

**NHS BLOOD AND TRANSPLANT**

**CARDIOTHORACIC ADVISORY GROUP - LUNG**

**REVIEW OF ALLOCATION ZONES**

**SUMMARY**

**INTRODUCTION**

- 1 Allocation zones are reviewed annually by CTAG and arrangements are made to ensure equity for patients by adjusting the allocation zone boundaries to reflect the demand for transplantation at each centre. The lung allocation zones were last adjusted in June 2022.
- 2 This report provides up to date figures on each centre's percentage share of registrations onto the national lung transplant list and each centre's percentage share of lung donors that arose in their zone. The time periods analysed are 1 March 2022 to 29 February 2024 for registrations, and 1 March 2021 to 29 February 2024 for donors.

**RESULTS**

**Comparison of registrations and donors**

- 3 When comparing the proportion of lung registrations made by each centre with the proportion of lung donors in each of the current lung allocation zones, there were significantly more registrations than donors at Birmingham and significantly more donors than registrations at Newcastle. Therefore, there is evidence that the zones should be changed.

**Donor activity**

- 4 The utilisation rate (transplanted out of offered) of DBD lungs was similar across zones in the time period, but slightly higher for donors in Manchester's zone. The national utilisation rates were 19% and 11%, for DBD and DCD donor lungs respectively.

**Transplant activity**

- 5 Whereas zonal allocation is prioritised in all sections of the heart allocation scheme (super-urgent, urgent and non-urgent), for lung, zonal allocation is only considered in the non-urgent scheme. Overall, more transplants are performed from non-zonal donors than zonal donors (63% vs 37%).

**CONCLUSION**

- 6 There was a significant difference observed in the percentage share of lung registrations and donors at Birmingham and Newcastle, therefore changes will need to be made to the lung zonal boundaries.

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**REVIEW OF ALLOCATION ZONES**

**BACKGROUND**

- 1 After the national super-urgent and urgent lung allocation tiers, donor lungs are offered to non-urgent patients via a centre offer where priority is given to the 'zonal centre'. Each centre is assigned an allocation zone, with the exception of Great Ormond Street, which comprises a list of donor hospitals based on geography, donor density and registration activity. Allocation zones are reviewed annually by CTAG and arrangements are made to ensure equity for patients by adjusting the allocation zone boundaries to reflect the demand for transplantation at each centre.
- 2 The lung allocation zones were last adjusted in June 2022. The current list of hospitals in each lung allocation zone can be found on-line at  
<https://www.odt.nhs.uk/transplantation/tools-policies-and-guidance/allocation-zones>
- 3 It was agreed by CTAG in October 2017 that any review of allocation zones should use the most up to date period of registration and donor data. The time period covers 2 years for registrations and 3 years for donors, therefore this report analyses:
  - Registrations: 1 March 2022 to 29 February 2024
  - Donors: 1 March 2021 to 29 February 2024
- 4 This report also covers activity data since 1 March 2021, for donors and transplants, including the number and utilisation of donors in each zone, and the number of zonal/imported transplants per centre.
- 5 Please see POL230: NHSBT Lung Allocation Policy (online here  
<https://www.odt.nhs.uk/transplantation/tools-policies-and-guidance/policies-and-guidance/>) for details of how the allocation zones are used in the offering process.

**DATA AND METHODS**

- 6 Changes to the lung allocation zones are based on a statistically significant difference being observed between the percentage share of registrations and the percentage share of donors for any one centre/allocation zone (at the 5% significant level). It was agreed by CTAG in 2021 that the previously applied Bonferroni correction will be removed in future, in order to increase the sensitivity of the tests.
- 7 Registrations are defined as:

The total number of UK Group 1 lung registrations in the latest two year period at adult centres, but excluding a) any registrations made by Newcastle of patients < 16 years, and (b) any patients that were only ever registered as urgent or super-urgent (since these schemes do not use zonal priority).

Registrations that ended in a domino or live donor transplant and multi-organ registrations are included, however registrations for heart-lung transplantation are not included in the number of lung registrations as heart-lung blocks are allocated according to the heart allocation sequence. Retrospective registrations made after an unlisted patient was transplanted are also included.

