

*This Policy replaces
POL228/5*

Copy Number

Effective **17/05/17**

Summary of Significant Changes

Changes to Heart-Lung Block Allocation (Section 10) in light of introduction of Super-Urgent and Urgent Lung Allocation Schemes
Clarification around Fast Track Offering Scheme (Section 12)

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), which acts on behalf of the NHSBT Board, and which will be responsible for annual review of the guidance herein.

Last updated: April 2017

Approved by TPRC: April 2017

The aim of this document is to provide a policy for the allocation and acceptance of donated hearts to adult and paediatric recipients on the UK national transplant list. These criteria apply to all proposed recipients of organs from deceased donors.

In the interests of equity and justice all centres should work to the same allocation criteria. Non-compliance with 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 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 that ensure equity and fairness.

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

1. Policy Overview

1.1 Rationale

The rationale for this policy is the need to balance the importance of optimising outcomes for patients by selecting the most appropriate recipient for the heart, with the need to give priority to the sickest candidate (while ensuring risk of transplantation is within acceptable limits (estimated >50% chance of survival within 1 year)).

1.2 Basis of Allocation

There are three tiers of allocation: the Super-Urgent Heart Allocation Scheme (SUHAS), the Urgent Heart Allocation Scheme (UHAS) and the Non-Urgent Heart Allocation Scheme (NUHAS).

Heart Transplantation: Organ Allocation

Selection criteria for these three schemes are documented in the *NHS Blood and Transplant Heart Transplantation: Selection Criteria and Recipient Registration*.

http://www.odt.nhs.uk/pdf/heart_selection_policy.pdf

Hearts are allocated to individual named patients on a national basis for those on the super-urgent and urgent lists. For patients on the non-urgent list, hearts are allocated on a centre basis for local allocation.

1.3 Patient Criteria

Patients meeting criteria for transplantation with organs from deceased donors must be registered with NHS Blood and Transplant. Selection criteria for heart transplantation are detailed in the *NHS Blood and Transplant Heart Candidate Selection Policy* [POL229](#). 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.

1.4 Transplant Centres

There are seven licensed heart transplant centres in the UK: Birmingham, Great Ormond Street Hospital, Glasgow, Harefield, Manchester, Newcastle and Papworth. Newcastle transplant adult and paediatric patients, and Great Ormond Street transplant paediatric patients only. The remaining centres transplant adult patients only.

2. Donor Information

An adult heart donor is defined as being a patient aged 16 years or above at the time of death. A paediatric heart donor is defined as being a patient aged less than 16 years at the time of death. Contraindications to organ donation are reviewed regularly and revised as needed.

http://www.odt.nhs.uk/pdf/contraindications_to_organ_donation.pdf *Clinical contraindications to approaching families for possible organ donation* includes heart specific contraindications. As with all guidelines, these should be used with clinical judgement.

3. Recipient Information

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 given advice on consent in http://www.odt.nhs.uk/pdf/guidelines_consent_for_solid_organ_transplantation_adults.pdf *Guidelines for consent for solid organ transplantation in adults*.

3.1 Adult Patients

An adult patient is defined as being a patient aged 16 years or above at the time of registration.

3.2 Paediatric Patients

A paediatric patient is defined as being a patient aged less than 16 years at the time of registration. A paediatric patient who reaches their 16th birthday while on the waiting list will retain their paediatric status.

3.3 Small Adult Patients

A Small Adult is defined as being a patient with a body weight of 30 kg or less at the time of listing. Paediatric patients and Small Adults will generally receive offers for hearts available from a paediatric donor before adult patients.

Heart Transplantation: Organ Allocation

A centre may request, through the Cardiothoracic Advisory Group (CTAG) Adjudication Panel, registration of a Small Adult, weighing between 30 kg and 40 kg, when there are specific reasons to justify inclusion in this priority group (such as excess fluid retention which may not reflect lean body mass). In such cases, indication for Small Adult listing should be marked on the registration form.

