NHS BLOOD AND TRANSPLANT NATIONAL LIVER OFFERING SCHEME FORTY-TWO MONTH REVIEW

SUMMARY

1. BACKGROUND

- 1.1. The new National Liver Offering Scheme (NLOS) was introduced on 20 March 2018 for donation after brain death (DBD) donors and mainly for liver offers to named patients. Offering of livers from donors after circulatory death (DCD) has not changed and remains on a centre-specific basis rather than on a patient specific basis. This report examines the impact of the new DBD scheme on patients on the waiting list, livers offered and transplant activity.
- 1.2. It should be noted that this report may not include all data due to delays in reporting.
- 1.3. Updated Kidney Offering Scheme and Pancreas Offering Scheme were introduced on 11 September 2019. Unfortunately, an unexpected and untested change was introduced to the NLOS at the same time which affected the number of patients that appeared as named elective patients on matching run. This change was removed on the 19 September 2019 and this report includes this period in all analyses apart from in the flow chart in Figure 12B.
- 1.4. Due to the impact of COVID-19, it was agreed by OTDT Medical team and the Liver Advisory Group chair on 27 March 2020 that liver centres should consider an elective named patient offer for any patient when offered and not just the named patient. It was also agreed that a kidney would not be held back if a liver/kidney patient was in the top 3 named elective patients. There were no changes to the DCD offering scheme and the changes to the DBD offering scheme ceased on 9 July 2020 when named patient offering recommenced. This period is excluded from part of the liver offering section.

2. DATA AND METHODS

2.1. **Table S1** shows the time period and inclusion and exclusion criteria for the aspects of the offering scheme examined in this report. NHS Group 2 registrations and transplants were excluded throughout the report along with registrations, offers and transplants for intestinal patients not requiring a liver. Super-urgent and elective registrations were included in all aspects apart from the transplant list activity section as were adult and paediatric registrations and transplants.

Table S1	Inclusion and exclusion criteria for the a	is report	
Section	Time period	Inclusions	Exclusions
Registration	 20 September 2014 to 19 March 2018 (forty-two months prior, N=4054) 20 March 2018 to 19 September 2021 (forty-two months post, N=4058) 	New active/suspended registrations	 Dublin registrations NHS Group 2 registrations
One and three month post- registration outcome	 20 September 2014 to 19 December 2017 (<i>thirty-nine months prior</i>, N=3044) 20 March 2018 to 19 June 2021 (<i>thirty-nine months post</i>, N=3065) 	 Active and suspended Adult elective liver and liver/kidney registrations 	 Dublin registrations NHS Group 2 registrations Intestinal registrations
Six months post- registration outcome	 20 September 2014 to 19 September 2017 (<i>thirty-six months prior</i>, N=2781) 20 March 2018 to 19 March 2021 (<i>thirty months-six post</i>, N=2788) 	 Active and suspended Adult elective liver and liver/kidney registrations 	 Dublin registrations NHS Group 2 registrations Intestinal registrations
Transplant list activity	 Patients active/ suspended on 19 March 2018 (N=418) 20 March 2018 to 19 September 2021 (N=3338) 	 Active and suspended Adult elective liver and liver/kidney registrations 	 Dublin registrations NHS Group 2 registrations Intestinal registrations
Liver offering	 Forty-two months prior, N=6318 (3025 DBD and 3293 DCD) Forty-two months post, N=6227 (3200 DBD and 3027 DCD) 	 UK deceased donors whose liver was offered for transplantation Offers to Dublin for super- urgent patients 	 Intestinal offers regardless of whether patients required a liver Offers declined due to the patient accepting previously offered liver Offers to Dublin for elective patients
Transplant activity	 Forty-two months prior, N=3280 (2575 DBD and 705 DCD) Forty-two months post, N=3107 (2534 DBD and 573 DCD) 	UK transplants	 Transplants performed at Dublin Intestinal transplants for patients not requiring a liver NHS Group 2 transplants
Ninety-day post- transplant survival	 20 December 2014 to 19 March 2018 (<i>thirty-nine months prior</i>, N=1633 for DBD and 628 for DCD) 20 March 2018 to 19 June 2021 (<i>thirty-nine months post</i>, N=1477 for DBD and 458 for DCD) 	UK adult elective liver and liver/kidney transplants	 Transplants performed between 27 March 2020 and 9 July 2020 Transplants performed at Dublin Intestinal transplants for patients not requiring a liver NHS Group 2 transplants
One-year post- transplant survival	 20 September 2015 to 19 March 2018 (<i>thirty months prior</i>, N=1328 for DBD and 497 for DCD) 20 March 2018 to 19 September 2020 (<i>thirty months post</i>, N=1220 for DBD and 379 for DCD) 	UK adult elective liver and liver/kidney transplants	 Transplants performed at Dublin Intestinal transplants for patients not requiring a liver NHS Group 2 transplants

3. RESULTS

REGISTRATION ACTIVITY

- 3.1. There were 4058 new NHS Group 1 liver registrations in the UK in the first forty-two months of the scheme. (Table 1)
- 3.2. There was a 1% increase in elective and 9% decrease in super-urgent registrations between the forty-two months pre and post NLOS introduction. There was also a small increase in adult elective CLD registrations (6%) in the forty-two months post NLOS but the number of HCC registrations (including HCC downstaging) were similar in the two time periods (631 and 613 respectively). The number of new variant syndrome registrations has decreased from 264 in the forty-two months post. (**Table 3**)
- 3.3. Ninety-two percent of the new adult elective registrations in the first forty-two months of NLOS were for first graft compared with 91% in the forty-two months prior. (**Table 4**)
- 3.4. There was no statistically significant increase in the median age of new adult elective registrations (55 in both time periods). (**Table 5**)

POST-REGISTRATION OUTCOME

- 3.5. There were 3065 adult elective registrations in the subset of patients registered in the first thirtynine months post-NLOS. One thousand, four hundred and thirty three (47%) of the 3065 registrations received a transplant within three months of registration. The corresponding threemonth transplant rate for patients registered in the equivalent 39 months in 2014/2017 was 42%. (Table 6)
- 3.6. The proportion of patients who either died on the list or were removed due to condition deterioration in the first three months was lower in the 39 months post NLOS than 39 months prior (4% and 6% respectively). This reduction was also seen in the six-month registration outcome for a subset who were registered in two 36-month periods (6% and 8% respectively). The decrease in mortality rate was observed across all type of patients (except for HCC), age groups (except for 26-39 years) and whether or not the patient was registered for their first transplant. (Figures 3, 4 and 5)

TRANSPLANT LIST ACTIVITY

- 3.7. Four hundred and eighteen adult elective NHS Group 1 patients were active on the transplant list on 19 March 2018. A lower percentage of those who were active on the list have received a liver transplant compared with new registrations in the forty-two months since (66% compared with 67%). (Table 7)
- 3.8. There was a significant difference in registration outcome for CLD, HCC and variant syndrome patients. (Figure 7)

3.9. Three hundred and thirty seven patients (9%) active on the transplant list during the first forty-two months either died on the list or were removed due to condition deteriorated. An additional 220 patients were removed due to either their condition improving (N=127 (58%)) or other reasons detailed in Table 7A.

LIVER OFFERING

- 3.10. Overall, 3200 DBD livers and 3027 DCD livers were offered in the first forty-two months of the scheme. For DBD donors, 2757 (86%) were retrieved and 2378 (87% of those retrieved) were transplanted. For DCD donors, 868 (29%) were retrieved and 571 (66% of those retrieved) were transplanted. The proportions retrieved were similar to the forty-two months prior for DBD donors. (Table 9)
- 3.11. Figures 12a and 12b in the main paper show the number of DBD livers offered during the first forty-two months at each stage of the liver offering pathway. Livers offered during COVID are included in Figure 12a but excluded at the elective stage of Figure 12b. Four hundred and forty five livers were either accepted and transplanted or declined and not offered on prior to the elective section of the offering pathway.
- 3.12. Of the 2567 DBD livers offered to the elective section that were not offered only to paediatric centres and not offered during the first wave of COVID-19 in 2020, 2306 (90%) were allocated to the elective CLD/HCC pathway and 261 (10%) were randomly allocated to the variant syndrome pathway which is consistent with the percentages used in the probabilistic prioritisation of the elective list.
- 3.13. One thousand, two hundred and fourteen (not accepted by higher tiers) offered to named elective CLD/HCC were accepted and transplanted while 97 livers offered to the named elective variant syndrome pathway were accepted and transplanted.
- 3.14. One thousand, one hundred and thirteen livers declined by all stages were fast-tracked and 464 were accepted and transplanted.
- 3.15. There were 15251 DBD liver offers (excluding intestinal offers) made to UK centres during the first forty-two months of the scheme which was an increase of 66% compared with the forty-two months prior. All centres saw an increase in offers with one centre, Kings College, observing a greater than 94% increase in offers. (Table 11)
- 3.16. Five thousand and eighty two (33%) of the 15251 offers made in the first 42 months post NLOS were to named elective liver recipients (excluding offers made during COVID-19 in 2020). The number of named patient offers per donor ranged between 1 and 10 with a median of one offer per donor. The number of named offers per patient ranged between 1 and 27 with a median of two offers per patient. Twenty-nine patients at 7 centres were offered more than 10 livers in the

forty-two month time period (12 were offered 11 livers, 4 were offered 12 livers, 4 were offered 13 livers, 4 were offered 14 livers, 1 was offered 16 livers, 2 were offered 17, 1 was offered 25 livers and 1 was offered 27 livers).

TRANSPLANT ACTIVITY

- 3.17. There has been a 5% decrease in the number of DBD super-urgent transplants (357 and 286 respectively). (**Table 19**)
- 3.18. One hundred and forty one of the 1709 adult elective liver and liver/kidney transplants performed in the first 36 months were performed in the UK between 27 March 2020 and 9 July 2020. These transplants are **excluded** from the transplant section as DBD livers were not offered through the National Liver Offering Scheme due to COVID-19 and both DBD and DCD livers were offered to clinically urgent patients.
- 3.19. For DBD transplants, there was evidence of a statistically significant association between time period and age group (p=0.0016), disease group (p<0.0001), transplant centre (p=0.02), zonal (p<0.0001), type of patient (p=0.0001) and blood group compatibility (p<0.0001). (Table 20 and 21).
- 3.20. For DCD transplants, there was evidence of a statistically significant association between time period and disease group (p<0.0001), transplant centre (p<0.0001), type of patient (p=0.0007) and blood group compatibility (p=0.0073). There was no evidence of a statistically significant association for age group (p=0.13) and zonal transplants (p=0.37). (**Table 20 and 21**).
- 3.21. There was a statistically significant increase in cold ischaemia time for adult elective DBD transplants when comparing the forty-two months pre and post (median CIT 8.55 hours and 9.05 respectively, p<0.0001). However, this may be due to the inclusion of periods of machine perfusion which is not currently collected on the liver transplant record form. (**Figure 14**)
- 3.22. There was no significant difference in ninety-day DBD and DCD patient survival (p-value=0.41 and 0.31 respectively). (Figure 18). There were no significant difference at a 5% significance level in ninety-day graft or transplant survival for either DBD or DCD transplants. (Figures 20, 21, 22 and 23)
- 3.23. There was no significant difference in one-year DBD and DCD patient survival (p-value=0.21 and 0.44 respectively). (Figure 24). There were no significant difference at a 5% significance level in one-year graft or transplant survival for either DBD or DCD transplants. (Figures 26, 27, 28 and 29)

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November 2021

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1. BACKGROUND

- 1.1. The new National Liver Offering Scheme (NLOS) was introduced on 20 March 2018 for donation after brain death (DBD) donors and mainly for liver offers to named patients. Offering of livers from donors after circulatory death (DCD) has not changed and remains on a centre-specific basis rather than on a patient specific basis. This report examines the impact of the new DBD scheme on patients on the waiting list, livers offered and transplant activity.
- 1.2. It should also be noted that this report may not include all data due for the first forty-two months due to delays in reporting.
- 1.3. The updated Kidney Offering Scheme and Pancreas Offering Scheme were introduced on 11 September 2019. Unfortunately, an unexpected and untested change was introduced to the NLOS at the same time which affected the number of patients that appeared as named elective patients on matching run. This change was removed on the 19 September 2019 and this report includes this period in all analyses apart from in the flow chart in Figure 12B.
- 1.4. Due to the impact of COVID-19, it was agreed by OTDT Medical team and the Liver Advisory Group chair on 27 March 2020 that liver centres should consider an elective named patient offer for any patient when offered and not just the named patient. It was also agreed that a kidney would not be held back if a liver/kidney patient was in the top 3 named elective patients. There were no changes to the DCD offering scheme and NLOS resumed on 9 July 2020.
- 1.5. Birmingham, Royal Free, Kings College and Cambridge temporarily closed for all adult transplants in December 2020/January 2021. Royal Free and Birmingham temporarily transferred some of their clinically urgent patients to other transplant centres who were open. Transplant centres reviewed their transplant lists in January 2021 and formally suspended non-urgent patients. Offering to named clinically urgent patients continued and centres could consider livers for nonurgent patients if declined for all clinically urgent patients.
- 1.6. All transplant centres other than Birmingham formally reactivated all non-urgent CLD and HCC patients on the 6th April 2021 while variant syndrome patients and patients at Birmingham were reactivated in late April 2021.

