

Liver Activity

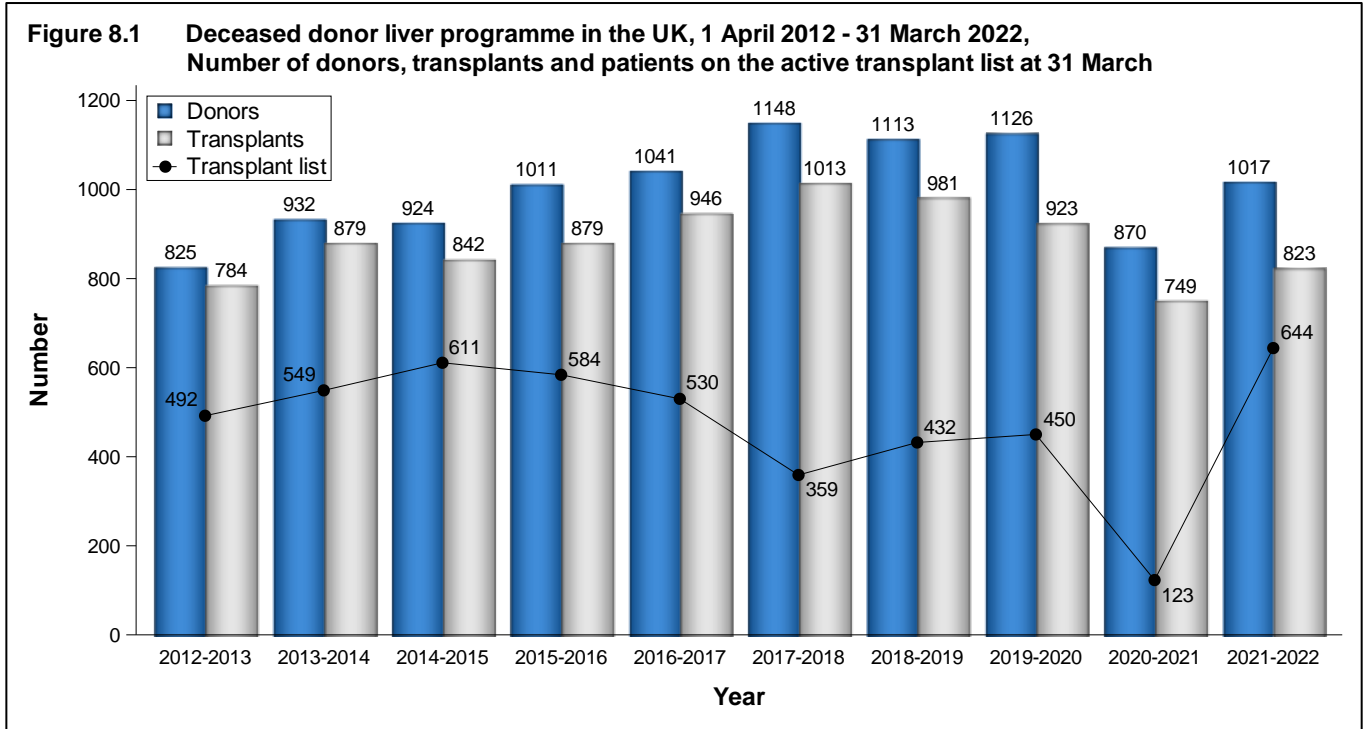
Key messages

- The number of patients on the active liver transplant list at 31 March 2022 was 644, an increase of 424% from 2021. This was mainly due to the reactivation of non clinically urgent patients following the height of the pandemic.
- The number of liver donors after brain death increased by 3% to 707, while transplants from donors after brain death increased by 1 to 629
- The number of liver donors after circulatory death increased by 70% to 310, while transplants from donors after circulatory death increased by 60% to 194

8.1 Overview

Note that the COVID-19 pandemic will have affected the number of offered, retrieved and transplanted organs in 2021-2022 as well as the number of patients active on the liver transplant list as at 31 March 2021.

The number of deceased liver donors and transplants in the UK in the last ten years is shown in **Figure 8.1**. There has been a decrease in the number of patients registered on the active liver transplant list between 2012/2013 and 2019/2020. However, this number has increased by 424% to 644 patients active in March 2022, higher than pre-pandemic levels. The numbers of donors and transplants has steadily increased over the last decade although both have slightly decreased over the last three years.