3.4 Patient Categories

There are three patient categories for which a patient can be registered. Table 1 indicates which patient category (Paediatric, Small Adult or Adult) a patient is classed in depending upon the registered status of the patient (i.e. by age and whether they are registered as a Small Adult) and which type of centre they are registered at. The type of centre is important because generally a 15 year old patient, for example, registered at an adult centre will, by definition, be of adult size and hence require adult sized organs, whereas generally a 15 year old patient at a paediatric centre will require specialist paediatric treatment and hence paediatric sized organs. A patient will only have one classification and cannot be 'dual listed' to receive offers as part of more than one scheme.

Status of patient	Adult Centre (Harefield, Papworth, Birmingham, Manchester, Glasgow)	Adult & Paediatric Centre (Newcastle*)	Paediatric Centre (GOSH)
Aged under 16	Adult	Paediatric	Paediatric
Aged 16 or above (not Small Adult)	Adult	Adult	Paediatric
Small Adult Aged 16 or above and weight ≤30kg or Aged 16 or above, weight between 30-40kg and agreed by Adjudication Panel	Small Adult	Small Adult	Paediatric

* Newcastle is counted as both an adult centre and a paediatric centre in this document.

4. Allocation Zones

In many aspects of the heart offering sequence (Section 5), 'zonal centre' priority is given to the patients at a centre when the donor is located within the centre's allocation zone. Each transplant centre has been assigned an allocation zone, with the exception of Great Ormond Street. This means that every donating hospital is assigned to one of the transplant centre allocation zones, based on geography and donor density. Allocation zones are reviewed annually by CTAG and arrangements made to ensure equity for patients by adjusting the allocation zone boundaries to reflect the demand for transplantation at each centre.

