NHS
Blood and Transplant

ANNUAL REPORT ON LIVING DONOR KIDNEY TRANSPLANTATION

REPORT FOR 2024/2025
(1 APRIL 2010 – 31 MARCH 2025)

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Contents

Executive Summary

This report presents key figures about living donor kidney transplantation in the UK. The period reported covers 15 years of transplant data, from 1 April 2010. The report presents information on the number of transplants, follow-up data and survival analysis on a national and centre-specific basis.

Key findings

- There were 874 adult living donor kidney transplants performed in the UK in 2024/25, an increase of 43 transplants compared to 2023/24. Of these, 405 (392 in 2023/24) were genetically related, 222 (199 in 2023/24) were unrelated, 2 (1 in 2023/24) were HLAi, 22 (26 in 2023/24) were ABOi, 164 (149 in 2023/24) were paired/pooled and 59 (46 in 2023/24) were non-directed altruistic donor transplants. The equivalent number of paediatric transplants was 77, one transplant more than the previous year.

- The proportion of living donors across the UK being prescribed anti-hypertensive drugs is 6% at five years and 11% at ten years post donation.

- Serum creatinine for living donors in the UK is 97 (84-112) at five years and 92 (79-108) at ten years post donation.

- The UK rate of graft survival five years after adult living donor kidney transplant by type is; unrelated 95%, genetically related 95%, non-directed altruistic 88%, paired exchange 91%, ABOi 96% and HLAi 79%.

- 48% of registered recipients in the UK Living Kidney Sharing Scheme have been transplanted and 72% of identified transplants proceed.

Use of the contents of this report should be acknowledged as follows:
Annual Report on Living Donor Kidney Transplantation 2024/25. NHS Blood and Transplant

Introduction

This report presents information on transplant activity between 1 April 2010 and 31 March 2025, for all 24 centres performing living donor kidney transplantation in the UK. Data were obtained from the UK Transplant Registry, at NHS Blood & Transplant, that holds information relating to donors, recipients and outcomes for all kidney transplants performed in the UK.

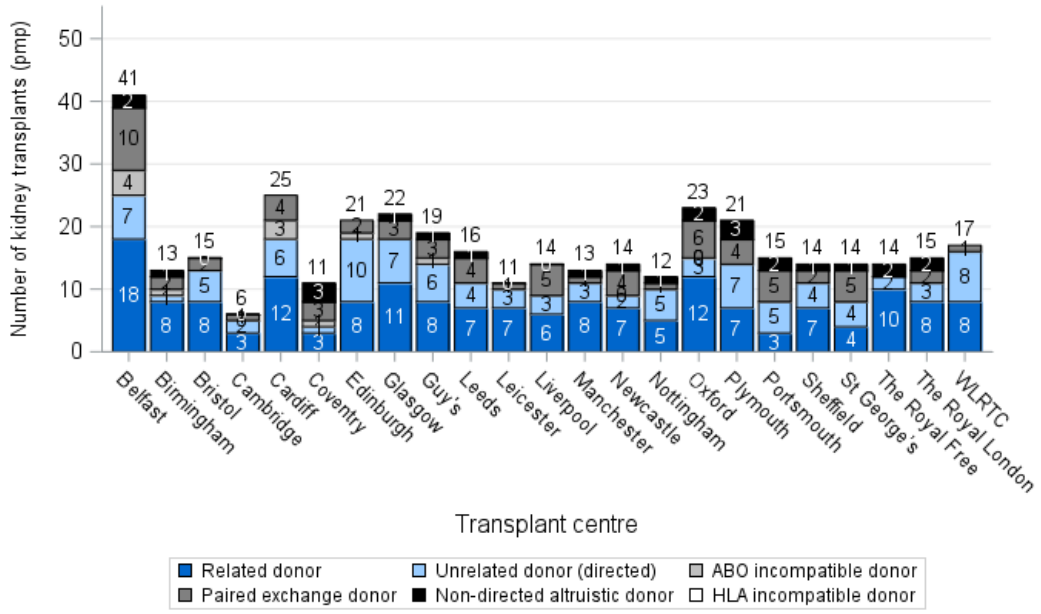
Graft and patient survival estimates are reported at one-year post transplant for the period 1 April 2020 to 31 March 2024 and five-year post-transplant for the period 1 April 2016 to 31 March 2020. Results are described separately according to the type of donor.

Throughout this report West London Renal and Transplant Centre is labeled as WLRTC and Great Ormond Street Hospital is labelled as GOSH.

The COVID-19 pandemic has led to unprecedented challenges for UK transplantation. Concerns about the ability to care for transplant recipients, lack of access to resource, and the risk versus benefit for immunosuppressed transplant recipients, have resulted in a major reduction in the number of organ transplants undertaken.

Figure 2.1 shows the number of adult living donor kidney transplants per million population (pmp) that were performed in 2024/25 in each transplant centre.

Figure 2.1 Adult Living donor kidney transplants (pmp) in the UK, 1 April 2024 - 31 March 2025



ADULT

Figure 2.2 shows the number of adult living donor kidney transplants performed in the UK between 1 April 2010 and 31 March 2025.

Figure 2.2 Adult living donor kidney transplants in the UK, 1 April 2010 - 31 March 2025

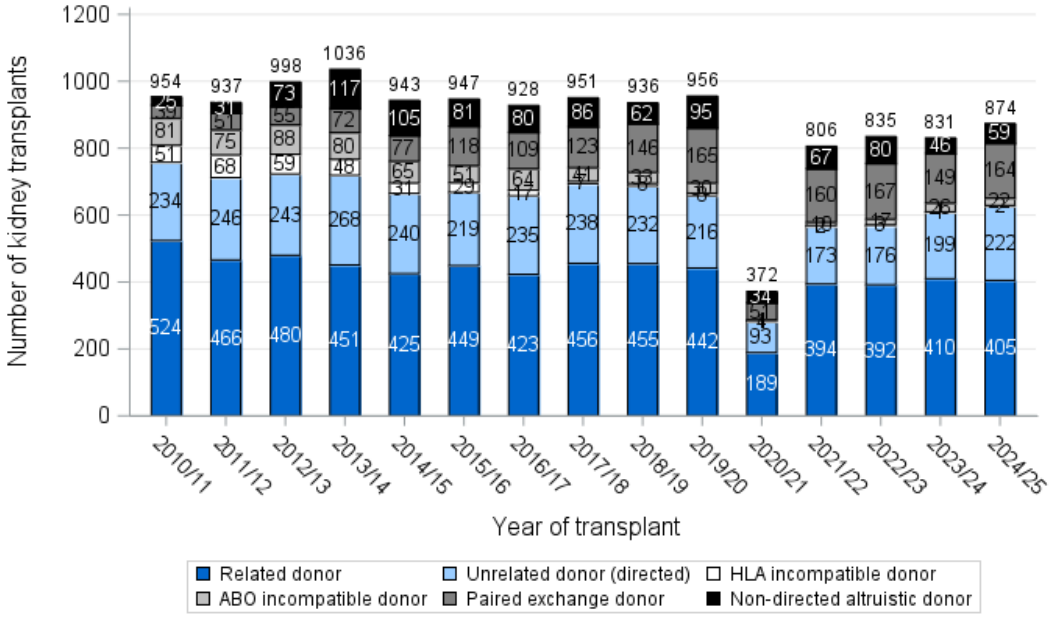


Figure 2.3 and **Table 2.1** show the number of adult living donor kidney transplants performed in 2024/25 in each transplant centre.

Figure 2.3 Adult Living donor kidney transplants in the UK, 1 April 2024 - 31 March 2025

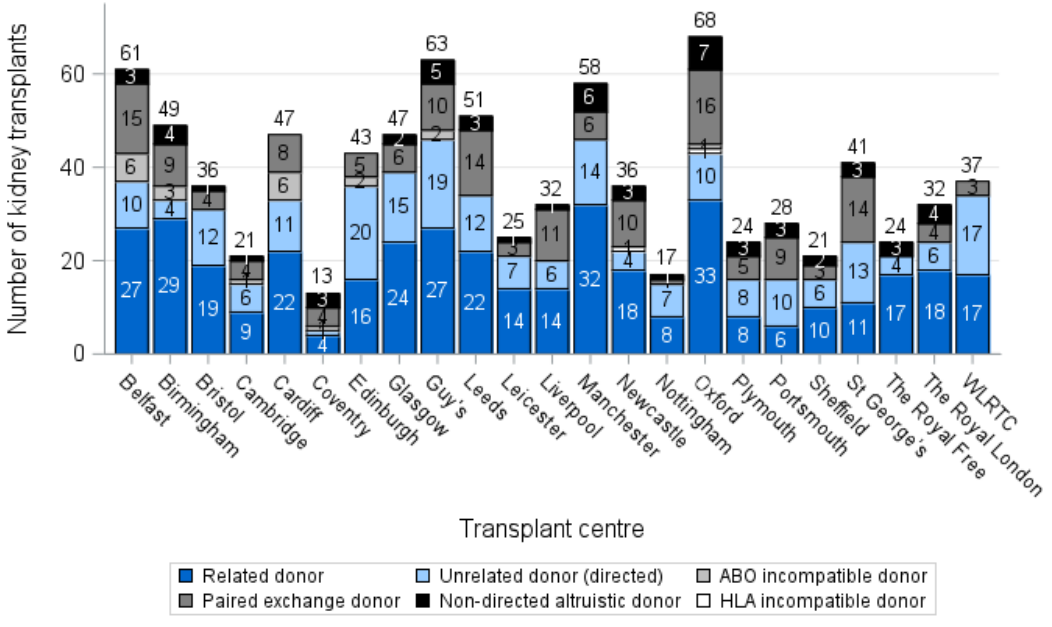


Table 2.1 Adult living donor kidney transplants in the UK, 1 April 2024 - 31 March 2025

Transplant Centre	Donor type					
	Related donor	Unrelated donor (directed)	HLA incompatible donor	ABO incompatible donor	Paired exchange donor	Non-directed altruistic donor
Belfast	27	10	0	6	15	3
Birmingham	29	4	0	3	9	4
Bristol	19	12	0	0	4	1
Cambridge	9	6	0	1	4	1
Cardiff	22	11	0	6	8	0
Coventry	4	1	0	1	4	3
Edinburgh	16	20	0	2	5	0
Glasgow	24	15	0	0	6	2
Guy's	27	19	0	2	10	5
Leeds	22	12	0	0	14	3
Leicester	14	7	0	0	3	1
Liverpool	14	6	0	0	11	1
Manchester	32	14	0	0	6	6
Newcastle	18	4	1	0	10	3
Nottingham	8	7	0	0	1	1
Oxford	33	10	1	1	16	7
Plymouth	8	8	0	0	5	3
Portsmouth	6	10	0	0	9	3
Sheffield	10	6	0	0	3	2
St George's	11	13	0	0	14	3
The Royal Free	17	4	0	0	0	3
The Royal London	18	6	0	0	4	4
WLRTC	17	17	0	0	3	0

Figure 2.4 shows the proportion of adult living donor kidney transplants by donor type and centre in 2024/2025.

Figure 2.4 Adult living donor kidney transplants in the UK, 1 April 2024 - 31 March 2025

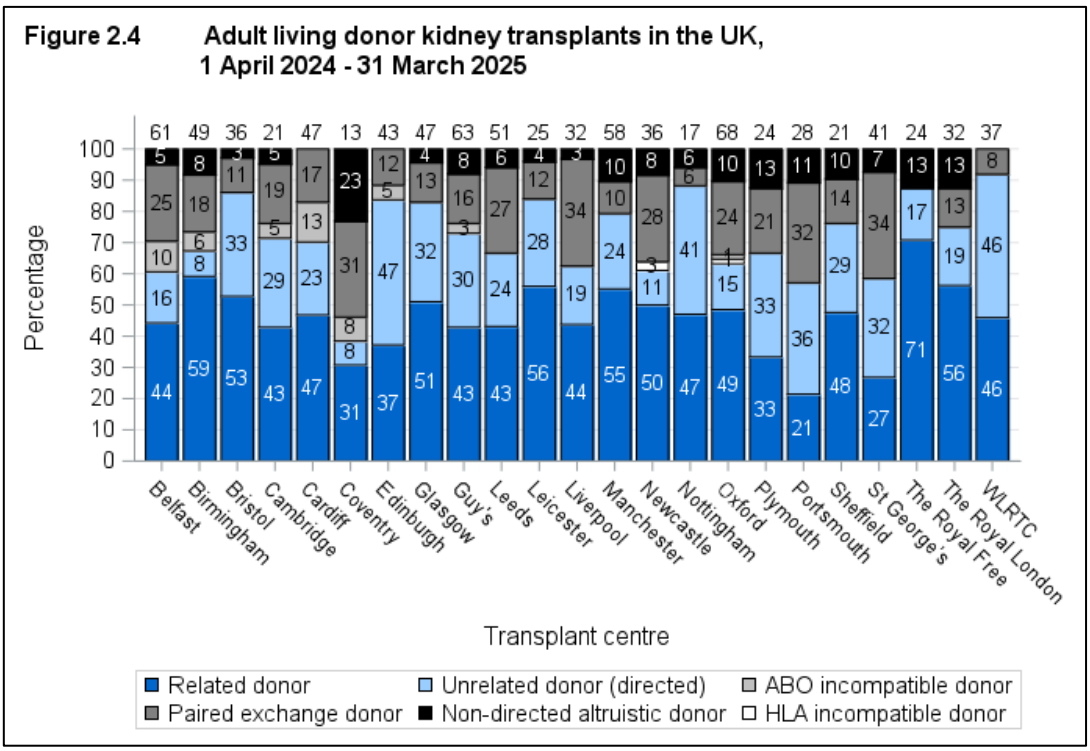
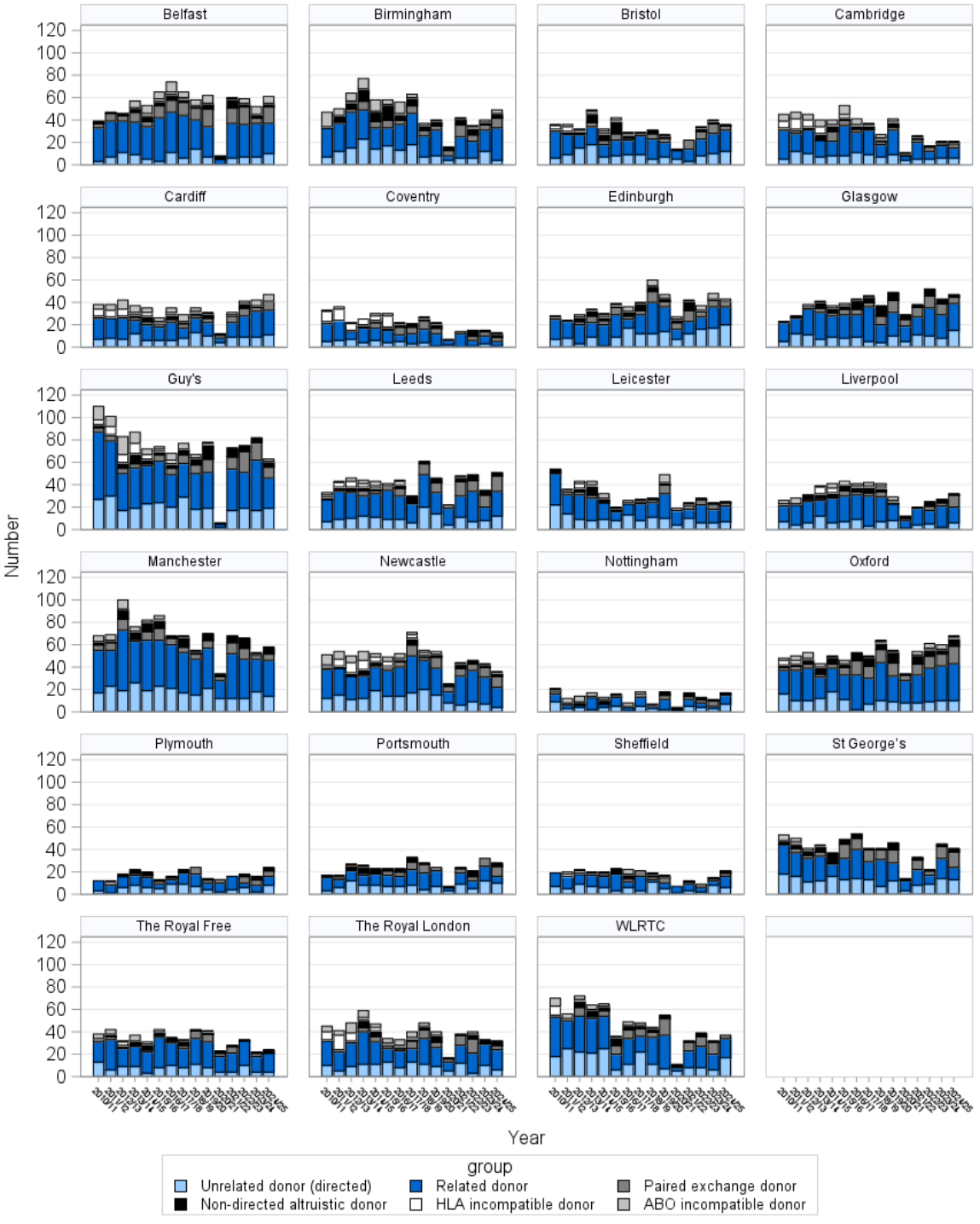


Figure 2.5 shows the number of adult living donor kidney transplants by donor type and centre between 1 April 2010 and 31 March 2025.

Figure 2.5 Adult living donor kidney transplants in the UK by centre, 1 April 2010- 31 March 2025



PAEDIATRIC

Figure 2.6 shows the number of paediatric living donor kidney transplants performed in the UK between 1 April 2010 and 31 March 2025.

Figure 2.6 Paediatric living donor kidney transplants in the UK, 1 April 2010 - 31 March 2025

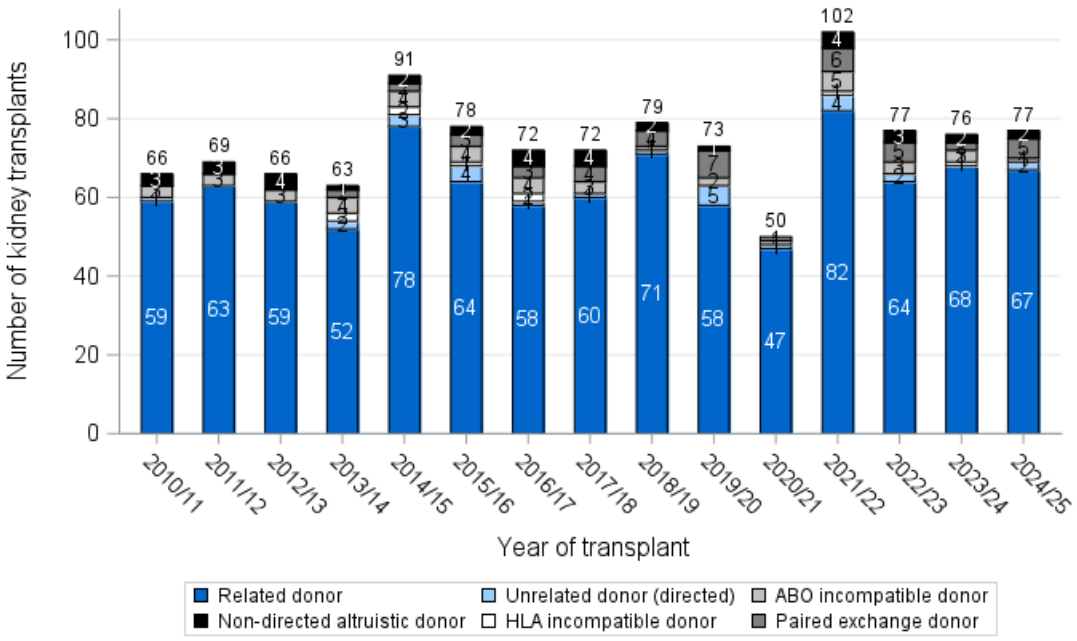
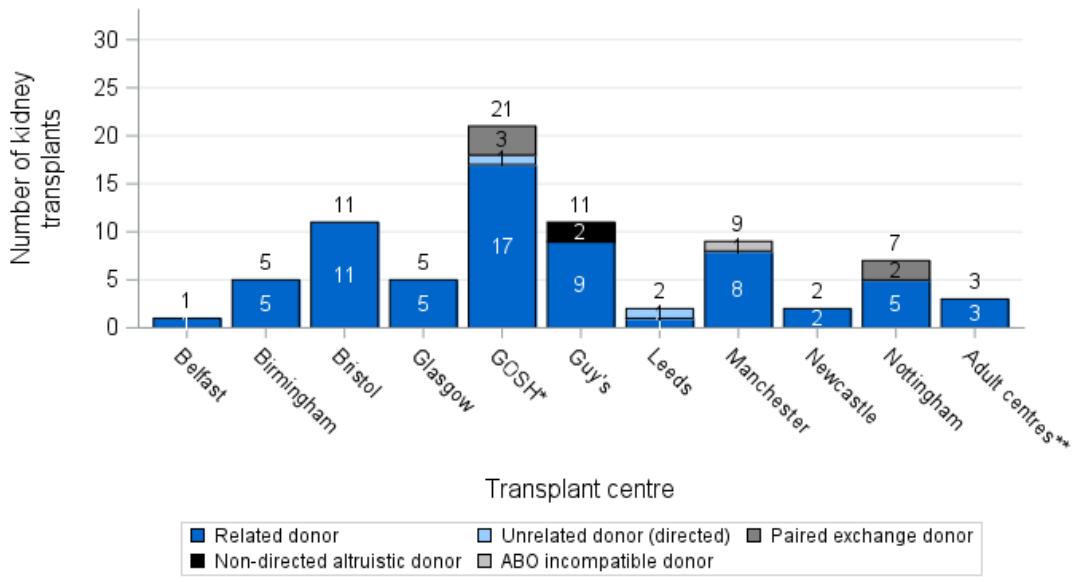


Figure 2.7 and **Table 2.2** show the number of paediatric living donor kidney transplants performed in 2024/25 in each transplant centre.

