



Blood and Transplant

**INTERIM REPORT ON
LIVER TRANSPLANTATION**

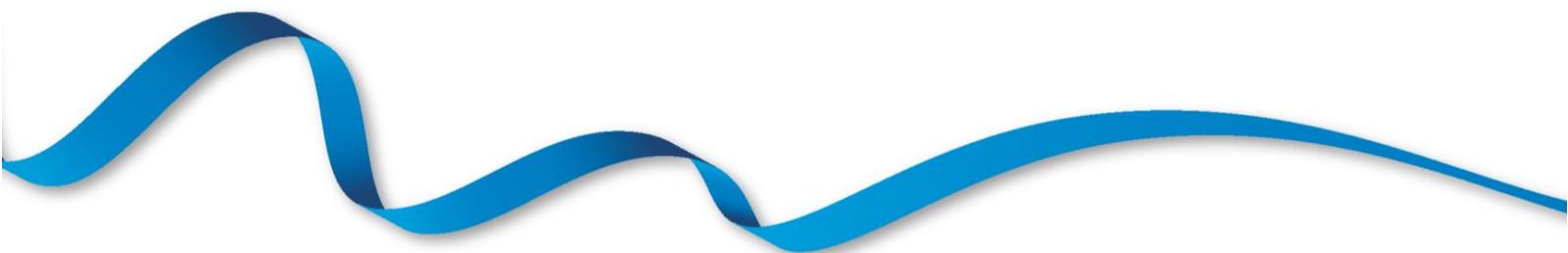
**REPORT FOR 2021/2022
(1 OCTOBER 2020 – 30 SEPTEMBER 2021)**

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Executive Summary



This interim report presents key figures about liver transplantation in the UK for the period from 1 October 2020 to 30 September 2021. The report presents information on the number of transplants, [patient survival](#) and [graft function](#) after liver transplantation; both on a national and centre-specific basis. A full report is produced every year and is published in the summer to include the latest full financial year.

The National Liver Offering Scheme was introduced on 20th March 2018 for offering livers for donors after brain death (DBD).

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

Key points

- There were 789 **liver transplants** performed in the UK between 1 October 2020 and 30 September 2021. Of these, 679 (86%) were deceased donor first liver only transplants (including liver only transplants due to intestinal failure) and 25 (3%) were living donor first liver only transplants. The remainder were repeated transplants (75) or multi-organ transplants (10).
- Of the 679 **deceased donor first liver only transplants** in the time period, 616 (91%) were in adult recipients and 63 (9%) were in paediatric recipients. The approximate proportion of elective and super-urgent transplants in each of these age groups was 91% to 9% and 86% to 14%, respectively.
- Of the 25 **living donor first liver only (including domino) transplants** in the time period, 12 (48%) were in adult recipients and 13 (52%) were in paediatric recipients. All adult recipients were elective. Of paediatric recipients, 12 (92%) were elective and 1 (8%) was super-urgent.
- The unadjusted national **rates of patient survival** 90 days after first liver transplantation from deceased donors were 97.1% for adult elective and 94% for adult super-urgent registrations. Those for paediatric elective and super-urgent registrations were 100% and 87.5%, respectively, although this should be regarded as guidance only due to the relatively small number of data points.
- The unadjusted national **rates of graft function** 90 days after first liver transplantation from deceased donors were 94.5% for adult elective and 94% for adult super-urgent patient registrations. The rates for paediatric elective and super-urgent patient registrations were 97.9% and 87.5% respectively but note the caveat above.

- **Table 1.1** provides a summary of liver transplant activity in the UK for 1 October 2020 to 30 September 2021. For comparison, transplant activity figures are also provided for 1 October 2019 to 30 September 2020.

Table 1.1 Number of first liver only transplants in the UK, by recipient age group and urgency status and by donor type, for 2019/20¹ and for 2020/21²						
	2019/20¹			2020/21²		
	Elective	Super-urgent	Total	Elective	Super-urgent	Total
Deceased donor	671	78	749	617	62	679
Adult patient	611	59	670	563	53	616
Paediatric patient	60	19	79	54	9	63
Living donor	23	0	23	24	1	25
Adult patient	5	0	5	12	0	12
Paediatric patient	18	0	18	12	1	13
TOTAL	694	78	772	641	63	704

¹ 1 October 2019 – 30 September 2020
² 1 October 2020 – 30 September 2021

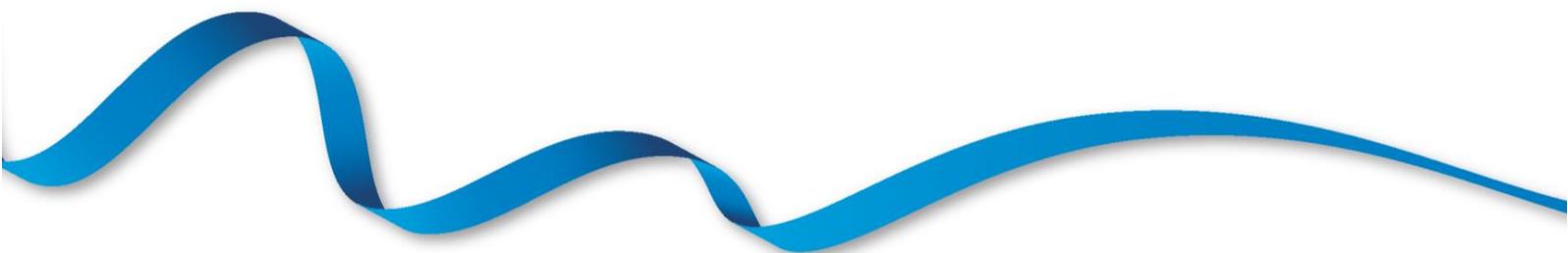
- **Table 1.2** provides a summary of unadjusted 90 days patient survival (%) and graft function (%) for deceased donor first liver only transplants for 1 October 2020 to 30 September 2021. For comparison, unadjusted 90 days patient survival (%) and graft function (%) are also provided for 1 October 2019 to 30 September 2020.

