NHS
Blood and Transplant

ANNUAL REPORT ON KIDNEY TRANSPLANTATION

REPORT FOR 2024/2025
(1 APRIL 2015– 31 MARCH 2025)

PUBLISHED AUGUST 2025

PRODUCED IN COLLABORATION WITH NHS ENGLAND

Contents

Executive Summary

This report presents key figures about kidney transplantation in the UK. The period reported covers 10 years of transplant data, from 1 April 2015. The report presents information on the number of transplants and survival analysis after first kidney only transplantation on a national and centre-specific basis.

Key findings

- On 31 March 2025, there were 6,412 adults on the UK active kidney transplant list which represents a 11% increase in the number of patients a year earlier. The equivalent number of paediatric patients was 145, representing an increase by 26 from the previous year.

- There were 3,058 adult kidney only transplants performed in the UK in 2024/25; a 1% decrease compared to the previous year. Of these, 1,050 were from DBD donors, 1,120 were from DCD donors and 888 were from living donors. The equivalent number of paediatric transplants was 115 representing a 3% decrease from the previous year.

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

Introduction

This report presents information on transplant activity between 1 April 2015 and 31 March 2025, for all 24 centres performing 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 (deceased and living).

Patient survival from listing is reported at one-, five- and ten-year post registration for a deceased donor adult kidney only transplant between 1 January 2013 and 31 December 2024.

The centre specific results for survival estimates are adjusted for differences in risk factors between the centres. The risk models used are described in the Appendix.

Patients requiring multi-organ transplants are excluded from all analyses and all results are described separately for adults (aged≥18years) and paediatric patients (aged<18 years) other than those presented in this Introduction section.

Throughout this report West London Renal and Transplant Centre is labeled as WLRTC.

On 11 September 2019, a new National Kidney Offering Scheme was introduced to offer kidneys from both donors after brain death and donors after circulatory death. This is a change from the previous system where kidneys from donors after circulatory death were offered under a different scheme than kidneys from donors after brain death. The scheme has two tiers with priority going to patients who are the most difficult to match or who have waited over 7 years for a transplant.

The COVID-19 pandemic led to unprecedented challenges for UK transplantation. Concerns about the ability to care for transplant recipients, lack of access to resource because it is being used for patients in the pandemic, and the risk versus benefit for immunosuppressed transplant recipients, resulted in a major reduction in the number of organ transplants undertaken and the impact of the pandemic is still evident.

Figure 2.1 shows the number of patients on the kidney transplant list on 31 March each year between 2016 and 2025.

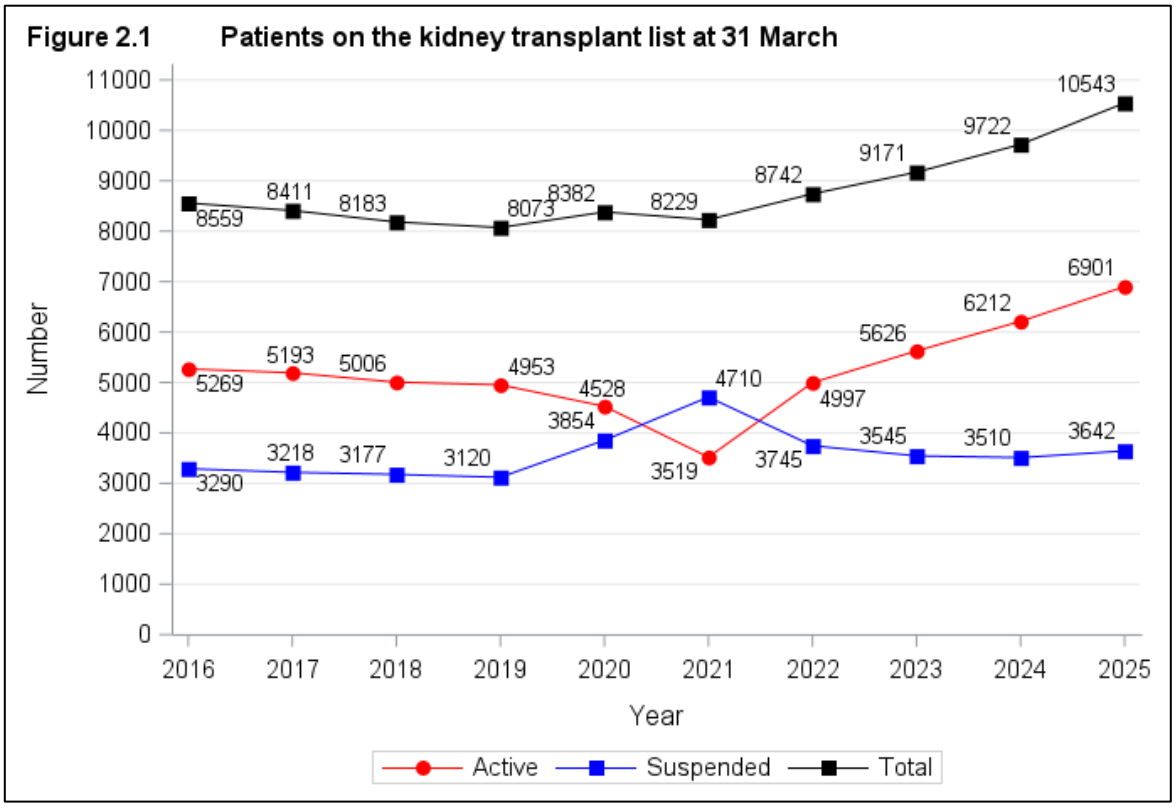


Figure 2.2 shows the number of patients on the kidney transplant list at 31 March 2025 for each transplant centre.

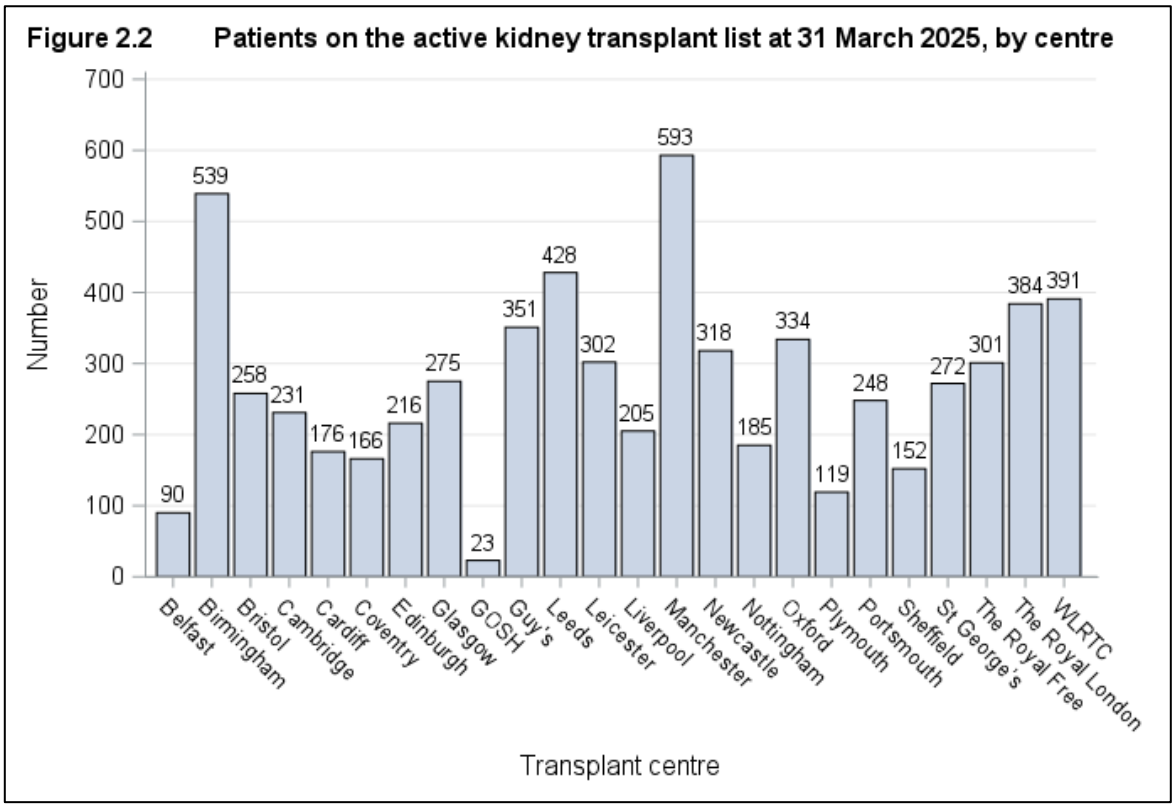


Figure 2.3 shows the total number of kidney transplants performed in the last ten years.

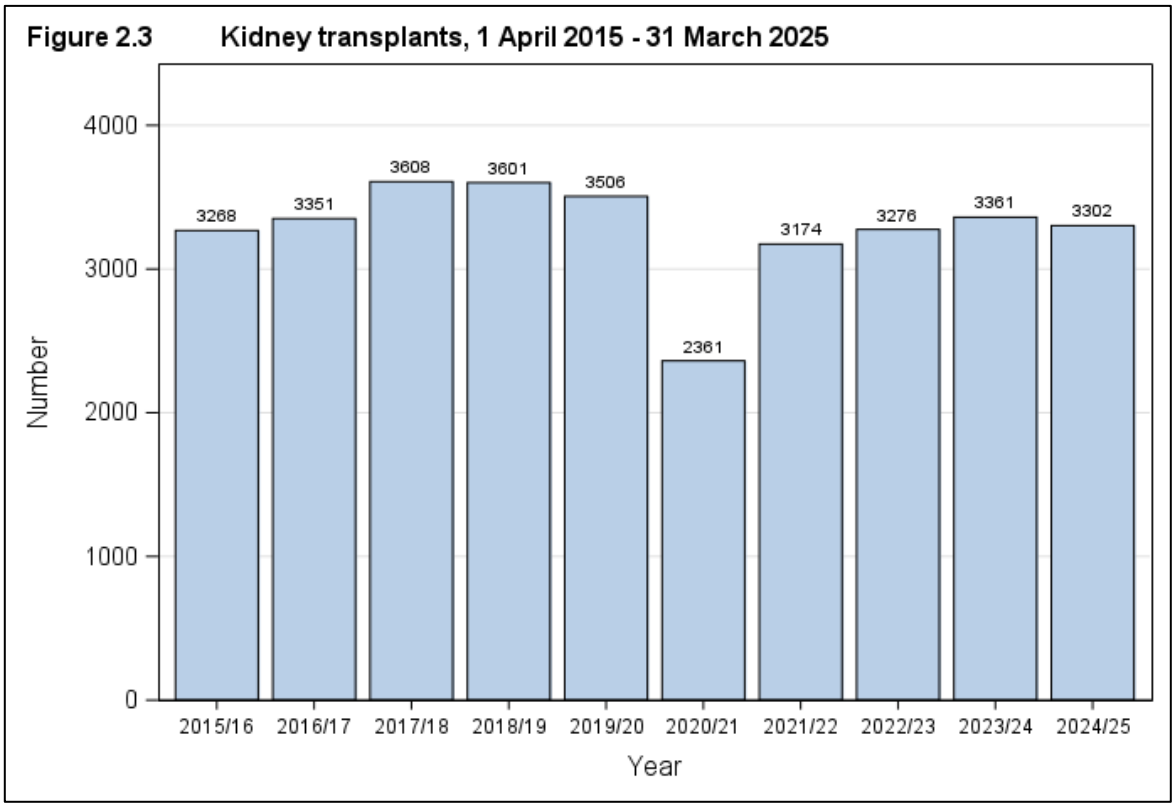


Figure 2.4 shows the total number of kidney transplants performed in 2024/25 at each transplant centre.

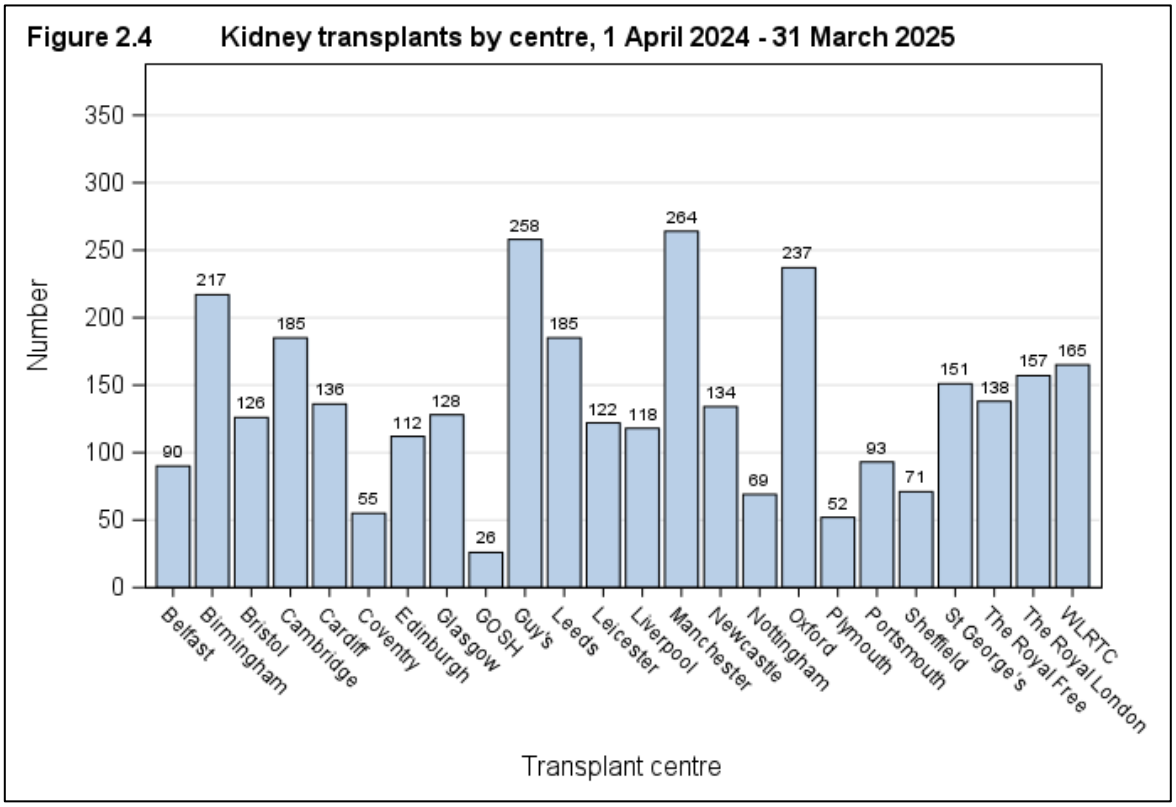


Figure 2.5 shows the total number of kidney transplants performed per million population in 2024/25 at each transplant centre.

Figure 2.5 Adult Deceased donor kidney transplants (pmp) in the UK, 1 April 2024 - 31 March 2025

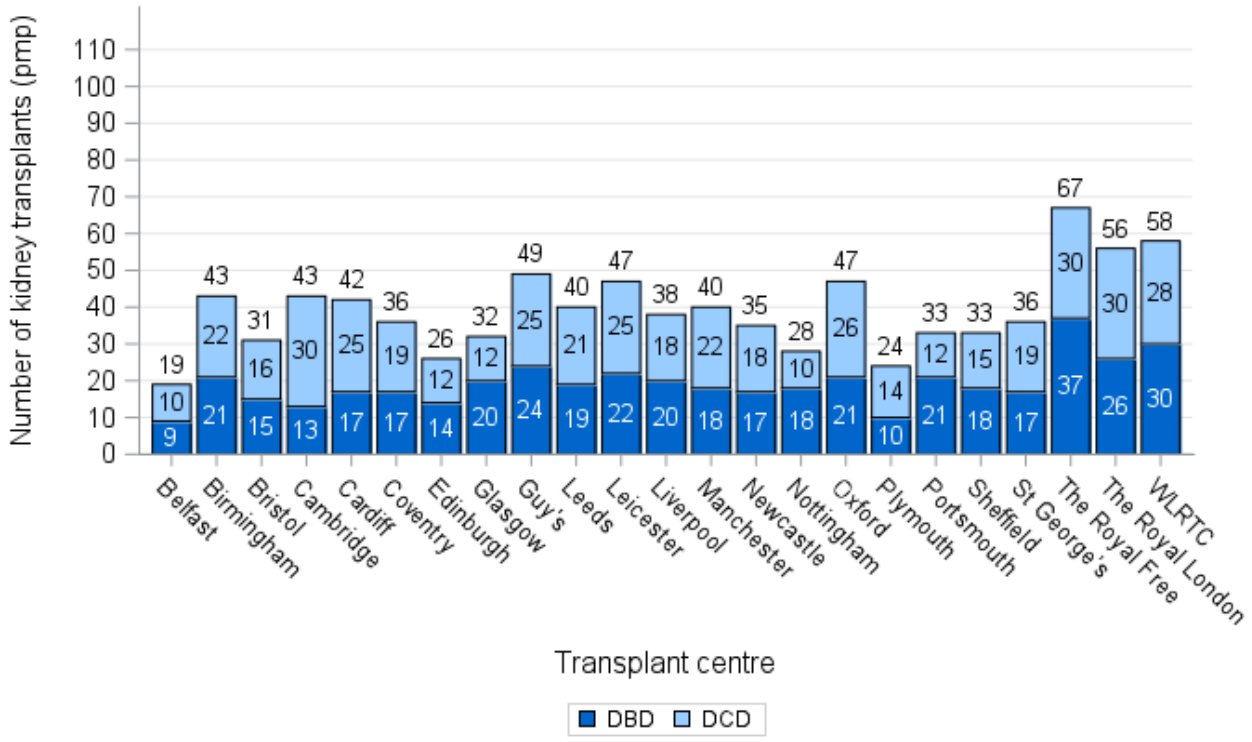
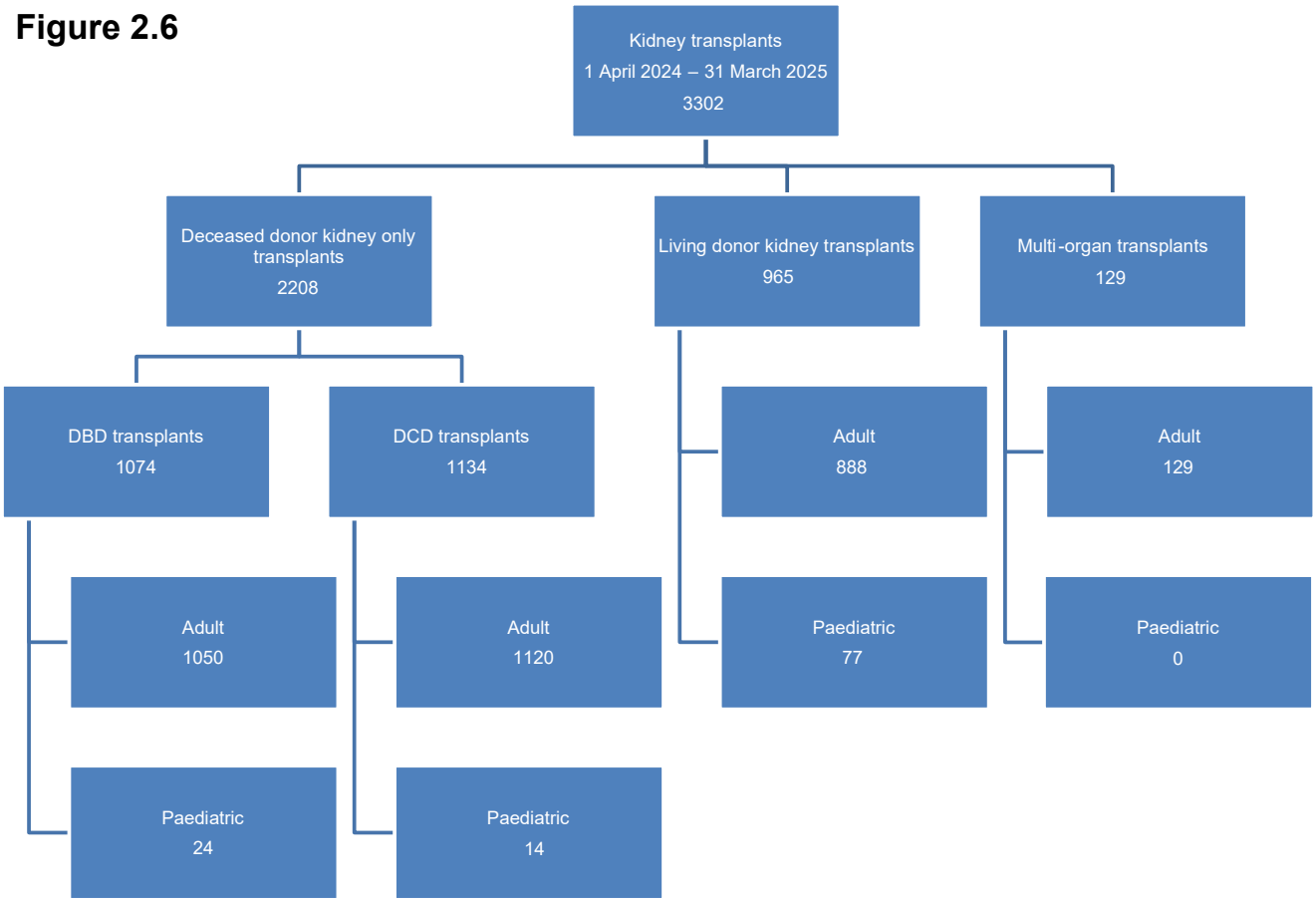


Figure 2.6 details the 3,302 kidney transplants performed in the UK between 1 April 2024 and 31 March 2025. Of the 129 multi-organ transplants, 113 were simultaneous kidney and pancreas transplants, 7 were kidney and liver transplants and 9 were simultaneous kidney and islet transplants.

Figure 2.6



Geographical variation in registration and transplant rates

Figure 2.7 shows rates of registration to the kidney only transplant list per million population (pmp) between 1 April 2024 and 31 March 2025 compared with deceased donor kidney only transplant rates pmp for the same time period, by recipient country/NHS region of residence. **Figure 2.8** shows the transplant rates pmp for living donor kidney only transplants in the same period. **Table 2.2** shows the breakdown of these numbers by recipient country/NHS region of residence. No adjustments have been made for potential demographic differences in populations. If a patient has had more than one registration/transplant in the period, each registration/transplant is considered. Note that this analysis only considered NHS Group 1 patients.

Since there will inevitable be some random variation in rates between areas, the systematic component of variation (SCV) was used to identify if the variation is more (or less) than a random effect for the different NHS regions in England only. Only first registrations and transplants in this period were considered. The larger the SCV the greater the evidence of a high level of systematic variation between areas. Registration, deceased donor transplant, and living donor transplant rates yielded an SCV of 0.0242 (p-value = <0.001), 0.0463 (p-value = <0.001), and 0.0224 (p-value = 0.001) respectively. The p-value shows the probability that an SCV of this size (or higher) would be observed by chance if only random variation existed and therefore, strong evidence of geographical variation beyond what would be expected at random. No adjustment has been made for area-specific demographic characteristics that may impact the rates of registration to the transplant list and transplantation such as age and sex. Therefore, these results should be interpreted with caution.

Figure 2.7 Comparison of kidney registration rates (pmp) with deceased donor transplant rates (pmp) by recipient country/NHS region of residence

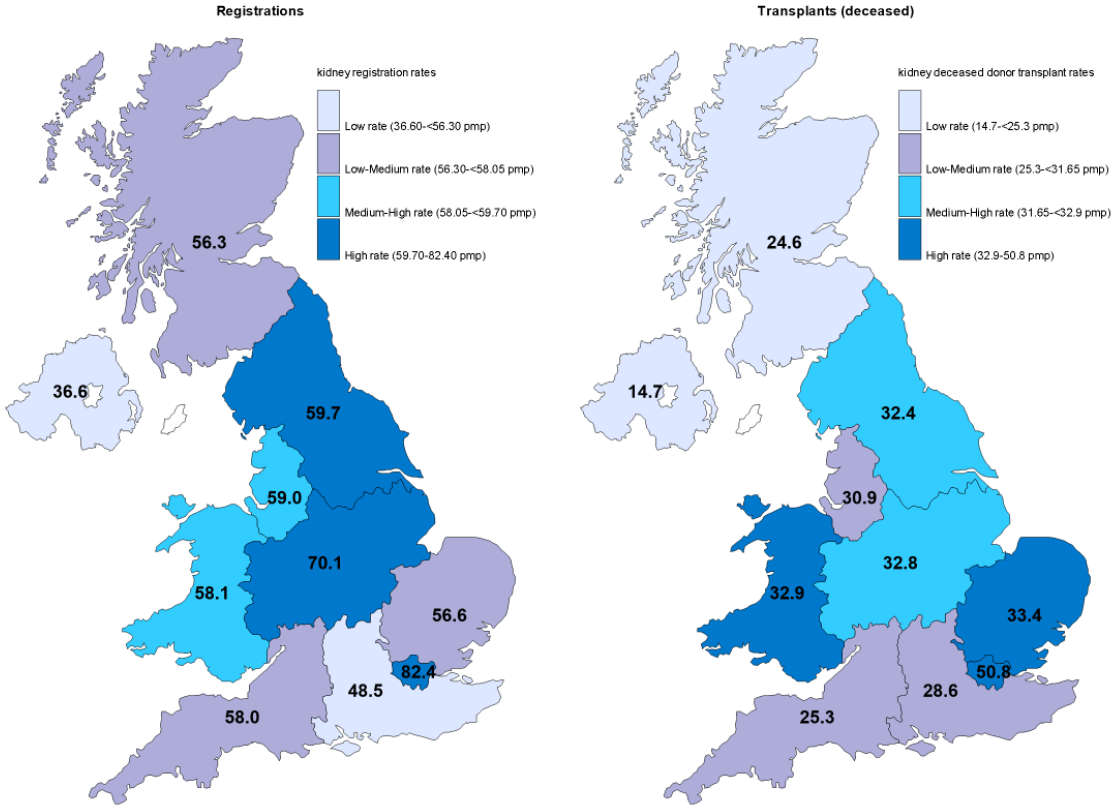


Figure 2.8 Living donor kidney transplant rates (pmp) by recipient country/NHS region of residence

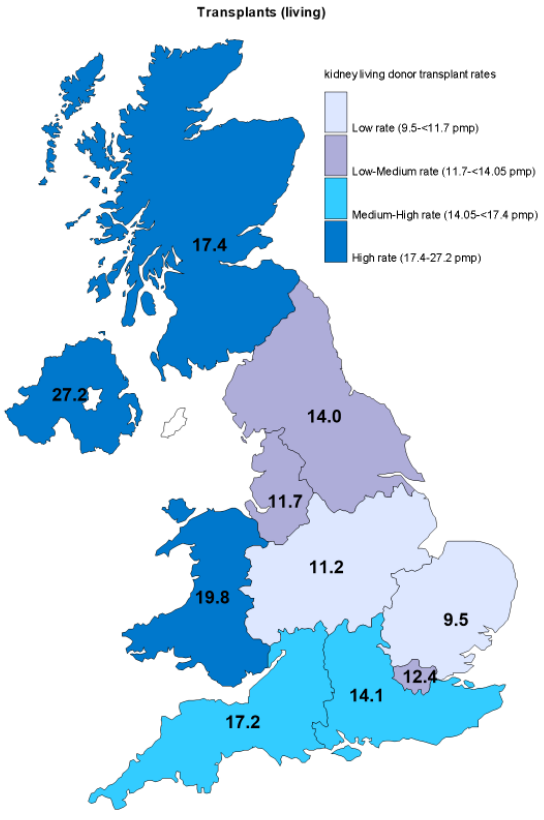


Table 2.2 Kidney registration and transplant rates per million population (pmp) in the UK, 1 April 2024 - 31 March 2025, by Country/NHS region

Country/ NHS region	Registrations (pmp)		Deceased Donor Transplants (pmp)		Living Donor Transplants (pmp)	
North East and Yorkshire	491	(59.7)	266	(32.4)	115	(14.0)
North West	444	(59.0)	232	(30.9)	88	(11.7)
Midlands	768	(70.1)	359	(32.8)	123	(11.2)
East of England	362	(56.6)	214	(33.4)	61	(9.5)
London	731	(82.4)	451	(50.8)	110	(12.4)
South East	455	(48.5)	268	(28.6)	132	(14.1)
South West	334	(58.0)	146	(25.3)	99	(17.2)
England	**3585**	**(62.8)**	**1936**	**(33.9)**	**728**	**(12.7)**
Isle of Man	**7**	**(87.5)**	**0**	**(0.0)**	**0**	**(0.0)**
Channel Islands	**8**	**(47.1)**	**5**	**(29.4)**	**0**	**(0.0)**
Wales	**182**	**(58.1)**	**103**	**(32.9)**	**62**	**(19.8)**
Scotland	**307**	**(56.3)**	**134**	**(24.6)**	**95**	**(17.4)**
Northern Ireland	**70**	**(36.6)**	**28**	**(14.7)**	**52**	**(27.2)**
TOTAL	**4166**	**(61.6)**	**2208**	**(32.7)**	**937**	**(13.9)**

[1] Registrations include 7 recipients whose postcode was unknown and excludes 1 recipient who resides in the Republic of Ireland.
[2] Deceased donor transplants include 2 recipients whose postcode was unknown.
[3] Living donor transplants excludes 10 recipients who reside in the Republic of Ireland.

Adult kidney transplant list

3.1 Adults on the kidney transplant list as at 31 March, 2016 – 2025

Figure 3.1 shows the number of adults on the kidney only transplant list at 31 March each year between 2016 and 2025.

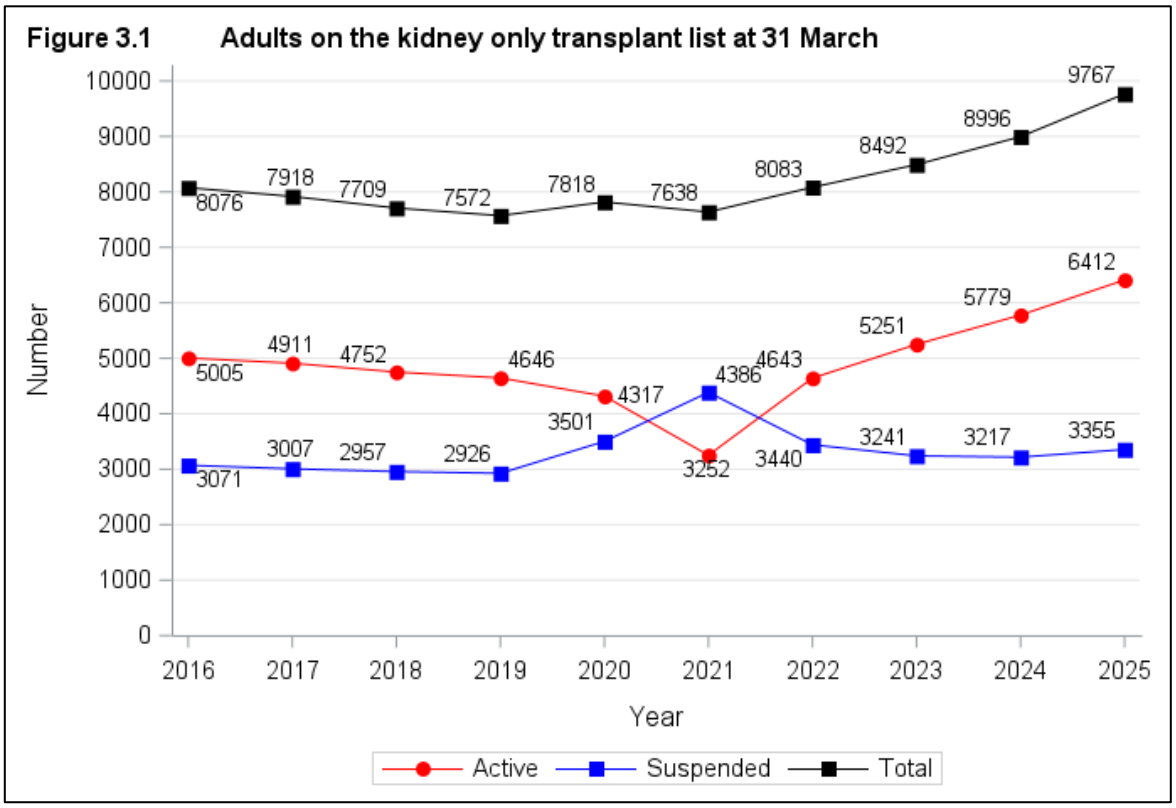


Figure 3.2 shows the number of adults on the active kidney only transplant list at 31 March 2025 by centre.

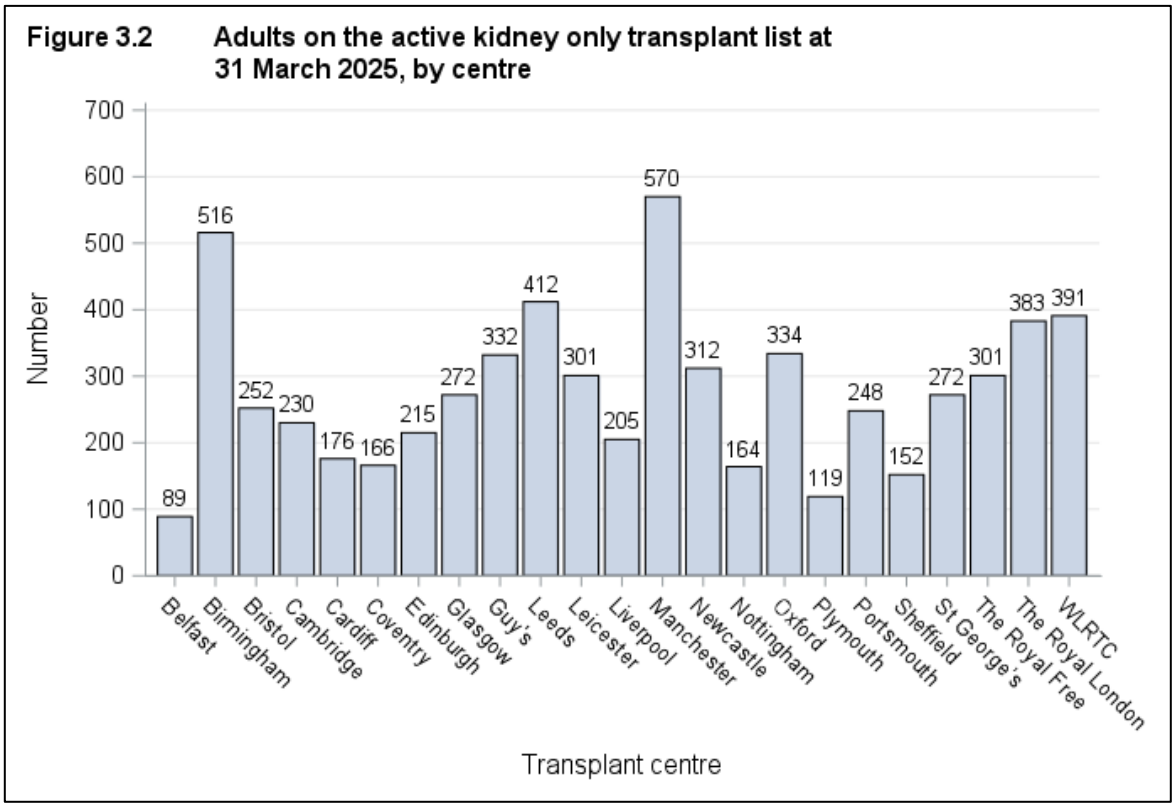


Figure 3.3 shows the number of adults on the suspended kidney only transplant list at 31 March 2025 by centre.

Figure 3.3 Adults on the suspended kidney only transplant list at 31 March 2025, by centre

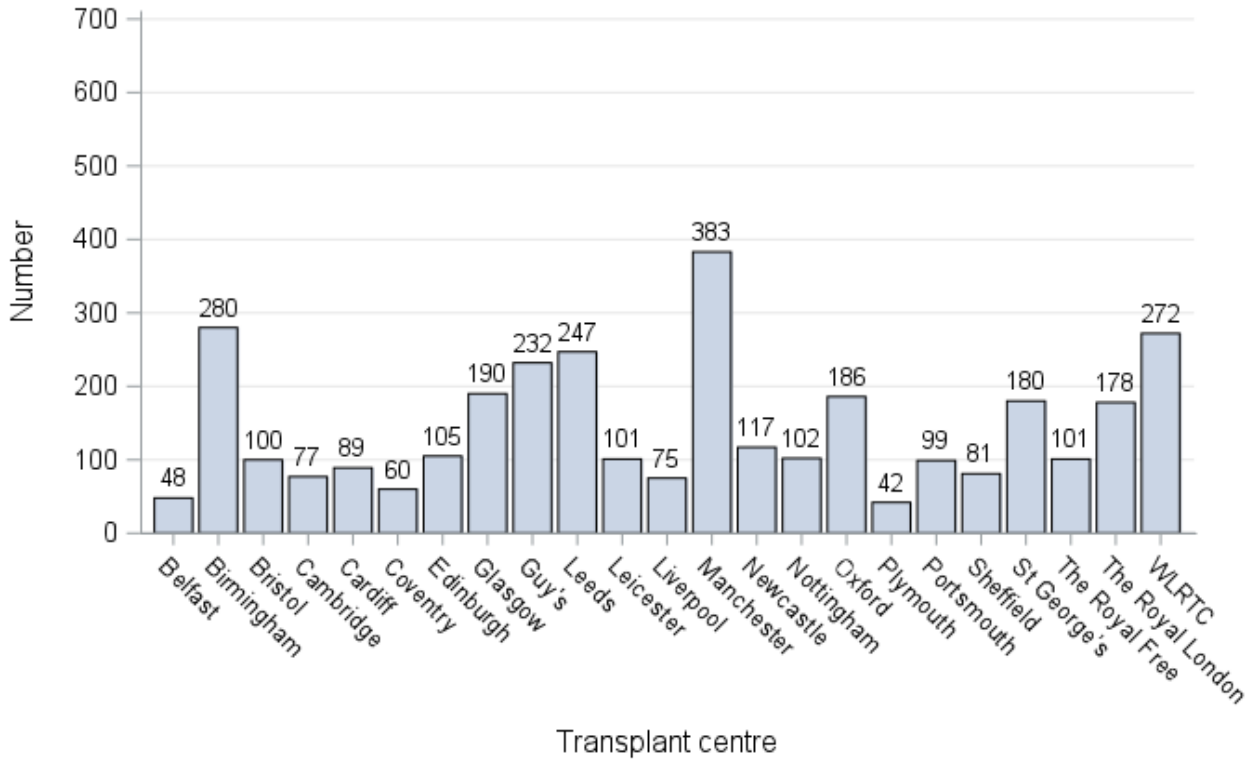
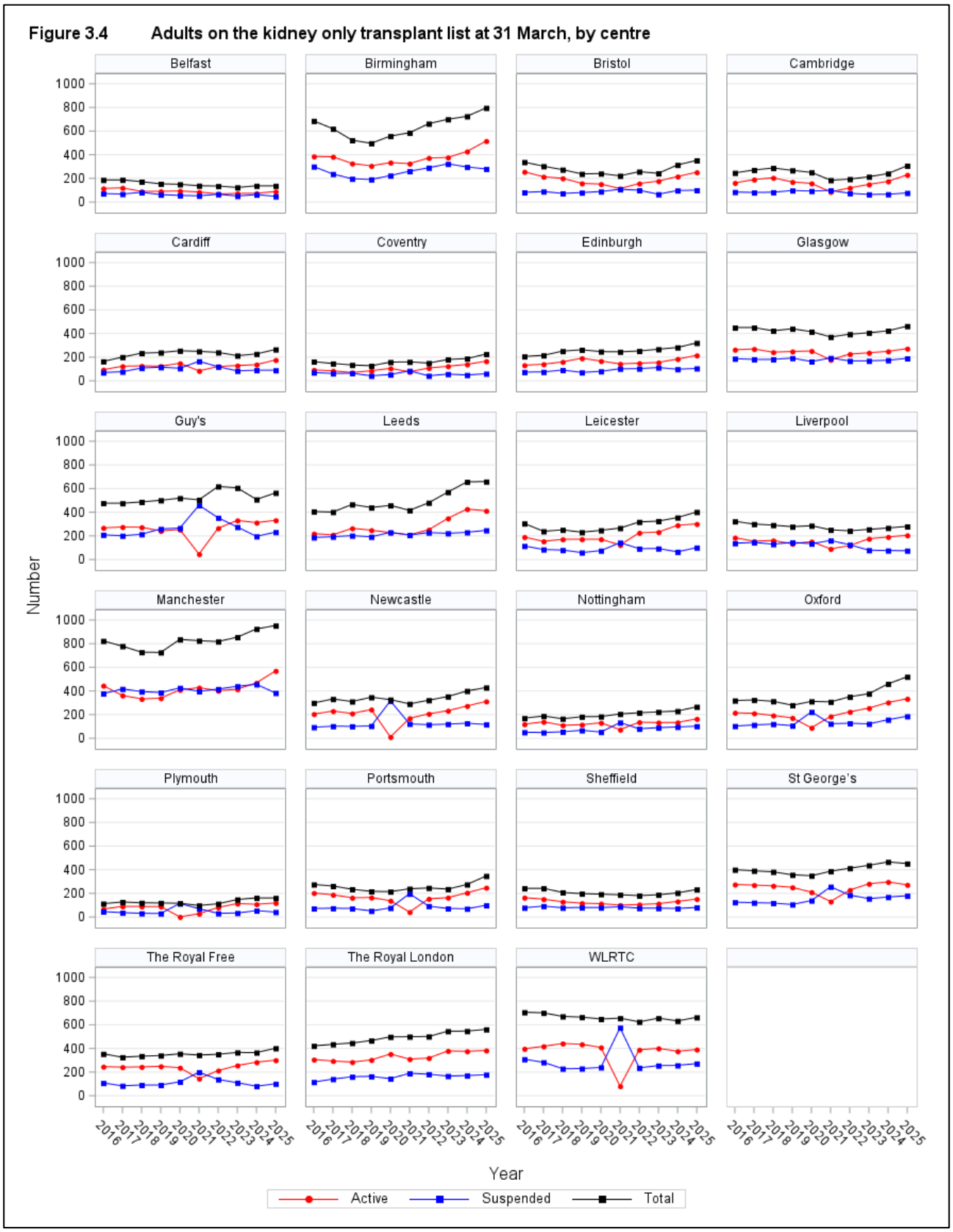


Figure 3.4 shows the number of adults on the transplant list at 31 March each year between 2016 and 2025 for each transplant centre.



3.2 Post-registration outcomes, 1 April 2021 – 31 March 2022

An indication of outcomes for patients listed for a kidney transplant is summarised in **Figure 3.5**. This shows the proportion of patients transplanted or still waiting one and three years after joining the list. It also shows the proportion removed from the transplant list (typically because they become too unwell for transplant) and those dying while on the transplant list.