For patients registered more than once in the registration period, the following rules apply:

- If a patient was registered, removed then reregistered, only the first registration is included.
- If a patient was registered, transplanted then reregistered, both registrations are included.
- If a patient was active, suspended then reactivated, only the first activation is included.
- If a patient moved from the non-urgent list to the urgent or super-urgent list and then back to the non-urgent list (without transplantation in between) they will only be counted once.

8 Donors are defined as:

The total number of UK adult ( $\geq 16$  years at time of death) lung donors after brain death or circulatory death over the latest three year period. Donors not resulting in a lung transplant are excluded. Paediatric donors who donated to adult patients are included, along with adult donors whose organs were transplanted into paediatric patients.

## RESULTS

### Comparison of registrations and donors

9 **Table 1** summarises the proportion of lung registrations made by each centre over the two year period and compares this with the number of lung donors that arose under each allocation zone over the three year period. This shows that Birmingham had a significantly higher proportion of registrations than donors in their zone and Newcastle had a significantly higher proportion of donors than registrations. Therefore, there is evidence of a need to adjust the zonal boundaries.

Centre/zone	Lung registrations		Lung donors in current zone		p-value <sup>1</sup>
	N	%	N	%	
Birmingham	60	16	34	10	0.02
Harefield	90	24	81	23	0.92
Manchester	66	17	56	16	0.66
Newcastle	80	21	105	30	<0.01
Papworth	83	22	70	20	0.58
<b>UK</b>	<b>379</b>	<b>100</b>	<b>346</b>	<b>100</b>	-

<sup>1</sup> Chi-squared test comparison of proportion of registrations with proportion of donors, please note that the p-value has not been adjusted for multiple comparisons

## Donor Activity

10 In the period from 1 March 2021 to 29 February 2024, there were 2,226 adult DBD donors who donated at least one organ in the UK. **Table 2** shows the breakdown of these donors by lung zone, with the number of donors who had their lung(s) offered, accepted, retrieved, and transplanted. In total, 1,280 (58%) donors had at least one lung offered, 584 (46% of offered) donors had at least one lung accepted, 255 (44% of accepted) had at least one lung retrieved and 244 (96% of retrieved) had at least one transplanted. The utilisation rate (transplanted of offered) was 19% nationally and was highest in Manchester's zone at 28%.

**Table 2 Adult DBD lung organ donation and retrieval rates in the UK by allocation zone, 1 March 2021 - 29 February 2024**

Zone	Number of DBD donors	Offered (% of donors)		Accepted (% of offered)		Retrieved (% of accepted)		Transplanted (% of retrieved) (% of offered)	
		N		N		N		N	
Birmingham	312	142	(46)	67	(47)	27	(40)	24	(89) (17)
Harefield	585	348	(59)	158	(45)	68	(43)	65	(96) (19)
Manchester	301	133	(44)	73	(55)	37	(51)	37	(100) (28)
Newcastle	581	383	(66)	160	(42)	72	(45)	69	(96) (18)
Papworth	447	274	(61)	126	(46)	51	(40)	49	(96) (18)
<b>UK</b>	<b>2226</b>	<b>1280</b>	<b>(58)</b>	<b>584</b>	<b>(46)</b>	<b>255</b>	<b>(44)</b>	<b>244</b>	<b>(96)</b> <b>(19)</b>

11 **Table 3** shows similar information but for the 1,911 DCD donors in the period. The DCD utilisation rate was 11% nationally, with Manchester's zone having a higher utilisation rate at 18%.

**Table 3 Adult DCD lung organ donation and retrieval rates in the UK by allocation zone, 1 March 2021 - 29 February 2024**

Zone	Number of DCD donors	Offered (% of donors)		Accepted (% of offered)		Retrieved (% of accepted)		Transplanted (% of retrieved) (% of offered)	
		N		N		N		N	
Birmingham	278	76	(27)	26	(34)	11	(42)	8	(73) (11)
Harefield	482	210	(44)	70	(33)	32	(46)	26	(81) (12)
Manchester	268	78	(29)	34	(44)	15	(44)	14	(93) (18)
Newcastle	468	211	(45)	73	(35)	24	(33)	19	(79) (9)
Papworth	414	183	(44)	65	(36)	23	(35)	18	(78) (10)
<b>UK</b>	<b>1911</b>	<b>758</b>	<b>(40)</b>	<b>268</b>	<b>(35)</b>	<b>105</b>	<b>(39)</b>	<b>85</b>	<b>(81)</b> <b>(11)</b>