Table 1.2 Unadjusted 90-day patient survival (%) and graft function (%) for deceased donor first liver only transplants, for 2019/20¹ and for 2020/21²				
	2019/20¹		2020/21²	
	Elective	Super-urgent	Elective	Super-urgent
90 days patient survival				
Adult patient	98%	96%	97.1%	94%
Paediatric patient ³	94%	93%	100%	-
90 days graft function				
Adult patient	95%	92%	94.5%	94%
Paediatric patient ³	90%	93%	97.9%	-

¹ 1 October 2019 – 30 September 2020
² 1 October 2020 – 30 September 2021
³ Survival rates for cohorts with less than 10 patients are not presented due to small numbers

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Introduction



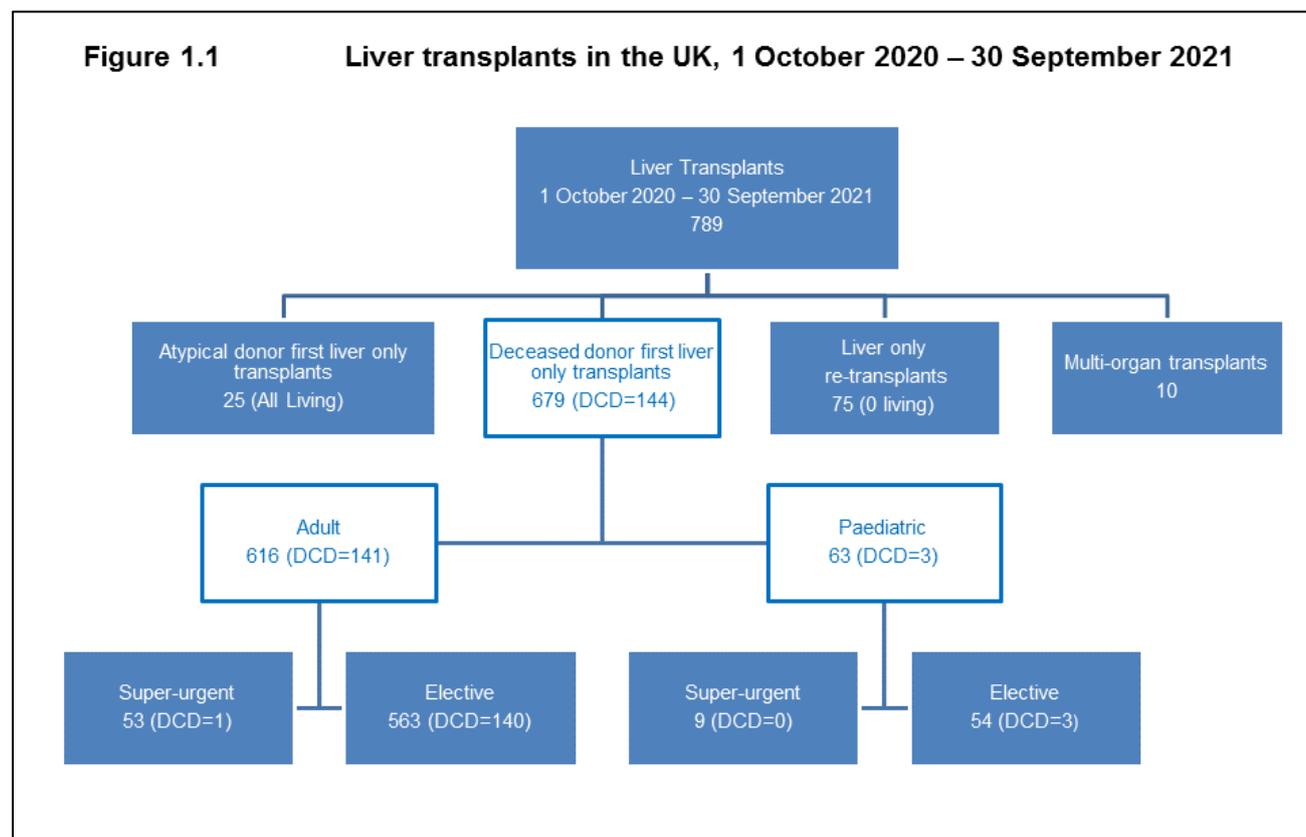
This interim report presents information on liver transplant activity, [patient survival](#) and [graft function](#) after transplantation between 1 October 2020 and 30 September 2021, for all seven centres performing liver transplantation in the UK. Data were obtained from the UK Transplant Registry, at NHS Blood & Transplant, that holds information relating to donors, recipients and outcomes for all liver transplants performed in the UK.

There are three paediatric transplant centres in the UK; Children’s Hospital (Birmingham), St James’s University Hospital (Leeds) and King’s College Hospital (London). Leeds and King’s College are adult transplant centres too, in addition to Queen Elizabeth Hospital (Birmingham), Addenbrooke’s Hospital (Cambridge), Royal Infirmary (Edinburgh), Royal Free Hospital (London) and Freeman Hospital (Newcastle).

Results in this report are described separately for adult (aged ≥17 years) and paediatric recipients (aged <17 years), and according to the urgency of the transplantation ([elective](#) and [super-urgent](#)). *Note:* Super-urgent registration categories were changed on 17 June 2015 to account for development in treatment of patients with acute liver failure.