Figure 3.5 Post-registration outcome for 3768 new adult kidney only registrations made in the UK, 1 April 2021 - 31 March 2022

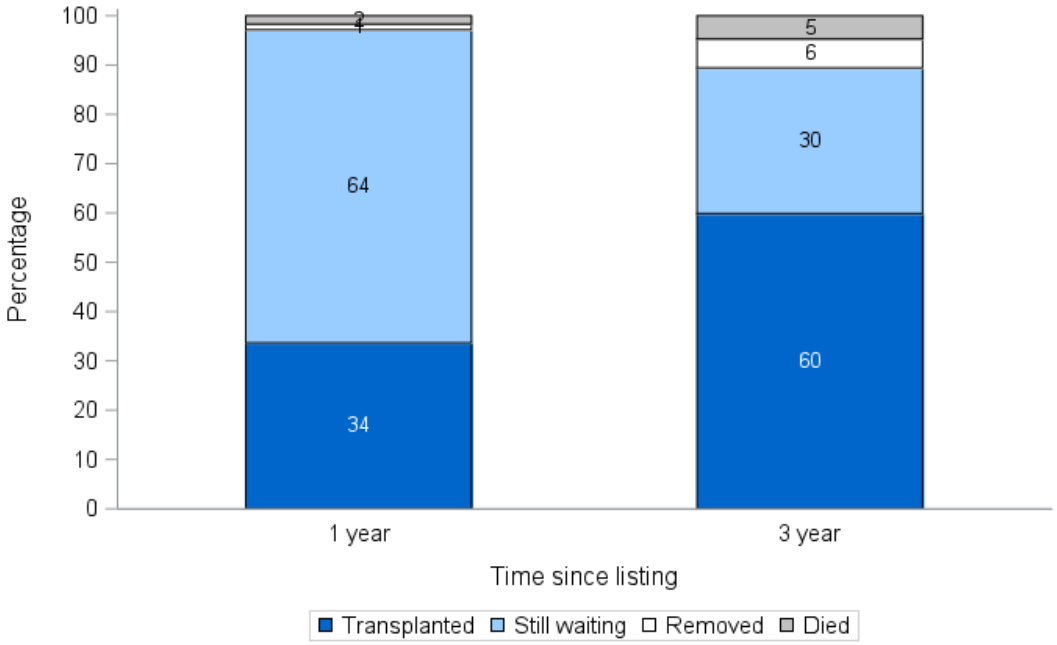
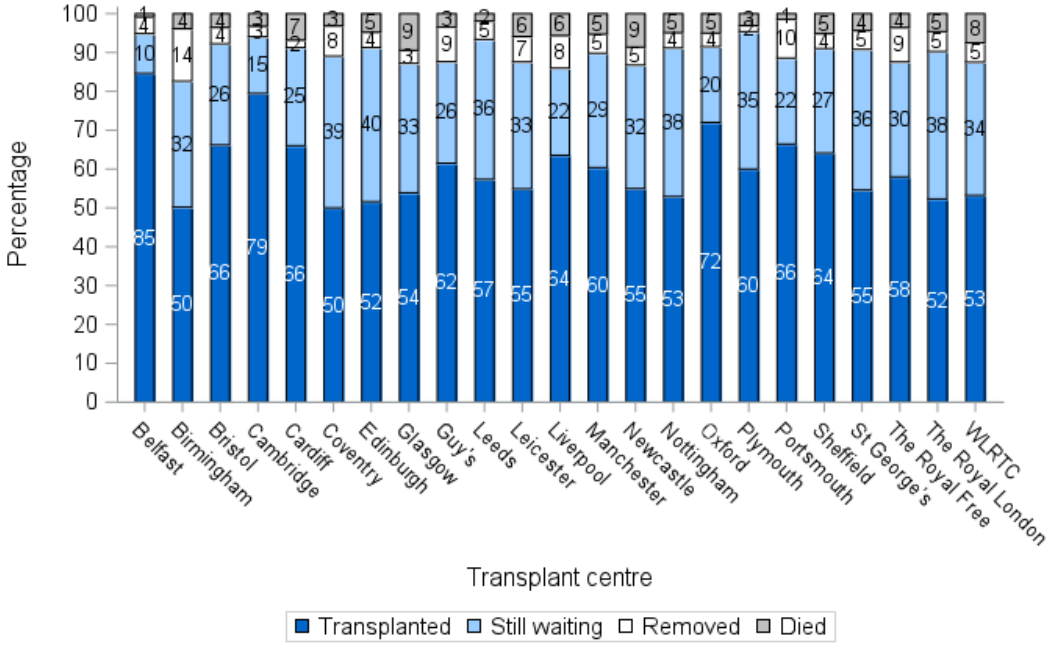


Figure 3.6 shows the proportion of patients transplanted or still waiting three years after joining the list by centre.

Figure 3.6 Three-year post-registration outcome for 3768 new adult kidney only registrations made in the UK, 1 April 2021 - 31 March 2022, by centre



3.3 Demographic characteristics, 1 April 2024 – 31 March 2025

The sex, ethnicity, age group, calculated reaction frequency and primary renal disease of patients on the transplant list are shown by centre in **Figure 3.7, 3.8, 3.9, 3.10 and 3.11**, respectively. Note that all percentages quoted are based only on data where relevant information was available. Data are not presented where the proportion of missing data was over 50%.

Figure 3.7 Sex of adult registrations on the active kidney only transplant list, 1 April 2024 and 31 March 2025, by centre

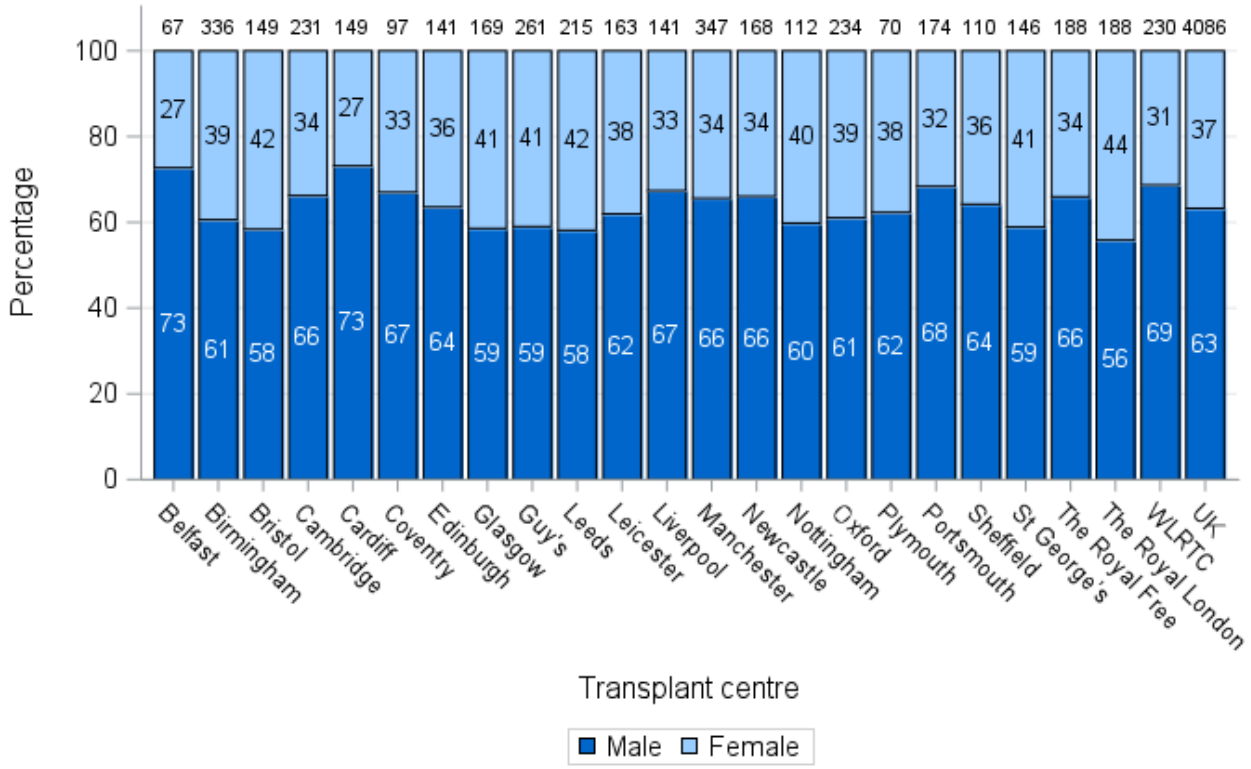


Figure 3.8 Ethnicity of adult registrations on the active kidney only transplant list, 1 April 2024 and 31 March 2025, by centre

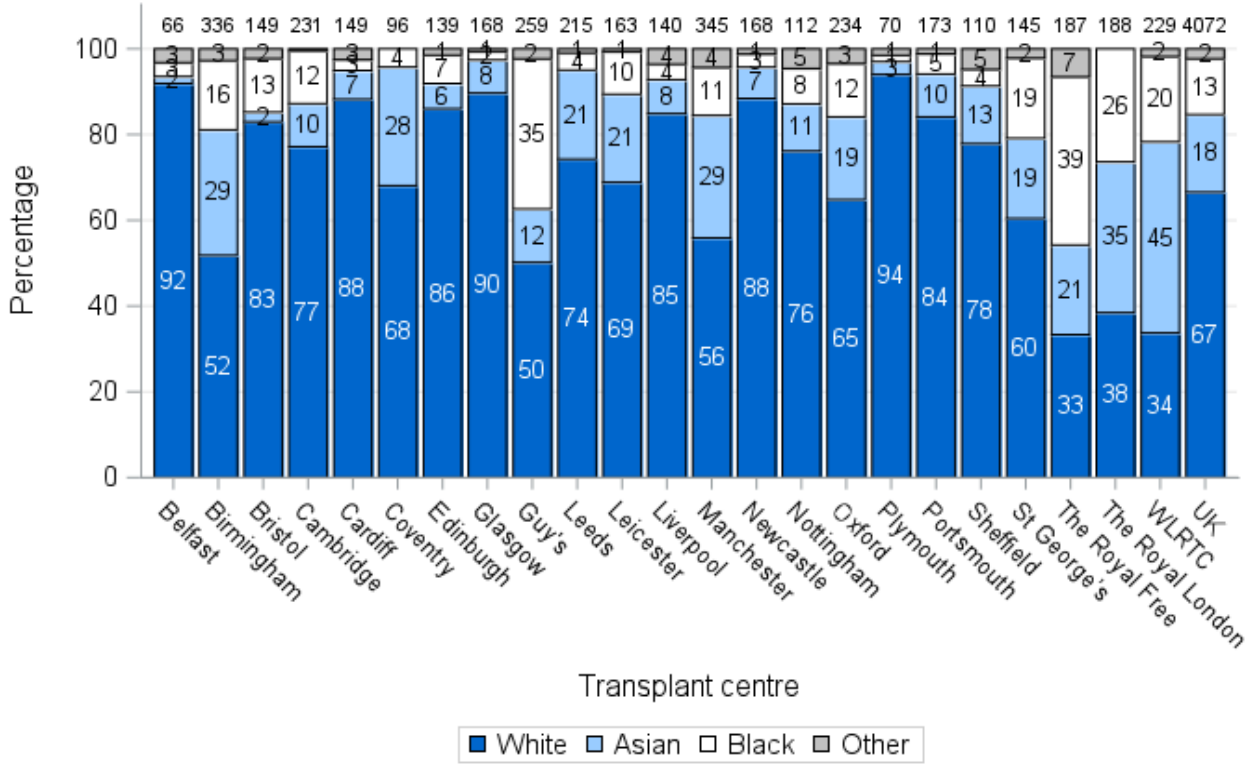


Figure 3.9 Age of adult registrations on the active kidney only transplant list, 1 April 2024 and 31 March 2025, by centre

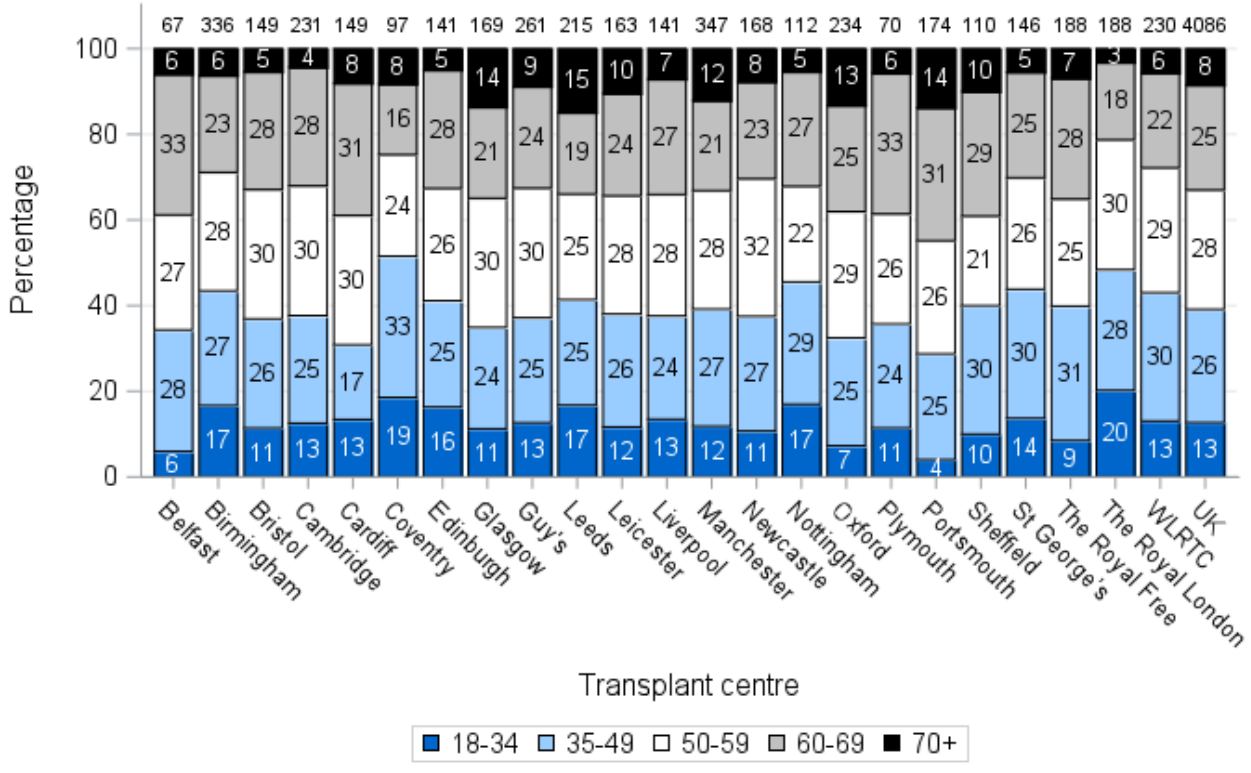


Figure 3.10 cRF of adult registrations on the active kidney only transplant list, 1 April 2024 and 31 March 2025, by centre

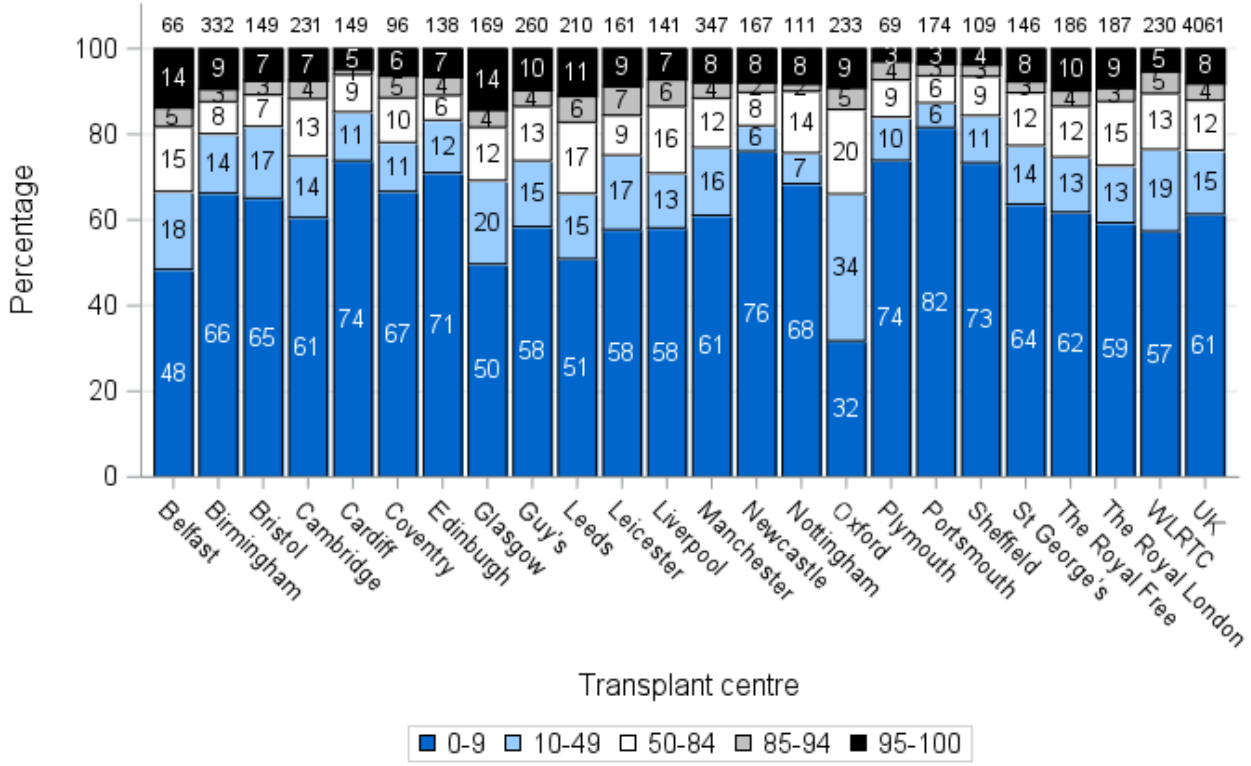
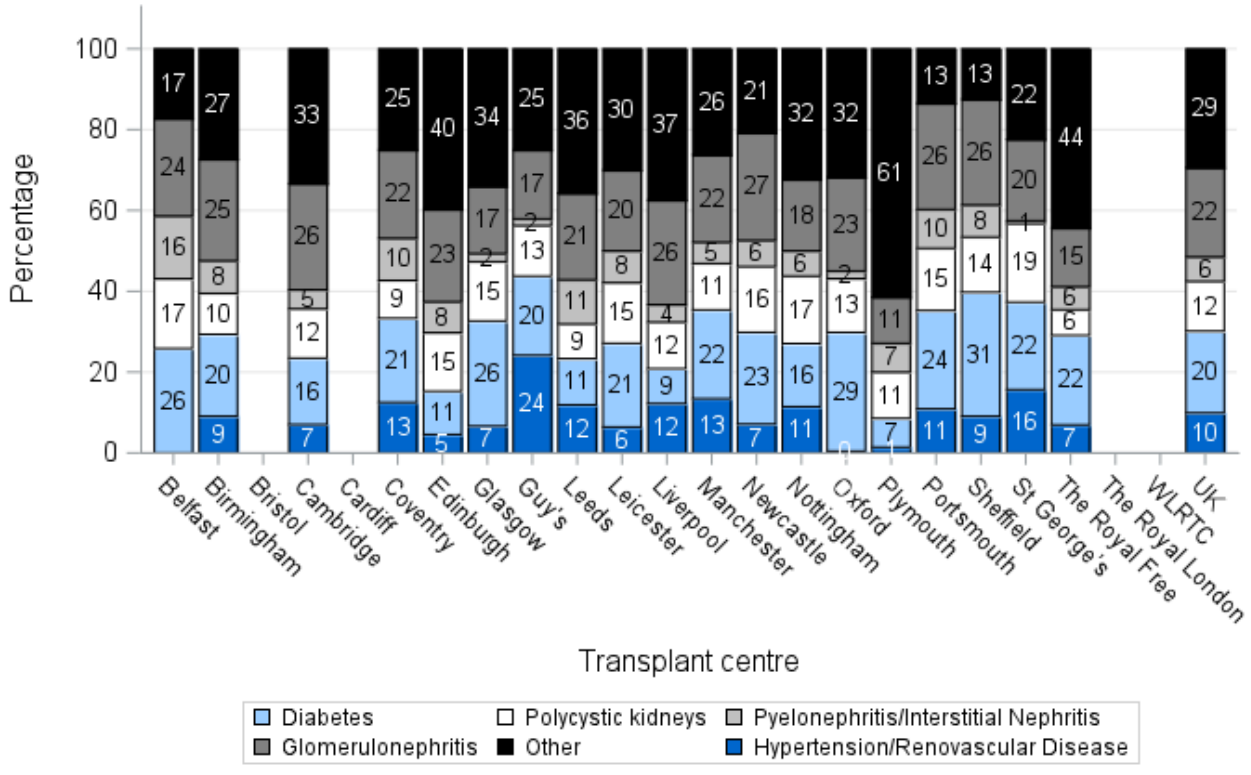


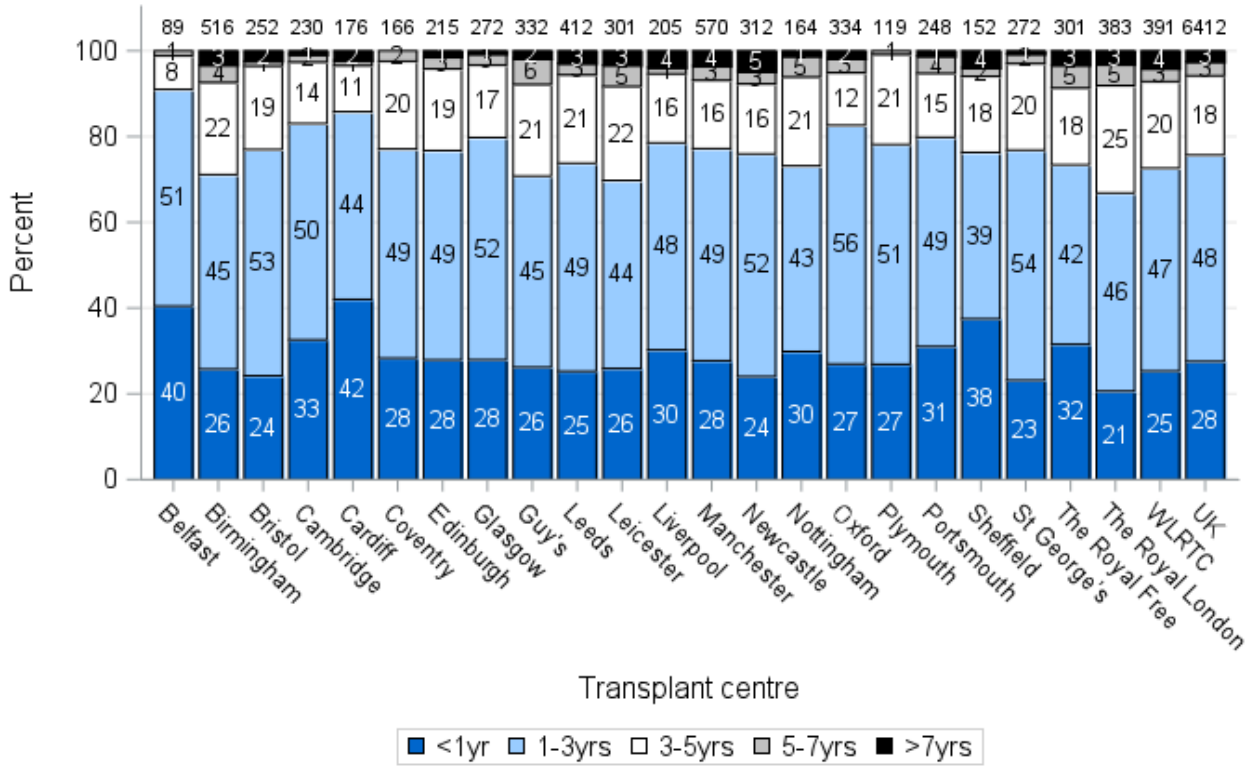
Figure 3.11 Primary renal disease of adult registrations on the active kidney only transplant list, 1 April 2024 and 31 March 2025, by centre



3.4 Adult waiting times for those currently on the list, 31 March 2025

Figure 3.12 shows the length of time adults have been waiting on the kidney only transplant list at 31 March 2025 by centre. A small proportion of adults have been waiting for a transplant for more than seven years, 96% of these adults are highly sensitised with a calculated reaction frequency (cRF) of 85% or higher. Of those waiting for more than seven years, 81% have a cRF of 100% which makes these adults very difficult to match.

Figure 3.12 Adults on the active kidney only transplant list as at 31 March 2025, by centre and waiting time



3.5 Median waiting time to transplant, 1 April 2019 – 31 March 2022

The length of time a patient waits for a kidney transplant varies across the UK. The median active waiting time for adult deceased donor kidney only transplantation is shown in **Figure 3.13a** and **Table 3.1a** for patients registered at each individual unit. Risk-adjusted median active waiting time to adult deceased donor kidney only transplantation is shown in **Figure 3.14a** and **Table 3.1a**. The median total waiting time (including dialysis and periods of suspension) for adult deceased donor kidney only transplantation is shown in **Figure 3.13b** and **Table 3.1b** for patients registered at each individual unit. Risk-adjusted median total waiting time to adult deceased donor kidney only transplantation is shown in **Figure 3.14b** and **Table 3.1b**. The data shown are for all adults, joining the list within the time period shown, including those still awaiting a transplant on the day of analysis. Patients who received a live donor or multi-organ transplant are not included. The national allocation scheme introduced in April 2006 helped to reduce the variability in deceased donor kidney waiting times across the country but currently some variability remains. Waiting times across centres continue to differ in a way that it is difficult for centres to control, given that the 2006 National Kidney Allocation Scheme determined allocation of all kidneys available for transplant from donors after brain death (DBD). This has continued following the introduction of the 2019 National Kidney Offering Scheme which determines allocation of all DBD kidneys and kidneys from donations after circulatory death (DCD).

2006 National Kidney Allocation Scheme
Only kidneys from donors after brain death were allocated via a national allocation scheme during the majority of the time period analysed. DCD kidneys were allocated to patients through local allocation arrangements and these vary across the country because some centres have a larger DCD programme than others. From 3 September 2014 one kidney from DCD donors aged between 5 and 49 years were allocated within four pre-defined regions using the 2006 DBD allocation principles and as such should reduce variability in waiting times across the country.

Kidneys from DBD are allocated to patients listed nationally through the 2006 Kidney Allocation Scheme. The 2006 Kidney Allocation Scheme introduced in April 2006 prioritised patients with ideal tissue matches (000 HLA mismatches) and then assigned points to patients based on the level of tissue match between donor and recipient, the length of time spent waiting for a transplant, age of the recipient (with a progressive reduction in points given after the age of thirty) and location points such that patients geographically close to the retrieval centre received more points. The patients with the highest number of points for a donated kidney were preferentially offered the kidney, no matter where in the UK they received their treatment.

2019 National Kidney Offering Scheme
The 2019 Kidney Offering Scheme was introduced on 11 September 2019 and this is a single scheme for offering all kidneys from deceased donors in the UK. This scheme prioritises patients who are difficult to match or have waited a long time for a transplant. Waiting time was updated from time from first active listing under the 2006 scheme to time from the earliest of starting permanent dialysis (HD or PD) in the UK or first active listing. On 25 February 2025, a cap on suspension time points for pre-dialysis patients on the transplant list. The number of points accrued for days of suspension before a patient has started permanent dialysis was capped at 180 days. This cap is only applicable to a patient's first registration.

We present a visual comparison of median waiting time to transplant 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 waiting times of the different transplant units are with the national rate accounting for different patient mix within centres. Funnel plots show the risk-adjusted median waiting time to transplant plotted against the number of patients registered at each centre, with the overall national unadjusted waiting time to transplant (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.

Interpreting the funnel plots

If a centre lies within all the limits, then that centre has a median waiting time to transplant 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 median waiting time to transplant 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 median waiting time to transplant that is higher than the national rate, while a centre that lies below the lower limits has a median waiting time to transplant that is lower than the national rate. It is important to note that adjusting for patient mix through the use of risk-adjustment models may not account for all possible causes of centre differences. There may be other factors that are not taken into account in the risk-adjustment process that may affect the median waiting time to transplant of a particular centre.

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.

The median active waiting time to transplant for adults registered on the kidney only transplant list between 1 April 2019 and 31 March 2022 is 502 days. The median total waiting time to transplant (including dialysis and periods of suspension) for adults registered on the kidney only transplant list between 1 April 2019 and 31 March 2022 is 1169 days.

Figure 3.13a Median active waiting time to deceased donor transplant for adults registered on the kidney transplant list, 1 April 2019 - 31 March 2022

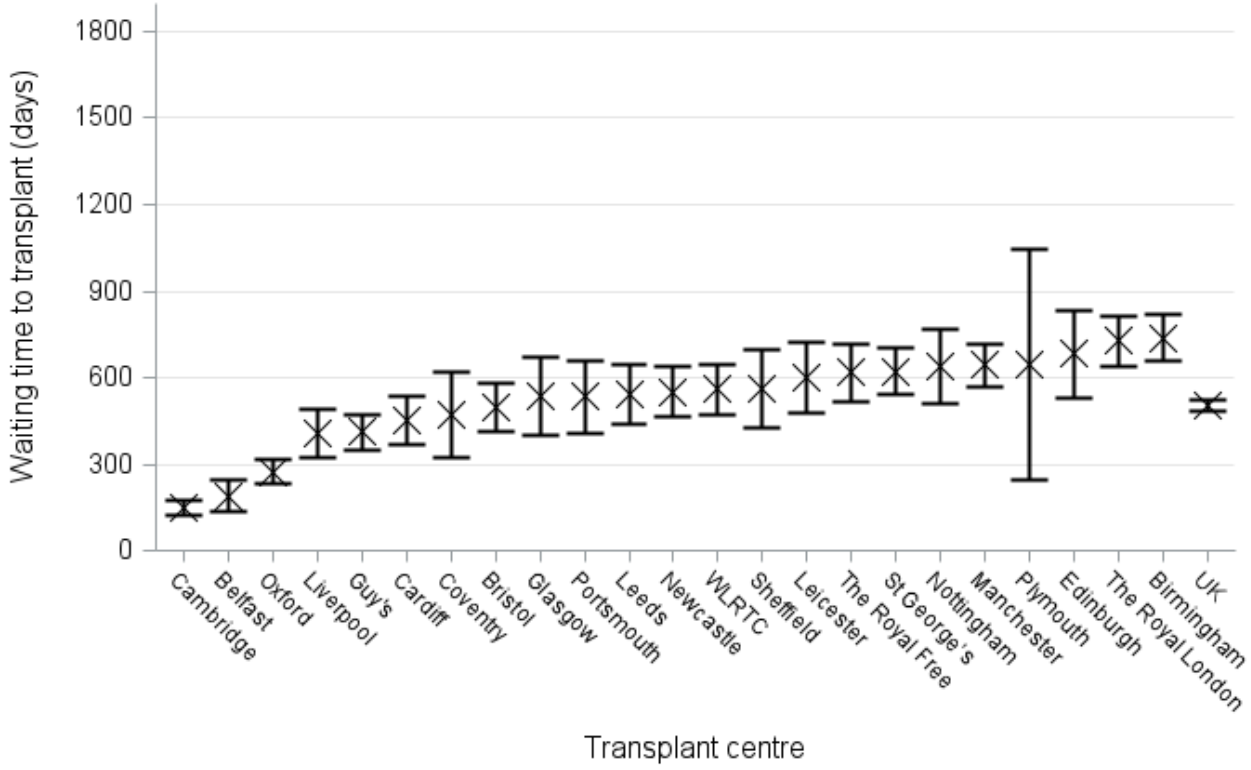


Figure 3.13b Median total waiting time to deceased donor transplant for adults patients registered on the kidney transplant list, 1 April 2019 - 31 March 2022

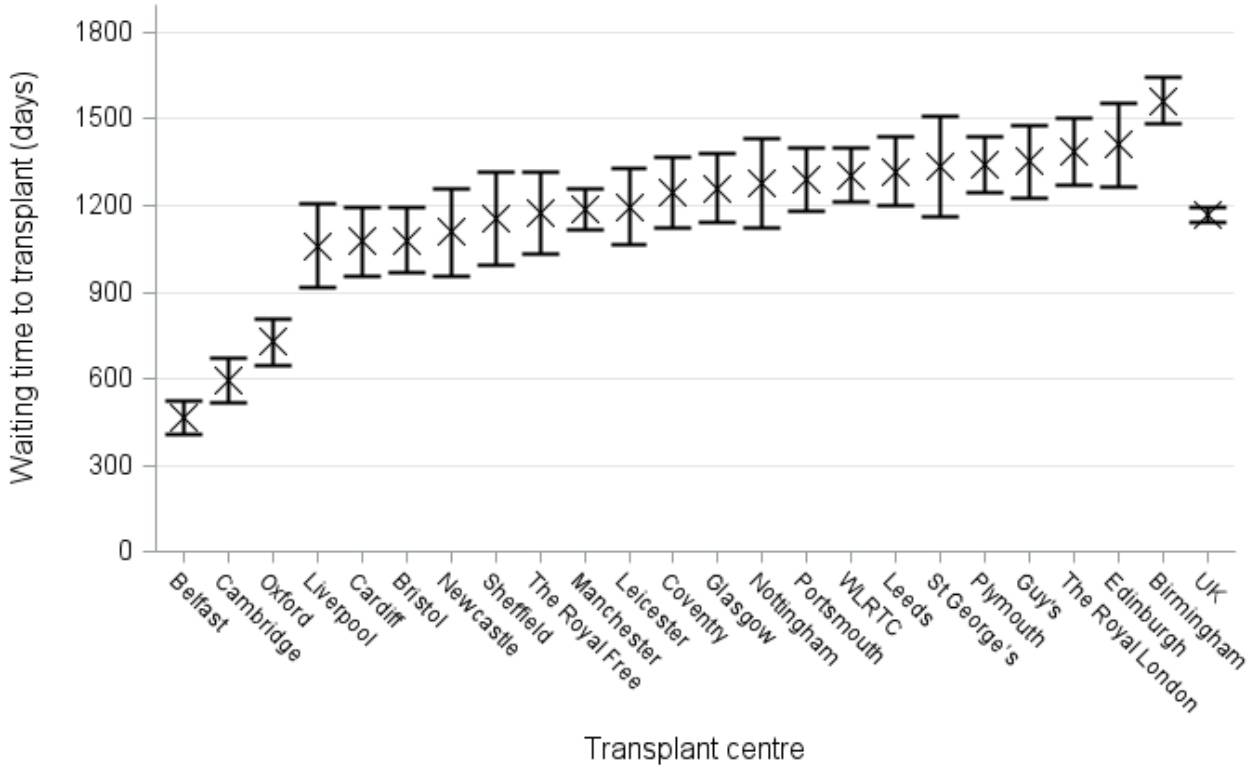


Figure 3.14a Adult risk-adjusted median active waiting times for patients listed between 1 April 2019 and 31 March 2022

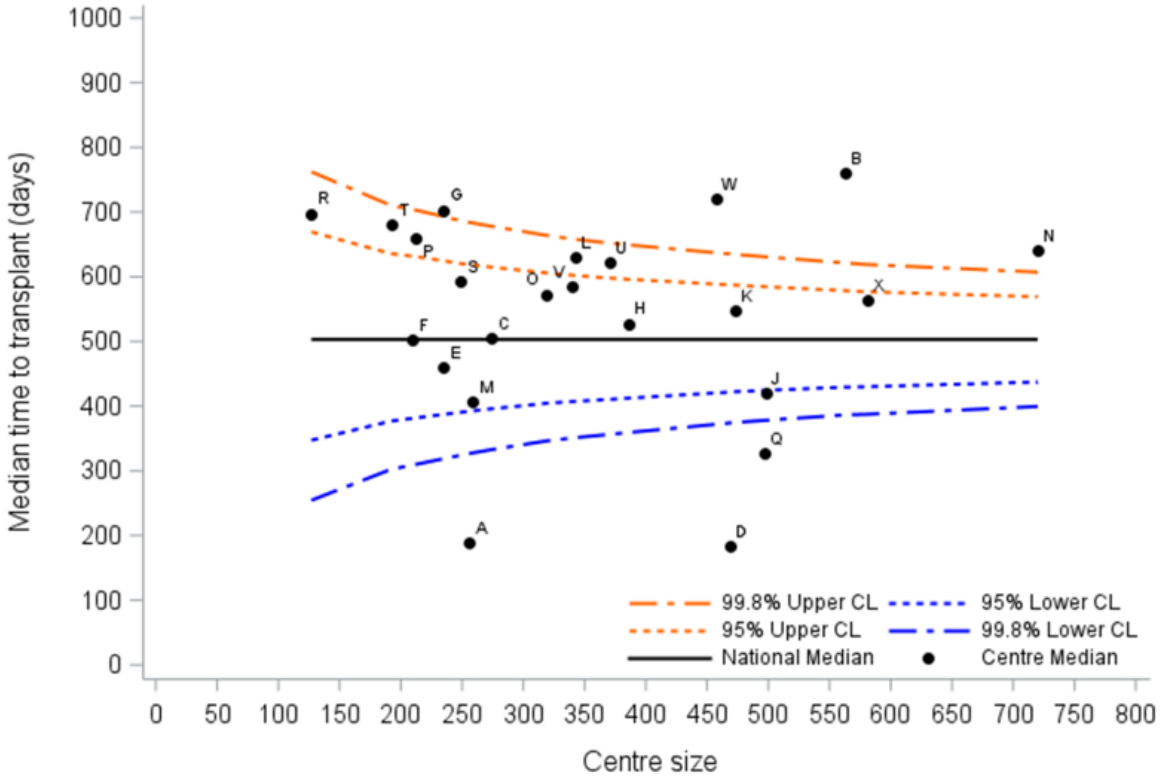


Figure 3.14b Adult risk-adjusted median total waiting time for patients listed between 1 April 2019 and 31 March 2022

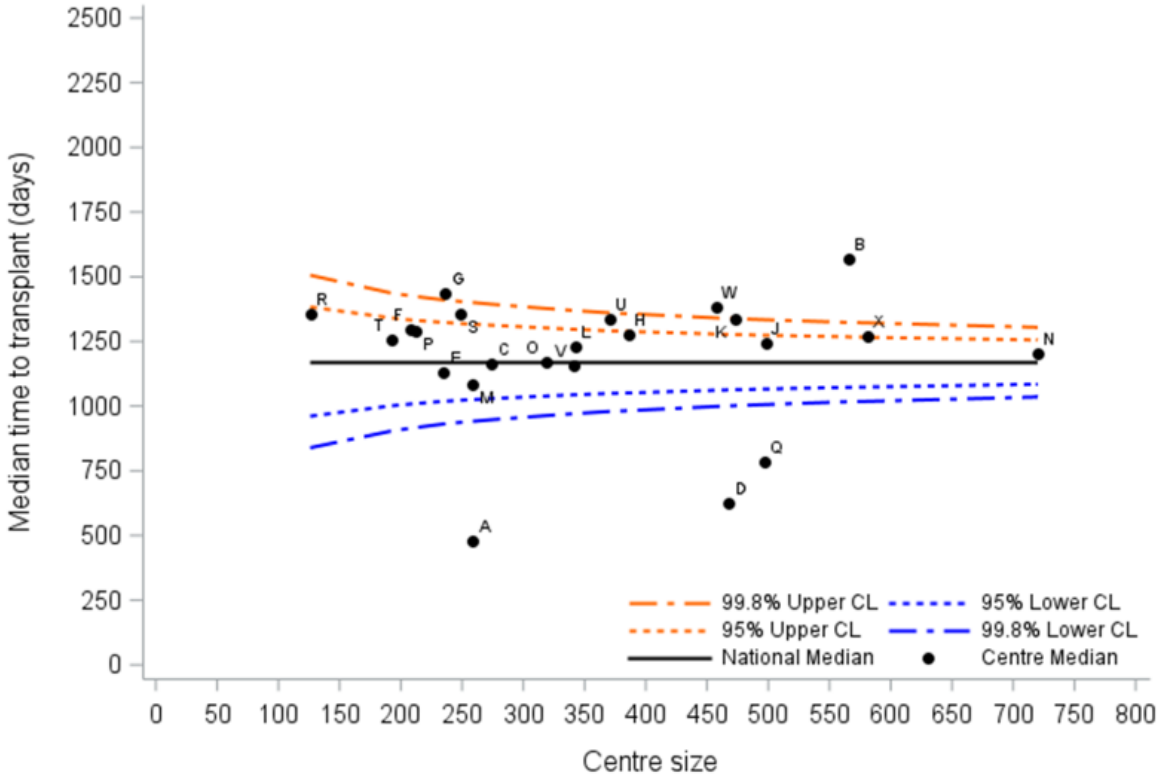


Table 3.1a Median active waiting time to kidney only transplant in the UK, for adults registered 1 April 2019 – 31 March 2022

Transplant centre	Code	Number of adults registered	Waiting time (days)		
			Unadjusted Median	95% Confidence interval	Risk-adjusted median
Cambridge	D	476	150	122 - 178	184
Belfast	A	262	189	134 - 244	190
Oxford	Q	500	275	231 - 319	328
Liverpool	M	259	408	323 - 493	407
Guy's	J	501	411	347 - 475	420
Cardiff	E	237	451	366 - 536	459
Coventry	F	210	474	326 - 622	503
Bristol	C	276	499	415 - 583	506
Glasgow	H	387	534	398 - 670	528
Portsmouth	S	249	535	408 - 662	592
Leeds	K	474	542	439 - 645	549
Newcastle	O	322	551	465 - 637	573
WLRTC	X	586	559	475 - 643	563
Sheffield	T	193	561	426 - 696	680
Leicester	L	354	600	477 - 723	631
The Royal Free	V	343	617	518 - 716	586
St George’s	U	377	623	540 - 706	622
Nottingham	P	216	641	513 - 769	659
Manchester	N	721	644	571 - 717	640
Plymouth	R	132	647	247 - 1047	698
Edinburgh	G	238	683	533 - 833	703
The Royal London	W	463	727	640 - 814	720
Birmingham	B	570	737	657 - 817	761
UK		**8346**	**502**	**482 - 522**	

Table 3.1b Median total waiting time[1] to kidney only transplant in the UK, for adults registered 1 April 2019 – 31 March 2022

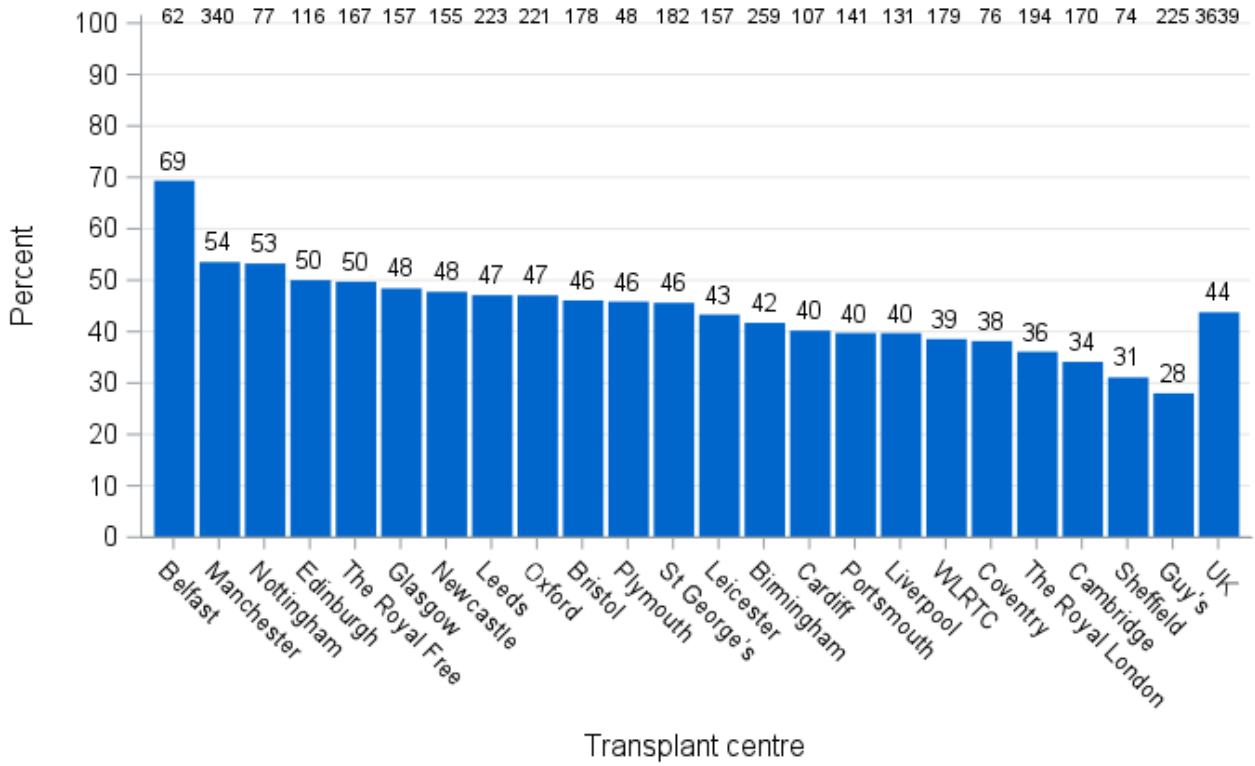
Transplant centre	Code	Number of adults registered	Waiting time (days)		
			Unadjusted Median	95% Confidence interval	Risk-adjusted median
Belfast	A	261	466	407 - 525	478
Cambridge	D	474	593	516 - 670	628
Oxford	Q	499	728	647 - 809	786
Liverpool	M	259	1061	917 - 1205	1081
Cardiff	E	237	1077	958 - 1196	1133
Bristol	C	275	1079	966 - 1192	1162
Newcastle	O	322	1107	958 - 1256	1173
Sheffield	T	193	1153	993 - 1313	1254
The Royal Free	V	343	1174	1035 - 1313	1156
Manchester	N	721	1187	1116 - 1258	1203
Leicester	L	347	1196	1066 - 1326	1230
Coventry	F	209	1247	1125 - 1369	1297
Glasgow	H	387	1260	1140 - 1380	1279
Nottingham	P	216	1279	1124 - 1434	1289
Portsmouth	S	249	1290	1179 - 1401	1354
WLRTC	X	586	1306	1215 - 1397	1270
Leeds	K	474	1318	1200 - 1436	1336
St George's	U	376	1335	1159 - 1511	1346
Plymouth	R	130	1343	1247 - 1439	1356
Guy's	J	500	1353	1228 - 1478	1244
The Royal London	W	463	1385	1268 - 1502	1384
Edinburgh	G	238	1410	1266 - 1554	1436
Birmingham	B	570	1562	1482 - 1642	1567
UK		**8329**	**1169**	**1143 - 1195**	

[1] Total waiting time includes dialysis and periods of suspension
Recipients who were not active for more than 1 day are excluded from this analysis.