Figure 2.7 Paediatric Living donor kidney transplants in the UK, 1 April 2024 - 31 March 2025



*Guy's team assess donors and perform transplants for GOSH recipients
**Adult centres includes patients under 18 years transplanted at adult units

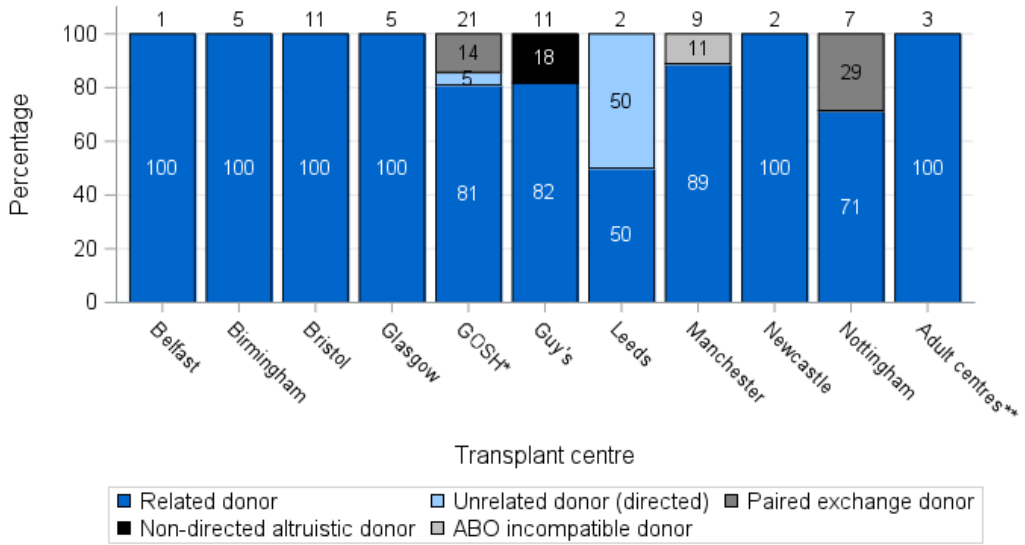
Table 2.2 Paediatric living donor kidney transplants in the UK, 1 April 2024 - 31 March 2025

Transplant Centre	Donor type					
	Related donor	Unrelated donor (directed)	HLA incompatible donor	ABO incompatible donor	Paired exchange donor	Non-directed altruistic donor
Adult centres**	3	0	0	0	0	0
Belfast	1	0	0	0	0	0
Birmingham	5	0	0	0	0	0
Bristol	11	0	0	0	0	0
GOSH*	17	1	0	0	3	0
Glasgow	5	0	0	0	0	0
Guy's	9	0	0	0	0	2
Leeds	1	1	0	0	0	0
Manchester	8	0	0	1	0	0
Newcastle	2	0	0	0	0	0
Nottingham	5	0	0	0	2	0

*Guy's team assess donors and perform transplants for GOSH recipients
**Adult centres includes patients under 18 years transplanted at adult units

Figure 2.8 shows the proportion of paediatric living donor kidney transplants by donor type and centre in 2024/25.

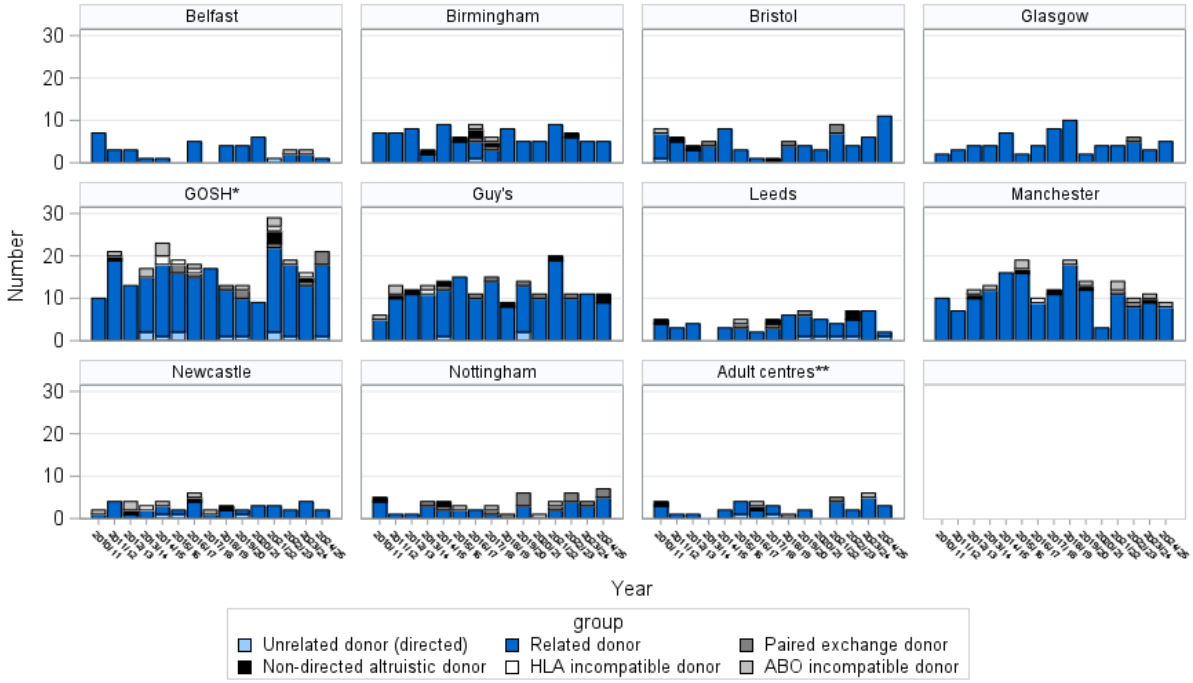
Figure 2.8 Paediatric living donor kidney transplants in the UK, 1 April 2024 - 31 March 2025



*Guy's team assess donors and perform transplants for GOSH recipients
**Adult centres includes patients under 18 years transplanted at adult units

Figure 2.9 shows the number of paediatric living donor kidney transplants by donor type and centre between 1 April 2010 and 31 March 2025.

Figure 2.9 Paediatric living donor kidney transplants in the UK by centre, 1 April 2010 - 31 March 2025



*Guy's team assess donors and perform transplants for GOSH recipients
**Adult centres includes patients under 18 years transplanted at adult units

Demographic Characteristics

ADULT

The sex, ethnicity, age group, sensitisation (cRF), cRF by transplant type for HSP, blood group, dialysis status of donors and recipients of adult living donor kidney transplants and pre-emptive transplant rates are shown by centre in **Figure 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7** and **3.8** respectively. Note that all percentages quoted are based only on data where relevant information was available.

Figure 3.1 Sex of recipient and donor by adult transplant type, 1 April 2019 - 31 March 2025

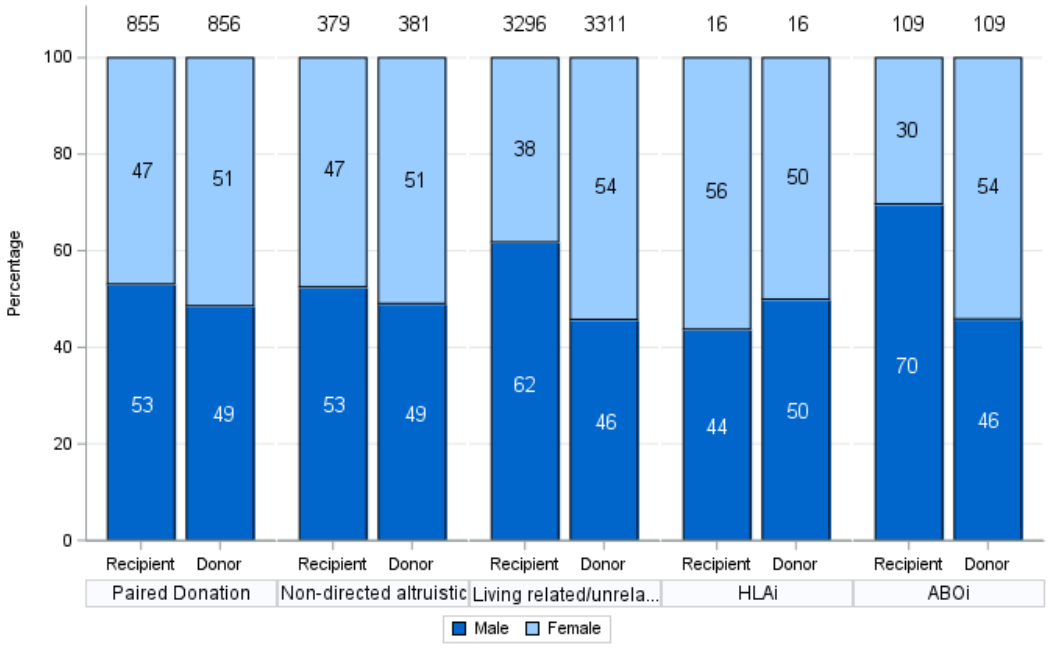


Figure 3.2 Ethnicity of recipient and donor by adult transplant type, 1 April 2019 - 31 March 2025

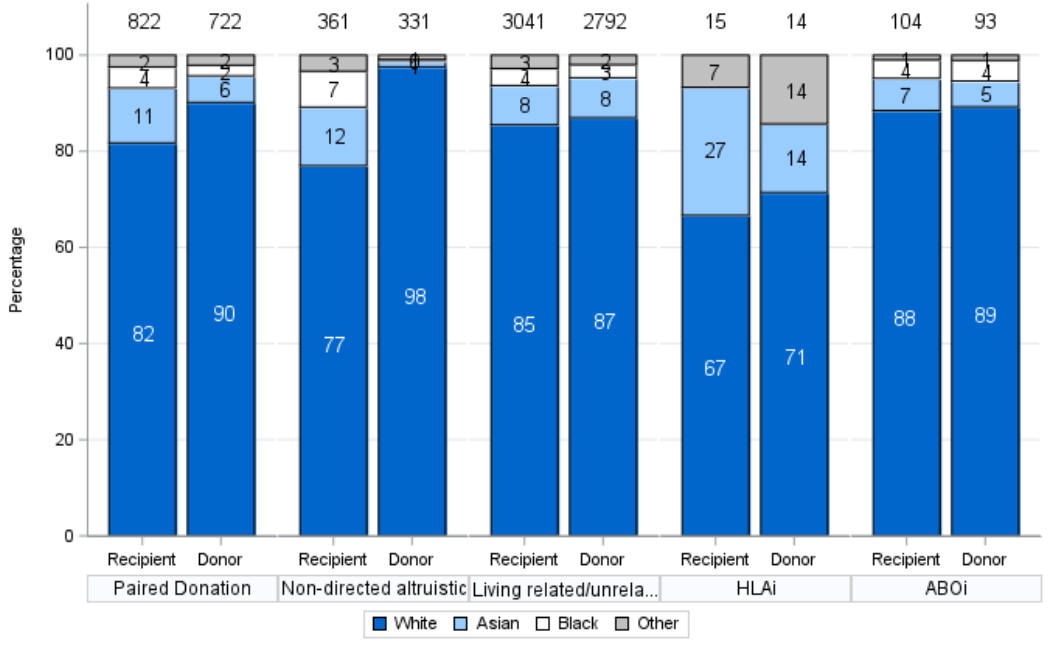


Figure 3.3 Age of recipient and donor by adult transplant type, 1 April 2019 - 31 March 2025

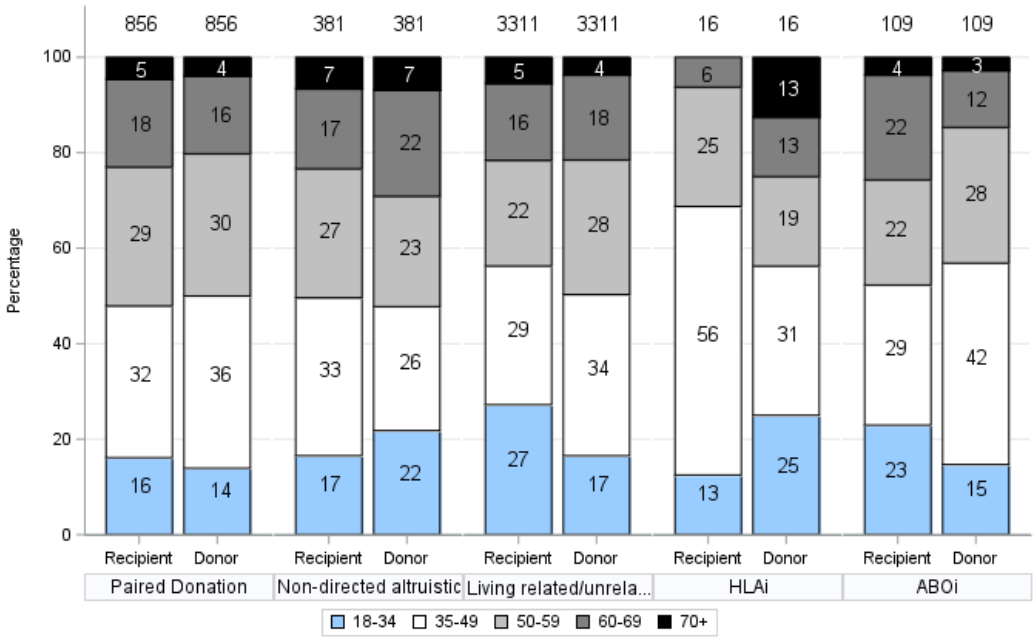


Figure 3.4 Recipient Calculated Reaction Frequency by adult transplant type 1 April 2019 - 31 March 2025

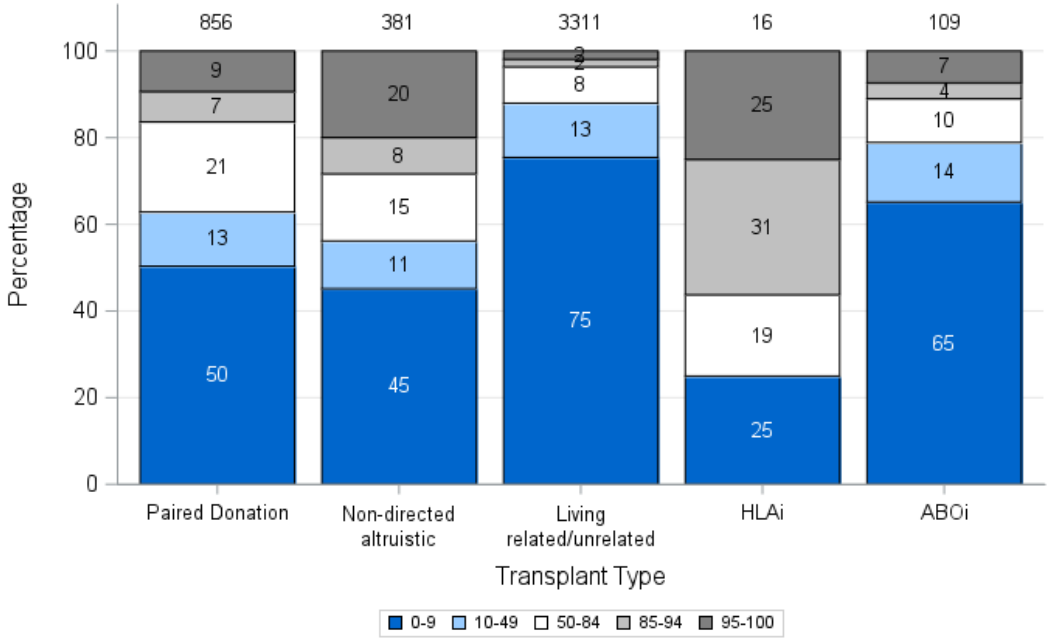


Figure 3.5 Adult HSP by transplant type and year of transplant, 1 April 2019 - 31 March 2025

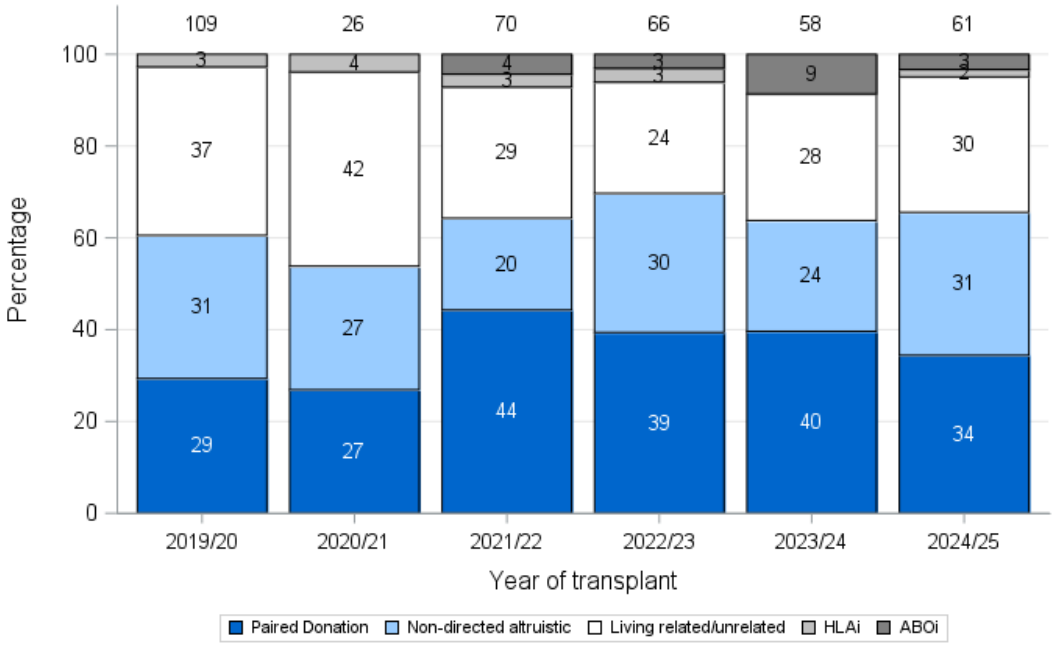


Figure 3.6 Recipient and donor blood group by adult transplant type, 1 April 2019 - 31 March 2025

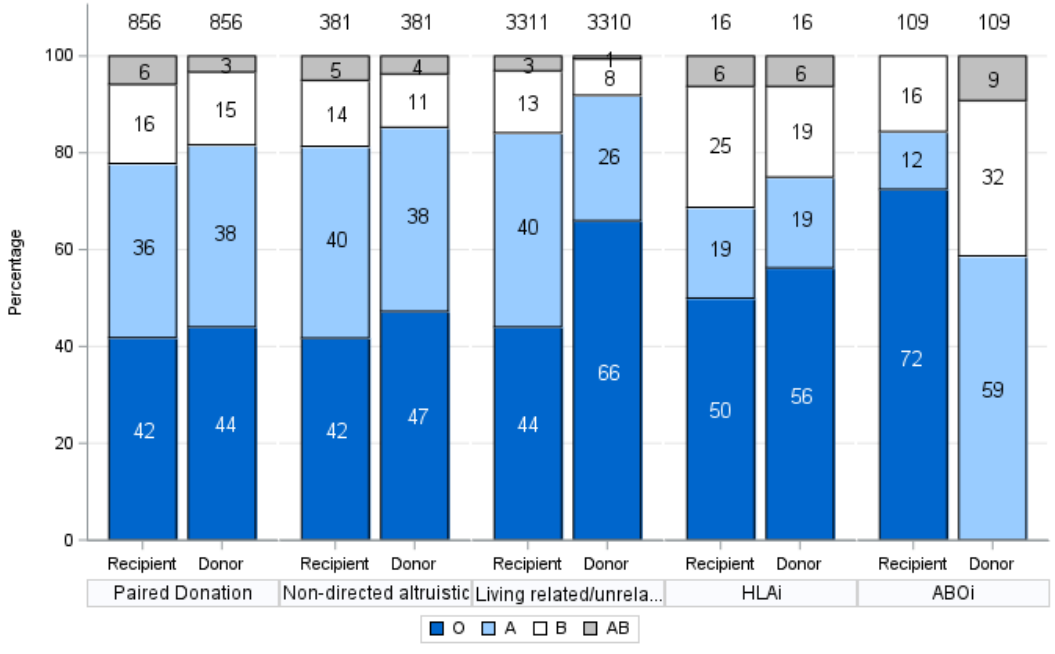


Figure 3.7 Dialysis status at transplant by adult transplant type, 1 April 2019 - 31 March 2025

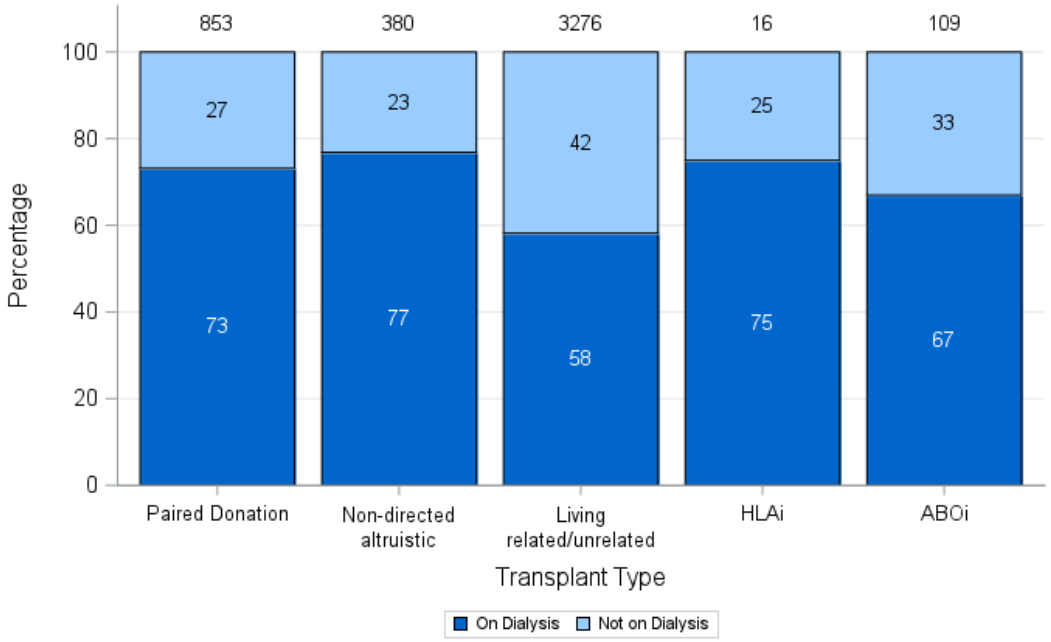
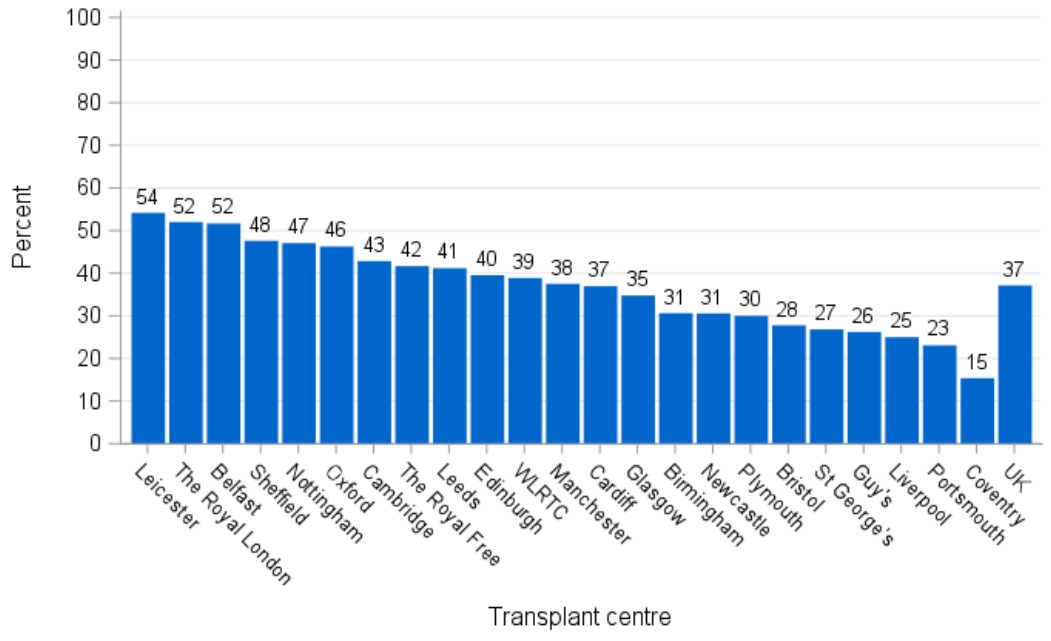


Figure 3.8 Adult living donor pre-emptive transplant rates by centre, 1 April 2024 - 31 March 2025



PAEDIATRIC

The sex, ethnicity, age group, sensitisation (cRF), cRF by transplant type for HSP, blood group and dialysis status of donors and recipients of paediatric living donor kidney transplants and pre-emptive transplant rates are shown by centre in **Figure 3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15** and **3.16** respectively. Note that all percentages quoted are based only on data where relevant information was available. Percentages are omitted where there is a low number of recipients and donors.