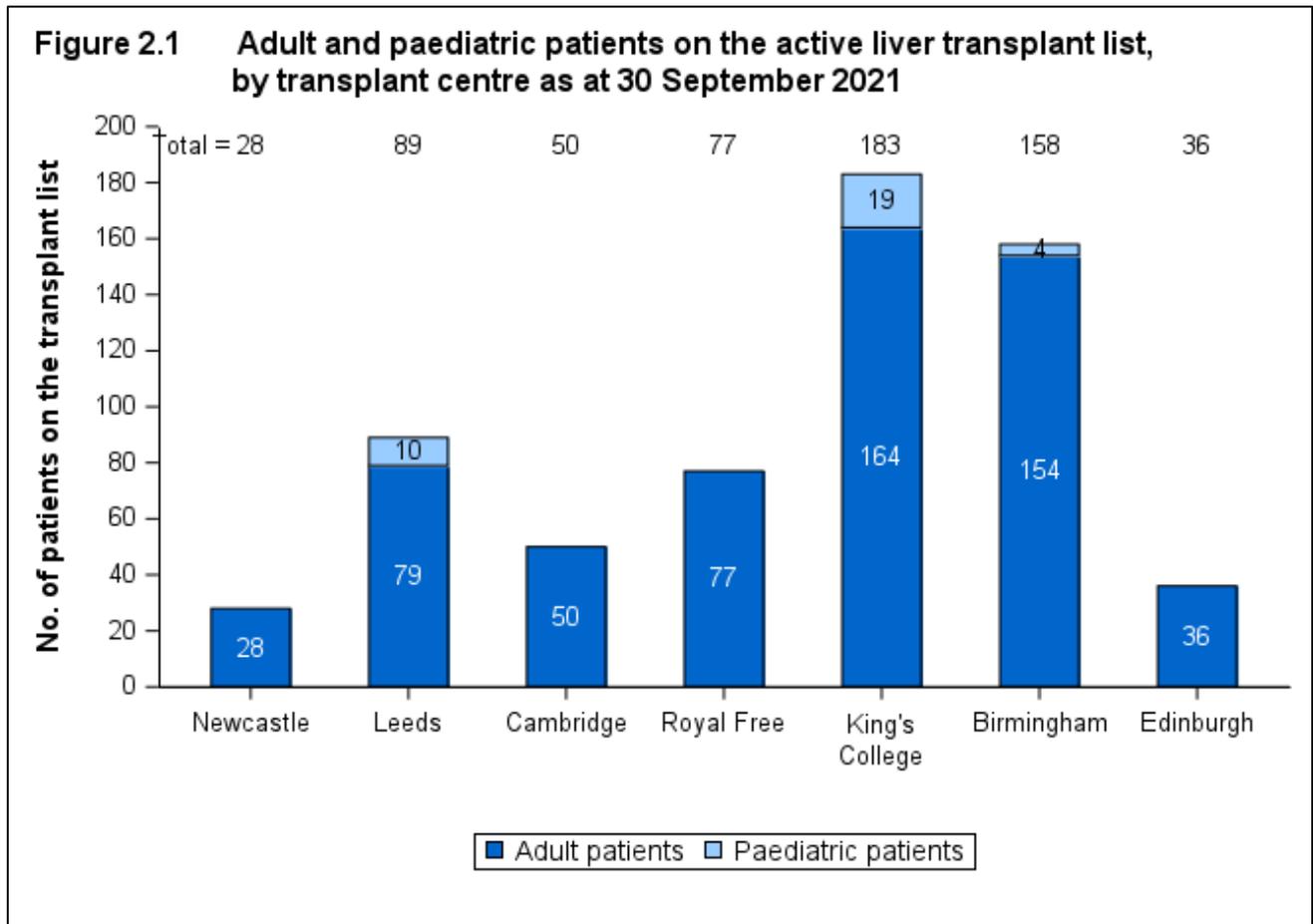
[Data](#) sources and [methods](#) are described in full detail in the **Appendix**.

Figure 1.1 details the 789 liver transplants performed in the UK in the reported time period. Of these, 679 (86%) were deceased donor first liver only transplants: 616 (91%) in adult and 63 (9%) in paediatric patients. Of the 679 transplants, 62 (9%) were super-urgent and 617 (91%) were elective transplants.



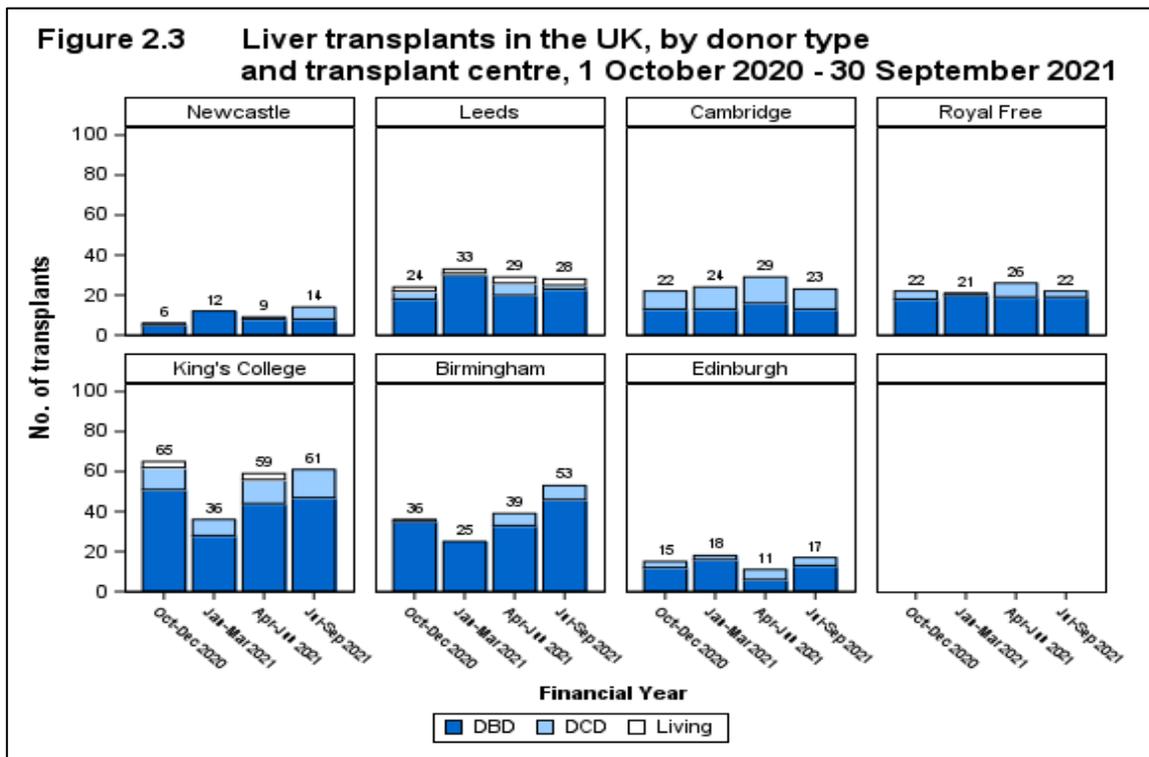
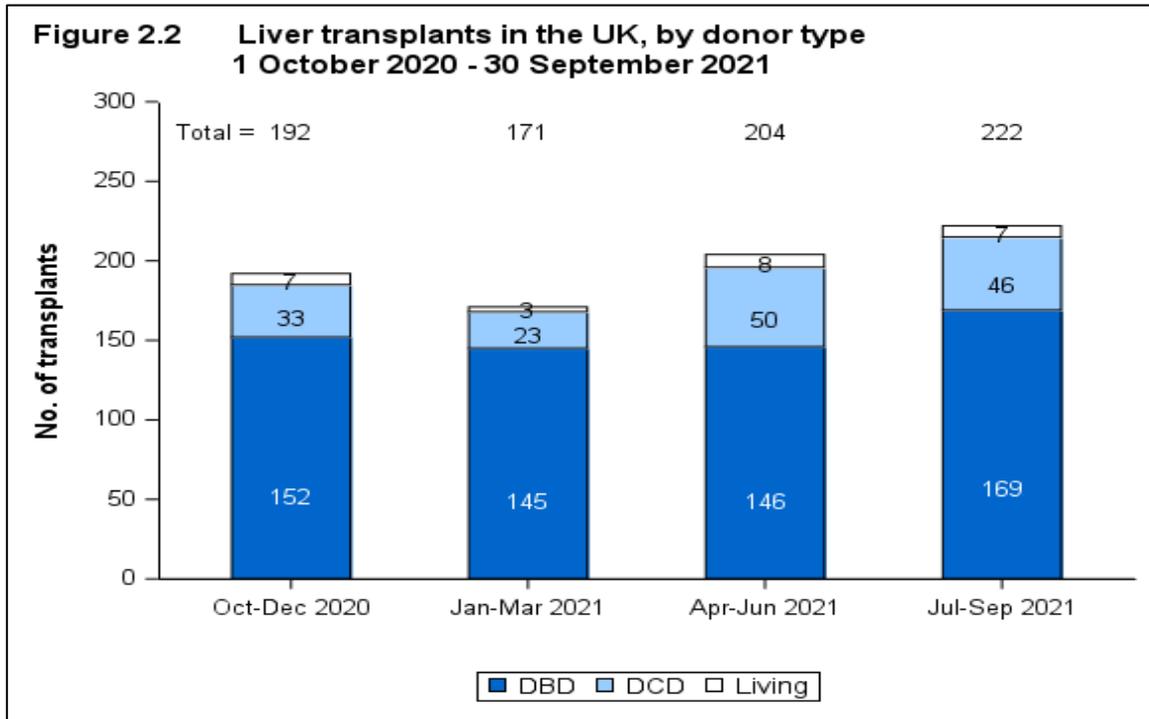
2.1 Transplant list