Intestinal transplants that used a liver are not included in the liver activity reported. However, any livers retrieved and used for such transplants are included in the liver donor activity. Liver only transplants in intestinal failure patients are included in the liver transplant activity. Intestinal transplant activity is reported in **Chapter 9**.

The number of deceased donors, deceased and living donor transplants, and patients on the active transplant list, by centre, is shown in **Table 8.1**. The numbers of liver donors reflect the number of organs retrieved from within each centre's allocation zone (by any retrieval team) rather than the number of retrievals made by that centre. In 2021-2022, 1017 organ donors donated their liver for transplant: 707 donors after brain death and 310 donors after circulatory death. There were 644 patients on the active transplant list at 31 March 2022, an increase of 424% from 31 March 2021.

Overall, the number of liver transplants (either whole liver or liver lobe transplants) from donors after brain death increased by 1 to 629, and donors after circulatory death increased by 60% to 194, compared with the previous financial year. Additionally, there were 25 living liver lobe donor transplants (NHS Group 1: 16 and Group 2: 9).

Patients are prioritised as super-urgent if they require a new liver as soon as possible due to rapid failure of the native organ. Other patients are referred to as elective. In 2021-2022, there were 79 deceased donor adult super-urgent transplants, representing 11% of all adult deceased transplants and 23 deceased donor paediatric super-urgent transplants, representing 30% of all paediatric deceased transplants.

Table 8.1 Deceased and living liver donors and transplants, 1 April 2021 - 31 March 2022 (2020-2021) and transplant list patients at 31 March 2022 (2021) in the UK, by age group and centre

Allocation zone/ transplant centre	Deceased donors ¹						Deceased transplants						Living donor transplants		Active transplant list	
	DBD		DCD		TOTAL		DBD		DCD		TOTAL					
Adult																
Birmingham	140	(129)	64	(38)	204	(167)	140	(132)	26	(11)	166	(143)	0	(0)	186	(23)
Cambridge	65	(51)	53	(25)	118	(76)	53	(50)	49	(37)	102	(87)	0	(0)	52	(10)
Edinburgh	84	(101)	32	(19)	116	(120)	42	(61)	18	(6)	60	(67)	0	(0)	38	(11)
King's College	176	(179)	75	(40)	251	(219)	142	(130)	46	(34)	188	(164)	0	(0)	166	(24)
Leeds	126	(121)	45	(28)	171	(149)	73	(81)	15	(16)	88	(97)	4	(1)	80	(7)
Newcastle	36	(34)	12	(5)	48	(39)	28	(32)	13	(2)	41	(34)	0	(0)	28	(6)
Royal Free	67	(64)	19	(14)	86	(78)	76	(67)	25	(12)	101	(79)	0	(0)	59	(9)
TOTAL	694	(679)	300	(169)	994	(848)	554	(554)⁶	192	(118)	746	(672)⁶	11^{2,7}	(4)^{3,8}	609	(90)
Paediatric																
Birmingham	9	(5)	0	(3)	9	(8)	28	(26)	1	(0)	29	(26)	0	(0)	3	(7)
Cambridge	1	(0)	0	(3)	1	(3)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Edinburgh	0	(1)	1	(0)	1	(1)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
King's College	3	(2)	6	(4)	9	(6)	28	(36)	1	(3)	29	(39)	8	(10)	19	(16)
Leeds	0	(1)	2	(2)	2	(3)	19	(12)	0	(0)	19	(12)	5	(8)	12	(10)
Newcastle	0	(0)	1	(0)	1	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(0)
Royal Free	0	(0)	0	(1)	0	(1)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
TOTAL	13	(9)	10	(13)	23	(22)	75	(74)	2	(3)	77	(77)	14^{4,9}	(18)⁵	35	(33)

¹ Includes donors whose livers were retrieved by other teams

² Includes 4 and 7 living liver lobe transplants in NHS Group 1 and Group 2 recipients, respectively

³ Includes 1 and 3 living liver lobe transplants in NHS Group 1 and Group 2 recipients, respectively

⁴ Includes 12 and 2 living liver lobe transplants in NHS Group 1 and Group 2 recipients, respectively

⁵ Includes 13 and 5 living liver lobe transplants in NHS Group 1 and Group 2 recipients, respectively

⁶ Includes 1 transplant at London Bridge involving a private patient

⁷ Includes 3 transplants at London Cromwell and 4 transplants at London Bridge involving private patients

⁸ Includes 3 transplants at London Bridge involving private patients

⁹ Includes 1 transplant at London Cromwell involving a private patient

8.2 Transplant list

During 2021-2022, 1,250 patients joined the liver transplant list. Outcomes for patients on the list at 1 April 2021 and those joining the list during the year are shown in **Table 8.2**. There have been 114 (9%) new registrations that were super-urgent.

