

Bed status

The five centres complete the ECMO Bed Availability tool on a daily basis.

<http://www.specialisedservices.nhs.uk/respiratoryecmocapacity/>.

This gives an indication of the available bed capacity and provides an early warning of potential issues. During surge phases, the surge point is defined as only three out of the 15 beds being available in the designated centres. This position is confirmed by the Adult ECMO Lead. Bed capacity is reviewed on a daily basis by the Adult ECMO Lead.

ORGANISATIONS AND ROLES

NHS England

Adult ECMO Lead in-hours: between the hours of 9am and 5pm from Monday to Friday (except for bank holidays), the Adult ECMO Lead is Sheela Upadhyaya, telephone 0207 932 3926 or Mobile: 07787 002818, e-mail sheela.upadhyaya@nhs.net

ECMO centres, regional and area team colleagues will be notified of any deputising arrangements for annual leave, etc.

The role of the Adult ECMO Lead in-hours is to:

- Be responsible for the day-to-day management of the Adult ECMO standard operating procedure
- Review the standard operating procedure as necessary
- Ensure that appropriate payments are made for surge activity in line with agreed tariffs
- Convene and chair the weekly teleconferences during pre-surge. The surge point is defined as only three out of the 15 beds being available in the designated centres.
- Ensure that any actions following the weekly pre-surge teleconferences are implemented
- Send an e-mail to the Adult ECMO Lead out-of-hours every Friday at 4pm
- Confirm when a surge point is reached. The surge point is defined as only three out of the 15 beds being available in the designated centres. This position is confirmed by the Adult ECMO Lead
- Monitor bed capacity on a daily basis when a surge point is reached
- Convene and chair teleconferences during surge phases
- Ensure that any actions following surge teleconferences are implemented
- Confirm when a surge point has passed and pre-surge arrangements can be reinstated
- Confirm (in conjunction with the Medical Directorate Lead) when an escalation point is reached. Escalation point is defined when a surge point is reached.
- Convene teleconferences during escalation phases
- Ensure (in conjunction with the Medical Directorate Lead) that any actions following escalation teleconferences are implemented
- Provide support to the Adult ECMO Lead out-of-hours during escalation phases

- Confirm (in conjunction with the Adult ECMO Lead) when an escalation point has passed and surge arrangements can be reinstated

Adult ECMO Lead out-of-hours: between the hours of 5pm and 9am Monday to Friday, at weekends and on bank holidays, the Adult ECMO Lead is the on-call Operations Director supported by the on-call Emergency Preparedness Response Resilience officer, telephone 0845 000 5555 e-mail england.epr@nhs.net]

The role of the Adult ECMO Lead out-of-hours is to:

- Ensure that any actions following the weekly pre-surge teleconferences are implemented (only when the weekly teleconference falls on a bank holiday)
- Send an e-mail to the Adult ECMO Lead in-hours every Monday at 8pm copying to all ECMO centres.
- Confirm when a surge point is reached
- Monitor bed capacity on a daily basis when a surge point is reached
- Convene and chair teleconferences during surge phases
- Ensure that any actions following surge teleconferences are implemented (in conjunction with the Adult ECMO Lead in-hours)
- Confirm when a surge point has passed and pre-surge arrangements can be reinstated
- Confirm (in conjunction with the Medical Directorate Lead) when an escalation point is reached
- Convene teleconferences during escalation phases
- Ensure (in conjunction with the Medical Directorate Lead) that any actions following escalation teleconferences are implemented (in conjunction with the Adult ECMO Lead in-hours)
- Confirm (in conjunction with the Medical Directorate Lead) when an escalation point has passed and surge arrangements can be reinstated

Medical Directorate Lead

- Confirm (in conjunction with the Adult ECMO Lead) when an escalation point is reached
- Chair teleconferences during escalation phases
- Ensure (in conjunction with the Adult ECMO Lead) that any actions following escalation teleconferences are implemented
- Act as the NHS England lead in the event of any media communications
- Confirm (in conjunction with the Adult ECMO Lead) when an escalation point has passed and surge arrangements can be reinstated

Designated centres

The role of the designated centres is to:

- Complete the ECMO Bed Availability tool at 10am on a daily basis during all phases
- Take part in the weekly teleconferences during periods of potential bed capacity issues, reporting bed availability and any known issues
- Alert NHS England to any potential bed capacity issues outside of the weekly teleconferences
- Take part in surge teleconferences, reporting bed availability; make available surge capacity according to agreed standard operating procedure.

