO oxygenator is in series with the native lungs, and the ECMO circuit provides respiratory support. Venous blood is withdrawn through a large-bore intravenous line; oxygen is added and CO2 removed, and oxygenated blood is returned to the venous circulation near the right atrium. Venous access for VV ECMO can be configured through 2 single lumen catheters (typically in the right internal jugular and femoral veins), or through 1 dual lumen catheter in the right internal jugular vein. In the femorotrigular approach, a single large multiperforated drainage cannula is inserted in the femoral vein and advanced to the cavo-atrial junction, and the return cannula is inserted into the superior vena cava via the right internal jugular vein. Alternatively, in the bi-femoral-jugular approach, drainage cannulae are placed in both the superior vena cava and the inferior vena cava via the jugular and femoral veins, and a femoral return cannula is advanced to the right atrium. In the dual-lumen catheter approach, a single bicaval cannula is inserted via the right jugular vein and positioned to allow drainage from the inferior vena cava and superior vena cava and return via the right atrium.

#### Indications
VV ECMO provides only respiratory support, and therefore is used for conditions in which there is progressive loss in ability to provide adequate gas exchange due to abnormalities in the lung parenchyma, airways, or chest wall. Right ventricular (RV) dysfunction due to pulmonary hypertension that is secondary to parenchymal lung disease may sometimes be effectively treated by VV ECMO.
However, acute or chronic obstruction of the pulmonary vasculature (eg, saddle pulmonary embolism) may require VA ECMO. There may be cases in which RV dysfunction due to pulmonary hypertension caused by severe parenchymal lung disease may be severe enough to require VA ECMO. In adults, VV ECMO is generally used only in situations in which all other reasonable avenues of respiratory support have been exhausted, including mechanical ventilation with lung protective strategies, pharmacologic therapy, and prone positioning.

**Venoarterial ECMO**

**Technique**
In venoarterial extracorporeal membrane oxygenation (VA ECMO), the ECMO oxygenator is in parallel with the native lungs and the ECMO circuit provides both cardiac and respiratory support. In VA ECMO, venous blood is withdrawn and oxygen is added and CO2 removed similar to VV ECMO, but blood is returned to the arterial circulation. Cannulation for VA ECMO can done peripherally, with withdrawal of blood from a cannula in the femoral or internal jugular vein and return of blood through a cannula in the femoral or subclavian artery. Alternatively, it can be done centrally, with withdrawal of blood directly from a cannula in the right atrium and return of blood through a cannula in the aorta. VA ECMO typically requires a high blood flow extracorporeal circuit.

**Indications**
VA ECMO provides both cardiac and respiratory support. Thus, it is used in situations of significant cardiac dysfunction that is refractory to other therapies, when significant respiratory involvement is suspected or demonstrated, such as treatment-resistant cardiogenic shock, pulmonary embolism, or primary parenchymal lung disease severe enough to compromise right heart function. Echocardiography should be used before ECMO is considered or started to identify severe left ventricular dysfunction which might necessitate the use of VA ECMO. The use of peripheral VA ECMO in the presence of adequate cardiac function may cause severe hypoxia in the upper part of the body (brain and heart) in the setting of a severe pulmonary shunt.2

**Medical Management During ECMO**
During ECMO, patients require supportive care and treatment for their underlying medical condition, including ventilator management, fluid management, and systemic anticoagulation to prevent circuit clotting, nutritional management, and appropriate antimicrobials. Maintenance of the ECMO circuit requires frequent (ie, multiple times in 24 hours) monitoring by medical and nursing staff and evaluation at least once per 24 hours by a perfusion expert.

ECMO may be associated with significant complications, which can be related to the vascular access required to the need for systemic anticoagulation, including hemorrhage, limb ischemia, compartment syndrome, cannula thrombosis, and limb amputation. Patients are also at risk of progression of their underlying disease process.

**Summary**
Potential indications for extracorporeal membrane oxygenation (ECMO) in the adult population include acute, potentially reversible respiratory failure due to a variety of causes; as a bridge to lung transplant; in potentially reversible cardiogenic shock; and as an adjunct to cardiopulmonary resuscitation (ECMOassisted CPR).

The evidence related to the use of ECMO in adult acute respiratory failure consists of 1 moderately-sized randomized controlled trial, several nonrandomized comparative studies, and multiple case series. The most direct evidence about the efficacy of ECMO in adult respiratory failure comes from the CESAR trial. Although the CESAR trial had limitations, including nonstandardized management in the control group and unequal intensity of treatment between the treatment and control groups, for the study’s primary outcome of disability-free survival at 6 months, there was a large effect size, with an absolute risk reduction in mortality of 16.25%. Recent nonrandomized comparative studies generally report improvements in outcomes with ECMO. Therefore, the use of ECMO may be considered medically necessary for patients meeting the definitions of acute respiratory failure in the CESAR trial. However,
questions remain about the generalizability of findings from the CESAR trial and nonrandomized study results to other patient populations, and further clinical trials in more specific patient populations are needed.

The evidence related to the use of ECMO as a bridge to lung transplantation consists of small case series. For this population, there are no other options, the alternative is likely death, and controlled trials would be extremely difficult to perform. Although the available evidence about whether the use of ECMO increases the rate of successful lung, heart, or heart-lung transplantation is limited, clinical input supported the use of ECMO as a short-term bridge to transplant. Therefore, ECMO may be considered medically necessary for this indication.

Less evidence exists about the use of ECMO for primary cardiac causes and ECMO-assisted CPR. For these indications, case series do not provide evidence on efficacy compared with standard care, and nonrandomized comparative studies are limited by selection bias that likely leads to noncomparability of patient groups. As a result, ECMO for primary cardiogenic shock and ECMO-assisted CPR are considered investigational.

**Policy History**

<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/2017</td>
<td>New references added from BCBSA National medical policy.</td>
</tr>
<tr>
<td>7/2016</td>
<td>New references added from BCBSA National medical policy.</td>
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**Information Pertaining to All Blue Cross Blue Shield Medical Policies**

Click on any of the following terms to access the relevant information:

- [Medical Policy Terms of Use](#)
- [Managed Care Guidelines](#)
- [Indemnity/PPO Guidelines](#)
- [Clinical Exception Process](#)
- [Medical Technology Assessment Guidelines](#)

**References**


36. Schechter MA, Ganapathi AM, Englum BR, et al. Spontaneously breathing extracorporeal membrane oxygenation support provides the optimal bridge to lung transplantation. Transplantation. Dec 2016;100(12):2699-2704. PMID 26910331