Figure 3.9 Sex of recipient and donor by paediatric transplant type, 1 April 2019 - 31 March 2025

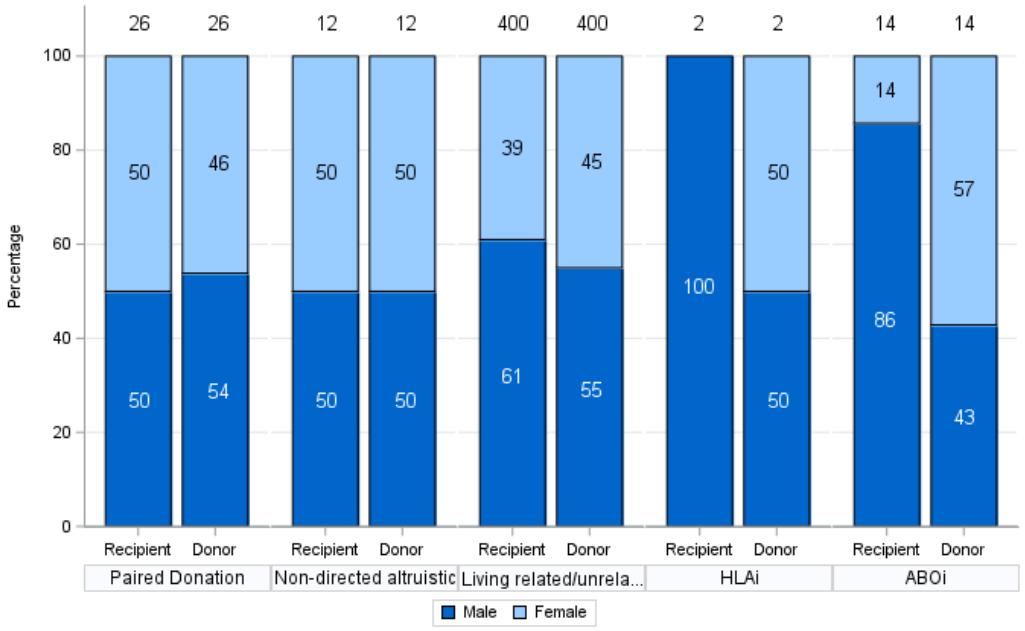


Figure 3.10 Ethnicity of recipient and donor by paediatric transplant type, 1 April 2019 - 31 March 2025

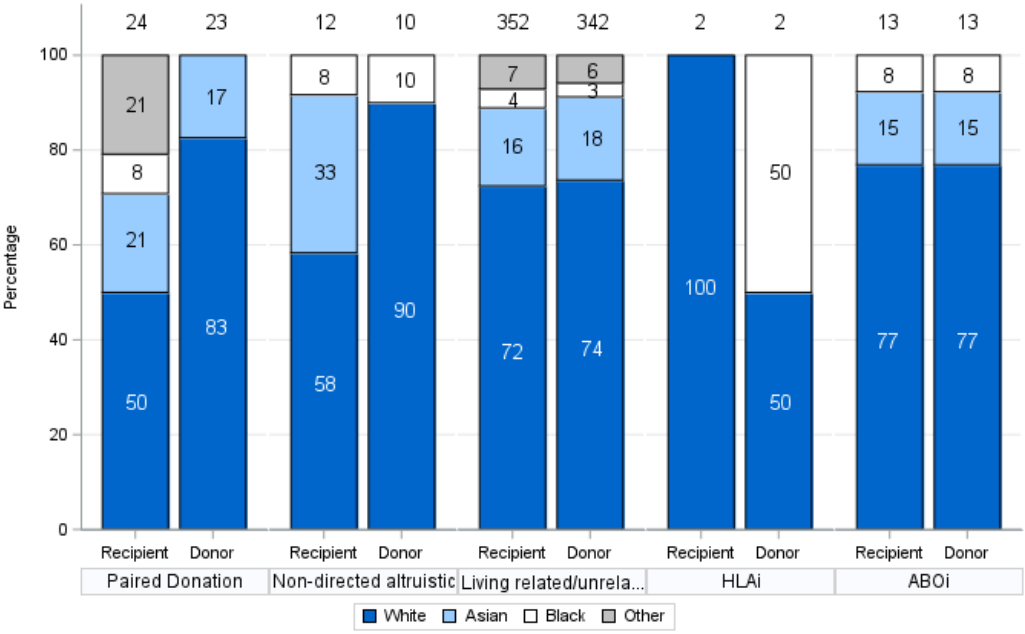


Figure 3.11 Age of recipient and donor by paediatric transplant type, 1 April 2019 - 31 March 2025

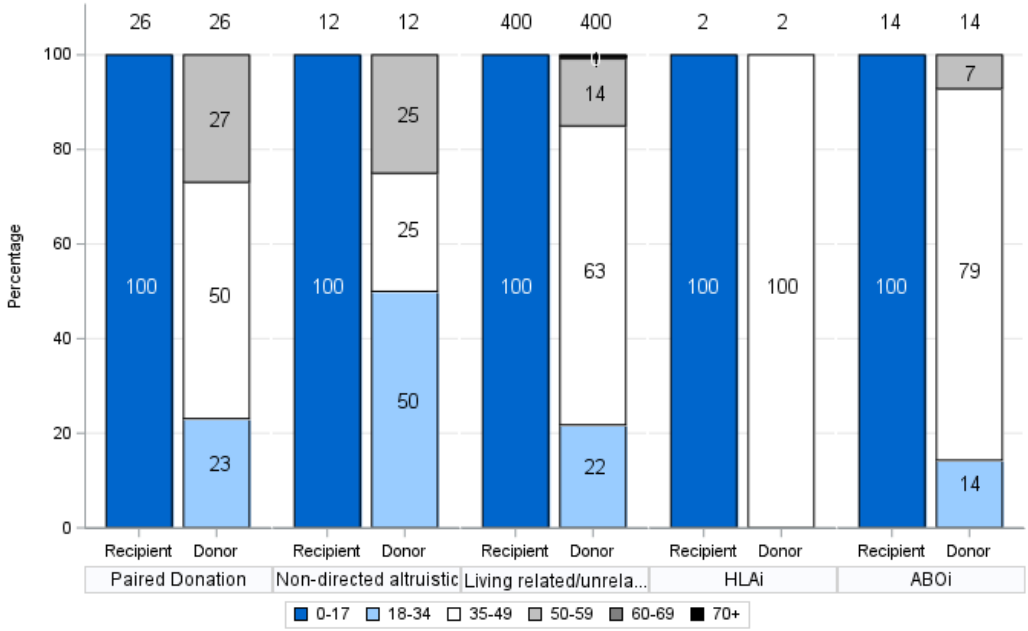


Figure 3.12 Recipient Calculated Reaction Frequency by paediatric transplant type 1 April 2019 - 31 March 2025

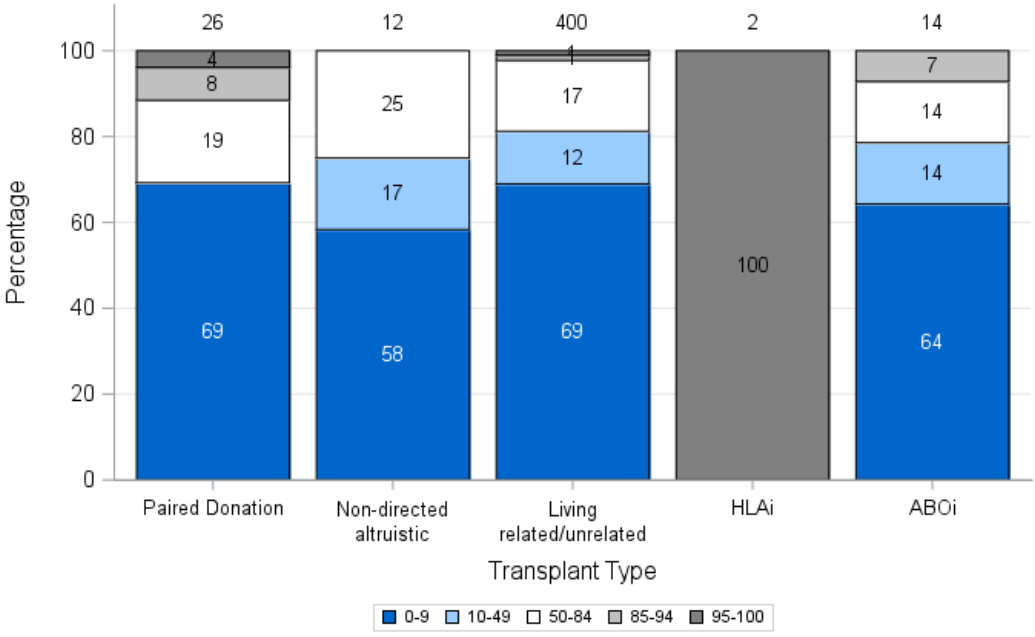


Figure 3.13 Paediatric HSP by transplant type and year of transplant, 1 April 2019 - 31 March 2025

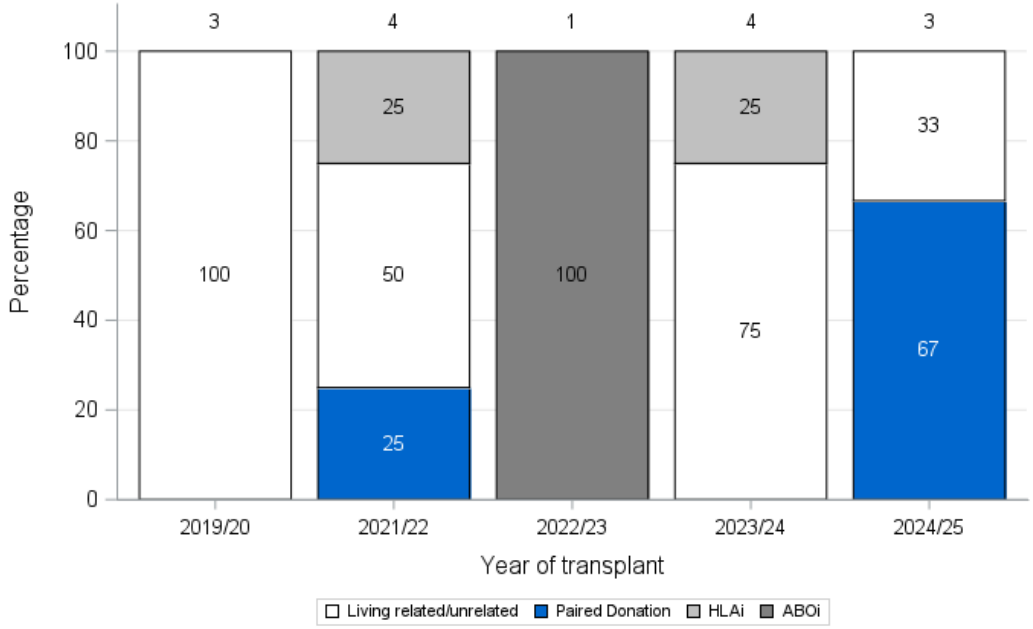


Figure 3.14 Recipient and donor blood group by paediatric transplant type, 1 April 2019 - 31 March 2025

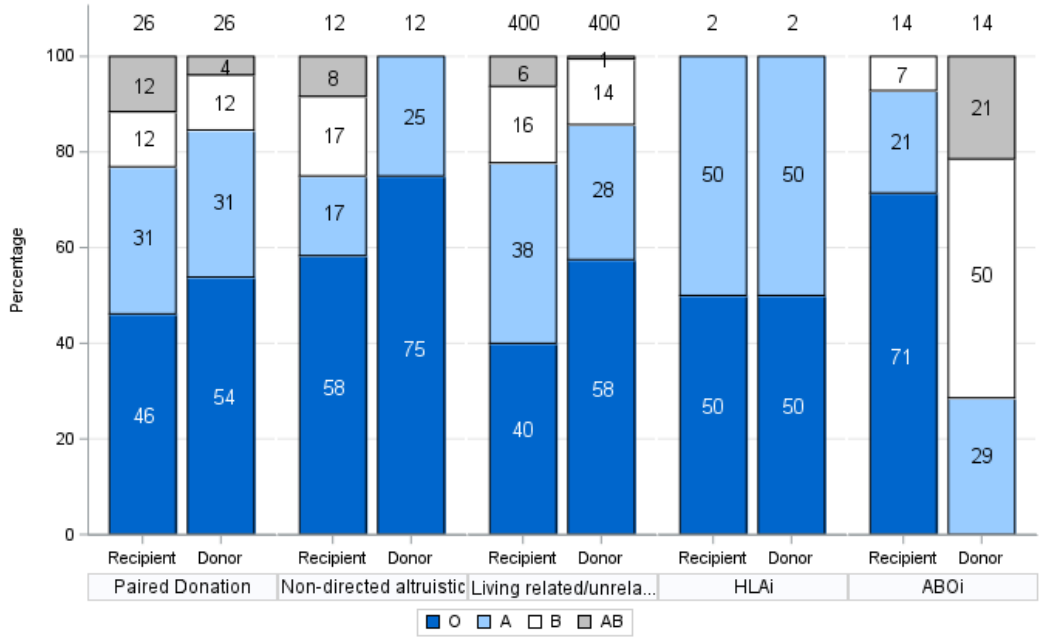


Figure 3.15 Dialysis status at transplant by paediatric transplant type, 1 April 2019 - 31 March 2025

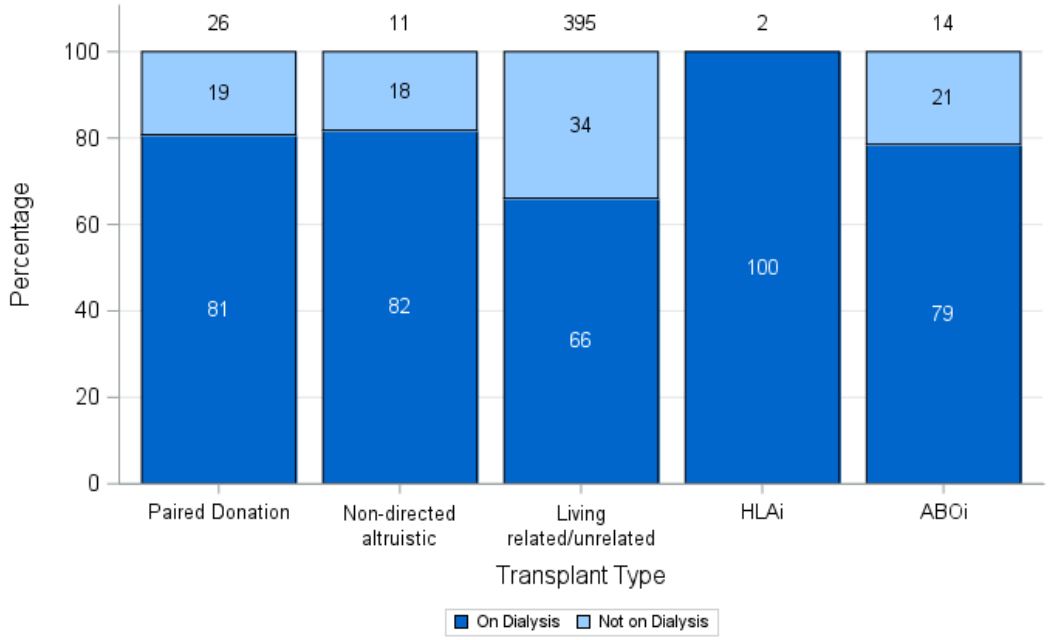
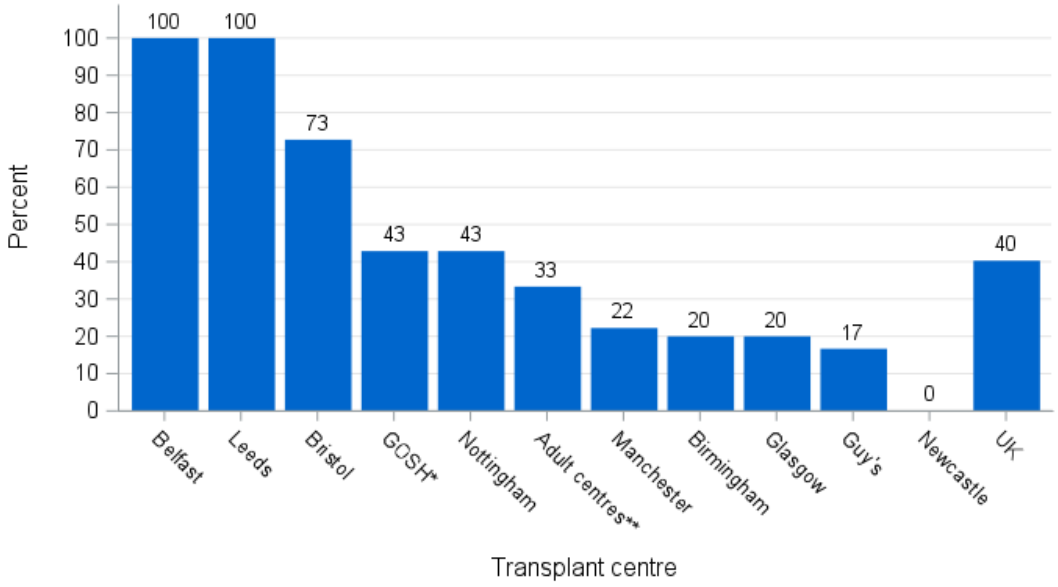


Figure 3.16 Paediatric living donor pre-emptive transplant rates by centre, 1 April 2024 - 31 March 2025



*Guy's team assess donors and perform transplants for GOSH recipients
**Adult centres includes patients under 18 years transplanted at adult units

UK Living Kidney Sharing Scheme

4.1 Paired Donation Scheme

4.1.1 Registrations: Matching Runs, 1 April 2019 – 31 March 2025

Figure 4.1 shows the number of recipients included in matching runs from 1 April 2019 to 31 March 2025. Overall, there were 1,752 recipients included in matching runs over this period. **Figure 4.2** shows the number of pairs included in each matching run, split by pair incompatibility.

Figure 4.1 Number of patients included in matching runs, 1 April 2019 - 31 March 2025

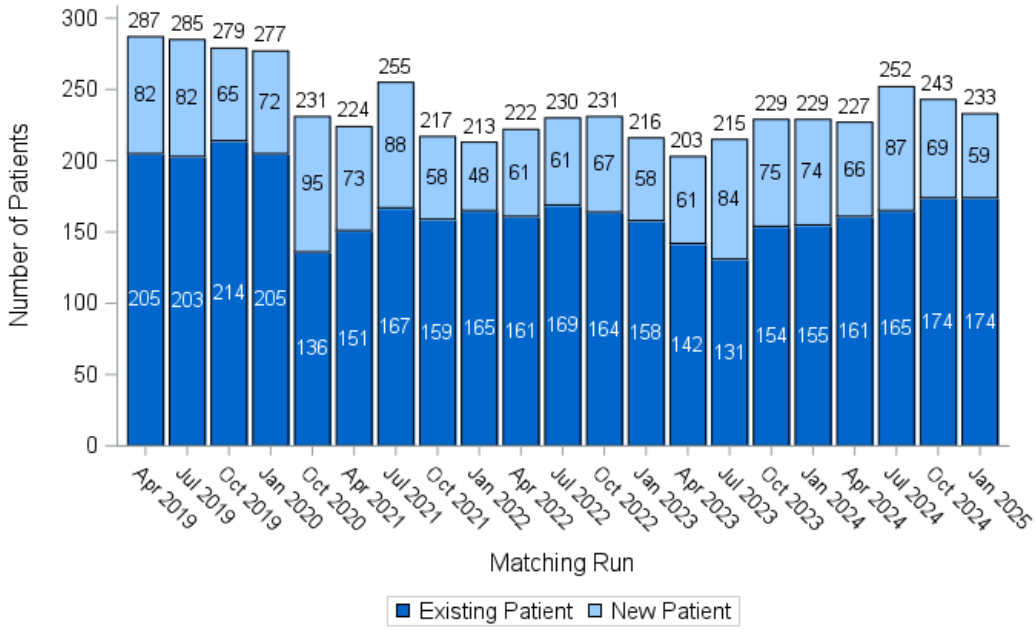


Figure 4.2 Pairs included in matching runs, 1 April 2019 - 31 March 2025

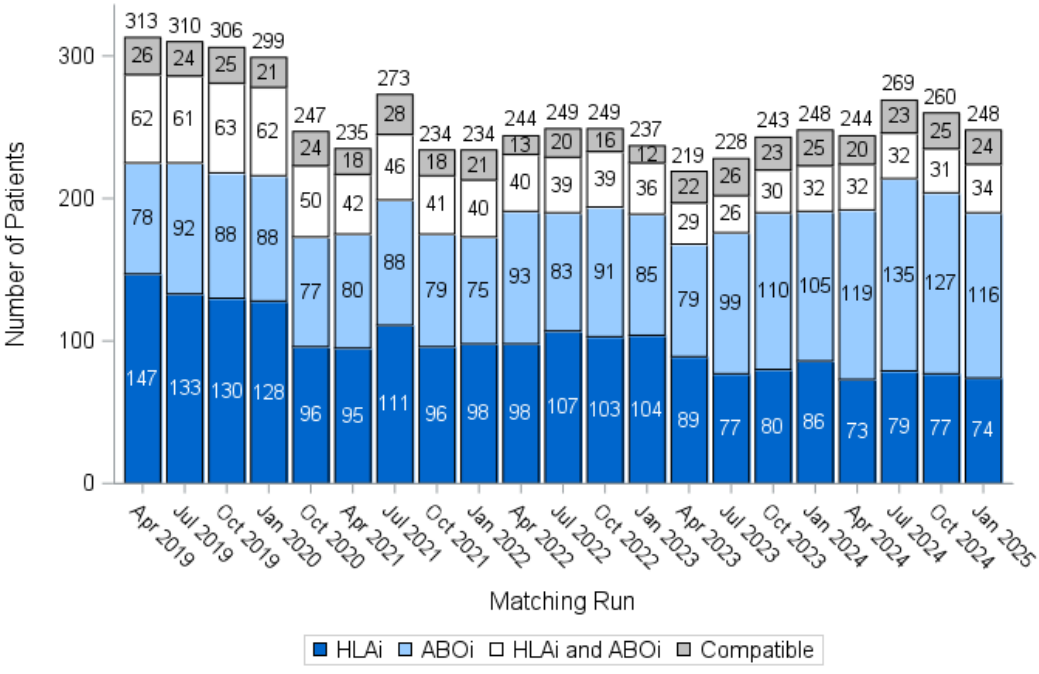


Figure 4.3 shows the number of pairs included in matching runs from 1 April 2019 to 31 March 2025 by centre. This is broken down further by the nature of the incompatibility between the pair. Most pairs registered over this period were ABO incompatible (39%). This information is also shown in **Table 4.1**.