1.7. Birmingham closed for all DCD offers in January 2021 with Newcastle and Leeds receiving Birminghams zonal and linked offers on a rota basis. Birmingham reopened for DCD offers in late April 2021.

2. DATA AND METHODS

2.1. REGISTRATION ACTIVITY AND POST-REGISTRATION OUTCOME

- 2.1.1. Data on 8112 new active/suspended NHS Group 1 registrations on the UK liver transplant list between 20 September 2014 and 19 September 2021 were obtained from the UK Transplant Registry on 11 October 2021. Patients registered in Dublin or as NHS Group 2 were excluded as such elective patients would only be offered a liver if all UK transplant centres declined the offer.
- 2.1.2. One and three month registration outcome was examined for registrations either between 20 September 2014 and 19 December 2017 (N=3044) or between 20 March 2018 and 19 June 2021 (N=3065).
- 2.1.3. Six month registration outcome was also examined for a subset registered either between 20 September 2014 and 19 September 2017 (N=2781) or between 20 March 2018 and 19 March 2021 (N=2788).

2.2. TRANSPLANT LIST ACTIVITY

2.2.1. Data on 3756 patients who were either active/suspended on the UK liver transplant list on 19 March 2018 or registered between 20 March 2018 and 19 September 2021 were obtained from the UK Transplant Registry on 11 October 2021. Patients registered in Dublin were excluded.

2.3. LIVER OFFERING

- 2.3.1. Data on 12545 deceased donors (6225 DBD and 6320 DCD) from the UK whose liver was offered for transplantation between 20 September 2014 and 19 September 2021 were obtained from the UK Transplant Registry on 14 October 2021. Intestinal offers were excluded regardless of whether they required a liver or not. The data was split into two time periods:
 - 2.3.1.1. 20 September 2014 to 19 March 2018 (previous forty-two months)
 - 2.3.1.2. 20 March 2018 to 19 September 2021 (since NLOS implementation).

2.4. TRANSPLANT ACTIVITY AND POST-TRANSPLANT SURVIVAL

2.4.1. Data on 6387 deceased donor liver transplants (5109 DBD and 1278 DCD) performed in the UK between 20 September 2014 and 19 September 2021 were also obtained from the UK Transplant Registry on 11 October 2021. Intestinal transplants involving the liver were included. The data was also split into the same two time periods as the liver offering section.

3. RESULTS

3.1. REGISTRATION ACTIVITY - OVERALL

3.1.1. Figure 1 shows the number of new NHS Group 1 registrations on the UK liver transplant list between 20 September 2014 and 19 September 2021 by quarter and urgency status while Table 1 compares the forty-two months pre and post the introduction of NLOS. Although there has been an increase in elective registrations since NLOS was introduced, there was no statistically significant association between the two time periods and registration type (Fishers exact p-value=0.1).



Table 1	Urgency status by time period for all NHS Group 1 liver registrations in the UK, 20 September 2014 to 19 September 2021						
Urgency s	status	Forty-two months prior	Forty-two months post	Total			
Elective		3582 (88)	3629 (89)	7211 (89)			
Super-urg	ent	472 (12)	429 (11)	901 (11)			
Total		4054 (100)	4058 (100)	8112 (100)			

3.2. REGISTRATION ACTIVITY - SUPER-URGENT

3.2.1. Table 2 compares the forty-two months pre and post the introduction of NLOS by super-urgent category. There was no significant association between super-urgent categories and the two time periods (Chi-squared p-value=0.37). The proportion of patients registered as either category 8 (HAT on days 0 to 21) or 9 (Early graft dysfunction on days 0 to 7) was 29% and 24% in the time periods prior and post respectively. Appendix A shows the descriptions of each categories.

Table 2Super-urgent c20 September 2	ategory by time period 2014 to 19 September 2	for super-urgent registrati 021	ions in the UK,
Super-urgent category	Forty-two months prior	Forty-two months post	Total
1	11 (2)	12 (3)	23 (3)
2	30 (6)	28 (7)	58 (6)
3	24 (5)	27 (6)	51 (6)
4	7 (1)	10 (2)	17 (2)
5	38 (8)	18 (4)	56 (6)
6	161 (34)	162 (38)	323 (36)
7	27 (6)	25 (6)	52 (6)
8	71 (15)	48 (11)	119 (13)
9	64 (14)	54 (13)	118 (13)
10	8 (2)	10 (2)	18 (2)
20	18 (4)	19 (4)	37 (4)
88	13 (3)	16 (4)	29 (3)
Total	472 (100)	429 (100)	901 (100)

3.2.2. **Table 2a** compares the forty-two months pre and post the introduction of NLOS by transplant number and graft number. A higher proportion of patients were registered for their second liver transplant in the forty-two months prior than during the forty-two months post (26% and 25% respectively). Of the patients registered for a second graft, 73% of those registered in the forty-two months post had received a DBD transplant as their first transplant compared with 59% in the forty-two months prior.

Table 2a Transplant numbe urgent registration	Transplant number and type of previous graft by time period for super- urgent registrations in the UK, 20 September 2014 to 19 September 2021						
Registered for	Forty-two months	Forty-two months	Total				
First transplant	326 (69)	310 (72)	633 (71)				
Second transplant First was a DBD tx First was a DCD tx First was a living donor tx	123 (26) 106 (25) 73 (59) 77 (73) 40 (33) 26 (25) 9 (7) 3 (3)		229 (25) 150 (66) 66 (29) 12 (5)				
Third transplant	21 (4)	13 (3)	34 (4)				
Fourth transplant	0 (0)	0 (0)	0 (0)				
Fifth transplant	1 (0)	0 (0)	1 (0)				
Total	472 (100)	429 (100)	901 (100)				

3.3. REGISTRATION ACTIVITY - ELECTIVE

3.3.1. **Table 3** compares the forty-two months pre and post the introduction of NLOS for NHS Group 1 elective registrations by age and type of patient. There was no statistically significant associations between patient age and the two time periods (Fishers exact p-value=0.31).

Table 3	ole 3 Type of elective patient by time period for elective registrations in the UK, 20 September 2014 to 19 September 2021						
Type of patient		Forty-two months prior	Forty-two months post	Total			
Overall		3582 (100)	3629 (100)	7211 (100)			
Adult elective ¹		3270 (91)	3338 (92)	6608 (92)			
CLD		2367 (72)	2512 (75)	4879 (74)			
HCC		615 (19)	579 (17)	1194 (18)			
HCC dov	wnstaging	16 (0)	34 (1)	50 (1)			
Variant s	syndrome	264 (8)	196 (6)	460 (7)			
Hepatob	lastoma	1 (0)	6 (0)	7 (0)			
Liver and	d cardiothoracic	4 (0)	11 (Ó)	15 (Ó)			
Paediatric elective ²		312 (9)	291 (8)	603 (8)			
Hepatoblastoma		20 (6)	46 (16)	66 (11)			
Non hep	atoblastoma	292 (94)	244 (84)	536 (89)			
Liver and	d cardiothoracic	0 (0)	1 (0)	1 (0)			

¹ Includes 18 CLD, 4 HCC and 2 Variant syndrome patients aged 17 years or over and weighing 40kg or under (9 in the fortytwo months prior and 15 in the forty-two months post); 14 were dual-listed as small adults (5 in the forty-two months prior and 9 in the forty-two months post)

² Includes 3 hepatoblastoma and 95 non hepatoblastoma patients aged less than 17 years and weighing 40kg or over (54 in the forty-two months prior and 41 in the forty-two months post); 46 were dual-listed as large paediatrics (6 in the forty-two months prior and 40 in the forty-two months post)

- 3.3.2. **Table 4** compares the forty-two months pre and post the introduction of NLOS for each type of adult patient registered over the last 84 months by transplant number. The majority of patients were registered for a first liver transplant and there were no statistically significant associations between graft number and the two time periods (Fishers exact p-value=0.46).
- 3.3.3. All but two of the HCC patients were registered for a first graft. Both patients registered for a second graft had a UKELD less than 49, encephalopathy grade 0 and no current ascites.

Table 4Transplant number by time period for adult elective registrations in the UK,20 September 2014 to 19 September 2021							
	Forty-two months	Forty-two months	Total				
_	prior	post					
CLD ¹ (Fishers exact p-value	e=0.58)						
1 st graft	2112 (89)	2259 (90)	4371 (90)				
2 nd graft	213 (9)	206 (8)	419 (9)				
3 rd graft	35 (1)	43 (2)	78 (2)				
4 th graft	6 (0)	4 (0)	10 (0)				
6 th graft	1 (0)	0 (0)	1 (0)				
HCC ² (Fishers exact p-valu	e>0.99) 614 (100)	578 (100)	1192 (100)				
2 nd graft	1 (0)	1 (0)	2 (0)				
2 gran	1 (0)	1 (0)	2 (0)				
Variant syndrome (Fishers	s exact p-value=0.81)						
1 st graft	239 (91)	180 (92)	419 (91)				
2 nd graft	21 (8)	15 (8)	36 (8)				
3 rd graft	2 (1)	1 (1)	3 (1)				
4 th graft	2 (1)	0 (0)	2 (0)				
Overall adult elective ³ (Fis	shers exact p-value=0.46)						
1 st graft	2989 (91)	3068 (92)	6057 (92)				
2 nd graft	235 (7)	222 (7)	457 (7)				
3 rd graft	37 (1)	44 (Ì)	81 (1)				
4 th graft	8 (0)	4 (0)	12 (0)				
6 th graft	1 (0)	0 (0)	1 (0)				
Total	3270 (100)	3338 (100)	6608 (100)				

¹ One patient dual-listed was registered for a second graft and three patients for a first graft in the forty-two months prior whilst four were registered for a first graft and one for a second graft and three for a third graft in the forty-two months post

² One patient dual-listed was registered for a first graft in the forty-two months prior whilst one was registered for a second graft in the forty-two months post

³ Includes HCC downstaging and liver and cardiothoracic patients all of whom were registered for first graft

3.3.4. Table 5 shows compares the median and interquartile age at registration for the forty-two months pre and post the introduction of NLOS for each type of adult patient registered over the last 84 months. There were no statistically significant differences in the median recipient age (Kruskal-Wallis p-value≥0.28).

Table 5Median (IQR) age by time period for adult elective NHS Group 1 registrations in the UK, 20 September 2014 to 19 September 2021						
	Forty-two months prior	Forty-two months post	Total			
CLD ¹ (Kruskal-Wallis p-valu	ie=0.32)	-				
N	2367	2512	4879			
Median (IQR)	53 (44 - 61)	54 (44 - 61)	54 (44 - 61)			
Range	17 - 76	17 - 74	17 - 76			
HCC (Kruskal-Wallis p-value	e=0.28)					
N	615	579	1194			
Median (IQR)	60 (55 - 65)	61 (56 - 66)	60 (55 - 65)			
Range	18 - 75	19 - 73	18 - 75			
Variant syndrome (Kruska	l-Wallis p-value=0.61)					
N	264	196	460			
Median (IQR)	50 (38.5 - 57.5)	48.5 (37.5 – 57.5)	49 (38 – 57.5)			
Range	17 - 72	17 - 70	17 - 72			
Overall adult elective ² (Kru	uskal-Wallis p-value=0.39)					
N	3270	3338	6608			
Median (IQR)	55 (46 - 62)	55 (46 - 62)	55 (46 - 62)			
Range	17 - 76	17 - 74	17 - 76			
¹ There were five patients dual-listed in the forty-two months prior and 7 in the forty-two months post ² Includes HCC downstaging and liver and cardiothoracic patients						

3.4. POST-REGISTRATION OUTCOME

- 3.4.1. **Table 6 and Figure 2** shows the one and three-month registration outcome for adult elective NHS Group 1 liver patients registered in the thirty-nine months since the implementation of the NLOS along with the equivalent thirty-nine month period in 2014/2017. There were 3065 adult elective registrations in the first thirty-nine months of NLOS and 1433 (47%) received a transplant within 3 months of registration. The corresponding three-month transplant rate for patients registered during the equivalent thirty-nine months in 2014/2017 was 42%. There were statistically significant differences between the time periods and registration outcome at one month and three month (Fishers exact p-value<0.0001 for both).
- 3.4.2. Table 6 and Figure 2 also show the six-month registration outcome for adult elective patients registered during the first thirty-six months of NLOS and the equivalent thirty-six month period in 2014/2017. There were statistically significant differences between the two time periods and registration outcome at six months (Fishers exact p-value<0.0002). 1646 (59%) of the 2788 registrations were transplanted within 6 months compared with 56% in the thirty-six months prior. The proportion of patients who either died on the list or were removed due to condition deterioration within six months was 6% in the thirty-six months post compared with 8% in the thirty-six months prior.</p>

Table 6	Registration outcome for adult elective NHS Group 1 registrations on the UK liver transplant list, 20 September 2014 to 19 June 2021

Registration outcome	One-month 39 months prior	outcome ¹ 39 months post	Three-mont 39 months prior	h outcome ¹ 39 months post	Six-month 36 months prior	outcome ² 36 months post
Remained active/suspended	2324 (76)	2026 (66)	1572 (52)	1448 (47)	920 (33)	879 (32)
Died/ removed due to condition deterioration ³	73 (2)	50 (2)	171 (6)	109 (4)	235 (8)	163 (6)
Removed due to other reasons	13 (0)	48 (2)	35 (1)	75 (2)	74 (3)	100 (4)
Transplanted	634 (21)	941 (31)	1266 (42)	1433 (47)	1552 (56)	1646 (59)
Total	3044 (100)	3065 (100)	3044 (100)	3065 (100)	2781 (100)	2788 (100)
Fishers exact p-value	<0.0	001	<0.0	0001	<0.0	002

¹ 20 September 2014 to 19 December 2017 (prior) and 20 March 2018 to 19 June 2021 (post)

² 20 September 2014 to 19 September 2017 (prior) and 20 March 2018 to 19 March 2021 (post)

³ Includes patients removed as registered onto super-urgent list



3.4.3. Figure 3 shows the three-month registration outcome by time period and type of adult elective patient. A higher proportion of new CLD and HCC downstaging registrations post NLOS were transplanted in the first three months post-registration than registrations during the same period in 2014/2017. There was a statistically significant association between three-month registration outcome and time period of registration for CLD patients (Fishers exact p-value<0.01) but not for HCC, variant syndrome, and HCC downstaging patients (Fishers exact p-value≥0.1). Equivalent charts for six-month are presented in Figure B1 in Appendix B and show consistent results with the three-month outcome chart.