- Take part in escalation teleconferences, reporting bed availability; instigate other actions, in line with the agreed protocol

ACTION PHASES

The following sections describe actions in **pre-surge** (heightened risk of surge), **surge** (need for extra capacity to be deployed) and **escalation** (all surge capacity deployed) phases. This SOP would apply for any surge situation, not just pandemic flu – e.g. mass casualty events. In a mass casualty event there may need to be a specific urgent call. This will be organised by the Adult ECMO lead as necessary.

Pre-surge phase

During periods when there are likely to be bed capacity issues (for example, between 1st November and 31st March and/or in case of a pandemic), the Adult ECMO Lead convenes a weekly teleconference to discuss bed availability and potential issues. The calls take place every Monday at 1pm and the individuals taking part include:

- A representative from each of the five centres designated centres
- The Adult ECMO Lead in-hours or his/her deputy (Chair) [except when the teleconference takes place on a bank holiday when this role is undertaken by the Adult ECMO Lead out-of-hours]
- A representative from each of the four NHS England Regions
- A representative from National Services Division, Scotland (commissioner of ECMO services in Scotland)
- A representative from Public Health England
- A representative from the Communications Team
- A representative from the Medical Directorate
- A member of the NHS England EPRR Team (as required)

The weekly teleconference will cover:

An update of bed capacity from each of the five centres

Immediate issues (today only)

Potential issues and a discussion of possible solutions

Intelligence sharing

Immediate intelligence sharing: urgent clinical issues, staffing constraints

ICU Bed state round-up: 5 centres

Planning

Surge capacity planning

Support needed

Communications within NHS England and within designated centres

NHS England will circulate a brief note of the meeting. The regional representatives will be responsible for feeding back to their constituent Area Teams if, for example, there is an indication that ECMO capacity issues may impact on other services.

The teleconference details are as follows:

UK Freephone:	0800 917 1950
Chairperson passcode:	56527758 then #
Participant passcode:	76793881 then #

The Adult ECMO Lead in-hours will send an e-mail to the Adult ECMO Lead out-of-hours every Friday at 4pm (or before a bank holiday period) and the Adult ECMO Lead out-of-hours will send an e-mail to the Adult ECMO Lead in-hours every Monday at 8am (or following a bank holiday period). The e-mail will either:

- a) confirm that there are no known issues;
- b) detail potential issues and what has been discussed in terms of possible solutions; or
- c) detail known issues and what has been put in place as a consequence

This communication will be copied to the five designated centres.

Surge phase

The surge point is defined as only three out of the 15 beds being available in the designated centres. This position is confirmed by the Adult ECMO Lead.

Once the surge point is reached, the Adult ECMO Lead will:

- Review the bed status information from the ECMO *Bed Availability* tool
- Convene a teleconference with the five centres (and the other attendees of the weekly teleconferences where feasible)
- Confirm that the surge point has been reached
- Agree which surge capacity should be made available
- Agree how the surge point will be monitored, for example, through frequent teleconferences
- Communicate information via the agreed surge sitrep template [to be developed]
- Agree the communications plan with the communications representative in line with the pre-agreed plan [to be developed]

The Adult ECMO Lead is responsible for liaising with other NHS England staff to ensure that the agreed actions are implemented alongside the agreed communications plan.

The Adult ECMO Lead will decide either:

- a) The surge point has passed and pre-surge arrangements can be reinstated; or
- b) Surge arrangements have been exhausted and the escalation point has been reached.

Escalation phase

The escalation phase is defined as all designated beds being full and all identified surge capacity being full. This position is confirmed by the Adult ECMO Lead in conjunction with the Medical Directorate Lead.

