

This is a supplement document intended to guide ECMO utilization for respiratory failure in the state of Utah during the COVID-19 pandemic. Refer to the Utah COVID-19 CSC annex for the ICU/ventilator allocation protocol. ECMO is FDA approved for treatment of COVID-19 and should be considered in a small subset of patients as a “salvage therapy”. In Utah, it is currently available at the University of Utah, Intermountain Medical Center, and Primary Children’s Hospital. This protocol does not discriminate based on age, race, color, national origin, disability, sex, or exercise of conscience and religion. It meets the CSC ethical goals of fairness, duty to care, transparency, consistency, proportionality, and accountability. We recommend the use of Crisis Triage Officers (CTOs) or CTO Teams be used during contingency and crisis care.

Contingency Care: Every effort should be made to avoid Crisis Standards. Contingency strategies should be maximized based on evidence-based best practices as they emerge, and by load leveling among hospitals and healthcare systems through coordinated patient and resource allocation. ECMO centers, in coordination with the state, need to conduct frequent assessments of ECMO supply relative to anticipated patient demand. ECMO candidates will need consultation for transfer to ECMO centers within 7 days of mechanical ventilation. If an ECMO candidate cannot be taken care at the contacted ECMO center, the sending facility may be asked to contact another ECMO center, while the ECMO centers may also work together to identify alternate referral options. ECMO centers should also consider staff or equipment movement or augmentation to maintain some capacity.

Crisis Care for ECMO: If ECMO capacity becomes insufficient within the state, ECMO care should be increasingly focused on those that are more likely to benefit from it, to meet the goal of “the greatest good for the greatest number.” Resources permitting all other therapies will be offered at the discretion of the treating team. ECPR should be discontinued.

Crisis Care for ICU/ventilator: If Utah implements Crisis Standards of Care for ICU/ventilator care, then ECMO will be further restricted to very limited circumstances, as agreed upon by the ECMO centers.

ECMO Initiation - Request ECMO care consultation IF inclusion criteria are present, relative contraindications have been considered, resources are available, and shared decision making has been performed. Provide information about the risks and benefits of ECMO care with its attendant risks of discomfort and uncertain prospects for recovery, and convey specific recommendations about the medically proposed course. Inform the patient/surrogate of the potential need to evaluate the appropriateness of ECMO support going forward, including the need for surrogates to be readily available for discussion and decision making. Consider obtaining informed assent (in which the family is explicitly offered the choice to defer to clinicians’ judgment) for withholding or withdrawing life-sustaining therapy (Assent to DNR). Non-ICU care, including comfort care, needs to be made available to those that are critically ill but unlikely to benefit from, or not wanting, continued ICU care.

Inclusion Criteria:

- patients with isolated respiratory failure and good overall chance of recovery
- continued refractory hypoxemia defined as P/F < 100 despite PEEP >14 and FiO₂ >70% after attempting other therapies IF available, including proning and inhaled pulmonary vasodilator.

Relative Contraindications:

- Underlying severe frailty associated with very limited functional status or chronic medical problems such as advanced heart failure or disabling chronic pulmonary disease.
- Mechanical ventilation for >7 days in adult patients.
- Mechanical ventilation for >10 days in pediatric patients.
- Terminal illness.
- Significant extrapulmonary comorbidities, such as multiorgan failure.
- Brain injury with poor prognosis, such as acute large stroke or intracerebral hemorrhage.
- Persistent acute on chronic cardiogenic shock requiring multiple vasoactive medications without response to therapy.
- BMI greater than 45 indicates worsened outcomes.

Some patients should be priority considered for ECMO care, unless their clinical condition or shared decision-making process indicates otherwise. These include the following:

Pregnancy: Patients with pregnancy may represent two lives, and thus giving them priority is aligned with “do the greatest good for the greatest number.”

Those who are younger generally have better outcomes with less resource utilization. Because of its predicted impact on outcomes, age should be used as a tiebreaker when not all eligible patients can get ECMO care.

Those who are central to the public health response in order to preserve this vital workforce. Those whose work directly supports the provision of acute care to others are vital to the public health response, and thus should be prioritized for ECMO care.

ECMO withdrawal - Patients in whom ECMO is not proving beneficial should be transitioned to non-ICU care. Patients on ECMO longer than 21 days should be considered candidates for removal if under Crisis Standards for ECMO, unless clear improvement is occurring. Patients that are being considered for lung transplantation may require additional time on ECMO.