

NHS BLOOD AND TRANSPLANT

NATIONAL LIVER OFFERING SCHEME

THIRTY-SIX 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 aspects of NLOS examined in this report			
Section	Time period	Inclusions	Exclusions
Registration activity	<ul style="list-style-type: none"> 20 March 2015 to 19 March 2018 (<i>thirty-six months prior</i>, N=3475) 20 March 2018 to 19 March 2021 (<i>thirty-six months post</i>, N=3456) 	<ul style="list-style-type: none"> New active/suspended registrations 	<ul style="list-style-type: none"> Dublin registrations NHS Group 2 registrations
One and three month post-registration outcome	<ul style="list-style-type: none"> 20 March 2015 to 19 December 2017 (<i>thirty-three months prior</i>, N=2583) 20 March 2018 to 19 December 2020 (<i>thirty-three months post</i>, N=2609) 	<ul style="list-style-type: none"> Active and suspended Adult elective liver and liver/kidney registrations 	<ul style="list-style-type: none"> Dublin registrations NHS Group 2 registrations Intestinal registrations
Six months post-registration outcome	<ul style="list-style-type: none"> 20 March 2015 to 19 September 2017 (<i>thirty months prior</i>, N=2320) 20 March 2018 to 19 September 2020 (<i>thirty months post</i>, N=2359) 	<ul style="list-style-type: none"> Active and suspended Adult elective liver and liver/kidney registrations 	<ul style="list-style-type: none"> Dublin registrations NHS Group 2 registrations Intestinal registrations
Transplant list activity	<ul style="list-style-type: none"> Patients active/ suspended on 19 March 2018 (N=418) 20 March 2018 to 19 March 2021 (N=2828) 	<ul style="list-style-type: none"> Active and suspended Adult elective liver and liver/kidney registrations 	<ul style="list-style-type: none"> Dublin registrations NHS Group 2 registrations Intestinal registrations
Liver offering	<ul style="list-style-type: none"> <i>Thirty-six months prior</i>, N=5408 (2794 DBD and 2614 DCD) <i>Thirty-six months post</i>, N=5464 (2632 DBD and 2832 DCD) 	<ul style="list-style-type: none"> UK deceased donors whose liver was offered for transplantation Offers to Dublin for super-urgent patients 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> <i>Thirty-six months prior</i>, N=2843 (2236 DBD and 607 DCD) <i>Thirty-six months post</i>, N=2688 (2207 DBD and 481 DCD) 	<ul style="list-style-type: none"> UK transplants 	<ul style="list-style-type: none"> Transplants performed at Dublin Intestinal transplants for patients not requiring a liver NHS Group 2 transplants
Ninety day post-transplant survival	<ul style="list-style-type: none"> 20 June 2015 to 19 March 2018 (<i>thirty-three months prior</i>, N=1441 for DBD and 543 for DCD) 20 March 2018 to 19 December 2020 (<i>thirty-three months post</i>, N=1277 for DBD and 396 for DCD) 	<ul style="list-style-type: none"> UK Adult elective liver and liver/kidney transplants 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 20 March 2016 to 19 March 2018 (<i>twenty-four months prior</i>, N=1082 for DBD and 386 for DCD) 20 March 2018 to 19 March 2020 (<i>twenty-four months post</i>, N=1118 for DBD and 347 for DCD) 	<ul style="list-style-type: none"> UK Adult elective liver and liver/kidney transplants 	<ul style="list-style-type: none"> Transplants performed at Dublin Intestinal transplants for patients not requiring a liver NHS Group 2 transplants