3.6 Pre-emptive listing rates, 1 April 2023 – 31 March 2024

Rates of pre-emptive kidney only listings are shown in **Figure 3.15** for adults joining the list between 1 April 2023 and 31 March 2024. Patients listed on the deceased donor transplant list prior to receiving a living donor transplant are excluded and in order to remove the effect of these patients an earlier cohort was selected.

Figure 3.15 Adult pre-emptive listing rates by centre, registrations between 1 April 2023 and 31 March 2024



3.7 2019 Kidney Offering Scheme Recipient Risk Index, 1 April 2024 – 31 March 2025

A Recipient Risk Score (RRI) was developed alongside the change in kidney offering scheme in 2019. The RRI is now calculated for each eligible patient using four risk factors. A recipient is then categorised into one of four groups (R1-R4) based on the risk score and by pre-determined cut-off values.

RRI = exp { 0 x (recipient age≤25)-75) +
0.016 x ((recipient age>25)-75) +
0.361 x (recipient on dialysis at registration) +
0.033 x ([waiting time from dialysis-950]/365.25) +
0.252 x (Diabetic recipient) }

R1 → RRI ≤ 0.74 (lowest risk)
R2 → RRI 0.74 – 0.94
R3 → RRI 0.94 – 1.20
R4 → RRI ≥1.20 (highest risk)

Table 3.2 presents the RRI groups and average scores for adults on the kidney only transplant list at 31 March 2025.

Table 3.2 Recipient Risk Index of adult patients active on the kidney only transplant list at 31 March 2025

Transplant centre	Recipient Risk Group				
	R1	R2	R3	R4	Avg. RRI
Belfast	42	27	17	3	0.79
Birmingham	195	142	104	75	0.88
Bristol	82	92	58	20	0.87
Cambridge	78	72	54	26	0.87
Cardiff	66	57	34	19	0.85
Coventry	59	37	42	28	0.9
Edinburgh	61	71	53	30	0.89
Glasgow	78	99	66	29	0.88
Guy's	117	99	76	40	0.88
Leeds	153	110	87	62	0.89
Leicester	101	87	63	50	0.91
Liverpool	77	59	39	30	0.89
Manchester	201	180	116	73	0.89
Newcastle	93	102	75	42	0.9
Nottingham	65	52	28	19	0.85
Oxford	103	82	86	63	0.95
Plymouth	32	43	28	16	0.9
Portsmouth	67	78	56	47	0.94
Sheffield	42	58	25	27	0.92
St George's	108	77	54	33	0.86
The Royal Free	100	95	65	41	0.89
The Royal London	156	110	81	36	0.84
WLRTC	139	120	73	59	0.89
UK	**2215**	**1949**	**1380**	**868**	**0.89**

Response to adult kidney offers

Offer decline rates

Kidney-only offers from DBD and DCD donors who had at least one kidney retrieved, offered directly and on behalf of a named individual patient and resulted in transplantation are included in the analysis. Any offers made through the reallocation of kidneys, declined kidney or fast track schemes were excluded. Offers where a donor was already accepted for the recipient are also excluded. Only offers through the DCD kidney allocation scheme are presented, all local DCD offers are excluded.

In order to understand centre practices more fully, data are presented separately for DBD and DCD standard and extended criteria donors (SCD & ECD). ECD have been defined as donors aged ≥60 years at the time of death OR aged 50 to 59 years with at least two or three donor characteristics: hypertension, creatinine > 130 µmol/l or death due to intracranial haemorrhage. SCD are donors that did not meet the ECD criteria.

Funnel plots were used to compare centre specific offer decline rates and indicate how consistent the rates of the individual transplant centres are with the national rate. The overall national unadjusted offer decline rate is shown by the solid line while the 95% and 99.8% confidence lines are indicated via a thin and thick dotted line, respectively. Each dot in the plot represents an individual transplant centre. Centres that are positioned above the upper limits indicate on offer decline rate that is higher than the national rate, while centres positioned below the lower limits indicates on offer decline rate that is lower than the national rate. Patient case mix is known to influence the number of offers a centre may receive. In this analysis however only individual offers for named patients were considered which excluded any ABO- and HLA-incompatible patients. For this reason it was decided not to risk adjust for known centre differences in patient case mix.

4.1 DBD Standard criteria offer decline rates, 1 April 2022 – 31 March 2025

Figure 4.1 compares individual centre offer decline rates with the national rate for SCD over the time period, 1 April 2022 and 31 March 2025. Centres can be identified by the information shown in **Table 4.1**.

Figure 4.1 **Adult standard criteria DBD donor kidney offer decline rates for kidneys that resulted in a transplant, 1 April 2022 and 31 March 2025**

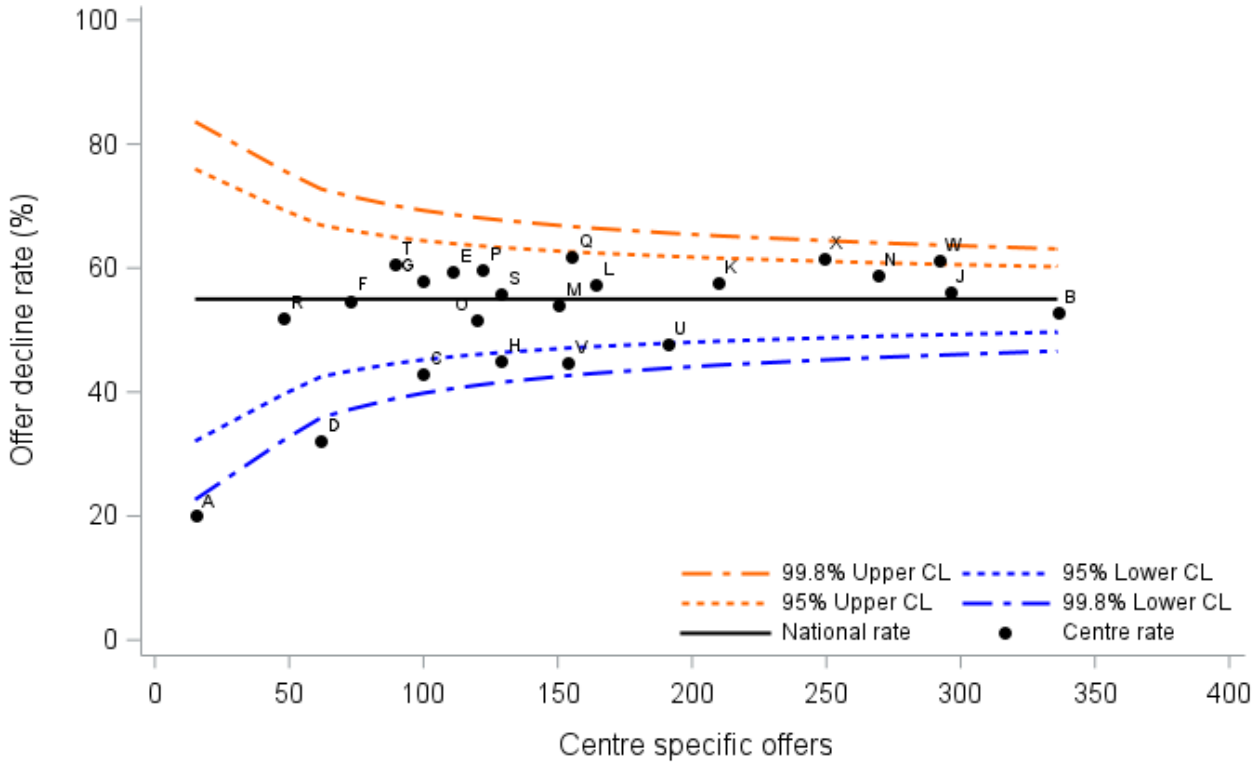


Table 4.1 compares individual centre offer decline rates for SCD over time by financial year.

Table 4.1 Adult standard criteria DBD donor kidney offer decline rates by transplant centre, 1 April 2022 and 31 March 2025

Centre	Code	2022/23		2023/24		2024/25		Overall	
		N	(%)	N	(%)	N	(%)	N	(%)
Belfast	A	8	(25)	2	(0)	5	(20)	15	(20)
Birmingham	B	129	(55)	122	(50)	85	(54)	336	(53)
Bristol	C	39	(33)	35	(49)	26	(50)	100	(43)
Cambridge	D	22	(36)	20	(30)	20	(30)	62	(32)
Cardiff	E	45	(60)	35	(60)	31	(58)	111	(59)
Coventry	F	18	(44)	25	(48)	30	(67)	73	(55)
Edinburgh	G	32	(47)	29	(66)	39	(62)	100	(58)
Glasgow	H	50	(48)	43	(42)	36	(44)	129	(45)
Guy's	J	117	(56)	96	(58)	83	(54)	296	(56)
Leeds	K	80	(58)	68	(63)	62	(52)	210	(58)
Leicester	L	54	(65)	59	(51)	51	(57)	164	(57)
Liverpool	M	58	(59)	57	(58)	35	(40)	150	(54)
Manchester	N	90	(56)	95	(58)	84	(63)	269	(59)
Newcastle	O	41	(49)	41	(59)	38	(47)	120	(52)
Nottingham	P	47	(70)	39	(49)	36	(58)	122	(60)
Oxford	Q	33	(73)	60	(65)	62	(53)	155	(62)
Plymouth	R	23	(48)	18	(61)	7	(43)	48	(52)
Portsmouth	S	50	(56)	44	(61)	35	(49)	129	(56)
Sheffield	T	36	(67)	26	(62)	27	(52)	89	(61)
St George's	U	77	(48)	65	(46)	49	(49)	191	(48)
The Royal Free	V	49	(39)	42	(57)	63	(41)	154	(45)
The Royal London	W	93	(62)	91	(47)	108	(72)	292	(61)
WLRTC	X	77	(55)	86	(65)	86	(64)	249	(61)
UK		**1268**	**(55)**	**1198**	**(55)**	**1098**	**(55)**	**3564**	**(55)**

Centre has reached the upper 99.8% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the lower 99.8% confidence limit

4.2 DBD Extended criteria offer decline rates, 1 April 2022 – 31 March 2025

Figure 4.2 compares individual centre offer decline rates with the national rate for ECD over the time period, 1 April 2022 and 31 March 2025. Centres can be identified by the information shown in **Table 4.2**.

Figure 4.2 **Adult extended criteria DBD donor kidney offer decline rates for kidneys that resulted in a transplant, 1 April 2022 and 31 March 2025**

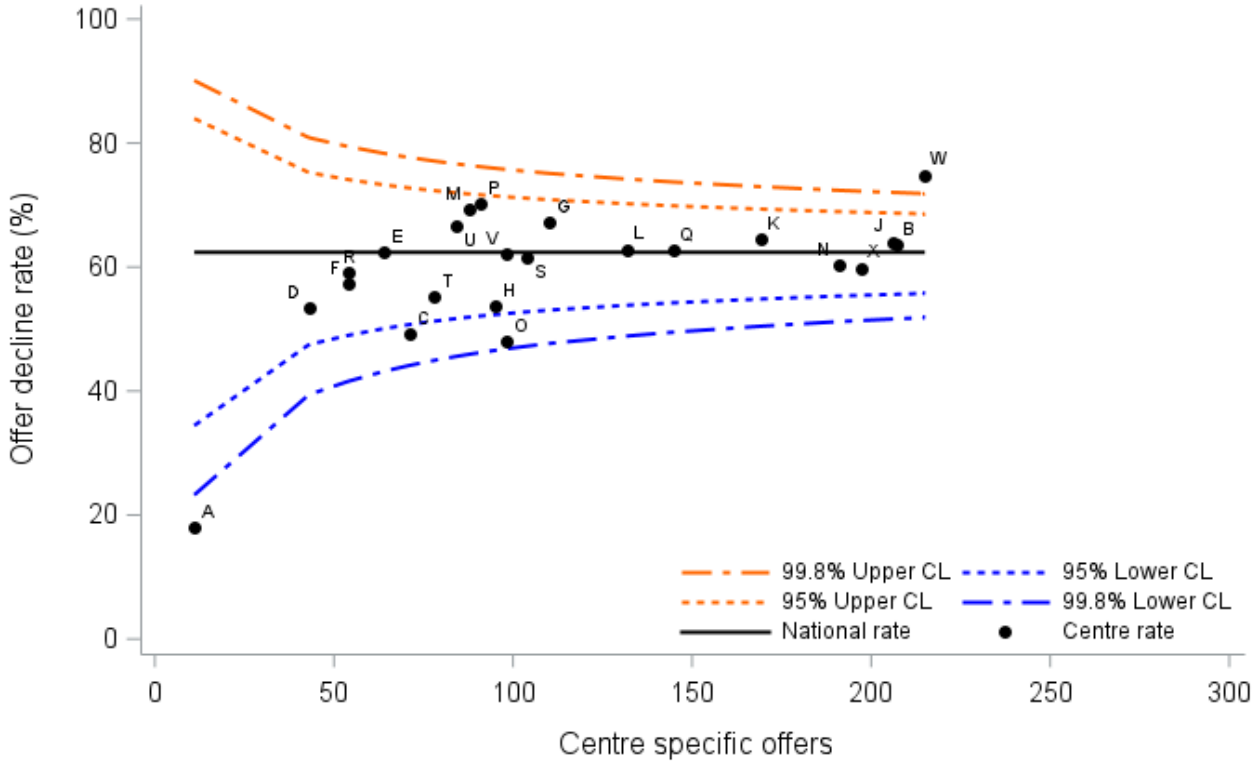


Table 4.2 compares individual centre offer decline rates for ECD over time by financial year.

Table 4.2 Adult extended criteria DBD donor kidney offer decline rates by transplant centre, 1 April 2022 and 31 March 2025

Centre	Code	2022/23		2023/24		2024/25		Overall	
		N	(%)	N	(%)	N	(%)	N	(%)
Belfast	A	3	(0)	2	(50)	6	(17)	11	(18)
Birmingham	B	74	(72)	73	(56)	60	(63)	207	(64)
Bristol	C	17	(47)	24	(54)	30	(47)	71	(49)
Cambridge	D	13	(54)	17	(53)	13	(54)	43	(53)
Cardiff	E	26	(65)	21	(71)	17	(47)	64	(63)
Coventry	F	18	(50)	23	(61)	13	(62)	54	(57)
Edinburgh	G	27	(59)	35	(54)	48	(81)	110	(67)
Glasgow	H	30	(57)	31	(52)	34	(53)	95	(54)
Guy's	J	65	(68)	80	(63)	61	(62)	206	(64)
Leeds	K	41	(56)	56	(68)	72	(67)	169	(64)
Leicester	L	46	(67)	47	(57)	39	(64)	132	(63)
Liverpool	M	38	(71)	30	(73)	20	(60)	88	(69)
Manchester	N	52	(56)	66	(53)	73	(70)	191	(60)
Newcastle	O	17	(59)	41	(37)	40	(55)	98	(48)
Nottingham	P	36	(75)	26	(69)	29	(66)	91	(70)
Oxford	Q	43	(56)	52	(65)	50	(66)	145	(63)
Plymouth	R	24	(46)	18	(72)	12	(67)	54	(59)
Portsmouth	S	34	(71)	31	(55)	39	(59)	104	(62)
Sheffield	T	34	(62)	19	(53)	25	(48)	78	(55)
St George's	U	30	(73)	34	(68)	20	(55)	84	(67)
The Royal Free	V	34	(56)	32	(69)	32	(63)	98	(62)
The Royal London	W	59	(78)	77	(73)	79	(75)	215	(75)
WLRTC	X	66	(52)	68	(66)	63	(62)	197	(60)
UK		**827**	**(63)**	**903**	**(61)**	**875**	**(63)**	**2605**	**(62)**

Centre has reached the upper 99.8% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the lower 99.8% confidence limit

4.3 DCD Standard criteria offer decline rates, 1 April 2022 – 31 March 2025

Figure 4.3 compares individual centre offer decline rates with the national rate for SCD over the time period, 1 April 2022 and 31 March 2025. Centres can be identified by the information shown in **Table 4.3**.

Figure 4.3 **Adult standard criteria DCD donor kidney offer decline rates for kidneys that resulted in a transplant, 1 April 2022 and 31 March 2025**

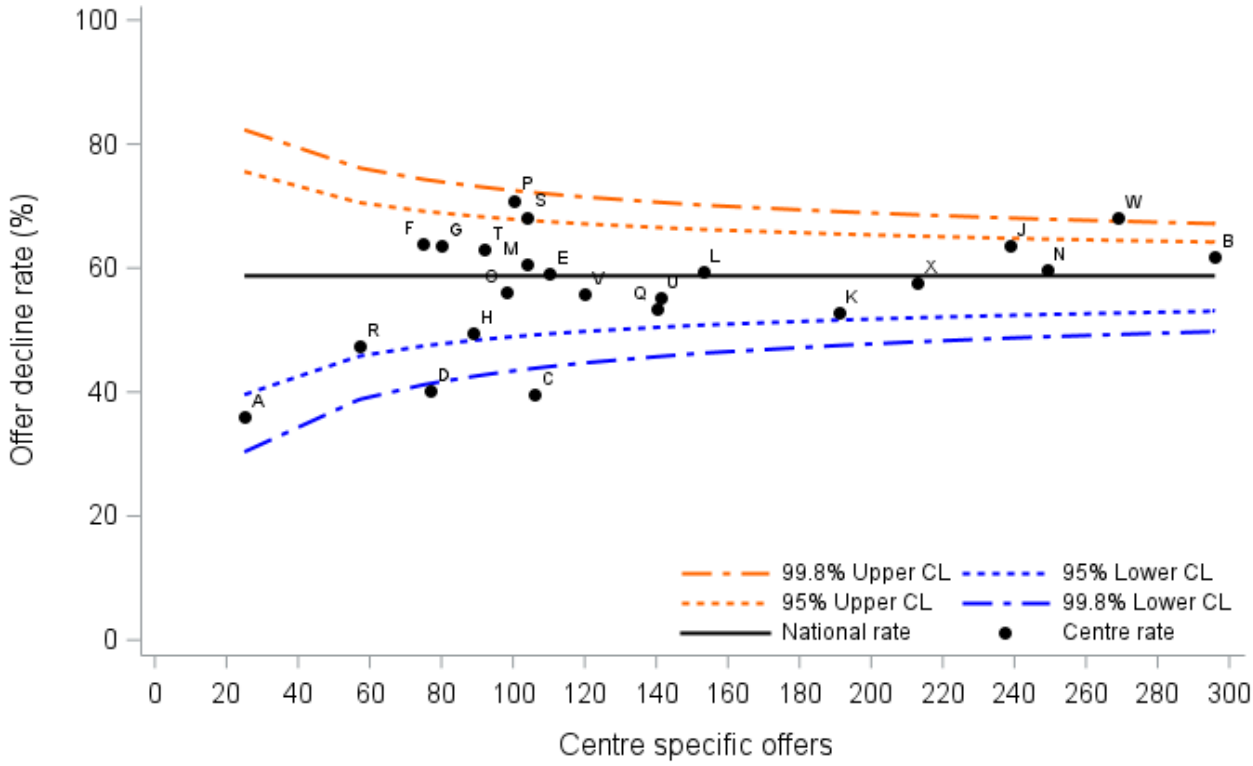


Table 4.3 compares individual centre offer decline rates for SCD over time by financial year.

Table 4.3 Adult standard criteria DCD donor kidney offer decline rates by transplant centre, 1 April 2022 and 31 March 2025

Centre	Code	2022/23		2023/24		2024/25		Overall	
		N	(%)	N	(%)	N	(%)	N	(%)
Belfast	A	8	(25)	13	(54)	4	(0)	25	(36)
Birmingham	B	102	(67)	91	(64)	103	(55)	296	(62)
Bristol	C	38	(34)	39	(41)	29	(45)	106	(40)
Cambridge	D	22	(18)	27	(56)	28	(43)	77	(40)
Cardiff	E	36	(72)	40	(63)	34	(41)	110	(59)
Coventry	F	20	(60)	23	(61)	32	(69)	75	(64)
Edinburgh	G	18	(56)	30	(63)	32	(69)	80	(64)
Glasgow	H	30	(53)	29	(34)	30	(60)	89	(49)
Guy's	J	69	(70)	91	(65)	79	(57)	239	(64)
Leeds	K	45	(44)	82	(62)	64	(47)	191	(53)
Leicester	L	53	(62)	49	(55)	51	(61)	153	(59)
Liverpool	M	29	(59)	40	(73)	35	(49)	104	(61)
Manchester	N	65	(58)	81	(63)	103	(58)	249	(60)
Newcastle	O	28	(50)	35	(74)	35	(43)	98	(56)
Nottingham	P	37	(78)	31	(61)	32	(72)	100	(71)
Oxford	Q	42	(50)	41	(61)	57	(51)	140	(54)
Plymouth	R	23	(61)	21	(43)	13	(31)	57	(47)
Portsmouth	S	41	(63)	44	(68)	19	(79)	104	(68)
Sheffield	T	35	(69)	35	(57)	22	(64)	92	(63)
St George's	U	35	(43)	56	(70)	50	(48)	141	(55)
The Royal Free	V	18	(39)	48	(60)	54	(57)	120	(56)
The Royal London	W	73	(74)	85	(62)	111	(68)	269	(68)
WLRTC	X	44	(50)	89	(57)	80	(63)	213	(58)
UK		**911**	**(59)**	**1120**	**(61)**	**1097**	**(57)**	**3128**	**(59)**

Centre has reached the upper 99.8% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the lower 99.8% confidence limit

4.4 Reallocation of kidneys, 1 April 2022 – 31 March 2025

Between 3 April 2006 and 11 September 2019 all kidneys from donation after brain death (DBD) donors have been allocated through the 2006 National Kidney Allocation Scheme. There are however certain situations when a kidney can be reallocated to an alternative patient of the centre's choice. This occurs when the kidney is accepted and dispatched to a named patient but is subsequently declined and there are no other patients listed nationally who fall within Tiers A to D of the kidney allocation scheme (000 mismatched adults and paediatric patients or favourably matched paediatric patients).

In this situation the centre in receipt of the kidney can reallocate the organ to a locally listed patient of their choice based on an individual centre matching run.

Since 11 September 2019 all kidneys from deceased donors have been allocated through the 2019 National Kidney Offering Scheme. In a similar fashion to the 2006 scheme, if a kidney needs to be reallocated because the patient for whom the kidney has been accepted cannot subsequently receive the transplant then the kidney can be reallocated to an alternative patient of the centre's choice if the kidney has been dispatched to the transplant centre and there are no suitable patients in Tier A.

Funnel plots were used to compare centre specific reallocation rates and indicate how consistent the rates of the individual transplant centres are with the national rate. The overall national reallocation rate is shown by the solid line while the 95% and 99.8% confidence lines are indicated via a thin and thick dotted line, respectively. Each dot in the plot represents an individual transplant centre. Centres that are positioned above the upper limits indicate a reallocation rate that is higher than the national rate, while centres positioned below the lower limits indicates a reallocation rate that is lower than the national rate.

Figure 4.4 compares individual centre reallocation rates with the national rate over the time period, 1 April 2022 and 31 March 2025. Centres can be identified by the information shown in **Table 4.4**.

Figure 4.4 **Local reallocation of DBD donor kidneys following an acceptance of an adult offer through the national allocation scheme**

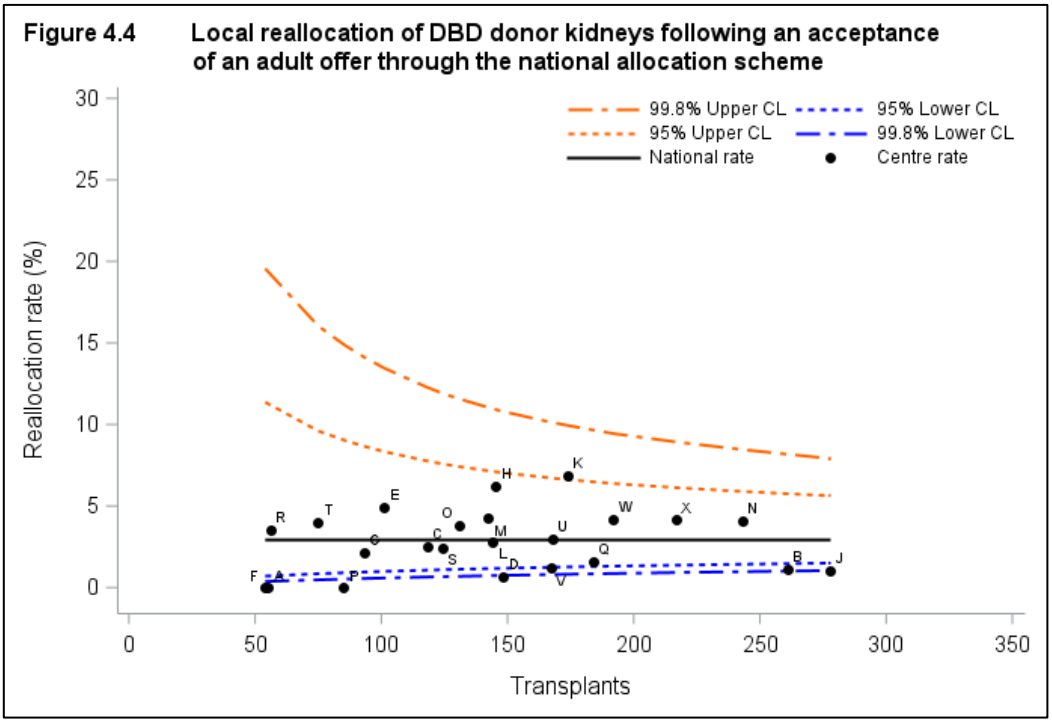


Table 4.4 compares individual reallocation rates over time by financial year.

Table 4.4 Local reallocation of DBD donor kidneys following an acceptance of an adult offer through the national allocation scheme

Centre	Code	2022/23		2023/24		2024/25		Overall	
		N	(%)	N	(%)	N	(%)	N	(%)
Belfast	A	28	(0)	14	(0)	13	(0)	55	(0)
Birmingham	B	85	(0)	101	(1)	75	(3)	261	(1)
Bristol	C	41	(7)	40	(0)	37	(0)	118	(3)
Cambridge	D	56	(0)	51	(0)	41	(2)	148	(1)
Cardiff	E	33	(6)	35	(6)	33	(3)	101	(5)
Coventry	F	18	(0)	20	(0)	16	(0)	54	(0)
Edinburgh	G	31	(0)	32	(3)	30	(3)	93	(2)
Glasgow	H	47	(4)	53	(9)	45	(4)	145	(6)
Guy's	J	89	(1)	106	(2)	83	(0)	278	(1)
Leeds	K	63	(3)	49	(4)	62	(13)	174	(7)
Leicester	L	41	(2)	59	(3)	44	(2)	144	(3)
Liverpool	M	50	(4)	47	(4)	45	(4)	142	(4)
Manchester	N	84	(6)	85	(4)	74	(3)	243	(4)
Newcastle	O	39	(10)	49	(0)	43	(2)	131	(4)
Nottingham	P	25	(0)	33	(0)	27	(0)	85	(0)
Oxford	Q	57	(0)	63	(2)	64	(3)	184	(2)
Plymouth	R	28	(4)	16	(6)	12	(0)	56	(4)
Portsmouth	S	43	(2)	39	(5)	42	(0)	124	(2)
Sheffield	T	28	(7)	20	(0)	27	(4)	75	(4)
St George's	U	54	(2)	62	(6)	52	(0)	168	(3)
The Royal Free	V	70	(1)	34	(3)	63	(0)	167	(1)
The Royal London	W	58	(7)	76	(3)	58	(3)	192	(4)
WLRTC	X	96	(5)	57	(2)	64	(5)	217	(4)
UK		**1164**	**(3)**	**1141**	**(3)**	**1050**	**(3)**	**3355**	**(3)**

Centre has reached the upper 99.8% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the lower 99.8% confidence limit

Adult kidney transplants

5.1 Kidney only transplants, 1 April 2015 – 31 March 2025

Figure 5.1 shows the total number of adult kidney only transplants performed in the last ten years, by type of donor.

Figure 5.1 Adult kidney only transplants, 1 April 2015 - 31 March 2025

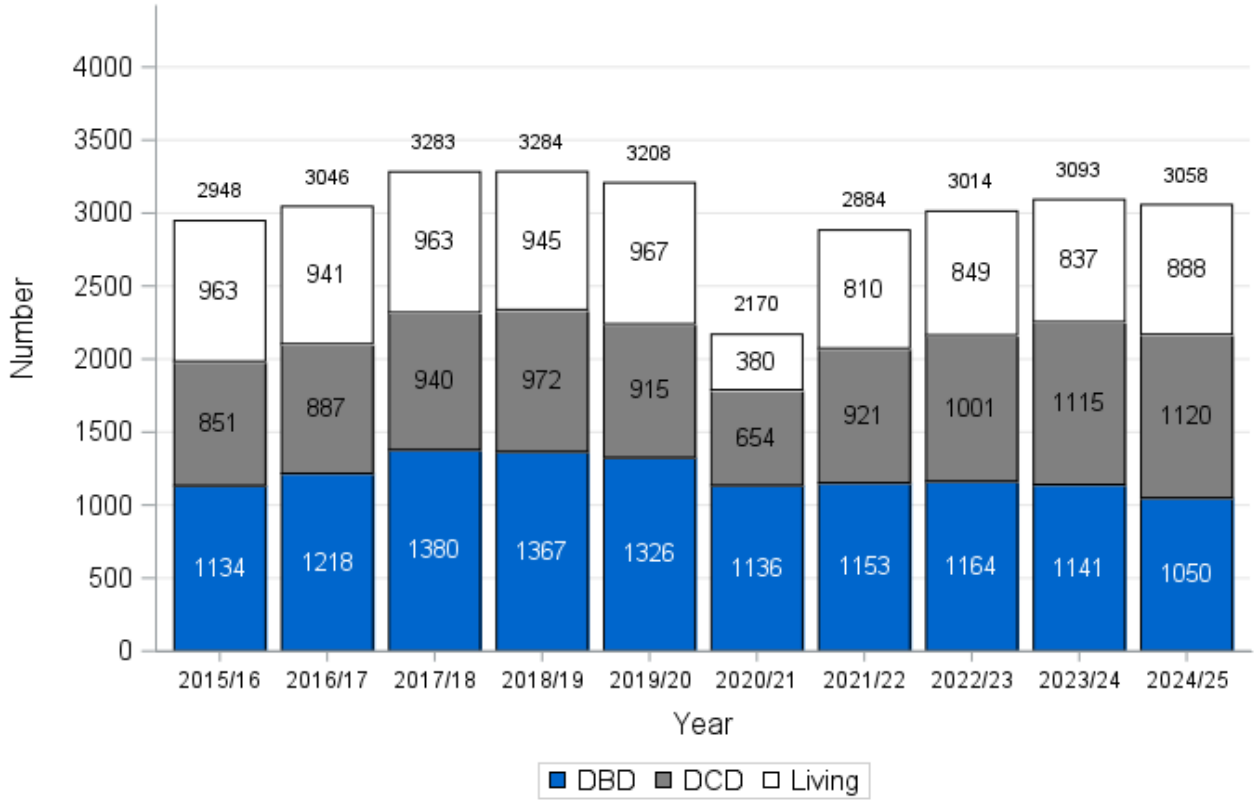


Figure 5.2 shows the total number of adult kidney only transplants performed in 2024/25, by centre and type of donor. The same information is presented in **Figure 5.3,** but this shows the proportion of DBD, DCD and living donor transplants performed at each centre.

Figure 5.2 Adult kidney only transplants, 1 April 2024 - 31 March 2025

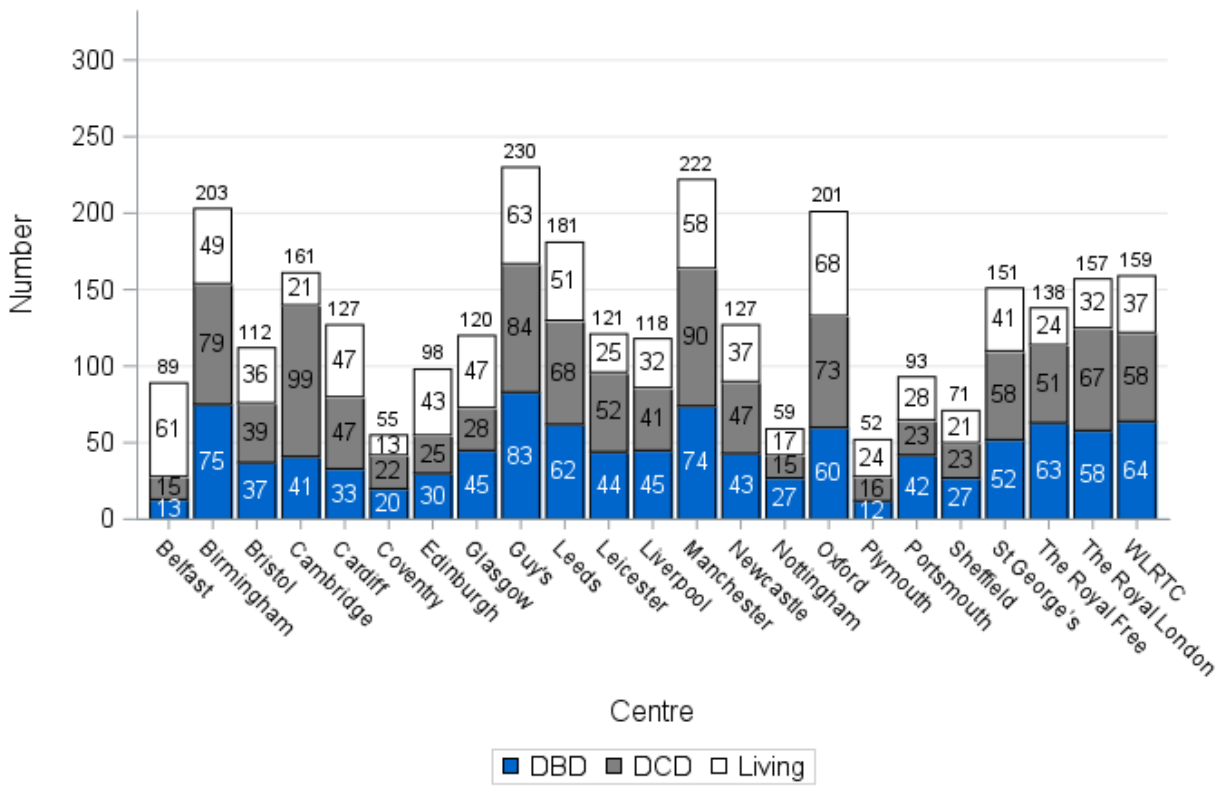


Figure 5.3 Adult kidney only transplants, 1 April 2024 - 31 March 2025

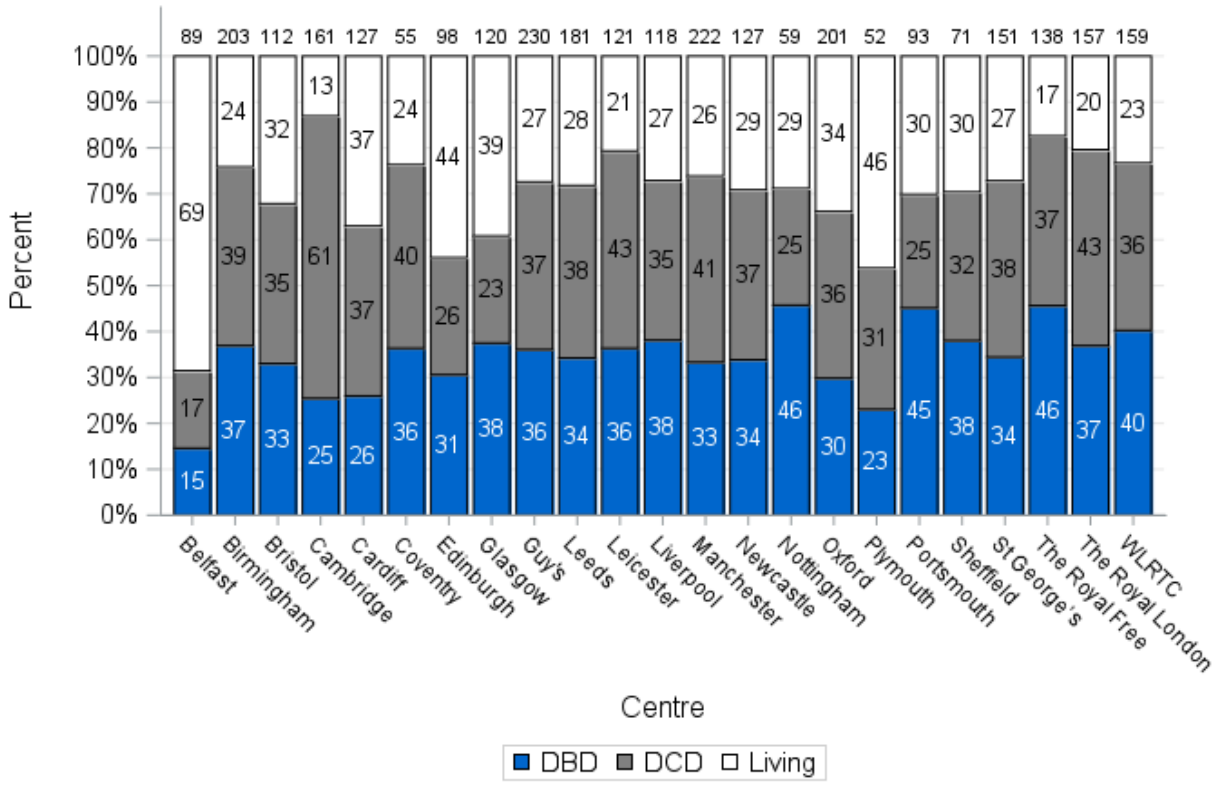
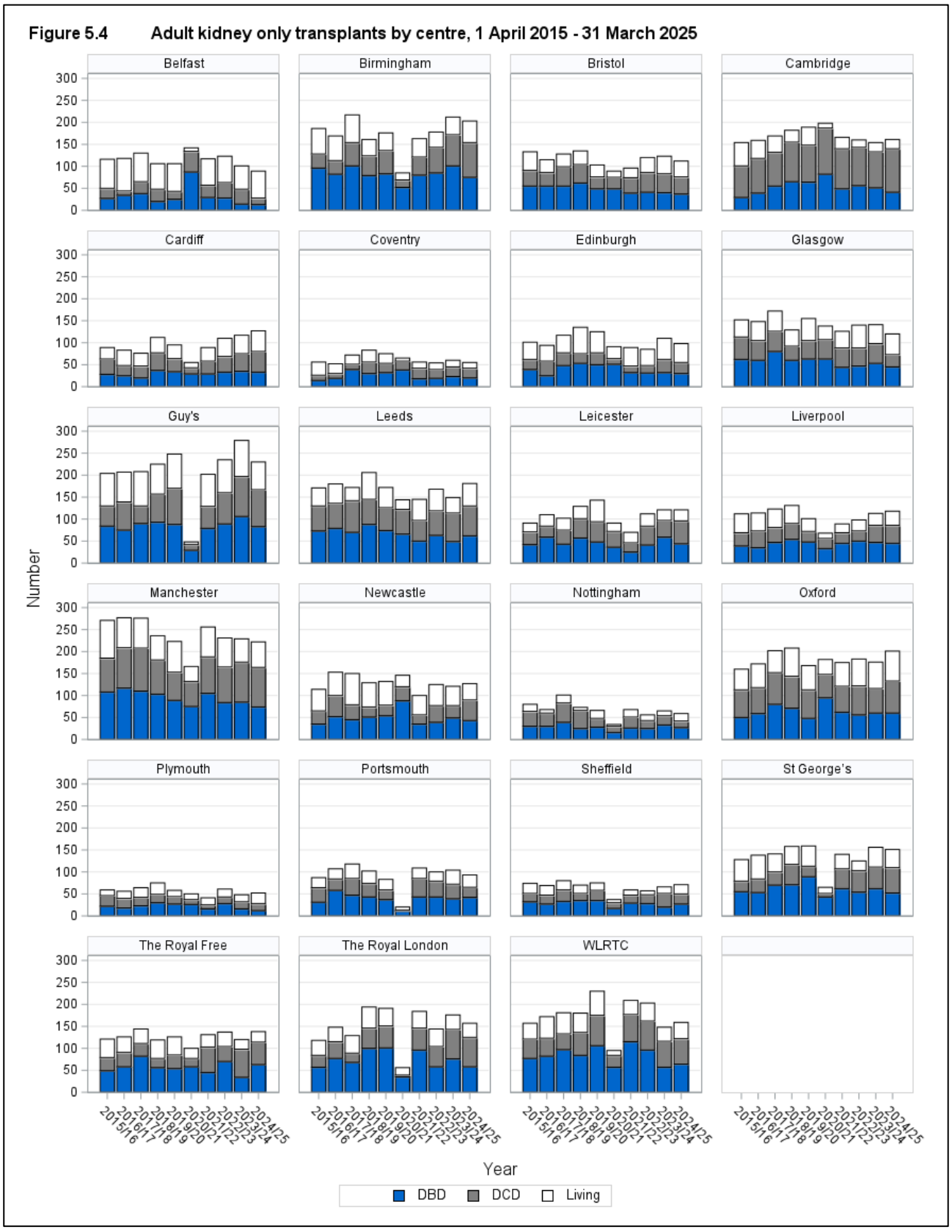


Figure 5.4 shows the total number of adult kidney only transplants performed in last ten years, by centre and type of donor.