Once the escalation point is reached, the Adult ECMO Lead will:

- Review the bed status information from the ECMO *Bed Availability* tool
- Convene a teleconference (to be chaired by the Medical Directorate Lead) with the five centres (and other NHS England staff as appropriate)
- Confirm that the escalation point has been reached

- Agree what other actions (in line with the protocol [to be developed]) should be instigated
- Agree how the escalation point will be monitored, for example, through frequent teleconferences
- Communicate information via the agreed escalation sitrep template [to be developed]
- Agree the communications plan with the communications representative in line with the pre-agreed plan [to be developed]

The Adult ECMO Lead, in conjunction with the Medical Directorate Lead, is responsible for liaising with other NHS England staff to ensure that the agreed actions are implemented alongside the agreed communications plan.

The Adult ECMO Lead, in conjunction with the Medical Directorate Lead, will decide when the escalation point has passed and surge arrangements can be reinstated.

Interdependencies / links with other services

- Critical Care Networks to prioritise repatriation to create capacity in ECMO centres. Regional leads to support the repatriation of patients from ECMO centres to create capacity during surge, accepting that repatriation may not be back to originating Trusts.
- ECMO centres supported by Regional leads to manage repatriation of patients to create capacity.
- Acknowledgement in Regions that prioritisation of ECMO may impact on Trust waiting times for elective services.
- Regional leads to facilitate local clinical teams to support the physical repatriation of patients.

Recovery phase

The recovery phase is defined as the point at which surge and escalation phases have taken place and pre-surge arrangements have been reinstated. This position is confirmed by the Adult ECMO Lead in-hours.

Once the recovery point is reached, the Adult ECMO Lead in-hours:

- Prepares (in conjunction with the Medical Directorate Lead), a debrief following any escalation phases, including recommendations for improvement
- Discusses post-escalation debriefs at the weekly teleconferences
- Implements any changes agreed as a result of post-escalation debriefs

8) 具体的な ECMO センターの管理システム

患者情報、管理などにおいてそれぞれのセンターが独自のシステムを持ち進めている。

ここでは例としてロンドンにある Guy' s and St. Thomas' NHS Foundation Trust

のシステムを紹介する。

Extracorporeal Membrane Oxygenation (ECMO)

The aim of this information sheet is to help answer some of the questions you may have about your relative requiring extracorporeal membrane oxygenation (ECMO). It explains the benefits, risks and alternatives to the therapy. If you have any questions and concerns, please do not hesitate to speak to a doctor or nurse caring for your relative.

What is ECMO?

ECMO is a temporary life support system used for people whose lungs have stopped working properly. This can be caused by a number of things such as very severe infections causing damage to the lungs that is called acute respiratory distress syndrome (ARDS). The ECMO machine does the work of lungs. A tube carries blood from the right side of the heart, which is then pumped through an artificial lung where it picks up oxygen and drops off carbon dioxide. This oxygen-rich blood is then passed back into the person's blood system.

What are the benefits – why should my relative have ECMO?

ECMO is only used for people who are very seriously ill and who have not responded to other methods of helping their breathing, such as ventilators or oscillators. ECMO is only used where the doctors believe that without ECMO your relative will die. A recent trial of ECMO published in the Lancet (the CESAR trial) demonstrated that 57/90 (63%) of patients with severe ARDS who had ECMO survived.

What are the risks?

The risks of ECMO are bleeding, clotting, infection, brain damage and damage to the blood vessels. Approximately 1 in 20 patients who require ECMO have a bleed into their brain. Anyone who needs ECMO has a significant risk of dying.

Are there any other alternatives?

By the time your relative needs ECMO, all alternative forms of breathing support have been tried and have not worked. There is no other alternative.

Asking for your consent

Although you are not able to provide consent on behalf of your relative, the intensive care doctors will talk to you about your relative's treatment, and discuss the risks and benefits of ECMO with you. Your relative will be kept unconscious at this stage because they are too sick to be awake. You should receive the leaflet, **Helping you decide: our consent policy**, which gives you more information. If you do not, please ask us for one.

Information

What happens during ECMO?

Two or three large tubes are inserted into your relative, usually in the groin and/or the neck. The blood is taken out of their body, passed through an artificial lung and then returned to their body. A blood thinning drug is given to prevent the blood clotting in the tubing. ECMO is a continuous process and patients may require ECMO support for several weeks.

How do we stop ECMO?

Once your relative's lungs have recovered sufficiently for a normal ventilator to be used on its own, the ECMO will be stopped and the tubes removed. If there is no hope of your relative making a recovery, the doctors will talk to you about palliative care.