Figure 2.1 shows the number of adult and paediatric patients on the active liver transplant list as at 30 September 2021, by transplant centre. In total, there were 621 patients on the transplant list; 588 were adults and 33 were paediatric patients. King's College had the largest share of the transplant list (29% each) and Newcastle the smallest (5%). This figure includes [elective](#) and [super-urgent](#) registrations. Compared with numbers as at 30 September 2020, there has been a 37% increase (from 453 registrations to 621 registrations) on the active liver transplant list.



2.2 Transplant activity

During the one-year study period, 789 liver transplants were reported. Activity by quarter is shown in **Figure 2.2**, by [type of donor](#) while **Figure 2.3** shows the equivalent information by transplant centre. **Figure 2.3** excludes six elective living donor transplants and one DBD donor transplant performed at the London Bridge and three elective living donor transplants performed at Cromwell.



Adult Liver Transplantation



3.1 Transplant activity

The number of adult first liver only transplants performed in the study period is shown in **Figure 3.1**, by quarter and donor type. Of the 628 transplants of this type, 616 (98%) were deceased donor transplants and, of these, 563 (91%) were [elective](#) and 53 (9%) were [super-urgent](#) transplants. Of the remaining 12 transplants, all were elective living donor transplants.

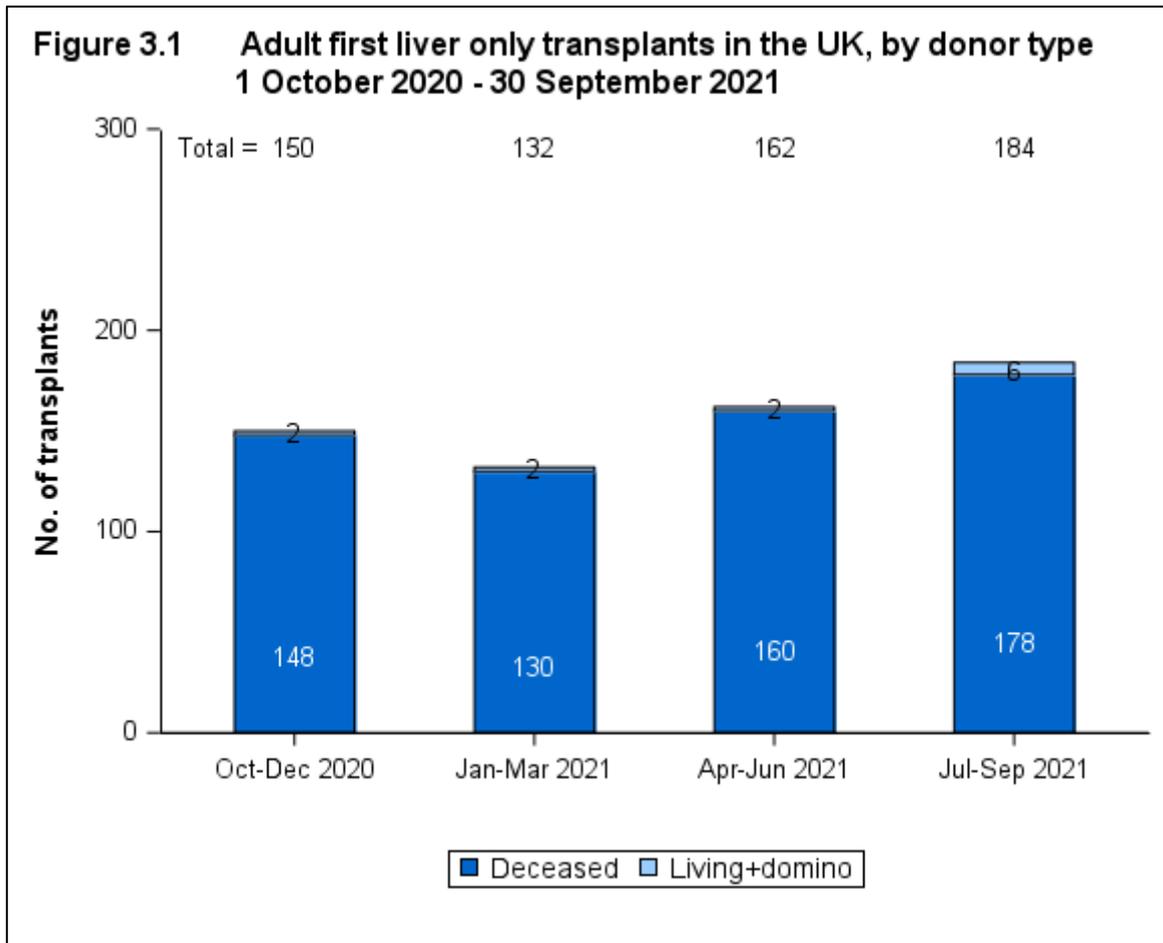


Table 3.1 shows the total number of adult transplants performed in the reported time period, including atypical donor, [multi-organ](#) and re-transplants. It also shows the number of adult deceased and living (including domino) donor first liver only transplants, by transplant centre.