5.2 Demographic characteristics of recipients, 1 April 2024 – 31 March 2025

The sex, ethnicity and age group of recipients who received a kidney only transplant are shown by centre in **Figure 5.5, 5.6 and 5.7**, respectively. Note that all percentages quoted are based only on data where relevant information was available.

Figure 5.5 Sex of adult kidney only transplant recipients, 1 April 2024 and 31 March 2025, by centre

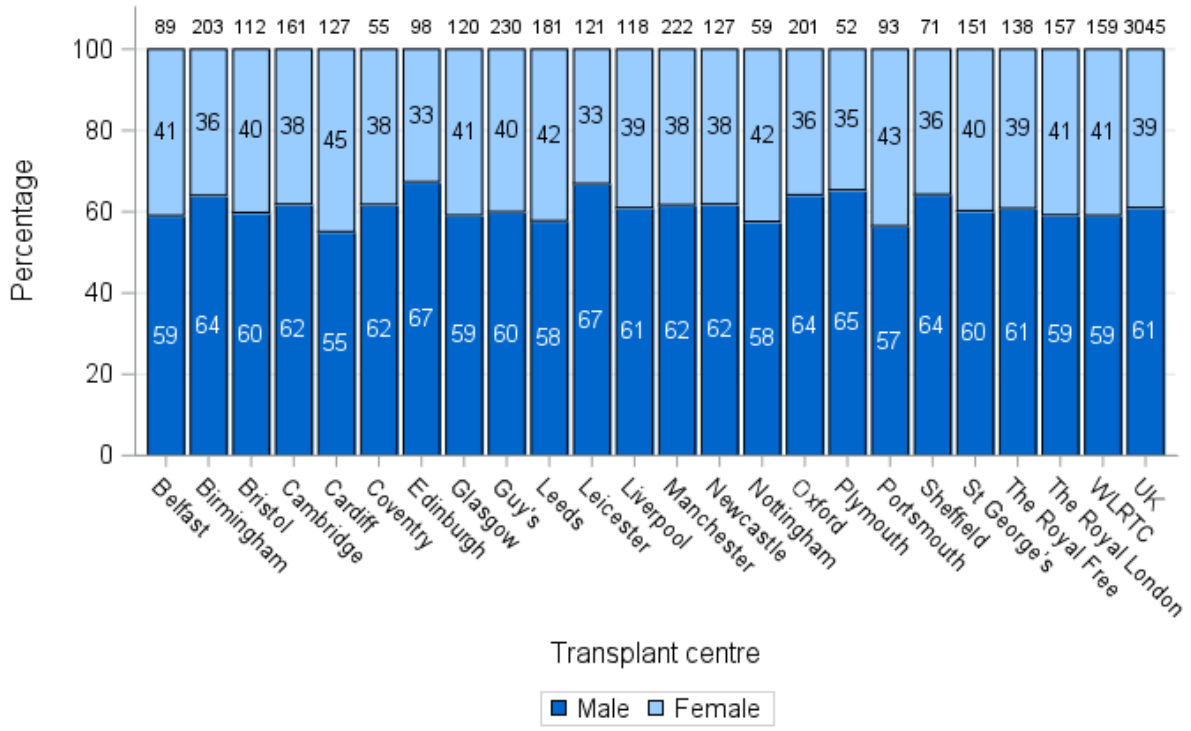


Figure 5.6 Ethnicity of adult kidney only transplant recipients, 1 April 2024 and 31 March 2025, by centre

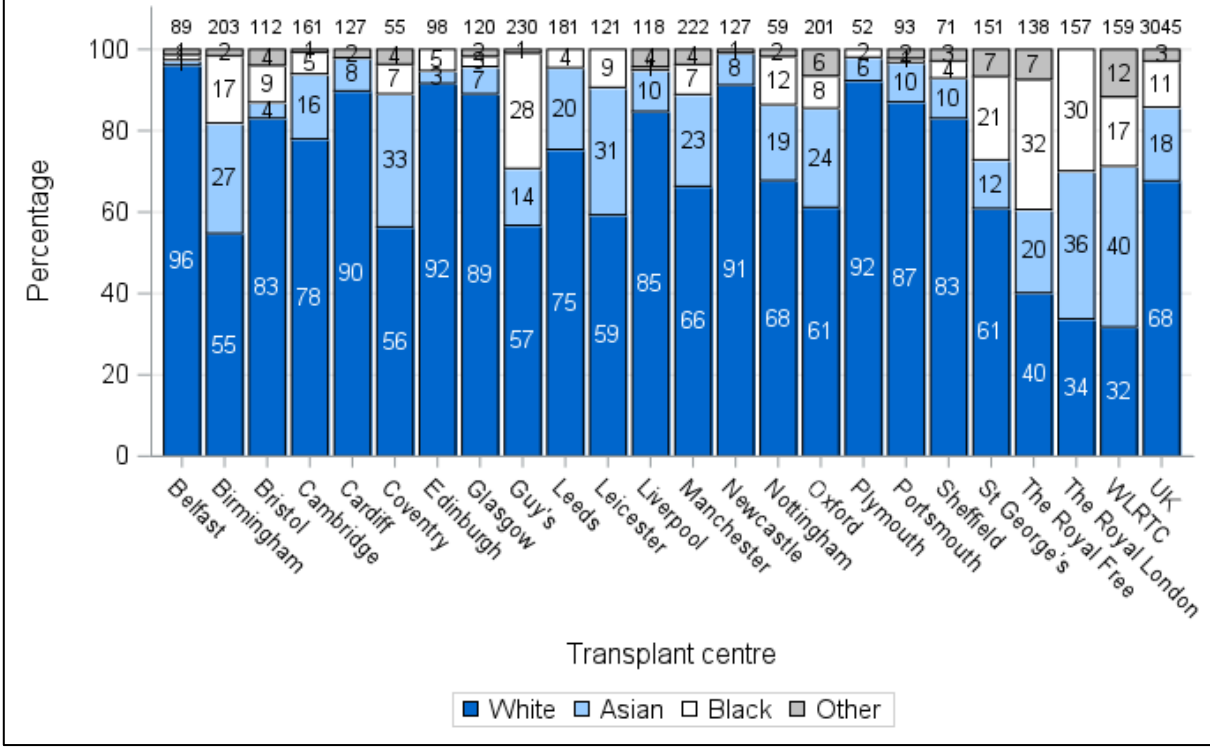
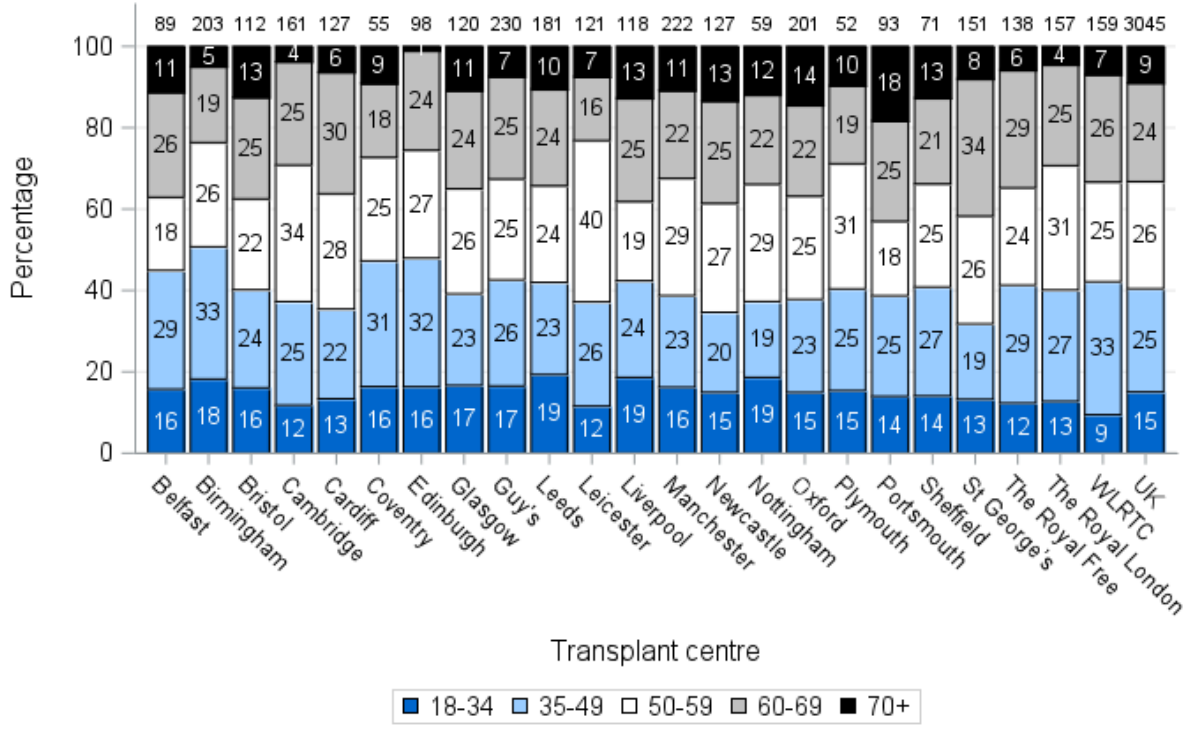


Figure 5.7 Age of adult kidney only transplant recipients, 1 April 2024 and 31 March 2025, by centre



5.3 Pre-emptive transplant rates, 1 April 2024 – 31 March 2025

Rates of pre-emptive kidney only transplantation are shown in **Figure 5.8** for adult deceased donor transplants and **Figure 5.9** for adult living donor transplants. Living donor transplants are more likely to be carried out before the need for dialysis than deceased donor transplants: 37% and 13% respectively. This is because a living donor transplant can often be carried out more quickly than a deceased donor kidney transplant as the latter often necessitates a long waiting time.

Figure 5.8 Adult deceased donor pre-emptive transplant rates by centre, 1 April 2024 - 31 March 2025

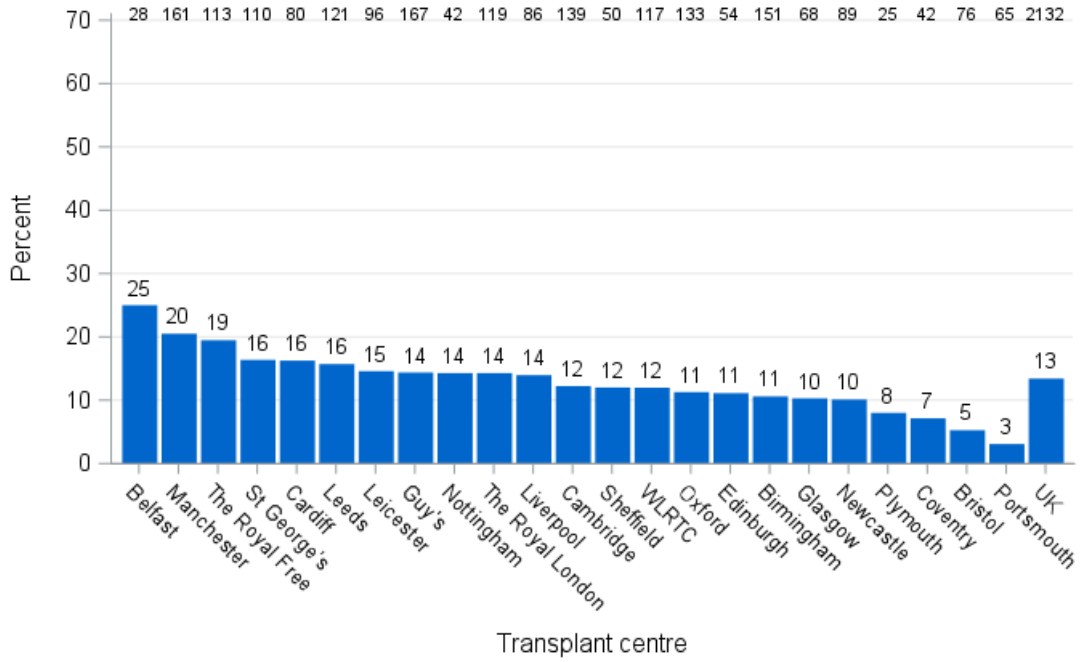
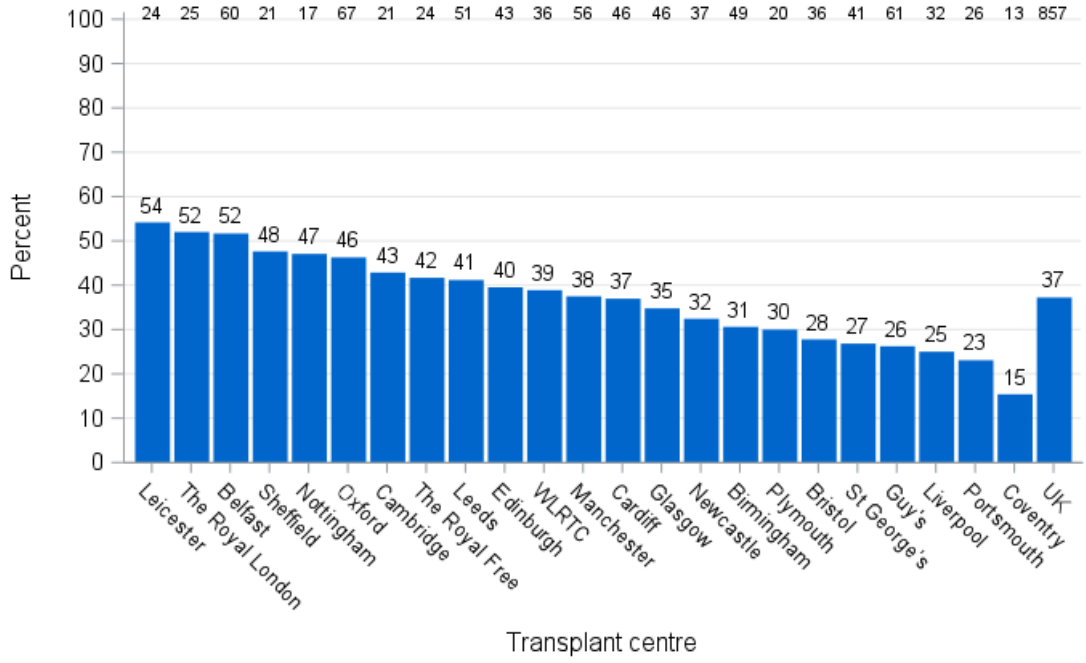


Figure 5.9 Adult living donor pre-emptive transplant rates by centre, 1 April 2024 - 31 March 2025



5.4 Kidney donor risk-index[1]

The severe shortage of deceased donor (DD) organs available for transplantation has led to increased use of kidneys from suboptimal donors with potentially less good transplant outcome. Categorising such kidneys according to anticipated outcome is important because it enables clinicians to be better informed when making decisions about organ allocation and allows appropriate counselling of potential recipients. Kidneys from suboptimal donors are variously referred to as marginal, extended criteria, or expanded criteria organs. Although categorising DD kidneys as either standard or expanded criteria has the advantage of simplicity, it does not adequately reflect the wide spectrum of donor kidney quality, and this has led to the development of more refined approaches to assessing the quality of DD kidneys. A donor risk index was developed by determining the factors that influence transplant survival, the time from transplant to the earlier of graft failure or patient death. A UK donor risk index was derived from the parameter estimates of the donor factors in the Cox model developed for overall transplant survival. This gives the following index:

UKKDRI = exp{-0.245 x (donor age <40) +
0.396 x (donor age ≥60) +
0.265 x (history of hypertension) +
0.0253 x [donor weight(kg)-75]/10) +
0.00461 x (days in hospital) +
0.0465 x (adrenaline)}

Reference

1 Watson CJE, Johnson RJ, Birch R, Collett D, Bradley JA. A simplified donor risk index for predicting outcome after deceased donor kidney transplantation. *Transplantation*, 2012; 93: 314-318

Figure 5.10 shows the number of transplanted DBD donor kidneys over the last ten financial years by kidney donor risk index group. In 2024/25, 38% of all transplants were performed using kidneys from donors categorised as high risk (UK Donor risk index ≥1.35).

Figure 5.10 UK Kidney Donor Risk Index of transplanted DBD donor kidneys 1 April 2015 - 31 March 2025

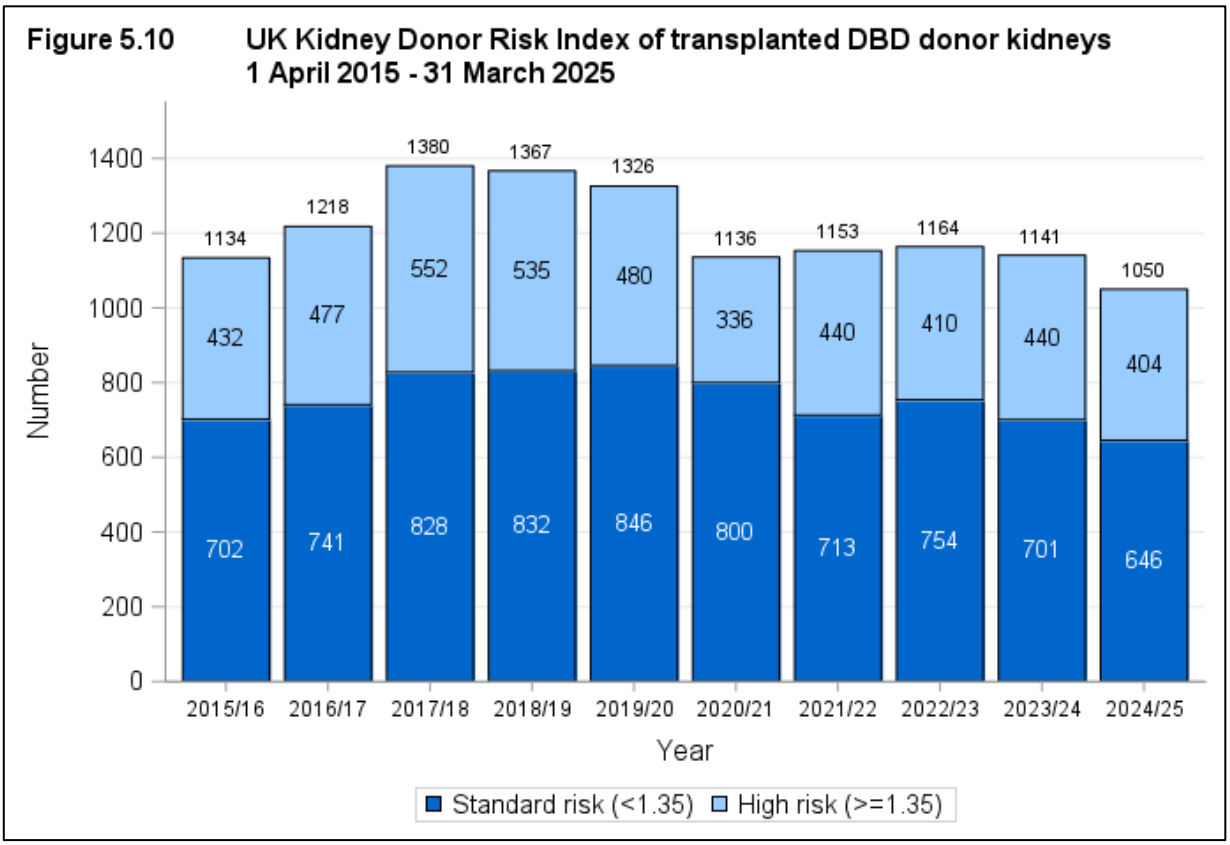


Figure 5.11 shows the number of transplanted DBD donor kidneys in 2024/25 by kidney donor risk index group for each transplant centre. The same information is presented in **Figure 5.12** but this shows the proportion of standard risk and high risk donor transplants performed at each centre.

Figure 5.11 UK Kidney Donor Risk Index of transplanted DBD donor kidneys 1 April 2024 - 31 March 2025

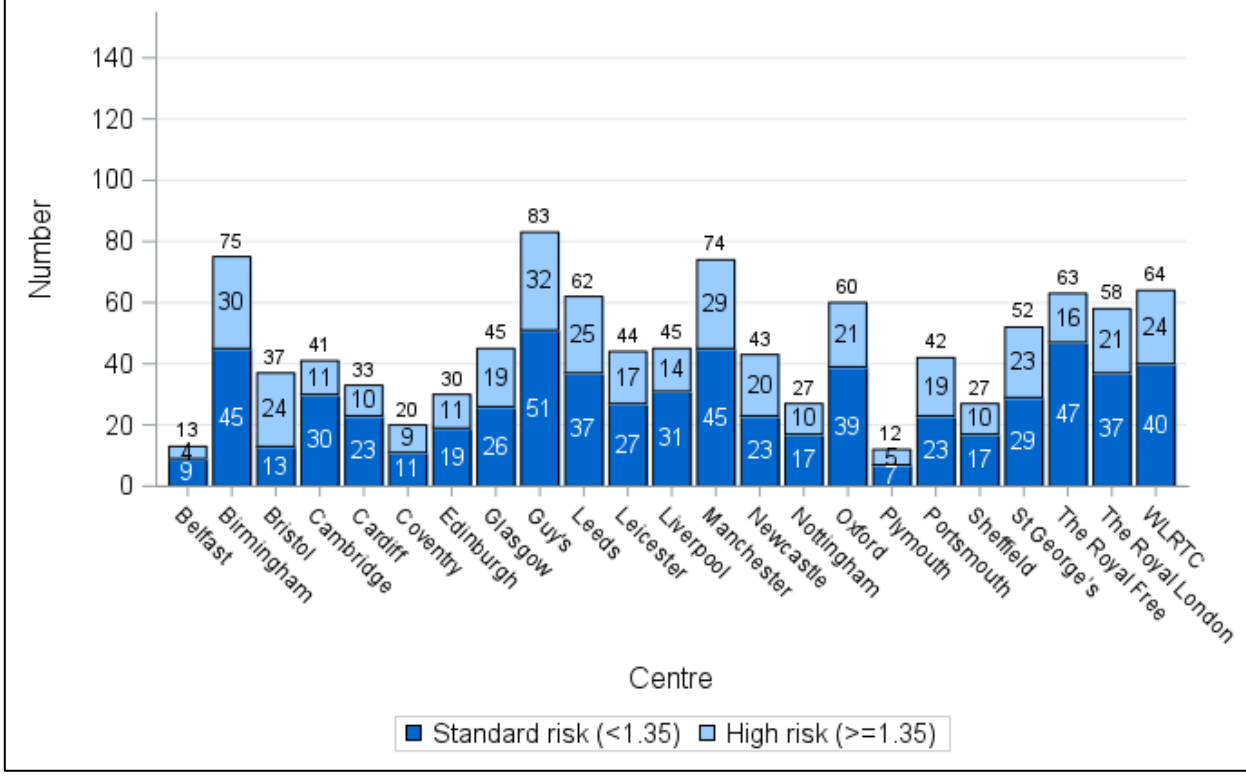


Figure 5.12 UK Kidney Donor Risk Index of transplanted DBD donor kidneys 1 April 2024 - 31 March 2025

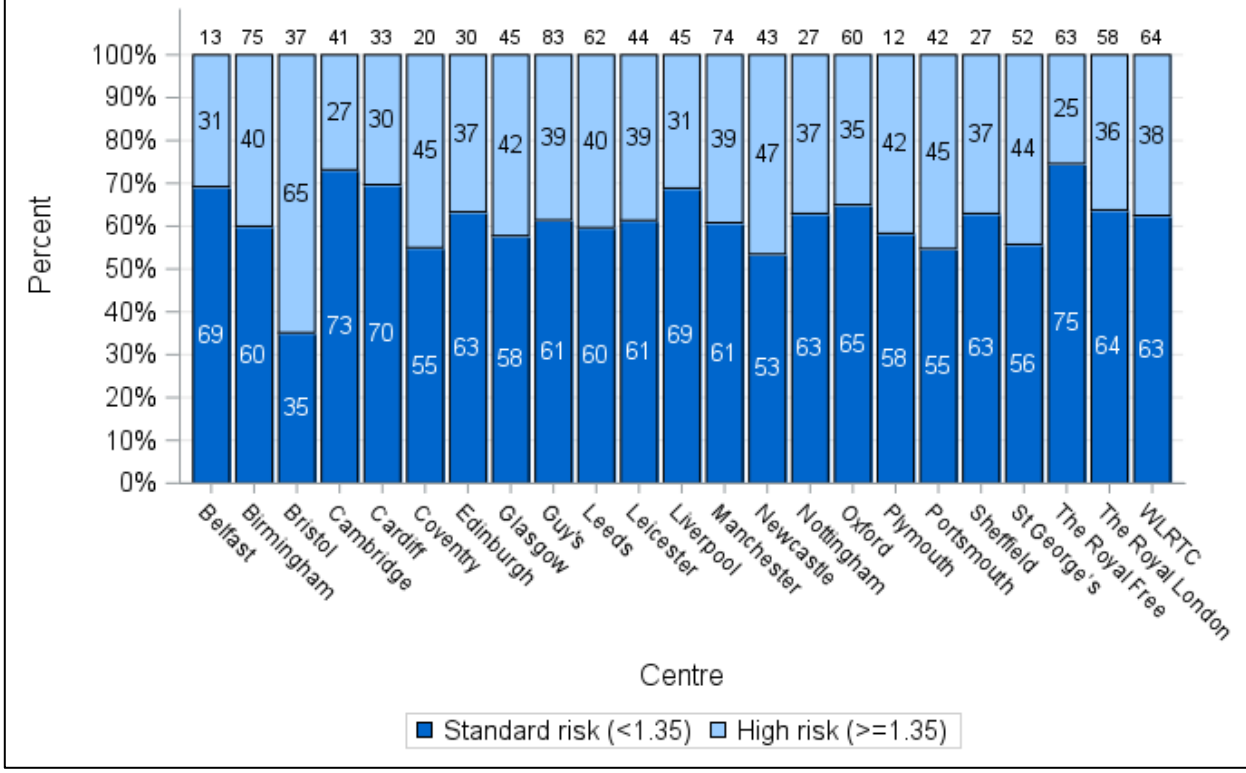
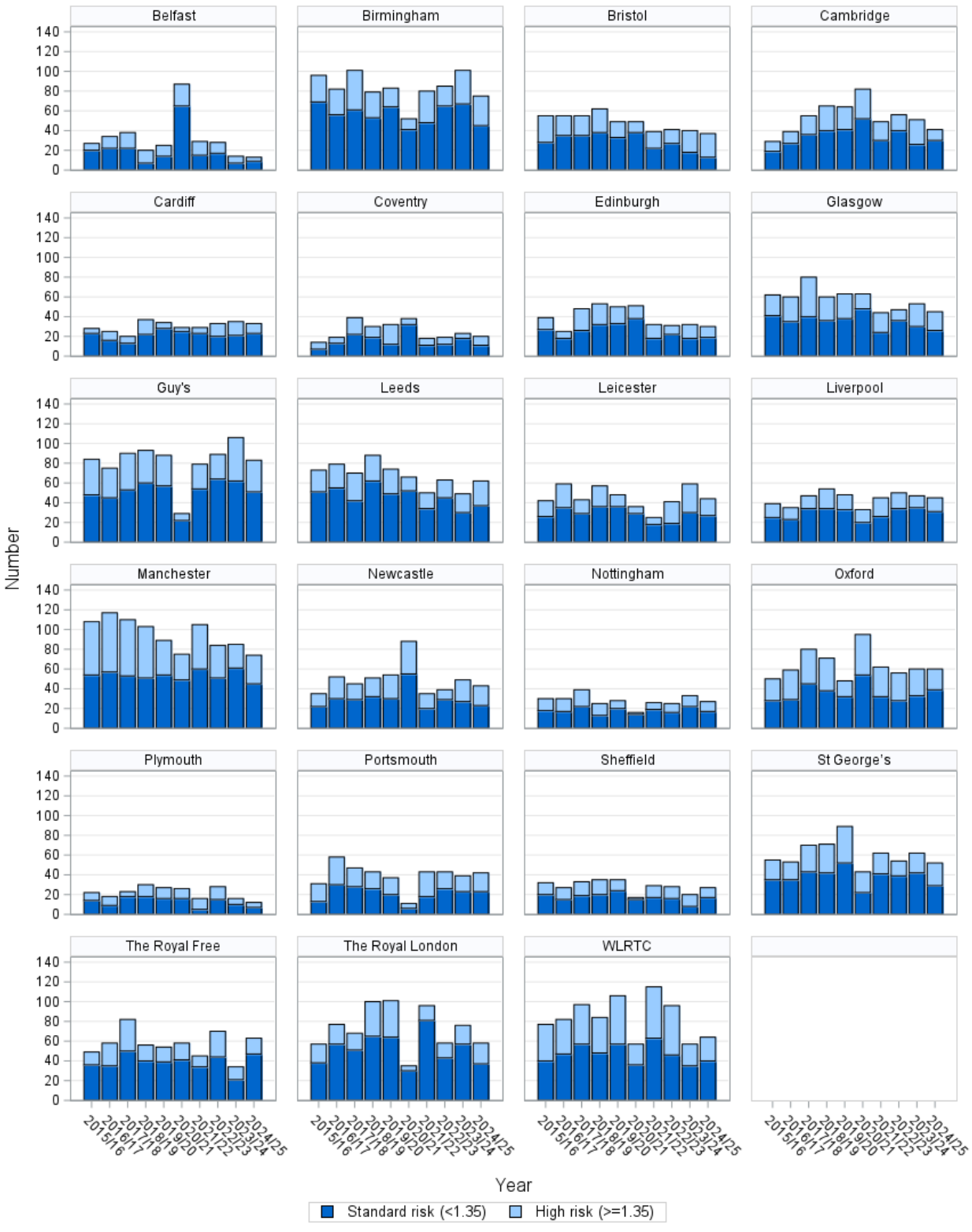


Figure 5.13 shows the number of transplanted DBD donor kidneys in the last ten years by kidney donor risk index group for each transplant centre.

Figure 5.13 **UK Kidney Donor Risk Index of transplanted DBD donor kidneys by centre, 1 April 2015 - 31 March 2025**



5.5 2019 Kidney Offering Scheme Donor Risk Index and Recipient Risk Index, 1 April 2024 – 31 March 2025

A new Kidney Donor Risk Index (DRI) was developed for deceased donors alongside the change in kidney offering scheme in 2019. This DRI is calculated using seven risk factors. A donor is then categorised into one of four groups (D1-D4) based on the risk score and by pre-determined cut-off values.

$$
\begin{aligned}
DRI = \exp\{\ & 0.023 \times (\text{donor age}-50) \\
& -0.152 \times ([\text{donor height}-170]/10) \\
& +0.149 \times (\text{history of hypertension}) \\
& -0.184 \times (\text{female donor}) \\
& +0.190 \times (\text{CMV +ve donor}) \\
& -0.023 \times ([\text{offer eGFR}-90]/10) \\
& +0.015 \times (\text{days in hospital})\ \}
\end{aligned}
$$

D1 → DRI ≤ 0.79 (lowest risk)
D2 → DRI 0.79 – 1.12
D3 → DRI 1.12 – 1.50
D4 → DRI ≥1.50 (highest risk)

As discussed in Section 3.8 a Recipient Risk Score (RRI) was also developed alongside the 2019 offering scheme using four risk factors.

$$
\begin{aligned}
RRI = \exp\{\ & 0 \times (\text{recipient age} \leq 25)-75) \\
& +0.016 \times ((\text{recipient age} > 25)-75) \\
& +0.361 \times (\text{recipient on dialysis at registration}) \\
& +0.033 \times ([\text{waiting time from dialysis}-950]/365.25) \\
& +0.252 \times (\text{Diabetic recipient})\ \}
\end{aligned}
$$

A recipient is then categorised into one of four groups based on the risk score and pre-determined cut-off values.

R1 → RRI ≤ 0.74 (lowest risk)
R2 → RRI 0.74 - 0.94
R3 → RRI 0.94 – 1.20
R4 → RRI ≥1.20 (highest risk)

Table 5.1 presents the DRI and RRI groups and average scores for kidneys transplanted between 1 April 20234 and 31 March 2025.

Table 5.1 UK Kidney Donor Risk Index of transplanted deceased donor kidneys and Recipient Risk Index of those receiving them, 1 April 2024 - 31 March 2025

Transplant centre	Donor Risk Group					Recipient Risk Group				
	D1	D2	D3	D4	Avg. DRI	R1	R2	R3	R4	Avg. RRI
Belfast	8	7	4	8	1.13	6	10	8	3	0.92
Birmingham	42	50	34	28	1.1	51	36	34	38	0.96
Bristol	10	20	16	26	1.29	15	18	17	24	1.02
Cambridge	35	47	29	42	1.17	46	34	46	23	0.92
Cardiff	22	28	11	16	1.07	30	28	17	8	0.86
Coventry	11	6	11	10	1.22	6	11	10	11	1.01
Edinburgh	25	18	7	17	1.05	19	23	14	12	0.94
Glasgow	18	17	18	20	1.21	21	15	19	15	0.97
GOSH	4	1	0	0	0.61	5	0	0	0	0.55
Guy's	42	31	40	51	1.23	35	47	50	38	0.99
Leeds	26	34	37	20	1.11	34	29	35	29	0.97
Leicester	20	22	23	28	1.21	25	23	25	21	0.98
Liverpool	26	22	17	16	1.1	29	17	19	19	0.96
Manchester	76	33	40	35	1.04	67	43	37	41	0.94
Newcastle	13	28	22	24	1.24	12	26	28	25	1.06
Nottingham	11	10	10	9	1.17	15	8	15	7	0.93
Oxford	53	50	25	25	1	35	51	38	43	1
Plymouth	3	10	6	7	1.26	5	7	8	8	1.01
Portsmouth	12	10	19	18	1.26	14	7	20	16	1.05
Sheffield	9	15	14	8	1.17	8	15	11	11	1.02
St George’s	14	34	19	35	1.32	21	41	21	23	0.99
The Royal Free	31	33	22	20	1.05	38	27	21	23	0.93
The Royal London	29	36	33	21	1.11	23	35	36	25	0.96
WLRTC	26	33	35	26	1.14	25	32	30	33	1.01
UK	**566**	**595**	**492**	**510**	**1.14**	**585**	**583**	**559**	**496**	**0.97**

5.6 Total preservation time, 1 April 2022 – 31 March 2025

The length of time that elapses between the initial perfusion of the kidney with preservation fluid to its transplantation into the recipient is called the total preservation time (preservation time). Generally, the shorter this time, the more likely the kidney is to work immediately and the better the long-term outcome. One of the reasons why live donor kidney transplantation is so successful is because the preservation time is generally three to six hours long. For deceased donor renal transplants, preservation time is unlikely to be as short as this, but efforts are made to keep the time to a minimum. Evidence indicates that the outcome is only adversely affected when preservation time is longer than 20 hours, although many deceased donor kidney transplants with a preservation time of more than 20 hours have been very successful.

The factors which determine preservation time include a) transportation of the kidney from the retrieval hospital to the hospital where the transplant is performed, b) the need to tissue type the donor and cross-match the donor and potential recipients, c) the occasional necessity of moving the kidney to another hospital if a transplant cannot go ahead, d) contacting and preparing the recipient for the transplant and e) access to the operating theatre.

Median preservation times are shown in addition to inter-quartile ranges. Fifty percent of the transplants have a preservation time within the inter-quartile range. There is some variation in average (median) preservation time between different transplant centres although all centres continually try to reduce this time.

Figure 5.14 shows the median total preservation time in adult DBD donor kidney only transplants over the last 10 years.

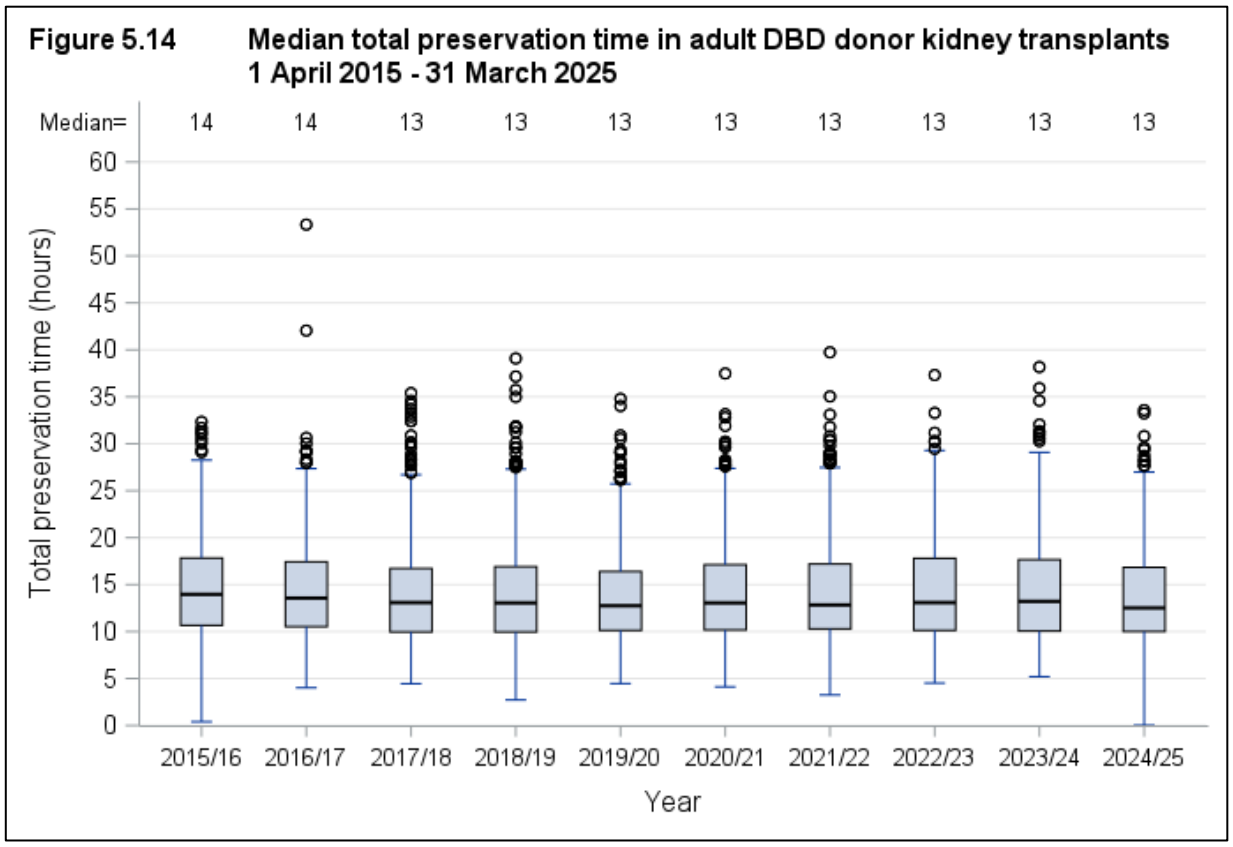


Figure 5.15 shows the median total preservation time in adult DBD donor kidney only transplants in 2024/25 for each transplant centre.

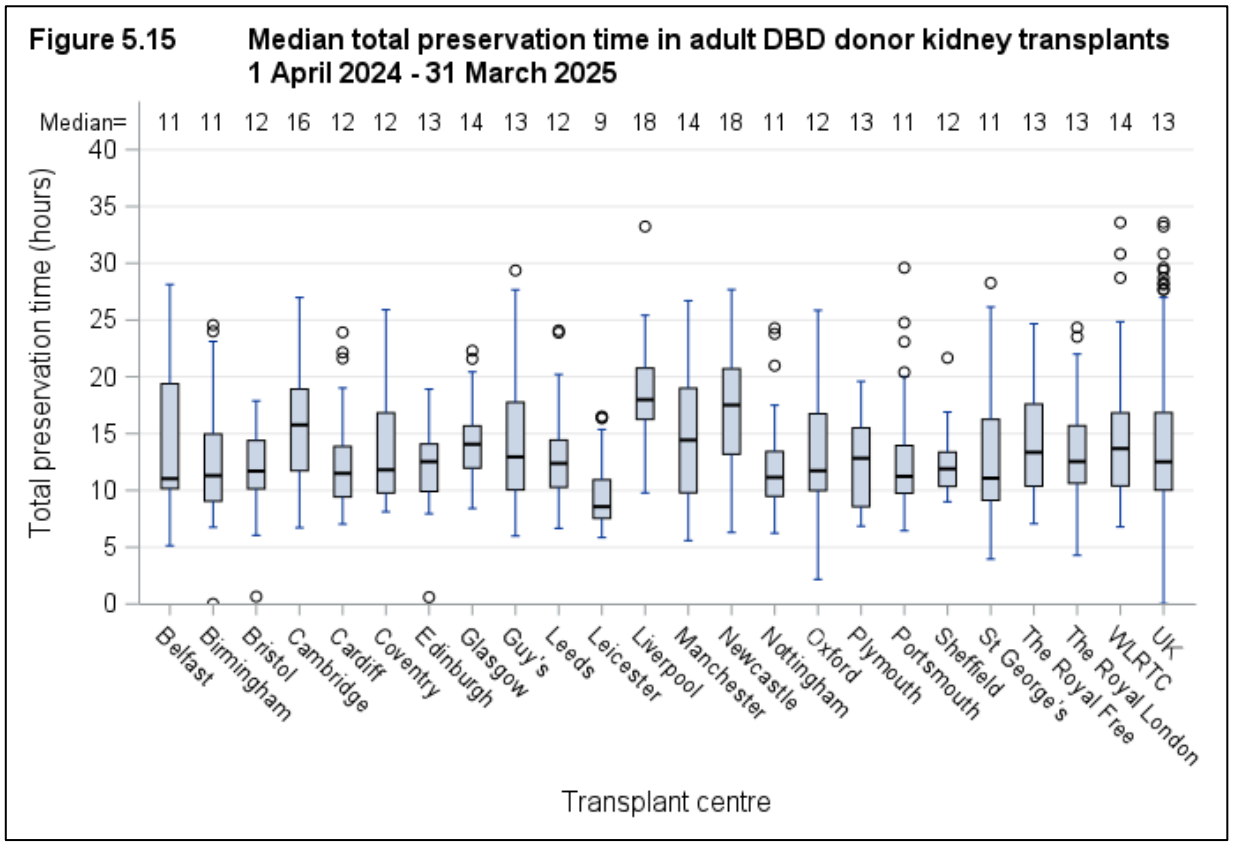


Figure 5.16 shows the median total preservation in adult DBD donor kidney only transplants over the last ten years for each transplant centre.

Figure 5.16 Median total preservation time in adult DBD donor kidney transplants, 1 April 2014 - 31 March 2024

Figure 5.17 shows the proportion of adult DBD donor kidney only transplants in 2024/25 that have been performed within 18 hours of preservation time for each transplant centre.