Will your relative feel any pain?

Your relative will be given powerful pain-relievers and sedatives whilst they are on ECMO. Any procedures will be performed with local anaesthetic.

Who can I contact for more information?

If you have any questions or concerns about ECMO, please speak with the intensive care consultant looking after your relative.

Useful contacts

PALS - To make comments or raise concerns about the Trust's services, please contact our Patient Advice and Liaison Service (PALS). Ask a member of staff to direct you to PALS or:

t: 020 7188 8801 at St Thomas' **t:** 020 7188 8803 at Guy's **e:** pals@gstt.nhs.uk

Knowledge & Information Centre (KIC) - For more information about health conditions, support groups and local services, or to search the internet and send emails, please visit the KIC on the Ground Floor, North Wing, St Thomas' Hospital.

t: 020 7188 3416 **e:** kic@gstt.nhs.uk

Language support services - If you need an interpreter or information about the care you are receiving in the language or format of your choice, please get in touch using the following contact details.

t: 020 7188 8815 **fax:** 020 7188 5953 **e:** languagesupport@gstt.nhs.uk

NHS Direct - Offers health information and advice from specially trained nurses over the phone 24 hours a day.

t: 0845 4647 **w:** www.nhsdirect.nhs.uk

Guy's and St Thomas' NHS Foundation Trust

St Thomas' Hospital, Westminster Bridge Road, London SE1 7EH **Guy's Hospital**, Great Maze Pond, London SE1 9RT

Switchboard: 020 7188 7188 www.guysandstthomas.nhs.uk

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Department/PPG/

Severe Respiratory Failure Referral

Date: _____ Time: _____
Referring Hospital: _____ Hospital Postcode: _____
ITU Phone No: _____ NHS Number: _____
Referring Consultant: _____ Patient Postcode: _____
Patient's First Name: _____ Surname: _____
Age: ____ DOB: _____ Weight: ____ kg Height: ____ cm BMI: ____
Diagnosis: _____
Known Allergies: _____
Ethnicity: _____
Patient's GP: _____ GP Phone number: _____

History:

Co-morbidities:

Next-Of-Kin:

Aware of transfer: Y/N

Available in ICU for GSTT team to gain assent: Y/N

Airway:

ET Tube Oral/Nasal/Tracheostomy, size: _____

Date of intubation: _____

Ventilation:

Mode: SIMV/BiPAP/PCV/APRV/HFOV

Settings: Pplat _____ PEEP: _____ Mean Airway Pressure _____ Rate _____

FiO2: _____ % TV: _____ Dynamic Compliance: _____ I:E: _____

Nitric Oxide: Y/N: PPM _____ Prone position: Y / N

Duration: FiO2 >0.8: _____ days Pplat>30: _____ days

GSTT Severe Respiratory Failure Service Phone: 02071882511

ABG:

pH: _____ PaO₂: _____ PaCO₂: _____ HCO₃: _____ BE: _____

SaO₂: _____ lactate: _____

PaO₂/FiO₂ ratio: _____ VE: _____ VE corr: _____

Chest Drains: Y/N R/L/both

Chest X-Ray:

ETT position mid trachea Y/N

Quadrants infiltrated:

Murray Score

Taking the score for each variable and dividing by 4.

Score values

PaO₂/FiO₂ (kPa): >40=0, 30-40=1, 23.3-29.9=2, 13.3-23.2=3, <13.3=4

CXR: normal=0, 1 point per quadrant infiltrated.

PEEP (cmH₂O): <5=0, 6-8=1, 9-11=2, 12-14=3, >15=4.

