POLICY POL230/5

Donor Lung Distribution and Allocation

This Policy replaces *POL230/4*	**Copy Number**
	Effective **06/02/2017**

Summary of Significant Changes

Separation of paediatric and small adult centre rotas so that small adults are offered to after paediatric patients.
All fast tracked lungs now allocated to the first accepting centre (previously, for fast track offers from the UK, the lung would be allocated to the centre placed highest on the rota if more than one centre wished to accept).

Policy

This policy has been created by the Cardiothoracic Advisory Group (CTAG) on behalf of NHSBT.

The policy has been considered and approved by the Transplant Policy Review Committee (TPRC), who act on behalf of the NHSBT Board, and who will be responsible for annual review of the guidance herein.

Last updated: January 2017
Approved by TPRC: July 2016

The aim of this document is to provide a guideline for the acceptance and allocation of donor lungs to adult and paediatric recipients on the UK transplant list. These criteria apply to all recipients of organs from deceased donors.

In the interests of equity and justice all centres should work to the same allocation criteria. Non-compliance to these guidelines will be handled directly by NHSBT, in accordance with: *POL198: NHS Blood and Transplant Organ Donation and Transplantation: Policy on Non-compliance with Selection and Allocation policies (http://www.odt.nhs.uk/pdf/non_compliance_with_selection_and_allocation_policies.pdf).*

It is acknowledged that these guidelines will require regular review and refreshment. Where they do not cover specific individual cases, mechanisms are in place for the allocation of organs in exceptional cases.

The guidance in this document describes how lungs donated by deceased donors are allocated.

1. Allocation Policy

1.1 Rational

The rationale of the allocation system is to provide a transparent allocation process for lungs from deceased donors, which balances the need to reduce mortality on the waiting list with the need to match donor lungs with recipients to provide the best outcome for all listed patients. NHSBT, in collaboration with CTAG and other stakeholders, is currently evaluating the impact of moving to a national allocation of lungs for some urgent patients.

1.2 Basis of Allocation

Lungs are allocated to the transplant centre in whose allocation zone the donor originates. The clinicians in that centre will select the most appropriate recipient from their active waiting list. Should the organ not be suitable for any local zonal recipients the organ is offered to the remaining transplant centres in sequence through the lung transplant centre rota.

1.3 Patient Criteria

Patients put forward by transplant centres and who meet the criteria for transplantation with organs from deceased donors must be registered with NHS Blood and Transplant. Selection criteria for lung transplantation are detailed in *POL231: Lung Candidate Selection Criteria (http://www.odt.nhs.uk/pdf/lung_selection_policy.pdf)*. The person requesting registration is accountable for the accuracy of the information provided. NHSBT will ensure that patients meet registration criteria and refer back those where the criteria are not met.

2. Donor Information

An adult lung donor is defined as a donor aged 16 years or over at the time of death. A paediatric donor is defined as a donor aged less than 16 years at the time of death. Contraindications to organ donation are reviewed regularly and revised as needed. *POL188: Clinical contraindications to approaching families for possible organ donation (http://www.odt.nhs.uk/pdf/contraindications_to_organ_donation.pdf)* includes lung specific contraindications. As with all guidelines, these should be used with clinical judgement.

3. Recipient Information

An adult recipient is defined as being a patient aged 16 years or above at the time of registration and will receive priority within the offering sequence for any organs available from an adult donor with the exception of 'Small Adults'. A Small Adult is defined as being a patient with a body weight of 40kg or less at the time of listing. Indication for Small Adult listing must be marked on the registration form. Paediatric recipients (patients aged less than 16 years) and Small Adults will receive priority within the offering sequence for any organs available from a paediatric donor. A paediatric patient who reaches their 16th birthday while on the waiting list will retain their paediatric status.

Transplantation is associated with risk. It is the responsibility of the surgeon to ensure that the potential transplant recipient understands and accepts the risks associated with organ transplantation as well as the benefits. Obtaining informed consent is a process which involves the whole multi-disciplinary team. NHSBT and the British Transplantation Society have provided advice on consent in *POL191: Guidelines for consent for solid organ transplantation in adults (http://www.odt.nhs.uk/pdf/guidelines_consent_for_solid_organ_transplantation_adults.pdf)*.

4. Allocation Zones

There are six licensed lung transplant centres in the UK: Harefield, Papworth, Birmingham, Newcastle, Manchester and Great Ormond Street, London. Newcastle transplant adult and paediatric recipients, and Great Ormond Street transplant paediatric recipients only. The remaining centres transplant adult patients only. Additionally, Newcastle offer lung transplant services to patients from Scotland as the transplant centre in Glasgow performs heart only transplants at present.