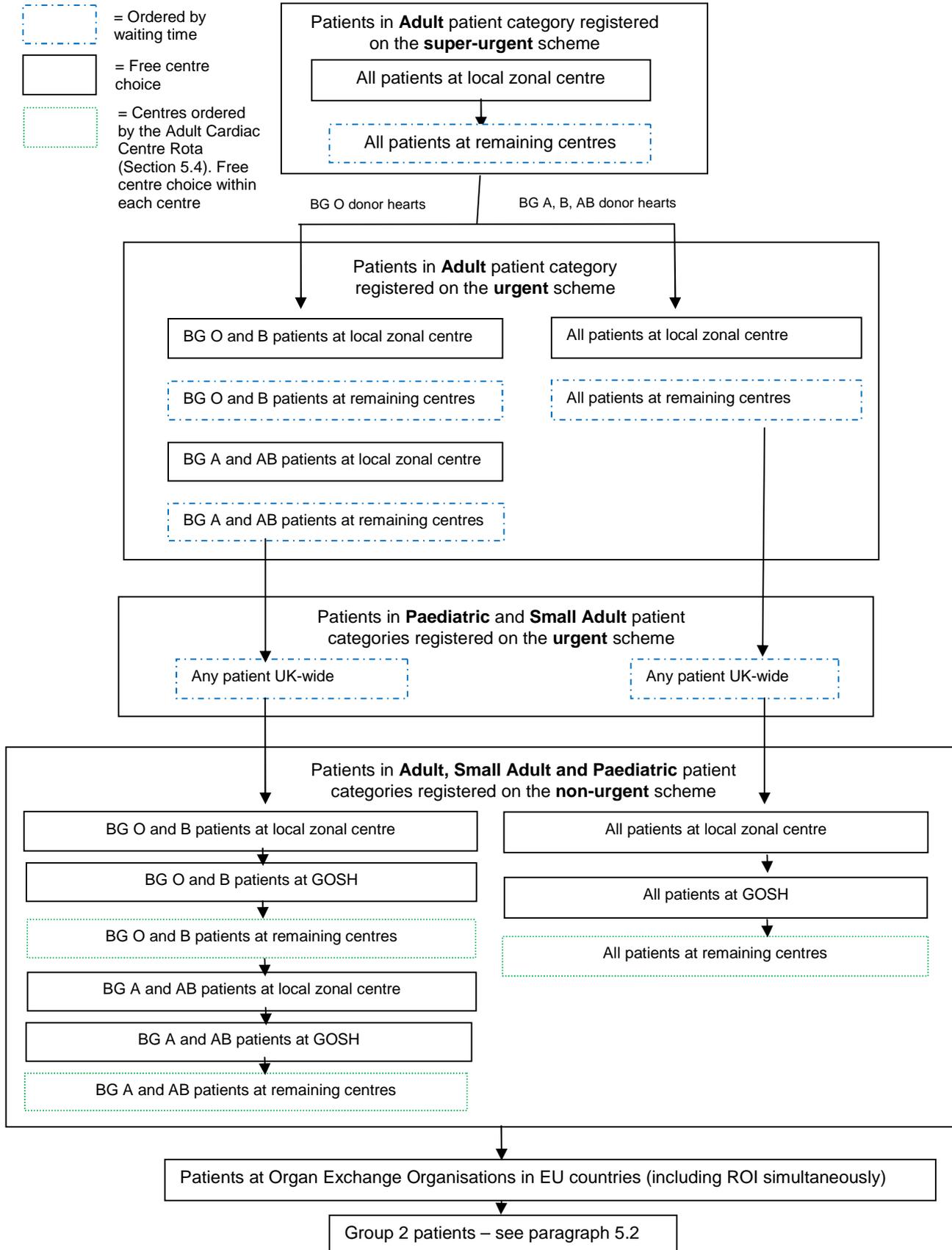
5. Heart Offering Sequence

5.1 Group 1 Patients

Offers are made to centres in the priority order indicated in Figure 1 for an adult donor and Figure 2 for a paediatric donor. Both diagrams describe the offering sequence for Group 1 patients only; the final step in the offering sequence is to offer to Group 2 patients (as described in Section 5.2). Group 1 and Group 2 patients are defined in the Directions of NHS Blood and Transplant and reflect NHS entitlement (<http://www.odt.nhs.uk/odt/regulation/NHSBT-directions-2005/>).