3. RESULTS

REGISTRATION ACTIVITY

- 3.1. There were 3456 new NHS Group 1 liver registrations in the UK in the first thirty-six months of the scheme. (**Table 1**)
- 3.2. There was a 0.2% increase in elective and 6% decrease in super-urgent registrations between the thirty-six months pre and post NLOS introduction. There was also a small increase in adult elective CLD registrations (4%) in the thirty-six months post NLOS but the number of HCC registrations (including HCC downstaging) were similar in the two time periods (540 and 529 respectively). The number of new variant syndrome registrations has decreased from 222 in the thirty-six months prior to 164 in the thirty-six months post. (**Table 3**)
- 3.3. Ninety-two percent of the new adult elective registrations in the first thirty-six months of NLOS were for first graft compared with 91% in the thirty 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 2609 adult elective registrations in the subset of patients registered in the first thirty-three months post-NLOS. One thousand, two hundred and sixty two (49%) of the 2609 registrations received a transplant within three months of registration. The corresponding three-month transplant rate for patients registered in the equivalent 33 months in 2015/2017 was 43%. (**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 33 months post NLOS than 33 months prior (3% and 6% respectively). This reduction was also seen in the six-month registration outcome for a subset who were registered in two 30-month periods (5% and 8% respectively). The decrease in mortality rate was observed across all type of patients (apart from for HCC), age groups 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 active on the list have received a liver transplant compared with new registrations during the time (65% compared with 68%). (**Table 7**)

- 3.8. There was a significant difference in registration outcome for CLD, HCC and variant syndrome patients. (**Figure 7**)
- 3.9. Two hundred and seventy eight patients (9%) active on the transplant list during the first thirty-six months either died on the list or were removed due to condition deteriorated. An additional 179 patients were removed due to either their condition improving (N=101 (56%)) or other reasons detailed in **Table 7A**.

LIVER OFFERING

- 3.10. Overall, 2794 DBD livers and 2614 DCD livers were offered in the first thirty-six months of the scheme. For DBD donors, 2400 (86%) were retrieved and 2085 (87% of those retrieved) were transplanted. For DCD donors, 714 (27%) were retrieved and 480 (67% of those retrieved) were transplanted. The proportions retrieved were similar to the thirty 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 thirty-six 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**. Three hundred and eighty 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 2224 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, 1988 (89%) were allocated to the elective CLD/HCC pathway and 236 (11%) 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 and twenty nine (not accepted by higher tiers) offered to named elective CLD/HCC were accepted and transplanted while 87 livers offered to the named elective variant syndrome pathway were accepted and transplanted.
- 3.14. Nine hundred and eighty nine livers declined by all stages were fast-tracked and 410 were accepted and transplanted.
- 3.15. There were 12988 DBD liver offers (excluding intestinal offers) made to UK centres during the first thirty-six months of the scheme which was an increase of 60% compared with the thirty-six months prior. All centres saw an increase in offers with one centre, Kings College, observing a greater than 90% increase in offers. (**Table 11**)
- 3.16. Four thousand, one hundred and seventy (32%) of the 12988 offers made in the first 36 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 two patients at 6 centres were offered more than 10 livers (9 were offered 11 livers, 4 were offered 12 livers, 4 were offered 13 livers, 2 were offered 14 livers, 2 were offered 17 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 (300 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 ($p=0.0005$), disease group ($p<0.0001$), transplant centre ($p=0.05$), 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 ($p<0.0001$) and blood group compatibility ($p=0.0005$). There was no evidence of a statistically significant association for age group ($p=0.14$) and zonal transplants ($p=0.60$). (**Table 20 and 21**).
- 3.21. There was a statistically significant increase in cold ischaemia time for adult elective DBD transplants when comparing the thirty-six months pre and post (median CIT 8.53 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=0.18 and 0.24 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=0.15 and 0.12 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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- 1.2. It should also be noted that this report may not include all data due for the first thirty-six 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 the National Liver Offering Scheme 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 non-urgent patients if declined for all clinically urgent patients.
- 1.6. Various options for maintaining liver transplantation were discussed with NHS England and they approved in January 2021 regional protected status for a minimum of three liver transplant centres.

- 1.7. All transplant centres other than Birmingham formally reactivated all non-urgent CLD and HCC patients on the 6th April 2021. Transplant centres were advised not to reactivate non-urgent variant syndrome patients at present. Birmingham are currently only open for clinically urgent patients but this is reviewed on a regular basis.
- 1.8. Birmingham closed for all DCD offers in January 2021 with Newcastle and Leeds receiving Birmingham's zonal and linked offers on a rota basis. This continues to be in operation in April 2021.