Lungs from deceased donors in the UK are allocated on a centre-basis. Each adult transplant centre has been assigned an allocation zone so potential adult donors in that zone will be offered first to that 'local' centre. Donors originating in Scotland are assigned to the Newcastle allocation zone. If the offer is declined, then the lungs will be offered to the other centres in rotation. The process is similar for paediatric donation and allocation except that centre rotation does not involve 'local' priority.

The risks and benefits of a zonal allocation-based approach compared with either regional or national allocation remains under close consideration. While a national allocation system may in some cases offer advantages in ensuring transparency and equity, a zonal allocation may alternatively offer benefits in terms of closer matching of donor and recipient to ensure better outcomes. NHS Blood and Transplant is working closely with clinicians and other stakeholders to review and develop the most appropriate allocation systems for the patients in UK. Allocation zones are being reviewed annually and arrangements made to ensure equity for patients by adjusting the allocation zone boundaries to reflect the need for transplantation in that zone.

5. Lung Offering Sequence

Group 1 and Group 2 recipients are defined in the Directions to NHS Blood and Transplant (*http://www.odt.nhs.uk/odt/regulation/NHSBT-directions-2005/).*

5.1 Adult Donor Lung Allocation Sequence

Offers of adult donor lungs will be made to centres in the following priority order for Group 1 recipients:

- The local zonal centre
- Great Ormond Street
- Remaining adult transplant centres in the UK, according to the Adult Lung Centre Rota (see Section 5.3)
- Organ Exchange Organisations in EU countries (including Republic of Ireland).

Offers will then be made to centres in the following priority order for Group 2 recipients:

- The local zonal centre
- Transplant centres in the UK, according to the Adult Lung Centre Rota
- Organ Exchange Organisations in EU countries (including Republic of Ireland)

5.2 Paediatric Donor Lung Allocation Sequence

All paediatric donor lungs in the UK will be offered first to paediatric recipients, followed by Small Adults, and then to adults in the following priority order for Group 1 recipients:

- Paediatric transplant centres according to the Paediatric Lung Centre Rota (see Section 5.4).
- Adult centres with Small Adults registered according to the Small Adult Centre Rota (see Section 5.5).
- The local zonal centre for adult patients.
- Remaining adult transplant centres in the UK according to the Adult Lung Centre Rota.
- Organ Exchange Organisations in EU countries (including Republic of Ireland).

Offers will then be made to centres in the same priority order for Group 2 recipients.

5.3 Adult Lung Centre Rota

The Adult Lung Centre Rota is calculated as follows;

- All adult centres (excluding the local zonal centre) are ordered in reverse-chronological order of last transplant date when organs (from an adult or paediatric donor) are accepted and used outside of their own allocation zone.
- If a centre accepts and uses an organ from within their own zone, it does not move position on the rota.
- As each centre carries out a transplant using an organ donated from within the UK and imported from another zone, it will be moved to the bottom of the rota.
- A centre transplanting an organ donated from outside the UK will retain its place and not be moved to the bottom of the rota.
- A centre importing a heart-lung block for transplant will be rotated to the bottom of both the Cardiac Centre Rota (*http://www.odt.nhs.uk/pdf/heart_allocation_policy.pdf*) and Lung Centre Rota. However, if the importing centre donated a domino heart in return for the heart-lung block, it will be rotated to the bottom of the Lung Centre Rota only, retaining its position on the Cardiac Centre Rota.

5.4 Paediatric Lung Centre Rota

The paediatric cardiac centre rota consists of the two paediatric transplant centres and is calculated as follows;

- Paediatric centres are ordered in reverse-chronological order of last transplant date when organs from an adult or paediatric donor are accepted and used.
- As each centre carries out a transplant using an organ donated from within the UK, it will be moved to the bottom of the rota.
- A centre transplanting an organ donated from outside the UK will retain its place and not be moved to the bottom of the rota.
- A centre accepting a heart-lung block for transplant will be rotated to the bottom of both the Cardiac Centre Rota (*http://www.odt.nhs.uk/pdf/heart_allocation_policy.pdf*) and Lung Centre Rota. However, if the transplanting centre donated a domino heart in return for the heart-lung block, it will be rotated to the bottom of the Lung Centre Rota only, retaining its position on the Cardiac Centre Rota.