3.4.4. Figure 4 shows the three-month registration outcome by time period and age group. A higher proportion of patients aged either 17-29, 50-59 or 60+ years registered post NLOS were transplanted in the first three months post-registration than registrations during the same period in 2014/2017. There was a statistically significant association between registration outcome and time period of registration for all age groups. Equivalent charts for six-month are presented in Figure B2 in Appendix B and show consistent results with the three-month outcome chart for 17-25, 40-49 and 60+ years. There was no statistically significant association between six-month registration outcome and time period of registration for 25-39 and 50-59 years.



3.4.5. **Figure 5** shows the three-month registration outcome by time period and whether the patient was registered for a first graft or regraft. A higher proportion of first graft patients registered post NLOS were transplanted in the first three months post-registration than registrations during the same period in 2014/2017. There was a statistically significant association between registration outcome and time period of registration for patients registered for a first graft but not for regraft patients (Fishers exact p-value<0.01 and 0.96 respectively). Equivalent charts for six-month are presented in **Figure B3** in **Appendix B** and show consistent results with the three-month outcome chart.



3.4.6. **Figure 6** shows the three-month registration outcome by quarter. The mortality rate in the first three months ranged between 2% and 8% in the quarters since the introduction of NLOS compared with between 3% and 8% in the quarters prior. Equivalent charts for six-month are presented in **Figure B4** in **Appendix B** and show consistent results with the three-month outcome chart.



3.5. TRANSPLANT LIST ACTIVITY

- 3.5.1. **Table 7** shows the outcome for 418 adult elective NHS Group 1 liver patients on the list on 19 March 2018 along with those patients joining the adult elective list in the forty-two months since the implementation of the NLOS. Since the scheme was implemented, 3338 adult elective patients joined the liver transplant list and 2248 (67%) of the 3338 patients have received a transplant. The corresponding transplant rate for patients active on the list on 19 March 2018 was 66%.
- 3.5.2. **Table 7** also shows that 337 adult elective liver patients, either active/suspended on the list on 19 March 2018 or registered in the first forty-two months, either passed away while on the transplant list, were removed due to their condition deteriorating or were registered onto the super-urgent list between 20 March 2018 and 31 September 2021. One-hundred-and-thirty-six of the 337 patients died on the list while 196 patients were removed due to their condition deteriorating and 5 patients were registered onto the super-urgent list. Twenty-four of the 196 patients removed due to their condition deteriorating died after being removed; six of the patients were active on the transplant list on 19 March 2018.
- 3.5.3. It should, however, be noted that there may be a delay in centres informing NHSBT of patient deaths.

Table 7Adult elective NHS group 1 liver transplant list and new registrations in the UK,20 March 2018 to 19 September 2021 as at 30 September 2021					
Outcome of patient at 3 September 2021	30	Active and suspended patients at 19 March 2018 N (%)	New registrations between 20 March 2018 and 19 September 2021 ¹ N (%)	Total N (%)	
Remained active/ suspended Transplanted Removed due to other reasons Died/ removed due to condition deteriorated ²		27 (6) 274 (66) 71 (17) 46 (11)	650 (19) 2248 (67) 149 (4) 291 (9)	677 (18) 2522 (67) 220 (6) 337 (9)	
TOTAL		418 (100)	3338 (100)	3756 (100)	
¹ Includes re-registration ² Includes patients remo	is for sec ved as re	cond or subsequent transplants	s t		

3.5.4. **Table 7A** shows the reasons for removals for the 220 patients removed from the list due to reasons other than condition deterioration. Forty five patients on the list on 20 March 2018 and 82 new registrations were removed from the list due to condition improved whilst 48 were removed

Table 7AReason for removal for 220 adult elective NHS group 1 liver transplant list and new registrations in the UK removed from the list for reasons other than condition deterioration, 20 March 2018 to 19 September 2021 as at 30 September 2021					
		Active and suspended patients at 19 March 2018	New registrations between 20 March 2018 and 19 September 2021 ¹	Total	
		N (%)	N (%)	N (%)	
Condition imp	proved	45 (63%)	82 (55%)	127 (58)	
Patient/paren	t request	9 (13%)	7 (5%)	16 (7)	
Patient/ non-o	compliant	8 (11%)	24 (16%)	32 (15)	
Patient fallen agreed listing	outside of criteria	1 (1%)	9 (6%)	10`(5)́	
Other		8 (11%)	27 (18%)	35 (16)	
TOTAL 71 (100) 149 (100) 220 (100)					
¹ Includes re-	registrations fo	r second or subsequent trans	splants		

3.5.5. **Figure 7** shows the registration outcome by whether the patients were on the list on 20 March 2018 and type of adult elective patient. A higher proportion of new CLD and HCC registrations were transplanted in the first forty-two months than patients on the list on 20 March 2018. Due to the offering scheme, a higher proportion of variant syndrome patients on the list were transplanted compared with new registrations. There were statistically significant associations between registration outcome and time period of registration for, separately, CLD, HCC and variant syndrome patients (Fishers exact p-value<0.001).



3.5.6. **Figure 8** shows the registration outcome by whether the patients were on the list on 20 March 2018 and age group. A higher proportion of new registrations were transplanted in the first fortytwo months than patients on the list on 20 March 2018 in all age groups apart from 17-24 and 40-49 year olds. There were statistically significant associations between registration outcome and time period of registration for all age groups (Fishers exact p-value<0.03).



3.5.7. **Figure 9** shows the registration outcome by whether the patients were on the list on 20 March 2018 and whether the patients were registered for their first transplant or regraft. A higher proportion of new registrations were transplanted in the first forty-two months than patients on the list on 20 March 2018 for first registrations, and regrafts. There was a statistically significant association between registration outcome and time period of registration for first grafts (Fishers exact p-value<0.0001) but not for regrafts (Fishers exact p-value=0.05).



3.5.8. Thirty-four patients listed for a regraft, either on the list on 20 March 2018 or registered during the forty-two months post NLOS, were removed from the transplant list (regardless of reason). Of these thirty-four patients, ten were on the list on the 20 March 2018 and twenty-four were registered in the first forty-two months of NLOS. **Table 8** shows the other reasons for removal from the transplant list for each of the 34 patients.

Table 8	Table 8 Reasons for removal for 34 regraft patients removed from the transplant list							
Patient number	Centre	Month removed	Time from previous tx	Time on the list	Reason for removal	Other reasons given		
Patients	on the lis	t on 20 March 2018	8					
1	6	March 2018	1940	2562	Condition deteriorated	Deterioration of Hocum therefore not fit for OLTX		
2	5	May 2018	1178	266	Condition improved			
3	6	July 2018	1106	247	Condition improved			
4	5	August 2018	480	596	Condition deteriorated	Awaiting cardiology review, episode of SVT yesterday		
5	5	May 2018	527	212	Condition deteriorated	, , ,		
6	4	March 2019	2220	392	Condition improved			
7	3	February 2019	1903	337	Condition deteriorated	Further investigations required for anaemia and cardiac function		
8	6	November 2019	5275	879	Condition deteriorated	Pt requires full assessment for retransplant now, after a long period of suspension on the waiting list since Aug 2018. Deemed medically too high risk to receive a transplant		
9	5	February 2020	808	604	Condition deteriorated	Requires Haematology review and bone marrow biopsy due to neutropenia		
10	6	July 2020	5537	764	Other	Patient now for palliative care in their local hospital		
Dationt r	onistorod	botwoon 20 March	2018 and 10	Sonton	abor 2021			
11	6	December 2018	2799	24	Condition deteriorated	Has extra hepatic collections,		
12	6	April 2018	1245	2	Other	At patients request		
13	6	September 2018	1220	55	Condition deteriorated	Patient has developed lung cancer		
14	5	April 2019	2736	6	Condition deteriorated	Patient has deteriorated and is no longer a transplant candidate.		
15	6	June 2019	2564	74	Condition improved			
16	3	September 2019	158	150	Condition deteriorated	HCC in nodes outsides liver		
17	5	October 2019	3351	66	Condition deteriorated	Patient has developed multi- organ failure, rising lactate in the context of sepsis.		
18	3	December 2019	49	13	Condition improved	Clinically improving. No longer has an indication for transplant		
19	7	January 2020	179	117	Condition Deteriorated	HCC metastases		
20	5	February 2020	7655	164	Condition Deteriorated	super urgent request sent through via National appeal.		
21	4	Februarv 2020	103	30	Condition improved	OPA 13.2.20		
22	3	February 2020	645	93	Condition improved			
23	1	March 2020	6929	10	Condition deteriorated			
24	5	July 2020	2907	609	Condition deteriorated			
25	3	September 2020	56	1	Condition improved	Not clinically urgent		

26	5	March 2021	11009	927	Condition deteriorated	Awaiting Vascular review, lower limb numbness and pain, known SMV calcification
27	2	April 2021	62	15	Other	Moved to su waiting list
28	6	April 2021	710	3	Condition improved	Request made by Hepatologist to Suspend as improved
29	6	May 2021	5498	74	Condition deteriorated	
30	7	May 2021	11069	654	Condition deteriorated	Patient pyrexial; patient died
31	4	May 2021	26	0	Registered onto the super-urgent list	
32	4	June 2021	545	381	Condition deteriorated	Admitted to ITU. Aim to get patient off ITU and to discharge with palliative care
33	5	June 2021	6249	84	Condition improved	Clinical condition improved since listing
34	6	August 2021	128	11	Condition deteriorated	Patient went for transplant found to have malignancy therefore abandoned

3.6. LIVER OFFERING

- 3.6.1. **Table 9** shows the overall UK deceased donor liver offering outcome between 20 September 2014 and 19 September 2021, by donor type and time period. In the first forty-two months of the scheme, 3200 DBD livers were offered for transplantation compared with 3025 during the forty-two months prior to the implementation. Of the livers offered, 2757 (86%) were retrieved for the purposes of transplantation and 2394 (87%) were transplanted (all but 16 were transplanted in the UK). The proportion of DBD livers offered and retrieved is very similar to the percentage for the forty-two months prior to the introduction of the new scheme.
- 3.6.2. Solid organs were not retrieved from 203 DBD donors and 1183 DCD donors whose liver was offered for transplantation. **Table 9**, therefore, also shows the liver offering outcome for donors where at least one solid organ was retrieved for the purposes of transplantation.
- 3.6.3. **Table 10** shows, separately, the reasons for not offering, not retrieving and not transplanting livers by donor type and time period. The number in brackets are the corresponding values for solid organ donors where at least one organ was retrieved for the purposes of transplantation.
- 3.6.4. During the first forty-two months, 38 DBD livers were not offered due to consent/ authorisation being refused by either the family or coroner. The main reason for declining and not retrieving was organ unsuitable (n=216) and other reasons (n=109).
- 3.6.5. Three hundred and sixty three DBD livers were retrieved for the purposes of transplantation but were not transplanted in the first forty-two months of the new scheme. 206 of these 363 livers were not transplanted due to other reasons whilst 112 were not transplanted due to organ unsuitable, 29 due to donor medical history, 12 due to poor function and four due to donor non-medical reasons.
- 3.6.6. All sixteen livers transplanted overseas in the first forty-two months were transplanted into superurgent patients in Dublin.

