Acute Respiratory Failure:
Patient Selection for veno-venous ECMO

Conditions where ECMO use is commonly associated with favourable clinical outcomes

- ARDS with primary lung injury (from infection, aspiration or direct trauma)
- Primary graft dysfunction following lung transplantation (within 7 days)
- Pulmonary vasculitis (Goodpasture's, ANCA-associated, other Autoimmune)

Conditions where ECMO is often considered, but outcome is variable.

- ARDS from secondary lung injury (from non-pulmonary sepsis, burns or pancreatitis)
- Lung transplant recipients 7-30 days post transplant
- Age >70

Consideration of ECMO support in these conditions depends on individual patient circumstances and should include discussion with experienced ECMO Clinical Service Staff

Clinical triggers supporting the initiation of VV ECMO

- Inability to maintain SaO2 > 88 or pH > 7.20 with safe mechanical ventilation
  - Plateau pressure < 35cmH_2O and
  - Tidal Volume <6ml/Kg predicted body weight
- Despite (if considered safe and available)
  - Echo assessment
  - Adequate (inotropic) cardiac support
  - Trial of high PEEP (18-22)
  - Recruitment manoeuvre
  - Prone positioning
  - Nitric Oxide or alternative pulmonary vasodilators
- Evidence of progressive barotrauma as a result of mechanical ventilation (pneumatocysts or pneumothoraces)

Logistic triggers supporting the initiation of VV ECMO

- The need for inter-hospital transport of the patient with progressive severe respiratory failure

Acute Respiratory Failure:
Patient Selection for veno-venous ECMO

Chronic Health Exclusion Criteria

- Age: > 75 years
- Active malignancy
- Severe brain injury
- Immunosuppressed
  - Previous Bone marrow transplant
  - Previous heart, lung, renal transplant (>30 days)
  - HIV: AIDS defining illness despite antiretroviral therapy
- Presence of additional severe, symptomatic chronic organ failure
  - Cirrhosis (jaundice, ascities, encephalopathy)
  - End-stage renal failure (dialysis)
  - Cardiomyopathy (VAD or inotropes)
  - Chronic lung disease*

  *(*see Chronic Respiratory Failure/Bridge to Transplant Patient selection)*

Presenting Illness Exclusion Criteria

- Septic shock (where 3 or more of the following features are present before ECMO)
  - Lactate > 10
  - Noradrenaline > 1.5ug/Kg/min
  - Severe myocardial depression
  - Advanced microcirculatory failure with severe mottling or established purpura
- Acute/subacute pulmonary fibrosis is the likely cause of acute respiratory failure
  - Previous known/treated SLE, extra-articular Rheumatoid Arthritis, Scleroderma, Dermatomyositis, Sarcoidosis,
  - Clinical or pathological investigations suggestive of irreversible process (e.g. bleomycin lung injury)
- Obliterative Bronchiolitis is the likely cause of respiratory failure
  - Minimal or nodular CXR changes with profound fixed airway limitation

Chronic Respiratory Failure Bridge to Transplant*:

Patient Selection for ECMO (VV or VA)

*Includes chronic PAH patients

Patient Eligibility for ECMO

- AIR1 (Lung Transplant) unit approval for transplant (PRIOR to ECMO)

AND

- Lung Transplant Surgery Consultant approval for transplant (PRIOR to ECMO)

Note: provision of ECMO for patients with chronic lung disease must be preceded with multidisciplinary approval of patient eligibility. This will require at least 12-24 hours.

Note: patients with end-stage lung disease referred for ICU support in extremis or shock, should not receive ECMO as a bridge to recovery or decision

Absolute contraindications to ECMO

- Cardiac Arrest
- Multiple system organ failure
- Immobility
- Inadequate vascular access*

**Patients with long tern SVC access catheters must have a venogram prior to ECMO cannulation to exclude significant SVC stenosis*

Patient Selection for veno-arterial ECMO

Cardiogenic Shock:

Conditions where ECMO use for cardiogenic shock is commonly associated with favourable clinical outcomes

- Acute fulminate myocarditis
- Cardiomyopathy (first presentation)
- Chronic cardiomyopathy (suitable for VAD)
- Primary Graft Failure post heart transplant
- AMI
  - without multiple organ failure or sepsis
  - with early revascularisation (PCI)
- Drug overdose
- Pulmonary Embolism
- Pre/post lung transplant with severe pulmonary artery hypertension

Conditions where ECMO is often considered, but outcome is variable and often poor

- AMI
  - with multiple organ failure or sepsis
  - late revascularisation, need for CABG or distal disease
- Sepsis with profound myocardial depression
- Post cardiotomy (ischaemic or valvular surgery)

Consideration of ECMO support in these conditions depends on individual patient circumstances and should include discussion with experienced ECMO Clinical Service Staff

Patient Selection for veno-arterial ECMO

Cardiogenic Shock:

Chronic Health Exclusion Criteria

- Age: > 70 years
- Active malignancy
- Severe brain injury
- Immunosuppressed
  - Previous Bone marrow transplant
  - Previous heart, lung, renal transplant (>30 days)
  - HIV: AIDS defining illness despite antiretroviral therapy
- Presence of additional severe, symptomatic chronic organ failure
  - Cirrhosis (jaundice, ascities, encephalopathy)
  - End-stage renal failure (dialysis)
  - Chronic pulmonary artery hypertension*

  *(*see Chronic Respiratory Failure/Bridge to Transplant Patient selection)*

Presenting Illness Exclusion Criteria

- Advanced shock (where 3 or more of the following features are present before ECMO)
  - Lactate > 15 or pH < 6.9
  - Anuria > 4 hours (prior to ECMO)
  - AST or ALT > 2000, or, INR >4.5
  - Advanced microcirculatory failure with severe mottling or established purpura
- Shock primarily due to mitral or aortic valvular insufficiency
- Aortic dissection

Patient Selection for veno-arterial ECMO Following Cardiac Arrest (> 10 minutes):

Chronic Health Exclusion Criteria

- Age: > 70 years
- Multiple past coronary revascularisations
- Any known severe, symptomatic chronic organ failure
  - Cirrhosis (jaundice, ascities, encephalopathy)
  - End-stage renal failure (dialysis)
  - Peripheral vascular disease (surgery)
  - Cardiomyopathy (VAD or inotropes)
  - Chronic lung disease*
  - Chronic Pulmonary artery hypertension*

  *(*see Chronic Respiratory Failure/Bridge to Transplant Patient selection)*

Presenting Illness Exclusion Criteria

- External centre needing cannulation
- Unwitnessed
- Known or suspected aortic dissection

Patient Selection for ECMO

Request for VA ECMO transfer following ECMO initiation at another site

Exclusion Criteria

Patients SHOULD NOT be retrieved to The Alfred ICU from other centres following emergency VA ECMO if any of the following are present

- Central (sternal) cannulation
- Leg ischaemia
- Left ventricular distension and pulmonary haemorrhage
- Evidence of neurological deficit (ECMO following cardiac arrest)
  - All patients more than 24 hours post ECMO should have a CT brain and clinical assessment
- Ongoing bleeding
- Unstable blood pressure or vasopressor requirements
- Unstable circuit blood flow (<3L/min)