Table 3.1 Number of UK adult liver transplants between, 1 October 2020 and 30 September 2021, by transplant centre and urgency status						
Centre	Total number of transplants		Deceased donor first liver only transplants		Living donor first liver only transplants	
	Elective	Super-urgent	Elective	Super-urgent	Elective	Super-urgent
Newcastle	36	5	33	5	0	0
Leeds	82	13	73	11	4	0
Cambridge	90	8	78	7	0	0
Royal Free	83	8	71	3	0	0
King's College	165	22	153	17	0	0
Birmingham	113	12	97	9	0	0
Edinburgh	60	1	58	1	0	0
TOTAL	638^{1,2}	69	563	53	12¹	0

¹Includes 6 living donor first transplants at London Bridge and 2 at London Cromwell
²Includes 1 DBD donor re-transplant at London Bridge

Figure 3.2 shows adult elective deceased donor first liver only transplants, by quarter and transplant centre.

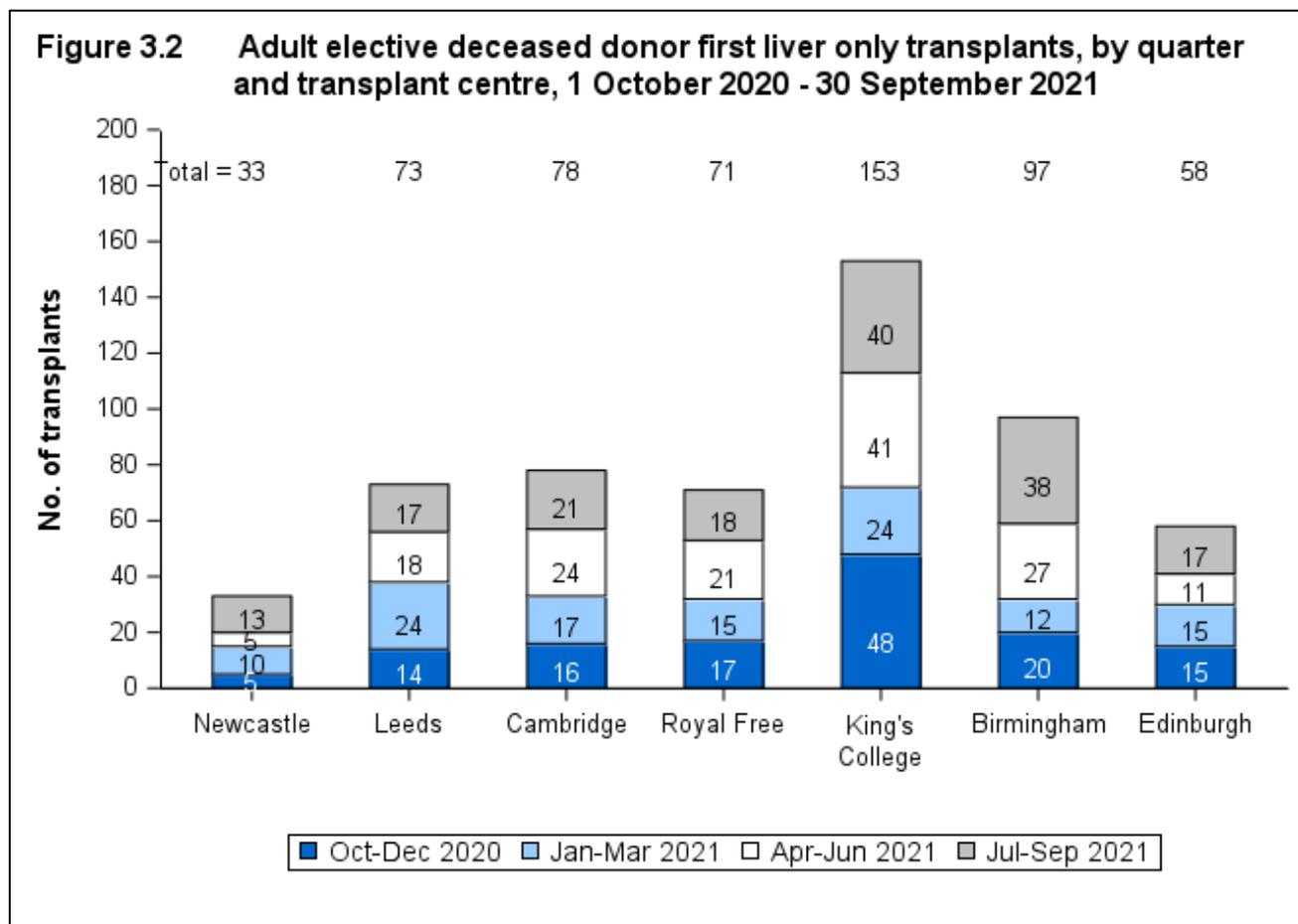
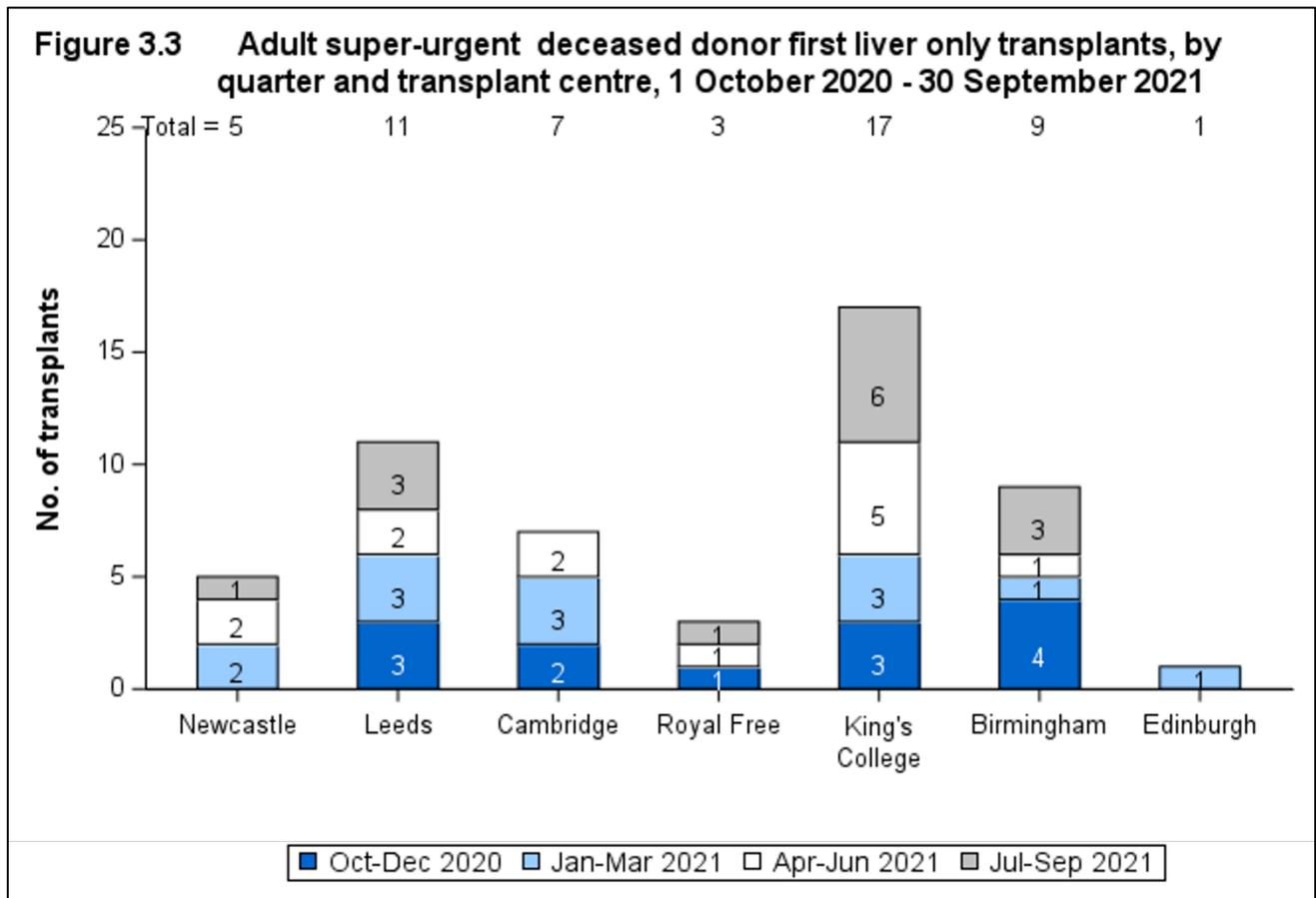