Compliance (ml/cmH₂O): >80=0, 60-79=1, 40-59=2, 20-39=3, and <19=4

Murray score:

PaO₂/FiO₂ _____

CXR _____

PEEP _____

Compliance _____

Total: _____

Murray Score: _____

Circulation:

HR: _____ Blood pressure: _____ / _____ Mean Arterial Pressure: _____
CVP: _____ ScvO₂: _____ Cardiac index: _____ EVLWI: _____ SVRI: _____
Inotrope/vasopressor 1: _____ @ _____ mcg/Kg/min
Inotrope/vasopressor 2: _____ @ _____ mcg/Kg/min
Inotrope/vasopressor 3: _____ @ _____ mcg/Kg/min
Inotrope/vasopressor 4: _____ @ _____ mcg/Kg/min

Cumulative net fluid balance:

Last 24 hours: _____

Length of stay: _____

Renal replacement therapy: Y/N

Any episode of cardiac arrest Y/N

Duration: _____ min

Demonstrated return of CNS function: Y/N

Neurology:

Sedation:

Paralysis: Y/N

RASS:

Intact Y/N/Not known

Intracranial haemorrhage Y/N

Description:

Infection:

Source:

Positive Cultures:

Positive Virology :

Antibiotics:

MRSA: Y/N

CDiff: Y/N

Norovirus: Y/N

TB: Y/N

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Investigations:

FBC: Hb: _____ WBC: _____ Plt: _____

Renal: Urea: _____ Creat: _____ Sodium: _____ Potassium: _____

LFT's: BR: _____ ALT: _____ ALP: _____ GGT: _____

COAG: INR: _____ APTTr: _____ AT: _____ Fibrinogen: _____

Echo report Y/N

Findings:

CT report: Y/N

Findings:

Bronchoscopy report: Y/N

Findings:

CT and CXR transferred

image exchange portal Y/N

CD to accompany transfer Y/N

Outcome:

Consultant contacted for advice:

Referral accepted: Y/N/advice only

Reason for refusal/advice given:

Follow-up needed: Y/N

Daily follow-up of advice only:

Clinical status at ICU discharge: alive/dead

Name of person completing form:

Position:

Please fax completed form to GSTT Severe Respiratory Failure Service: **Fax 02071883048**

GSTT Severe Respiratory Failure Service Phone: 02071882511

SEVERE RESPIRATORY FAILURE RETRIEVAL CHECKLIST *

Name

DOB

Referring Site

DEPARTURE ST THOMAS' ICU	
DATE	TIME
ICIP inc.transfer flowsheet created	<input type="checkbox"/>
Team introduce themselves by name and role	<input type="checkbox"/>
State procedure planned	<input type="checkbox"/>
Equipment available and checked	
Trolley	<input type="checkbox"/>
ECLS inc cannulae	<input type="checkbox"/>
Drug pouch	<input type="checkbox"/>
Transfer bag	<input type="checkbox"/>
Confirm destination by hospital name and postcode + route	<input type="checkbox"/>
Referrer aware of retrieval and ETA	<input type="checkbox"/>
IN AMBULANCE	
Oxygen supplies checked	<input type="checkbox"/>
Trolley plugged in and powered	<input type="checkbox"/>

REFERRING SITE	
ARRIVAL	DATE
	TIME
Trolley plugged in and powered	<input type="checkbox"/>
DEPARTURE	
	DATE
	TIME
Adequate infusions for journey	<input type="checkbox"/>
All notes and imaging present	<input type="checkbox"/>
Family aware of retrieval and GST destination	<input type="checkbox"/>
EW1 aware ETA and CT booked	<input type="checkbox"/>
IN AMBULANCE	
Oxygen swapped to ambulance supply	<input type="checkbox"/>
Trolley plugged in and powered	<input type="checkbox"/>

ADMISSION ST THOMAS' ICU	
DATE	TIME
CT performed if indicated	<input type="checkbox"/>
Handover to EW1 team	
Medical	<input type="checkbox"/>
Nursing	<input type="checkbox"/>
Perfusion	<input type="checkbox"/>
POST TRANSFER to be completed before end of shift	
Transfer data on ICIP inc SAEs	<input type="checkbox"/>
Email gepacsteam@gstt.nhs.uk with pt name + referring site for image link	<input type="checkbox"/>
Trolley / transfer bag restocked	<input type="checkbox"/>
Clamps to CSSD	<input type="checkbox"/>
Blood ordered	<input type="checkbox"/>
Technicians informed of equipment issues	<input type="checkbox"/>

* Tick boxes once step confirmed or N/A if not applicable

GSTT ECMO Retrieval Preparation Checklist for Referring Hospitals

ECMO is the oxygenation of blood by an artificial lung aided by a modified heart-lung machine. Two large cannulae are inserted to allow the blood to circulate extracorporeally. Cannulation takes up 60 minutes and is carried out in theatres under fluoroscopic guidance. After allowing two to three hours for stabilization patients are transported back to GSTT.