2. DATA AND METHODS

2.1. REGISTRATION ACTIVITY AND POST-REGISTRATION OUTCOME

- 2.1.1. Data on 6931 new active/suspended NHS Group 1 registrations on the UK liver transplant list between 20 March 2015 and 19 March 2021 were obtained from the UK Transplant Registry on 1 April 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 a registrations either between 20 March 2015 and 19 December 2017 (N=2583) or between 20 March 2018 and 19 December 2020 (N=2609).
- 2.1.3. Six month registration outcome was also examined for a subset registered either between 20 March 2015 and 19 September 2017 (N=2320) or between 20 March 2018 and 19 September 2020 (N=2359).

2.2. TRANSPLANT LIST ACTIVITY

- 2.2.1. Data on 3246 patients who were either active/suspended on the UK liver transplant list on 19 March 2018 or registered between 20 March 2018 and 19 March 2021 were obtained from the UK Transplant Registry on 31 March 2021. Patients registered in Dublin were excluded.

2.3. LIVER OFFERING

- 2.3.1. Data on 10872 deceased donors (5426 DBD and 5446 DCD) from the UK whose liver was offered for transplantation between 20 March 2015 and 19 March 2021 were obtained from the UK Transplant Registry on 11 April 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 March 2015 to 19 March 2018 (*previous thirty-six months*)
 - 2.3.1.2. 20 March 2018 to 19 March 2021 (*since NLOS implementation*).

2.4. TRANSPLANT ACTIVITY AND POST-TRANSPLANT SURVIVAL

- 2.4.1. Data on 5531 deceased donor liver transplants (4443 DBD and 1088 DCD) performed in the UK between 20 March 2015 and 19 March 2021 were also obtained from the UK Transplant Registry on 8 April 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 March 2015 and 19 March 2021 by quarter and urgency status while **Table 1** compares the thirty-six 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=0.4).