Table 8.2 Liver transplant list and new registrations in the UK, 1 April 2021 - 31 March 2022						
Outcome of patient at 31 March 2022	Active and suspended patients at 1 April 2021		New registrations in 2021-2022¹		TOTAL	
	N	%	N	%	N	%
	Remained active/suspended	233	39	522	42	755
Transplanted	217	36	626	50	843	46
Removed ²	125	21	63	5	188	10
Died ³	24	4	39	3	63	3
TOTAL	599		1250		1849	

¹ Includes re-registrations for second or subsequent patients
² Includes 34 patients removed and re-registered at a different centre or on different pathway
³ Includes patients removed due to deteriorating condition

Table 8.3 shows the active transplant list in the UK at 31 March 2022 and 2021 by country/NHS region of patient's residence. At 31 March 2022, the overall rate was 9.6 pmp and ranged from 7.9 to 10.7 pmp across English NHS regions.

**Table 8.3 Active liver transplant list at 31 March
by Country/NHS region of patient residence**

Country/ NHS region of residence	Liver transplant list (pmp)			
	2022		2021	
North East and Yorkshire	71	(8.2)	11	(1.3)
North West	74	(10.4)	14	(2.0)
Midlands	114	(10.7)	28	(2.6)
East of England	52	(7.9)	6	(0.9)
London	79	(8.8)	14	(1.6)
South East	81	(9.1)	12	(1.3)
South West	60	(10.6)	9	(1.6)
England	531	(9.4)	94	(1.7)
Isle of Man	0	(0.0)	0	(0.0)
Channel Islands	0	(0.0)	1	(5.9)
Wales	37	(11.7)	5	(1.6)
Scotland	39	(7.1)	13	(2.4)
Northern Ireland	28	(14.7)	3	(1.6)
TOTAL¹	644	(9.6)	123	(1.8)

¹Includes patients in 2022 (2021) residing in: Unspecified UK 2 (0); Republic of Ireland 2 (5); Overseas 5 (2)

An indication of longer term outcomes for patients listed for a liver transplant is summarised in **Figure 8.2**. This shows the proportion of patients transplanted or still waiting six months, one year and two years after joining the transplant list. It also shows the proportion removed from the transplant list and those dying while on the transplant list (which includes those patients removed due to condition deteriorated). At one year post-registration, 71% of patients had received a liver transplant while 8% of patients had died whilst waiting or had been removed due to their condition deteriorating. 3% had been removed for other reasons such as the patient's condition improving, as a result of non-compliance or at the request of the patient or family.

Figure 8.2 Post-registration outcome for 1046 new elective liver only registrations made in the UK, 1 April 2019 - 31 March 2020

