
Extracorporeal Membrane Oxygenation/Extracorporeal Life Support

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Extracorporeal Membrane Oxygenation (ECMO), or extracorporeal life support (ECLS), is defined as the use of a modified cardiopulmonary bypass circuit for temporary life support for patients with potentially reversible cardiac and/or respiratory failure. ECMO/ECLS provides a mechanism for gas exchange as well as cardiac support thereby allowing for recovery from existing lung and/or cardiac disease. ECMO/ECLS is an accepted treatment modality for recipients with respiratory and/or cardiac failure failing to respond to conventional medical therapy.

Indications

ECMO/ECLS is indicated for but not limited to the following diagnoses:

- Persistent pulmonary hypertension of the newborn
- Meconium aspiration syndrome
- Respiratory distress syndrome
- Sepsis/pneumonia
- Congenital diaphragmatic hernia
- Air leak syndrome
- Reversible cardiac failure
- Recipients meeting criteria for heart and/or lung transplant

Selection criteria include all of the following:

- Gestational age not less than 34 weeks
- Minimum birth weight of 2,000 grams
- No coagulopathy or uncontrolled bleeding
- No intracranial hemorrhage
- Mechanical ventilation less than 10 to 14 days
- Reversible lung and cardiac disease
- No lethal congenital anomalies
- No uncorrectable congenital heart disease
- No irreversible brain damage
- Failure of maximal medical or conventional therapy

Institutional Requirements

Applicable for recipients of the California Children's Services (CCS) program:

- Neonates
 - Have a Neonatal Intensive Care Unit (NICU) approved by CCS as a regional NICU
 - Have a CCS-approved Neonatal ECMO/ECLS center
 - Provide Inhaled Nitric Oxide (INO) services for neonates
- Pediatric: CCS-approved Pediatric Intensive Care Unit (PICU) with congenital heart surgery program

Authorization

An approved *Treatment Authorization Request* (TAR) or Service Authorization Request (SAR) is required for reimbursement of CPT codes 33946 and 33947 only. All other ECMO/ECLS services do not require an approved TAR or SAR.

ECMO/ECLS services are billed with the following codes:

Table of CPT Codes for ECMO/ECLS Services

CPT Code	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)
33953	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

Note: CPT codes 33946 thru 33949 are not reimbursable when billed with modifier 63.

Table of CPT Codes for ECMO/ECLS Services (continued)

CPT Code	Description
33955	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
33957	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)
33959	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)
33963	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)
33965	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
33969	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
33985	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
33987	Extracorporeal membrane oxygenation. (ECMO)/extracorporeal life support (ECLS) provided by physician; Arterial exposure with creation of graft conduit (eg, chimney graft) to facilitate arterial perfusion for ECMO/ECLS
33988	Extracorporeal membrane oxygenation. (ECMO)/extracorporeal life support (ECLS) provided by physician; Insertion of left heart vent by thoracic incision (eg, sternotomy, thoracotomy) for ECMO/ECLS
33989	Extracorporeal membrane oxygenation. (ECMO)/extracorporeal life support (ECLS) provided by physician; Removal of left heart vent by thoracic incision (eg, sternotomy, thoracotomy) for ECMO/ECLS

Billing Physician Services

Neonatology services directly related to the cannulation, initiation, management and the discontinuation of the ECMO circuit and parameters are distinct from the daily overall management of the recipient.

Daily overall management of the recipient may be separately reported using the relevant hospital inpatient services, or critical care evaluation and management CPT codes (99221, 99222, 99223, 99231, 99232, 99233, 99234, 99235, 99236, 99291, 99292, 99468, 99469, 99471, 99472, 99475, 99476, 99477, 99478, 99479 and 99480) and may be reimbursed to any provider for the same recipient and same date of service. Refer to the *Current Procedural Terminology* (CPT) code book for detailed physician billing instructions for the ECMO/ECLS services for each code.

Billing Inpatient Services

ECMO/ECLS must be performed in a regional NICU in a CCS designated ECMO center.

ECMO services must be submitted on the claim with all revenue/sick baby codes applicable to the entire stay. For neonates, the claim is submitted for services rendered to the baby only. Services to the mother are billed separately.

ECMO/ECLS services are billed with the following revenue codes:

- 174 (nursery, newborn, Level IV): newborn 0 thru 28 days
- 202 (medical intensive care): adults
- 203 (pediatric intensive care): infants and children

These revenue codes are billed in conjunction with ICD-10-PCS extracorporeal oxygenation procedure codes 5A1522F, 5A1522G and 5A1522H.

Hospital Reimbursement DRG-Reimbursed Facilities

ECMO/ECLS services for hospitals are paid according to diagnosis-related groups (DRG) reimbursement methodology. Refer to the *Diagnosis-Related Groups (DRG): Inpatient Services* section in the Inpatient Part 2 provider manual for DRG information.

To qualify for reimbursement the hospital must:

- Have a NICU approved by CCS as a Regional NICU.
- Have a CCS-approved Neonatal ECMO/ECLS Center.
- Provide Inhaled Nitric Oxide (INO) services for neonates.

Inhaled Nitric Oxide (INO)

Inhaled Nitric Oxide (INO) is a selective pulmonary vasodilator. The mechanism of action involves the activation of an enzyme system that leads to smooth muscle relaxation. In infants at 34 weeks gestation or more, INO can improve oxygenation when conventional therapy has failed.

Billing Inpatient Services

INO services are billed with revenue code 174 (nursery, newborn; level IV) in conjunction with ICD-10-PCS procedure code 3E0F7SD (introduction of nitric oxide gas into respiratory tract, via natural or artificial opening).

INO services must be submitted on a claim with all revenue/sick baby codes applicable to the entire stay. The claim is submitted for INO services rendered to the baby only. Services to the mother are billed separately.

Hospital Reimbursement: DRG-Reimbursed Facilities

INO services for hospitals are paid according to diagnosis-related groups (DRG) reimbursement methodology. Refer to the *Diagnosis-Related Groups (DRG): Inpatient Services* section in the Inpatient Part 2 provider manual for DRG information.

To qualify for reimbursement the hospital must:

- Have a NICU approved by CCS as a Regional NICU
- Have a CCS-approved Neonatal ECMO Center
- Provide Inhaled Nitric Oxide (INO) services for neonates

Legend

Symbols used in the document above are explained in the following table.

Symbol	Description
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»	This is a change mark symbol. It is used to indicate where on the page the most recent change ends.