as at 14 October 2021				
	DBD	liver	DCD	liver
	Forty-two months prior	Forty-two months post	Forty-two months prior	Forty-two months post
1. ALL DECEASED DONORS Number donors	3282	3474	3993	3719
Liver not offered for donation Liver offered for donation	257 3025	274 3200	700 3293	692 3027
Liver not retrieved (% offered) Liver retrieved (% offered)	384 (13%) 2641 (87%)	443 (14%) 2757 (86%)	2276 (69%) 1017 (31%)	2159 (71%) 868 (29%)
Liver transplanted overseas (% retrieved) Liver transplanted in the UK (% retrieved)	13 (0.5%) 2381 (90%)	16 (0.6%) 2378 (86%)	0 (0%) 705 (69%)	0 (0%) 571 (66%)
Liver not transplanted (% retrieved)	247 (9.4%)	363 (13%)	312 (31%)	297 (34%)
Liver used for research (% not transplanted)	182 (74%)	131 (36%)	229 (73%)	107 (36%)
2. ALL SOLID ORGAN DONORS Number donors	2939	3086	2047	1990
Liver not offered for donation Liver offered for donation	92 2847	89 2997	124 1923	146 1844
Liver not retrieved (% offered) Liver retrieved (% offered)	206 (7%) 2641 (93%)	240 (8%) 2757 (92%)	906 (47%) 1017 (53%)	976 (53%) 868 (47%)
Liver transplanted overseas (% retrieved) Liver transplanted in the UK (% retrieved)	13 (0.5%) 2381 (90%)	16 (0.6%) 2378 (86%)	0 (0%) 705 (69%)	0 (0%) 571 (66%)
Liver not transplanted (% retrieved)	247 (9.4%)	363 (13%)	312 (31%)	297 (34%)
Liver used for research (% not transplanted)	182 (74%)	131 (36%)	229 (73%)	107 (36%)

Table 9 Overall deceased donor liver offering outcome, 20 September 2014 to 19 September 2021,as at 14 October 2021

Table 10 Reasons for non-retrieval and non-use of livers from deceased donors (solidorgan donors), 20 September 2014 to 19 September 2021, as at 14 October 2021

	DBD	liver	DC	D liver
	Forty-two	Forty-two	Forty-two	Forty-two
	months prior	months post	months prior	months post
REASONS NOT OFFERED			F (0)	4 (0)
Family permission not sought	1 (1) 65 (28)	1 (1) 22 (11)	5 (2) 125 (19)	4 (3) 24 (11)
Permission refused by coroner	39 (15)	22 (11) 15 (10)	45 (10)	26 (13)
Donor unsuitable - age	2 (2)	0 (0)	36 (8)	44 (21)
Donor unsuitable - past history	72 (39)	69 (52)	196 (65)	156 (70)
Donor unstable	8 (.)	2 (.)	25 (3)	3 (1)
Donor unsuitable - size	0 (0)	0 (0)	0 (0)	1 (1)
Poor function	4 (2)	13 (12)	30 (9)	35 (18)
Infection Other disease	0 (0)	0 (0)	6 (.) 0 (0)	1 (.)
Organ damaged	0 (0)	0 (0)	0 (0)	1 (1)
Ischaemia time too long - warm	0 (0)	0 (0)	0 (0)	1 (1)
Donor unsuitable - virology	6 (1)	0 (0)	4 (.)	1 (.)
Donor unsuitable - medical reason	1 (1)	0 (0)	3 (1)	0 (0)
Other National Action	27 (2)	14 (3)	119 (7)	59 (6)
Not reported	32 (1)	138 (.)	106 (1)	325 (.)
Total not offered	257 (92)	274 (89)	700 (124)	692 (146)
REASONS FOR NON-RETRIEVAL				
Donor	40 (0)	00 (10)		40 (40)
Donor unsuitable - medical	46 (9) 17 (5)	39 (10) 16 (8)	30 (3) 84 (43)	40 (12) 73 (47)
Donor age	7 (5)	10 (6)	437 (181)	502 (236)
Organ	. (0)			001 (200)
Örgan unsuitable - clinical	170 (97)	216 (135)	573 (295)	613 (335)
Poor function	45 (33)	53 (33)	175 (93)	146 (93)
Other	00 (57)	100 (49)	071 (201)	705 (050)
	99 (57)	109 (46)	971 (291)	765 (253)
lotal offered, not retrieved	384 (206)	443 (240)	2276 (906)	2159 (976)
REASONS RETRIEVED BUT NOT TRANSPLANTED				
Donor unsuitable - medical	20 (20)	29 (29)	14 (14)	18 (18)
Donor unsuitable - non medical	4 (4)	4 (4)	3 (3)	8 (8)
Donor age	0 (0)	0 (0)	0 (0)	1 (1)
Organ				
Organ unsuitable - clinical	103 (103)	112 (112)	116 (116)	<i>(</i> 4 (<i>(</i> 4)
Other	Z (Z)	12 (12)	0 (0)	14 (14)
Other	118 (118)	206 (206)	179 (179)	182 (182)
Total retrieved, not transplanted	247 (247)	363 (363)	312 (312)	297 (297)

- 3.6.7. **Figure 10** shows the DBD liver offering outcome for all livers offered regardless of whether any solid organs were retrieved for the purposes of transplantation. **Figure 10** shows that 277 livers were offered during the first quarter of NLOS which was the second highest number of livers offered during the 7 year period.
- 3.6.8. The percentage of organs retrieved and transplanted per quarter ranged from 73% to 84% in the forty-two months prior and 67% to 82% in the forty-two months post the introduction of NLOS. The percentage of livers retrieved and used for research ranged between 3% and 11% in the forty-two months prior and 0% to 10% for the forty-two months post the introduction of NLOS.
- 3.6.9. **Figure 11** shows the equivalent information for all solid organ donors where the liver was offered for transplantation and at least one organ (not necessarily the liver) was retrieved for the purposes of transplantation.





- 3.6.10. Figure 12a show the number of livers offered during the first forty-two months of the new scheme at each stage of the liver offering pathway up to and including the liver and cardiothoracic section. Livers offered during COVID are included in Figure 12a but excluded at the elective stage of Figure 12b. 30 of the 3200 donors did not meet the DBD criteria at the start of the offering process and 27 were retrieved and transplanted. These livers are hence excluded from the offering pathway.
- 3.6.11. Livers from 340 donors meeting the DBD criteria were accepted and transplanted into superurgent patients (including 16 super-urgent patients in Dublin). Three hundred and fifty livers were offered to hepatoblastoma patients and 31 were accepted and transplanted. Two hundred and eighty-eight livers were offered to the liver and intestinal list and 32 were accepted and transplanted. Please note that a liver accepted and used at any stage may have been provisionally offered on to elective patients or fast-tracked before being accepted and used. These have not been included in the number of livers offered in later stages along with livers that may have been accepted, split and transplanted into two patients.
- 3.6.12. Three hundred and fifty-six livers were offered to liver and cardiothoracic patients and seven were accepted and transplanted combined liver and cardiothoracic patients.
- 3.6.13. **Figure 12b** shows the number of livers that were offered to elective patients and hadn't been accepted and used for super-urgent, hepatoblastoma, liver/intestinal and liver/cardiothoracic patients. Of the 2755 livers offered to elective patients, 2710 were adult donors and 45 were

paediatric donors (aged less than 16 years or weighing 40 kg or less). 490 adult donors met the split criteria and 439 livers were offered to paediatric centres for paediatric/small adult patients. 137 of the 439 livers were accepted and transplanted. Twenty-six livers were only offered to paediatric patients and not offered to elective adult patient or fast-tracked.

- 3.6.14. 162 livers were offered to elective patients between 27 March and 9 July 2020.
- 3.6.15. Ninety percent of livers offered to elective patients were randomly allocated to the elective CLD/HCC pathway while ten percent were allocated to the variant syndrome pathway. Of the 2306 livers allocated to the CLD/HCC pathway, 2078 (90%) were offered to named patients and 1214 (58%) were accepted and transplanted. Of the 261 livers allocated to the VS pathway, 213 (82%) were offered and 97 (46%) were accepted and transplanted.





3.6.16. Table 11 shows the number of liver offers made to each UK liver transplant centre in either the forty-two months prior to the new scheme or during the first forty-two months of the new scheme. Livers offered to intestinal patients have been excluded. The number of offers made to UK liver transplant centres has increased by 66% from 9182 to 15251.

20 Sept	ember 2014 to 19 Se	eptember 2021			
Centre offered	Forty-two mont No. of offers (no. of donors)	ths prior to NLOS Median number (IQR) of offers per donor	Forty-two mor No. of offers (no. of donors)	nths post NLOS Median number (IQR) of offers per donor	% increase in offers
				•	
A. All liver offers					
Newcastle	1059 (1014)	1 (1, 1)	1841 (1431)	1 (1, 1)	74
Leeds	1509 (1327)	1 (1, 1)	2323 (1693)	1 (1, 2)	54
Cambridge	1068 (998)	1 (1, 1)	1615 (1334)	1 (1, 1)	51
Royal Free	1193 (1078)	1 (1, 1)	1779 (1448)	1 (1, 1)	49
Kings College	1643 (1398)	1 (1, 1)	3202 (2082)	1 (1, 2)	95
Birmingham	1545 (1316)	1 (1, 1)	2786 (1902)	1 (1, 2)	80
Edinburgh	1165 (1088)	1 (1, 1)	1705 (1414)	1 (1, 1)	46
Total	9182 (2974)	2 (1, 5)	15251 (3150)	4 (2, 8)	66
B. All liver offers for	livers ultimately trar	nsplanted	l		
Newcastle	532 (509)	1 (1, 1)	1004 (786)	1 (1, 1)	89
Leeds	937 (828)	1 (1, 1)	1350 (992)	1 (1, 2)	44
Cambridge	551 (511)	1 (1, 1)	866 (726)	1 (1, 1)	57
Royal Free	653 (590)	1 (1, 1)	955 (770)	1 (1, 1)	46
Kings College	1035 (883)	1 (1, 1)	2017 (1352)	1 (1, 2)	95
Birmingham	993 (837)	1 (1, 1)	1718 (1210)	1 (1, 2)	73
Edinburgh	636 (594)	1 (1, 1)	887 (728)	1 (1, 1)	39
Total	5337 (2361)	1 (1, 3)	8797 (2355)	3 (1, 5)	65

Table 11Number of DBD liver only offers (excludes intestinal offers) per UK transplant centre,
20 September 2014 to 19 September 2021

3.6.17. **Table 12** shows, for livers that were ultimately transplanted, the outcome of liver offers made to each UK liver transplant centre in either the forty-two months prior to the new scheme or during the first forty-two months of the new scheme. It also shows the offer outcome after excluding fast-track offers that were not accepted and transplanted (i.e. declined or accepted and not used fast-track offers) as well as livers offered from either DCD or positive virology donors. It should be noted that offers of left and right lobes are included. The proportion of offers accepted and not used has increased for both all liver only offers and all offers excluding non-transplanted fast-track offers.

offer ou	utcome							
		Forty-two months prior t	o NLOS (N (%))			Forty-two months post	to NLOS (N (%))	
Centre offered	Declined	Accepted but subsequently declined	Accepted and transplanted	Total	Declined	Accepted but subsequently declined	Accepted and transplanted	Total
A. All liver only c	offers							
Newcastle	404 (76)	10 (2)	118 (22)	532	879 (88)	20 (2)	105 (10)	1004
Leeds	499 (53)	45 (5)	393 (42)	937	868 (64)	149 (11)	333 (25)	1350
Cambridge	293 (53)	16 (3)	242 (44)	551	598 (69)	49 (6)	219 (25)	866
Royal Free	328 (50)	22 (3)	303 (46)	633	541 (57)	116 (12)	298 (31)	955
Kings College	403 (39)	49 (5)	583 (56)	1035	1165 (58)	211 (10)	641 (32)	2017
Birmingham	352 (35)	44 (4)	597 (60)	993	852 (50)	230 (13)	636 (37)	1718
Edinburgh	346 (54)	9 (1)	281 (44)	636	574 (65)	75 (8)	238 (27)	887
Total	2625 (49)	195 (4)	2517 (47)	5317	5477 (62)	850 (10)	2470 (28)	8797
B. Excluding fast	t-track offer	s that were not accept	ed and transpl	anted or al	l positive vi	rology/ DCD offers		
Newcastle	341 (73)	10 (2)	118 (25)	469	535 (82)	18 (3)	103 (16)	656
Leeds	442 (50)	43 (5)	393 (45)	878	610 (57)	136 (13)	328 (31)	1074
Cambridge	240 (48)	15 (3)	242 (49)	497	346 (57)	42 (7)	214 (36)	602
Royal Free	272 (46)	21 (4)	303 (51)	596	313 (44)	109 (15)	294 (41)	716
Kings College	363 (37)	48 (5)	583 (59)	994	933 (53)	188 (11)	633 (36)	1754
Birmingham	312 (33)	44 (5)	597 (63)	953	658 (44)	212 (14)	633 (42)	1503
Edinburgh	273 (48)	9 (2)	281 (50)	563	271 (47)	71 (12)	237 (41)	579
Total	2243 (45)	190 (4)	2517 (51)	4950	3666 (53)	776 (11)	2442 (35)	6884

Table 12 Offer outcome for DBD livers that were offered <u>and ultimately transplanted</u>, 20 September 2014 to 19 September 2021, by centre, time period and offer outcome

- 3.6.18. 5082 (33%) of the 15251 offers made in the first 42 months post NLOS were to named recipients. All offers between 27 March and 9 July 2020 are excluded as centres were offered livers for any clinically urgent patient rather than named patients.
- 3.6.19. The number of named patient offers per donor ranged between 1 and 10 with a median of one named patient offers per donor. The number of named offers per patient ranged between 1 and 27 with a median of two offers per patient. Twenty-nine patients at 7 centres were offered 11 or more livers in the forty-two month time period (12 were offered 11 livers, 4 were offered 12 livers, 4 were offered 13 livers, 4 were offered 14 livers, 1 was offered 16 livers, 2 were offered 17, 1 was offered 25 livers and 1 was offered 27 livers).
- 3.6.20. **Table 13** shows the outcome of named patient liver offers made during the first forty-two months of the new scheme by type of patient and, for Chronic Liver Disease (CLD) patients, aetiology. It also shows the offer outcome after excluding named patients offers for livers that were ultimately not transplanted. Overall, forty-four percent of named patient offers were accepted and 26% were accepted and transplanted. The number of transplants will not agree with the flow chart in **Figure 12A** as **Table 13** includes all elective named patient offers and will include livers that were offered as a right lobe after being accepted for super-urgent and hepatoblastoma patients.
- 3.6.21. Table 14 shows the outcome of named patient liver offers made during the first forty-two months of the new scheme by type of patient and centre for CLD/HCC patients while Table 14A shows the equivalent information for variant syndrome patients. The proportion transplanted by centre ranged between 17% and 31% for elective CLD/HCC patients and 13% to 30% for elective variant syndrome patients.
- 3.6.22. **Table 15** shows the outcome of named patient liver offers made during the first forty-two months of the new scheme by type of patient and blood group, separately, for CLD/HCC patients and variant syndrome patients.
- 3.6.23. **Table 16** shows the outcome of HCC named patient liver offers made during the first forty-two months of the new scheme by UKELD, current ascites and encephalopathy grade. The majority of patients offered a liver had a UKELD of 54 or greater at offering and had no or mild ascites and encephalopathy grade 0.