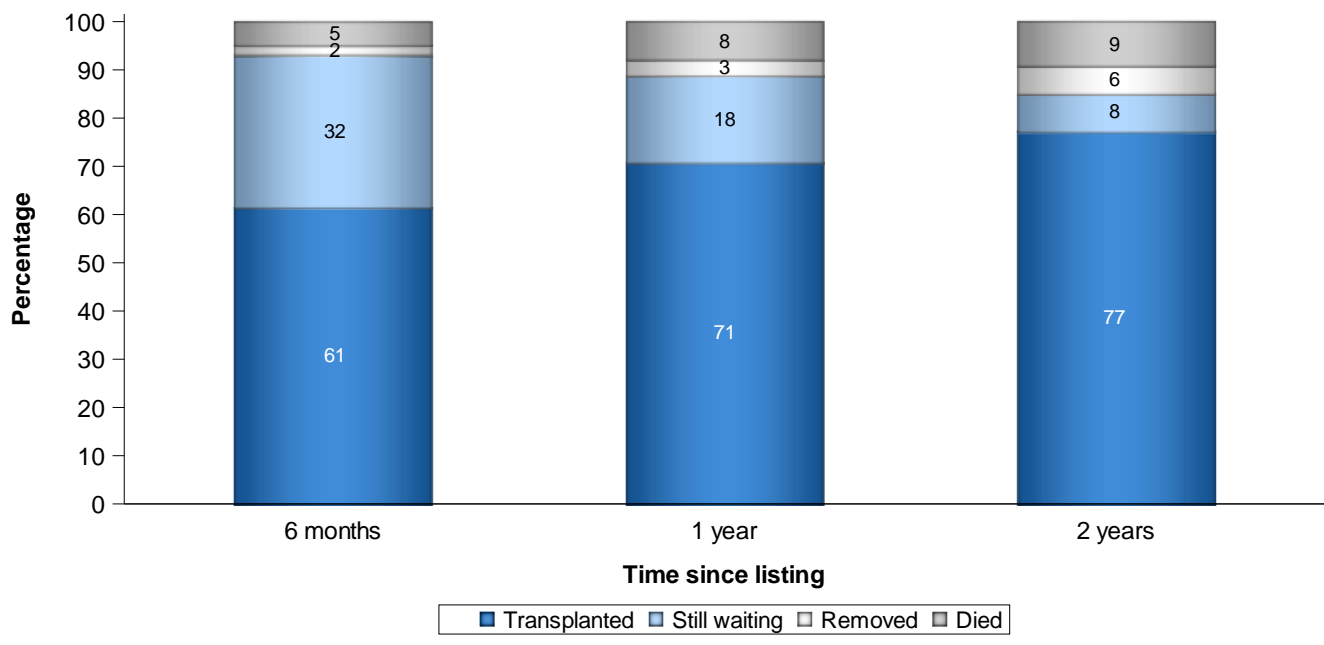


Table 8.4 and **Table 8.5** show the median waiting time to liver transplant for adult and paediatric elective registrations, separately, including a breakdown by blood group and ethnicity for adult elective registrations only. On average, adult patients wait 84 days for a transplant while paediatric patients wait an average of 66 days. Note that these waiting times are not adjusted for other relevant factors which may be influential and differ across blood or ethnic groups.

Table 8.4 Median waiting time to liver transplant in the UK, for patients registered 1 April 2019 - 31 March 2021

Blood group	Number of patients registered	Waiting time (days)	
		Median	95% Confidence interval
Adult			
O	805	123	99 - 147
A	698	62	50 - 74
B	207	103	69 - 137
AB	83	27	16 - 38
TOTAL	1793	84	74 - 94
Paediatric	142	66	48 - 84

Table 8.5 Median waiting time to liver transplant in the UK, for patients registered 1 April 2019 - 31 March 2021

Ethnicity	Number of patients registered	Waiting time (days)	
		Median	95% Confidence interval
Adult			
White	1519	80	69 - 91
Asian	143	101	62 - 140
Black	45	126	57 - 195
Other	43	90	3 - 177
TOTAL	1793¹	84	74 - 94
Paediatric	142	66	48 - 84

¹ Includes 43 patients with unknown ethnicity

8.3 Donor and organ supply

Of the 1,397 organ donors, 1017 (73%) donated their liver and 801 (79%) of these donated livers were used; see **Table 8.6**. Of livers retrieved from donors after brain death and donors after circulatory death, 86% and 63% were transplanted, respectively. Segments from one liver can be used in more than one transplant, see **Table 8.9**.

Table 8.6 Deceased liver donation and retrieval in the UK, 1 April 2021 - 31 March 2022, by allocation zone

Allocation zone	Number of donors						Number of livers retrieved (used)					
	Solid organ			Liver			DBD			DCD		
	DBD	DCD	TOTAL	DBD	DCD	TOTAL	DBD	DCD	TOTAL	DBD	DCD	TOTAL
Birmingham	161	125	286	149	64	213	149	(128)	64	(42)	213	(170)
Cambridge	72	89	161	66	53	119	66	(59)	53	(39)	119	(98)
Edinburgh	94	60	154	84	33	117	84	(73)	33	(20)	117	(93)
King's College	196	151	347	179	81	260	179	(158)	81	(43)	260	(201)
Leeds	145	113	258	126	47	173	126	(100)	47	(28)	173	(128)
Newcastle	40	30	70	36	13	49	36	(29)	13	(8)	49	(37)
Royal Free	77	44	121	67	19	86	67	(60)	19	(14)	86	(74)
TOTAL	785	612	1397	707	310	1017	707	(607)	310	(194)	1017	(801)

The rates per million population (pmp) for liver donors are shown in **Table 8.7** by donor country/NHS region of residence. No adjustments have been made for potential demographic differences in populations. The overall deceased liver donor rate was 15.2 pmp in 2021-2022 and ranged from 11.2 pmp to 17.9 pmp across English NHS regions.