We would appreciate it if the following preparations could be made:

Patient Preparation

- Inform the patient's family of the retrieval by our team and preferably have them available to discuss assent
- Insert radial arterial line
- Leave central line in current position
- Have drawn up and attached to the patient your usual colloid, your usual strength infusions of noradrenaline, sedatives (preferably an opiate and a benzodiazepine) and neuromuscular blockers
- All notes/charts photocopied, all imaging on CD or transferred electronically to GSTT
- Please give 1.2g N-Acetylcysteine intravenously, for the contrast at cannulation, unless there are any contraindications

Organise operating theatres

- A free theatre with a scrub nurse available
- Radiolucent theatre table
- C-arm in theatre with fluoroscopy capability and radiographer
- Contrast for intravenous injection – at least 100mL
- Vascular ultrasound in theatre
- Two large empty surgical trolleys with drapes for sterile preparation of equipment
- One small empty surgical trolley
- Available anaesthetist

Current Investigations

- Full blood count, electrolytes, creatinine, liver function tests, lactate, CRP
- APTr, INR, fibrinogen, D-dimer, antithrombin (if possible)
- Chest x-ray, ECG, echocardiogram (if possible)
- Current microbiology

Blood Bank

- Crossmatch and have available 4 units packed red cells, regardless of Hb
- Crossmatch and have available platelets, ONLY if platelet count < 100
- Crossmatch and have available FFP, ONLY if INR or APTr > 1.5

The retrieval team will bring all equipment and medicines with them, except controlled drugs which you will need to provide – midazolam infusion 1mg/mL and fentanyl 50mcg/mL. The retrieval team will draw these up prior to transfer back to GSTT to avoid any syringe driver incompatibility.

Any problems or changes in patient condition, please contact GSTT ICU 02071882511

9) ECMO センターの成績

Guy's and St. Thomas' NHS Foundation Trust の ECMO センターの成績を示す。

UK SRF Centres

Nicholas Barrett
 Consultant in Critical Care
 Lead for Severe Respiratory Failure

Guy's and St Thomas' NHS
 KING'S HEALTH PARTNERS

CESAR

Time (days)	Conventional management	ECMO
0	90	90
50	45	64
100	44	58
150	34	58
200	0	0

Peek (2009) Lancet

ECMO H1N1 Australia 2009

Figure 1. Flow Diagram of Patients Receiving Mechanical Ventilation for Suspected 2009 Influenza A(H1N1) Infection at ECMO Centers

Group	Confirmed 2009 influenza A(H1N1) or influenza A not subtyped	Had suspected but unconfirmed influenza	Confirmed 2009 influenza A(H1N1) of influenza A not subtyped
ECMO	61	7	133
ECMO - Outcome	53 Confirmed 2009 influenza A(H1N1): 42 Alive, 4 Still in ICU, 11 Died	8 Confirmed influenza A not subtyped: 6 Alive, 1 Still in ICU, 2 Died	6 Alive, 1 Still in ICU, 1 Died
Non-ECMO	-	-	133
Non-ECMO - Outcome	-	-	116 Alive, 11 Still in ICU, 17 Died

JAMA, 2009

Daily UK ICU bed occupancy Influenza A H1N1 2009/11

196 ICU beds
 851 ICU beds

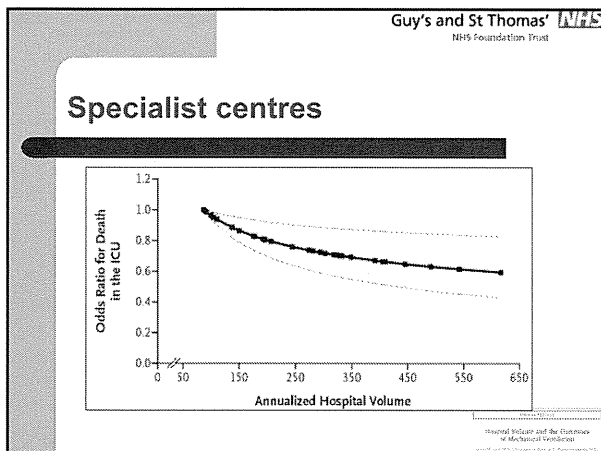
UK response

- Surge capacity
 - 5 centres
 - Central co-ordination of response
 - Ad hoc
 - Triage criteria discussed
 - Transport predominantly conventional