		Offe	r outcome for all	named patient off	Offer outcome for all named patient offers for livers that we				
Type of patient	Disease group	Declined	Accepted but not used	Transplanted	Total	Declined	Accepted but not used	Transplanted	Total
Chronic Liver	Hepatitis C	63 (53)	22 (18)	35 (29)	120	33 (41)	12 (15)	35 (44)	80
Disease (CLD)	ALD	714 (52)	271 (20)	387 (28)	1372	401 (44)	118 (13)	387 (43)	906
	Hepatitis B	22 (47)	3 (6)	22 (47)	47	17 (43)	1 (3)	22 (55)	40
	PSC	272 (55)	92 (18)	134 (27)	498	175 (49)	46 (13)	134 (38)	355
	PBC	185 (52)	59 (17)	110 (31)	354	107 (43)	32 (13)	110 (44)	249
	AID	209 (54)	70 (18)	109 (28)	388	134 (47)	42 (15)	109 (38)	285
	Metabolic	508 (57)	146 (16)	236 (27)	890	289 (48)	71 (12)	236 (40)	596
	Other	85 (63)	20 (15)	29 (22)	134	55 (56)	14 (14)	29 (30)	98
	Retransplant	368 (63)	104 (18)	112 (19)	584	232 (56)	69 (17)	112 (27)	413
epatocellular c	arcinoma								
HCC)		118 (53)	42 (19)	61 (28)	221	72 (46)	22 (14)	61 (39)	155
otal elective C	CLD/HCC	2544 (55)	829 (18)	1235 (27)	4608	1515 (48)	427 (13)	1235 (39)	3177
ariant syndrom	ne	287 (61)	89 (19)	98 (21)	474	180 (56)	46 (14)	98 (30)	324
otal named pa	atient offers	2831 (56)	918 (18)	1333 (26)	5082	1695 (48)	473 (14)	1333 (38)	3501

 Table 13
 Offer outcome for named elective patient offers made between 20 March 2018 and 19 September 2021 (excluding 27 March 2020 to 9 July 2020), by aetiology

Table 14	Offer outcome fo 9 July 2020), by	or named elect aetiology and	ive CLD/HCC pati centre	ent offers made b	etween 20 I	March 2018 and	I 19 September 20	21 (excluding 27 M	March 2020 to	
		Offe	r outcome for all	named patient off	ers	Offer outco	Offer outcome for all named patient offers for livers that were ultimately transplanted			
Type of patient	Centre	Declined	Accepted but not used	Transplanted	Total	Declined	Accepted but not used	Transplanted	Total	
Chronic Liver	Newcastle	276 (76)	31 (8)	58 (16)	365	167 (71)	9 (4)	58 (25)	234	
Disease	Leeds	292 (53)	110 (20)	148 (27)	550	165 (45)	54 (15)	148 (40)	367	
(CLD)	Cambridge	343 (65)	68 (13)	116 (22)	527	213 (59)	33 (9)	116 (32)	362	
	Royal Free	323 (53)	125 (21)	160 (26)	608	204 (46)	83 (19)	160 (36)	447	
	Kings College	534 (54)	163 (17)	283 (29)	980	314 (48)	64 (10)	283 (43)	661	
	Birmingham	381 (44)	213 (25)	269 (31)	863	204 (34)	120 (20)	269 (45)	593	
	Edinburgh	277 (56)	77 (16)	140 (28)	494	176 (49)	42 (12)	140 (39)	358	
Hepatocellul	Newcastle	8 (57)	1 (7)	5 (36)	14	5 (50)	0	5 (50)	10	
ar carcinoma	Leeds	22 (47)	14 (30)	11 (23)	47	12 (39)	8 (26)	11 (35)	31	
(HCC)	Cambridge	22 (81)	1 (4)	4 (15)	27	15 (75)	1 (5)	4 (20)	20	
	Royal Free	7 (32)	5 (23)	10 (45)	22	5 (29)	2 (12)	10 (59)	17	
	Kings College	18 (49)	7 (19)	12 (32)	37	12 (43)	4 (14)	12 (43)	28	
	Birmingham	21 (60)	4 (11)	10 (29)	35	11 (46)	3 (13)	10 (42)	24	
	Edinburgh	20 (51)	10 (26)	9 (23)	39	12 (48)	4 (16)	9 (36)	25	
Total	Newcastle	284 (75)	32 (8)	63 (17)	379	172 (70)	9 (4)	63 (26)	244	
elective	Leeds	314 (53)	124 (21)	159 (27)	597	177 (44)	62 (16)	159 (40)	398	
CLD/HCC	Cambridge	365 (66)	69 (12)	120 (22)	554	228 (60)	34 (9)	120 (31)	382	
	Royal Free	330 (52)	130 (21)	170 (27)	630	209 (45)	85 (18)	170 (37)	464	
	Kings College	552 (54)	170 (17)	295 (29)	1017	326 (47)	68 (10)	295 (43)	689	
	Birmingham	402 (45)	217 (24)	279 (31)	898	215 (35)	123 (20)	279 (45)	617	
	Edinburgh	297 (56)	87 (16)	149 (28)	533	188 (49)	46 (12)	149 (39)	383	
	Edinburgh	297 (56)	87 (16)	149 (28)	533	188 (49)	46 (12)	149 (39)		

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Table 14A	Offer outcome for named elective variant syndrome patient offers made between 20 March 2018 and 19 September 2021 (excluding 27 March 2020 to 9 July), by aetiology and centre											
		Offe	r outcome for all	named patient off	ers	Offer outcor	ne for all named p ultimately	atient offers for liv transplanted	vers that wer			
Type of	Centre	Declined	Accepted but	Transplanted	Total	Declined	Accepted but	Transplanted	Total			
patient			not used				not used					
Variant	Newcastle	17 (74)	3 (13)	3 (13)	23	9 (69)	1 (8)	3 (23)	13			
syndrome	Leeds	48 (64)	11 (15)	16 (21)	75	25 (51)	8 (16)	16 (33)	49			
	Cambridge	14 (58)	6 (25)	4 (17)	24	6 (55)	1 (9)	4 (36)	11			
	Royal Free	17 (57)	4 (13)	9 (30)	30	11 (48)	3 (13)	9 (39)	23			
	Kings College	128 (64)	37 (19)	35 (18)	200	92 (63)	20 (14)	35 (24)	147			
	Birmingham	41 (46)	23 (26)	26 (29)	90	24 (39)	11 (18)	26 (43)	61			
	Edinburgh	22 (69)	5 (16)	5 (16)	32	13 (65)	2 (10)	5 (25)	20			

Table 15	Offer outcome to 9 July 2020	e for named el), by aetiology	ective CLD/HCC p and blood group	oatient offers mad	e between :	20 March 2018 a	and 19 September	r 2021 (excluding :	27 March 2020		
		Offe	r outcome for all	named patient off	ers	Offer outcor	Offer outcome for all named patient offers for livers that were				
Type of patient	Blood group	Declined	Accepted but not used	Transplanted	Total	Declined	Accepted but not used	Transplanted	Total		
Chronic Liver	0	1065 (58)	322 (17)	462 (25)	1849	626 (50)	171 (14)	462 (37)	1259		
Disease (CLD)	А	1003 (54)	338 (18)	511 (28)	1852	620 (48)	174 (13)	511 (39)	1305		
	В	231 (53)	84 (19)	123 (28)	438	126 (43)	41 (14)	123 (42)	290		
	AB	127 (51)	43 (17)	78 (31)	248	71 (42)	19 (11)	78 (46)	168		
Hepatocellular	0	27 (46)	16 (27)	16 (27)	59	18 (44)	7 (17)	16 (39)	41		
carcinoma	А	73 (63)	11 (10)	31 (27)	115	44 (54)	6 (7)	31 (38)	81		
(HCC)	В	10 (45)	8 (36)	4 (18)	22	5 (38)	4 (31)	4 (31)	13		
	AB	8 (32)	7 (28)	10 (40)	25	5 (25)	5 (25)	10 (50)	20		
Total elective	0	1092 (57)	338 (18)	478 (25)	1908	644 (50)	178 (14)	478 (37)	1300		
CLD/HCC	Α	1076 (55)	349 (18)	542 (28)	1967	664 (48)	180 (13)	542 (39)	1386		
	В	241 (52)	92 (20)	127 (28)	460	131 (43)	45 (15)	127 (42)	303		
	AB	135 (49)	50 (18)	88 (32)	273	76 (40)	24 (13)	88 (47)	188		
Variant	0	167 (64)	43 (16)	51 (20)	261	103 (60)	19 (11)	51 (29)	173		
syndrome	Α	97 (56)	39 (23)	36 (21)	172	64 (52)	22 (18)	36 (30)	122		
	В	15 (52)	6 (21)	8 (28)	29	9 (43)	4 (19)	8 (38)	21		
	AB	8 (67)	1 (8)	3 (25)	12	4 (50)	1 (13)	3 (38)	8		

Table 16 Offer outcome for named elective ascites and encephalopathy grad	e HCC patier le	nt offers between 20	March 2018 and	19 Septen	nber 2021 (exc	luding 27 March 2	2020 to 9 July 2020), by UKELD,	
	Off	er outcome for all na	amed patient offe	rs	Offer outcome for all named patient offers for livers that were ultimately transplanted				
Ascites and encephalopathy grade	Declined	Accepted but not used	Transplanted	Total	Declined	Accepted but not used	Transplanted	Total	
UKELD < 49									
No ascites and encephalopathy grade 0	16 (50)	6 (19)	10 (31)	32	9 (39)	4 (17)	10 (43)	23	
Mild ascites and encephalopathy grade 0	2 (100)	0 (0)	0 (0)	2	2 (100)	0 (0)	0 (0)	2	
Moderate ascites and encephalopathy grade 0	3 (60)	2 (40)	0 (0)	5	1 (50)	1 (50)	0 (0)	2	
TOTAL	21 (54)	8 (21)	10 (26)	39	12 (44)	5 (19)	10 (37)	27	
UKELD 49 - 53									
No ascites and encephalopathy grade 0	23 (56)	8 (20)	10 (24)	41	12 (46)	4 (15)	10 (38)	26	
Mild ascites and encephalopathy grade 0	2 (40)	2 (40)	1 (20)	5	2 (40)	2 (40)	1 (20)	5	
Moderate ascites and encephalopathy grade 0	1 (50)	1 (50)	0 (0)	2	1 (100)	0 (0)	0 (0)	1	
Severe ascites and encephalopathy grade 0	4 (100)	0 (0)	0 (0)	4	3 (100)	0 (0)	0 (0)	3	
No ascites and encephalopathy grade 1	3 (75)	0 (0)	1 (25)	4	2 (67)	0 (0)	1 (33)	3	
Mild ascites and encephalopathy grade 1	1 (50)	0 (0)	1 (50)	2	1 (50)	0 (0)	1 (50)	2	
Moderate ascites and encephalopathy grade 1	0 (0)	0 (0)	1 (100)	1	0 (0)	0 (0)	1 (100)	1	
TOTAL	34 (58)	11 (19)	14 (24)	59	21 (51)	6 (15)	14 (34)	41	
UKELD 54 or over									
No ascites and encephalopathy grade 0	21 (54)	9 (23)	9 (23)	39	11 (48)	3 (13)	9 (39)	23	
Mild ascites and encephalopathy grade 0	20 (51)	7 (18)	12 (31)	39	16 (48)	5 (15)	12 (36)	33	
Moderate ascites and encephalopathy grade 0	6 (55)	0 (0)	5 (45)	11	4 (44)	0 (0)	5 (56)	9	
Severe ascites and encephalopathy grade 0	4 (100)	0 (0)	0 (0)	4	3 (100)	0 (0)	0 (0)	3	
No ascites and encephalopathy grade 1	3 (33)	3 (33)	3 (33)	9	1 (17)	2 (33)	3 (50)	6	
Mild ascites and encephalopathy grade 1	5 (63)	0 (0)	3 (38)	8	2 (40)	0 (0)	3 (60)	5	
Moderate ascites and encephalopathy grade 1	4 (36)	4 (36)	3 (27)	11	2 (33)	1 (17)	3 (50)	6	
Severe ascites and encephalopathy grade 1	0 (0)	0 (0)	2 (100)	2	0 (0)	0 (0)	2 (100)	2	
TOTAL	63 (51)	23 (19)	37 (30)	123	39 (45)	11 (13)	37 (43)	87	