Table 8.7 Liver donation rates for deceased donors in the UK, 1 April 2021 - 31 March 2022, by Country/ NHS region						
Country/ NHS region of residence	DBD		Liver donors (pmp) DCD		TOTAL	
	North East and Yorkshire	98	(11.3)	33	(3.8)	131
North West	56	(7.9)	30	(4.2)	86	(12.1)
Midlands	97	(9.1)	53	(5.0)	150	(14.1)
East of England	61	(9.3)	38	(5.8)	99	(15.1)
London	80	(8.9)	21	(2.3)	101	(11.2)
South East	105	(11.8)	55	(6.2)	160	(17.9)
South West	67	(11.8)	28	(4.9)	95	(16.8)
England	564	(10.0)	258	(4.6)	822	(14.5)
Isle of Man	1	(12.5)	0	(0.0)	1	(12.5)
Channel Islands	3	(17.6)	2	(11.8)	5	(29.4)
Wales	40	(12.6)	5	(1.6)	45	(14.2)
Scotland	42	(7.7)	21	(3.8)	63	(11.5)
Northern Ireland	33	(17.4)	6	(3.2)	39	(20.5)
TOTAL¹	707	(10.5)	310	(4.6)	1017	(15.2)

¹ Includes 42 donors (24 DBD and 18 DCD) with unknown UK postcode

8.4 Transplants

The number of liver transplants by recipient country/NHS region of residence are shown in **Table 8.8**. No adjustments have been made for potential demographic differences in populations. The deceased donor transplant rate ranged from 10.2 to 13.6 pmp across English NHS regions and overall was 12.1 pmp.

Table 8.8 Liver transplant rates per million population (pmp), in the UK, 1 April 2021 - 31 March 2022, by country and English NHS region								
Country/ NHS region of residence	DBD		DCD		TOTAL		Living	
	N	(pmp)	N	(pmp)	N	(pmp)	N	(pmp)
North East and Yorkshire	70	(8.1)	18	(2.1)	88	(10.2)	2	(0.2)
North West	65	(9.2)	11	(1.6)	76	(10.7)	5	(0.7)
Midlands	115	(10.8)	25	(2.3)	140	(13.1)	0	(0.0)
East of England	53	(8.1)	34	(5.2)	87	(13.3)	2	(0.3)
London	91	(10.1)	31	(3.4)	122	(13.6)	3	(0.3)
South East	74	(8.3)	30	(3.4)	104	(11.6)	1	(0.1)
South West	57	(10.1)	14	(2.5)	71	(12.5)	1	(0.2)
England	525	(9.3)	163	(2.9)	688	(12.2)	14	(0.2)
Isle of Man	1	(12.5)	0	(0.0)	1	(12.5)	0	(0.0)
Channel Islands	1	(5.9)	0	(0.0)	1	(5.9)	0	(0.0)
Wales	22	(6.9)	6	(1.9)	28	(8.8)	0	(0.0)
Scotland	51	(9.3)	18	(3.3)	69	(12.6)	0	(0.0)
Northern Ireland	19	(10.0)	5	(2.6)	24	(12.6)	0	(0.0)
TOTAL^{1,2}	621	(9.3)	192	(2.9)	813	(12.1)	15	(0.2)

¹ Excludes 20 recipients who reside outside the UK (8 DBD, 2 DCD, 10 Living)
² Includes 3 (2 DBD and 1 living) recipients with an unknown UK postcode

The number of whole, reduced and split liver transplants by urgency status of the transplant (elective, super-urgent) in 2021-2022 is shown in **Table 8.9**. The term 'reduced' is used when only one lobe of the liver is transplanted and the term 'split' applies when both lobes of the liver are transplanted into two different recipients.