5.5 Small Adult Rota

Offers of donor lungs to Small Adults are made on a centre basis. The order in which centres are prioritised is determined by the length of time each centre's longest waiting Small Adult has been waiting. The centre with the longest waiting Small Adult will feature at the top of the rota. If a centre has more than one Small Adult waiting, they are able to select which patient to transplant as this is a centre offer.

5.6 Allocation Within Centres

Organs are allocated on a centre basis. This allows the clinicians to select the most appropriate recipient within their centre, based on need, benefit and other clinical issues. Most centres will allocate the lungs to the patient with the greatest need, but other factors will also need to be considered to obtain optimal outcomes. Donor factors include age, smoking history, bilateral or single lung offer and graft quality; recipient factors include their respiratory diagnosis, age, height and blood group (which together influence the chance and speed of identifying matched donors) and expected cold ischaemia time. Discussions are necessary with all patients concerning varying risk associated with some donors. Patient preferences should be considered and appropriate consent must be obtained. There should be a documented audit trail so the surgeon can justify the decision.

5.7 Organs Unsuitable for Offering

If the retrieval team consider the lungs to be not suitable, the organs must be offered to two more cardiothoracic transplant centres (not including Great Ormond Street) before they are deemed untransplantable. Suggested criteria for non-retrieval are listed in **Appendix 1**. Suggested donor acceptance criteria are listed in **Appendix 2**.

6. Offering time

Offers will be made in accordance with the transplant centre rotation for offering donor lungs, on the basis of a firm offer to the first centre and a provisional offer to the second in line.

For all cases, centres to which a firm offer has been made must advise NHSBT within 45 minutes whether they wish to accept or decline the offer. If the organ is declined, it will be offered to the second in line as a firm offer and to the third in line as a provisional offer, and so on throughout the rotational sequence.

For firm offers made to a centre previously advised provisionally, NHSBT must be advised within 30 minutes whether they wish to accept or decline the firm offer. If an offer is accepted by the first centre outside of the agreed time and the offer has already been accepted by the second centre, the donor lung(s) will be automatically allocated to the second centre.

Only once all centres have declined a donor for a Group 1 recipient will Group 2 recipient requirements be considered.

A centre to which an offer has been made will retain its place on the centre rota while a decision is pending. A centre declining an offer will retain its place on the rota.

7. Fast Track Offer Scheme

The Fast Track Offer Scheme is initiated in two scenarios:

1. When lungs are available to allocate at short notice from within the UK, i.e. lungs that are:
    - Unallocated but are due to be removed within 90 minutes (ie cross clamp/withdrawal of treatment planned) or
    - Unallocated but already removed or in the process of removal.
2. When lungs are available from Europe.

Transplant centres may register with the ODT Duty Office to receive offers through the Fast Track Offer Scheme.

The scheme operates as follows:

- Offers of lungs meeting the Fast Track offer scheme criteria will be made only to centres registered in the scheme.
- Offers will be made by the ODT Duty Office by either simultaneous facsimile transmission or text message to pager/mobile phone of donor information.
- Centres must respond by telephone to a Fast Track offer within 45 minutes of the offer if they wish to accept. The ODT Duty Office will not follow-up those centres that do not respond within this time.
- Lungs will be allocated to the first accepting centre. Centres not responding will be deemed to have declined the offer.
- Group 1 patients will be allocated organs before Group 2 patients. Centres accepting for Group 2 patients must wait until the 45 minutes have lapsed to ensure no centre is accepting for a Group 1 patient.

8. Allocation Policies for Multiple Organs

8.1 Heart-Lung Block

Heart-lung blocks are offered using the heart offering sequence (*http://www.odt.nhs.uk/pdf/heart_allocation_policy.pdf*). The heart (only) of all heart-lung blocks is offered to all the urgent heart patients first. If not accepted by any urgent heart patients, the heart-lung block is offered according to the non-urgent heart offering sequence, starting with the zonal centre.

If an urgent heart patient also requires lungs, the centre must inform the Duty Office at the time of offering. In such cases, the Duty Office will inform the requesting centre of all the centres above them on the lung rota and the decision as to whether the urgent heart patient may take the lungs must be determined between these centres.

A centre can:

1. accept the heart-lung block for one recipient

2. accept the heart-lung block and split it for 2 or 3 recipients

3. accept the heart and one lung – the remaining single lung is offered according to the lung offering sequence

4. accept the heart only - the remaining 2 lungs are offered according to the lung offering sequence

5. accept both lungs only - the heart is offered according to the heart offering sequence (*http://www.odt.nhs.uk/pdf/heart_allocation_policy.pdf*)

6. accept one lung only - the heart is offered according to the heart offering sequence (*http://www.odt.nhs.uk/pdf/heart_allocation_policy.pdf*) and the remaining single lung is offered according to the lung offering sequence.