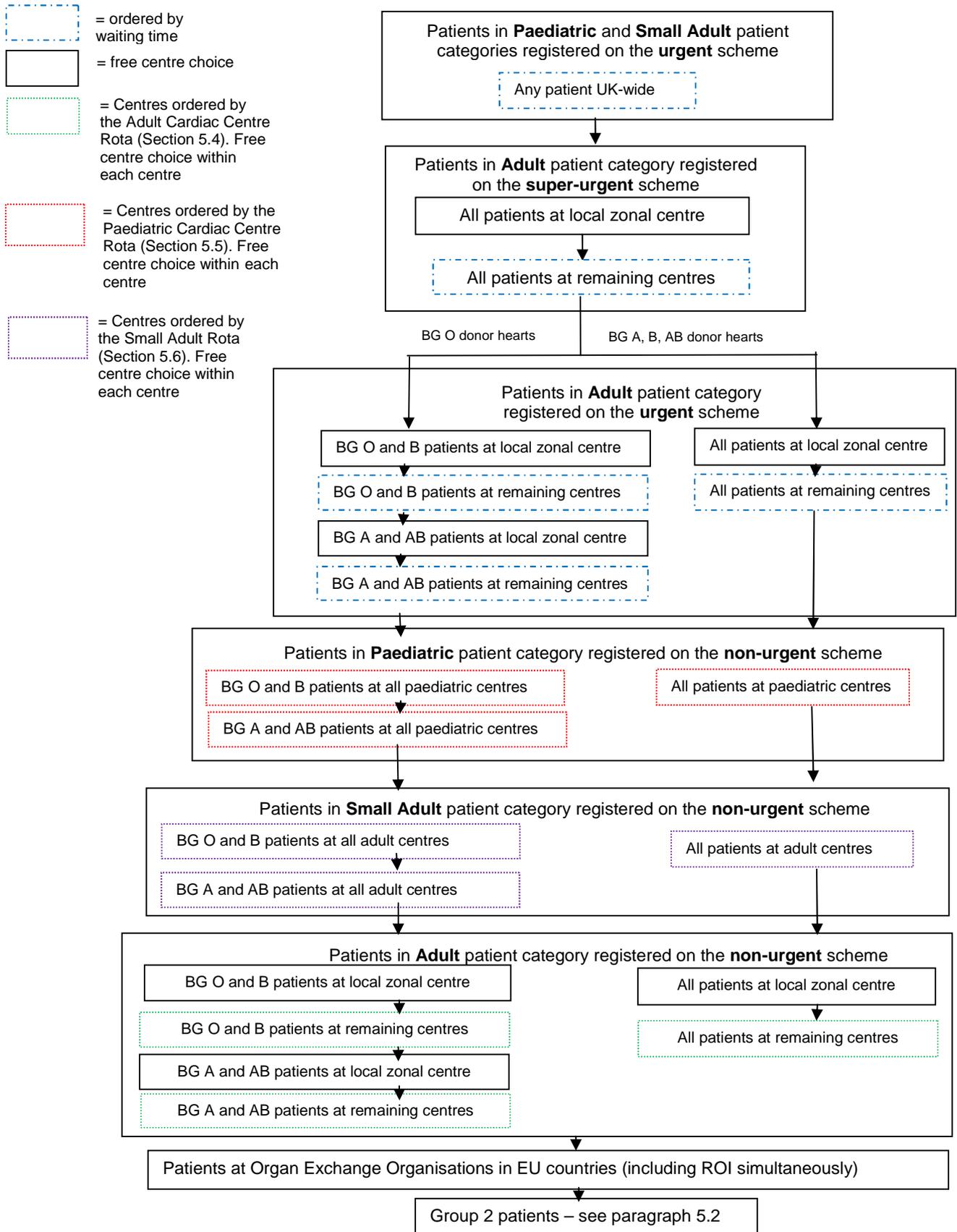
Heart Transplantation: Organ Allocation

Figure 1 Allocation for an adult donor heart (donor ≥ 16 years)



Heart Transplantation: Organ Allocation

Figure 2 Allocation for a paediatric donor heart (donor < 16 years)



Heart Transplantation: Organ Allocation

5.2 Group 2 Patients

Offers of adult donor hearts to Group 2 patients are made to centres in the following priority order:

1. The local zonal transplant centre
2. All other transplant centres in the UK, according to the Adult Cardiac Centre Rota (see Section 5.4)
3. Organ Exchange Organisations in EU countries

Offers of paediatric donor hearts to Group 2 patients are made to centres in the following priority order:

1. Transplant centres in the UK with a paediatric, according to the Paediatric Cardiac Centre Rota (see Section 5.5).
2. Transplant centres in the UK with a Small Adult registered, according to the Small Adult Rota (see Section 5.6).
3. The local zonal transplant centre for adult patients
4. Centres in the UK for adult patients, according to the Adult Cardiac Centre Rota (see Section 5.4)
5. Organ Exchange Organisations in EU countries

5.3 Donor-Recipient Blood Group Prioritisation

CTAG acknowledge that blood group O and B patients waiting for a heart transplant are disadvantaged in that they often compete against a greater number of patients for an organ, compared with blood group A and AB registered patients. The main reason for this is due to blood group compatibility, as shown in Table 2. For this reason, in many aspects of the UHAS and the NUHAS offering sequence, patients are prioritised differently depending on the blood group of the donor.

Table 2: Donor-Recipient blood group compatibility

Donor	Recipient			
	O	A	B	AB
O	C	C	C	C
A	-	C	-	C
B	-	-	C	C
AB	-	-	-	C

C= Compatible

5.4 Adult Cardiac Centre Rota

After a donor heart is offered to the local zonal centre for non-urgent patients in the Adult category (see Table 1) and subsequently after an offer is made to GOSH in the case of adult donor hearts, offers are made on a centre basis. The order in which centres are prioritised follow the Adult Cardiac Centre Rota, as follows:

- All adult centres are ordered in reverse-chronological order of last transplant date for non-urgent Adult patients 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 for non-urgent Adult patients using an organ donated from within the UK and imported from another zone, it will be moved to the bottom of the rota.