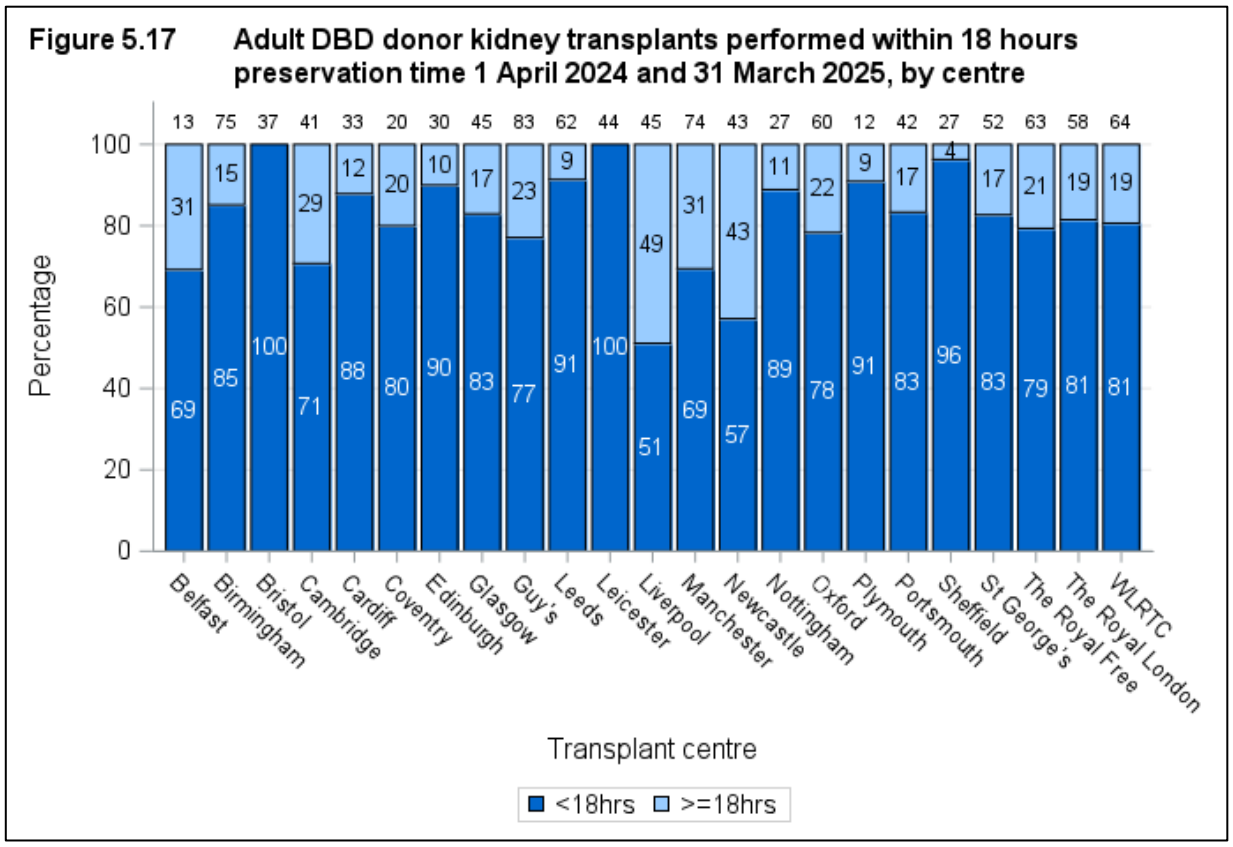


Figure 5.18 shows the median total preservation time in adult DCD donor kidney only transplants over the last 10 years.

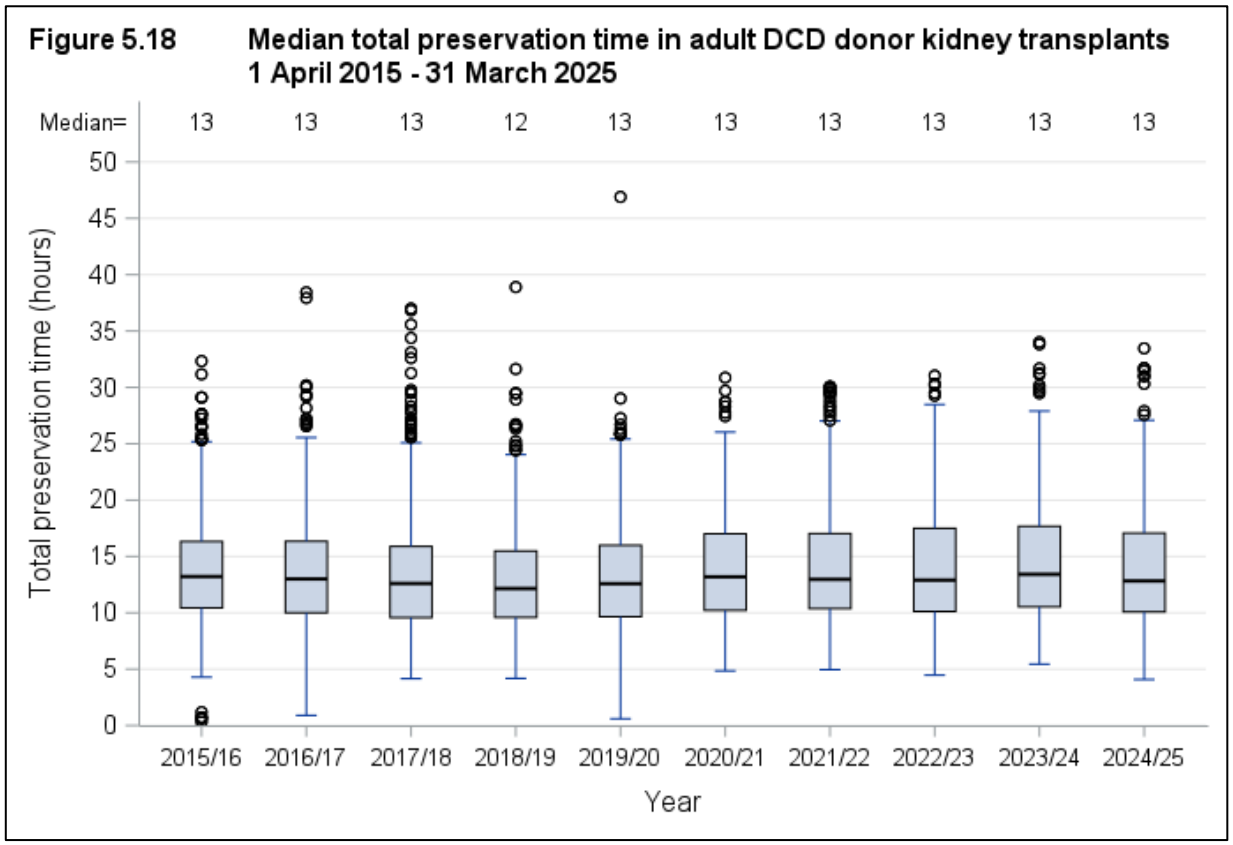


Figure 5.19 shows the median total preservation time in adult DCD donor kidney only transplants in 2024/25 for each transplant centre.

Figure 5.19 Median total preservation time in adult DCD donor kidney transplants 1 April 2024 - 31 March 2025

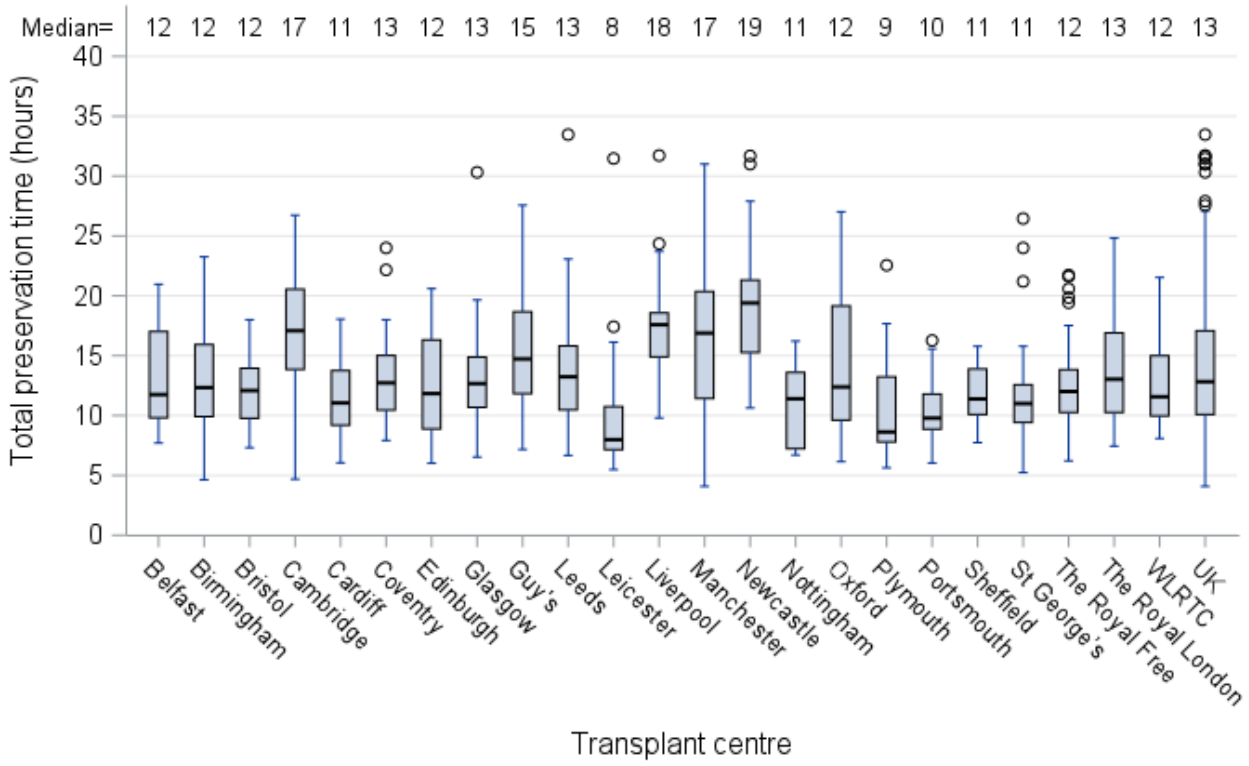


Figure 5.20 shows the median total preservation time in adult DCD donor kidney only transplants over the last ten years for each transplant centre.

Figure 5.20 **Median total preservation time in adult DCD donor kidney transplants, 1 April 2015 - 31 March 2025**

Figure 5.21 shows the proportion of adult DCD donor kidney only transplants in 2024/25 that have been performed within 12 hours of preservation time for each transplant centre.

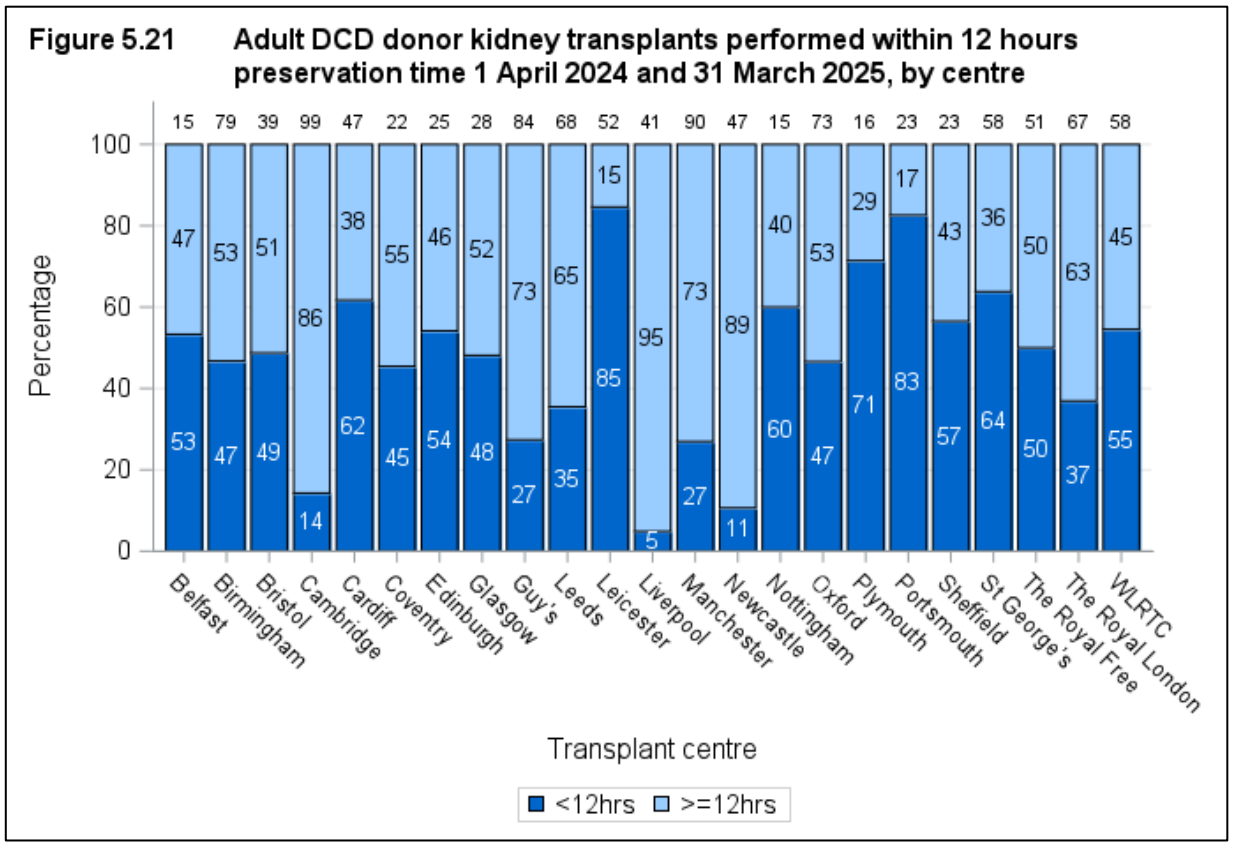


Figure 5.22 shows the median total preservation time in adult living donor kidney transplants over the last 10 years.

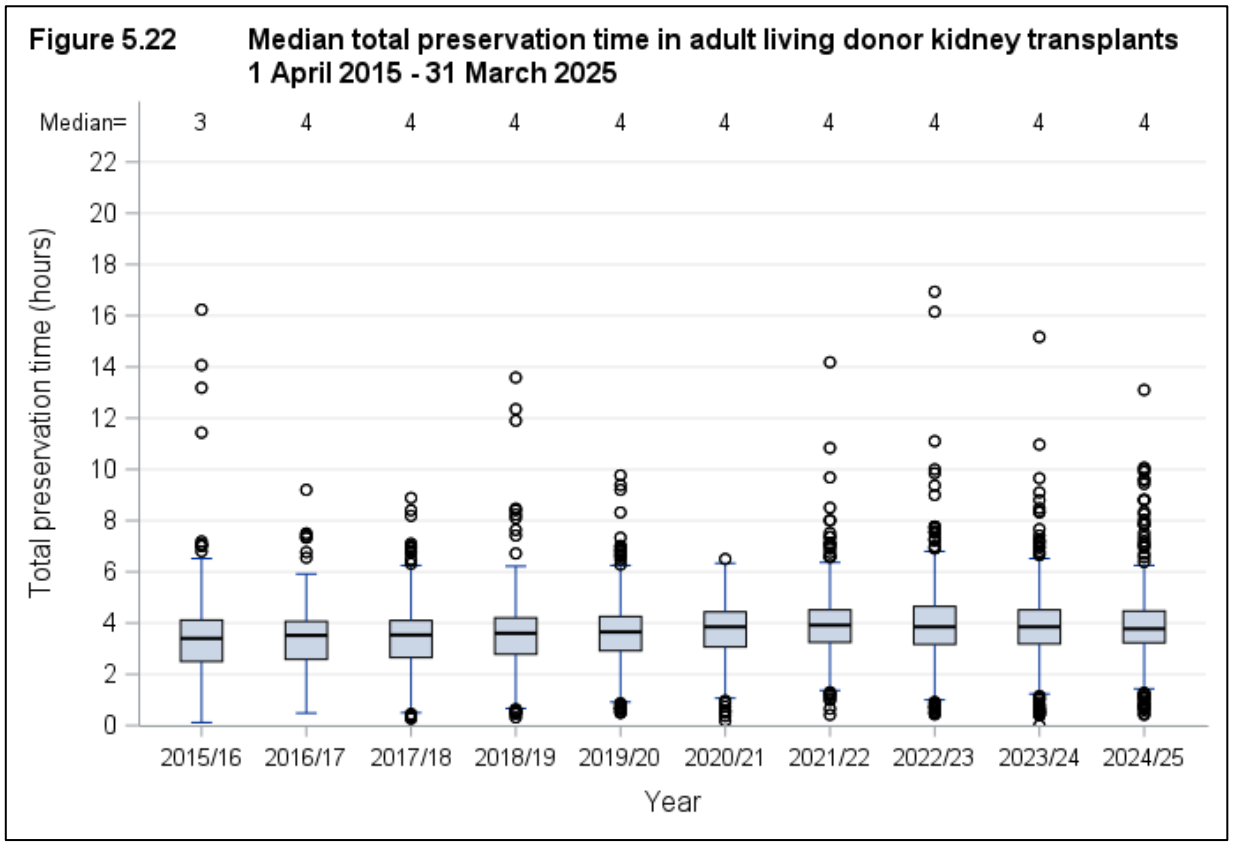


Figure 5.23 shows the median total preservation time in adult living donor kidney transplants in 20224/25 for each transplant centre.

Figure 5.23 Median total preservation time in adult living donor kidney transplants 1 April 2024 - 31 March 2025

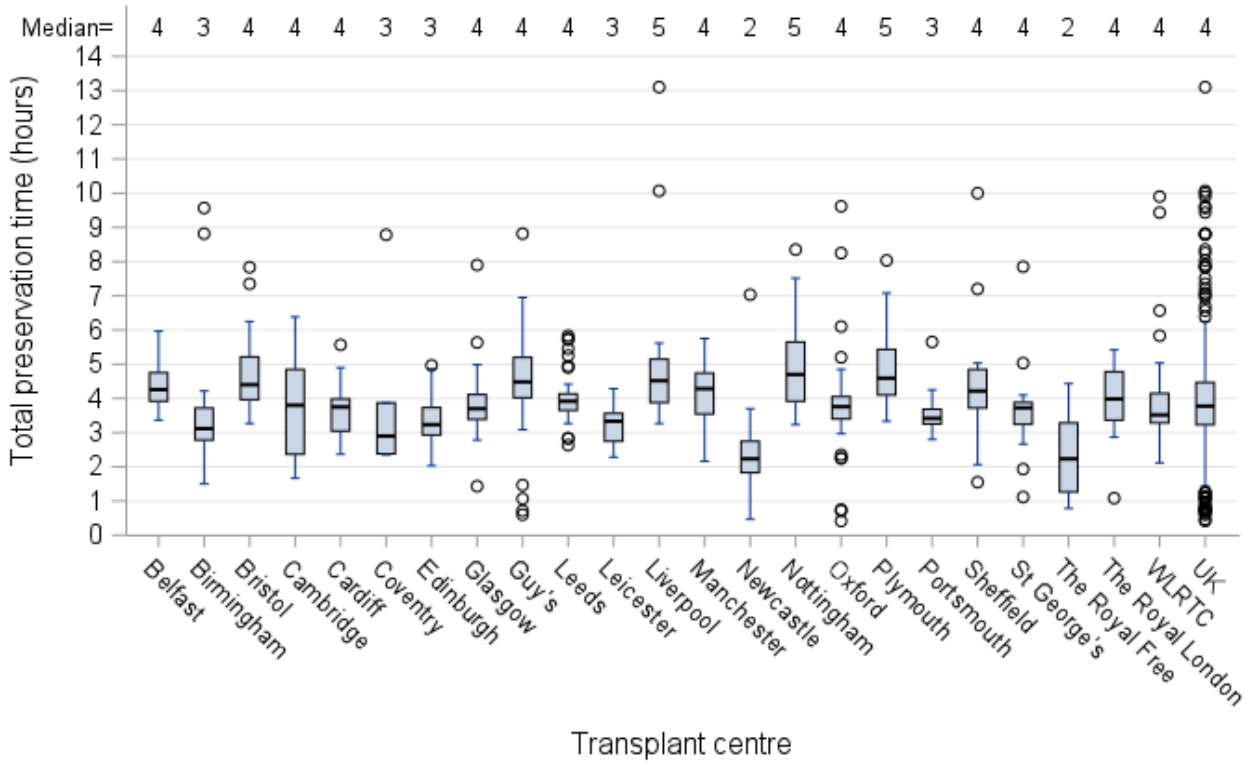
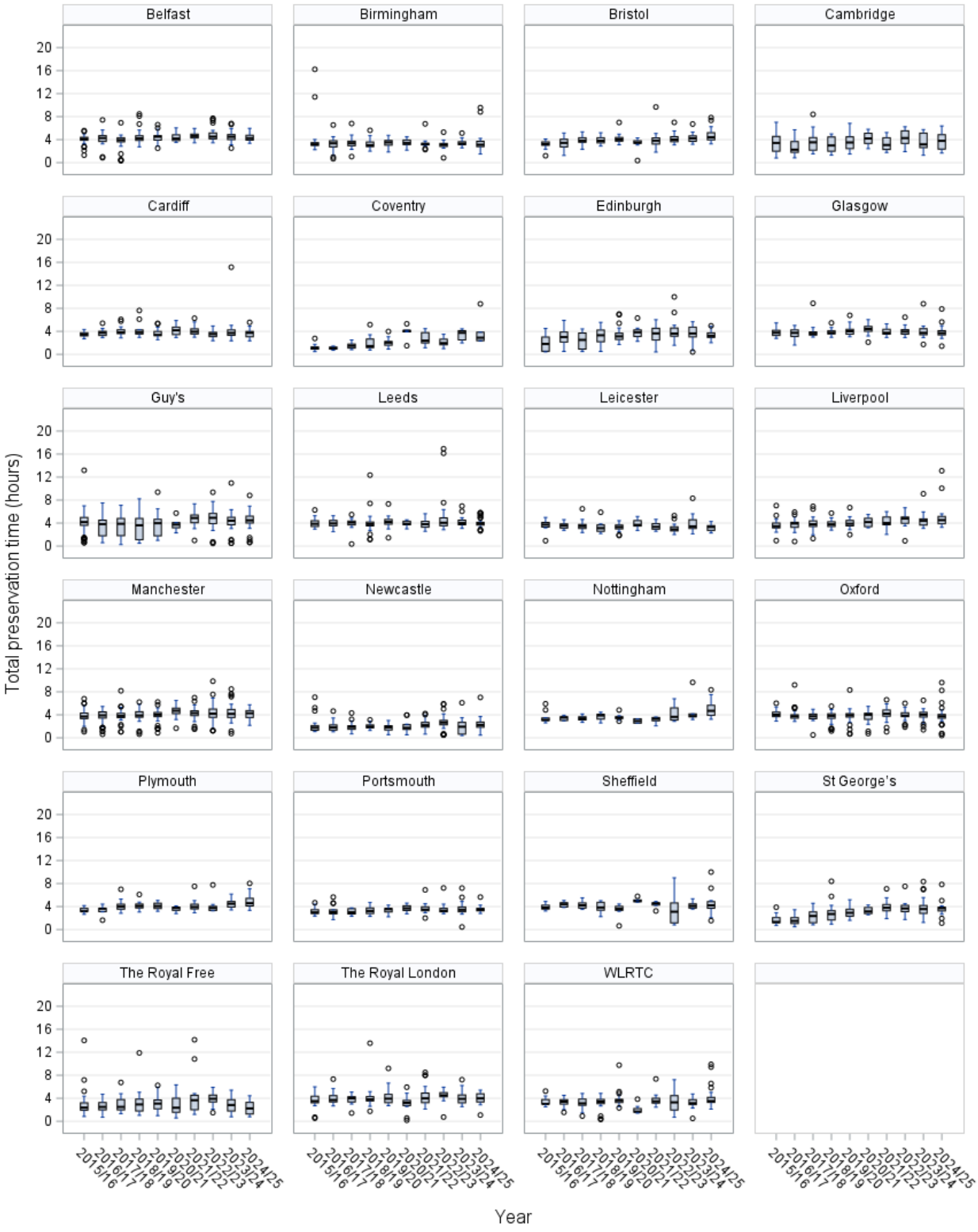


Figure 5.24 shows the median total preservation time in adult living donor kidney transplants over the last ten years for each transplant centre.

Figure 5.24 **Median total preservation time in adult living donor kidney transplants, 1 April 2015 - 31 March 2025**



Adult kidney outcomes

6.1 Deceased donor graft and patient survival

The funnel plots show that, for the most part, the centres lie within the confidence limits. Some of the funnel plots show some centres lie outside the lower 95% confidence limits, indicating that these centres have survival rates that are significantly lower than the national rate. Some of the funnel plots show some centres to be above the upper 99.8% confidence limit. This suggests that these centres may have survival rates that are considerably higher than the national rate. Centres can be identified by the information shown in **Table 6.1**. Transplants where cold ischaemia time (CIT) is unknown are excluded from the one year risk-adjusted analysis.

Figure 6.1 **Risk-adjusted one year graft (death censored) survival rates for first deceased donor kidney transplants in adult patients, between 1 April 2020 and 31 March 2024**

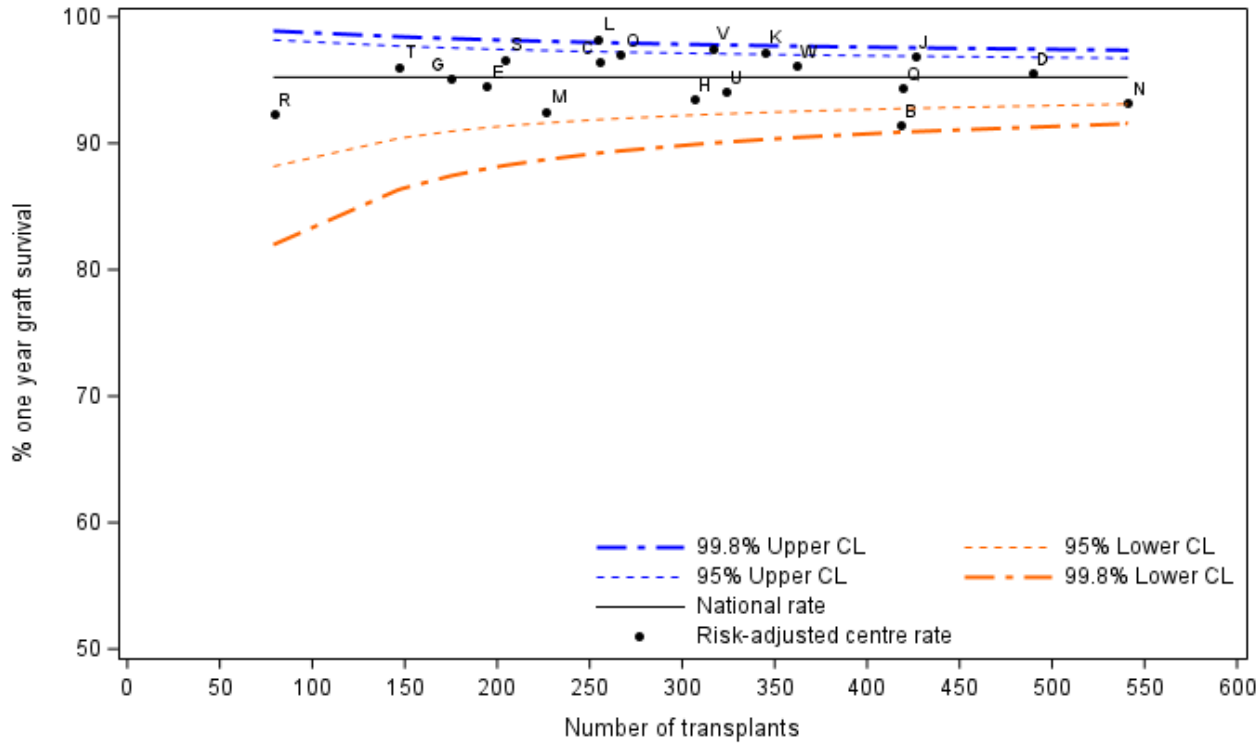


Figure 6.2 **Risk-adjusted one year patient survival rates for first deceased donor kidney transplants in adult patients, between 1 April 2020 and 31 March 2024**

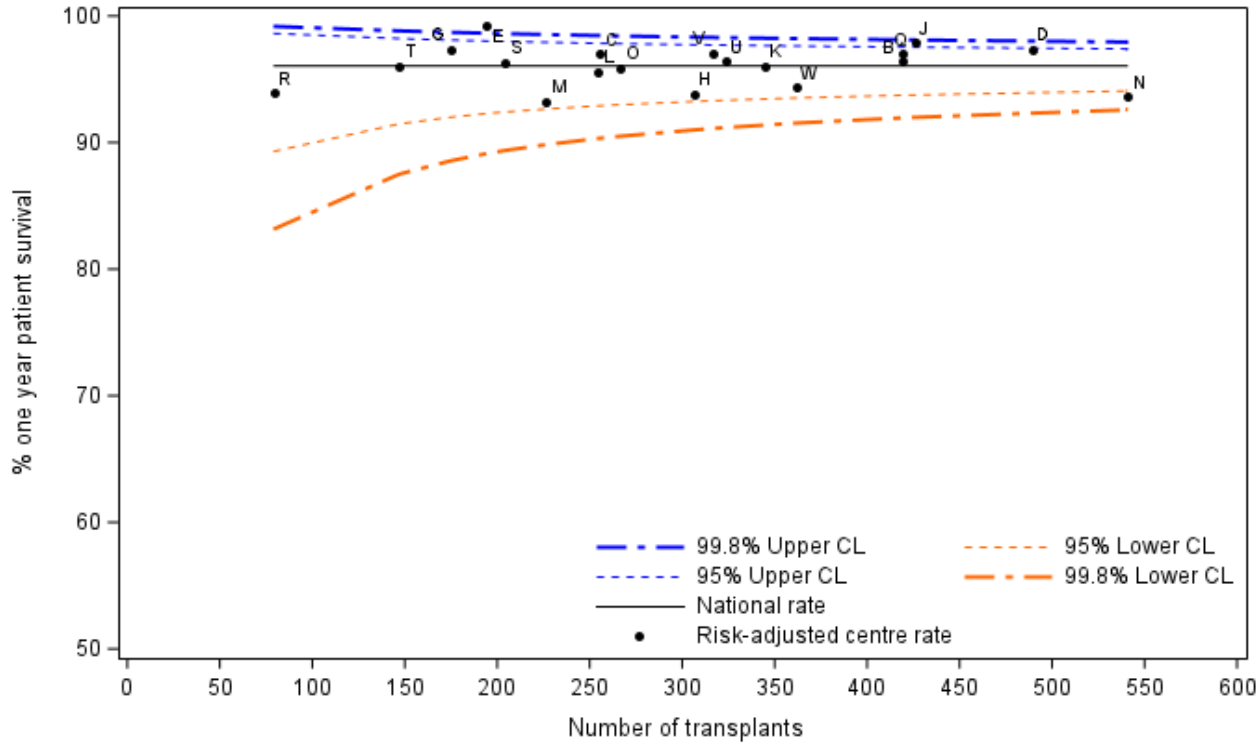


Figure 6.3 **Risk-adjusted five year graft (death censored) survival rates for first deceased donor kidney transplants in adult patients, between 1 April 2016 and 31 March 2020**

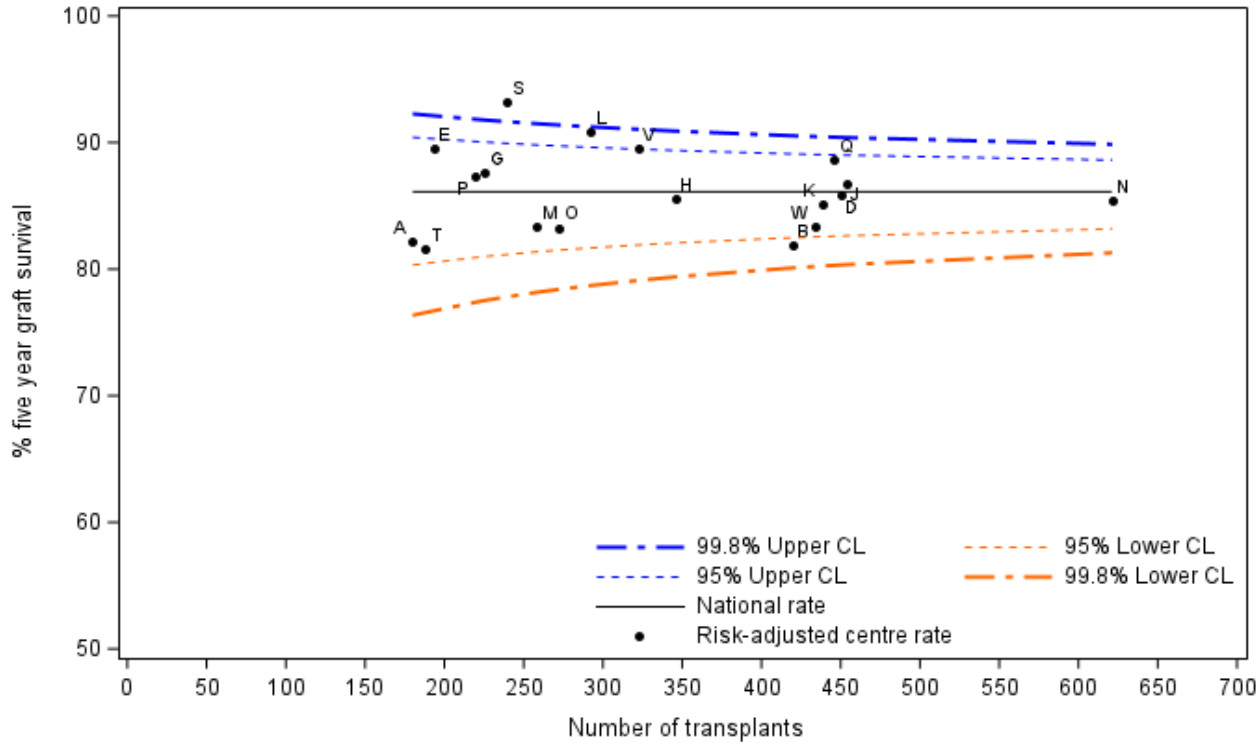


Figure 6.4 **Risk-adjusted five year patient survival rates for first deceased donor kidney transplants in adult patients, between 1 April 2016 and 31 March 2020**

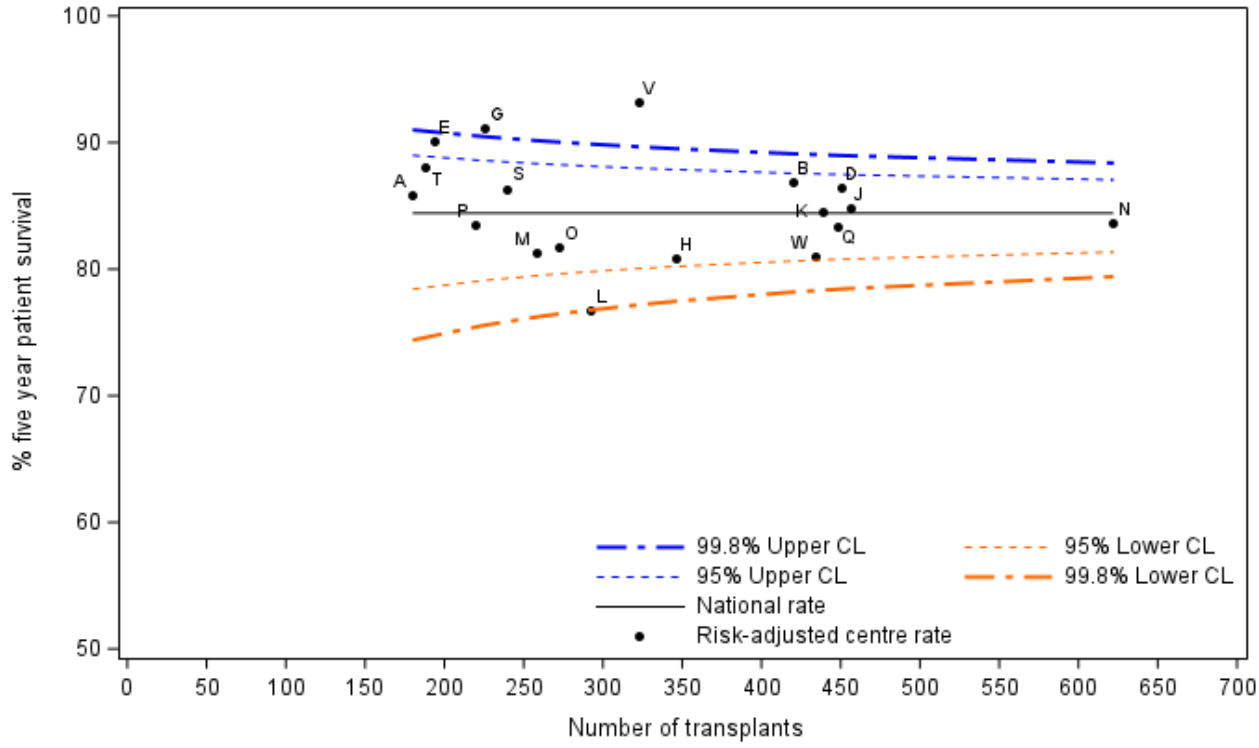


Table 6.1 One and five year first adult kidney-only graft and patient survival using kidneys from deceased donors

		Kidney graft survival				Patient survival			
		One-year*		Five-year**		One-year*		Five-year**	
Centre	Code	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Belfast	A	N/A	N/A	82	(74 - 88)	N/A	N/A	86	(78 - 91)
Birmingham	B	91	(88 - 94)	82	(77 - 86)	96	(94 - 98)	87	(82 - 90)
Bristol	C	96	(93 - 98)	N/A	N/A	97	(93 - 99)	N/A	N/A
Cambridge	D	96	(93 - 97)	86	(82 - 89)	97	(95 - 99)	86	(82 - 90)
Cardiff	E	94	(90 - 97)	90	(83 - 94)	99	(96 - 100	90	(85 - 94)
Coventry	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Edinburgh	G	95	(90 - 98)	88	(81 - 92)	97	(93 - 99)	91	(86 - 95)
Glasgow	H	94	(90 - 96)	86	(81 - 90)	94	(90 - 96)	81	(75 - 85)
Guy's	J	97	(94 - 98)	87	(83 - 90)	98	(96 - 99)	85	(80 - 88)
Leeds	K	97	(95 - 99)	85	(81 - 89)	96	(93 - 98)	85	(80 - 88)
Leicester	L	98	(96 - 100	91	(86 - 94)	96	(92 - 98)	77	(70 - 82)
Liverpool	M	93	(88 - 96)	83	(77 - 88)	93	(88 - 96)	81	(75 - 86)
Manchester	N	93	(90 - 95)	85	(82 - 88)	94	(91 - 96)	84	(80 - 87)
Newcastle	O	97	(94 - 99)	83	(77 - 88)	96	(92 - 98)	82	(76 - 86)
Nottingham	P	N/A	N/A	87	(81 - 92)	N/A	N/A	83	(76 - 89)
Oxford	Q	94	(92 - 96)	89	(85 - 92)	97	(95 - 98)	83	(79 - 87)
Plymouth	R	92	(82 - 98)	N/A	N/A	94	(84 - 98)	N/A	N/A
Portsmouth	S	97	(93 - 99)	93	(89 - 96)	96	(93 - 98)	86	(81 - 91)
Sheffield	T	96	(91 - 99)	82	(74 - 88)	96	(90 - 99)	88	(81 - 93)
St George's	U	94	(91 - 96)	N/A	N/A	96	(93 - 98)	N/A	N/A
The Royal Free	V	98	(95 - 99)	89	(85 - 93)	97	(95 - 99)	93	(89 - 96)
The Royal London	W	96	(93 - 98)	83	(79 - 87)	94	(90 - 97)	81	(76 - 85)
WLRTC	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
UK		**95**	**(95 - 96)**	**86**	**(85 - 87)**	**96**	**(96 - 97)**	**84**	**(83 - 85)**

Centre has reached the lower 99.8% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the upper 99.8% confidence limit

* Includes transplants performed between 1 April 2020 - 31 March 2024
** Includes transplants performed between 1 April 2016 - 31 March 2020
Centres have been omitted where less than 75% of data reported

6.2 Living donor graft and patient survival

The funnel plots show that, for the most part, the centres lie within the confidence limits. One of the funnel plots shows a centre that lies outside the lower 95% confidence limits, indicating that the centre has survival rates that are significantly lower than the national rate. Some of the funnel plots show some centres to be above the upper 95% confidence limit. This suggests that these centres may have survival rates that are considerably higher than the national rate. Centres can be identified by the information shown in **Table 6.2**. Living donor antibody incompatible kidney transplants are excluded from the analysis as these transplants are known to have inferior graft survival rates. Transplants where the donor age is unknown are excluded from the risk-adjusted analysis.