Figure 3.3 shows adult super-urgent deceased donor first liver only transplants, by quarter and transplant centre.



The demographic characteristics of 563 adult [elective](#) first-time transplant recipients of a deceased donor liver in the time period are shown, by centre and overall, in **Table 3.2**. 70% of these recipients were male and the median recipient age and BMI was 56 years and 28 kg/m² respectively. The most common indication for transplantation was alcoholic liver disease (30% of cases) followed cancer (16% of cases). For some characteristics, due to rounding, percentages may not add up to 100.

Table 3.2 Demographic characteristics of adult elective deceased donor first liver only transplant recipients, 1 October 2020 and 30 September 2021

		Birmingham	Cambridge	Edinburgh	King's College	Leeds	Newcastle	Royal Free	TOTAL
		N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Number		97	78	58	153	73	33	71	563 (100)
Recipient sex	Male	69 (71)	56 (72)	33 (57)	94 (61)	58 (79)	26 (79)	56 (79)	392 (70)
	Female	28 (29)	22 (28)	25 (43)	59 (39)	15 (21)	7 (21)	15 (21)	171 (30)
Recipient ethnicity	White	78 (80)	76 (97)	55 (95)	120 (78)	68 (93)	28 (85)	54 (76)	479 (85)
	Asian	12 (12)	1 (1)	3 (5)	19 (12)	3 (4)	3 (9)	12 (17)	53 (9)
	Black	2 (2)	1 (1)	0	8 (5)	0	1 (3)	2 (3)	14 (3)
	Other	0	0	0	6 (4)	2 (3)	1 (3)	3 (4)	12 (2)
	Not reported	5 (5)	0	0	0	0	0	0	5 (1)
Indication	Cancer	6 (6)	18 (23)	7 (12)	22 (14)	13 (18)	6 (18)	15 (21)	87 (16)
	Hepatitis C	4 (4)	1 (1)	0	5 (3)	3 (4)	0	2 (3)	15 (3)
	Alcoholic liver disease	31 (32)	15 (19)	19 (33)	52 (34)	24 (33)	10 (30)	17 (24)	168 (30)
	Hepatitis B	1 (1)	0	0	4 (3)	1 (1)	2 (6)	1 (1)	9 (2)
	Primary sclerosing cholangitis	9 (9)	11 (14)	10 (17)	18 (12)	11 (15)	4 (12)	14 (20)	77 (14)
	Primary biliary cholangitis	10 (10)	7 (9)	9 (16)	11 (7)	2 (3)	2 (6)	3 (4)	44 (8)
	Autoimmune and cryptogenic disease	10 (10)	3 (4)	3 (5)	15 (10)	3 (4)	3 (9)	5 (7)	42 (8)
	Metabolic	16 (16)	19 (24)	8 (14)	16 (10)	13 (18)	3 (9)	9 (13)	84 (15)
	Other	10 (10)	4 (5)	2 (3)	10 (7)	3 (4)	3 (9)	5 (7)	37 (7)
	Recipient HCV status	Negative	89 (92)	72 (92)	53 (91)	140 (92)	62 (85)	33 (100)	61 (86)
Positive		7 (7)	6 (8)	3 (5)	12 (8)	3 (4)	0	6 (8)	37 (7)
Not reported		1 (1)	0	2 (3)	1 (1)	8 (11)	0	3 (4)	15 (3)
Pre-transplant status	Out-patient	85 (88)	72 (92)	52 (90)	135 (88)	63 (86)	32 (97)	66 (93)	505 (90)
	In-patient	12 (12)	6 (8)	5 (9)	17 (11)	7 (10)	1 (3)	5 (7)	53 (9)
	Not reported	0	0	1 (2)	1 (1)	3 (4)	0	0	5 (1)
Recipient age (years)	Median (IQR)	57 (46,63)	59 (49,63)	58 (48,64)	55 (46,61)	56 (48,62)	57 (48,63)	54 (48,62)	56 (48,63)
BMI kg/m2	Median (IQR)	28 (25,33)	29 (26,33)	28 (24,30)	27 (23,30)	29 (25,32)	28 (25,32)	27 (24,30)	28 (24,32)
Cold Ischaemia Time (hrs)	Median (IQR)	7 (6,9)	12 (9,16)	10 (8,11)	9 (7,10)	9 (7,10)	10 (9,11)	9 (8,11)	9 (7,11)
	Not reported	0	0	3	0	3	0	1	7