Heart Transplantation: Organ Allocation

- 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 into a non-urgent Adult patient will be rotated to the bottom of both the Adult Cardiac Centre Rota and the Adult Lung Centre Rota (see http://www.odt.nhs.uk/pdf/lung_allocation_policy.pdf: Donor Lung Distribution and Allocation policy).

5.5 Paediatric Cardiac Centre Rota

Offers of donor hearts to non-urgent patients in the Paediatric category (see Table 1) are made on a centre basis. The order in which centres are prioritised follows the Paediatric Cardiac Centre Rota, which consists of the two paediatric transplant centres and is calculated as follows:

- Paediatric centres are ordered in reverse-chronological order of last transplant date for non-urgent Paediatric patients when organs (from an adult or paediatric donor) are accepted and used.
- As each centre carries out a transplant for a non-urgent Paediatric patient 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 importing a heart-lung block for transplant into a non-urgent Paediatric patient will be rotated to the bottom of both the Paediatric Cardiac Centre Rota and the Paediatric Lung Centre Rota (see http://www.odt.nhs.uk/pdf/lung_allocation_policy.pdf: Donor Lung Distribution and Allocation policy).

5.6 Small Adult Rota

Offers of donor hearts to non-urgent patients in the Small Adult category (see Table 1) 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.

6. Super-Urgent Heart Allocation Scheme

The Super-Urgent Heart Allocation Scheme (SUHAS) is available for patients in the Adult category only (see Table 1).

- An offer is made firstly to the local zonal centre whereby the centre selects a suitable recipient from all those registered on the SUHAS at their centre.
- Allowing zonal centre priority means that a centre with a local donor may retain the heart for a super-urgent patient of any blood group even if another similar patient is waiting elsewhere; this will minimise cold ischaemia time and improve the outcome for the patient.
- If the zonal centre declines, offers are then made for each remaining patient on the national SUHAS waiting list in the order of their time spent waiting on the super-urgent list for this registration.
- Offers are not made to adult patients who are blood group incompatible with the donor. When a patient is registered, indication can be made to request only blood group identical or both identical and compatible donor heart offers.
- In addition, patients on the SUHAS can be registered with a maximum and minimum donor height and weight they are willing to accept, at the time of registration. These patients will subsequently not receive offers of donor hearts from donors that fall outside of these specified criteria.
- If a patient is suspended from the super-urgent list for more than 14 days their waiting time will be reset when/if reactivated and a new registration form will be required.

7. Urgent Heart Allocation Scheme

The Urgent Heart Allocation Scheme (UHAS) is available for all patient categories and the offering process differs depending on whether the donor is adult (Figure 1 and Section 7.1) or paediatric (Figure 2 and Section 7.2).

- Offers are not made to adult patients (≥ 16 years) who are blood group incompatible with the donor.
- When a patient is registered, indication can be made to request donor heart offers from 1) blood group identical donors only, 2) identical and compatible donors or 3) donors of any blood group (option available to paediatric patients only).
- Patients on the UHAS can be registered with a maximum and minimum donor height and weight they are willing to accept, at the time of registration. These patients will subsequently not receive offers of donor hearts from donors that fall outside of these specified criteria.
- A patient that has moved from the SUHAS to the UHAS will retain their waiting time spent on the SUHAS which will be added on to their UHAS waiting time.
- Patients moving from the UHAS to the SUHAS will not retain any waiting time from their urgent registration.
- If a patient is suspended from the urgent list for more than 14 days their waiting time will be reset when/if reactivated and a new registration form will be required.

