

NHS BLOOD AND TRANSPLANT
CARDIOTHORACIC ADVISORY GROUP - LUNG
REVIEW OF ALLOCATION ZONES

SUMMARY

INTRODUCTION

- 1 The cardiothoracic allocation zones were split into separate heart and lung allocation zones over two phases, in May 2017 and January 2018. This report is the fifth annual review of the lung allocation zones since this change.
- 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 2020 to 28 February 2023 for registrations, and 1 March 2019 to 28 February 2023 for donors.
- 3 The time period 1 April 2020 to 31 March 2021 is excluded from the analysis as there was a reduction in cardiothoracic donors and registrations due to the pandemic.

RESULTS

Comparison of registrations and donors

- 4 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 significant differences observed, matching the significant differences observed in Spring 2022.

Donor activity

- 5 The utilisation rate (transplanted out of offered) of DBD lungs was similar across zones in the time period, but slightly lower for donors in Newcastle's zone. The national DBD utilisation rate was 18%. For DCD lungs, the national utilisation rate was 12% and was similar across zones.

Transplant activity

- 6 Whereas zonal allocation is prioritised in all heart allocation schemes (super-urgent, urgent and non-urgent), for lung, zonal allocation is only considered in the non-urgent scheme. More transplants are performed from non-zonal donors than zonal donors (62% vs 38%).

CONCLUSION

- 7 There were significant differences observed in the percentage share of lung registrations and donors across centres/zones, however these match the significant differences observed in Spring 2022 therefore no further changes will be made to allocation zones to allow the changes made following the previous review to embed.

Lewis Simmonds and Rachel Hogg
Statistics and Clinical Research

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BACKGROUND

- 8 During 2017/18, the cardiothoracic allocation zones were split into separate heart and lung allocation zones in order to more appropriately match the supply of each organ with the demand at each centre. This split was phased in over a period of eight months to stagger the impact of this change. The first phase was implemented on 18 May 2017 and the second phase on 8 January 2018.
- 9 This report is the fifth annual review of the lung allocation zones since this change. A similar review of the heart allocation zones was presented at the CTAG-Heart meeting in May 2023.
- 10 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, however it was agreed by Cardiothoracic Centre Directors in June 2021 that the financial year 2020/21 should be removed from future analyses due to the impact of the COVID-19 pandemic on donation and registration activity. Therefore this report analyses:
 - Registrations: 1 March 2020 to 28 February 2023 (excluding 1 April 2020 to 31 March 2021)
 - Donors: 1 March 2019 to 28 February 2023 (excluding 1 April 2020 to 31 March 2021)
- 11 This report also covers activity data since 1 March 2019, for donors and transplants, including the number and utilisation of donors in each zone, and the number of zonal/imported transplants per centre.
- 12 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

- 13 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.
- 14 The total number of UK Group 1 lung registrations in the latest two year period between 1 March 2020 and 28 February 2023 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), and (c) any registrations between 1 April 2020 and 31 March 2021.

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.

- 15 Donors are defined as:

The total number of UK adult (≥ 16 years at time of death) lung donors after brain death or circulatory death over the latest three year period between 1 March 2019 and 28 February 2023 excluding donations between 1 April 2020 and 31 March 2021. 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

16 **Figure 1** summarises the number of lung donors and registrations between 1 March 2020 and 28 February 2023. We note that there was a reduction in both registrations and donations following March 2020, with a second large drop in registrations in February 2021 and in donations in November 2021. Due to this reduction in activity, the time-period 1 April 2020 – 31 March 2021 is excluded from the zonal assessment analysis.

Figure 1 Number of lung donors and registrations, 1 March 2020 – 28 February 2023



17 **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 the proportion of lung registrations and lung donors are unbalanced between the centres, with the largest differences at Harefield, having 28% of the donors, and only 20% of the registrations, and Papworth, having 29% of the registrations, but only 20% of the donors. This difference is statistically significant ($p=0.01$). Therefore, there is evidence that there is a need to adjust the zonal boundaries, however these results match what was seen in the Spring 2022 review of zones and therefore no further change is required whilst the changes made last year are embedded.