Figure 6.5 **Risk-adjusted one year graft (death censored) survival rates for first live donor kidney transplants in adult patients, between 1 April 2020 and 31 March 2024**

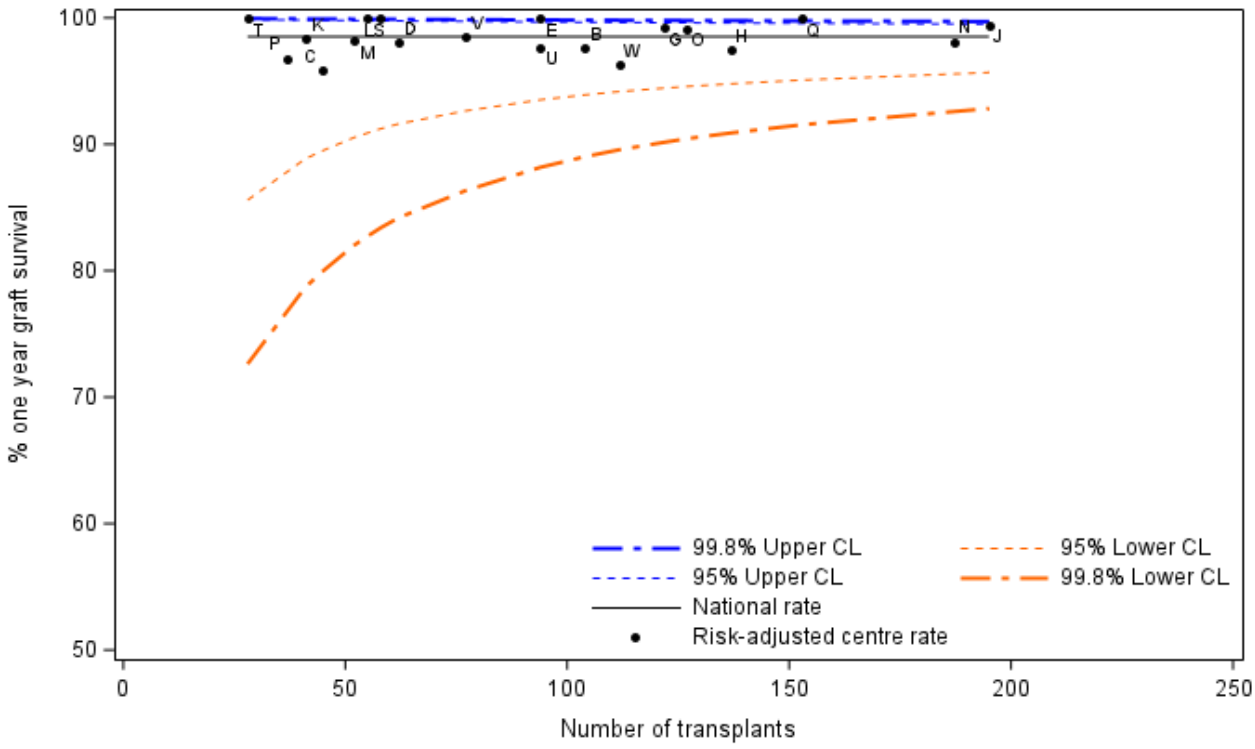


Figure 6.6 **Risk-adjusted one year patient survival rates for first live donor kidney transplants in adult patients, between 1 April 2020 and 31 March 2024**

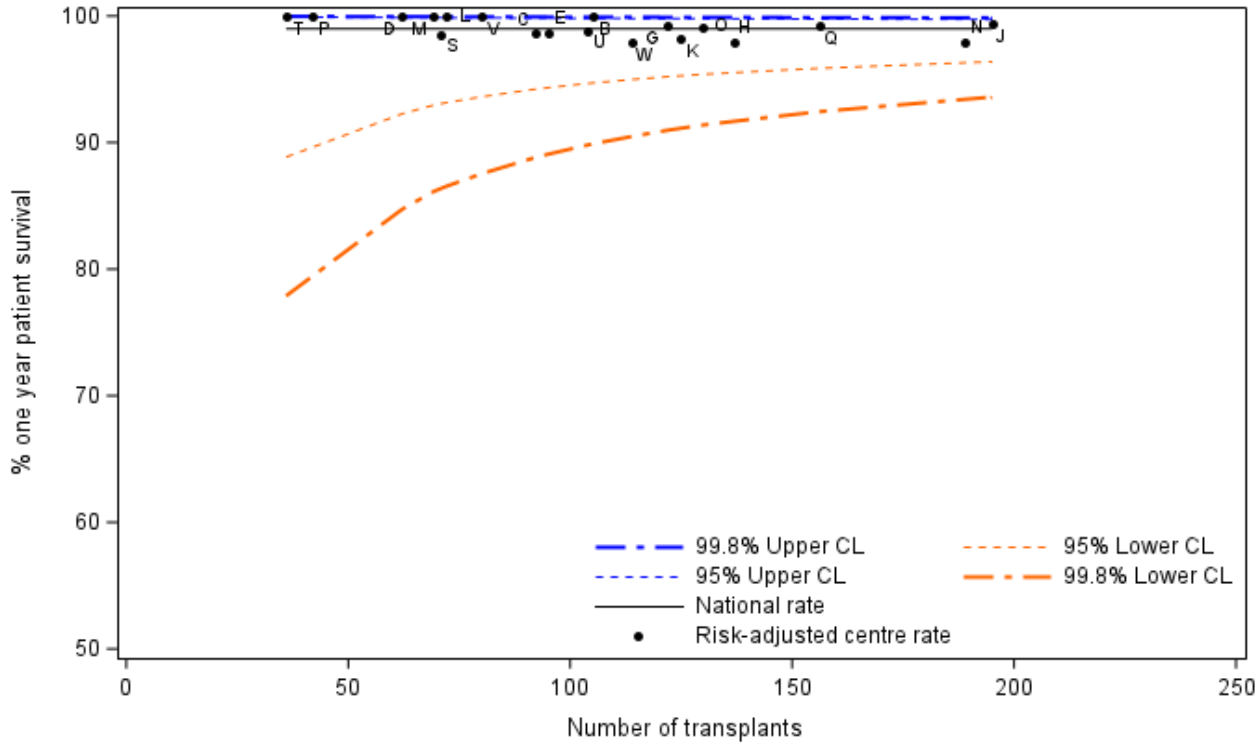


Figure 6.7 **Risk-adjusted five year graft (death censored) survival rates for first live donor kidney transplants in adult patients, between 1 April 2016 and 31 March 2020**

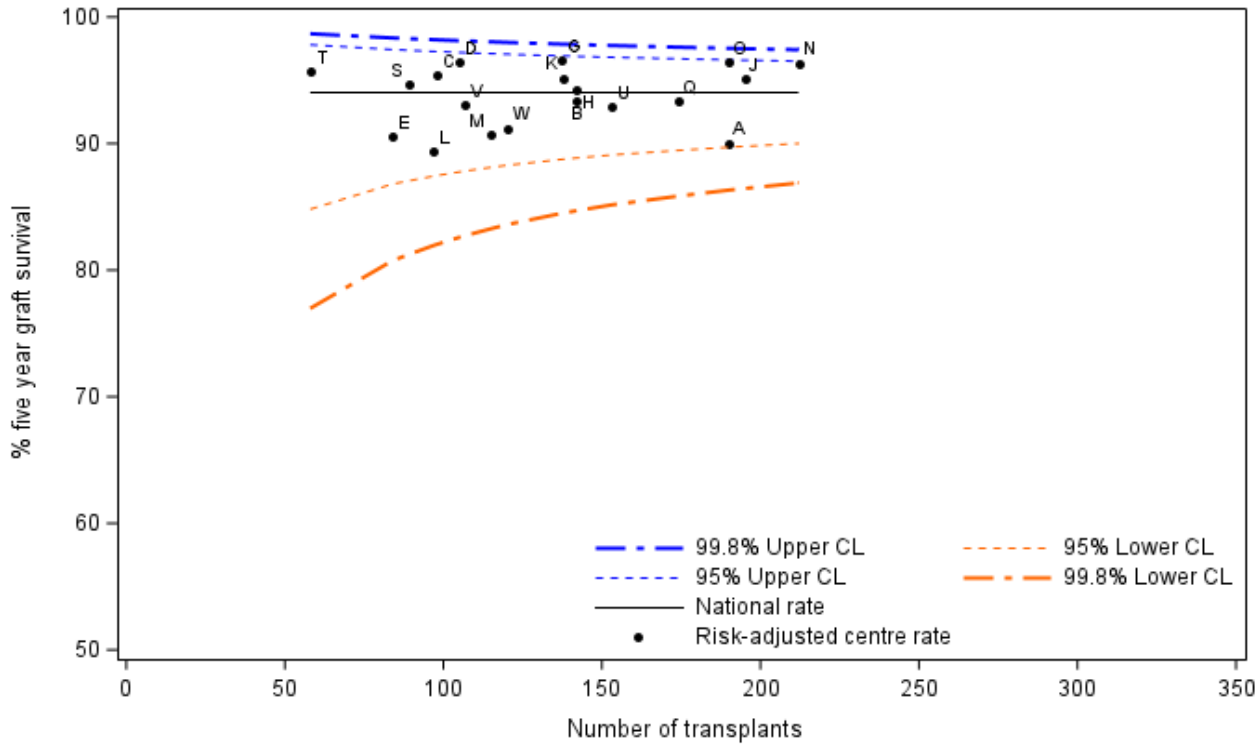


Figure 6.8 **Risk-adjusted five year patient survival rates for first live donor kidney transplants in adult patients, between 1 April 2016 and 31 March 2020**

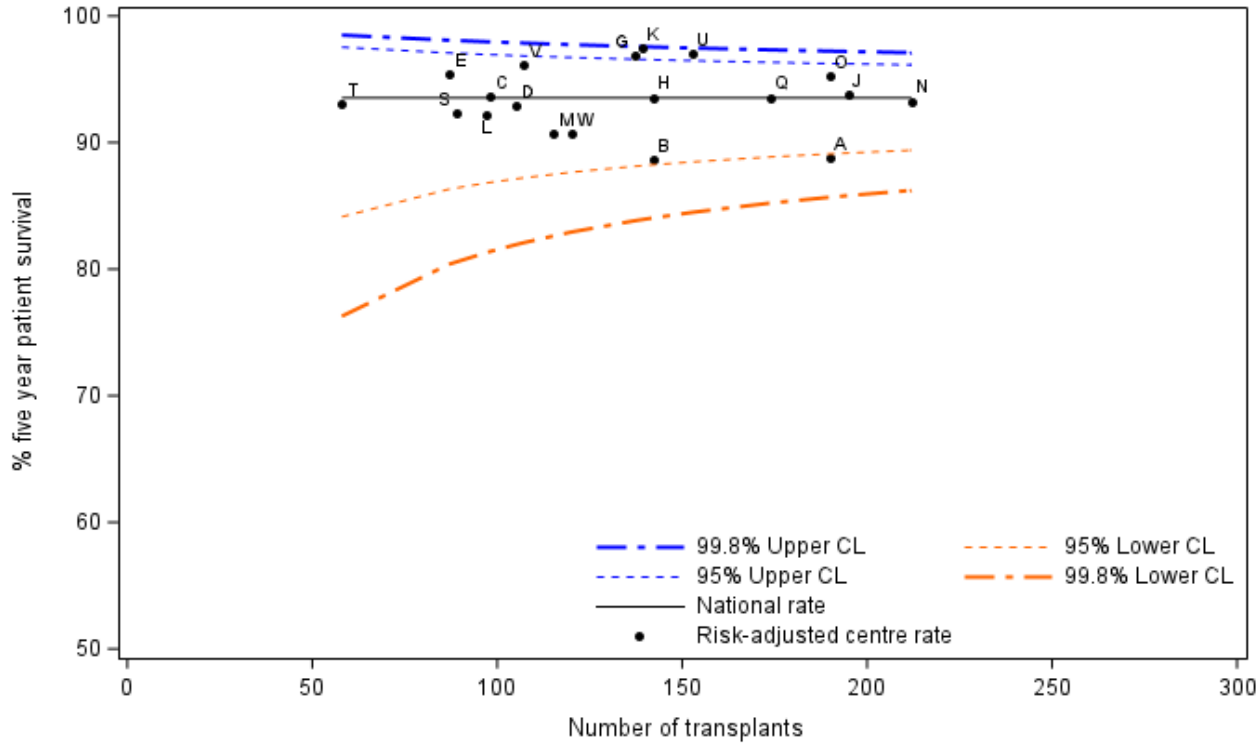


Table 6.2 One and five year first adult kidney-only graft and patient survival using kidneys from living donors

		Kidney graft survival				Patient survival			
		One-year*		Five-year**		One-year*		Five-year**	
Centre	Code	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Belfast	A	N/A	N/A	90	(83 - 95)	N/A	N/A	89	(83 - 93)
Birmingham	B	98	(91 - 100	93	(87 - 97)	100	N/A	89	(80 - 94)
Bristol	C	96	(88 - 99)	95	(88 - 99)	99	(92 - 100	94	(85 - 98)
Cambridge	D	98	(89 - 100	96	(91 - 99)	100	N/A	93	(84 - 97)
Cardiff	E	100	N/A	91	(80 - 97)	99	(93 - 100	95	(86 - 99)
Coventry	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Edinburgh	G	99	(96 - 100	97	(91 - 99)	99	(95 - 100	97	(92 - 99)
Glasgow	H	98	(93 - 99)	94	(88 - 98)	98	(94 - 100	94	(87 - 97)
Guy's	J	99	(97 - 100	95	(91 - 98)	99	(96 - 100	94	(89 - 97)
Leeds	K	98	(94 - 100	95	(90 - 98)	98	(94 - 100	97	(93 - 99)
Leicester	L	100	N/A	89	(80 - 95)	100	N/A	92	(85 - 97)
Liverpool	M	98	(90 - 100	91	(82 - 96)	100	N/A	91	(82 - 96)
Manchester	N	98	(94 - 100	96	(93 - 99)	98	(94 - 100	93	(89 - 96)
Newcastle	O	99	(95 - 100	96	(92 - 99)	99	(95 - 100	95	(91 - 98)
Nottingham	P	97	(82 - 100	N/A	N/A	100	N/A	N/A	N/A
Oxford	Q	100	N/A	93	(88 - 97)	99	(96 - 100	94	(88 - 97)
Plymouth	R	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Portsmouth	S	100	N/A	95	(86 - 99)	99	(92 - 100	92	(84 - 97)
Sheffield	T	100	N/A	96	(84 - 99)	100	N/A	93	(80 - 99)
St George's	U	98	(92 - 100	93	(87 - 97)	99	(94 - 100	97	(91 - 99)
The Royal Free	V	98	(91 - 100	93	(86 - 97)	100	N/A	96	(90 - 99)
The Royal London	W	96	(90 - 99)	91	(82 - 96)	98	(92 - 100	91	(82 - 96)
WLRTC	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
UK		**99**	**(98 - 99)**	**94**	**(93 - 95)**	**99**	**(98 - 99)**	**94**	**(93 - 94)**

Centre has reached the lower 99.8% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the upper 99.8% confidence limit

* Includes transplants performed between 1 April 2020 - 31 March 2024
** Includes transplants performed between 1 April 2016 - 31 March 2020
Centres have been omitted where less than 75% of data reported

6.3 Patient survival from listing

Survival from listing was analysed for all adult (≥ 18 years) patients registered for the first time for a kidney only between 1 January 2013 and 31 December 2024. Survival time was defined as the time from joining the transplant list to death, regardless of the length of time on the transplant list, whether or not the patient was transplanted and any factors associated with such a transplant e.g. donor type. Survival time was censored at either the date of removal from the list, or at the last known follow up date post transplant when no death date was recorded, or at the time of analysis if the patient was still active on the transplant list.

Renal patients may receive a live donor kidney without prior registration on the transplant list, although centre practices differ in relation to listing of potential live donor recipients. Consequently, patients who received a live donor kidney transplant within 6 months of listing were excluded from the analysis to minimise centre bias.

Ten year risk-adjusted survival rates from the point of kidney transplant listing are shown by centre in **Figure 6.9**. Some centres were above the upper 99.8% confidence limit indicating that these centres have 10-year survival rates from listing that are considerably higher than the national rate. Some centres fell below the 99.8% lower confidence limit. This suggests that 10-year survival from listing at these centres may be significantly lower than the national rate.

Centres can be identified by the information shown in **Table 6.3**, which also shows one, five and ten year risk-adjusted survival rates from the point of kidney transplant listing.

Figure 6.9 **Risk-adjusted 10 year patient survival from listing in adult patients registered between 1 January 2013 and 31 December 2024 for deceased donor kidney transplants**

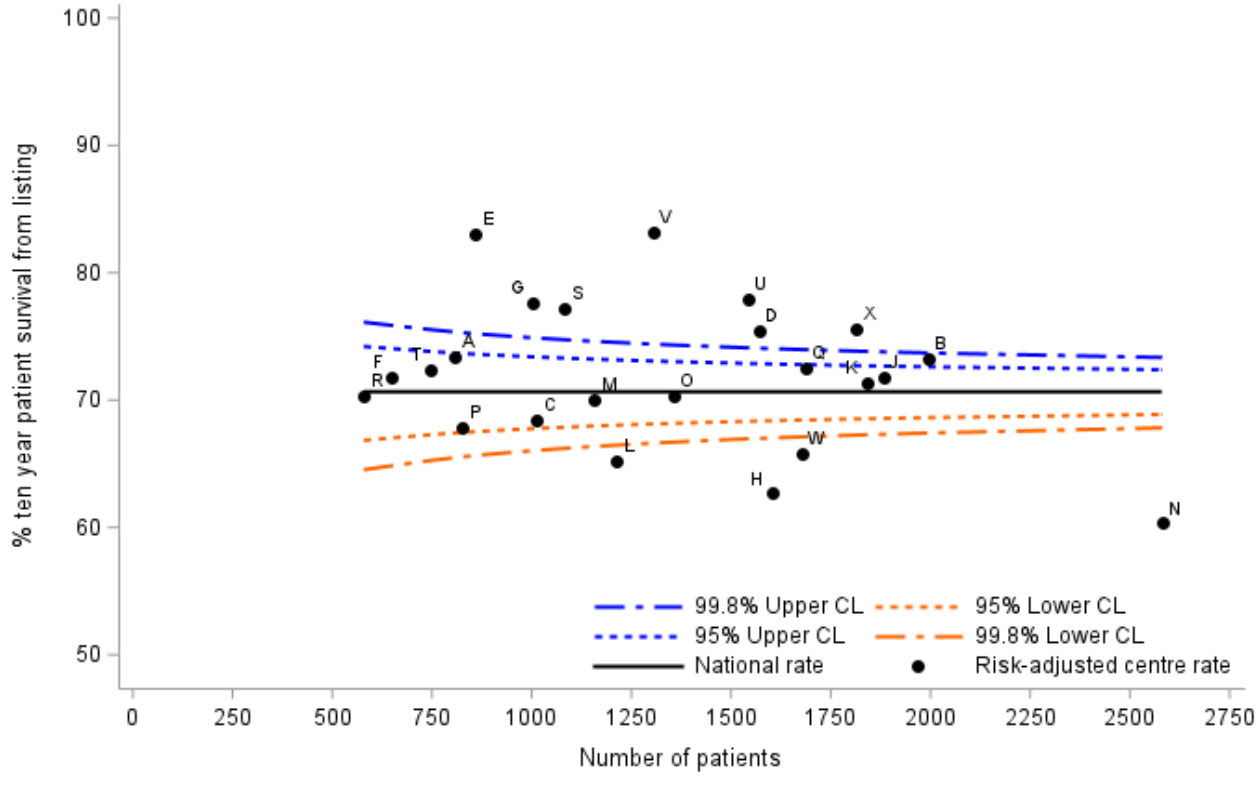


Table 6.3 **Risk-adjusted 1, 5 and 10 year patient survival from listing for adult patients registered between 1 January 2013 and 31 December 2024 for deceased donor kidney transplants**

Centre	Code	One year		Five year		Ten year	
		N	(%)	N	(%)	N	(%)
Belfast	A	808	(98)	808	(88)	808	(73)
Birmingham	B	1995	(98)	1995	(88)	1995	(73)
Bristol	C	1014	(98)	1014	(86)	1014	(68)
Cambridge	D	1571	(98)	1571	(90)	1571	(75)
Cardiff	E	858	(98)	858	(91)	858	(83)
Coventry	F	649	(98)	649	(87)	649	(72)
Edinburgh	G	1003	(99)	1003	(90)	1003	(78)
Glasgow	H	1603	(98)	1603	(84)	1603	(63)
Guy's	J	1881	(98)	1881	(88)	1881	(72)
Leeds	K	1839	(98)	1839	(87)	1839	(71)
Leicester	L	1213	(98)	1213	(84)	1213	(65)
Liverpool	M	1154	(98)	1154	(87)	1154	(70)
Manchester	N	2580	(98)	2580	(82)	2580	(60)
Newcastle	O	1357	(98)	1357	(86)	1357	(70)
Nottingham	P	827	(98)	827	(85)	827	(68)
Oxford	Q	1687	(98)	1687	(88)	1687	(73)
Plymouth	R	579	(98)	579	(87)	579	(70)
Portsmouth	S	1081	(98)	1081	(90)	1081	(77)
Sheffield	T	748	(98)	748	(87)	748	(72)
St George's	U	1543	(98)	1543	(89)	1543	(78)
The Royal Free	V	1303	(98)	1303	(92)	1303	(83)
The Royal London	W	1676	(98)	1676	(86)	1676	(66)
WLRTC	X	1815	(98)	1815	(89)	1815	(76)
UK		**30784**	**(98)**	**30784**	**(86)**	**30784**	**(71)**

Centre has reached the lower 99.8% confidence limit
Centre has reached the lower 95% confidence limit
Centre has reached the upper 95% confidence limit
Centre has reached the upper 99.8% confidence limit

Form Return Rates

7.1 Deceased donor form return rates, 1 April 2024 – 31 March 2025

Form return rates are reported in Table 7.1 for the kidney transplant record, three month and one year follow up form, along with lifetime follow up (more than two years). These include all adult deceased donor kidney only transplants between 1 April 2024 and 31 March 2025 for the transplant record, and all requests for follow up forms issued in this time period. Centres highlighted are transplant centres.

Table 7.1 Deceased donor form return rates, 1 April 2024 and 31 March 2025

Centre	TX RECORD		THREE MONTHS		ONE YEAR		LIFETIME	
	N	% returned	N	% returned	N	% returned	N	% returned
Aberdeen, Aberdeen Royal Infirmary							186	90
Airdrie, University Hospital Monklands							26	92
Bangor, Ysbyty Gwynedd District General Hospital							66	95
Basildon, Basildon Hospital							70	100
Belfast, Antrim Hospital							106	59
Belfast, Belfast City Hospital	28	100	34	100	44	64	299	97
Belfast, The Ulster Hospital							79	1
Birmingham, Birmingham Heartlands Hospital							98	94
Birmingham, Queen Elizabeth Hospital Birmingham	154	98	154	94	149	46	762	52
Bodelwyddan, Glan Clwyd District General Hospital							46	100
Bradford, St Lukes Hospital							297	91
Brighton, Royal Sussex County Hospital							312	0
Bristol, Southmead Hospital	76	100	72	89	74	34	587	39
Cambridge, Addenbrooke's Hospital	140	99	147	100	125	91	683	92
Canterbury, Kent And Canterbury Hospital							286	44
Cardiff, University Of Wales Hospital	80	100	84	100	80	93	847	75
Carlisle, Cumberland Infirmary							98	51
Carshalton, St Helier Hospital							483	75
Chelmsford, Broomfield Hospital							66	62
County Down, Daisy Hill Hospital							97	96
Coventry, University Hospital	41	100	43	93	38	34		
Derby, Royal Derby Hospital							196	99
Doncaster, Doncaster Royal Infirmary							91	98
Dorchester, Dorset County Hospital							296	2
Dudley, Russells Hall Hospital							75	91
Dulwich, King's College Hospital							498	1
Dundee, Ninewells Hospital							137	11
Dunfermline, Queen Margaret Hospital							87	85
Edinburgh, Royal Infirmary Of Edinburgh	55	100	55	98	50	90	300	99
Exeter, Royal Devon And Exeter Hospital (Wonford)							292	98
Glasgow, Queen Elizabeth University Hospital/ Western Infirmary	73	97	77	96	90	93	1111	86
Gloucester, Gloucestershire Royal Hospital							190	49

Table 7.1 Deceased donor form return rates, 1 April 2024 and 31 March 2025

Centre	TX RECORD		THREE MONTHS		ONE YEAR		LIFETIME	
	N	% returned	N	% returned	N	% returned	N	% returned
Great Yarmouth, James Paget Hospital							32	84
Hereford, The County Hospital							35	54
Hull, Hull Royal Infirmary							266	95
Inverness, Raigmore Hospital							81	91
Ipswich, Ipswich Hospital							167	23
Leeds, St James's University Hospital	130	100	131	95	107	93	802	84
Leicester, Leicester General Hospital	96	100	95	97	97	64	723	72
Liverpool, Royal Liverpool University Hospital	86	100	77	100	74	93	443	98
London, Guy's Hospital	167	100	175	100	190	33	612	54
London, Royal Free Hospital	114	99	111	100	94	83	1057	77
London, St George's Hospital	110	100	105	95	95	95	461	4
London, The Royal London Hospital (Whitechapel)	125	98	135	99	140	64	894	74
London, West London Renal And Transplant Centre	123	96	114	100			1265	0
Londonderry, Altnagelvin Area Hospital							89	2
Manchester, Manchester Royal Infirmary	164	100	151	97	165	39	795	56
Middlesbrough, The James Cook University Hospital							353	61
Newcastle, Freeman Hospital	90	100	90	93	75	85	400	93
Northampton, Northampton General Hospital							59	46
Norwich, Norfolk And Norwich University Hospital							270	97
Nottingham, Nottingham City Hospital	42	100	40	100	47	47	487	1
Omagh, Tyrone County Hospital							79	1
Oxford, Churchill Hospital	134	100	136	100	112	76	780	99
Peterborough, Peterborough City Hospital							47	2
Plymouth, Derriford Hospital	28	89	24	88	31	48	203	27
Portsmouth, Queen Alexandra Hospital/ St Mary's Hospital	65	100	70	91	73	82	718	84
Preston, Royal Preston Hospital							452	50
Reading, Royal Berkshire Hospital							333	87
Redhill, East Surrey Hospital							21	86
Sheffield, Northern General Hospital	50	100	47	85	50	90	557	28
Shrewsbury, Royal Shrewsbury Hospital							98	96
St Helier, Jersey General Hospital							35	97
Stevenage, Lister Hospital							220	99
Stoke-On-Trent, Royal Stoke University Hospital							219	86
Sunderland, Sunderland Royal Hospital							160	99
Swansea, Morriston Hospital							143	100
Truro, Royal Cornwall Hospital (Treliske)							262	5
Westcliff On Sea, Southend Hospital							69	94
Wirral, Arrowe Park Hospital							141	28

Table 7.1 Deceased donor form return rates, 1 April 2024 and 31 March 2025

Centre	TX RECORD		THREE MONTHS		ONE YEAR		LIFETIME	
	N	% returned	N	% returned	N	% returned	N	% returned
Wolverhampton, New Cross Hospital							151	99
Wrexham, Maelor General Hospital							101	98
York, York District Hospital							220	81

7.2 Living donor form return rates, 1 April 2024 – 31 March 2025

Form return rates are reported in Table 7.2 for the kidney transplant record, three month and one year follow up form, along with lifetime follow up (more than two years). These include all adult living donor kidney only transplants between 1 April 2024 and 31 March 2025 for the transplant record, and all requests for follow up forms issued in this time period. Centres highlighted are transplant centres.

Table 7.2 Living donor form return rates, 1 April 2024 and 31 March 2025

Centre	TX RECORD		THREE MONTHS		ONE YEAR		LIFETIME	
	N	% returned	N	% returned	N	% returned	N	% returned
Aberdeen, Aberdeen Royal Infirmary							107	90
Bangor, Ysbyty Gwynedd District General Hospital							24	100
Basildon, Basildon Hospital							31	97
Belfast, Antrim Hospital							71	61
Belfast, Belfast City Hospital	61	98	57	100	46	61	319	95
Belfast, The Ulster Hospital							59	2
Birmingham, Birmingham Heartlands Hospital							32	91
Birmingham, Queen Elizabeth Hospital Birmingham	49	100	43	100	44	43	422	53
Bodelwyddan, Glan Clwyd District General Hospital							24	100
Bradford, St Lukes Hospital							76	74
Bristol, Southmead Hospital	36	100	38	89	41	49	307	40
Cambridge, Addenbrooke's Hospital	21	100	19	100	21	86	267	95
Canterbury, Kent And Canterbury Hospital							254	50
Cardiff, University Of Wales Hospital	47	100	45	100	44	100	449	83
Carlisle, Cumberland Infirmary							43	72
Carshalton, St Helier Hospital							291	76
Chelmsford, Broomfield Hospital							27	67
County Down, Daisy Hill Hospital							75	92
Coventry, University Hospital	18	100	17	100	21	38	251	1
Derby, Royal Derby Hospital							52	100
Doncaster, Doncaster Royal Infirmary							42	100
Dorchester, Dorset County Hospital							108	3
Dudley, Russells Hall Hospital							25	92
Dulwich, King's College Hospital							205	0
Dundee, Ninewells Hospital							90	8
Dunfermline, Queen Margaret Hospital							45	80

Table 7.2 Living donor form return rates, 1 April 2024 and 31 March 2025

Centre	TX RECORD		THREE MONTHS		ONE YEAR		LIFETIME	
	N	% returned	N	% returned	N	% returned	N	% returned
Edinburgh, Royal Infirmary Of Edinburgh	43	100	48	92	49	90	194	99
Exeter, Royal Devon And Exeter Hospital (Wonford)							156	99
Glasgow, Queen Elizabeth University Hospital/ Western Infirmary	48	98	45	100	39	100	533	91
Gloucester, Gloucestershire Royal Hospital							90	43
Hereford, The County Hospital							24	54
Hull, Hull Royal Infirmary							152	94
Inverness, Raigmore Hospital							59	90
Ipswich, Ipswich Hospital							54	19
Leeds, St James's University Hospital	51	100	53	94	37	73	309	84
Leicester, Leicester General Hospital	25	96	29	97	26	73	442	77
Liverpool, Royal Liverpool University Hospital	32	100	37	100	29	97	269	98
London, Cromwell Hospital	8	25						
London, Guy's Hospital	63	98	56	95	81	46	479	50
London, Royal Free Hospital	21	100	20	95	18	72	458	79
London, St George's Hospital	41	100	44	100	44	48	179	4
London, The Royal London Hospital (Whitechapel)	32	78	36	97	33	85	389	82
London, West London Renal And Transplant Centre	38	95	36	100			600	0
Manchester, Manchester Royal Infirmary	58	100	60	92	55	31	402	58
Middlesbrough, The James Cook University Hospital							237	68
Newcastle, Freeman Hospital	36	100	38	97	43	84	269	91
Northampton, Northampton General Hospital							24	42
Norwich, Norfolk And Norwich University Hospital							62	95
Nottingham, Nottingham City Hospital	17	100	16	100	13	38	162	2
Oxford, Churchill Hospital	63	98	66	100	60	88	475	99
Plymouth, Derriford Hospital	24	83	24	79	16	63	101	28
Portsmouth, Queen Alexandra Hospital/ St Mary's Hospital	28	93	31	90	32	69	321	81
Preston, Royal Preston Hospital							246	60
Reading, Royal Berkshire Hospital							113	88
Sheffield, Northern General Hospital	21	100	20	80	16	94	248	27
Shrewsbury, Royal Shrewsbury Hospital							60	98
Stevenage, Lister Hospital							78	99
Stoke-On-Trent, Royal Stoke University Hospital							158	87
Sunderland, Sunderland Royal Hospital							102	98
Swansea, Morriston Hospital							50	98
Truro, Royal Cornwall Hospital (Treliske)							109	6
Westcliff On Sea, Southend Hospital							40	95
Wirral, Arrowe Park Hospital							65	25
Wolverhampton, New Cross Hospital							55	100
Wrexham, Maelor General Hospital							47	98

Table 7.2 Living donor form return rates, 1 April 2024 and 31 March 2025

Centre	TX RECORD		THREE MONTHS		ONE YEAR		LIFETIME	
	N	% returned	N	% returned	N	% returned	N	% returned
York, York District Hospital							84	77

Paediatric kidney transplant list

8.1 Paediatric patients on the kidney transplant list as at 31 March, 2016 – 2025

Figure 8.1 shows the number of paediatric patients on the kidney only transplant list at 31 March each year between 2016 and 2025.

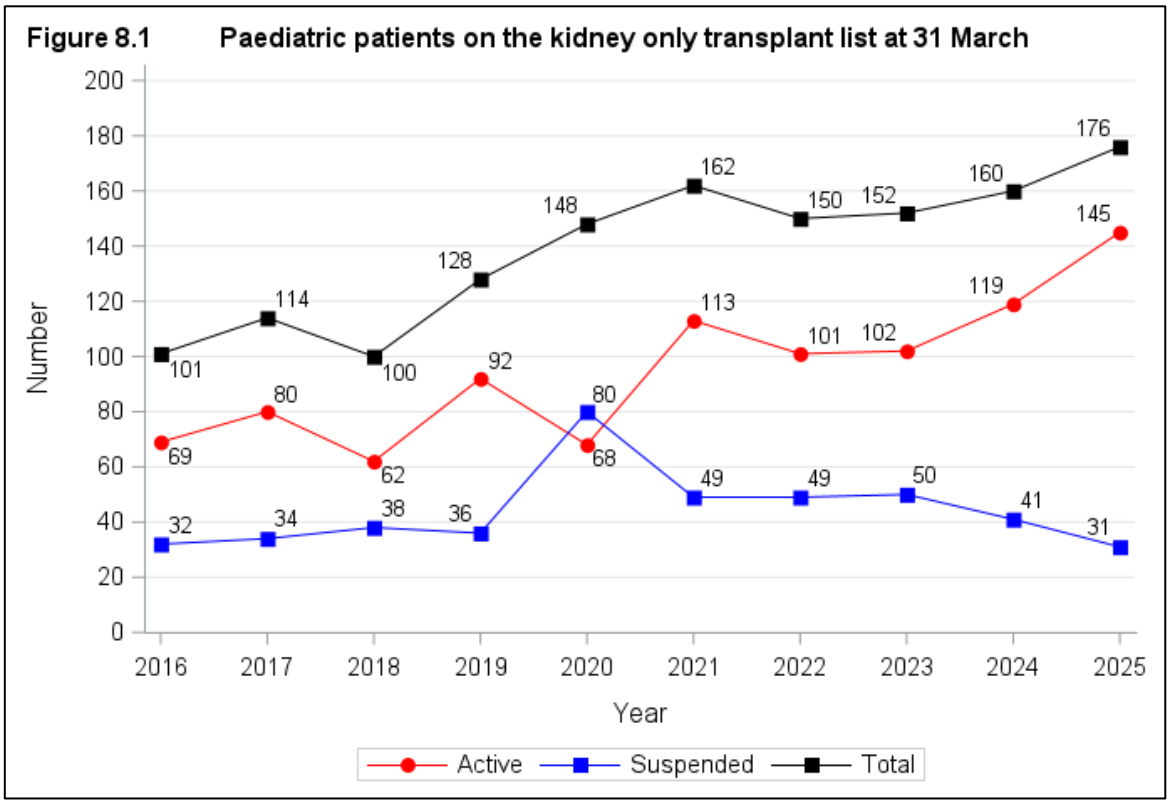


Figure 8.2 shows the number of paediatric patients on the active kidney only transplant list at 31 March 2025 by centre.

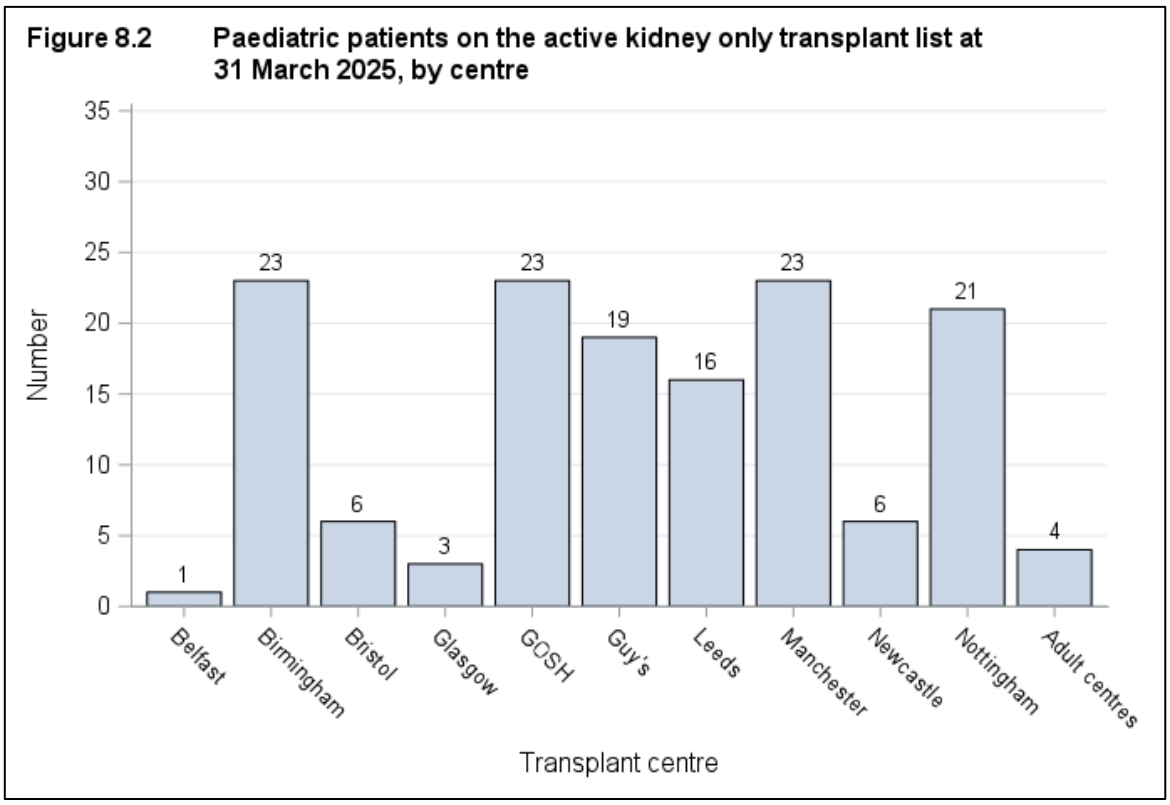


Figure 8.3 shows the number of paediatric patients on the suspended kidney only transplant list at 31 March 2025 by centre.

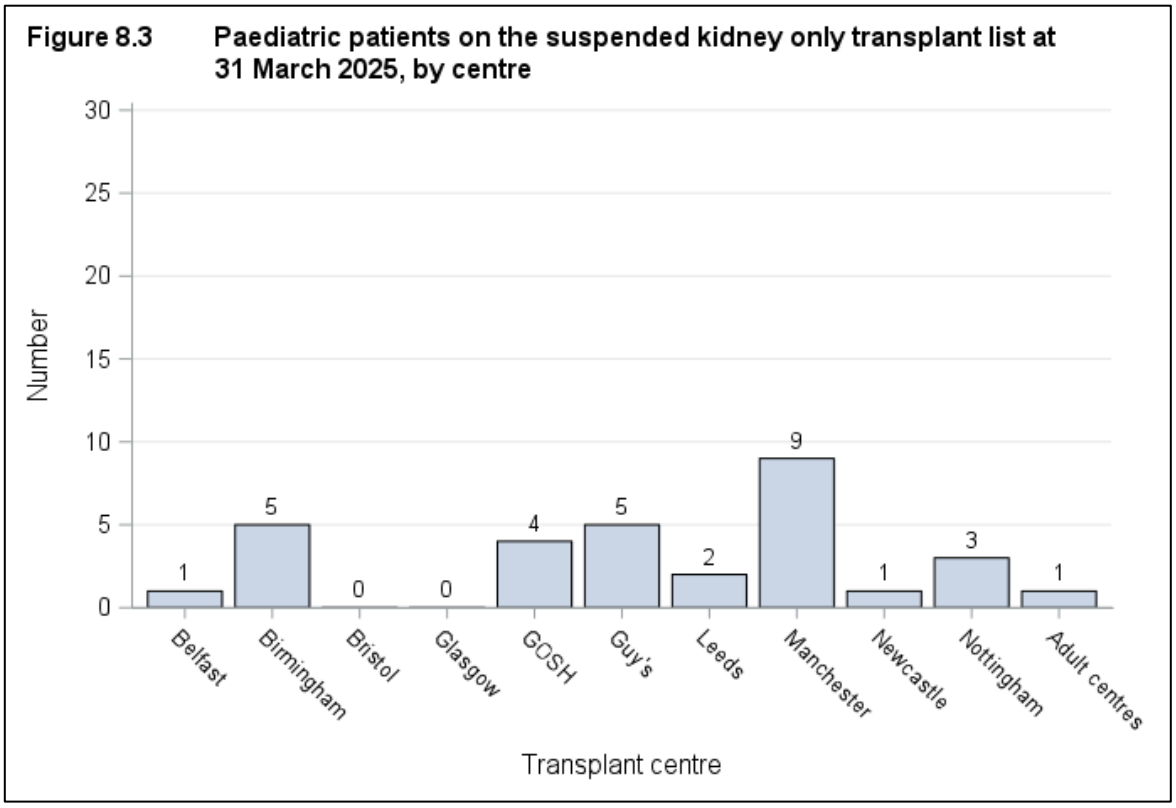
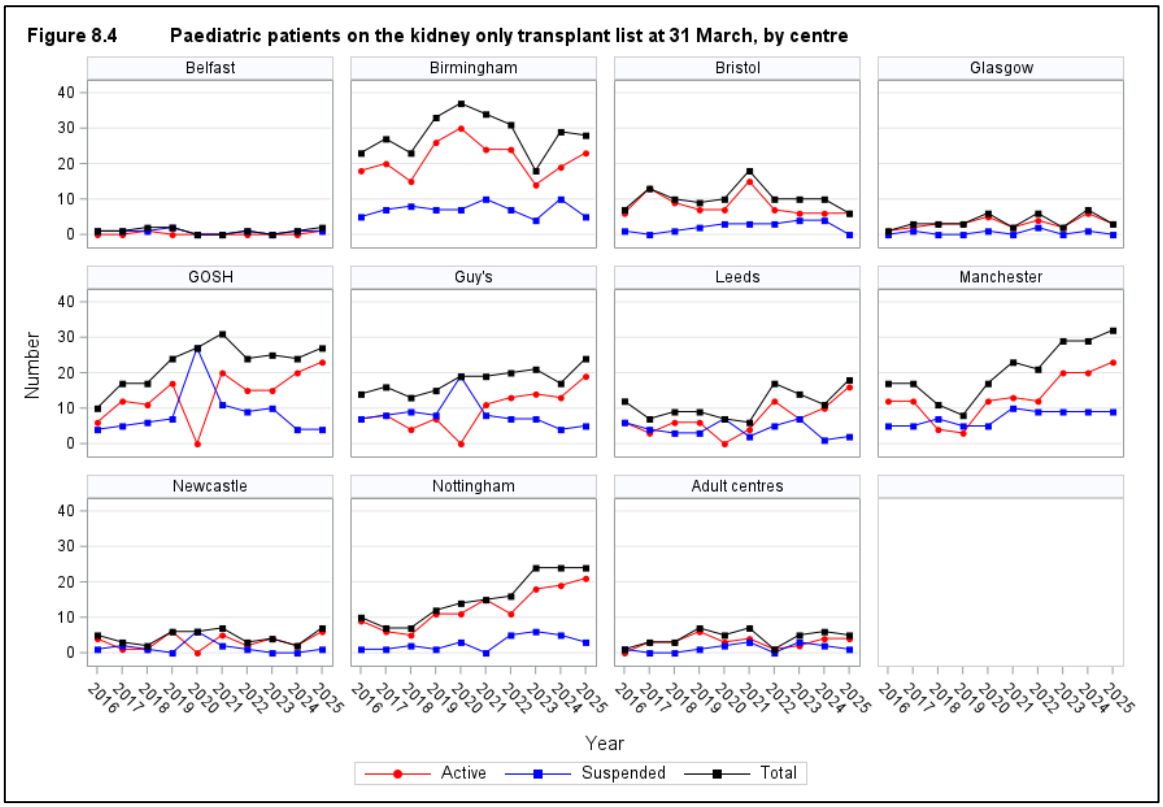


Figure 8.4 shows the number of paediatric patients on the transplant list at 31 March each year between 2016 and 2025 for each transplant centre.



8.2 Demographic characteristics, 1 April 2024 – 31 March 2025

The sex, ethnicity, age group and calculated reaction frequency of patients on the transplant list are shown by centre in **Figure 8.5, 8.6, 8.7 and 8.8**, respectively. Note that all percentages quoted are based only on data where relevant information was available. Centres with less than three paediatric registrations in the reporting year are omitted from the figures in this section.