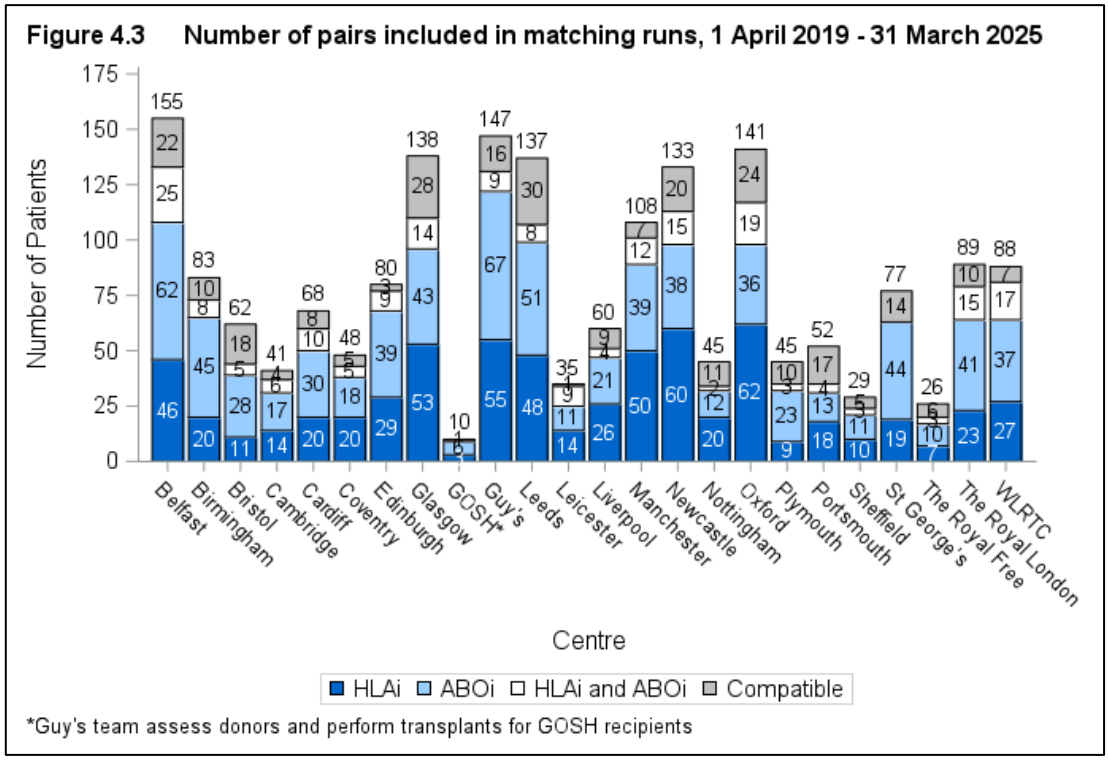


Table 4.1 **Pairs included in matching runs by compatibility and Centre, April 2019 - March 2025**

Centre	Number of pairs	HLAi	ABOi	HLAi and ABOi	Compatible
Belfast	155	46	62	25	22
Birmingham	83	20	45	8	10
Bristol	62	11	28	5	18
Cambridge	41	14	17	6	4
Cardiff	68	20	30	10	8
Coventry	48	20	18	5	5
Edinburgh	80	29	39	9	3
Glasgow	138	53	43	14	28
GOSH*	10	3	6	0	1
Guy's	147	55	67	9	16
Leeds	137	48	51	8	30
Leicester	35	14	11	9	1
Liverpool	60	26	21	4	9
Manchester	108	50	39	12	7
Newcastle	133	60	38	15	20
Nottingham	45	20	12	2	11
Oxford	141	62	36	19	24
Plymouth	45	9	23	3	10
Portsmouth	52	18	13	4	17
Sheffield	29	10	11	3	5
St George's	77	19	44	0	14
The Royal Free	26	7	10	3	6
The Royal London	89	23	41	15	10
WLRTC	88	27	37	17	7
UK	**1897**	**664**	**742**	**205**	**286**

*Guy's team assess donors and perform transplants for GOSH recipients

Table 4.2 **Recipients registered with different blood groups or unacceptable antigens, 1 April 2019 - 31 March 2025**

Year	Registered with different blood groups		Registered with unacceptable antigens		Total number of patients registered
	N	%	N	%	
19/20	4	1.5	24	8.8	272
20/21			6	6.6	91
21/22	8	3	5	1.9	267
22/23	4	1.6			244
23/24	10	3.4	15	5.1	297
24/25	7	2.5	14	5	281

4.1.2 Outcomes: Matching Runs, 1 April 2021 – 31 March 2025

Figure 4.4 shows the outcomes of recipients included in matching runs from 1 April 2021 to 31 March 2025, split by centre. Overall, 51% of recipients registered have had a transplant through the paired donation scheme.

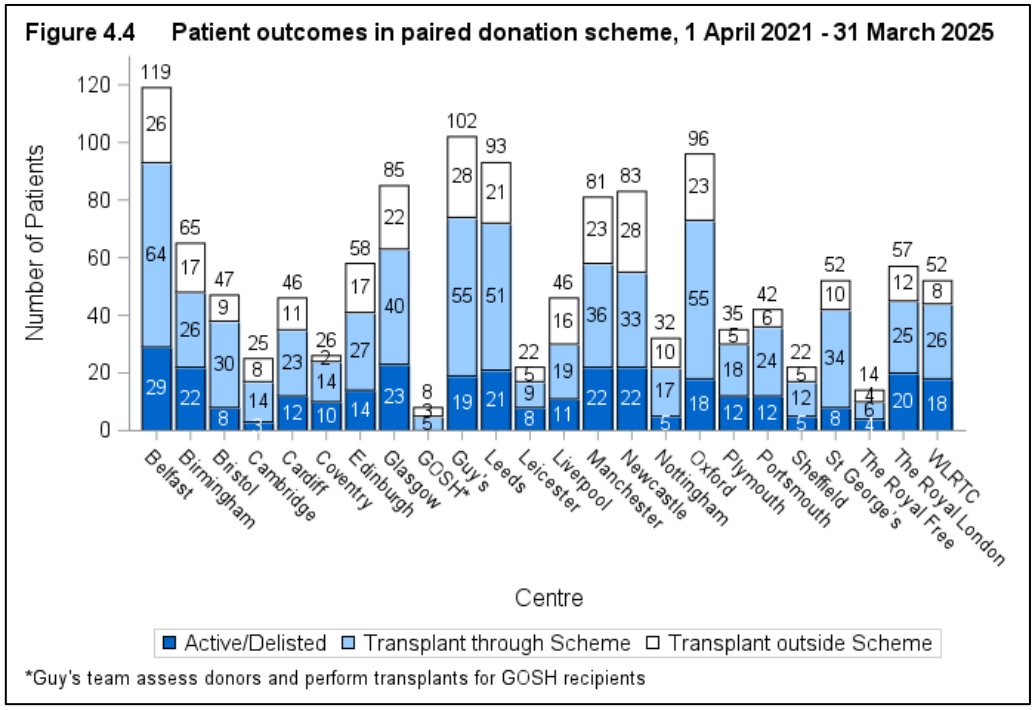
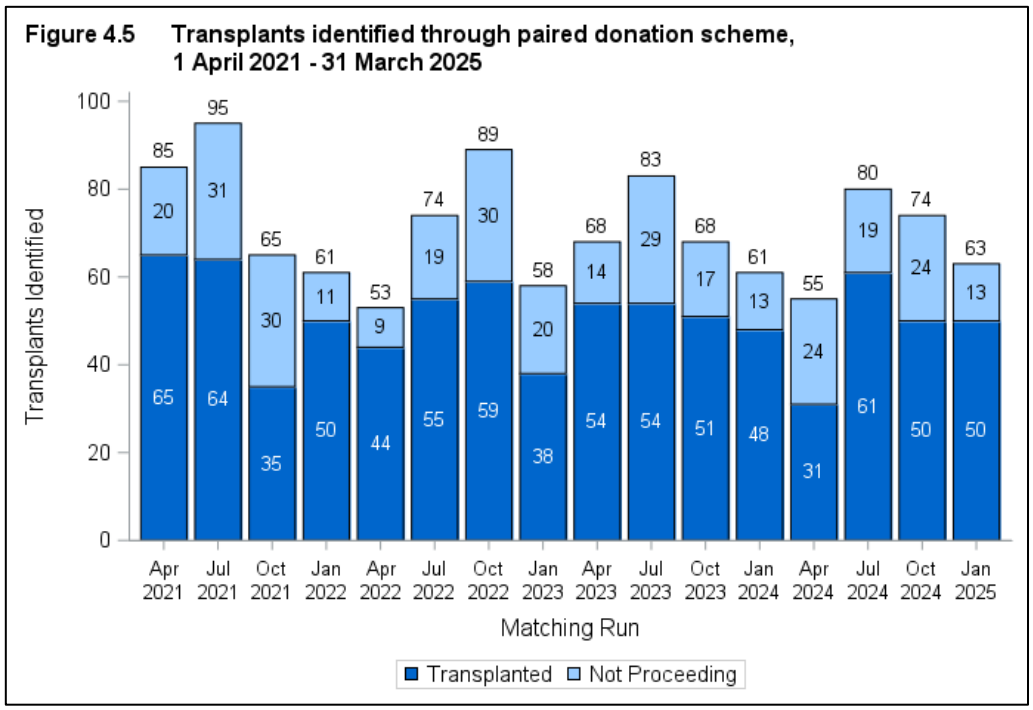


Figure 4.5 shows the transplants identified in each matching run from 1 April 2021 to 31 March 2025. The number of those that proceeded to transplant is also shown. Overall, 71% of transplants identified through the paired donation scheme have proceeded to transplant over this period.



Tables 4.3 and **4.4** show the number of transplants split by recipient calculated reaction frequency and recipient and donor blood group respectively.

Table 4.3 Transplants as a proportion of registered patients by calculated reaction frequency, 1 April 2021 - 31 March 2025

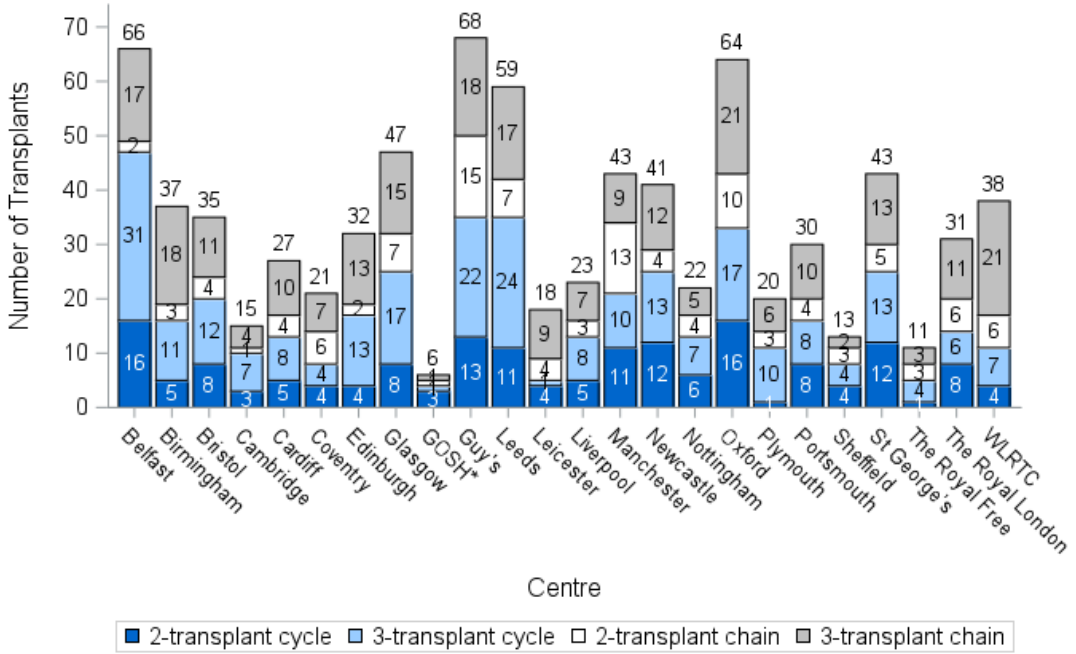
Calculated Reaction Frequency	Patients Registered	Patients Transplanted	
		N	(%)
0-9%	558	320	(57)
10-84%	390	237	(61)
85-94%	98	52	(53)
95-99%	167	52	(31)
100%	96	3	(3)

Table 4.4 Transplants as a proportion of registered pairs by blood group, 1 April 2021 - 31 March 2025

Donor Blood Group	Patient Blood Group (Patients Transplanted/Pairs Registered (%))											
	O			A			B			AB		
O	170/	319	(53%)	93/	129	(72%)	26/	48	(54%)	2/	4	(50%)
A	130/	413	(31%)	76/	140	(54%)	50/	80	(63%)	6/	13	(46%)
B	39/	117	(33%)	38/	52	(73%)	11/	33	(33%)	2/	4	(50%)
AB	5/	18	(28%)	11/	22	(50%)	5/	11	(45%)	0/	3	(0%)

Figure 4.6 shows the number of recipients transplanted from matching runs between 1 April 2021 and 31 March 2025. This is split by centre and exchange type.

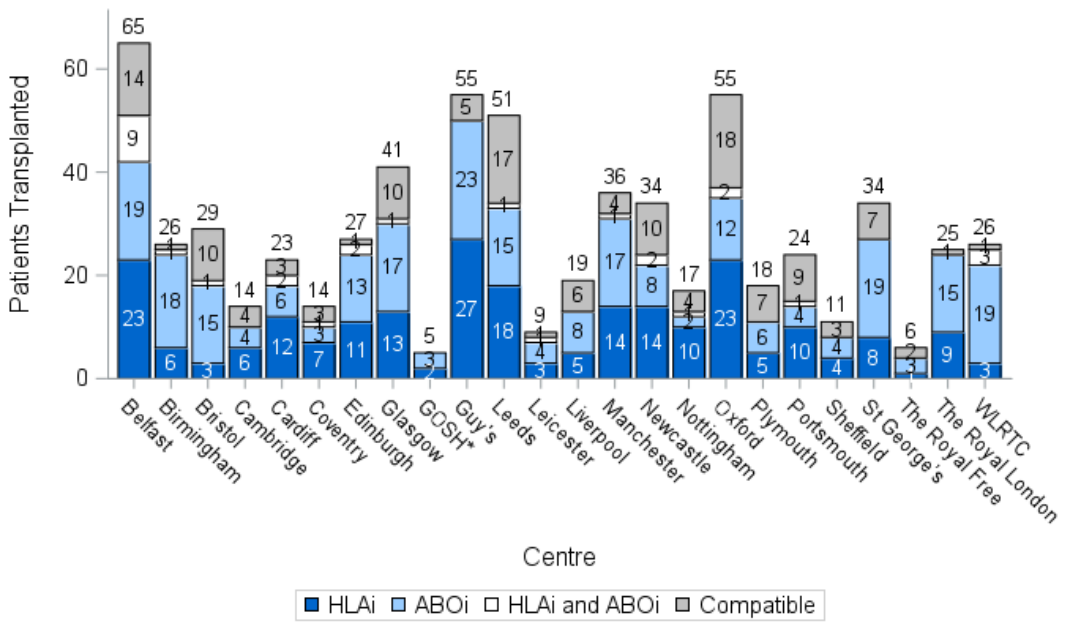
Figure 4.6 Number of transplants by type and centre, 1 April 2021 - 31 March 2025



*Guy's team assess donors and perform transplants for GOSH recipients

Figure 4.7 shows the recipients transplanted from matching runs between 1 April 2021 and 31 March 2025. This is split by centre and the incompatibility of the recipient with their registered donor. **Table 4.5** shows the number of transplants by exchange type and centre. **Table 4.6** shows the number of transplants by compatibility and centre. **Table 4.7** shows the average waiting time for transplant in the paired donation scheme. Data is censored if the recipient received a transplant outside the scheme.

Figure 4.7 Patients transplanted by pair incompatibility in matching runs, 1 April 2021 - 31 March 2025



*Guy's team assess donors and perform transplants for GOSH recipients

Table 4.5 Transplants by group type and centre, April 2021 - March 2025

Centre	Number of Transplants	2-transplant cycle	3-transplant cycle	2-transplant chain	3-transplant chain
Belfast	66	2	16	17	31
Birmingham	37	3	5	18	11
Bristol	35	4	8	11	12
Cambridge	15	1	3	4	7
Cardiff	27	4	5	10	8
Coventry	21	6	4	7	4
Edinburgh	32	2	4	13	13
Glasgow	47	7	8	15	17
GOSH*	6	1	3	1	1
Guy's	68	15	13	18	22
Leeds	59	7	11	17	24
Leicester	18	4	4	9	1
Liverpool	23	3	5	7	8
Manchester	43	13	11	9	10
Newcastle	41	4	12	12	13
Nottingham	22	4	6	5	7
Oxford	64	10	16	21	17
Plymouth	20	3	1	6	10
Portsmouth	30	4	8	10	8
Sheffield	13	3	4	2	4
St George's	43	5	12	13	13
The Royal Free	11	3	1	3	4
The Royal London	31	6	8	11	6
WLRTC	38	6	4	21	7
UK	**810**	**120**	**172**	**260**	**258**

*Guy's team assess donors and perform transplants for GOSH recipients

Table 4.6 Transplants by compatibility and centre, 1 April 2021 - 31 March 2025

Centre	Number of Transplants	HLAi	ABOi	HLA and ABOi	Compatible
Belfast	66	1	9	0	56
Birmingham	37	2	0	0	35
Bristol	35	1	0	0	34
Cambridge	15	0	0	0	15
Cardiff	27	0	1	0	26
Coventry	21	4	0	0	17
Edinburgh	32	1	0	0	31
Glasgow	47	0	0	0	47
GOSH*	6	0	0	0	6
Guy's	68	0	0	0	68
Leeds	59	2	0	0	57
Leicester	18	0	0	0	18
Liverpool	23	0	0	0	23
Manchester	43	1	0	0	42
Newcastle	41	0	1	0	40
Nottingham	22	0	0	0	22
Oxford	64	1	0	1	62
Plymouth	20	0	0	0	20
Portsmouth	30	0	0	0	30
Sheffield	13	0	0	0	13
St George's	43	0	0	0	43
The Royal Free	11	0	0	0	11
The Royal London	31	0	0	0	31
WLRTC	38	1	0	0	37
UK	**810**	**14**	**11**	**1**	**784**

*Guy's team assess donors and perform transplants for GOSH recipients

Table 4.7 Median waiting time to paired donation kidney transplant in the UK, for patients registered 1 April 2015 - 31 March 2021

Pair Incompatibility	Number of patients registered	Waiting time (days)	
		Median	95% Confidence interval
HLAi	510	391	304 - 478
ABOi	499	389	333 - 445
All Pairs	1387	386	341 - 431

4.2 Non-directed Altruistic Donation

4.2.1 Transplants, 1 April 2016 – 31 March 2025

Figure 4.8 shows the number of non-directed altruistic donor kidney transplants from 1 April 2016 to 31 March 2025. This is split by whether the donation was to the deceased donor waiting list or the donation initiated a non-altruistic donor chain.

Figure 4.8 Non-directed altruistic donor kidney transplants in the UK by type, 1 April 2016 - 31 March 2025

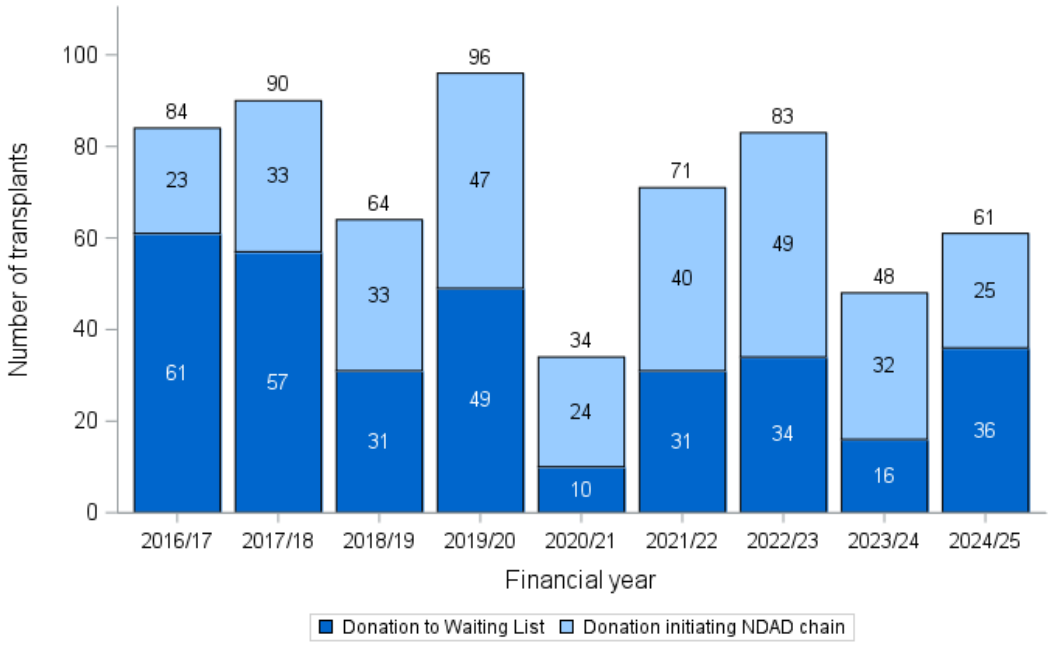


Table 4.8 shows the number of additional transplants performed through non-directed altruistic donor kidney transplant chains from 1 April 2016 to 31 March 2025.

Table 4.8 Additional transplants occurred from non-directed altruistic donor kidney transplant in the UK, April 2016 - March 2025

Financial Year	Donation to Waiting List Transplants	Donation initiating NDAD chain	Additional transplants through NDAD chains	Number of Transplants
2016/17	61	23	37	121
2017/18	57	33	49	139
2018/19	31	33	50	114
2019/20	49	47	76	172
2020/21	10	24	30	64
2021/22	31	40	67	138
2022/23	34	49	70	153
2023/24	16	32	54	102
2024/25	36	25	41	102
Total	**325**	**306**	**474**	**1105**

Figure 4.9 shows the number of non-directed altruistic donor kidney transplants from 1 April 2021 to 31 March 2025 by donor centre. **Figure 4.10** shows the number of non-directed altruistic donor kidney transplants from 1 April 2021 to 31 March 2025 by recipient centre.