7.1 Adult Donor Hearts

Adult donor hearts are offered to all patients in the UHAS adult patient category before being offered to patients in the UHAS paediatric and Small Adult patient categories (Figure 1). Urgent heart patients in the adult patient category are ranked by 1) blood group, 2) local zonal/non-zonal centre and 3) length of time spent waiting on the UHAS for this registration. If offers for all patients in the SUHAS and UHAS adult patient category are declined, the donor heart is then offered to all UHAS patients in the paediatric and Small Adult patient category. These patients are ordered by time spent waiting on the UHAS for the current registration. There is no blood group priority and patients in the Small Adult patient category rank alongside those in the paediatric group.

7.2 Paediatric Donor Hearts

Paediatric donor hearts are offered to all patients in the UHAS paediatric and Small Adult patient categories before being offered to patients in the SUHAS adult patient category and the UHAS adult patient category (Figure 2). UHAS patients in the paediatric and Small Adult patient category are ordered by time spent waiting on the UHAS this registration. There is no blood group priority and patients in the Small Adult patient category rank alongside those in the paediatric group. Urgent heart patients in the adult patient category are subsequently offered and are ranked by 1) blood group, 2) local zonal/non-zonal centre and 3) length of time spent waiting on the UHAS this registration.

8. Non-Urgent Heart Allocation Scheme

The Non-Urgent Heart Allocation Scheme (NUHAS) is available for all patient categories and the offering process differs depending on whether the donor is adult (Figure 1 and Section 8.1) or paediatric (Figure 2 and Section 8.2). 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.

8.1 Adult Donor Hearts

Heart Transplantation: Organ Allocation

- The order in which transplant centres are offered donor hearts is as follows, repeating this offering sequence twice for blood group O donors in order to ensure that all blood group O and B patients are offered before A and AB patients:
 - The local zonal centre
 - Great Ormond Street
 - Remaining adult centres ordered by the **Adult Cardiac Centre Rota** (Section 5.4), excluding the local zonal centre
- When an offer is made to Newcastle through either a zonal offer, or through the Cardiac Centre Rota offering, the centre must consider patients registered in all patient categories (Adult, Small Adult and Paediatric).

8.2 Paediatric Donor Hearts

- Offers are first made to patients in the Paediatric category according to the Paediatric Cardiac Centre Rota (Section 5.5), offering first to blood group O and B patients if the donor is blood group O.
- Offers are then made to patients in the Small Adult category according to the Small Adult Rota (Section 5.6), again offering first to blood group O and B patients if the donor is blood group O.
- If no non-urgent patients in the Paediatric or Small Adult patient categories accept the donor heart, the organ is then offered to non-urgent patients in the Adult patient category on a centre basis. The order in which transplant centres are offered donor hearts is as follows, repeating this offering sequence twice for blood group O donors in order to ensure that all blood group O and B patients are offered before A and AB patients:
 - The local zonal centre
 - Great Ormond Street
 - Remaining adult centres ordered by the Adult Cardiac Centre Rota (Section 5.4), excluding the local zonal centre.

9. Allocation of Donor Organs Within-Centre

For zonal super-urgent offers, zonal urgent offers and centre-based non-urgent offers, the centre is able to select a suitable recipient from all those listed in the relevant patient category. Selection of recipients within a centre must be done in a transparent and equitable manner with clear lines of accountability for the decision. There should be a documented audit trail so the surgeon can justify the decision.

Factors to be considered when allocating hearts within a centre include:

9.1 Prospective Cross-Match

Prospective lymphocyte cross-matching may be indicated for certain (sensitised) patients and should be discussed with the recipient Histocompatibility laboratory where practicable and clinically appropriate.

9.2 Size

This is important for intra-thoracic transplantation as the power output of the transplanted heart has to match the recipient. Small female donor hearts will not necessarily have the power for average sized male recipients.

9.3 Logistics

Given the consideration of ischaemic time and occasional short notice of organ availability, the logistics of recipient transplantation may come into play in the choice of potential recipient.

Heart Transplantation: Organ Allocation

9.4 Physiology

Physiology is particularly important with reference to the pulmonary vascular resistance or the pressure drop across the lungs, which might be important in placing marginal donor organs.