UK H1N1 SRF Centres Outcome

Time From Study Entry, d	ECMO-referred patients	Non-ECMO-referred patients
0	50	59
10	54	55
20	51	52
30	50	52
40	49	49
50	48	49
60	47	49
70	46	49
80	46	49
90	46	49

Noah, JAMA, 2011



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- ## Next steps
- Decision made for regional severe respiratory failure centres
 - Commissioning process
 - DOH roles
 - Hospital roles

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- ## Commissioning process
- Development of standards
 - Development of 3 stage process
 - Pre-qualification questionnaire
 - Tender document
 - Viva

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- ## Pre-qualification questionnaire
- Focus on institution
 - Size
 - Finances
 - Links to critical care networks
 - Limited focus on ECMO
 - Institutional ability to manage complex processes and pathway of care

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- ## Tender
- Focus on delivery of ECMO
 - Local staffing, training, equipment
 - Staff groups and MDT arrangements
 - Retrieval arrangements
 - Research arrangements
 - Finances

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- ## Viva
- Presentation to panel with professional, expert and lay members
 - Wide ranging from Trust to ECMO delivery
 - Question and answer session

Applicants

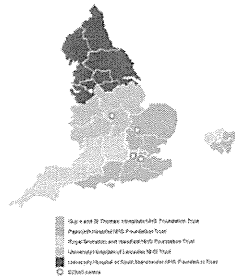
- PQQ > 30
- Tender 20
- Viva 12
- Final group selected 5

Regional SRF centres

- Novel model of care
- Financial support by NHS England
- Strict governance requirements
- National network
- Provide 24 hour assessment and retrieval
- Provide ECMO, including mobile ECMO

National Severe Respiratory Failure Service

- 5 centres
 - Wythenshawe
 - Leicester
 - Papworth
 - Brompton
 - GSTT



Network

- Manage each region independently
- Work together to provide cover for all of England at times of reduced capacity
- Consider triage/expansion as necessary
- Joint governance/audit arrangements

Governance arrangements

- Dedicated lead for severe respiratory failure
- Senior nurse and perfusionist involvement
- Local reporting within GSTT
- National reporting through UK commissioners
- National audit criteria with peer review
- International reporting to ELSO

National Audit Requirements

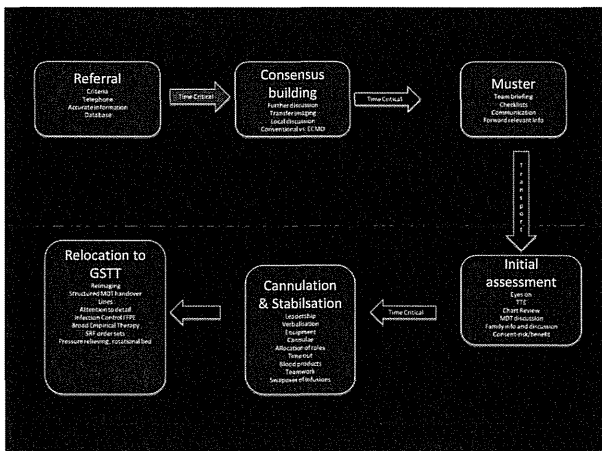
- Blood usage
- Survival (180 day)
- Tidal ventilation
- Quality of life measure
- SUI (circuit-related)
- Inability to admit
- Deaths referred for organ donation
- Ventilator care bundle

Regional responsibilities

- Educational role
- Audit
- Management of referrers
- Collaboration with referrers
- Information

National Indications for Referral

- Acute severe reversible respiratory failure
- Murray Score >3
- < 7 days ventilation
- No major life limiting co-morbidity
- No contraindication to anticoagulation



Referral

Criteria
Telephone
Accurate information
Database

GSTT Severe Respiratory Failure Regional Referral Guideline

Criteria for referral of patients with potentially reversible severe acute respiratory failure for consideration of retrieval and ECMO