Table 1 Number of lung registrations (1 March 2020 – 28 February 2023)¹ and donors (1 March 2019 – 28 February 2023)¹, by registering centre/current allocation zone					
Centre/zone	Lung registrations		Lung donors in current zone		p-value²
	N	%	N	%	
Birmingham	50	13	47	13	0.78
Harefield	76	20	105 ³	28	0.01
Manchester	55	15	60	16	0.58
Newcastle	87	23	86	23	0.99
Papworth	109	29	76	20	0.01
UK	377	100	374	100	-

¹ Donations and registrations between 1 April 2020 and 31 March 2021 have been excluded from the analysis due to the reduction in lung activity caused by the pandemic

² 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

³ One donor has been allocated to Harefield (Sutton, The Royal Marsden Hospital), but did not have an allocation zone at the time of offering

Donor Activity

- 18 In the period from 1 March 2019 to 28 February 2023 (excluding 1 April 2020 – 31 March 2021), there were 2,472 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, 1,501 (61%) donors had at least one lung offered, 671 (45% of offered) donors had at least one lung accepted, 292 (44% of accepted) had at least one lung retrieved and 275 (94% of retrieved and 18% of offered) had at least one transplanted. The utilisation rate (transplanted of offered) is similar across all zones, but lowest in Newcastle's zone in this time period.

Table 2 Adult DBD lung organ donation and retrieval rates in the UK by allocation zone, 1 March 2018 - 28 February 2022 (excluding 1 April 2020 – 31 March 2021)										
Zone	Number of DBD donors	Offered		Accepted		Retrieved		Transplanted		
		N	(% of donors)	N	(% of offered)	N	(% of accepted)	N	(% of retrieved)	(% of offered)
Birmingham	358	195	(54)	89	(46)	40	(45)	38	(95)	(19)
Harefield	719	449	(62)	208	(46)	102	(49)	98	(96)	(22)
Manchester	330	165	(50)	86	(52)	39	(45)	39	(100)	(24)
Newcastle	584	401	(69)	147	(37)	58	(39)	49	(84)	(12)
Papworth	481	291	(60)	141	(48)	53	(38)	51	(96)	(18)
UK	2472	1501	(61)	671	(45)	292	(44)	275	(94)	(18)

- 19 **Table 3** shows similar information but for the 1,871 DCD donors in the period. The DCD utilisation rates are similar across zones, with a national rate of 12%.

Table 3 Adult DCD lung organ donation and retrieval rates in the UK by allocation zone, 1 March 2019 - 28 February 2023 (excluding 1 April 2020 – 31 March 2021)

Zone	Number of DCD donors	Offered		Accepted		Retrieved		Transplanted		
		N	(% of donors)	N	(% of offered)	N	(% of accepted)	N	(% of retrieved)	(% of offered)
Birmingham	251	82	(33)	28	(34)	11	(39)	8	(73)	(10)
Harefield	514	220	(43)	88	(40)	46	(52)	33	(72)	(15)
Manchester	285	88	(31)	37	(42)	16	(43)	15	(94)	(17)
Newcastle	378	176	(47)	56	(32)	20	(36)	14	(70)	(8)
Papworth	443	204	(46)	66	(32)	23	(35)	20	(87)	(10)
UK	1871	770	(41)	275	(36)	116	(42)	90	(78)	(12)

Transplant Activity

20 **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, 62% of transplants in the time period were performed using imported lungs, with Birmingham having the highest proportion of imported lung transplants (83%) and Harefield having the lowest (44%).

Table 4 Adult lung transplants performed in the UK from UK adult donors, by transplanting centre and zonal status of the donor, 1 March 2019 - 28 February 2023 (excluding 1 April 2020 – 31 March 2021)

Centre	Transplants		Zonal		Imported	
	N	N	(%)	N	(%)	
Birmingham	30	5	(17)	25	(83)	
Harefield	78	44	(56)	34	(44)	
Manchester	57	25	(44)	32	(56)	
Newcastle	69	21	(30)	48	(70)	
Papworth	102	33	(32)	69	(68)	
UK	336	128	(38)	208	(62)	

CONCLUSIONS

21 There were significant differences observed in the percentage share of lung registrations and donors across centres/zones, therefore there is evidence for a need to update the lung allocation zones. However these match the significant differences observed in Spring 2022 therefore no further changes will be made to allocation zones to allow the changes made following the previous review to embed.