Figure 8.5 Sex of paediatric registrations on the active kidney only transplant list, 1 April 2024 and 31 March 2025, by centre

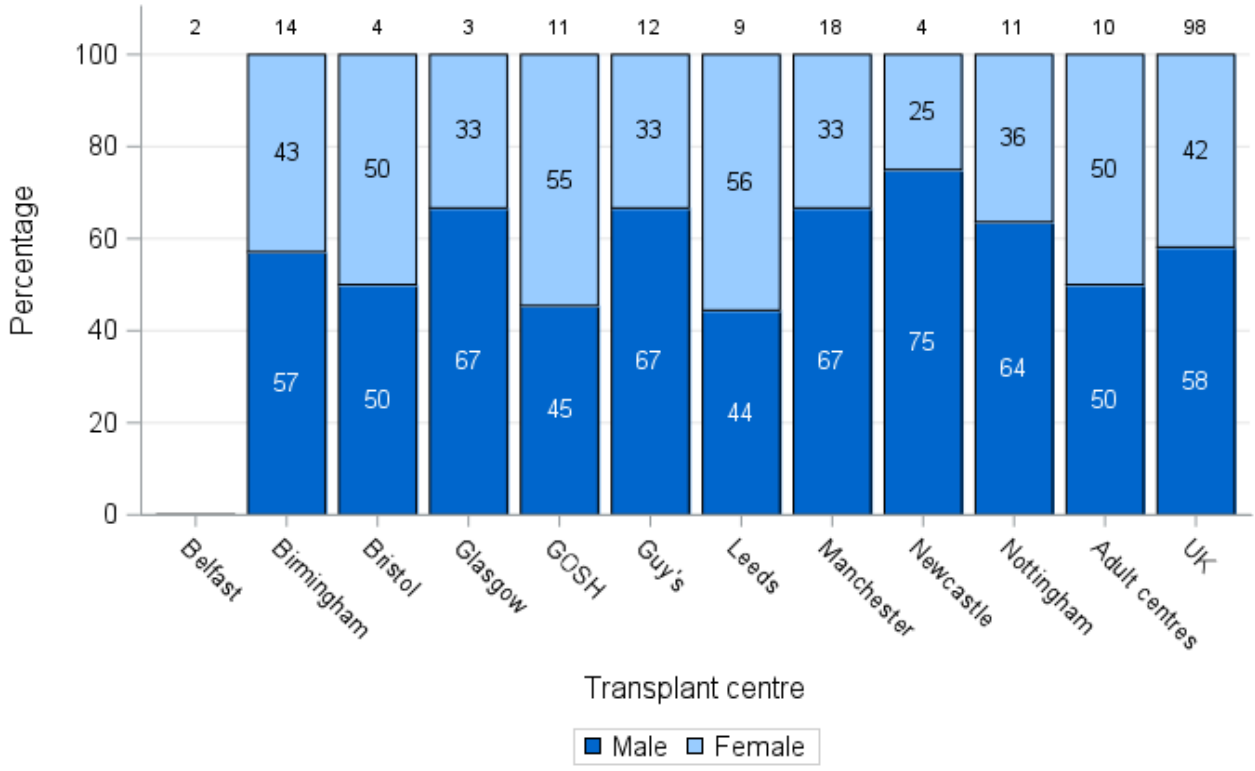


Figure 8.6 **Ethnicity of paediatric registrations on the active kidney only transplant list, 1 April 2024 and 31 March 2025, by centre**

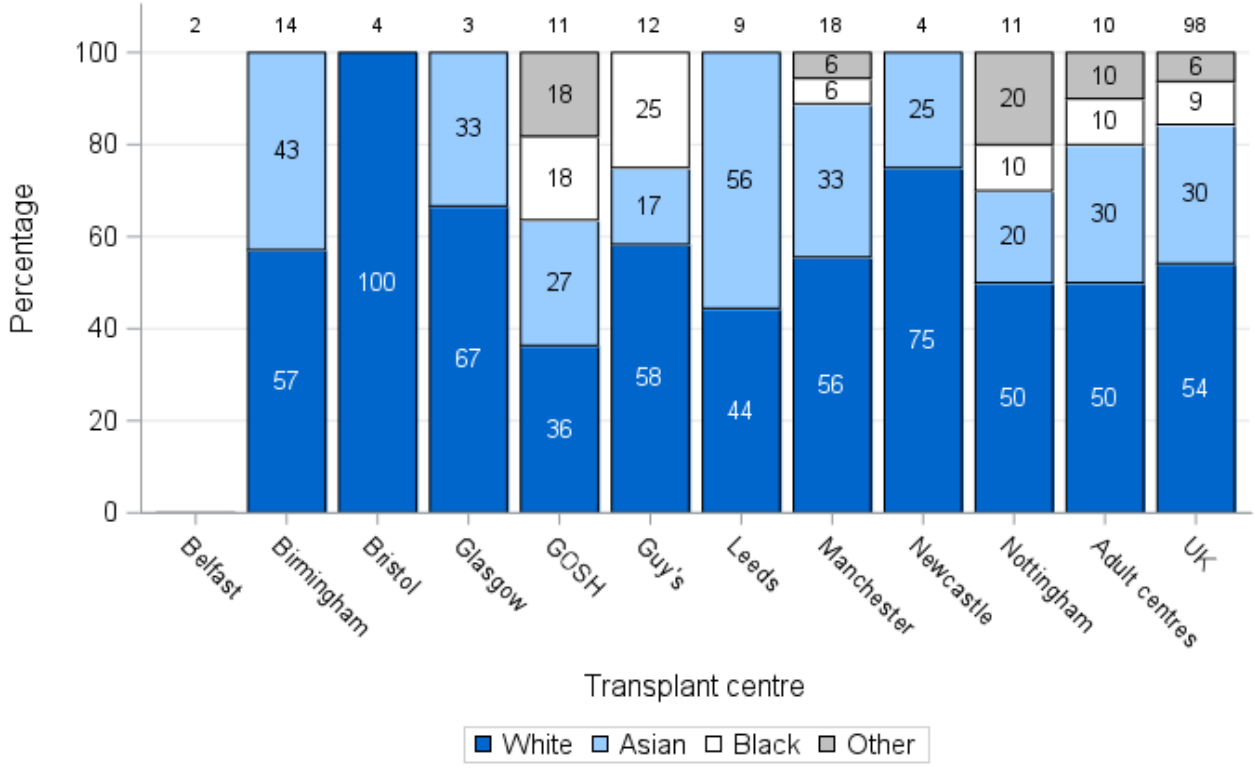


Figure 8.7 **Age of paediatric registrations on the active kidney only transplant list, 1 April 2024 and 31 March 2025, by centre**

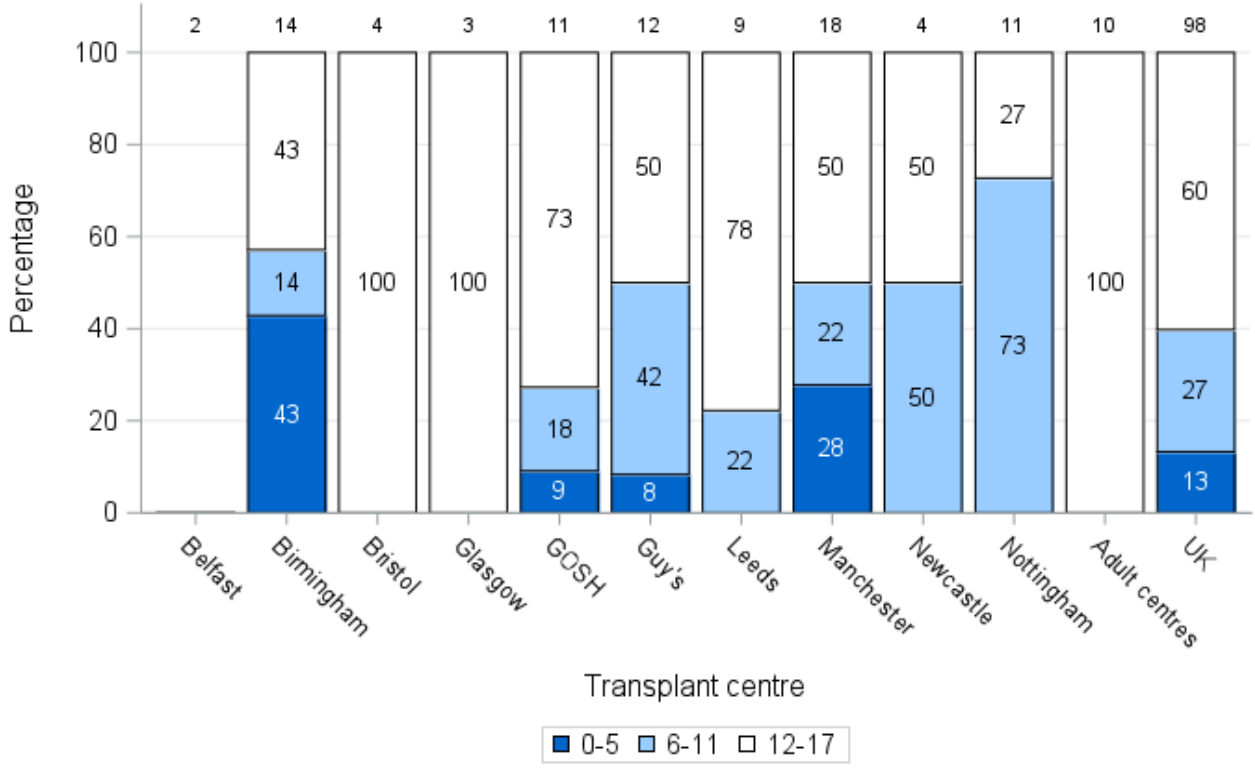
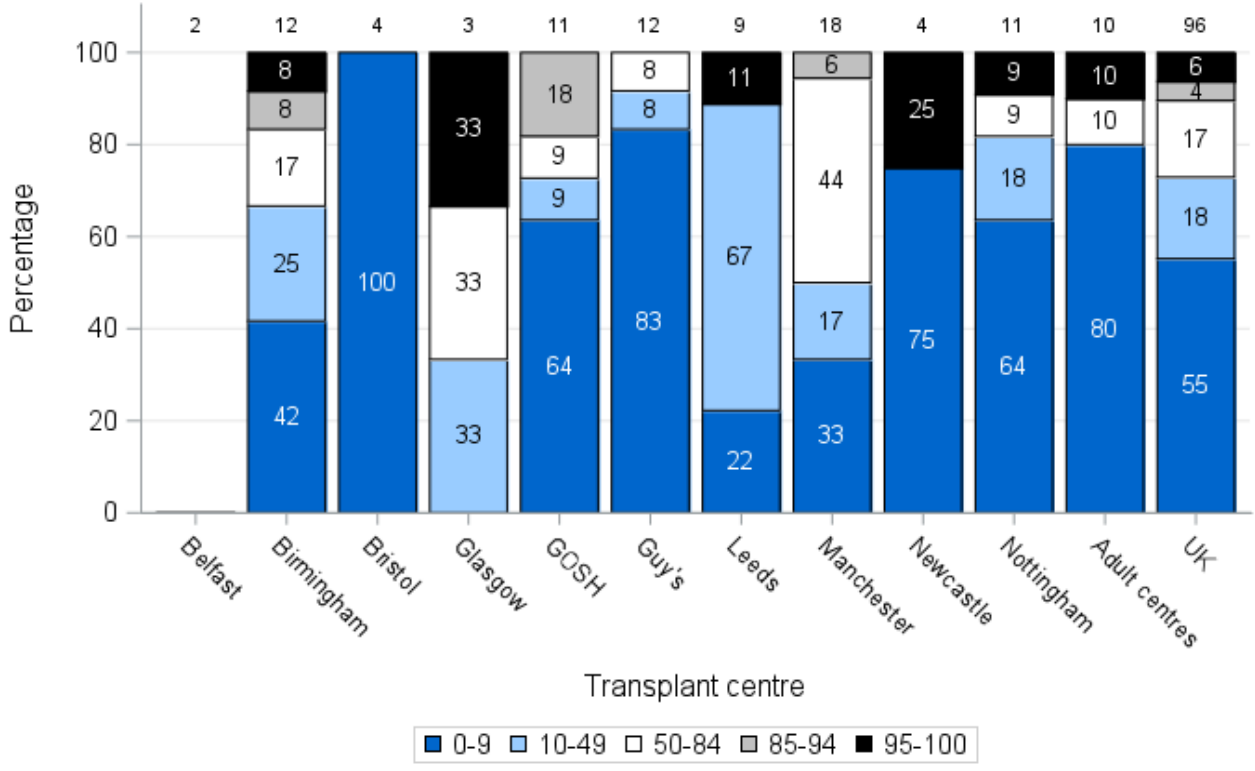


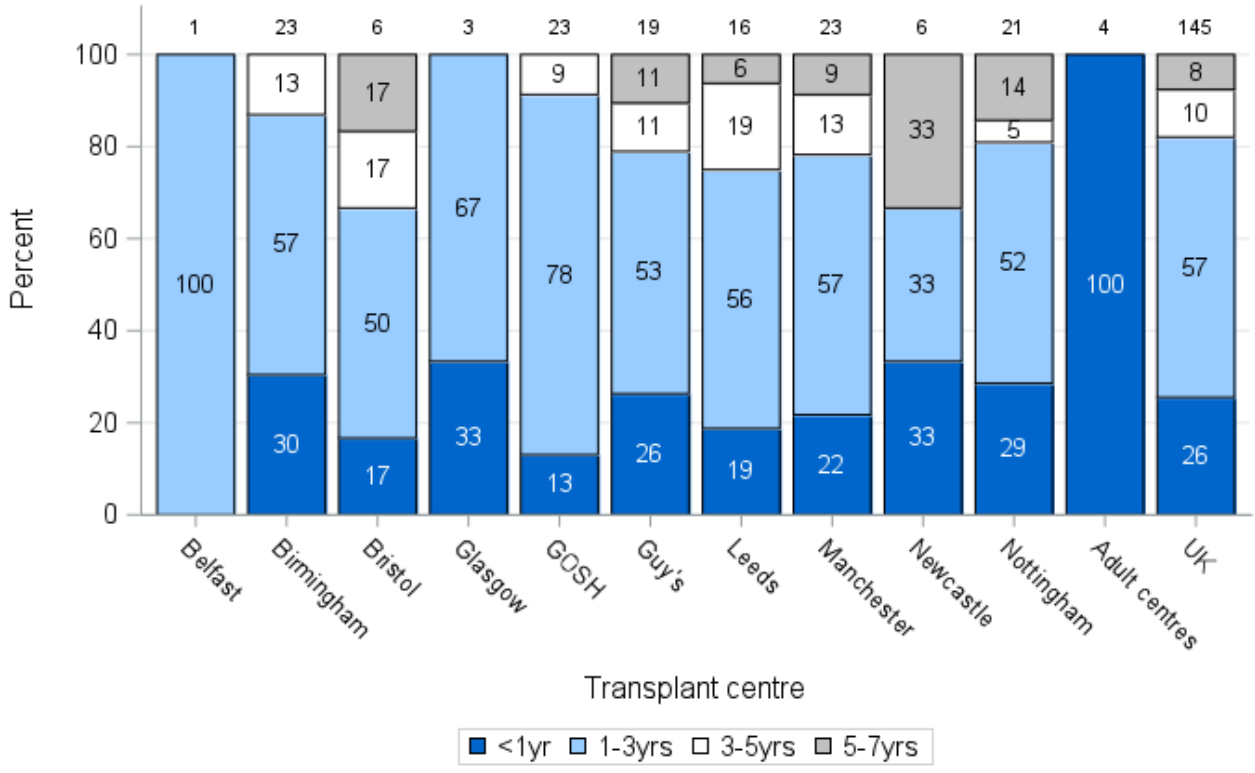
Figure 8.8 cRF of paediatric registrations on the active kidney only transplant list, 1 April 2024 and 31 March 2025, by centre



8.3 Paediatric waiting times for those currently on the list, 31 March 2025

Figure 8.9 shows the length of time paediatric patients have been waiting on the kidney only transplant list at 31 March 2025 by centre.

Figure 8.9 Paediatric patients on the active kidney only transplant list as at 31 March 2025, by centre and waiting time



8.4 Median waiting time to transplant, 1 April 2019 - 31 March 2022

The length of time a patient waits for a kidney transplant varies across the UK. The median active waiting time for adult deceased donor kidney only transplantation is shown in **Figure 8.10a** and **Table 8.1a** for patients registered at each individual unit. The median total waiting time (including dialysis and periods of suspension) for adult deceased donor kidney only transplantation is shown in **Figure 8.10b** and **Table 8.1b** for patients registered at each individual unit. The data shown are for all paediatric patients, joining the list within the time period shown, including those still awaiting a transplant on the day of analysis. Patients who received a live donor or multi-organ transplant are not included. The national allocation scheme introduced in April 2006 helped to reduce the variability in deceased donor kidney waiting times across the country but currently some variability remains. Waiting times across centres continue to differ in a way that it is difficult for centres to control, given that the 2006 National Kidney Allocation Scheme determined allocation of all kidneys available for transplant from donors after brain death (DBD). This has continued following the introductions of the 2019 National Kidney Offering Scheme which determines allocation of all DBD kidneys and kidneys from donations after circulatory death (DCD).

2006 National Kidney Allocation Scheme
Only kidneys from donors after brain death were allocated via a national allocation scheme during the majority of the time period analysed. DCD kidneys were allocated to patients through local allocation arrangements and these vary across the country because some centres have a larger DCD programme than others. From 3 September 2014 one kidney from DCD donors aged between 5 and 49 years were allocated within four pre-defined regions using the 2006 DBD allocation principles and as such should reduce variability in waiting times across the country.

Kidneys from DBD are allocated to patients listed nationally through the 2006 Kidney Allocation Scheme. The 2006 Kidney Allocation Scheme introduced in April 2006 prioritised patients with ideal tissue matches (000 HLA mismatches) and then assigned points to patients based on the level of tissue match between donor and recipient, the length of time spent waiting for a transplant, age of the recipient (with a progressive reduction in points given after the age of thirty) and location points such that patients geographically close to the retrieval centre received more points. The patients with the highest number of points for a donated kidney were preferentially offered the kidney, no matter where in the UK they received their treatment.

2019 National Kidney Offering Scheme
The 2019 Kidney Offering Scheme was introduced on 11 September 2019 and this is a single scheme for offering all kidneys from deceased donors in the UK. This scheme prioritises patients who are difficult to match or have waited a long time for a transplant. Waiting time was updated from time from first active listing under the 2006 scheme to time from the earliest of starting permanent dialysis (HD or PD) in the UK or first active listing. On 25 February 2025, a cap on suspension time points for pre-dialysis patients on the transplant list. The number of points accrued for days of suspension before a patient has started permanent dialysis was capped at 180 days. This cap is only applicable to a patient's first registration.

The median active waiting time to transplant for paediatric patients registered on the kidney only transplant list between 1 April 2019 and 31 March 2022 is 418 days. The median active waiting time to transplant for paediatric patients registered on the kidney

only transplant list between 1 April 2019 and 31 March 2022 is 952 days. Median values are not presented for Belfast, Glasgow and Newcastle as they had no paediatric patients registered and transplanted in the time period.

Figure 8.10a Median active waiting time to deceased donor transplant for paediatric patients registered on the kidney transplant list, 1 April 2019 - 31 March 2022

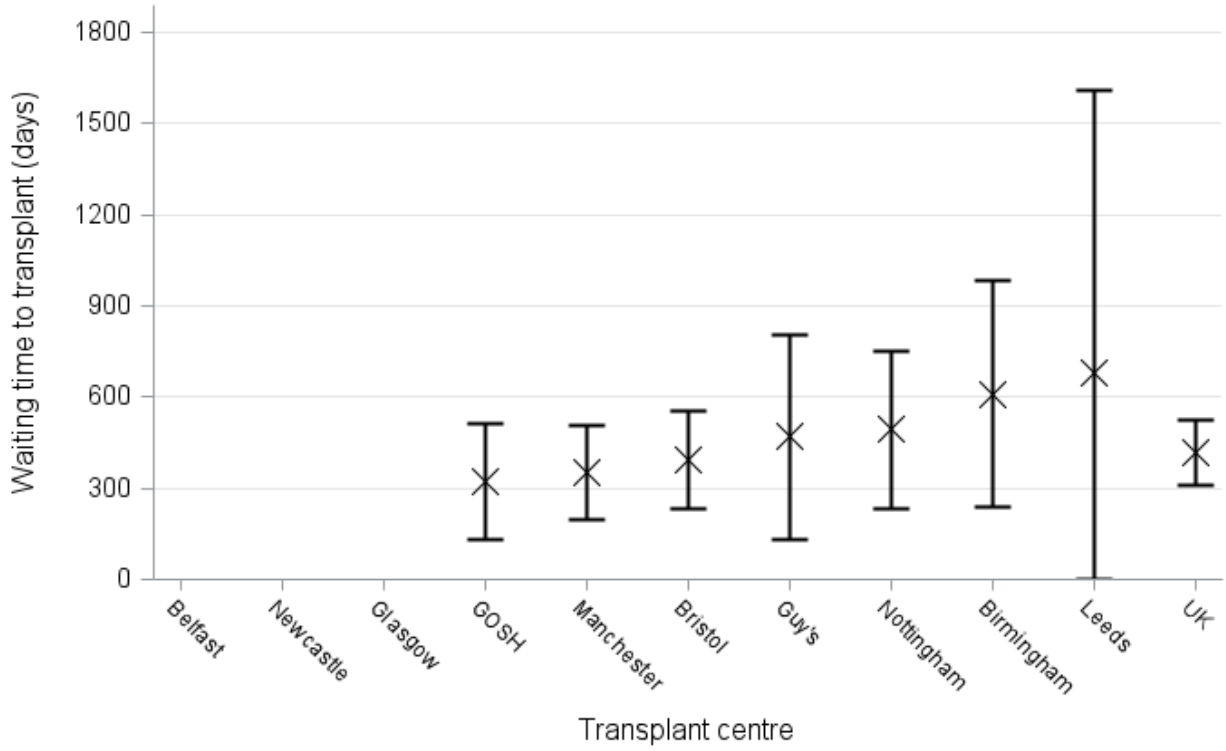


Figure 8.10b Median total waiting time to deceased donor transplant for paediatric patients registered on the kidney transplant list, 1 April 2019 - 31 March 2022

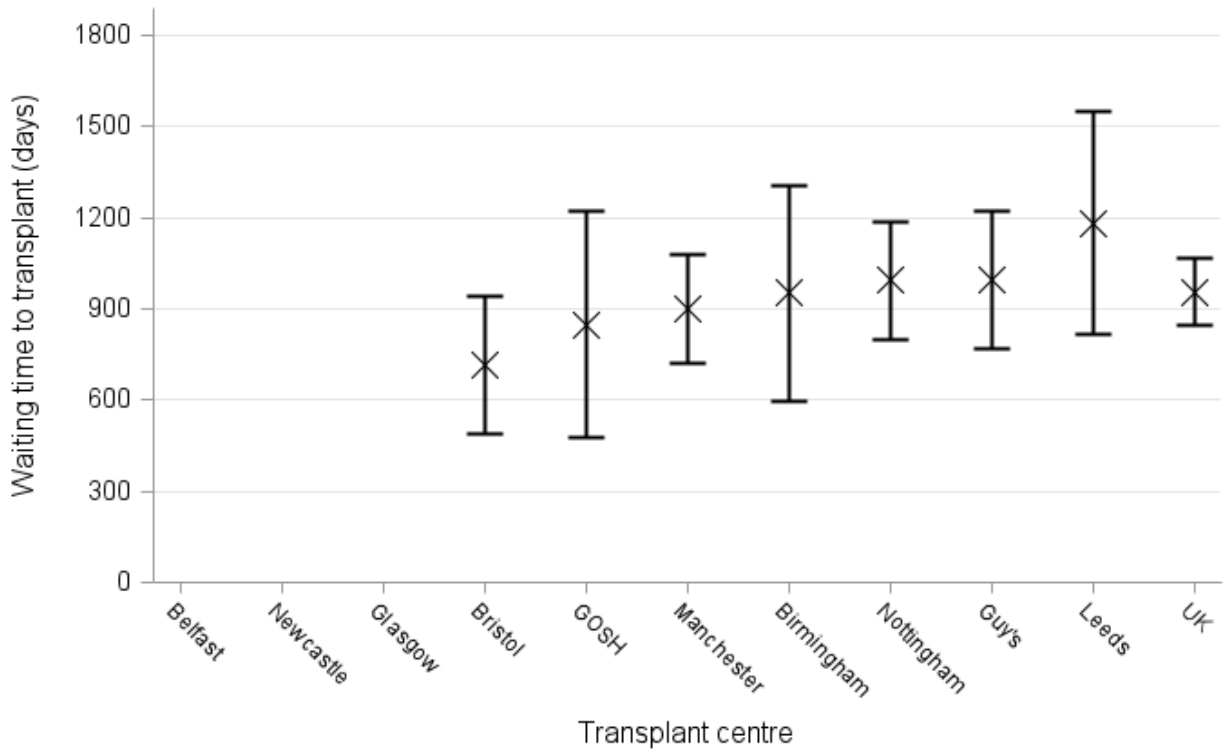


Table 8.1a Median active waiting time to kidney only transplant in the UK, for paediatric patients registered 1 April 2019 - 31 March 2022

Transplant centre	Number of patients registered	Waiting time (days) Unadjusted Median	95% Confidence interval
Belfast	0	-	
Newcastle	0	-	
Glasgow	0	-	
GOSH	25	324	133 - 515
Manchester	36	350	195 - 505
Bristol	17	392	232 - 552
Guy's	27	469	133 - 805
Nottingham	16	493	234 - 752
Birmingham	35	611	238 - 984
Leeds	14	681	0 - 1610
UK	**204**	**418**	**309 - 527**

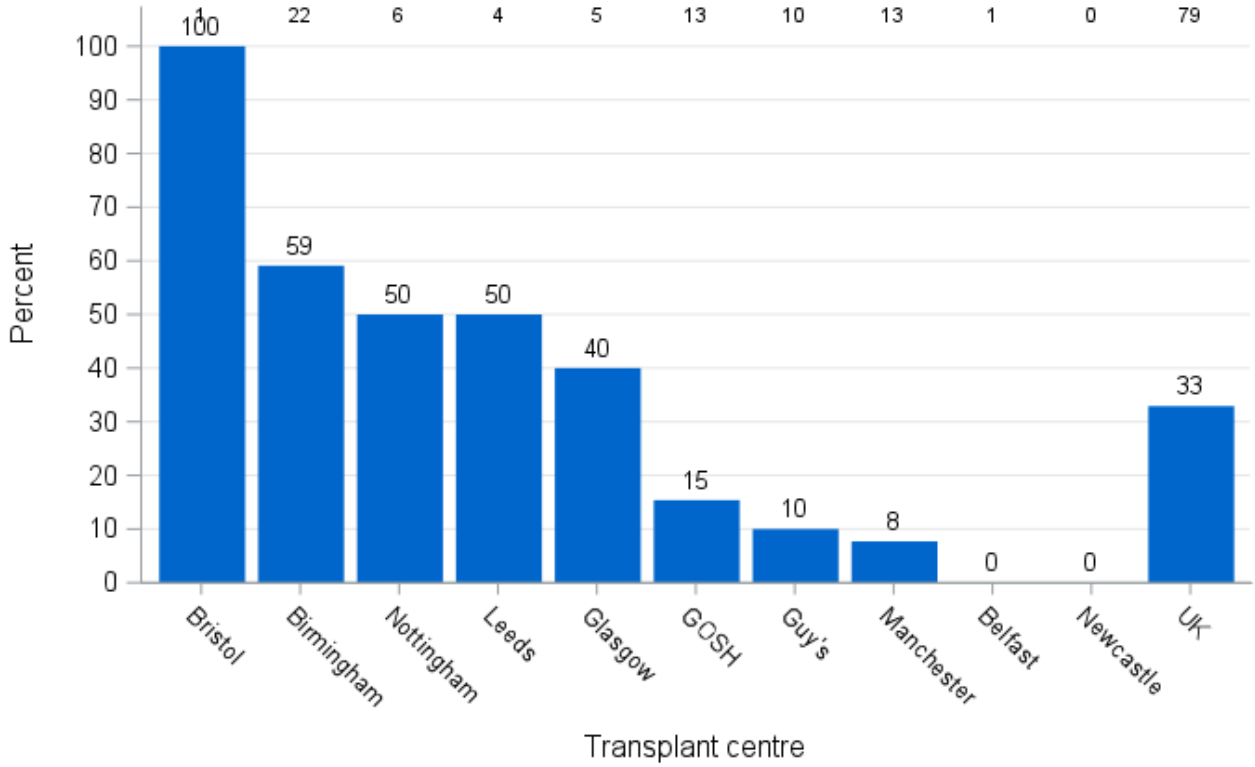
Table 8.1b Median total waiting time to kidney only transplant in the UK, for paediatric patients registered 1 April 2019 - 31 March 2022

Transplant centre	Number of patients registered	Waiting time (days) Unadjusted Median	95% Confidence interval
Belfast	0	-	
Newcastle	0	-	
Glasgow	0	-	
Bristol	17	715	489 - 941
GOSH	25	849	478 - 1220
Manchester	36	898	720 - 1076
Birmingham	35	951	595 - 1307
Nottingham	16	995	801 - 1189
Guy's	27	996	772 - 1220
Leeds	14	1183	814 - 1552
UK	**203**	**952**	**844 - 1060**

8.5 Pre-emptive listing rates, 1 April 2023 - 31 March 2024

Rates of pre-emptive kidney only listings are shown in **Figure 8.11** for paediatric patients joining the list between 1 April 2023 and 31 March 2024. Patients listed on the deceased donor transplant list prior to receiving a living donor transplant are excluded and in order to remove the effect of these patients an earlier cohort was selected. Pre-emptive listing accounted for 33% of all paediatric registrations across the UK. There were no pre-emptive registrations at Belfast. Newcastle had 0 registrations in the period.

Figure 8.11 Paediatric pre-emptive listing rates by centre, registrations between 1 April 2023 and 31 March 2024



Response to paediatric kidney offers

Offer decline rates

Kidney-only offers from DBD donors who had at least one kidney retrieved, offered directly and on behalf of a named individual patient and resulted in transplantation are included in the analysis. Any offers made through the reallocation of kidneys, declined kidney or fast track schemes were excluded, as were offers of kidneys from donations after circulatory death donors.

Data are presented for standard criteria donors (SCD). SCD are DBD donors aged <50 at the time of death.

Funnel plots were used to compare centre specific offer decline rates and indicate how consistent the rates of the individual transplant centres are with the national rate. The overall national unadjusted offer decline rate is shown by the solid line while the 95% and 99.8% confidence lines are indicated via a thin and thick dotted line, respectively. Each dot in the plot represents an individual transplant centre. Centres that are positioned above the upper limits indicate on offer decline rate that is higher than the national rate, while centres positioned below the lower limits indicates on offer decline rate that is lower than the national rate. Patient case mix is known to influence the number of offers a centre may receive. In this analysis however only individual offers for named patients were considered which excluded any ABO- and HLA-incompatible patients. For this reason it was decided not to risk adjust for known centre differences in patient case mix.

9.1 Standard criteria offer decline rates, 1 April 2022 – 31 March 2025

Figure 9.1 compares individual centre offer decline rates with the national rate for SCD over the time period, 1 April 2022 and 31 March 2025. Centres can be identified by the information shown in **Table 9.1**.

Figure 9.1 Paediatric standard criteria DBD donor kidney offer decline rates for kidneys that resulted in a transplant, 1 April 2022 and 31 March 2025

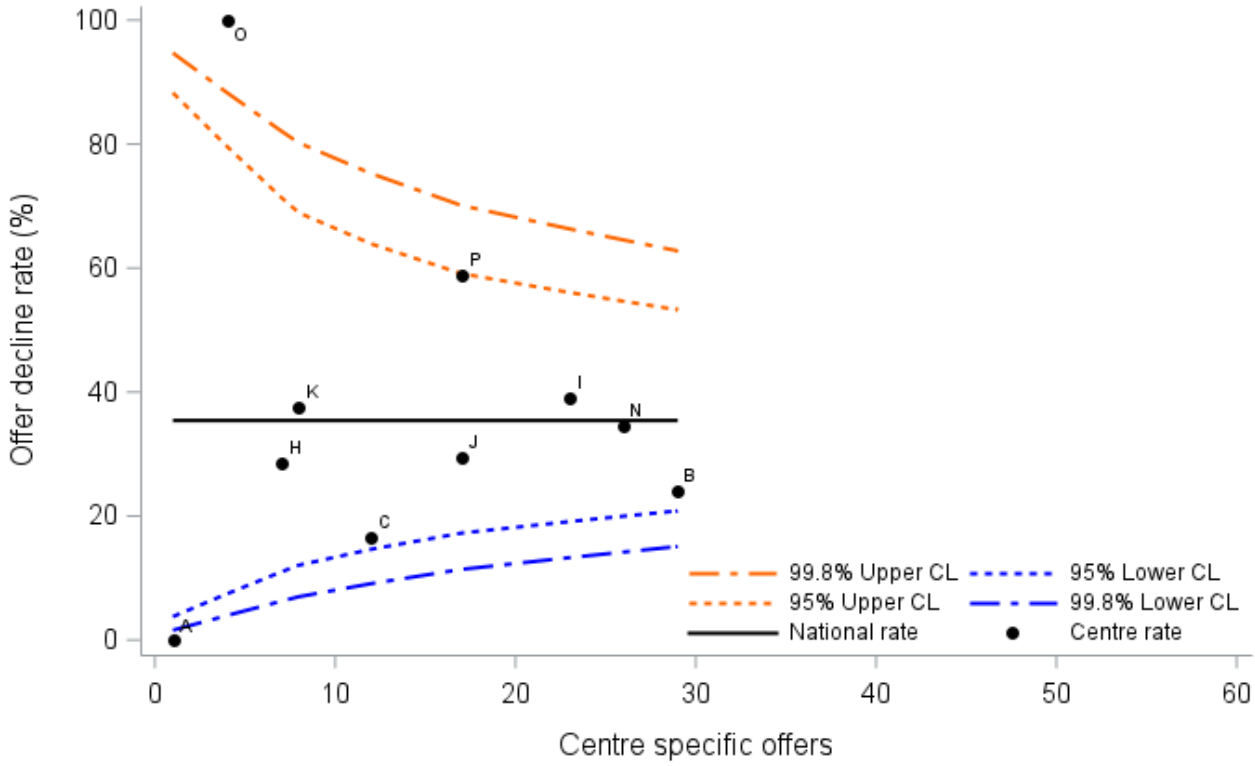


Table 9.1 compares individual centre offer decline rates for SCD over time by financial year.

Table 9.1 Paediatric standard criteria DBD donor kidney offer decline rates by transplant centre, 1 April 2022 and 31 March 2025

Centre	Code	2022/23		2023/24		2024/25		Overall	
		N	(%)	N	(%)	N	(%)	N	(%)
Belfast	A	0	(0)			0	(0)		
Birmingham	B	13	(23)	9	(22)	7	(29)	29	(24)
Bristol	C	6	(33)					12	(17)
GOSH	I			10	(60)	6	(50)	23	(39)
Glasgow	H	5	(40)	0	(0)			7	(29)
Guy's	J	8	(25)	8	(38)			17	(29)
Leeds	K	4	(25)			3	(67)	8	(38)
Manchester	N	9	(33)	6	(33)	11	(36)	26	(35)
Newcastle	O	2	(100)	1	(100)	1	(100)	4	(100)
Nottingham	P	6	(83)	8	(50)	3	(33)	17	(59)
UK		**60**	**(33)**	**48**	**(38)**	**36**	**(36)**	**144**	**(35)**

Paediatric kidney transplants

10.1 Kidney only transplants, 1 April 2015 – 31 March 2025

Figure 10.1 shows the total number of paediatric kidney only transplants performed in the last ten years, by type of donor.

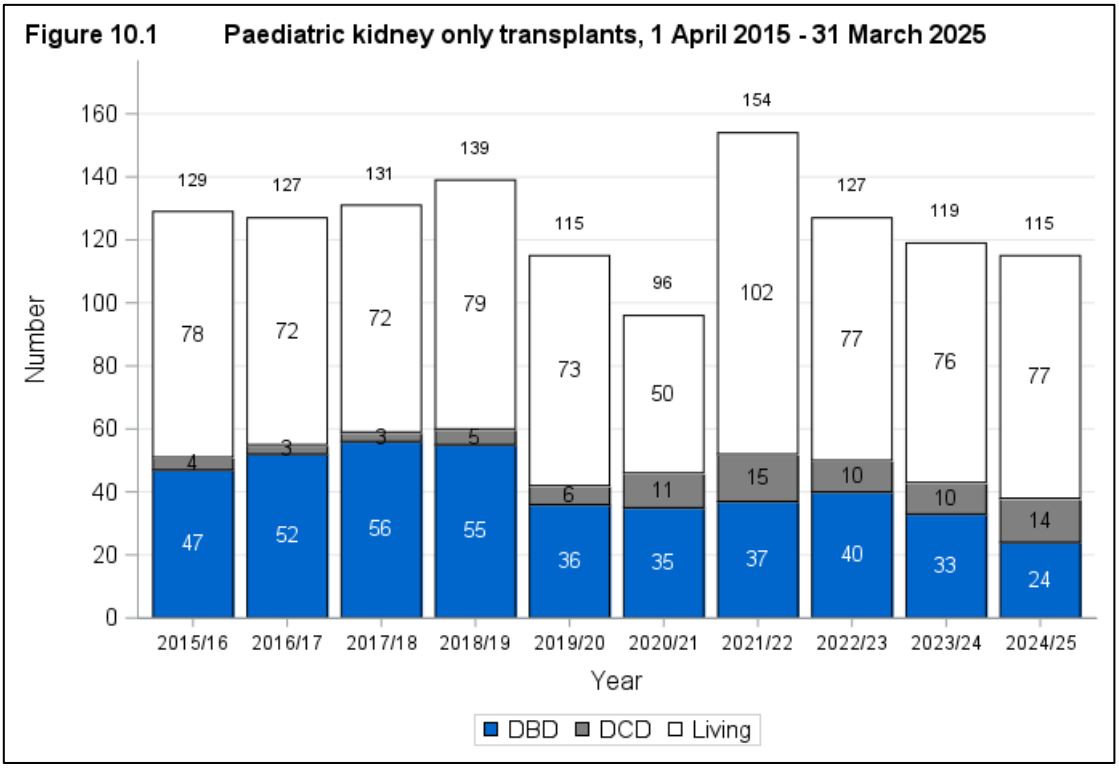
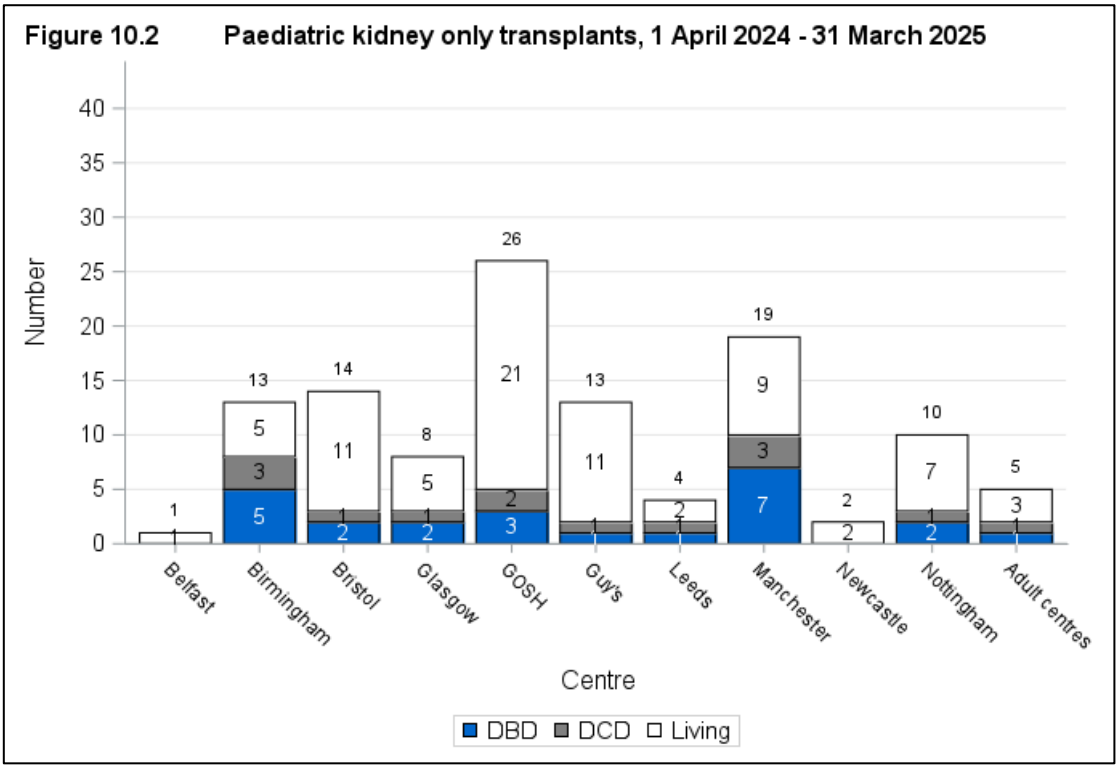


Figure 10.2 shows the total number of paediatric kidney only transplants performed in 2024/25, by centre and type of donor. The same information is presented in **Figure 10.3** but this shows the proportion of DBD, DCD and living donor transplants performed at each centre.



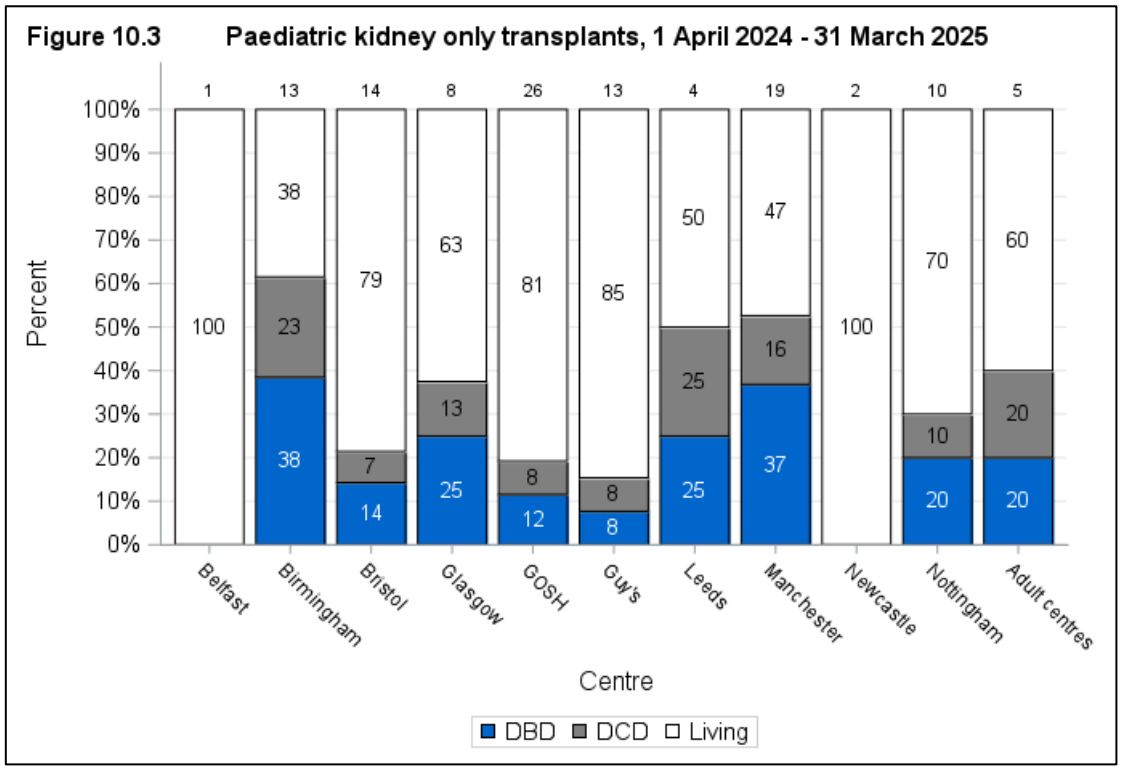
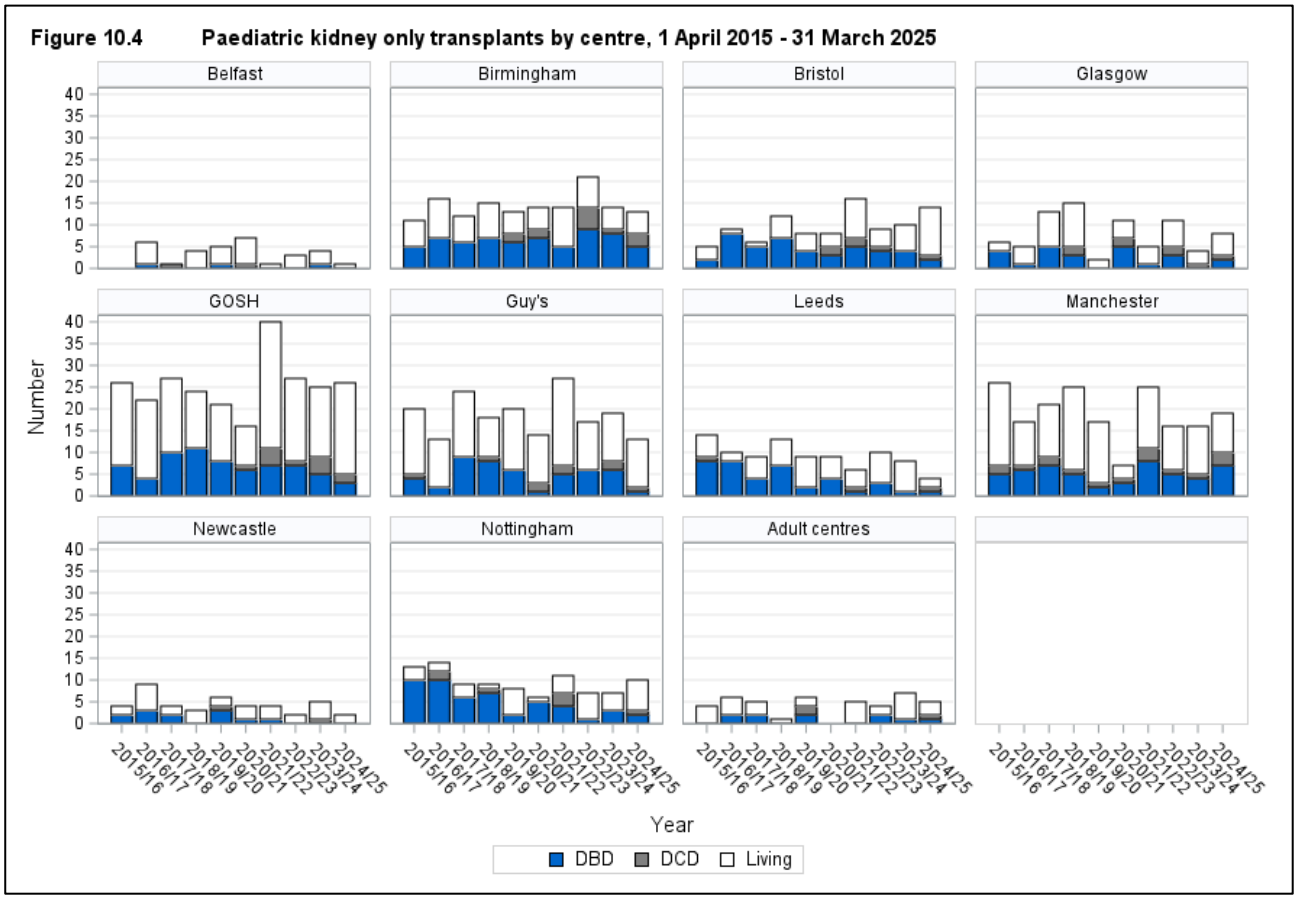


Figure 10.4 shows the total number of paediatric kidney only transplants performed in last ten years, by centre and type of donor.