Potentially reversible aetiology

Inability to achieve lung protective ventilation

- Vt > 8mL/kg ideal body weight
- Pplat > 30cmH2O

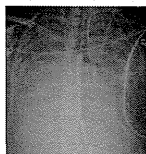
Refractory respiratory failure despite lung protective ventilation

- Hypoxaemia (PaO2/FiO2 < 13.3kPa)
- Hypercapnoea (pH < 7.2)
- Murray score of 3 or more

Bronchopleural fistula

7 days or less of

- FiO2 > 0.8
- Pplat > 30cmH2O



Contact GSTT ICU for advice or to discuss urgent, consultant retrieval for consideration of ECMO.

GSTT Intensive Care Unit 02071882511

Severe Respiratory Failure Referral

Date & Time of Referral: 16/04/2012 11:55:31 Monday 11:55 AM

Referring Hospital:

Hospital Postcode:

ITU Phone Number:

NHS Number:

Referring Consultant:

Patient's Firstname:

Patient's Surname:

Patient's Postcode:

Date of birth: dd/mm/yyyy

Age:

Gender: Male Female

Weight (kg):

Height (cm):

BMi:

BMi:

BGA (no):

Next of kin name of transfer:

Next of kin available in ICU for USIT Units to gain consent:

System Messages:

Severe Respiratory Failure Referral

Airway
 ET Tube: Tube Size (cm): Date of Intubation: dd/mm/yyyy

Ventilation
 Ventilation Mode:
 P/Fa (cmH₂O): PEEP (cmH₂O): Ramp Rate: P92 (%)
 VT (ml): Vt (ml/kg): Dynamic Compliance (ml/cmH₂O):
 Nitro-Oxide: PPR: Expiratory Position:

Duration P/Fa > 0.92: days
 Duration P/Fa > 10: days

ABG:
 pH: pO₂ (kPa): pCO₂ (kPa): HCO₃ (mmol/L):
 BE (mmol/L): SpO₂ (%): Lactate (mmol/L):
 PF Ratio: VE (l/min): Vt-Corrected SpO₂:

Chest
 Chest Drains: Location:

Chest X-Ray
 ETT position and function:
 Consolidation/atelectasis:

Murray Score
 PF Ratio Score: CUR Score: PEEP Score: Compliance Score:
 Total Score:

System Messages:

Last updated:

Severe Respiratory Failure Referral

Circulation
 HR: Mean Arterial Pressure (mmHg): Blood Pressure: / SvO₂:

If available:
 Cardiac Index (l/min/m²): EVLW: SVRE:

1. Inotrope/Vasopressor: Rate:
 2. Inotrope/Vasopressor: Rate:
 3. Inotrope/Vasopressor: Rate:
 4. Inotrope/Vasopressor: Rate:

Any episode of cardiac arrest: Duration (min):

Demonstrated return of CNS function:

Cumulative net fluid balance
 Last 24 hours:

Length of stay:

RRT:

System Messages:

Severe Respiratory Failure Referral

Neurology
 Sedated:
 Paralyzed:
 RASS Score:
 Delirium:
 Intracranial Pressure (mmHg):
 Disorientation:

Infection
 Antibiotics:
 Other Antibiotics:
 Source:

Positive Cultures

Positive Virology

PRISA:
GDPI:
Monitors:
W:

System Messages:

Severe Respiratory Failure Referral

Investigations
 Echo Report:
 Findings:

CT Report:
 Findings:

Bronchoscopy:
 Findings:

CT and CXR Transferred:

FBC:
 Hb (g/L): WBC (10⁹/L): Platelets (10⁹/L):

Renal
 Urea (mmol/L): Creatinine (umol/L): Sodium (mmol/L): Potassium (mmol/L):

LFTs
 Bilirubin (umol/L): ALT (u/l): ALP: GGT (u/l):

CD4s
 INR: APTT: Antithrombin (5g): Fibrinogen (g/dl):

System Messages:

Consensus building
 Further discussion with centre
 Transfer imaging
 Local discussion
 Conventional vs. ECMO

Retrieval
 Team briefing
 Checklists
 Communication
 Forward relevant info