OVERALL								
No ascites and encephalopathy grade 0	60 (54)	23 (21)	29 (26)	112	32 (44)	11 (15)	29 (40)	72
Mild ascites and encephalopathy grade 0	24 (52)	9 (20)	13 (28)	46	20 (50)	7 (18)	13 (33)	40
Moderate ascites and encephalopathy grade 0	10 (56)	3 (17)	5 (28)	18	6 (50)	1 (8)	5 (42)	12
Severe ascites and encephalopathy grade 0	8 (100)	0 (0)	0 (0)	8	6 (100)	0 (0)	0 (0)	6
No ascites and encephalopathy grade 1	6 (46)	3 (23)	4 (31)	13	3 (33)	2 (22)	4 (44)	9
Mild ascites and encephalopathy grade 1	6 (60)	0 (0)	4 (40)	10	3 (43)	0 (0)	4 (57)	7
Moderate ascites and encephalopathy grade 1	4 (33)	4 (33)	4 (33)	12	2 (29)	1 (14)	4 (57)	7
Severe ascites and encephalopathy grade 1	0 (0)	0 (0)	2 (100)	2	0 (0)	0 (0)	2 (100)	2

3.6.24. Figure 13 shows the number of named patient offers by month and type of patient. The median number of CLD named patient offers per month, excluding offers between 20 March and 19 July 2020, was 104.5 and ranged between 28 and 199 whilst the median number of HCC offers per month was 4.5 and ranged between 1 and 18 excluding the month between 20 August 2019 and 19 September 2019 due to issues with NLOS.





3.6.25. Table 17 shows the median Transplant Benefit Score (TBS) at time of offer for named elective CLD patient offers by, separately, aetiology, blood group and centre. Overall, the median TBS was 1156 days and ranged between -138 and 1627 days. The median TBS ranged between 987 days for other aetiology and 1252 days for AID. For blood group, the median TBS ranged between 994 days for blood group AB and 1210 days for blood group O.

Table 17	Median (Range disease (CLD) March 2020 to	e) Transplant Be patient offers, 2 9 July 2020)	nefit Score (TBS 0 March 2018 to	6) for named electi 19 September 202	ve chronic liver 21 (excluding 27
		Number of offers	Median TBS	Interquartile range	Range
Disease grou	qu				
Hepatitis C		120	1094.43475	910 - 1296	-43 - 1431
ALD		1372	1212.76692	1027 - 1329	-138 - 1626
Hepatitis B		47	1175.16709	974 - 1370	520 - 1617
PSC		498	1140.71510	988 - 1282	-23 - 1560
PBC		354	1079.04710	971 - 1223	368 - 1452
AID		388	1251.59495	1036 - 1372	-93 - 1620
Metabolic		890	1178.09187	1038 - 1317	235 - 1627
Other		134	986.73166	811 - 1104	-118 - 1480
Retransplant		584	1094.42079	975 - 1208	9 - 1512
Blood group					
0		1849	1210.94787	1079 - 1330	-53 - 1627
А		1852	1105.42379	943 - 1269	-118 - 1620
В		438	1140.97496	969 - 1291	-23 - 1560
AB		248	993.57591	735 - 1205	-138 - 1551
Centre					
Newcastle		365	1212.12665	1026 - 1320	11 - 1592
Leeds		550	1141.32854	1016 - 1291	-138 - 1574
Cambridge		527	1158.89249	986 - 1296	235 - 1591
Royal Free		608	1171.41758	998 - 1308	-23 - 1577
Kings College)	980	1148.47674	1010 - 1303	-118 - 1627
Birmingham		863	1137.50599	977 - 1300	-53 - 1626
Edinburgh		494	1155.42002	1013 - 1293	106 - 1620
OVERALL		4387	1155.83579	1001 - 1300	-138 - 1627

3.6.26. **Table 18** shows the median Transplant Benefit Score (TBS) at time of offer for named elective HCC patient offers by, separately, blood group, centre, UKELD group, current ascites and encephalopathy grade. The median TBS ranged between 415 days for blood group AB and 1106 days for blood group O.

Table 18	Median (Range) Transplant Benefit Score (TBS) for named elective hepatocellular carcinoma (HCC) patient offers, 20 March 2018 to 19 September 2021 (excluding 27 March 2020 to 9 July 2020)								
		Number of offers	Median TBS	Interquartile range	Range				
Blood group									
0		59	1106.12263	916 - 1268	23 - 1450				
A		115	933.98734	597 - 1081	-356 - 1493				
В		22	741.82521	355 - 1028	-130 - 1289				
AB		25	414.75382	274 - 549	-256 - 1011				
Centre									
Newcastle		14	680.92554	479 - 767	-192 - 1369				
Leeds		47	967.38588	668 - 1037	-130 - 1268				
Cambridge		27	866.27496	355 - 1315	-32 - 1493				
Royal Free		22	659.29795	445 - 1303	-256 - 1414				
Kings College		37	1055.99250	670 - 1148	-118 - 1475				
Birmingham		35	980.25665	479 - 1105	-356 - 1350				
Edinburgh		39	929.44353	324 - 1104	-66 - 1450				
UKELD group									
<49		39	191.72407	-2 - 403	-256 - 1016				
49-53		59	757.32215	448 - 1016	-356 - 1360				
≥ 54		123	1065.57525	899 - 1247	30 - 1493				
UKELD, Current ascites encephalopathy grade <49	and								
No ascites and encephalo	pathy grade 0	32	133.51099	-4 - 409	-256 - 1016				
Mild ascites and encephal	opathy grade 0	2	264.70764	-103 - 633	-103 - 633				
Moderate ascites and ence	ephalopathy grade 0	5	276.31535	274 - 276	219 - 297				
49 - 53									
No ascites and encephalo	pathy grade 0	41	980.25665	643 - 1049	-356 - 1360				
Mild ascites and encephale	opathy grade 0	5	597.37323	448 - 916	-118 - 967				
Moderate ascites and ence	ephalopathy grade 0	2	128.83332	-66 - 324	-66 - 324				
Severe ascites and encept	halopathy grade 0	4	383.35928	300 - 441	235 - 479				
No ascites and encephalo	pathy grade 1	4	668.42547	607 - 730	582 - 756				
Mild ascites and encephal	opathy grade 1	2	-22.97327	-3214	-3214				
Moderate ascites and ence	ephalopathy grade 1	1	603.31420	603 - 603	603 - 603				
≥ 54									
No ascites and encephalo	pathy grade 0	39	1062.35979	938 - 1228	493 - 1319				
Mild ascites and encephale	opathy grade 0	39	1256.03316	889 - 1369	515 - 1493				
Moderate ascites and ence	ephalopathy grade 0	11	1104.48748	1062 - 1173	642 - 1450				
Severe ascites and encept	halopathy grade 0	4	941.63945	546 - 1036	236 - 1045				
No ascites and encephalo	pathy grade 1	9	931.17751	763 - 976	30 - 1437				
Mild ascites and encephale	opathy grade 1	8	1058.00760	917 - 1164	676 - 1287				
Moderate ascites and ence	ephalopathy grade 1	11	1093.70070	791 - 1179	355 - 1350				
Severe ascites and encept	halopathy grade 1	2	866.82466	570 - 1164	570 - 1164				
OVERALL		221	933.98734	499 - 1111	-356 - 1493				

3.7. TRANSPLANT ACTIVITY

3.7.1. Table 19 shows the urgency status and age group of DBD and DCD liver transplants performed in the UK during the two time periods of interest. The proportion of super-urgent transplants performed in the first forty-two months of the new NLOS scheme was similar to the proportion performed during the forty-two months prior to the new scheme and there was no evidence of a statistically significant difference for DBD liver and liver/kidney transplants (overall Fishers exact p-value=0.33 for adult patients and 0.44 for paediatric). Highlighted in red are the transplants that will be analysed further in the rest of the section.

Table 19 Urgency status and age group f20 September 2014 to 19 Septer	or deceased donc nber 2021, as at 3	or liver transplant 0 September 2021	s performed in the I	e UK,	
	DBD	liver	DCD liver		
	Forty-two months prior N (%)	Forty-two months post N (%)	Forty-two months prior N (%)	Forty-two months post N (%)	
Adult elective liver and liver/kidney Adult elective Multivisceral Adult elective liver/ cardiothoracic Adult super-urgent liver and liver/kidney Adult super-urgent Multivisceral Paediatric elective liver and liver/kidney Paediatric elective Multivisceral	1976 (76.7) 18 (0.7) 3 (0.1) 310 (12.0) 2 (0.1) 208 (8.1) 13 (0.5)	1953 (77.1) 18 (0.7) 7 (0.3) 281 (11.1) 0 (0) 209 (8.2) 11 (0.4)	678 (96.2) 0 (0) 0 (0) 7 (1.0) 0 (0) 19 (2.7) 0 (0)	557 (97.2) 0 (0) 0 (0) 6 (1.0) 0 (0) 8 (1.4) 0 (0)	
Paediatric super-urgent liver and liver/kidney Total UK transplants	45 (1.7) 2575 (100)	55 (2.2) 2534 (100)	1 (0.1) 705 (100)	2 (0.3) 573 (100)	

- 3.7.2. One hundred and forty one of the 1953 adult elective liver and liver/kidney transplants were performed in the UK between 27 March 2020 and 9 July 2020. These transplants are **excluded** from the rest of the section as DBD livers were not offered through the National Liver Offering Scheme due to COVID-19, and both DBD and DCD livers were offered to clinically urgent patients. One group 2 transplant performed at London Bridge on 6 February 2021 and three intestinal liver only transplants performed at Cambridge between August 2017 and September 2018 have been excluded from the rest of this section.
- 3.7.3. **Table 20** and **Table 21** show the demographics of adult elective liver and liver/kidney DBD and DCD transplants performed in the UK during the two time periods of interest excluding transplants performed between 27 March and 9 July 2020. For both DBD and DCD transplants, there was no evidence of a statistically significant association between time period and transplant type (p=0.13 DBD, 0.44 DCD), type of liver transplanted for DBD (p=0.35) and gender (p=0.18 DBD, 0.16 DCD).
- 3.7.4. For DBD transplants, there was evidence of a statistically significant association between time period and age group (p=0.0016), disease group (p<0.0001), transplant centre (p=0.02), zonal (p<0.0001), type of patient (p=0.0001) and blood group compatibility (p<0.0001).</p>

3.7.5. For DCD transplants, there was evidence of a statistically significant association between time period and disease group (p<0.0001), transplant centre (p<0.0001), type of patient (p=0.0007) and blood group compatibility (p=0.0073). There was no evidence of a statistically significant association for age group (p=0.13) and zonal transplants (p=0.37).