Figure 4.9 Non-directed altruistic donor kidney transplants in the UK by type and donor centre, 1 April 2021 - 31 March 2025

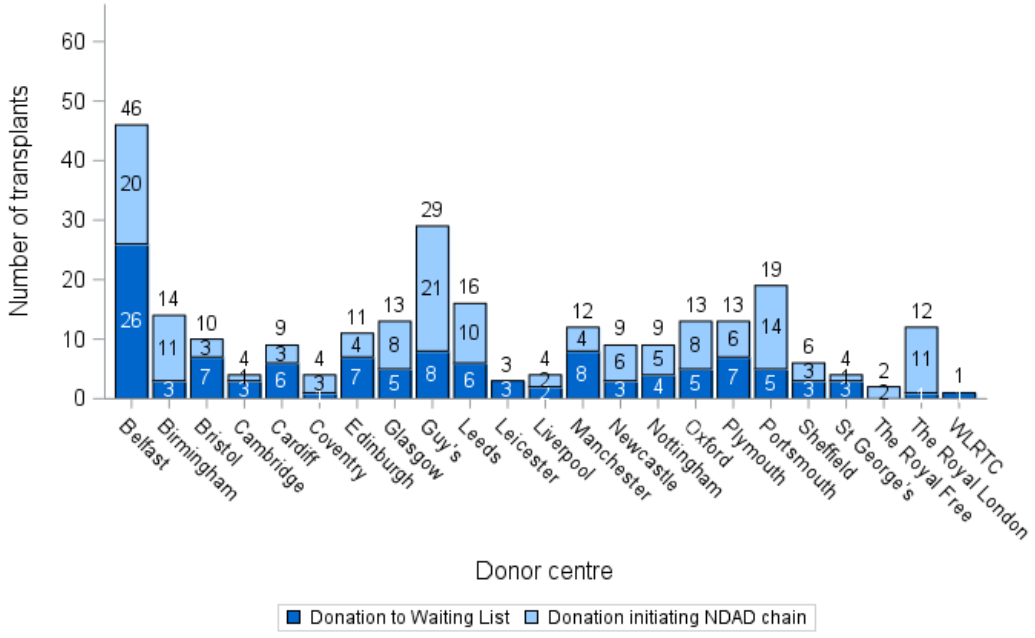
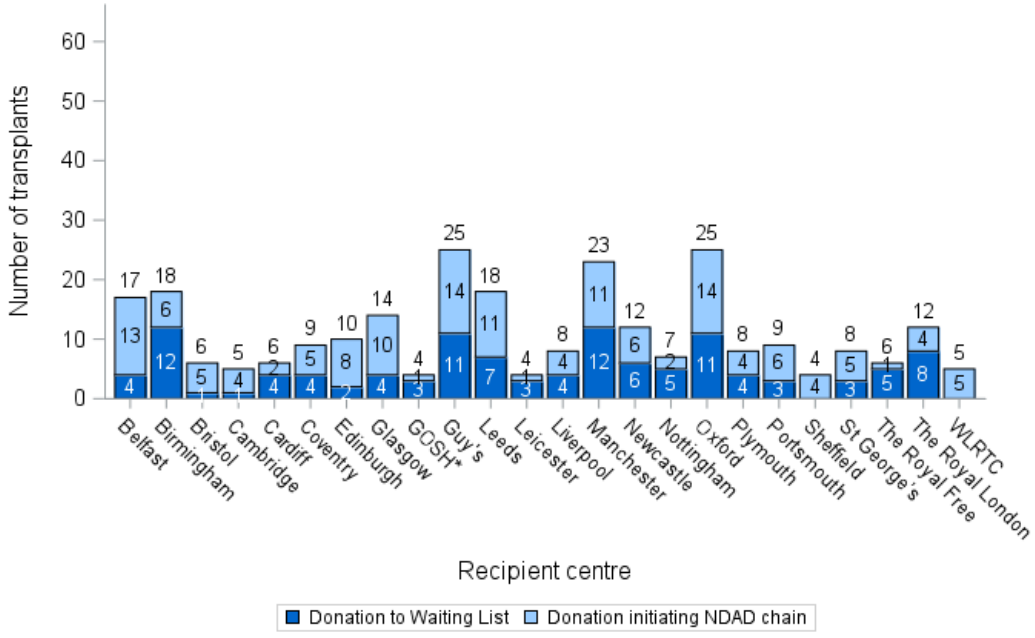


Figure 4.10 Non-directed altruistic donor kidney transplants in the UK by type and recipient centre, 1 April 2021 - 31 March 2025



4.2.2 Time to donation, 1 April 2021 – 31 March 2025

Figure 4.11 shows the median time in months from notification to donation from 1 April 2021 to 31 March 2025, by centre. This data is shown further in **Table 4.9**. The boxplot shows the minimum, lower quartile, median, upper quartile and maximum values. The boxplots are used to show the variation in the data and indicate any outlying values, which are shown by the circles on the plot. The box itself shows the interquartile range and the line inside the box indicates the median value.

Figure 4.11 Median time between notification and donation by centre, notifications April 2021 - March 2025

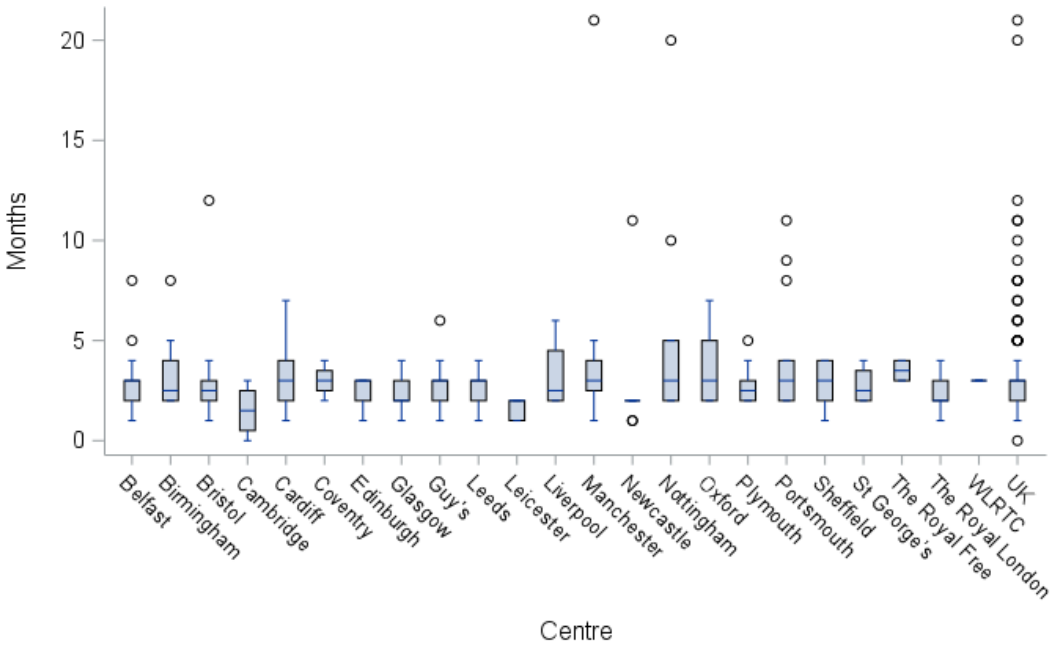


Table 4.9	Median time between notification and donation by Centre, Donations April 2021 - March 2025			
Centre	Number of donors	Median	Lower quartile	Upper quartile
Belfast	42	3	2	3
Birmingham	12	3	2	4
Bristol	10	3	2	3
Cambridge	4	2	1	3
Cardiff	9	3	2	4
Coventry	4	3	2	3
Edinburgh	11	3	2	3
Glasgow	12	2	2	3
Guy's	29	3	2	3
Leeds	13	3	2	3
Leicester	3	2	1	2
Liverpool	4	2	2	4
Manchester	12	3	2	4
Newcastle	9	2	2	2
Nottingham	9	3	2	5
Oxford	11	3	2	5
Plymouth	10	2	2	3
Portsmouth	19	3	2	4
Sheffield	6	3	2	4
St George’s	4	3	2	4
The Royal Free	2	4	3	4
The Royal London	11	2	2	3
WLRTC	1	3	3	3
UK	**247**	**3**	**2**	**3**

Antibody Incompatible Transplants

This section only includes living donor antibody incompatible kidney only transplants.

Antibody Incompatible transplant data is collected on the Antibody Incompatible Transplant Details form. **Figure 5.1** and **Table 5.1** show the form return rates by centre and include data on forms relating to antibody incompatible transplants from direct living donation and via the UKLKSS. The remainder of the section contains data on direct transplants only.

Figure 5.1 Antibody Incompatible Transplants return rates, 1 April 2015 - 31 March 2025

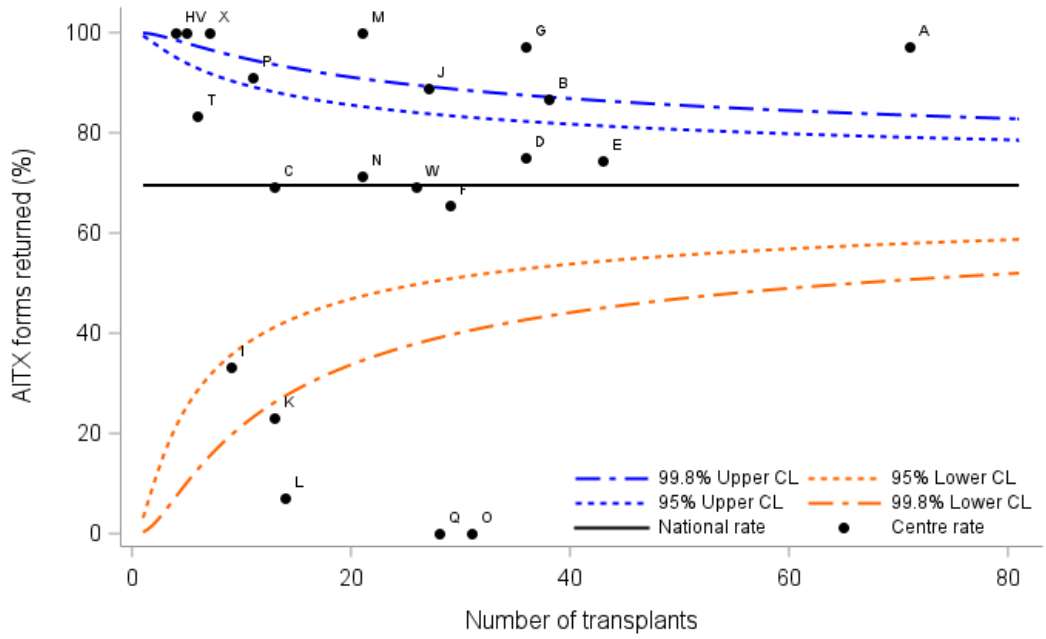


Table 5.1 **Antibody incompatible transplant form return rates, 1 April 2015 – 31 March 2025**

Transplant Centre	Code	Number of transplants	AITX forms returned N	%
Belfast	A	71	69	97
Birmingham	B	38	33	87
Bristol	C	13	9	69
Cambridge	D	36	27	75
Cardiff	E	43	32	74
Coventry	F	29	19	66
Edinburgh	G	36	35	97
Glasgow	H	4	4	100
GOSH*	I	9	3	33
Guy's	J	27	24	89
Leeds	K	13	3	23
Leicester	L	14	1	7
Liverpool	M	21	21	100
Manchester	N	21	15	71
Newcastle	O	31	-	-
Nottingham	P	11	10	91
Oxford	Q	28	-	-
Plymouth	R	0	-	-
Portsmouth	S	0	-	-
Sheffield	T	6	5	83
St George's	U	0	-	-
The Royal Free	V	5	5	100
The Royal London	W	26	18	69
WLRTC	X	7	7	100
UK		**489**	**340**	**70**

*Guy's team assess donors and perform transplants for GOSH recipients

ADULT

Figures 5.2 and **5.3** show the number of living donor antibody incompatible kidney transplants by financial year and centre respectively.

Figure 5.2 Adult living donor antibody incompatible kidney transplants in the UK, 1 April 2015 - 31 March 2025

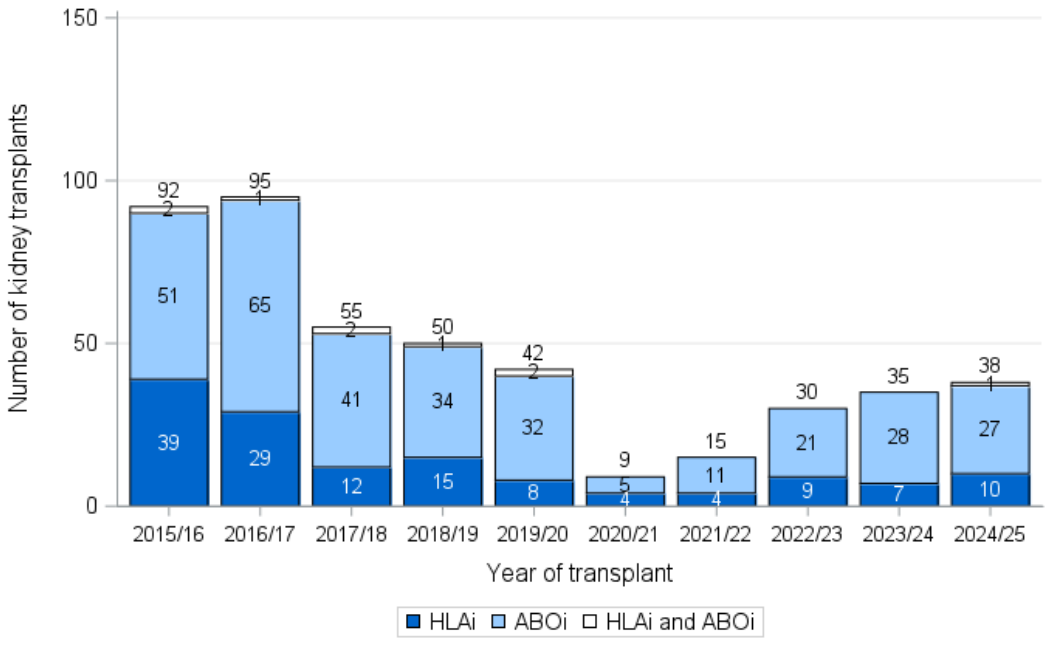


Figure 5.3 Adult living donor antibody incompatible kidney transplants in the UK, 1 April 2015 - 31 March 2025

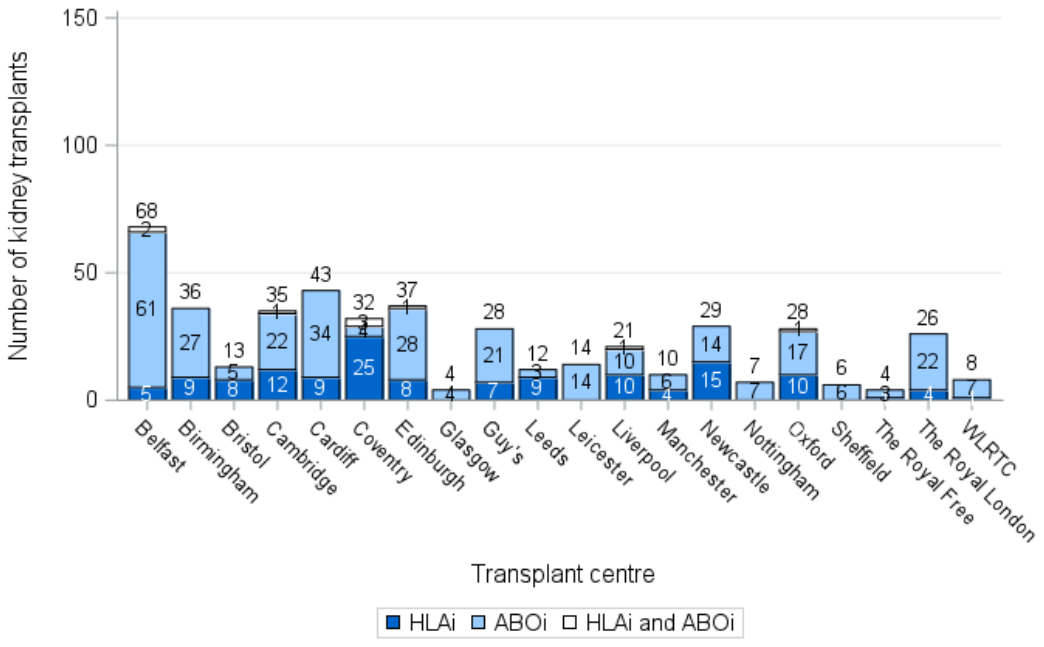


Table 5.2 shows the donor and recipient blood group for all ABOi transplants.

Table 5.2 Donor and recipient blood group for all adult ABOi transplants, 1 April 2015 - 31 March 2025

Recipient blood group	Donor blood group					
	A		B		AB	
	N	(%)	N	(%)	N	(%)
A	1	(0.3)	22	(6.8)	17	(5.2)
B	40	(12.3)	-		20	(6.2)
O	150	(46.3)	69	(21.3)	3	(0.9)

Table 5.3 shows the donor and recipient ABO by recipient CRF at transplant.

Table 5.3 Donor and recipient ABO by recipient CRF at transplant, 1 April 2015 - 31 March 2025

Donor-Recipient ABO	Recipient CRF at transplant							
	0-9		10-84		85-94		95-100	
	N	(%)	N	(%)	N	(%)	N	(%)
A-A	6	(1.3)	11	(2.4)	13	(2.8)	17	(3.7)
A-AB	-		2	(0.4)	1	(0.2)	1	(0.2)
A-B	27	(5.9)	6	(1.3)	4	(0.9)	3	(0.7)
A-O	99	(21.5)	38	(8.2)	6	(1.3)	8	(1.7)
AB-A	12	(2.6)	3	(0.7)	-		2	(0.4)
AB-AB	-		-		-		1	(0.2)
AB-B	16	(3.5)	3	(0.7)	-		1	(0.2)
AB-O	1	(0.2)	1	(0.2)	1	(0.2)	-	
B-A	14	(3.0)	5	(1.1)	2	(0.4)	1	(0.2)
B-B	4	(0.9)	4	(0.9)	3	(0.7)	2	(0.4)
B-O	43	(9.3)	18	(3.9)	3	(0.7)	5	(1.1)
O-A	4	(0.9)	1	(0.2)	1	(0.2)	5	(1.1)
O-AB	-		1	(0.2)	-		-	
O-B	-		-		1	(0.2)	2	(0.4)
O-O	16	(3.5)	15	(3.3)	11	(2.4)	17	(3.7)

Table 5.4 shows the pre and at transplant level group for all HLAi transplants. Data are only presented for cases where an antibody incompatible form has been completed and returned. **Table 5.5** shows the calculated reaction frequency by incompatibility type.

Table 5.4 **Pre and at transplant antibody level group for all adult HLAi transplants, 1 April 2015 - 31 March 2025**

	At Transplant antibody level group											
Pre treatment antibody level group	CDC pos, Flow pos, DSA SPA pos		CDC neg, Flow pos, DSA SPA pos		CDC neg, Flow neg, DSA SPA pos		CDC neg, Flow neg, DSA SPA neg		CDC NT, Flow pos, DSA SPA pos		Unknown	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
CDC NT, Flow pos, DSA SPA pos	-		-		2	(2.4)	-		7	(8.5)	-	
CDC neg, Flow neg, DSA SPA pos	-		-		25	(30.5)	1	(1.2)	-		1	(1.2)
CDC neg, Flow pos, DSA SPA pos	-		12	(14.6)	8	(9.8)	7	(8.5)	-		4	(4.9)
Unknown	-		-		-		2	(2.4)	-		13	(15.9)

Table 5.5 **At transplant calculated reaction frequency by incompatibility type, 1 April 2015 - 31 March 2025**

Calculated Reaction Frequency	ABOi		HLAi		HLAi and ABOi	
	N	%	N	%	N	%
0-9	212	(67.3)	30	(21.9)	-	(0.0)
10-84	72	(22.9)	35	(25.5)	1	(11.1)
85-94	15	(4.8)	29	(21.2)	2	(22.2)
95-100	16	(5.1)	43	(31.4)	6	(66.7)

PAEDIATRIC

Figures 5.4 and **5.5** show the number of living donor antibody incompatible kidney transplants by financial year and centre respectively.