10.2 Pre-emptive transplant rates, 1 April 2024 - 31 March 2025

Rates of pre-emptive kidney only transplantation are shown in **Figure 10.5** for paediatric deceased donor transplants and **Figure 10.6** for paediatric living donor transplants. Living donor transplants are more likely to be carried out before the need for dialysis than deceased donor transplants: 40% and 11% respectively. This is because a living donor transplant can often be carried out more quickly than a deceased donor kidney transplant as the latter often necessitates a long waiting time.

Figure 10.5 Paediatric deceased donor pre-emptive transplant rates by centre, 1 April 2024 - 31 March 2025

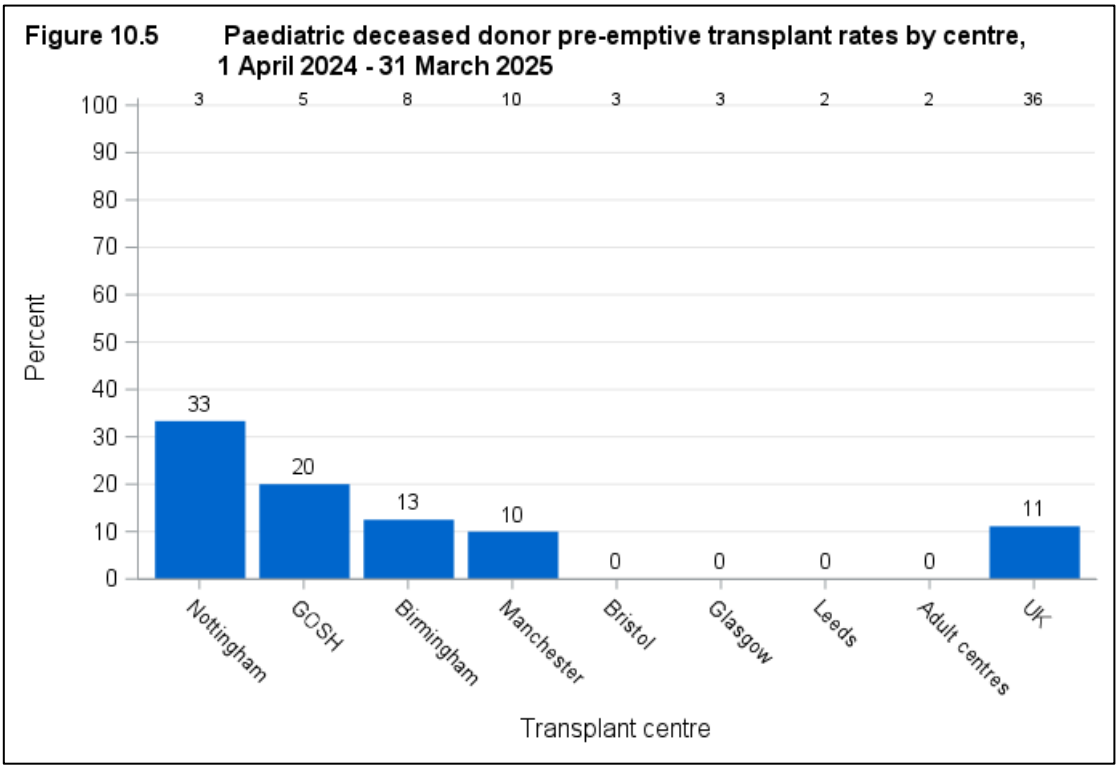
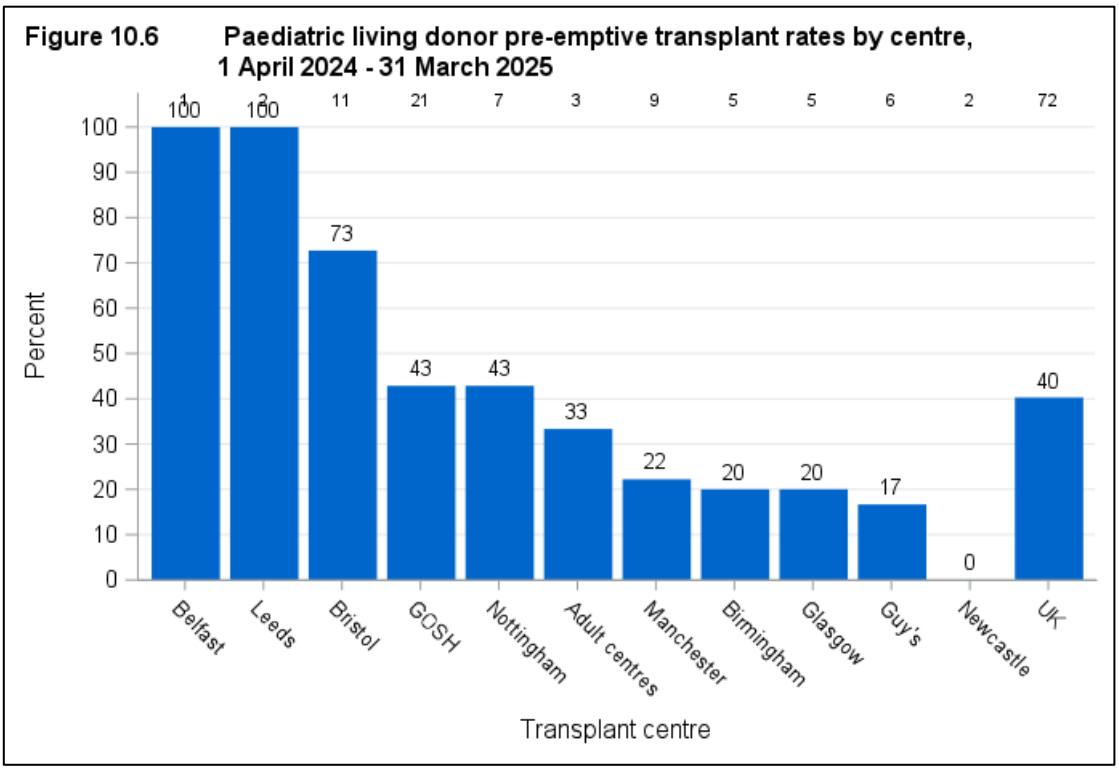


Figure 10.6 Paediatric living donor pre-emptive transplant rates by centre, 1 April 2024 - 31 March 2025



Paediatric kidney outcomes

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 risk-adjusted survival rate plotted against the number of transplants for each centre, with the overall national unadjusted 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 patients return to local renal units for follow-up care after their transplant and although we report survival according to transplant unit, patients 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. It is important to note that adjusting for patient mix through the use of risk-adjustment models may not account for all possible causes of centre differences. There may be other factors that are not taken into account in the risk-adjustment process that may affect the survival rate of a particular centre.

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.

11.1 Deceased donor graft and patient survival

The funnel plots show that, for the most part, the centres lie within the confidence limits. None of the funnel plots show any centres that lie outside the lower 95% confidence limits. Some of the funnel plots show some centres to be above the upper 99.8% confidence limit. This suggests that these centres may have survival rates that are considerably higher than the national rate. Centres can be identified by the information shown in **Table 11.1**. Transplants where cold ischaemia time (CIT) is unknown are excluded from the one year risk-adjusted analysis.

Figure 11.1 Risk-adjusted one year graft (death censored) survival rates for first deceased donor kidney transplants in paediatric patients, between 1 April 2020 and 31 March 2024

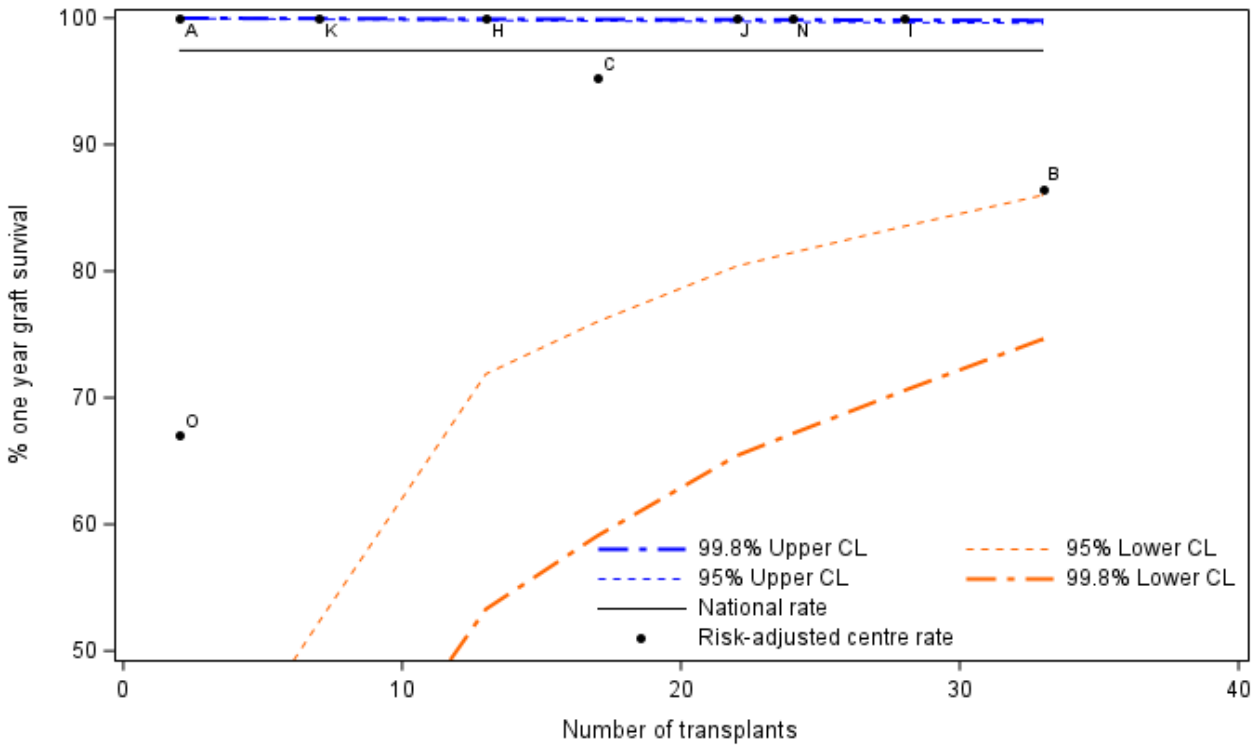


Figure 11.2 is not included. There were no one year patient mortalities for first paediatric kidney-only transplants using kidneys from deceased donors, for transplants between 1 April 2020 and 31 March 2024.

Figure 11.3 Risk-adjusted five year graft (death censored) survival rates for first deceased donor kidney transplants in paediatric patients, between 1 April 2016 and 31 March 2020

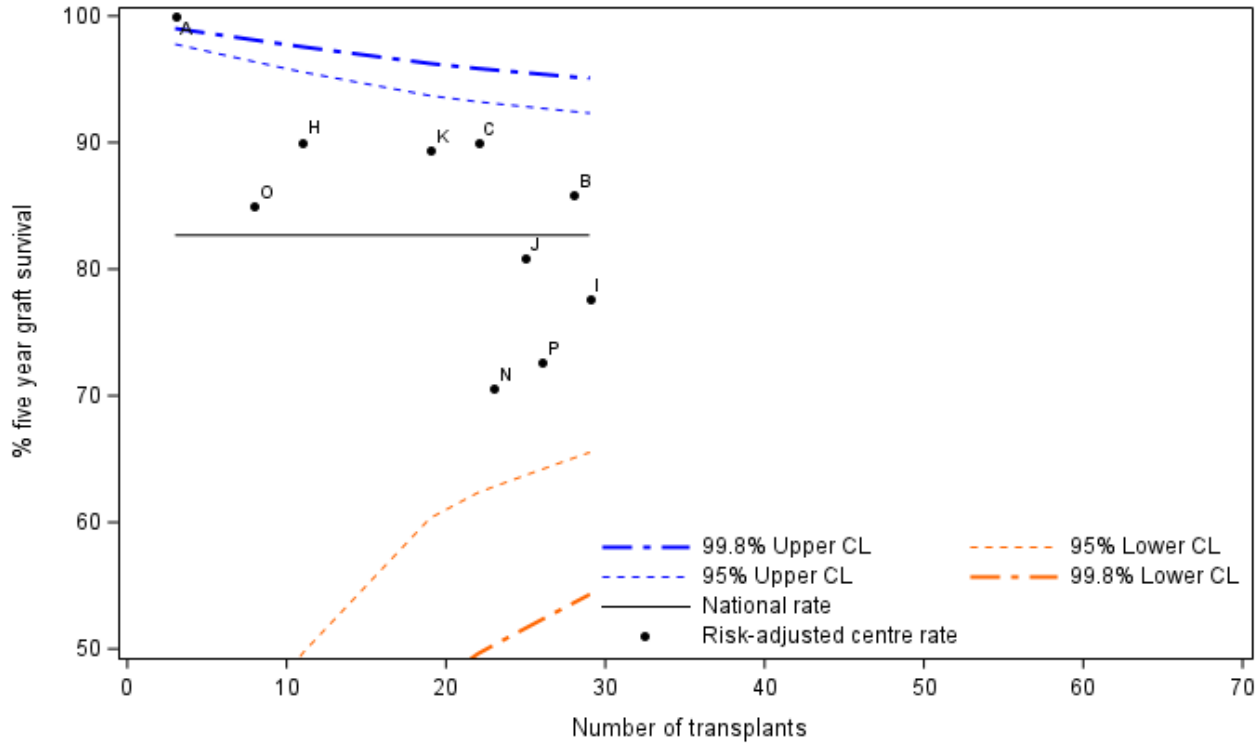


Figure 11.4 Risk-adjusted five year patient survival rates for first deceased donor kidney transplants in paediatric patients, between 1 April 2016 and 31 March 2020

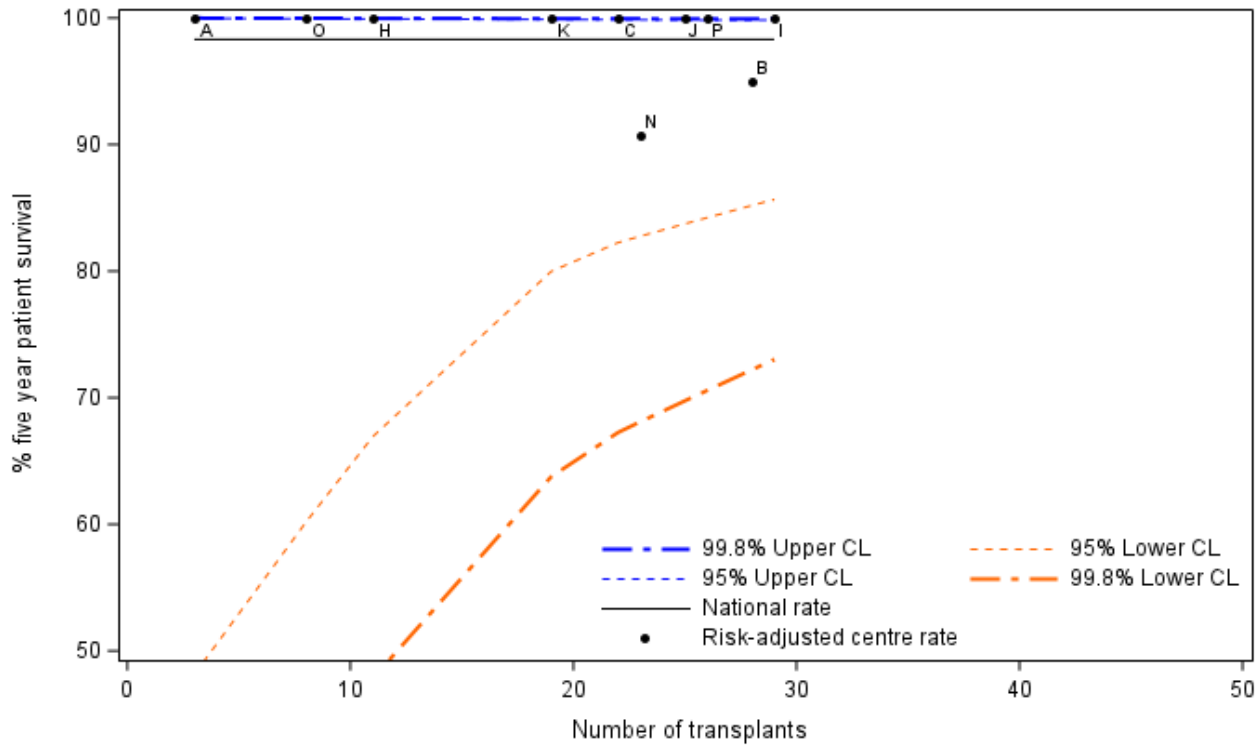


Table 11.1 One and five year first paediatric kidney-only graft and patient survival using kidneys from deceased donors

		Kidney graft survival				Patient survival			
		One-year*		Five-year**		One-year*		Five-year**	
Centre	Code	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Belfast	A	100	N/A	100	N/A	100	N/A	100	N/A
Birmingham	B	87	(25 - 100	86	(64 - 96)	100	N/A	95	(72 - 100
Bristol	C	95	(73 - 100	90	(64 - 99)	100	N/A	100	N/A
GOSH	I	100	N/A	78	(48 - 93)	100	N/A	100	N/A
Glasgow	H	100	N/A	90	(45 - 100	100	N/A	100	N/A
Guy's	J	100	N/A	81	(51 - 95)	100	N/A	100	N/A
Leeds	K	100	N/A	89	(62 - 99)	100	N/A	100	N/A
Manchester	N	100	N/A	71	(36 - 89)	100	N/A	91	(67 - 99)
Newcastle	O	67	(0 - 99)	85	(17 - 100	100	N/A	100	N/A
Nottingham	P	N/A	N/A	73	(41 - 90)	N/A	N/A	100	N/A
UK		**97**	**(93 - 99)**	**83**	**(76 - 87)**	**100**	**N/A**	**98**	**(95 - 99)**

* Includes transplants performed between 1 April 2020 - 31 March 2024
** Includes transplants performed between 1 April 2016 - 31 March 2020
Centres have been omitted where less than 75% of data reported
Transplants where CIT is unknown are excluded from the one year risk-adjusted analysis

11.2 Living donor graft and patient survival

The funnel plots show that, for the most part, the centres lie within the confidence limits. None of the funnel plots show any centres that lie outside the lower 95% confidence limits. Some of the funnel plots show some centres to be above the upper 99.8% confidence limit. This suggests that these centres may have survival rates that are considerably higher than the national rate. Centres can be identified by the information shown in **Table 11.2**. Transplants where the donor age is unknown are excluded from the risk-adjusted analysis.

Figure 11.5 Risk-adjusted one year graft (death censored) survival rates for first live donor kidney transplants in paediatric patients, between 1 April 2020 and 31 March 2024

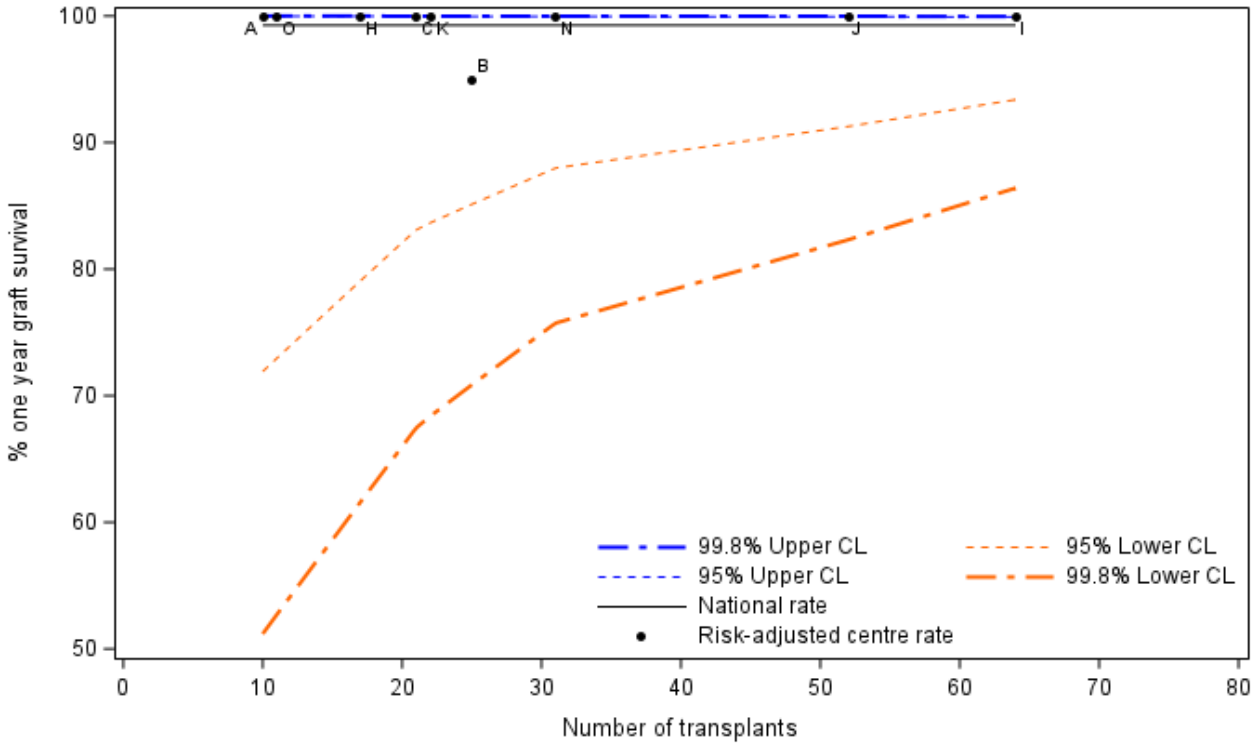


Figure 11.6 Risk-adjusted one year patient survival rates for first live donor kidney transplants in paediatric patients, between 1 April 2020 and 31 March 2024

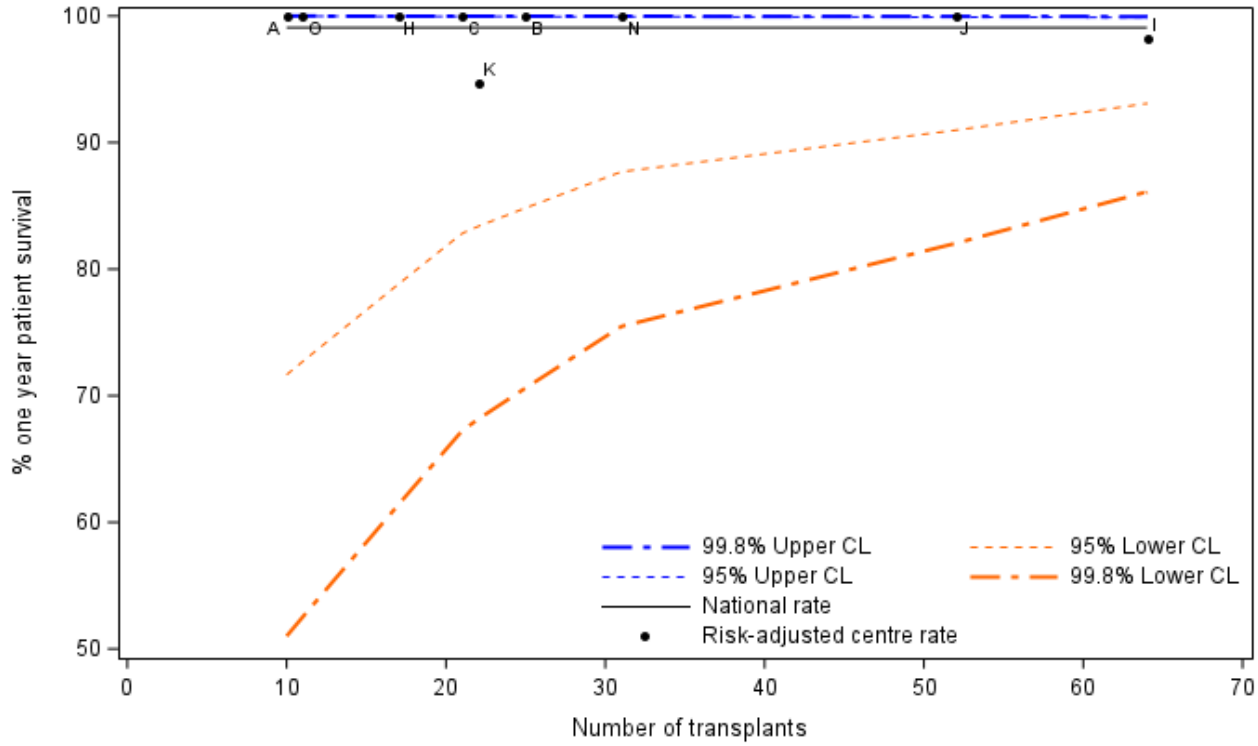


Figure 11.7 Risk-adjusted five year graft (death censored) survival rates for first live donor kidney transplants in paediatric patients, between 1 April 2016 and 31 March 2020

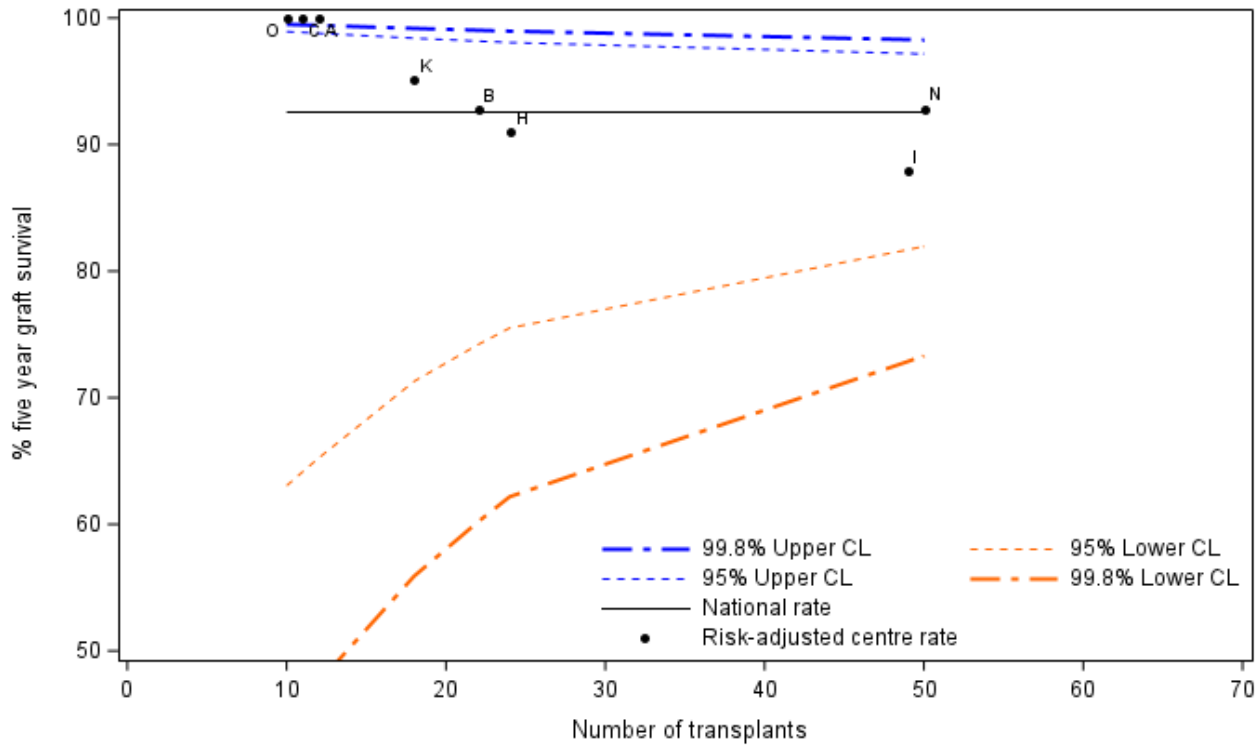


Figure 11.8 **Risk-adjusted five year patient survival rates for first live donor kidney transplants in paediatric patients, between 1 April 2016 and 31 March 2020**

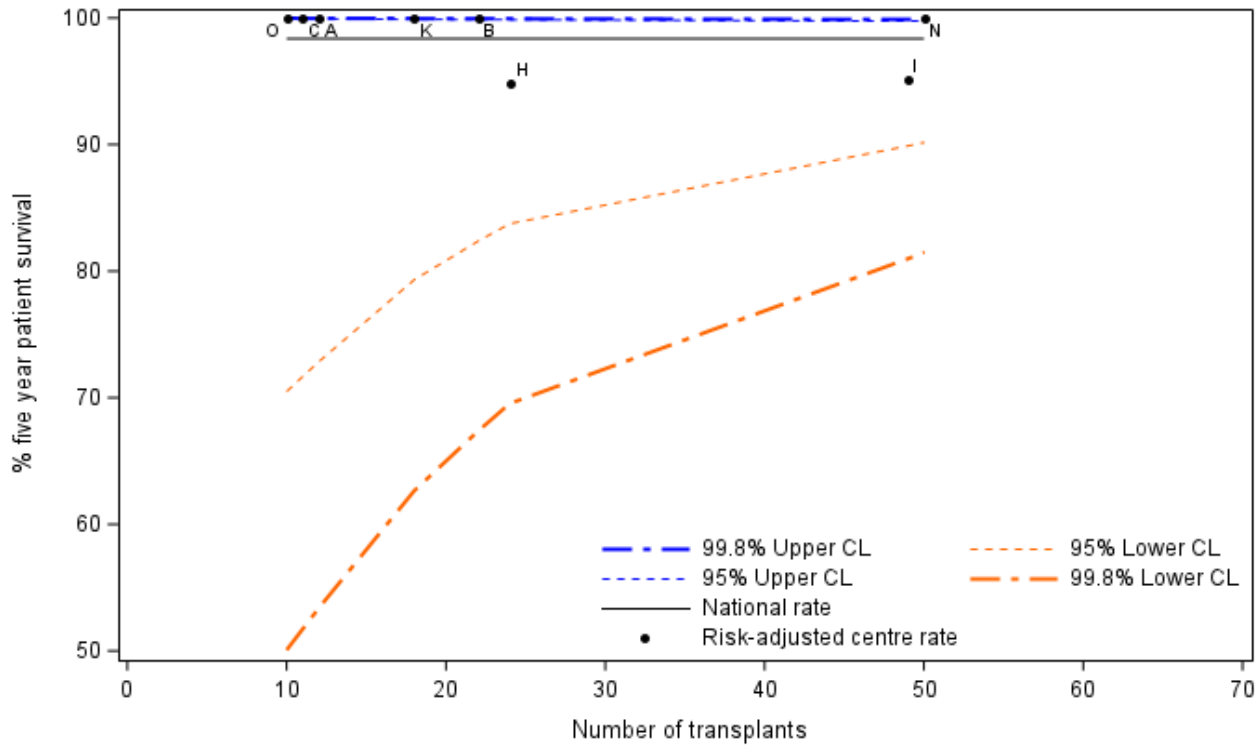


Table 11.2 **One and five year first paediatric kidney-only graft and patient survival using kidneys from living donors**

		Kidney graft survival				Patient survival			
		One-year*		Five-year**		One-year*		Five-year**	
Centre	Code	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Belfast	A	100	N/A	100	N/A	100	N/A	100	N/A
Birmingham	B	95	(72 - 100	93	(74 - 99)	100	N/A	100	N/A
Bristol	C	100	N/A	100	N/A	100	N/A	100	N/A
GOSH	I	100	N/A	88	(74 - 96)	98	(90 - 100	95	(82 - 99)
Glasgow	H	100	N/A	91	(68 - 99)	100	N/A	95	(71 - 100
Guy's	J	100	N/A	N/A	N/A	100	N/A	N/A	N/A
Leeds	K	100	N/A	95	(73 - 100	95	(70 - 100	100	N/A
Manchester	N	100	N/A	93	(82 - 98)	100	N/A	100	N/A
Newcastle	O	100	N/A	100	N/A	100	N/A	100	N/A
Nottingham	P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
UK		**99**	**(97 - 100**	**93**	**(88 - 95)**	**99**	**(96 - 100**	**98**	**(96 - 99)**

* Includes transplants performed between 1 April 2020 - 31 March 2024
** Includes transplants performed between 1 April 2016 - 31 March 2020
Centres have been omitted where less than 75% of data reported

Form return rates

12.1 Deceased donor form return rates, 1 April 2024 – 31 March 2025

Form return rates are reported in **Table 12.1** for the kidney transplant record, three month and one year follow up form, along with lifetime follow up (more than two years). These include all paediatric deceased donor kidney only transplants between 1 April 2024 and 31 March 2025 for the transplant record, and all requests for follow up forms issued in this time period.

Table 12.1 Deceased donor form return rates, 1 April 2024 and 31 March 2025

Centre	TX RECORD		THREE MONTHS		ONE YEAR		LIFETIME	
	N	% returned	N	% returned	N	% returned	N	% returned
Birmingham, Birmingham Children's Hospital			1	100	1	100	31	100
Birmingham, Queen Elizabeth Hospital Birmingham	8	100	9	89	9	89	72	51
Bradford, St Lukes Hospital							21	95
Bristol, Southmead Hospital	3	100	4	100	5	100	51	31
Cardiff, University Of Wales Hospital	1	100	1	100			51	67
Glasgow, Queen Elizabeth University Hospital							47	66
Leeds, St James's University Hospital	2	100	2	100	2	100	97	71
Leicester, Leicester General Hospital							21	71
London, Great Ormond Street Hospital For Children	5	100	7	100	9	78	37	100
London, Guy's Hospital			3	67	7	29	63	41
London, Royal Free Hospital							33	67
London, The Royal London Hospital (Whitechapel)							37	38
Manchester, Manchester Royal Infirmary	10	100	9	89	5	80	51	67
Nottingham, Nottingham City Hospital	3	100	1	100				
Oxford, Churchill Hospital							21	100
Sheffield, Northern General Hospital							31	29

12.2 Living donor form return rates, 1 April 2024 – 31 March 2025

Form return rates are reported in **Table 12.2** for the kidney transplant record, three month and one year follow up form, along with lifetime follow up (more than two years). These include all paediatric living donor kidney only transplants between 1 April 2024 and 31 March 2025 for the transplant record, and all requests for follow up forms issued in this time period.

Table 12.2 Living donor form return rates, 1 April 2024 and 31 March 2025

Centre	TX RECORD		THREE MONTHS		ONE YEAR		LIFETIME	
	N	% returned	N	% returned	N	% returned	N	% returned
Belfast, Royal Belfast Hospital For Sick Children							30	50
Birmingham, Birmingham Children's Hospital					1	100	31	100
Birmingham, Queen Elizabeth Hospital Birmingham	5	100	5	100	6	83	43	51
Bristol, Southmead Hospital	11	100	11	100	7	71	22	45
Cardiff, University Of Wales Hospital	1	100	1	100	1	100	55	67
Glasgow, Queen Elizabeth University Hospital							49	82
Leeds, St James's University Hospital	2	100	3	100	6	83	57	82
Liverpool, Alder Hey Children's Hospital							27	100
Liverpool, Royal Liverpool University Hospital							26	100
London, Great Ormond Street Hospital For Children	21	100	21	100	16	88	85	100
London, Guy's Hospital	11	55	8	88	10	40	126	35
London, Royal Free Hospital							32	72
London, The Royal London Hospital (Whitechapel)					1	100	22	14
Manchester, Manchester Royal Infirmary	9	100	9	100	12	100	42	60
Manchester, Royal Manchester Children's Hospital							40	88
Newcastle, Royal Victoria Infirmary							24	92
Nottingham, Nottingham City Hospital	7	100	6	100	5	20		
Oxford, Churchill Hospital					2	100	23	100
Portsmouth, Queen Alexandra Hospital							22	59
Southampton, Southampton University Hospitals							36	58

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 patient will be rapidly rejected.

Active transplant list
When a patient 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 patient 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 patient off the transplant list, either temporarily or permanently. This may be done, for example, if someone becomes too ill to receive a transplant. The patient is told about the decision to suspend them from the list and is informed whether the suspension is temporary or permanent. If a patient is suspended from the list, they are not included in the matching of any donor kidneys that become available.

Case mix
The types of patients 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 patient a person is depends on the patient characteristics that influence the outcome of the treatment. For example the case mix for patients registered for a kidney transplant is defined in terms of various factors such as the blood group, tissue type and age of the patient. These factors have an influence on the chance of a patient 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 patients whose data were used. If, by chance, data from a different set of patients 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 patients 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 patient death, across different groups of patients.

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

Donor after brain death (DBD)
A donor whose heart is still beating when their entire brain has stopped working so that they cannot survive without the use of a ventilator. Organs for transplant are removed from the donor while their heart is still beating, but only after extensive tests determine that the brain cannot recover and they have been certified dead.

Donor after circulatory death (DCD)
A donor whose heart stops beating before their brain stops working and who is then certified dead. The organs are then removed.

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. If a patient dies with a functioning graft, the graft survival is censored at time of death.

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 recipients 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.

Live 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
Patients that are placed on the kidney transplant list or receive a transplant prior to the need for dialysis are termed as pre-emptive. Patients 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 and risk-adjustment for survival rate estimation

Unadjusted and risk-adjusted 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. In reality, recipients differ and a risk-adjusted rate that allows for these differences would give a more meaningful estimate of survival.

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.

Computing risk-adjusted survival rates

A risk-adjusted survival rate is an estimate of what the survival rate at a centre would have been if they had had the same mix of recipients as that seen nationally. The risk-adjusted rate therefore presents estimates in which differences in recipient mix across centres have been removed as much as possible. For that reason, it is valid to only compare centres using risk-adjusted rather than unadjusted rates, as differences among the latter can be attributed to differences in recipient mix.

Risk-adjusted survival estimates were obtained through indirect standardisation. A Cox Proportional Hazards model was used to determine the probability of survival for each recipient based on their individual risk factor values. The sum of these probabilities for all recipients at a centre gives the number, E, of recipients or grafts expected to survive at least one year or five years after transplant at that centre. The number of recipients who actually survive the given time period is given by O. The risk-adjusted estimate is then calculated by multiplying the ratio O/E by the overall unadjusted survival rate across all centres.

The risk-adjustment models used were based on results from previous studies that looked at factors affecting the survival rates of interest. The factors included in the models are shown in the table below.

Systematic component of variation

For a given individual who is a resident in a given English Strategic Health Authority (SHA), registration to the transplant list is modelled as a Bernoulli trial. At the whole area level, this becomes a Binomial process which can be approximated by a Poisson distribution when rare events are modelled. Transplant counts follow similar assumptions.

To allow for the possibility that, even after allowing for area-specific Poisson rates, area differences remain, introduce an additional multiplicative rate factor which varies from area to area. Postulate a non-parametric distribution for the multiplicative factor, with variance σ^2. If the factor is one for all areas, then area differences are fully explained by the area-specific Poisson rate. If the factor varies with a nonzero variance, σ^2, then we conclude that there are unexplained area differences.

The systematic component of variation (SCV; McPherson *et al., N Engl J Med* 1982, 307: 1310-4) is the moment estimator of σ^2. Under the null hypothesis of homogeneity across areas, the SCV would be zero. The SCV, therefore, allows us to detect variability across areas beyond that expected by chance; the larger the SCV, the greater the evidence of systematic variation across areas.

Risk adjustment factors

Adult waiting time

Median active waiting time	Age at registration, sex, ethnicity, highly sensitised, blood group, dialysis at registration, matchability score
Median total waiting time	Age at registration, sex, ethnicity, highly sensitised, blood group, matchability score

Adult transplants
First transplants from deceased donors

1 year graft survival	Donor age, donor type, donor cause of death, recipient age, waiting time to transplant, primary renal disease, HLA mismatch group, total preservation time*, recipient ethnicity
1 year patient survival	Donor age, recipient age, waiting time to transplant, primary renal disease, HLA mismatch group, total preservation time*
5 year graft survival	Graft year, donor age, donor type, donor cause of death, recipient age, waiting time to transplant, primary renal disease, HLA mismatch group, recipient ethnicity
5 year patient survival	Graft year, donor age, recipient age, waiting time to transplant, primary renal disease

Transplants from live donors

1 year graft survival	Donor age, recipient age, primary renal disease, number of HLA mismatches
1 year patient survival	Recipient age
5 year graft survival	Graft year, donor age, recipient age, primary renal disease, number of HLA mismatches
5 year patient survival	Recipient age, primary renal disease

Paediatric transplants

First transplants from deceased donors

1 year graft survival	Donor age, recipient age, HLA mismatch group, total preservation time*
1 year patient survival	Recipient age
5 year graft survival	Donor age, recipient age, HLA mismatch group
5 year patient survival	Recipient age

Transplants from live donors

1 year graft survival	Donor age, recipient age
1 year patient survival	Recipient age
5 year graft survival	Donor age, recipient age
5 year patient survival	Recipient age

*Time between retrieval of kidney from the donor and time of transplant in the recipient.

A3 Factors used in risk-adjusted models for patient survival from listing

Adult registrations	
First registrations for deceased donor transplant	
1, 5 and 10 year patient survival from listing	age, gender, ethnicity, blood group, BMI, cRF*>=85%, primary disease, dialysis status

* Calculated reaction frequency

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