7. In the case of a Scottish donor heart-lung block:
   a) If the donor heart is not accepted for any patient registered on the UHAS, the heart should be offered to Glasgow and lungs to Newcastle as the respective zonal centres.
   b) If the heart is not accepted by Glasgow and the lungs are not accepted by Newcastle, the heart-lung block is offered according to the non-urgent heart offering sequence.

8.2 Kidney and Lung

A kidney can be accepted with a cardiothoracic organ and has primacy over any kidney allocation scheme. The acceptance of a kidney with a cardiothoracic organ must be made in the original 45 minute offering time.

APPENDIX 1

Suggested Criteria for Non-Retrieval of Lungs

A decision not to proceed with offering would be based on a documented PaO_2 <25kPa (187 mmHg) on FiO_2 1.0 and PEEP 5cmH_2O provided that:

- Endotracheal tube malposition had been excluded by chest x-ray (CXR) or bronchoscopy.
- Rigorous attempts had been made to recruit atelectatic segments by ventilator adjustment and physiotherapy.
- There are bilateral pathological changes on CXR.
- A clear cause for hypoxaemia has been established e.g. bilateral pulmonary contusion or other trauma, documented aspiration, CXR evidence of major pulmonary consolidation.
- In the presence of PaO2 <25kPa on FiO2 1.0 and PEEP 5cm.H_2O and unilateral CXR changes only, the possibility of single lung transplantation should be considered (pulmonary venous sampling during attempted organ retrieval is recommended).

APPENDIX 2

Suggested Donor Lung Acceptance Criteria

These are at the discretion of the recipient centre and should be in line with previously documented patient wishes

- Age up to 70 years.
- No or minimal chest trauma.
  - Pneumothorax and/or a chest drain are not a contraindication.
  - No previous chest surgery on the retrieval side.
- Ventilated less than 10 days.
  - Tracheostomies are acceptable.
- Normal CXR appearance reported on retrieval day.
  - Normal cardiac silhouette, normal lung fields.
  - Normal cardiothoracic ratio (i.e. less than 50% on standard CXR).
  - Borderline gases with a unilateral abnormality on CXR may mask a usable contralateral lung.
- No evidence of respiratory infection as demonstrated on CXR or the presence of purulent sputum and confirmed pathogens.
  - Purulent secretions do not necessarily rule out lung donation. Multiple organisms on gram stain may indicate normal flora and are unlikely to lead to infection. No donor should be rejected based on history of purulent sputum without bronchoscopic evidence of infection (i.e. infected mucosa).
  - Heavy fungal contamination of the bronchial tree may exclude donation. Candida infection should be treated with an azole.
- No systemic sepsis (i.e. white cell count >20,000/mL or pyrexia > 38^0C of unknown origin).
- Acceptable arterial blood gases (ABG):
  - On FiO_2 100%, $PaO_2 \geq 35$ kPa and on
  - FiO_2 of 40%, $PaO_2 \geq 14$ kPa
  - PO_2 (kPa) should preferably be 35 x FiO_2
  - PO_2 of 25 x FiO_2 may be considered at the discretion of the senior implanting surgeon.
- Normal ventilatory parameters with normal compliance.
  - The addition of 8 cmH_2O of positive end-expiratory pressure (PEEP) is recommended.
- Mild asthma is acceptable (but may be transmitted).
- Current pulmonary oedema if associated with CXR changes and borderline ABG excludes donation. May consider if treated and resolved. Fluid overload should be avoided.
- No evidence of aspiration. The presence of a positive history, poor gases and abnormal CXR and bronchoscopic findings suggesting aspiration will preclude donation. In cases of history suggesting inhalation, donors should have abnormal bronchoscopy before being turned down.
- CMV mismatches are acceptable unless specified in high risk recipients
- Carbon monoxide poisoning is acceptable with caution as long as there is no smoke inhalation.
- Smoking history should not be the sole reason for refusal of a well-functioning organ. Acceptable up to 30 pack years (i.e. 1 pack per day for 30 years). If greater than this, other factors should be considered in conjunction with smoking history as reasons for refusal.

Donor heart-lung acceptance criteria
In addition to the above, heart acceptance criteria should apply. These are covered within *Heart Transplantation: Organ Allocation (http://www.odt.nhs.uk/pdf/heart_allocation_policy.pdf).*