Figure 5.4 Paediatric living donor antibody incompatible kidney transplants in the UK, 1 April 2015 - 31 March 2025

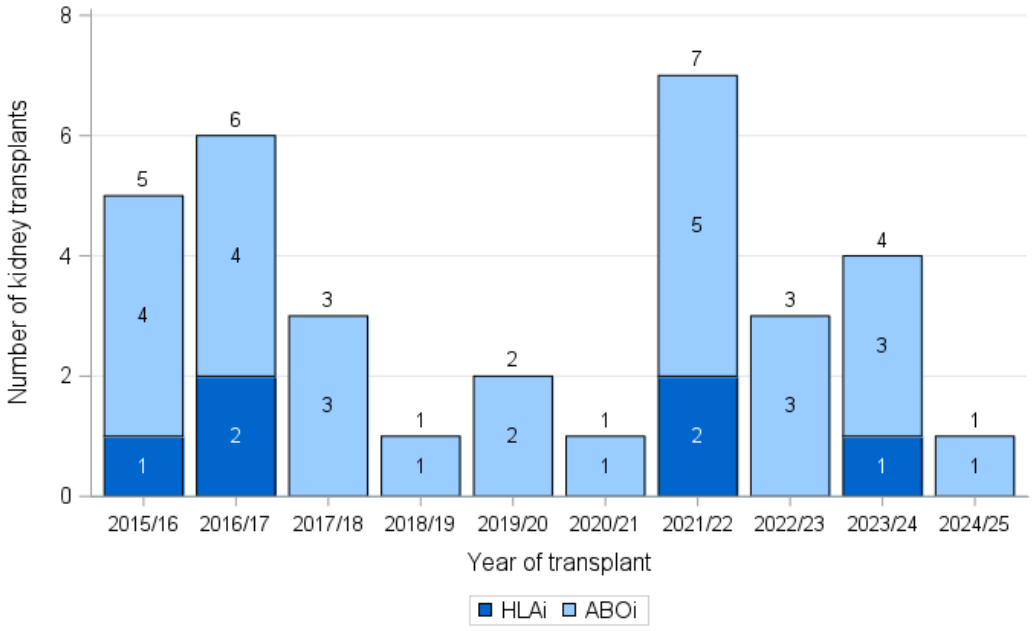
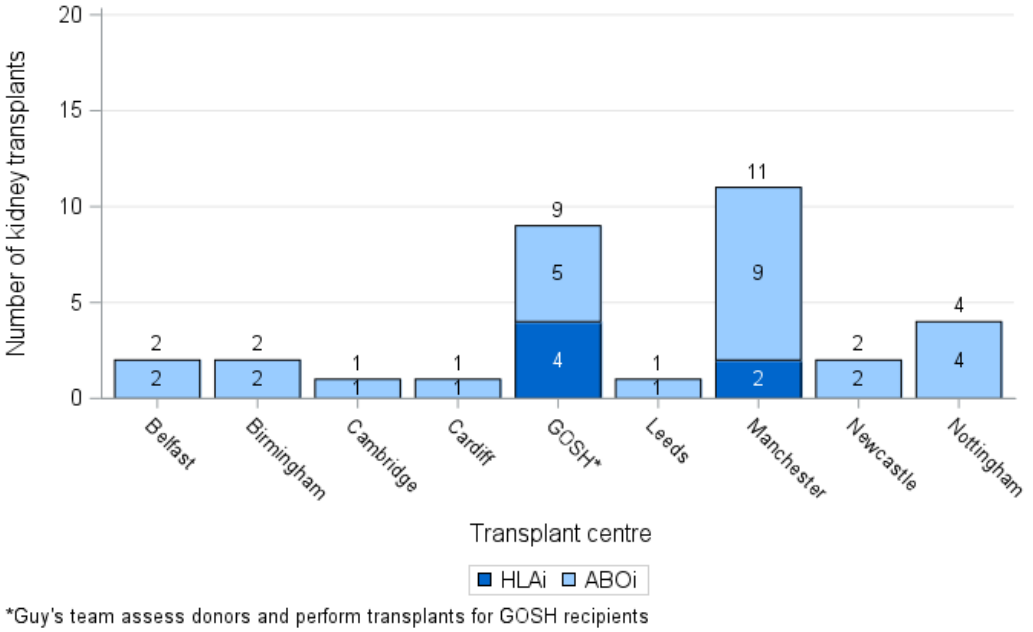


Figure 5.5 Paediatric living donor antibody incompatible kidney transplants in the UK, 1 April 2015 - 31 March 2025

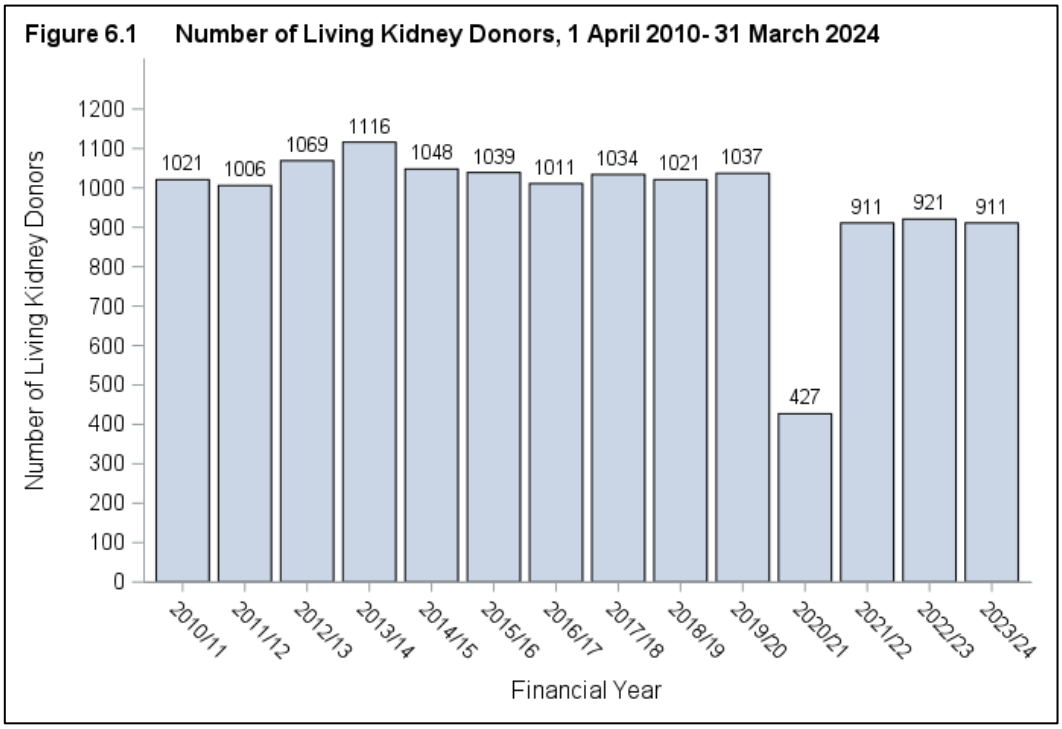


*Guy's team assess donors and perform transplants for GOSH recipients

Living Donor Follow-Up

This section contains information on all living donors who have donated to both adult and paediatric recipients from 2010/11 to 2023/24. Percentages are omitted if the reported proportion of the data item at 1 year is less than 75%, at 5 years is less than 50% or at 10 years is less than 35% at each centre.

Figure 6.1 shows the number of living donor kidney donors by financial year from 2010/11 to 2023/24.



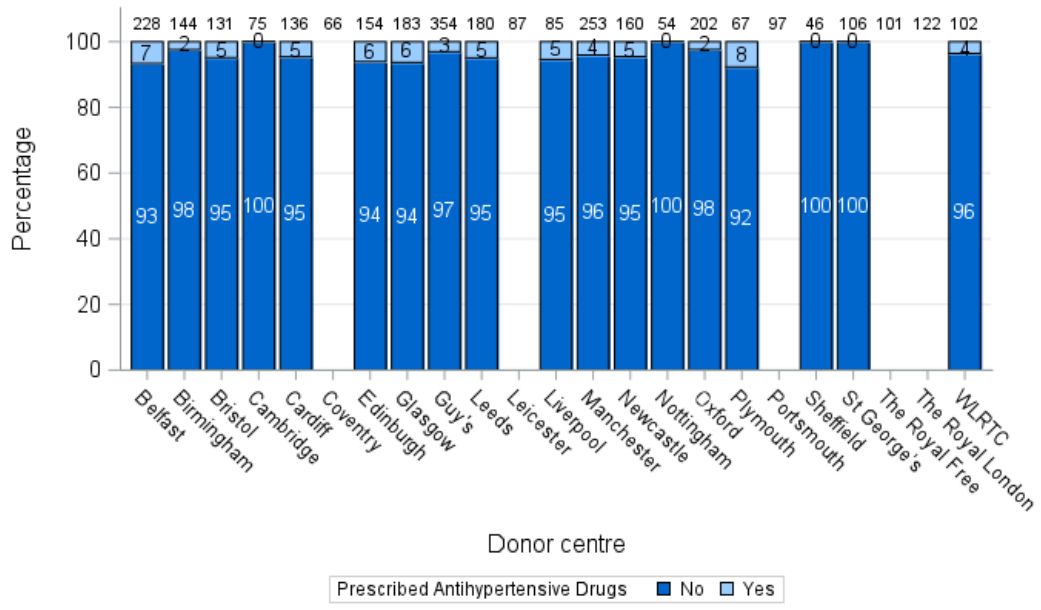
Of the living donors over this period, 114 deaths have been recorded. The causes of death are shown in **Table 6.1**. Two donors joined the kidney waiting list and received a kidney from a deceased donor, one has received two separate kidney transplants from deceased donors, and one received a kidney transplant from a living donor.

Table 6.1	Cause of death for living donors 1 April 2010 – 31 March 2024	
Cause of Death	N	%
Cancer	37	32
Bowel	2	2
Breast	1	1
Colonic	2	2
Liver	2	2
Lung	6	5
Oesophagus	2	2
Pancreatic	6	5
Prostate	2	2
Testicular	1	1
Other	13	11
Brain Tumor	2	2
Intracranial hemorrhage	3	3
Seizure	3	3
RTA	2	2
Suicide	5	4
Bronchopneumonia	2	2
Other	26	23
Unknown	34	30
TOTAL	**114**	**100**

6.1 Prescription of Antihypertensive drugs, 1 April 2010 – 31 March 2024

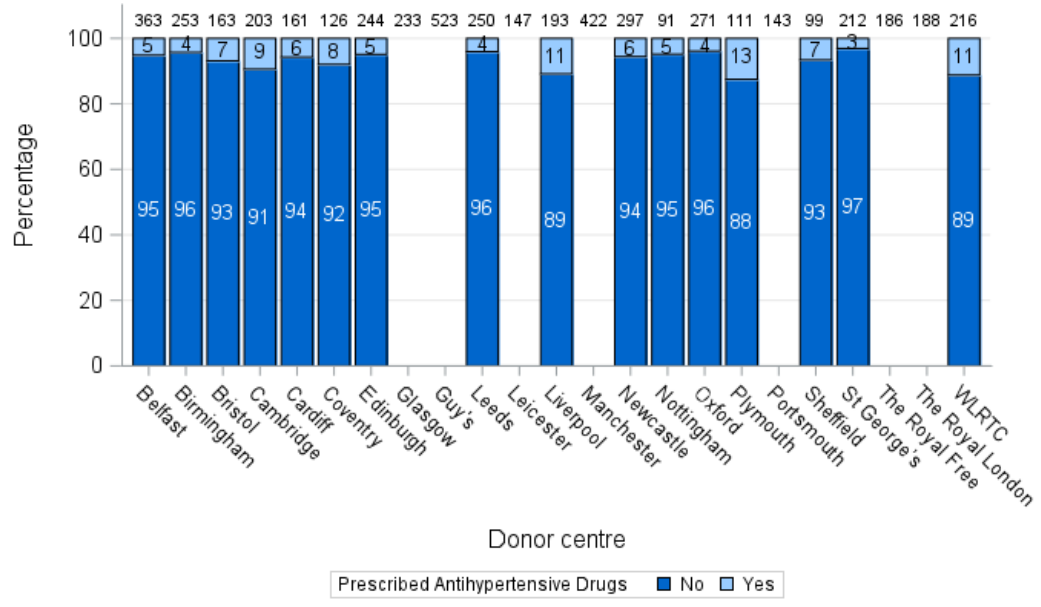
Figure 6.2, 6.3 and 6.4 show the proportion of living donor kidney donors where the donor has been prescribed antihypertensive drugs at 1, 5 and 10 year follow-up by centre, respectively. The same information is summarised in **Table 6.2**.

Figure 6.2 Percentage of Donors Prescribed Antihypertensive Drugs at 1 Year Follow-up, Donations 1 April 2020- 31 March 2024



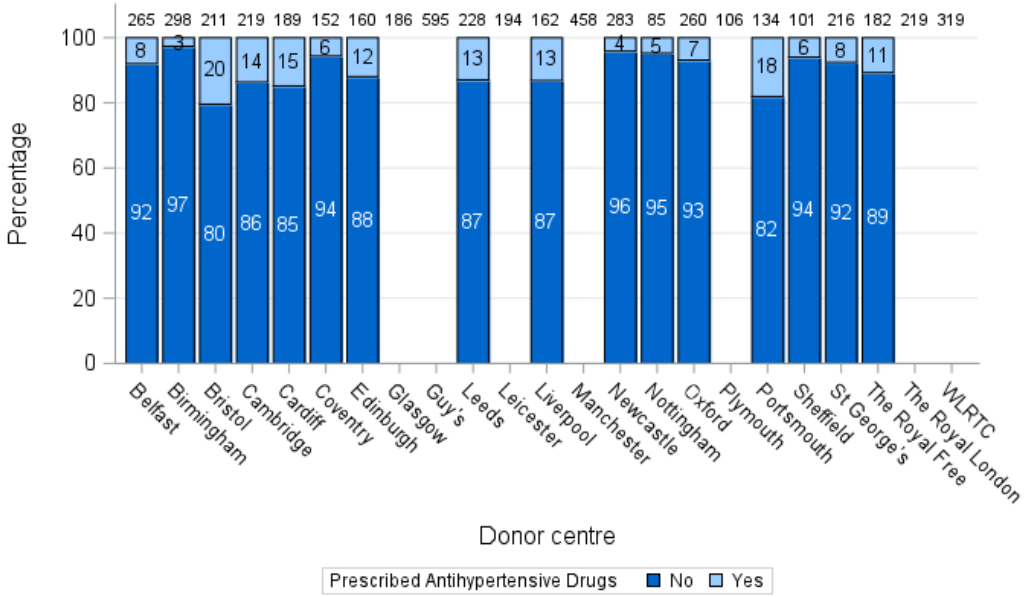
Percentages are omitted where less than 75% of data reported

Figure 6.3 Percentage of Donors Prescribed Antihypertensive Drugs at 5 Year Follow-up, Donations 1 April 2015- 31 March 2020



Percentages are omitted where less than 50% of data reported

Figure 6.4 Percentage of Donors Prescribed Antihypertensive Drugs at 10 Year Follow-up, Donations 1 April 2010- 31 March 2015



Percentages are omitted where less than 35% of data reported

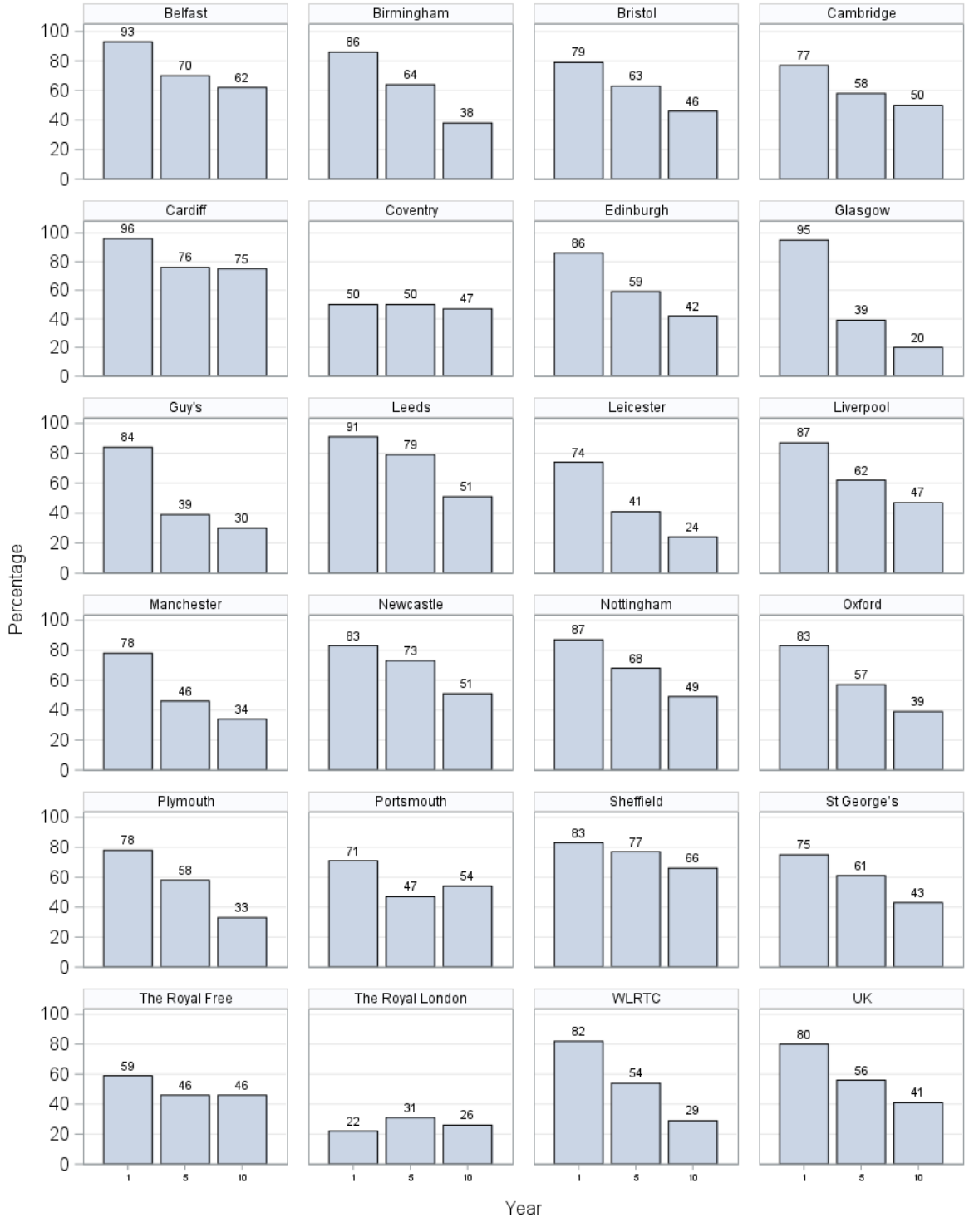
Table 6.2 **Percentage of Donors Prescribed Antihypertensive Drugs by Centre, Donations April 2010 - March 2024**

Centre	1 Year			5 Year			10 Year		
	N	%[1]	%[2]	N	%[1]	%[2]	N	%[1]	%[2]
Belfast	228	93	7	363	70	5	265	62	8
Birmingham	144	86	2	253	64	4	298	38	3
Bristol	131	79	5	163	63	7	211	46	20
Cambridge	75	77	0	203	58	9	219	50	14
Cardiff	136	96	5	161	76	6	189	75	15
Coventry	66	50	-	126	50	8	152	47	6
Edinburgh	154	86	6	244	59	5	160	42	12
Glasgow	183	95	6	233	39	-	186	20	-
Guy's	354	84	3	523	39	-	595	30	-
Leeds	180	91	5	250	79	4	228	51	13
Leicester	87	74	-	147	41	-	194	24	-
Liverpool	85	87	5	193	62	11	162	47	13
Manchester	253	78	4	422	46	-	458	34	-
Newcastle	160	83	5	297	73	6	283	51	4
Nottingham	54	87	0	91	68	5	85	49	5
Oxford	202	83	2	271	57	4	260	39	7
Plymouth	67	78	8	111	58	13	106	33	-
Portsmouth	97	71	-	143	47	-	134	54	18
Sheffield	46	83	0	99	77	7	101	66	6
St George's	106	75	0	212	61	3	216	43	8
The Royal Free	101	59	-	186	46	-	182	46	11
The Royal London	122	22	-	188	31	-	219	26	-
WLRTC	102	82	4	216	54	11	319	29	-
UK	**3133**	**80**	**4**	**5095**	**56**	**6**	**5222**	**41**	**11**

[1]% of donors with follow-up reported
[2]% of donors that have been prescribed antihypertensive drugs (where follow-up returned)
- Percentages are omitted where less than 75%, 50% or 35% of data reported at 1yr, 5yrs or 10yrs

Figure 6.5 shows the percentage of donors with follow-up reported by centre, for donations between April 2010 - March 2024.

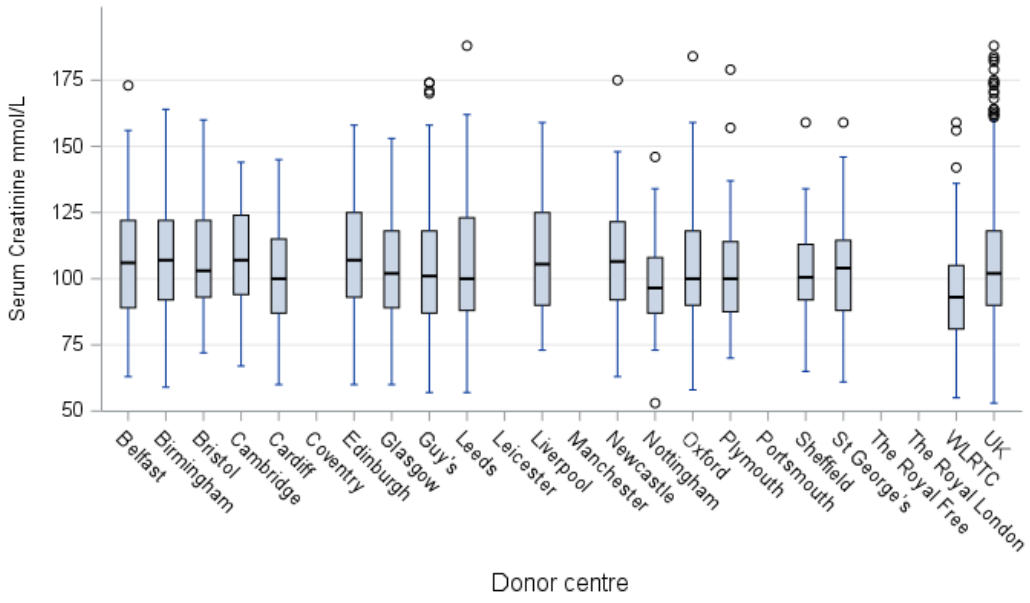
Figure 6.5 Percentage of donors with lifetime follow-up reported, by centre



6.2 Serum creatinine, 1 April 2010 – 31 March 2024

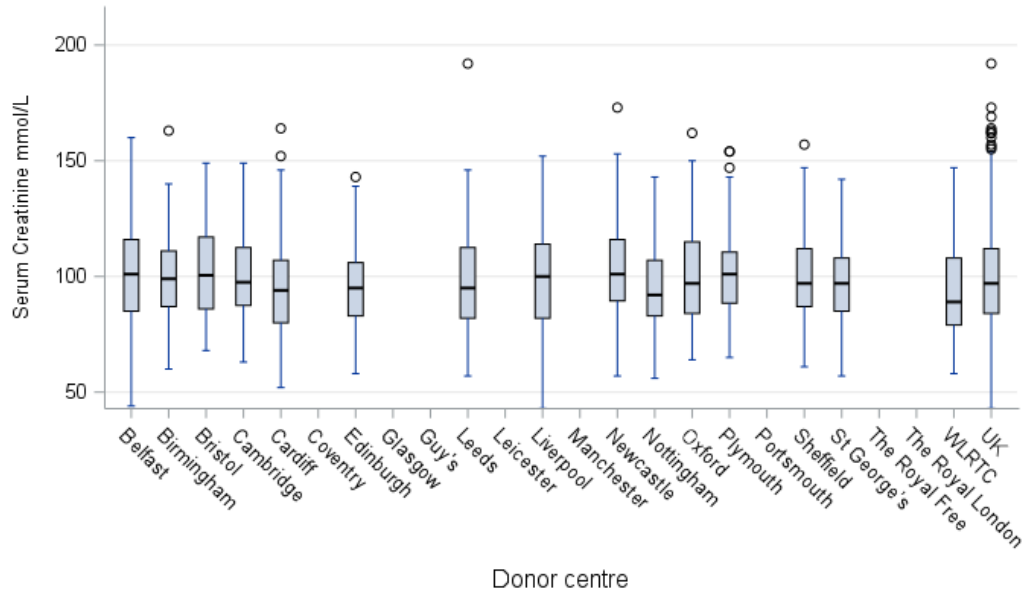
Figure 6.6, 6.7 and 6.8 show the median serum creatinine at 1, 5 and 10 year follow-up by centre, respectively. The same information is summarised in **Table 6.3**.