3.2 Elective patient survival and graft function

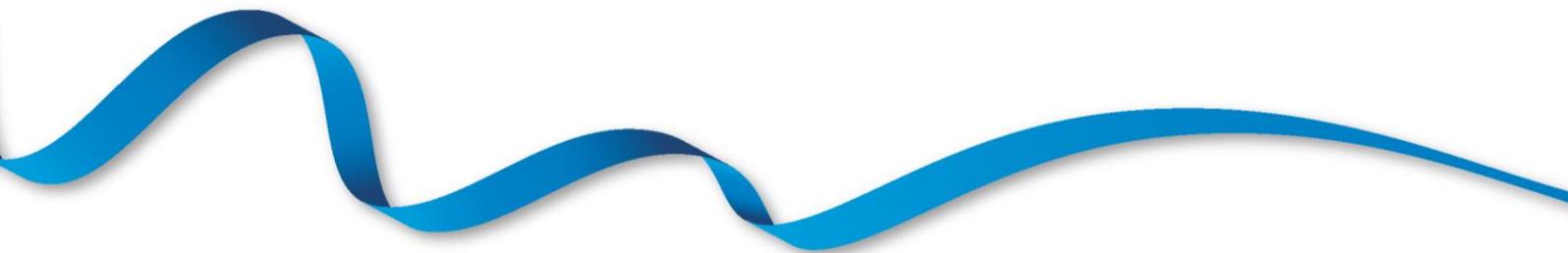
Table 3.3 shows the 90-day unadjusted [patient survival](#) and [graft function](#) for adult elective deceased donor first liver only transplants in the reported time period, overall and by centre. Survival information was known for 517 (92%) of the 563 adult elective deceased donor first liver only transplants performed in this time period. Ninety-seven percent of patients were alive 90 days post-transplant and the graft function rate at 90 days was 94.5%.

Table 3.3 Unadjusted 90-day patient survival (%) and graft function (%) for adult elective deceased donor first liver only transplants between, 1 October 2020 and 30 September 2021, by transplant centre					
Centre	Number of transplants	90-day survival (95% CI)		90-day graft function (95% CI)	
Newcastle	27	100.0	-	100.0	-
Leeds	66	92.4	(82.6-96.8)	88.9	(78.1-94.6)
Cambridge	76	100.0	-	100.0	-
Royal Free	47	95.7	(83.9-98.9)	87.2	(73.8-94.1)
King's College	150	98.7	(94.8-99.7)	96.0	(91.3-98.2)
Birmingham	96	96.9	(90.6-99.0)	93.7	(86.6-97.1)
Edinburgh	55	94.4	(83.8-98.2)	94.4	(83.8-98.2)
TOTAL	517	97.1	(95.2-98.2)	94.5	(92.2-96.2)

3.3 Super-urgent patient survival and graft function

One of the 53 adult super-urgent deceased donor first liver transplants in the period of study were auxiliary. Ninety-day survival was known for 50 of the remaining 52 non-auxiliary transplants. Forty-seven of the 50 patients with known 90 day survival survived the first ninety days and the resulting unadjusted national 90-day patient survival and graft function rates (95% confidence intervals) for adult super-urgent transplants were 94% (82.5-98.0) for both. Survival rates for individual centres are not presented due to all but two centres performing less than 10 adult super-urgent deceased donor first liver only transplants during the time period.

Paediatric Liver Transplantation



4.1 Transplant activity

The number of all paediatric first liver only transplants in the reported period is shown in **Figure 4.1**, by quarter. Of the 76 transplants in total for paediatric patients, 66 were [elective](#) and 10 were [super-urgent](#) transplants. There were 63 deceased donor transplants (three DCD) and 13 living donor transplants.