Overall, the number of deceased donor liver transplants increased by 10% in 2021-2022. There were 823 deceased donor liver transplants performed in 2021-2022: 733 whole liver, including 7 liver and kidney, 2 liver and heart and 1 liver and lung; 66 split liver, and 24 deceased liver lobe. Split liver transplants accounted for 73% of liver lobe transplant activity.

Table 8.9 Deceased liver transplants performed in the UK, 1 April 2020 - 31 March 2022

Transplant centre	2020-2021						2021-2022						TOTAL			
	Whole liver		Reduced liver		Split liver		Whole liver		Reduced liver		Split liver					
	E	SU	E	SU	E	SU	E	SU	E	SU	E	SU	E	SU		
Birmingham	123	13	3	1	26	3	152	17	155	15	3	2	17	3	175	20
Cambridge	72	12	0	0	3	0	75	12	91	7	0	0	4	0	95	7
Edinburgh	63	4	0	0	0	0	63	4	58	2	0	0	0	0	58	2
King's College	144	12	12	7	26	2	182	21	153	29	6	6	19	4	178	39
Leeds	85	10	4	0	9	1	98	11	70	15	6	2	13	1	89	18
Newcastle	30	4	0	0	0	0	30	4	38	3	0	0	0	0	38	3
Royal Free	68	7	0	0	4	0	72	7	85	11	0	0	5	0	90	11
TOTAL	585¹	62	19	8	68	6	672¹	76	650	82	15	10	58	8	723	100

E=Elective, SU=Super-urgent

Birmingham, King's College and Leeds transplant paediatric patients

¹ Includes 1 transplant at London Bridge involving a private patient

The length of time that elapses between a liver being removed from the donor to its transplantation into the recipient is called the cold ischaemia time (CIT). Generally, the shorter this time, the more likely the liver is to work immediately and the better the long-term outcome. In 2021-2022, the median CIT for a DBD donor whole liver only transplant was 8.6 hours (Inter-Quartile (IQ) range 7.3 – 10.1) and for a DCD donor whole liver only transplant was 8.0 hours (IQ range 6.6 – 10.4) and overall was 8.5 hours (IQ range 7.0 – 10.1). Please note some of the reported CITs may include the use of donor organ maintenance systems, in which cases the CIT reported will be an overestimate of the true cold ischaemia time.

At 31 March 2022 there were approximately 11,400 recipients with a functioning liver transplant (or multi-organ including the liver) being followed-up as reported to the UK Transplant Registry.

8.5 Demographic characteristics

The age group, sex, ethnicity and blood group of liver donors, transplant recipients and transplant list patients are shown in **Table 8.10** along with the liver graft number for transplant recipients and patients active on the transplant list.

Table 8.10 Demographic characteristics of deceased liver donors and transplant recipients, 1 April 2021 - 31 March 2022, and transplant list patients at 31 March							
		Donors		Transplant recipients		Active transplant list patients	
		N	(%)	N	(%)	N	(%)
Age	0-17	34	(3)	85	(10)	37	(6)
	18-34	161	(16)	79	(10)	86	(13)
	35-49	233	(23)	179	(22)	176	(27)
	50-59	243	(24)	228	(28)	188	(29)
	60-69	238	(23)	234	(28)	148	(23)
	70+	108	(11)	18	(2)	9	(1)
	mean (SD)	50	(17)	48	(18)	47	(16)
Sex	Male	557	(55)	531	(65)	386	(60)
	Female	460	(45)	292	(35)	258	(40)
Ethnicity	White	908	(91)	662	(82)	523	(84)
	Asian	33	(3)	99	(12)	66	(11)
	Black	18	(2)	28	(3)	19	(3)
	Other	35	(4)	14	(2)	18	(3)
	Unknown	23	-	20	-	18	-
Blood group	O	476	(47)	320	(39)	346	(54)
	A	419	(41)	363	(44)	212	(33)
	B	95	(9)	100	(12)	84	(13)
	AB	26	(3)	40	(5)	2	(0)
	Unknown ¹	1	-	0	-	0	-
Graft number	First graft	-	-	769	(93)	574	(89)
	Re-graft	-	-	54	(7)	70	(11)
TOTAL		1017	(100)	823	(100)	644	(100)

¹ Includes 1 donor with indeterminate blood group