## Transplant Activity

12 **Table 4** shows the number of adult lung transplants performed in the period using UK adult donors, by transplanting centre, broken down by whether the lungs were from a zonal donor or imported from outside the zone. Overall, 63% of transplants in the time period were performed using imported lungs, with Birmingham having the highest proportion of imported lung transplants (87%) and Manchester having the lowest (52%).

**Table 4 Adult lung transplants performed in the UK from UK adult deceased donors, by transplanting centre and zonal status of the donor, 1 March 2021 - 29 February 2024**

Centre	Transplants N	Zonal N	Zonal (%)	Imported N	Imported (%)
Birmingham	31	4	(13)	27	(87)
Harefield	62	29	(47)	33	(53)
Manchester	52	25	(48)	27	(52)
Newcastle	61	23	(38)	38	(62)
Papworth	101	34	(34)	67	(66)
<b>UK</b>	<b>307</b>	<b>115</b>	<b>(37)</b>	<b>192</b>	<b>(63)</b>

## CONCLUSIONS

13 There was a significant difference observed in the percentage share of lung registrations and donors at Birmingham and Newcastle, therefore changes will need to be made to zonal boundaries. The **Appendix** section details the changes proposed to achieve equity between lung registrations and lung zonal donors.

**Lewis Simmonds**  
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## Appendix – proposed changes to lung allocation zones

Appendix 1 List of hospitals with proposed lung allocation zonal boundary changes			
Current lung zone	Proposed lung zone	Hospital name	Number of lung donors in the three-year period
Manchester	Birmingham	Derby, Royal Derby Hospital	3
Manchester	Birmingham	Nottingham, NUH QMC Campus	11
Manchester	Birmingham	Stoke-on-Trent, Royal Stoke University Hospital	13
Birmingham	Harefield	Plymouth, Derriford Hospital	7
Newcastle	Manchester	Blackburn, Royal Blackburn Hospital	1
Newcastle	Manchester	Blackpool, Blackpool Victoria Hospital	1
Newcastle	Manchester	Grimsby, Diana Princess of Wales Hospital	1
Newcastle	Manchester	Huddersfield, Huddersfield Royal Infirmary	2
Newcastle	Manchester	Leeds, Leeds General Infirmary	9
Newcastle	Manchester	Lincoln, Lincoln County Hospital	1
Newcastle	Manchester	Preston, Royal Preston Hospital	1
Newcastle	Manchester	Scunthorpe, Scunthorpe General Hospital	2
Newcastle	Manchester	Sheffield, Northern General Hospital	4
Newcastle	Manchester	Sheffield, Royal Hallamshire Hospital	3
Newcastle	Manchester	Southport, Southport District General Hospital	1
Newcastle	Manchester	Wakefield, Pinderfields General Hospital	4
Papworth	Manchester	Rotherham, Rotherham District General Hospital	1
Harefield	Papworth	Oxford, John Radcliffe Hospital	8

## Appendix 2 Number of lung registrations (1 March 2022 – 29 February 2024) and donors (1 March 2021 – 29 February 2024), by registering centre/proposed allocation zone

Centre/zone	Lung registrations		Lung donors in proposed zone		p-value <sup>1</sup>
	N	%	N	%	
Birmingham	60	16	54	16	0.93
Harefield	90	24	80	23	0.84
Manchester	66	17	60	17	0.98
Newcastle	80	21	75	22	0.85
Papworth	83	22	77	22	0.91
<b>UK</b>	<b>379</b>	<b>100</b>	<b>346</b>	<b>100</b>	-

<sup>1</sup> Chi-squared test comparison of proportion of registrations with proportion of donors, please note that the p-value has not been adjusted for multiple comparisons

**Appendix 3 Map of UK hospitals with existing (left) and proposed (right) lung allocation zones**