Figure 6.6 Median Serum Creatinine at 1 year follow-up by Centre, Donations 1 April 2020 - 31 March 2024



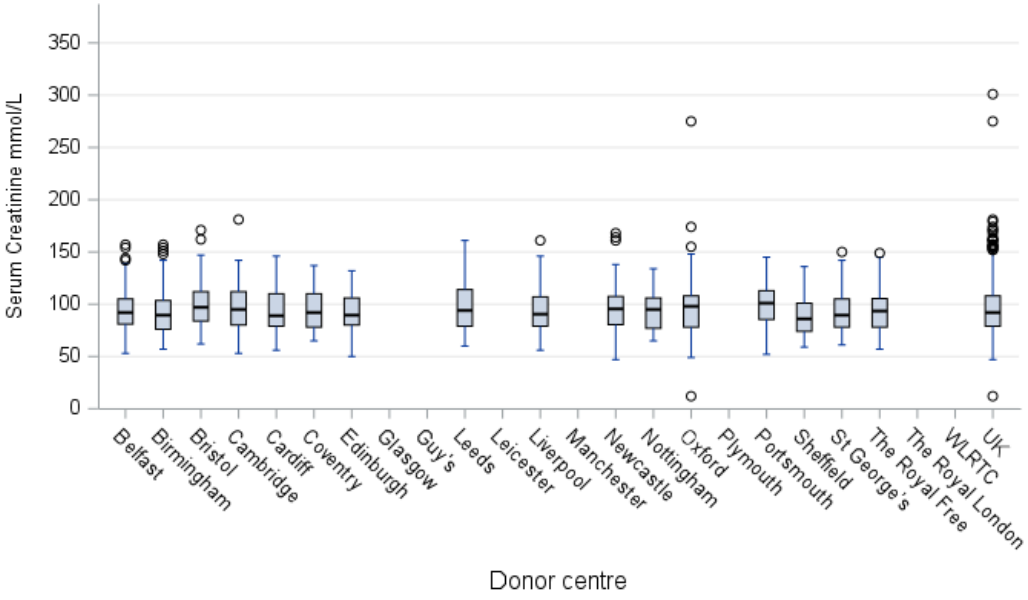
Median omitted where less than 75% of data reported

Figure 6.7 Median Serum Creatinine at 5 year follow-up by Centre, Donations 1 April 2015 - 31 March 2020



Median omitted where less than 50% of data reported

Figure 6.8 Median Serum Creatinine at 10 year follow-up by Centre, Donations 1 April 2010 - 31 March 2015



Median omitted where less than 35% of data reported

Table 6.3 **Median serum creatinine at 1, 5 and 10 year follow up by centre, donations 1 April 2010 - 31 March 2024**

Centre	1 Year			5 Year			10 Year		
	N	%[1]	Median (IQ range)	N	%[1]	Median (IQ range)	N	%[1]	Median (IQ range)
Belfast	228	92	106 (89-122)	363	70	101 (85-116)	265	62	92 (81-105)
Birmingham	144	85	107 (92-122)	253	63	99 (87-111)	298	38	89.5 (76-103.5)
Bristol	131	78	103 (93-122)	163	61	100.5 (86-117)	211	46	97 (84-112)
Cambridge	75	76	107 (94-124)	203	57	97.5 (87.5-112.5)	219	50	95 (80-112)
Cardiff	136	96	100 (87-115)	161	75	94 (80-107)	189	75	89 (79-110)
Coventry	66	50	-	126	48	-	152	46	92 (78-110)
Edinburgh	154	84	107 (93-125)	244	57	95 (83-106)	160	41	89.5 (80-106)
Glasgow	183	95	102 (89-118)	233	39	-	186	20	-
Guy's	354	83	101 (87-118)	523	39	-	595	29	-
Leeds	180	90	100 (88-123)	250	78	95 (82-112.5)	228	50	94 (79-114)
Leicester	87	74	-	147	41	-	194	24	-
Liverpool	85	82	105.5 (90-125)	193	56	100 (82-114)	162	46	90.5 (79-107)
Manchester	253	71	-	422	43	-	458	34	-
Newcastle	160	83	106.5 (92-121.5)	297	71	101 (89.5-116)	283	51	95.5 (80.5-107.5)
Nottingham	54	85	96.5 (87-108)	91	67	92 (83-107)	85	48	95 (77-106)
Oxford	202	81	100 (90-118)	271	55	97 (84-115)	260	39	98 (78-108)
Plymouth	67	78	100 (87.5-114)	111	58	101 (88.5-110.5)	106	33	-
Portsmouth	97	71	-	143	45	-	134	51	101 (85.5-113)
Sheffield	46	83	100.5 (92-113)	99	75	97 (87-112)	101	63	86 (74-101)
St George's	106	75	104 (88-114.5)	212	61	97 (85-108)	216	42	89.5 (78-105)
The Royal Free	101	59	-	186	46	-	182	46	93.5 (78-105.5)
The Royal London	122	22	-	188	30	-	219	26	-
WLRTC	102	82	93 (81-105)	216	54	89 (79-108)	319	29	-
UK	**3133**	**79**	**102 (90-118)**	**5095**	**55**	**97 (84-112)**	**5222**	**41**	**92 (79-108)**

[1]% of donors with follow-up reported
- Medians are omitted where less than 75%, 50% or 35% of data reported at 1yr, 5yrs or 10yrs

6.3 Return to normal activity, 1 April 2010 – 31 March 2024

Figure 6.9 shows the median time (in months) to return to normal activity after donation, by centre. The median ranged from 1 to 3 months post-transplant.

Figure 6.9 Median time until the donor returned to previous levels of general activity by Centre, Donations April 2020 - March 2024

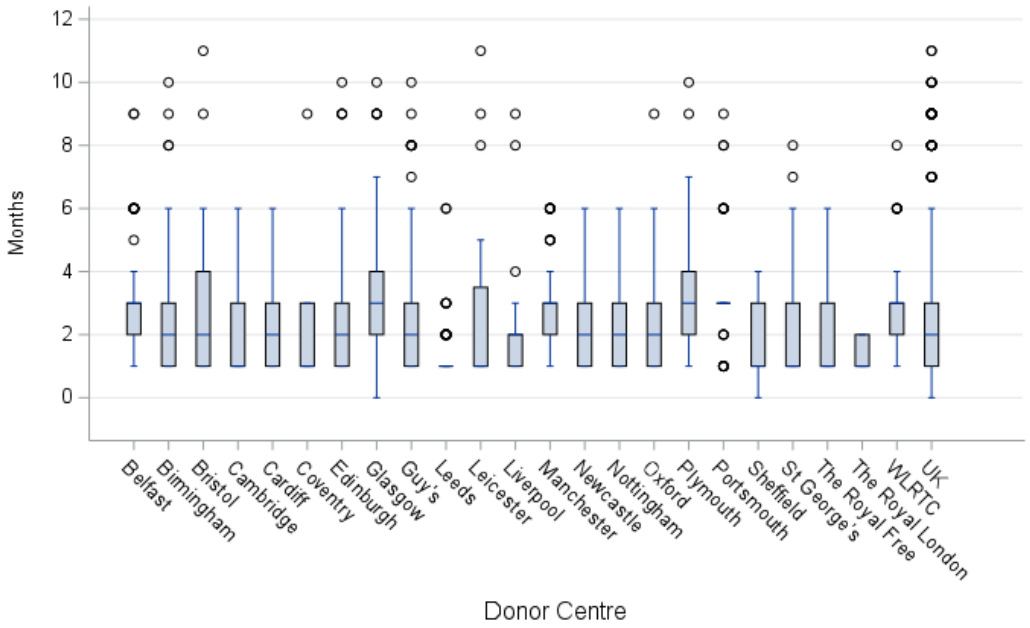
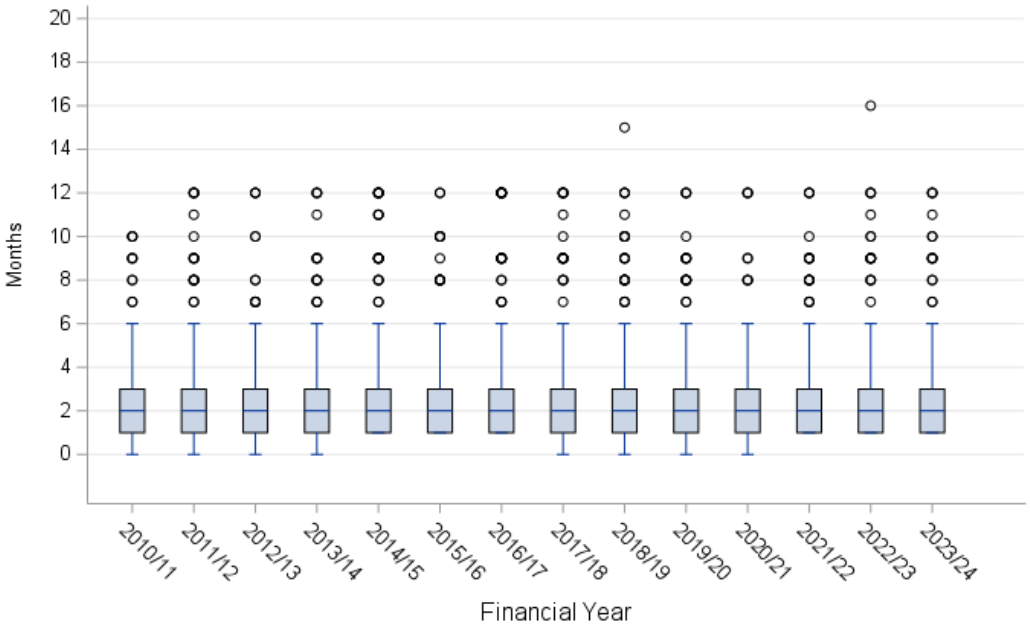


Figure 6.10 shows the median time (in months) to return to normal activity after donation in the UK, by financial year.

Figure 6.10 Median time until the donor returned to previous levels of general activity by financial year, Donations April 2010 - March 2024



Graft and Patient survival

ADULT

One and five year graft and patient survival are shown in **Figures 7.1-7.4** following adult living donor kidney transplants by donor type. **Tables 7.1-7.4** show the survival rates and 95% confidence limits.

Figure 7.1 1 year graft survival following adult living kidney transplant between 1 April 2020 and 31 March 2024

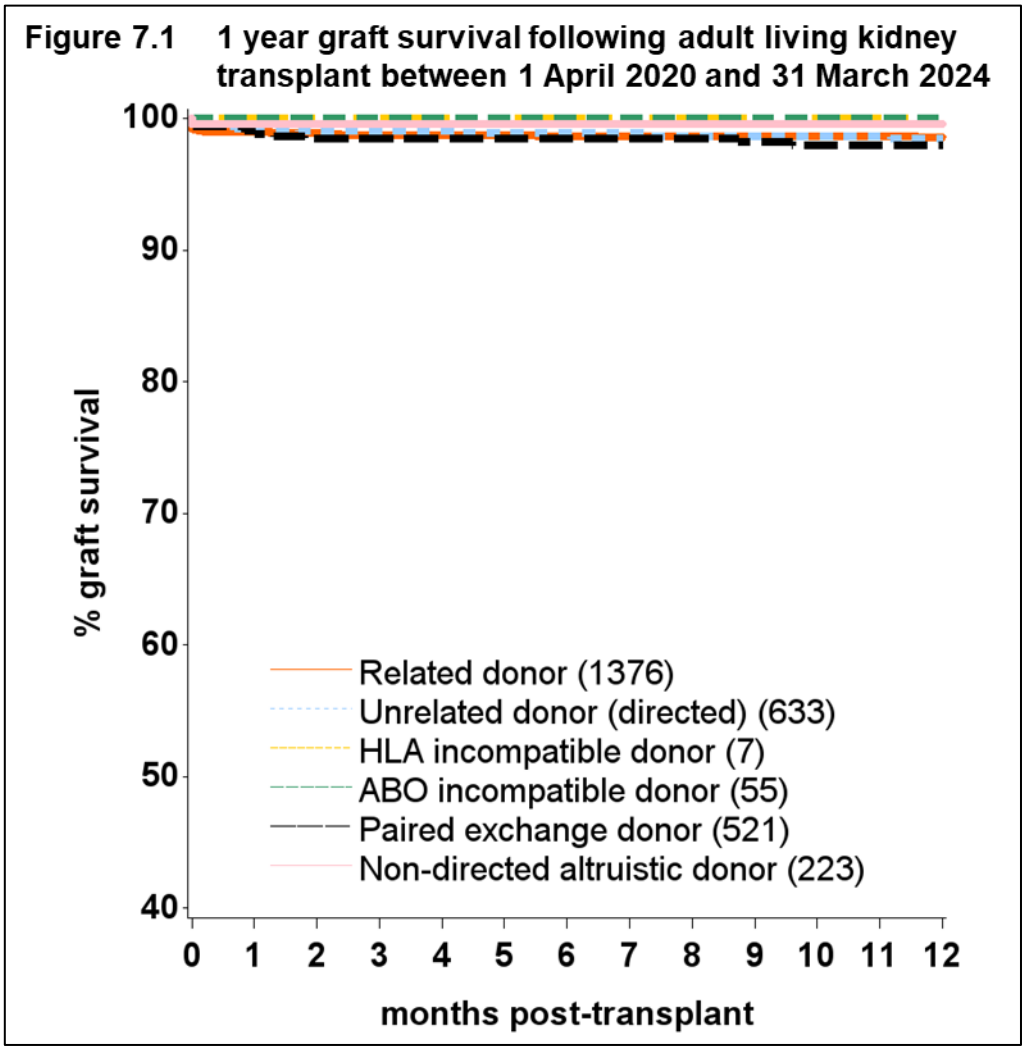


Table 7.1 1 year graft survival following living kidney transplant between 1 April 2020 and 31 March 2024 (p=0.6322)

Living Donors	No. at risk on day 0	% Graft survival	(95% confidence interval)
ABO incompatible donor	55	100.0	-
HLA incompatible donor	7	100.0	-
Non-directed altruistic donor	223	99.6	(97-100)
Related donor	1376	98.6	(98-99)
Unrelated donor (directed)	633	98.5	(97-99)
Paired exchange donor	521	98.0	(96-99)

Figure 7.2 5 year graft survival following adult living kidney transplant between 1 April 2016 and 31 March 2020

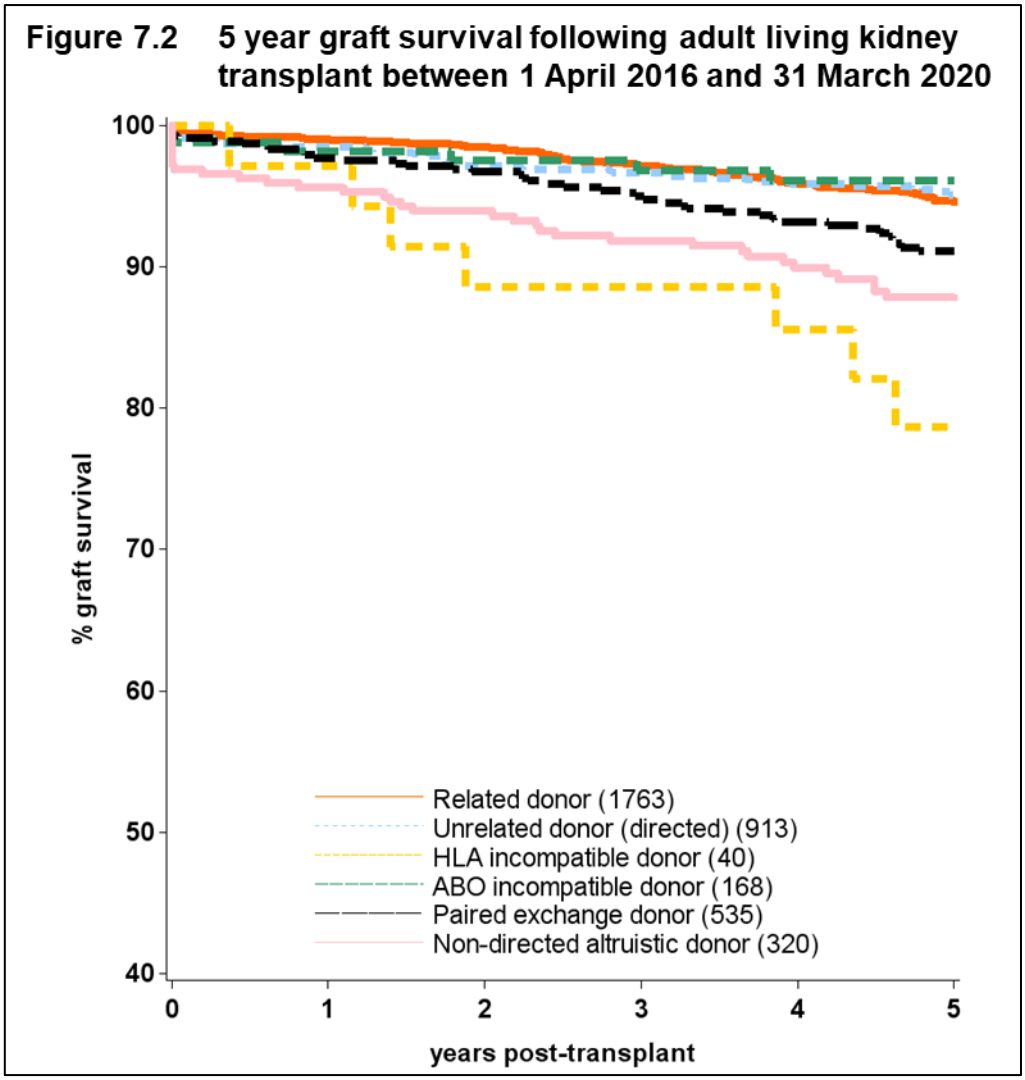


Table 7.2 5 year graft survival following living kidney transplant between 1 April 2016 and 31 March 2020 (p<0.0001)

Living Donors	No. at risk on day 0	% Graft survival	(95% confidence interval)
ABO incompatible donor	168	96.1	(92-98)
Unrelated donor (directed)	913	95.1	(93-96)
Related donor	1763	94.5	(93-96)
Paired exchange donor	535	91.1	(88-93)
Non-directed altruistic donor	320	87.8	(83-91)
HLA incompatible donor	40	78.7	(60-89)

Figure 7.3 1 year patient survival following adult living kidney transplant between 1 April 2020 and 31 March 2024

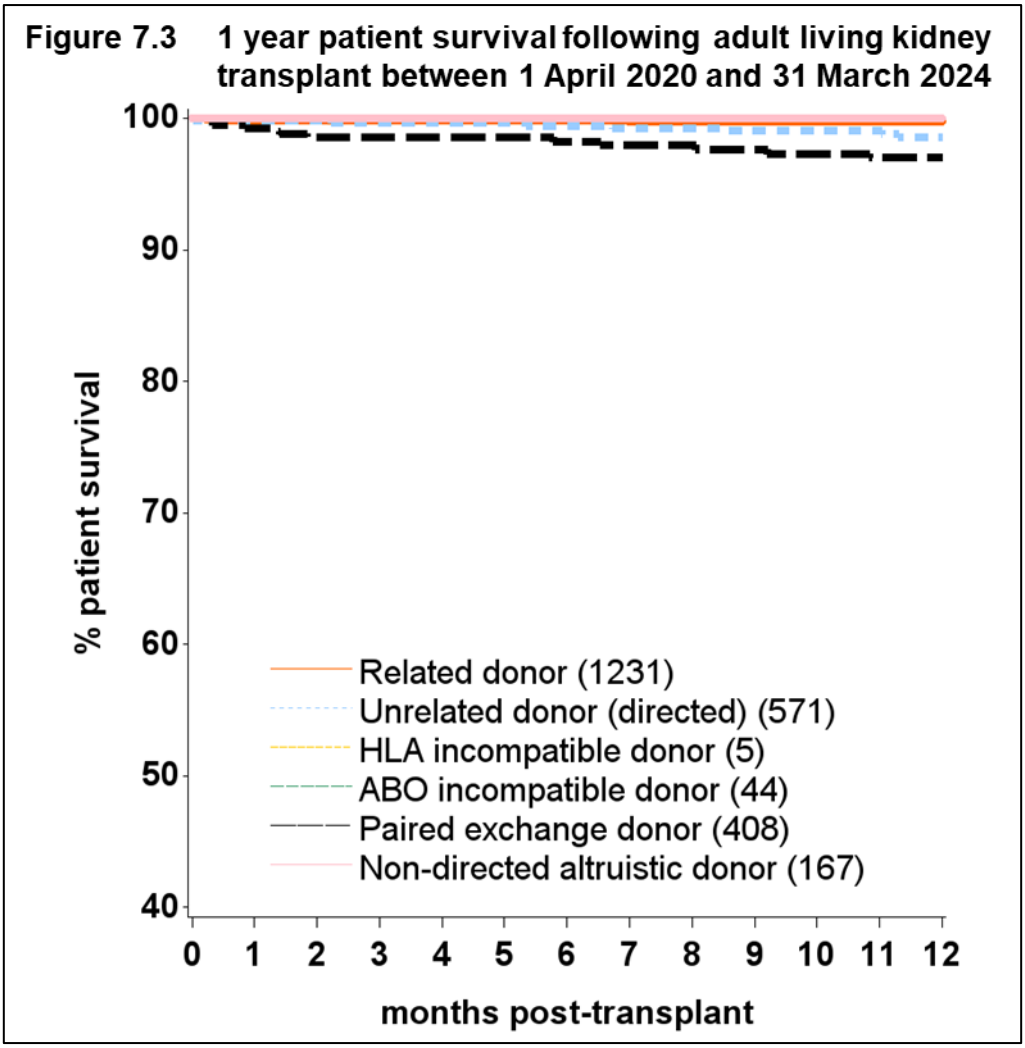


Table 7.3 1 year patient survival following living kidney transplant between 1 April 2020 and 31 March 2024 (p=0.0002)

Living Donors	No. at risk on day 0	% Graft survival	(95% confidence interval)
ABO incompatible donor	44	100.0	-
HLA incompatible donor	5	100.0	-
Non-directed altruistic donor	167	100.0	-
Related donor	1231	99.7	(99-100)
Unrelated donor (directed)	571	98.6	(97-99)
Paired exchange donor	408	97.0	(95-98)

Figure 7.4 5 year patient survival following adult living kidney transplant between 1 April 2016 and 31 March 2020

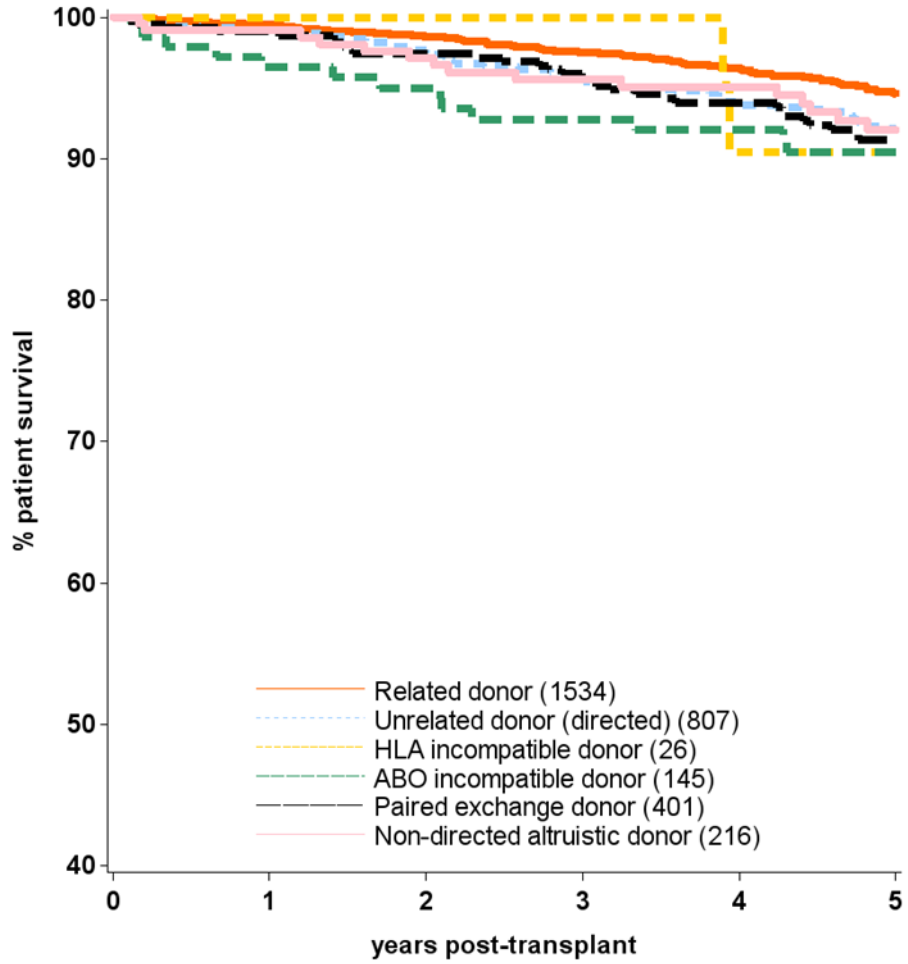


Table 7.4 5 year patient survival following living kidney transplant between 1 April 2016 and 31 March 2020 (p=0.0600)

Living Donors	No. at risk on day 0	% Graft survival	(95% confidence interval)
Related donor	1534	94.6	(93-96)
Unrelated donor (directed)	807	92.1	(90-94)
Non-directed altruistic donor	216	92.0	(87-95)
Paired exchange donor	401	91.4	(88-94)
HLA incompatible donor	26	90.5	(67-98)
ABO incompatible donor	145	90.4	(84-94)

We present a visual comparison of survival rates among centres that is based on a graphical display known as a funnel plot (1, 2). This display is used to show how consistent the rates of the different transplant units are with the national rate. Funnel plots show the survival rate plotted against the number of transplants for each centre, with the overall national survival rate (solid line), and its 95% (thin dotted lines) and 99.8% (thick dotted lines) confidence limits superimposed. Each dot in the plot represents one of the centres. Note that many recipients return to local renal units for follow-up care after their transplant and although we report survival according to transplant unit, recipients may in fact be followed up quite distantly from their transplant centre.