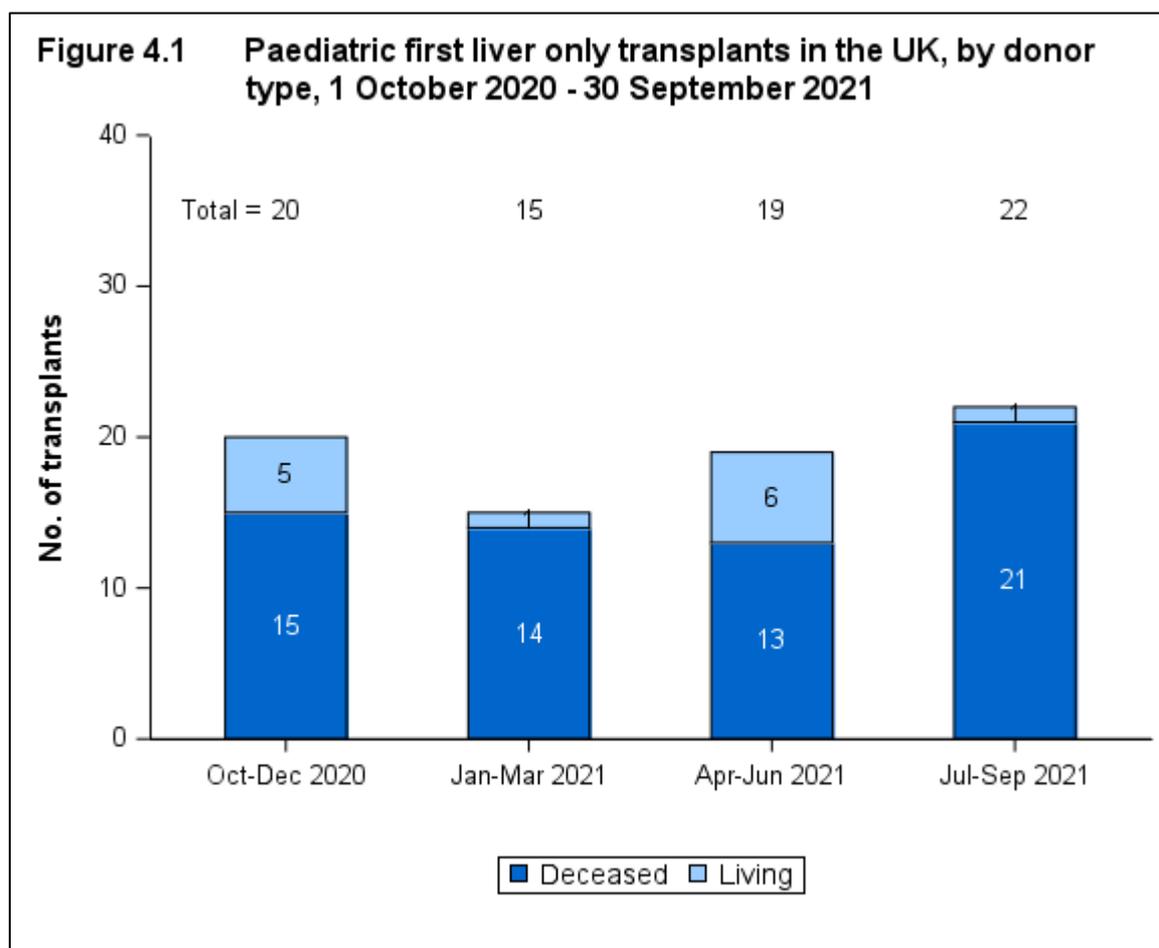


Table 4.1 shows the total number of paediatric transplants in the reported time period, including atypical donor, [multi-organ](#) and re-transplants. It also shows the number of paediatric deceased and living (including domino) donor first liver only transplants, by transplant centre.

Table 4.1 Number of paediatric transplants between 1 October 2020 and 30 September 2021, by transplant centre and urgency status

Centre	Total number of transplants		Deceased donor first liver only transplants		Living donor first liver only transplants	
	Elective	Super-urgent	Elective	Super-urgent	Elective	Super-urgent
Newcastle	0	0	0	0	0	0
Leeds	17	2	10	2	6	0
Cambridge	0	0	0	0	0	0
Royal Free	0	0	0	0	0	0
King's College	27	7	21	5	5	1
Birmingham	25	3	23	2	0	0
Edinburgh	0	0	0	0	0	0
TOTAL	70¹	12	54	9	12¹	1

¹Includes 1 living donor first transplant at London Cromwell

4.2 Patient survival and graft function

Table 4.2 shows the 90-day unadjusted [patient survival](#) and [graft function](#) for paediatric elective deceased donor first liver only transplants in the reported period, nationally and by centre. Survival information was known for 48 (89%) of the 54 paediatric elective deceased donor first liver only transplants performed in this time period and none of these transplants were [auxiliary](#). One hundred percent of patients were alive 90 days post-transplant and the graft function rate at 90 days was 97.9%.

Table 4.2 Unadjusted 90-day patient survival (%) and graft function (%) for paediatric elective deceased donor first liver only transplants between, 1 October 2020 and 30 September 2021, by transplant centre

Centre	Number of transplants	90-day survival (95% CI)		90-day graft function (95% CI)	
Leeds	8	100	-	100	-
King's College	21	100	-	100	-
Birmingham	19	100	-	94.7	(68.1-99.2)
TOTAL	48	100	-	97.9	(86.1-98.7)

There were 9 paediatric super-urgent deceased donor first liver transplants in the period of study; five at King's College, two at Birmingham and two at Leeds; none of the 9 transplants were auxiliary. Ninety-day survival was not known for one of the 9 non-auxiliary transplants. All but one patient survived the first ninety days and the resulting unadjusted national 90-day patient survival and graft function rates (95% confidence interval) for paediatric super-urgent transplants were both at 87.5% (37.8, 98.7). These rates should be regarded as guidance only due to the small number of transplants.

Appendix

A1 Data

Data were obtained from the UK Transplant Registry for the time period 1 October 2020 to 30 September 2021 and include all transplants performed in the UK, NHS Group 2 transplants, [auxiliary transplants](#), liver only transplants for intestinal failure patients and exclude all other transplants involving the liver for intestinal failure patients. The Adult and Paediatric sections are limited to first liver only transplants, and unadjusted survival is only estimated for deceased donor transplants, excluding [auxiliary transplants](#).

A2 Methods

Unadjusted patient survival and graft function rates

Unadjusted patient survival and graft function rates were estimated using [Kaplan-Meier](#) methods. Patient survival rates are based on the number of patients transplanted and the number and timing of those that die within the post-transplant period of interest. Patients can be included in this method of analysis irrespective of the length of follow-up recorded. If a patient is alive at the end of the follow-up then information about the survival of the patient is censored at time of analysis, 3rd March 2022. Death, irrespective of whether the graft is still functioning or not, is classed as an event. Estimates of graft function follow similar principles but the event of interest is graft failure in living post-transplant patients instead of patient death.

For the purposes of this report, no adjustment was made for risk factors that might make a patient more or less likely to die or a graft to fail. Comparison of unadjusted patient survival or graft function rates across centres and to the national rate should therefore be made with caution.

A3 Glossary of terms

Auxiliary transplant

Auxiliary transplantation uses a partial left or right lobe from the donor which acts as temporary support for the recipient's injured liver, which remains in place.

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.

Donor type

Liver donors can be of different types.

Donor after brain death (DBD)

Donation after Brainstem Death (DBD) means donation which takes place following the diagnosis of death using neurological criteria.

Donor after circulatory death (DCD)

Donation after Circulatory Death (DCD) means donation which takes place following the diagnosis of death using circulatory criteria.

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

Domino donor. A donor with a certain type of rare degenerative liver disease who receives a liver transplant to treat their condition. This donor gives their liver to another recipient in a domino liver transplant, because the liver still functions well for other recipients.

Elective and super-urgent patients

Separate selection criteria to join the liver transplant list have been devised for those patients requiring emergency transplantation (super-urgent) compared to those who require a routine procedure (elective transplantation). The two groups have a different range of aetiologies with markedly different short-term prognoses; different criteria are required to define that prognosis. Similarly, processes to allocate a donor liver are different for super-urgent and elective transplantation, reflecting those patient groups with a different risk of death without transplantation. *Note:* Super-urgent registration categories were changed on 17 June 2015 to account for development in treatment of patients with acute liver failure.

Graft function

The percentage of patients who are alive with a functioning graft. This is usually specified for a given time period after transplant. For example, a 90 day graft function rate is the percentage of patients alive with a functioning graft 90 days after transplant.

Kaplan-Meier method

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

Multi-organ transplant

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

Patient survival rate

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

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