Table 20 Adult elective liver and liver/kidney transplants performed in the UK using livers from deceased donors, 20 September 2014 to 19 September 2021 (excluding 27 March to 9 July 2020) as at 30 September 2021

	DBD	liver	DCD	liver
Total	Forty-two months prior N (%) 1974	Forty-two months post N (%) 1833	Forty-two months prior N (%) 678	Forty-two months post N (%) 534
lotal	1374	1055	0/0	554
Transplant Type Liver only Liver & kidney	1920 (97.3) 54 (2.7)	1797 (98.0) 36 (2.0)	678 (100) 0 (-)	533 (99.8) 1 (0.2)
Type of Liver Transplanted Whole liver Split liver Reduced liver	1822 (92.3) 151 (7.6) 1 (0.1)	1714 (93.5) 118 (6.4) 1 (0.1)	678 (100) 0 (-) 0 (-)	534 (100) 0 (-) 0 (-)
Recipient Age Group				
17-25 years 26-39 years 40-49 years 50-59 years 60-69 years 70+ years	106 (5.4) 242 (12.3) 336 (17.0) 643 (32.6) 609 (30.9) 38 (1.9)	105 (5.7) 185 (10.1) 245 (13.4) 605 (33.0) 654 (35.7) 39 (2.1)	12 (1.8) 38 (5.6) 113 (16.7) 270 (39.8) 225 (33.2) 20 (2.9)	11 (2.1) 50 (9.4) 73 (13.7) 212 (39.7) 177 (33.1) 11 (2.1)
Recipient Sex				
Male Female	1290 (65.3) 684 (34.7)	1159 (63.2) 674 (36.8)	438 (64.6) 240 (35.4)	366 (68.5) 168 (31.5)
Type of Patient				
CLD HCC VS HCC downstaging ACLF	1460 (74.0) 346 (17.5) 157 (8.0) 11 (0.6) 0 (-)	1473 (80.4) 208 (11.3) 139 (7.6) 11 (0.6) 2 (0.1)	435 (64.2) 217 (32.0) 22 (3.2) 4 (0.6) 0 (-)	298 (55.8) 210 (39.3) 11 (2.1) 14 (2.6) 1 (0.2)
Robert's Disease Group				
HCC	357 (18.1)	219 (11.9)	221 (32.6)	224 (41.9)
HCV	90 (4.6)	42 (2.3)	23 (3.4)	10 (1.9)
	445 (22.5)	488 (26.6)	170 (25.1)	109 (20.4)
PSC	243 (12 3)	199 (10.9)	59 (87)	50 (9.4)
PBC	123 (6.2)	152 (8.3)	76 (11.2)	36 (6.7)
AID	114 (5.8)	149 (8.1)	31 (4.6)	18 (3.4)
NAFLD	174 (8.8)	223 (12.2)	60 (8.8)	32 (6.0)
Metabolic (excluding NAFLD)	36 (1.8)	49 (2.7)	9 (1.3)	7 (1.3)
Retransplant	169 (8.6) 196 (9.9)	127 (6.9) 159 (8.7)	5 (0.7)	24 (4.5) 19 (3.6)

	DBD Forty-two	liver Forty-two	DCD Forty-two	liver Forty-two
Total	months prior N (%) 1974	months post N (%) 1833	N (%) 678	months post N (%) 534
Transplant Centre Newcastle Leeds Cambridge Royal Free Kings College Birmingham Edinburgh	104 (5.3) 301 (15.2) 200 (10.1) 251 (12.7) 419 (21.2) 443 (22.4) 256 (13.0)	82 (4.5) 229 (12.5) 179 (9.8) 253 (13.8) 443 (24.2) 445 (24.3) 202 (11.0)	20 (2.9) 76 (11.2) 111 (16.4) 51 (7.5) 169 (24.9) 191 (28.2) 60 (8.8)	14 (2.6) 63 (11.8) 125 (23.4) 83 (15.5) 129 (24.2) 88 (16.5) 32 (6.0)
Liver Transplant Number First liver transplant Second Third Fourth Sixth	1778 (90.1) 159 (8.0) 30 (1.5) 6 (0.3) 1 (0.1)	1673 (91.3) 135 (7.4) 20 (1.1) 5 (0.3) 0 (-)	673 (99.3) 4 (0.6) 1 (0.1) 0 (-) 0 (-)	515 (96.4) 18 (3.4) 1 (0.2) 0 (-) 0 (-)
Blood Group Compatibility Identical Compatible Incompatible	1946 (98.6) 27 (1.4) 1 (0.1)	1754 (95.7) 79 (4.3) 0 (-)	670 (98.8) 7 (1.0) 1 (0.1)	515 (96.4) 19 (3.6) 0 (-)
Zonal Transplants Non zonal Zonal	492 (24.9) 1482 (75.1)	1474 (80.4) 359 (19.6)	246 (36.3) 432 (63.7)	208 (39.0) 326 (61.0)
Blood group matching (D=donor, R=recipient) DO, RO DO, RA DO, RB DO, RAB DA, RO DA, RA DA, RAB DB, RB DB, RAB DAB, RAB	843 (42.7) 1 (0.1) 4 (0.2) 0 (-) 1 (0.1) 838 (42.5) 22 (1.1) 206 (10.4) 0 (-) 59 (3.0)	776 (42.3) 10 (0.5) 13 (0.7) 0 (-) 0 (-) 741 (40.4) 44 (2.4) 176 (9.6) 12 (0.7) 61 (3.3)	326 (48.1) 1 (0.1) 2 (0.3) 0 (-) 1 (0.1) 272 (40.1) 3 (0.4) 63 (9.3) 1 (0.1) 9 (1.3)	$\begin{array}{c} 241 \ (45.1) \\ 5 \ (0.9) \\ 11 \ (2.1) \\ 1 \ (0.2) \\ 0 \ (-) \\ 216 \ (40.4) \\ 1 \ (0.2) \\ 48 \ (9.0) \\ 1 \ (0.2) \\ 10 \ (1.9) \end{array}$

Table 21 Adult elective liver and liver/kidney transplants performed in the UK using liversfrom deceased donors, 20 September 2014 to 19 September 2021 (excluding 27March to 9 July 2020) as at 30 September 2021

3.7.6. **Table 22** shows the median waiting time to transplant for the adult elective transplants performed in the UK during the two time periods of interest (excluding 27 March to 9 July 2020) by donor type, transplant centre, blood group and type of patient. Overall, the median time to transplant was statistically significantly lower for DBD transplants performed during the forty-two months post NLOS compared with the forty-two months prior (36 and 87 days respectively, Kruskal-Wallis p-value<0.0001). The median time to DCD transplants was slightly lower in the forty-two months post NLOS compared with the forty-two months prior (62 and 69.5 days respectively) and was also statistically significant (Kruskal-Wallis p-value=0.033).

Table 22	Media donor	n (IQR; range) time s, 20 September 20	to transpla 14 to 19 Se	nt (day: ptembe	s) for adult elective li r 2021 (excluding 27	ver and live March to 9	er/kidn July 2	ey transplants perfo 020) as at 30 Septem	rmed in the ber 2021	UK us	ing livers from dece	ased
			DE	BD					D	CD		
	N F	Forty-two months p Median (IQR)	orior Range	N	Forty-two months p Median (IQR)	ost Range	N	Forty-two months p Median (IQR, range)	rior Range	N	Forty-two months µ Median (IQR, range)	oost Range
Overall	1969	87 (29 - 227)	0 - 2425	1833	36 (9 - 133)	0 - 1711	678	69.5 (27 - 185)	0 - 1202	534	62 (23 - 143)	0 - 1278
Type of patier	nt											
CLD	1457	77 (25 - 205)	0 - 2425	1473	26 (8 - 96)	0 - 1687	435	76 (26 - 185)	0 - 1202	298	65.5 (20 - 147)	0 - 1101
HCC	345	95 (38 - 209)	0 - 1030	208	61.5 (23.5 - 145)	0 - 767	217	65 (28 - 177)	0 - 1026	210	60.5 (25 - 141)	2 - 1278
VS	157	247 (95 - 553)	2 - 2307	139	346 (161 - 667)	2 - 1711	22	255.5 (48 - 381)	7 - 1070	11	117 (70 - 300)	5 - 559
HCC	10	91.5 (78 - 131)	16 - 384	11	22 (10 - 65)	4 - 204	4	53 (32 – 89.5)	13 - 124	14	34.5 (17 - 55)	11 - 323
downstaging ACLF	0	-	-	2	485 (2 – 968)	2 - 968	0	-	-	1	2 (2 – 2)	2 – 2
Centre												
Newcastle	103	68 (18 - 194)	1 - 787	82	40 (14 - 114)	1 – 760	20	102.5 (42.5 - 284)	5 - 1070	14	213 (120 - 452)	22 – 797
Leeds	299	62 (24 - 195)	1 - 1402	229	33 (9 - 125)	1 - 1405	76	61.5 (24 - 156) [′]	0 - 1026	63	49 (14 - 102)	2 – 565
Cambridge	200	75.5 (27 - 209)	0 - 1343	179	24 (9 - 76)	0 - 760	111	65 (25 - 181) [´]	0 - 870	125	58 (20 - 130)	1 - 625
Royal Free	250	124.5 (51 - 256)	0 - 1107	253	31 (9 - 106)	0 - 1261	51	72 (34 – 185)	1 – 613	83	57 (24 - 143)	2 - 693
Kings College	419	154 (64 - 329)	1 - 2425	443	41 (10 - 160)	0 - 1711	169	139 (56 - 290)	4 - 1202	129	84 (34 - 179)	1 - 1101
Birmingham	442	70.5 (26 - 182)	0 - 2307	445	47 (9 - 157)	0 - 1657	191	44 (19 - 106)	0 - 548	88	50 (18.5 – 105.5)	0 - 487
Edinburgh	256	51 (19 - 130)	0 - 1835	202	35.5 (8 - 132)	1 - 1124	60	69.5 (25.5 – 186.5)	0 - 808	32	49.5 (29.5 -162.5)	2 - 1278
Recipient blo	∣ od group)										
0	842	123 (43 - 313)	0 - 2307	776	54 (12 - 195)	0 - 1711	327	106 (34 - 257)	0 - 1070	241	80 (26 - 178)	0 - 1278
А	837	63 (22 - 149)	0 - 1321	751	25 (7 - 95)	0 - 1056	273	48 (19 - 109)	0 - 711	221	51 (22 - 107)	2 - 588
В	209	130 (57 - 289)	0 - 2425	189	59 (17 - 148)	2 - 1518	65	105 (45 - 246)	4 - 1202	59	92 (40 - 171)	1 - 607
AB	81	42 (14 - 105)	0 - 540	117	22 (7 - 62)	1 - 466	13	44 (10 - 111)	3 - 183	13	23 (8 - 84)	6 - 111

- 3.7.7. Figure 14 show the overall cold ischaemia time for the two time periods for DBD transplants while Figure 15 shows the cold ischaemia time for each centre. Figures 16 and Figure 17 show the equivalent information for DCD donor transplants. There was no statistically significant difference in the overall median cold ischaemia time for DCD transplants (Kruskal-Wallis p-value=0.48).
- 3.7.8. There was a statistically significant difference in the cold ischaemia time for adult elective DBD transplants when comparing the first forty-two months with the previous forty-two months (p<0.0001). However, it should be noted that these results will change as NHSBT has not received all the first week transplant record forms which collect the cold ischaemia time. It should also be noted that this analysis does not adjust for whether machine perfusion was used.</p>









3.8. NINETY-DAY POST-TRANSPLANT SURVIVAL

- 3.8.1.**Figure 18** shows the unadjusted ninety-day patient survival by time period and donor type for transplants performed in either the thirty-nine months prior to NLOS or in the first thirty-nine months of NLOS while **Table 23** shows the survival estimates and confidence intervals by blood group and type of patient. Transplants performed between 27 March 2020 and 9 July 2020 were excluded due to offering during COVID-19. Patient survival was defined as the time from first transplant to death or last known survival reported to NHSBT irrespective of whether the patient received a retransplant after their first transplant.
- 3.8.2.For DBD transplants, there was no overall statistically significant difference between the two time periods in ninety-day patient survival (log-rank p-value=0.41). However, there was a statistically significant difference in ninety-day survival for blood group O patients (log-rank p-value=0.02). There were no statistically significant differences between the two time periods for CLD and HCC (log rank p-value≥0.13), and for the individual centres (log-rank p-value≥0.34) apart from centre 7 which had borderline significance p-value=0.07.
- 3.8.3.For DCD transplants, there was no overall statistically significant difference at a 5% significance level overall between the two time periods in ninety-day patient survival (log-rank p-value=0.31). There were no statistically significant differences between the two time periods for CLD and HCC (log rank p-value≥0.16), blood groups (log rank p-value≥0.16) and for the individual centres (log rank p-value≥0.22).

3.8.4. **Figure 19** shows the unadjusted ninety-day patient survival by year and donor type for transplants performed between 20 March 2013 and 19 June 2021. There were no statistically significant differences in patient survival between the time periods for DBD and DCD (log-rank p-value=0.54 and 0.40 respectively).





			DBD					DCD		
	Thirty-n No, at risk on day 0	ine months prior ¹ % (95% CI)	Thirty- No, at risk on day 0	nine months post² % (95% CI)	Log- rank p- value	Thirty-r No, at risk on day 0	nine months prior ¹ % (95% CI)	Thirty-ni No, at risk on day 0	ne months post ² % (95% CI)	Log-rank p-value
Overall	1633	96.7 (95.7,97.5)	1477	97.2 (96.2,97.9)	0.41	628	97.0 (95.3,98.1)	458	95.8 (93.5,97.3)	0.31
Type of patient										
CLD	1168	96.7 (95.5,97.5)	1158	97.2 (96.1,98.0)	0.43	406	96.8 (94.5,98.1)	253	97.2 (94.3,98.7)	0.77
HCC	317	98.7 (96.7,99.5)	189	96.8 (93.1,98.6)	0.13	198	97.0 (93.4,98.6)	184	94.0 (89.4,96.6)	0.16
VS	137	92.0 (86.0,95.5)	118	97.4 (92.3,99.2)	0.06	20	100 (-)	8	100 (-)	-
HCC downstaging	11	100 (-)	11	100 (-)	-	4	100 (-)	13	92.3 (56.6,98.9)	0.58
ACLF	0	-	1	100 (-)	-	0	-	0	-	-
Recipient blood g	roup									
0	689	95.5 (93.7,96.8)	642	97.8 (96.3,98.7)	0.02	304	97.4 (94.8,98.7)	205	95.1 (91.0,97.3)	0.16
A	701	97.4 (96.0,98.4)	593	96.8 (95.0,97.9)	0.48	254	96.1 (92.8,97.9)	192	97.4 (93.8,98.9)	0.44
В	176	99.4 (96.0,99.9)	148	96.6 (92.0,98.6)	0.06	60	98.3 (88.8,99.8)	49	93.9 (82.2,98.0)	0.22
AB	67	94.0 (84.8,97.7)	94	96.8 (90.4,99.0)	0.40	10	100 (-)	12	91.7 (53.9,98.8)	0.36
Centre										
Newcastle	81	93.8 (85.8,97.4)	70	97.1 (89.1,99.3)	0.34	15	100 (-)	8	100 (-)	-
Leeds	255	94.1 (90.4,96.4)	174	94.8 (90.2,97.3)	0.78	73	95.9 (87.8,98.7)	54	94.4 (83.8,98.2)	0.68
Cambridge	172	98.3 (94.7,99.4)	151	98.0 (94.0,99.4)	0.87	102	96.1 (89.9,98.5)	101	97.0 (91.1,99.0)	0.73
Royal Free	227	95.6 (92.0,97.6)	204	96.5 (92.9,98.3)	0.62	48	97.9 (86.1,99.7)	70	92.8 (83.5,96.9)	0.22
Kings College	326	98.8 (96.8,99.5)	360	98.9 (97.1,99.6)	0.89	155	98.7 (94.9,99.7)	115	97.3 (92.0,99.1)	0.43
Birmingham	360	95.8 (93.2,97.5)	348	97.1 (94.7,98.4)	0.35	179	95.5 (91.3,97.7)	83	95.2 (87.7,98.2)	0.91
Edinburgh	212	99.1 (96.3,99.8)	170	96.3 (92.0,98.3)	0.07	56	98.2 (88.0,99.7)	27	96.3 (76.5,99.5)	0.60