Interpreting the funnel plots

If a centre lies within all the limits, then that centre has a survival rate that is statistically consistent with the national rate. If a centre lies outside the 95% confidence limits, this serves as an alert that the centre may have a rate that is significantly different from the national rate. If a centre lies outside the 99.8% limits, then further investigations may be carried out to determine the reasons for the possible difference. When a centre lies above the upper limits, this indicates a survival rate that is higher than the national rate, while a centre that lies below the lower limits has a survival rate that is lower than the national rate.

References

1. Tekkis PP, McCulloch P, Steger AC, Benjamin IS, Poloniecki JD. Mortality control charts for comparing performance of surgical units: validation study using hospital mortality data. British Medical Journal 2003; 326: 786 – 788.

2. Stark J, Gallivan S, Lovegrove J, Hamilton JRL, Monro JL, Pollock JCS, Watterson KG. Mortality rates after surgery for congenital heart defects in children and surgeons' performance. Lancet 2000; 355: 1004 – 1007.

Figures 7.5 to **7.8** shows one year unadjusted survival rates following adult living donor kidney transplants by centre for each donor type. **Table 7.5** shows the survival rates by centre and donor type. There were no events within 1 year of an adult living HLAi or ABOi donor kidney transplant so figures for these groups have not been included in this report.

Figure 7.5 **1 year graft survival following adult living related kidney transplant between 1 April 2020 and 31 March 2024**

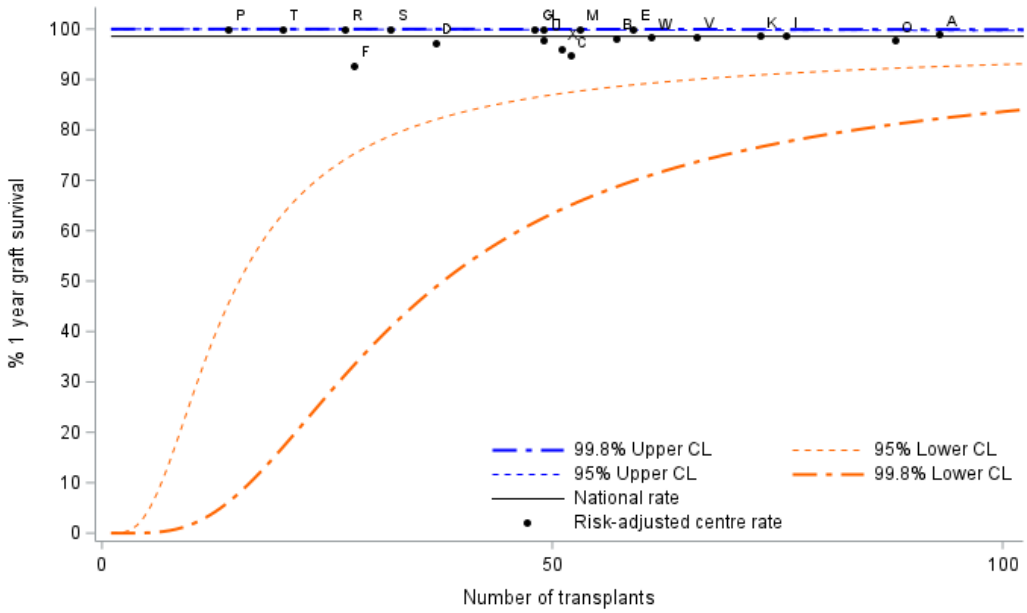


Figure 7.6 **1 year graft survival following adult living unrelated donor (directed) kidney transplant between 1 April 2020 and 31 March 2024**

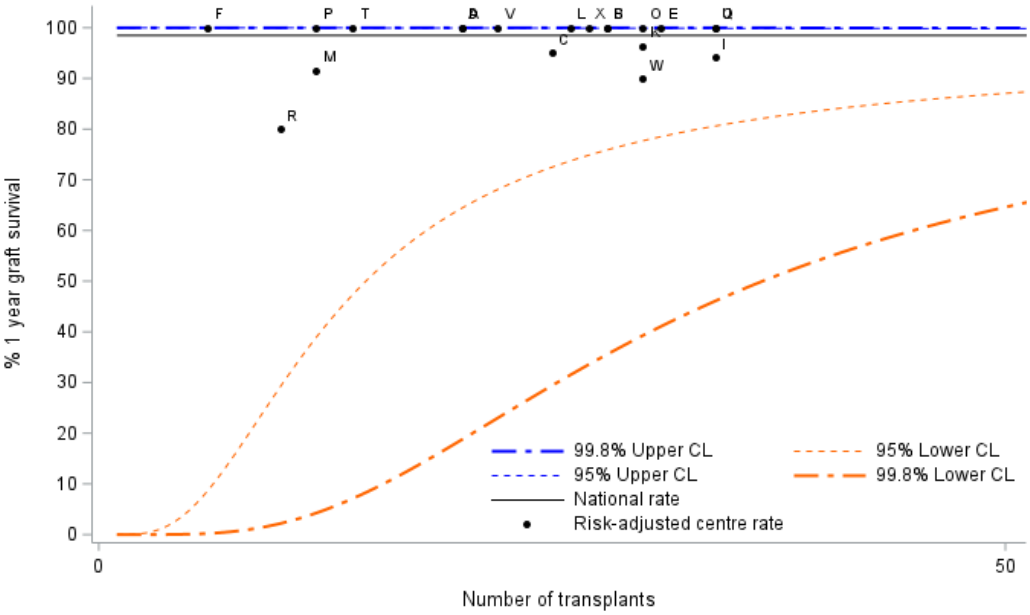


Figure 7.7 **1 year graft survival following adult living paired exchange donor kidney transplant between 1 April 2020 and 31 March 2024**

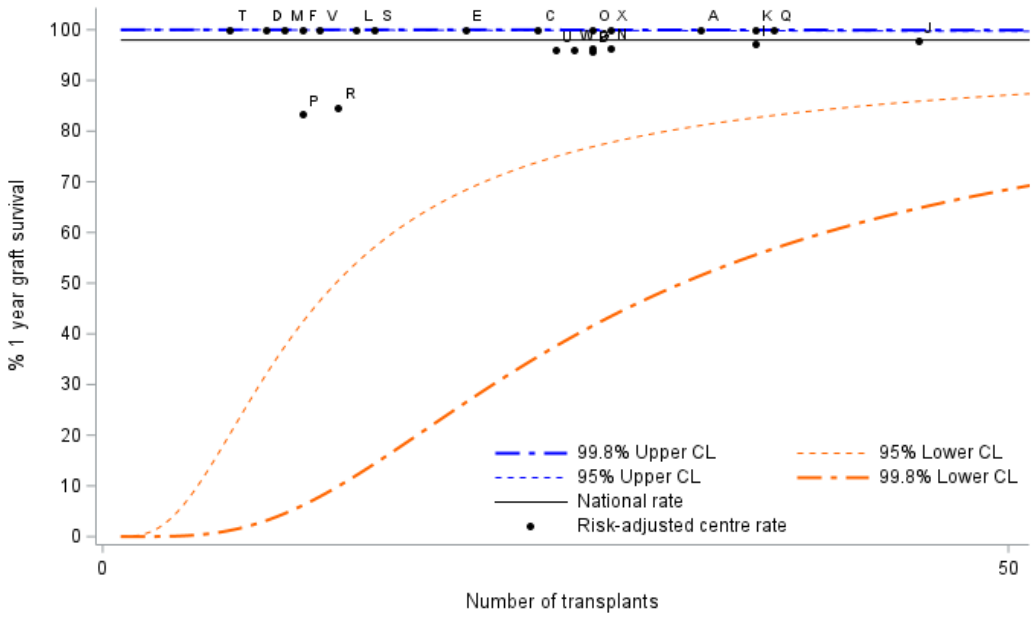


Figure 7.8 **1 year graft survival following adult living non-directed altruistic donor kidney transplant between 1 April 2020 and 31 March 2024**

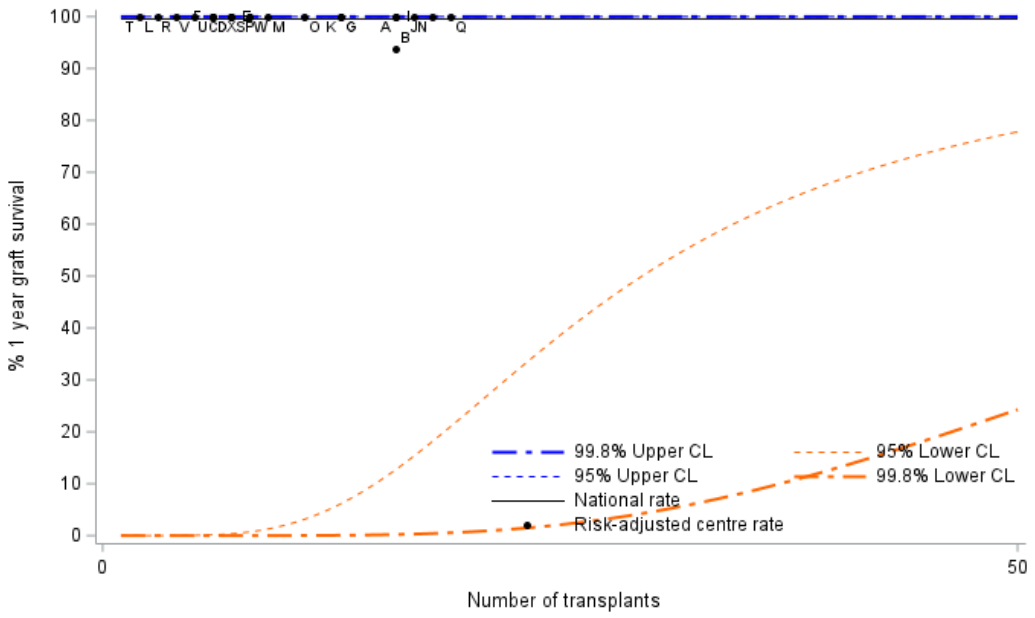


Table 7.5 **1 year graft survival following adult living donor kidney transplant between 1 April 2020 and 31 March 2024, by donor type and centre**

		Related		Unrelated		HLAi		ABOi		Paired		Non-directed altruistic	
Centre	Code	N	%[1]	N	%[1]	N	%[1]	N	%[1]	N	%[1]	N	%[1]
Belfast	A	93	98.9	20	100.0			12	100.0	33	100.0	16	100.0
Birmingham	B	57	98.2	28	100.0	1	100.0	4	100.0	27	95.8	16	93.8
Bristol	C	52	94.8	25	95.0	2	100.0			24	100.0	6	100.0
Cambridge	D	37	97.3	20	100.0	1	100.0	2	100.0	9	100.0	6	100.0
Cardiff	E	59	100.0	31	100.0			9	100.0	20	100.0	7	100.0
Coventry	F	28	92.9	6	100.0					11	100.0	6	100.0
Edinburgh	G	48	100.0	52	100.0			11	100.0	27	96.3	13	100.0
Glasgow	I	76	98.7	34	94.1					36	97.2	16	100.0
Guy's	J	117	100.0	55	100.0					45	97.8	17	100.0
Leeds	K	73	98.6	30	96.4	1	100.0			36	100.0	13	100.0
Leicester	L	49	100.0	26	100.0			3	100.0	14	100.0	3	100.0
Liverpool	M	53	100.0	12	91.7					10	100.0	9	100.0
Manchester	N	120	98.3	53	100.0			1	100.0	28	96.4	18	100.0
Newcastle	O	88	97.7	30	100.0	1	100.0	1	100.0	27	100.0	11	100.0
Nottingham	P	14	100.0	12	100.0					11	83.3	8	100.0
Oxford	Q	106	99.0	34	100.0	1	100.0	10	100.0	37	100.0	19	100.0
Plymouth	R	27	100.0	10	80.0					13	84.6	4	100.0
Portsmouth	S	32	100.0	28	100.0					15	100.0	7	100.0
Sheffield	T	20	100.0	14	100.0					7	100.0	2	100.0
St George's	U	49	98.0	34	100.0					25	96.0	6	100.0
The Royal Free	V	66	98.5	22	100.0					12	100.0	5	100.0
The Royal London	W	61	98.4	30	90.0			2	100.0	26	96.2	8	100.0
WLRTC	X	51	96.1	27	100.0					28	100.0	7	100.0
UK		**1376**	**98.6**	**633**	**98.5**	**7**	**100.0**	**55**	**100.0**	**521**	**98.0**	**223**	**99.6**

[1] % 1 year graft survival

PAEDIATRIC

Numbers are too small to present paediatric graft and patient survival broken down by living donor transplant type. Overall living donor survival is presented in the Annual report on kidney transplantation.

Appendix

A1 Glossary of terms

ABO
The most important human blood group system for transplantation is the ABO system. Every human being is of blood group O, A, B or AB, or of one of the minor variants of these four groups. ABO blood groups are present on other tissues and, unless special precautions are taken, a group A kidney transplanted to a group O recipient will be rapidly rejected.

Active transplant list
When a recipient is registered for a transplant, they are registered on what is called the 'active' transplant list. This means that when a donor kidney becomes available, the recipient is included among those who are matched against the donor to determine whether or not the kidney is suitable for them. It may sometimes be necessary to take a recipient off the transplant list, either temporarily or permanently. This may be done, for example, if someone becomes too ill to receive a transplant. The recipient is told about the decision to suspend them from the list and is informed whether the suspension is temporary or permanent. If a recipient is suspended from the list, they are not included in the matching of any donor kidneys that become available.

Case mix
The types of recipients treated at a unit for a common condition. This can vary across units depending on the facilities available at the unit as well as the types of people in the catchment area of the unit. The definition of what type of recipient a person is depends on the recipient characteristics that influence the outcome of the treatment. For example the case mix for recipients registered for a kidney transplant is defined in terms of various factors such as the blood group, tissue type and age of the recipient. These factors have an influence on the chance of a recipient receiving a transplant.

Confidence interval (CI)
When an estimate of a quantity such as a survival rate is obtained from data, the value of the estimate depends on the set of recipients whose data were used. If, by chance, data from a different set of recipients had been used, the value of the estimate may have been different. There is therefore some uncertainty linked with any estimate. A confidence interval is a range of values whose width gives an indication of the uncertainty or precision of an estimate. The number of transplants or recipients analysed influences the width of a confidence interval. Smaller data sets tend to lead to wider confidence intervals compared to larger data sets. Estimates from larger data sets are therefore more precise than those from smaller data sets. Confidence intervals are calculated with a stated probability, usually 95%. We then say that there is a 95% chance that the confidence interval includes the true value of the quantity we wish to estimate.

Confidence limit
The upper and lower bounds of a confidence interval.

Cox Proportional Hazards model
A statistical model that relates the instantaneous risk (hazard) of an event occurring at a given time point to the risk factors that influence the length of time it takes for the event to occur. This model can be used to compare the hazard of an event of interest, such as graft failure or recipient death, across different groups of recipients.

Cross-match
A cross-match is a test for recipient antibodies against donor antigens. A positive cross-match shows that the donor and recipient are incompatible. A negative cross-match means there is no reaction between donor and recipient and that the transplant may proceed.

Funnel plot
A graphical method that shows how consistent the survival rates of the different transplant units are compared to the national rate. The graph shows for each unit, a survival rate plotted against the number of transplants undertaken, with the national rate and confidence limits around this national rate superimposed. In this report, 95% and 99.8% confidence limits were used. Units that lie within the confidence limits have survival rates that are statistically consistent with the national rate. When a unit is close to or outside the limits, this is an indication that the centre may have a rate that is considerably different from the national rate.

Graft survival rate
The percentage of recipients whose grafts are still functioning. This is usually specified for a given time period after transplant. For example, a five-year transplant survival rate is the percentage of transplants still functioning five years after transplant.

HLA mismatch
Human Leucocyte Antigen (HLA) antigens are carried on many cells in the body and the immune system can distinguish between those that can be recognised as ‘self’ (belonging to you or identical to your own) and those that can be recognised as ‘nonself’. The normal response of the immune system is to attack foreign/non-self material by producing antibodies against the foreign material. This is one of the mechanisms that provide protection against infection. This is unfortunate from the point of view of transplantation as the immune system will see the graft as just another ‘infection’ to be destroyed, produce antibodies against the graft and rejection of the grafted organ will take place. To help overcome this response, it is recognised that ‘matching’ the recipient and donor on the basis of HLA (and blood group) reduces the chances of acute rejection and, with the added use of immunosuppressive drugs, very much improves the chances of graft survival. ‘Matching’ refers to the similarity of the recipient HLA type and donor HLA type. HLA mismatch refers to the number of mismatches between the donor and the recipient at the A, B and DR (HLA) loci. There can only be a total of two mismatches at each locus. For example, an HLA mismatch value of 000, means that the donor and recipient are identical at all three loci, while an HLA mismatch value of 210 means that the donor and recipient differ completely at the A locus, are partly the same at the B locus and are identical at the DR locus.

Inter-quartile range
The values between which the middle 50% of the data fall. The lower boundary is the lower quartile, the upper boundary the upper quartile.

Kaplan-Meier method
A method that allows patients with incomplete follow-up information to be included in estimating survival rates. For example, in a cohort for estimating one year patient survival rates, a recipient was followed up for only nine months before they relocated. If we calculated a crude survival estimate using the number of recipients who survived for at least a year, this recipient would have to be excluded as it is not known whether or not the recipient was still alive at one year after transplant. The Kaplan-Meier method allows information about such recipients to be used for the length of time that they are followed-up, when this information would otherwise be discarded. Such instances of incomplete follow-up are not uncommon and the Kaplan-Meier method allows the computation of estimates that are more meaningful in these cases.

Living donor
A donor who is a living person and who is usually, but not always, a relative of the transplant recipient. For example, a parent may donate one of their kidneys to their child.

Median
The midpoint in a series of numbers, so that half the data values are larger than the median, and half are smaller.

Multi-organ transplant
A transplant in which the recipient receives more than one organ. For example, a recipient may undergo a transplant of a kidney and liver.

National Kidney Allocation Scheme
A nationally agreed set of rules for sharing and allocating kidneys for transplant between transplant centres in the UK. The scheme is administered by NHS Blood and Transplant.

Patient survival rate
The percentage of recipients who are still alive (whether the graft is still functioning or not). This is usually specified for a given time period after transplant. For example, a five-year patient survival rate is the percentage of recipients who are still alive five years after their first transplant.

p value
In the context of comparing survival rates across centres, the p value is the probability that the differences observed in the rates across centres occurred by chance. As this is a probability, it takes values between 0 and 1. If the p value is small, say less than 0.05, this implies that the differences are unlikely to be due to chance and there may be some identifiable cause for these differences. If the p value is large, say greater than 0.1, then it is quite likely that any differences seen are due to chance.

Pre-emptive
Recipients that are placed on the kidney transplant list or receive a transplant prior to the need for dialysis are termed as pre-emptive. Recipients listed pre-emptively will usually require dialysis within six months of being placed on the transplant list.

Risk-adjusted survival rate
Some transplants have a higher chance than others of failing at any given time. The differences in expected survival times arise due to differences in certain factors, the risk factors, among recipients. A risk-adjusted survival rate for a centre is the expected survival rate for that centre given the case mix of their recipients. Adjusting for case mix in estimating centre-specific survival rates allows valid comparison of these rates across centres and to the national rate.

Risk factors
These are the characteristics of a recipient, transplant or donor that influence the length of time that a graft is likely to function or a recipient is likely to survive following a transplant. For example, when all else is equal, a transplant from a younger donor is expected to survive longer than that from an older donor and so donor age is a risk factor.

Unadjusted survival rate
Unadjusted survival rates do not take account of risk factors and are based only on the number of transplants at a given centre and the number and timing of those that fail within the post-transplant period of interest. In this case, unlike for risk-adjusted rates, all transplants are assumed to be equally likely to fail at any given time. However, some centres may have lower unadjusted survival rates than others simply because they tend to undertake transplants that have increased risks of failure. Comparison of unadjusted survival rates across centres and to the national rate is therefore inappropriate.

A2 Statistical methodology for survival rate estimation

Unadjusted estimates of patient and graft survival are given for each centre. Unadjusted rates give an estimate of what the survival rate at a centre is, assuming that all recipients at the centre have the same chance of surviving a given length of time after transplant.

Computing unadjusted survival rates

Unadjusted survival rates were calculated using the Kaplan-Meier method, which allows recipients with incomplete follow-up information to be included in the computation. For example, in a cohort for estimating one-year patient survival rates, a recipient was followed up for only nine months before they relocated. If we calculated a crude survival estimate using the number of recipients who survived for at least a year, this recipient would have to be excluded, as it is not known whether or not the recipient was still alive one year after transplant. The Kaplan-Meier method allows information about such recipients to be used for the length of time that they are followed-up, when this information would otherwise be discarded. Such instances of incomplete follow-up are not uncommon in the analysis of survival data and the Kaplan-Meier method therefore allows the computation of survival estimates that are more meaningful.

Prepared by:

Statistics and Clinical Research, NHS Blood and Transplant

Dr Matthew Robb
Sam Richards