10. Heart-Lung Block Allocation

10.1 Non-Urgent Heart-Lung Allocation Scheme

A non-urgent heart patient who requires a heart-lung block can register on to the Non-Urgent Heart-Lung Allocation Scheme (NUHLAS) by specifying that they also require lungs, in keeping with the criteria for the NUHAS. If the heart has not been accepted by any patient on the SUHAS or UHAS and the lungs have not been accepted for any patient on the Super-Urgent Lung Allocation Scheme or the Urgent Lung Allocation Scheme (see http://www.odt.nhs.uk/pdf/lung_allocation_policy.pdf: Donor Lung Distribution and Allocation policy), the heart-lung block is offered according to the Non-Urgent Heart Offering Scheme (Section 8). A centre can either accept the heart-lung block for one recipient or accept the heart for one recipient. If the heart-lung block is not accepted for one recipient, the lungs must be offered according to the Non-Urgent Lung Allocation Scheme (see http://www.odt.nhs.uk/pdf/lung_allocation_policy.pdf: Donor Lung Distribution and Allocation policy).

10.2 Urgent Heart-Lung Allocation Scheme

If an urgent heart patient also requires lungs, the centre must write to the CTAG Adjudication Panel for approval. If approved, the centre must inform the ODT Duty Office at the time of registration and again at time of offering. Urgent heart-lung patients rank amongst urgent heart patients and priority is given to urgent heart-lung patients before urgent lung patients, but after super-urgent lung patients (see http://www.odt.nhs.uk/pdf/lung_selection_policy.pdf: Lung Candidate Selection Criteria). If the lungs have been accepted by a centre for an urgent lung patient but another centre requires the lungs for an urgent heart-lung patient, the offer will be withdrawn from the first centre and the lungs will be re-allocated to the centre with the urgent heart-lung patient.

11. Offering Process

- Offers will be made in accordance with the cardiothoracic centre rotas for offering donor hearts, 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 the ODT Duty Office 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 heart allocation sequence.
- 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 heart will be automatically allocated to the second centre. For firm offers made to a centre previously advised provisionally, the ODT Duty Office must be advised within 30 minutes whether they wish to accept or decline the firm offer.
- A centre to which an offer has been made will retain its place on the heart allocation sequence while a decision is pending, although the ODT Duty Office will use discretion in offering a second time to centres which are currently considering an offer. If the centre chooses to decline the offer of an organ, it will retain its place in the centre rota.
- The centre should maintain contact with the local donor procurement coordinator during the offering sequence and the retrieval surgeon is empowered to abort the offering sequence on the basis of increasing donor instability that is likely to jeopardise other solid organ retrieval.
 - Wherever possible echocardiography and invasive monitoring (including cardiac output studies) should be utilised to endorse this decision.

12. Fast Track Offer Scheme

The Fast Track Offer Scheme is initiated in two scenarios:

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Heart Transplantation: Organ Allocation

1. When a heart is available at short notice from a UK donor, i.e.:
 - aortic cross-clamp is expected within 90 minutes of the referral to NHSBT, or
 - the heart has already been removed or is in the process of removal.
2. When a heart is available from Europe.

The scheme operates as follows:

- Offers of hearts meeting the Fast Track offer scheme criteria will be made to all centres simultaneously.
- Offers will be made by the ODT Duty Office by either simultaneous text message to pager/mobile phone or facsimile transmission of donor information.
- Centres must respond by telephone to a Fast Track offer to the ODT Duty Office 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. Centres not responding will be deemed to have declined the offer.
- Hearts will be allocated to the first accepting centre and may be for a super-urgent, urgent or non-urgent patient. However, if more than one centre wishes to accept the Fast Track Offer, negotiation can be made between centres.
- 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.

13. Acceptance of Allocated Organs

It is the responsibility of the recipient surgeon to decide whether to accept an organ and this decision will depend on both donor and recipient factors. Organs from all donors will carry some degree of risk and the risks associated with transplantation must be balanced against the benefits of transplantation and the risks of awaiting a further offer. The recipient is entitled to decline organs from donors with particular characteristics and these wishes should be respected.