² 20 March 2018 to 19 June 2021

- 3.8.5. **Figure 20** shows the unadjusted ninety-day graft survival by time period and donor type for transplants performed in either the thirty-nine months prior to NLOS or in the first thirty-nine months of NLOS while **Figure 21** shows the unadjusted graft survival for transplants performed in the last eight years. Transplants performed between 27 March 2020 and 9 July 2020 were excluded due to offering during COVID-19. Graft survival was defined as the time from first transplant to retransplant or last known survival reported to NHSBT. Patients who received a second transplant were treated as events while patients who were alive with a functioning first transplant were censored at 90 days.
- 3.8.6. There were no statistically significant differences in the unadjusted ninety-day graft survival between the two time periods for DBD and DCD transplants (log-rank p-value=0.32 and 0.45) and for DBD transplants performed over the last eight years (log-rank p-value=0.93). There was a statistically significant difference in ninety-day graft survival for DCD transplants performed over the last eight years (log-rank p-value=0.93).





- 3.8.7. Figure 22 shows the unadjusted ninety-day transplant survival by time period and donor type for transplants performed in either the thirty-nine months prior to NLOS or in the first thirty-nine months of NLOS while Figure 23 shows the unadjusted transplant survival for transplants performed in the last eight years. Transplants performed between 27 March 2020 and 9 July 2020 were excluded due to offering during COVID-19. Transplant survival was defined as the time from first transplant to retransplant, death or last known survival reported to NHSBT. Patients who received a second transplant or who died post-transplant were treated as events while patients who were alive with a functioning first transplant were censored at 90 days.
- 3.8.8. There were no statistically significant differences in the unadjusted ninety-day transplant survival between the two time periods for DBD and DCD transplants (log-rank p-value=0.58 and 0.97) and for DBD performed over the last eight years (log-rank p-value=0.78). DCD transplants performed over the last eight years had borderline significance p-value=0.07.





3.9 ONE-YEAR POST-TRANSPLANT SURVIVAL

- 3.9.1 **Figure 24** shows the unadjusted one-year patient survival by time period and donor type for transplants performed in either the thirty months prior to NLOS or in the first thirty months of NLOS while **Table 24** shows the survival estimates and confidence intervals by blood group and type of patient. Transplants performed between 27 March 2020 and 9 July 2020 were excluded due to offering during COVID-19. Patient survival was defined as the time from first transplant to death or last known survival reported to NHSBT irrespective of whether the patient received a retransplant after their first transplant.
- 3.9.2 For DBD transplants, there was no overall statistically significant difference between the two time periods in one-year patient survival (log-rank p-value=0.21). However, there was a statistically significant difference in one-year survival for blood group O patients (log-rank p-value=0.05). There were no statistically significant differences between the two time periods for CLD and HCC (log rank p-value≥0.21) and for the individual centres (log-rank p-value≥0.32).
- 3.9.3 For DCD transplants, there was no overall statistically significant difference at a 5% significance level overall between the two time periods in one-year patient survival (log-rank p-value=0.44). There were no statistically significant differences between the two time periods for CLD and HCC (log rank p-value≥0.58), blood groups (log rank p-value≥0.61) and for the individual centres (log rank p-value≥0.19).
- 3.9.4 **Figure 25** shows the unadjusted one-year patient survival by year and donor type for transplants performed between 20 March 2013 and 19 September 2020. There were no statistically significant differences in patient survival between the time periods for DBD and DCD (log-rank p-value=0.32 and 0.96 respectively).





			DBD			DCD						
	Thirty No, at risk on day 0	/ months prior ¹ % (95% Cl)	Thir No, at risk on day 0	ty months post ² % (95% CI)	Log- rank p- value	Thirty No, at risk on day 0	y months prior ¹ % (95% CI)	Thirty No, at risk on day 0	months post ² % (95% Cl)	Log-ranl p-value		
Overall	1328	93.9 (92.5,95.1)	1220	95.1 (93.6,96.2)	0.21	497	94.5 (92.1,96.2)	379	93.4 (90.3,95.5)	0.44		
Type of patient CLD HCC VS HCC downstaging ACLF	959 251 109 9 0	94.2 (92.6,95.6) 93.1 (89.2,95.7) 92.7 (85.9,96.3) 100 (-) -	946 157 106 11 0	95.5 (93.9,96.7) 92.5 (86.8,95.8) 95.0 (88.4,97.9) 100 (-) -	0.21 0.75 0.43 - -	326 152 15 4 0	96.0 (93.2,97.7) 91.3 (85.5,94.9) 93.3 (61.3,99.0) 100 (-) -	206 156 6 11 0	94.9 (90.8,97.2) 91.3 (85.5,94.9) 100 (-) 90.9 (50.8,98.7)	0.58 0.91 0.56 0.55 -		
Recipient blood ar	oup											
O A B AB	566 576 136 50	92.2 (89.7,94.1) 95.6 (93.6,97.0) 94.8 (89.4,97.5) 92.0 (80.0,96.9)	542 480 117 81	95.1 (92.8,96.6) 95.0 (92.5,96.7) 94.7 (88.5,97.6) 96.1 (88.3,98.7)	0.05 0.65 0.91 0.28	247 197 44 9	94.7 (91.1,96.9) 94.9 (90.7,97.2) 93.2 (80.3,97.7) 87.5 (38.7,98.1)	166 162 39 12	94.0 (89.0,96.7) 93.8 (86.4,96.8) 92.3 (78.0,97.5) 82.5 (46.0,95.3)	0.61 0.77 0.82 0.64		
Centre												
Newcastle Leeds Cambridge Royal Free Kings College Birmingham Edinburgh	68 212 146 188 259 285 170	89.7 (79.6,95.0) 91.5 (86.9,94.6) 94.5 (89.3,97.2) 92.6 (87.7,95.5) 97.2 (94.3,98.7) 93.3 (89.7,95.7) 95.9 (91.6,98.0)	53 134 125 179 285 303 141	94.2 (83.1,98.1) 92.0 (85.0,95.8) 96.7 (91.3,98.7) 93.8 (88.7,96.6) 97.0 (94.1,98.5) 95.2 (92.0,97.1) 93.9 (88.1,96.9)	0.37 0.75 0.42 0.59 0.89 0.32 0.38	12 58 83 34 128 137 45	91.7 (53.9,98.8) 94.8 (84.8,98.3) 96.4 (89.2,98.8) 94.1 (78.5,98.5) 95.9 (90.4,98.3) 92.0 (86.0,95.5) 95.6 (83.4,99.2)	7 45 75 67 89 77 19	100 (-) 87.1 (71.2,94.5) 93.1 (84.1,97.1) 90.3 (79.5,95.6) 96.6 (89.8,98.9) 94.8 (86.7,98.0) 94.7 (68.1,99.2)	0.48 0.19 0.36 0.52 0.96 0.46 0.86		

- 3.9.5 **Figure 26** shows the unadjusted one-year graft survival by time period and donor type for transplants performed in either the thirty months prior to NLOS or in the first thirty months of NLOS while **Figure 27** shows the unadjusted graft survival for transplants performed in the last eight years. Transplants performed between 27 March 2020 and 9 July 2020 were excluded due to offering during COVID-19. Graft survival was defined as the time from first transplant to retransplant or last known survival reported to NHSBT. Patients who received a second transplant were treated as events while patients who were alive with a functioning first transplant were censored at 1 year.
- 3.9.6 There were no statistically significant differences in the unadjusted one-year graft survival between the two time periods for DBD and DCD transplants (log-rank p-value=0.19 and 0.15) and for DBD transplants performed over the last eight years (log-rank p-value=0.86). DCD transplants performed over the last eight years had borderline significance (p-value=0.07).





- 3.9.7 Figure 28 shows the unadjusted one-year transplant survival by time period and donor type for transplants performed in either the thirty months prior to NLOS or in the first thirty months of NLOS while Figure 29 shows the unadjusted transplant survival for transplants performed in the last eight years. Transplants performed between 27 March 2020 and 9 July 2020 were excluded due to offering during COVID-19. Transplant survival was defined as the time from first transplant to retransplant, death or last known survival reported to NHSBT. Patients who received a second transplant or who died post-transplant were treated as events while patients who were alive with a functioning first transplant were censored at 1 year.
- 3.9.8 There were no statistically significant differences in the unadjusted one-year transplant survival between the two time periods for DBD and DCD transplants (log-rank p-value=0.39 and 0.44) and for DBD and DCD transplants performed over the last eight years (log-rank p-value=0.93 and 0.16).





4 CONCLUSIONS

The new National Liver Offering Scheme was implemented on the 20th March 2018. During the first fortytwo months of the scheme, ODT Hub Operations have offered 3200 livers from DBD donors and 3027 livers from DCD donors to UK transplant centres. Of the 3200 DBD liver donors, 2757 were retrieved for the purposes of transplantation and 2394 were transplanted.

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October 2021

APPENDIX A: SUPER-URGENT CATEGORIES

INDICATION FOR REGISTRATION

- Category 1: Aetiology: Paracetamol poisoning: pH <7.25 more than 24 hours after overdose and after fluid resuscitation
- 2 Category 2: Aetiology: Paracetamol poisoning: Co-existing prothombin time >100 seconds or INR >6.5, and serum creatinine >300 µmol/l or anuria, and grade 3-4 encephalopathy
- 3 Category 3: Aetiology: Paracetamol poisoning: Significant liver injury and coagulopathy following exclusion of other causes of hyperlactatemia (e.g. pancreatitis, intestinal ischemia) after adequate fluid resuscitation: arterial lactate >5 mmol/l on admission and >4 mmol/l 24 hours later in the presence of clinical hepatic encephalopathy
- 4 Category 4: Aetiology: Paracetamol poisoning: Two of the three criteria from category 2 with clinical evidence of deterioration (eg increased ICP, FiO₂ >50%, increasing inotrope requirements) in the absence of clinical sepsis
- 5 Category 5: Aetiology: Favourable non-paracetamol aetiologies such as acute viral hepatitis or ecstacy/ cocaine induced ALF: the presence of clinical hepatic encephalopathy is mandatory and: prothrombin time >100 seconds, or INR >6.5, or any three from the following: age >40 or <10 years; prothrombin time >50 seconds or INR >3.5; any grade of hepatic encephalopathy with jaundice to encephalopathy time >7 days; serum bilirubin >300 µmol/l
- 6 Category 6: Aetiology: Unfavourable non-paracetamol aetiologies such as seronegative or idiosyncratic drug reactions: a) prothrombin time >100 seconds, or INR >6.5, or b) in the absence of clinical hepatic encephalopathy then INR >2 after vitamin K repletion is mandatory and any two from the following: age >40 or <10 years; prothrombin time >50 seconds or INR >3.5; if hepatic encephalopathy is present then jaundice to encephalopathy time >7 days; serum bilirubin >300 µmol/l
- 7 Category 7: Aetiology: Acute presentation of Wilson's disease or Budd-Chiari syndrome. A combination of coagulopathy and any grade of encephalopathy
- 8 Category 8: Hepatic artery thrombosis on days 0 to 21 after liver transplantation
- 9 Category 9: Early graft dysfunction on days 0 to 7 after liver transplantation with at least two of the following: AST >10,000; INR >3.0; arterial lactate >3 mmol/l; absence of bile production
- 10 Category 10: The total absence of liver function (eg after total hepatectomy)
- 11 Category 11: Any patient who has been a live liver donor (NHS entitled) who develops severe liver failure within 4 weeks of the donor operation
- 20 Category 20: Acute liver failure in children under two years of age: INR >4 or grade 3-4 encephalopathy. Definition: Multisystem disorder in which severe acute impairment of liver function with or without encephalopathy occurs in association with hepatocellular necrosis in a child with no recognised underlying chronic liver disease. Children with leukaemia/lymphoma, haemophagocytosis and disseminated intra-vascular coagulopathy are excluded



APPENDIX B: SIX MONTH REGISTRATION OUTCOME