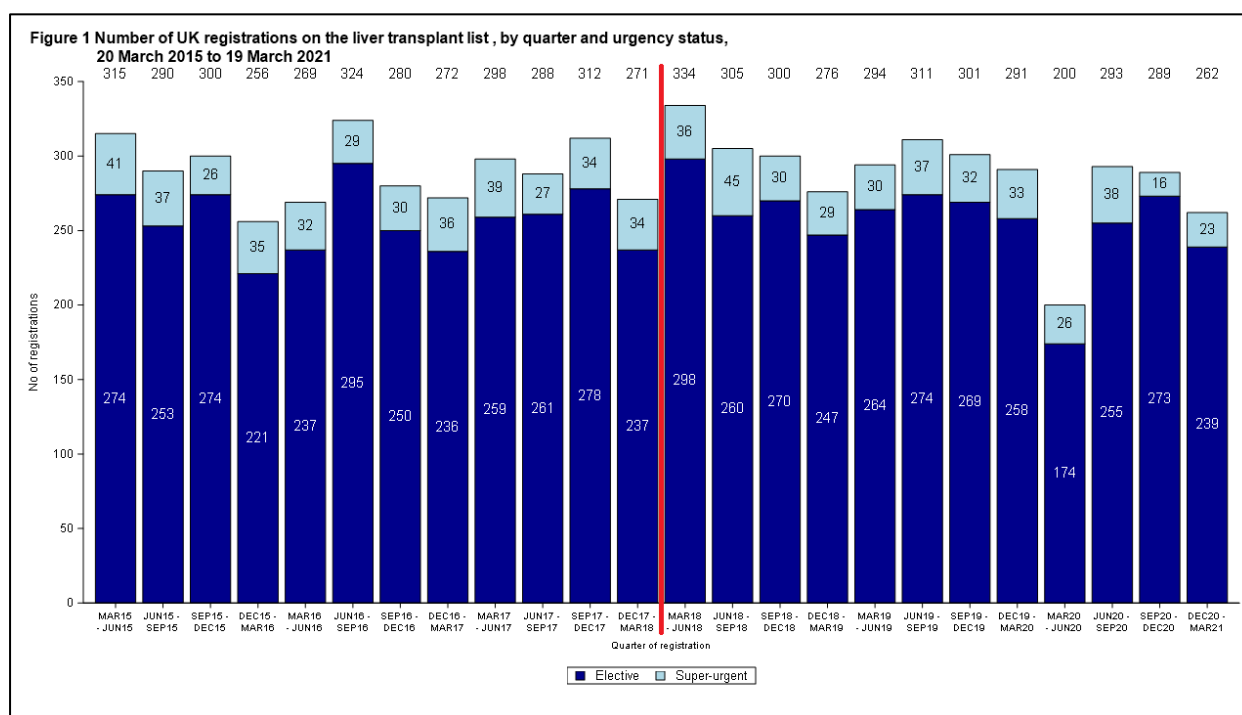


Table 1 Urgency status by time period for all NHS Group 1 liver registrations in the UK, 20 March 2015 to 19 March 2021

Urgency status	Thirty-six months prior	Thirty-six months post	Total
Elective	3075 (88)	3081 (89)	6156 (89)
Super-urgent	400 (12)	375 (11)	775 (11)
Total	3475 (100)	3456 (100)	6931 (100)

3.2. REGISTRATION ACTIVITY - SUPER-URGENT

3.2.1. **Table 2** compares the thirty-six 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=0.26). 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 23% in the time periods prior and post respectively. **Appendix A** shows the descriptions of each categories.

Table 2 Super-urgent category by time period for super-urgent registrations in the UK, 20 March 2015 to 19 March 2021			
Super-urgent category	Thirty six months prior	Thirty six months post	Total
1	8 (2)	10 (3)	18 (2)
2	26 (7)	26 (7)	52 (7)
3	20 (5)	24 (6)	44 (6)
4	7 (2)	7 (2)	14 (2)
5	29 (7)	12 (3)	41 (5)
6	135 (34)	146 (39)	281 (36)
7	25 (6)	20 (5)	45 (6)
8	63 (16)	42 (11)	105 (14)
9	53 (13)	46 (12)	99 (13)
10	8 (2)	10 (3)	18 (2)
20	16 (4)	18 (5)	34 (4)
Not Reported	10 (3)	14 (4)	24 (3)
Total	400 (100)	375 (100)	775 (100)

3.2.2. **Table 2a** compares the thirty-six 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 thirty-six months prior than during the thirty-six months post (27% and 25% respectively). Of the patients registered for a second graft, 74% of those registered in the thirty months-six post had received a DBD transplant as their first transplant compared with 58% in the thirty-six months prior.

Table 2a Transplant number and type of previous graft by time period for super-urgent registrations in the UK, 20 March 2015 to 19 March 2021			
Registered for	Thirty-six months prior	Thirty-six months post	Total
First transplant	274 (69)	272 (73)	546 (70)
Second transplant	106 (27)	92 (25)	198 (26)
First was a DBD tx	62 (58)	68 (74)	130 (66)
First was a DCD tx	34 (32)	21 (23)	55 (28)
First was a living donor tx	9 (8)	3 (3)	12 (6)
Third transplant	18 (5)	11 (3)	29 (4)
Fourth transplant	0 (0)	0 (0)	0 (0)
Fifth transplant	1 (0)	0 (0)	1 (0)
Total	400 (100)	375 (100)	775 (100)

3.3. REGISTRATION ACTIVITY - ELECTIVE

3.3.1. **Table 3** compares the thirty-six 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=0.49).

Table 3 Type of elective patient by time period for elective registrations in the UK, 20 March 2015 to 19 March 2021			
Type of patient	Thirty-six months prior	Thirty-six months post	Total
Overall	3075 (100)	3081 (100)	6156 (100)
<i>Adult elective¹</i>	<i>2807 (91)</i>	<i>2828 (92)</i>	<i>5635 (92)</i>
CLD	2039 (73)	2125 (75)	4164 (74)
HCC	526 (19)	498 (18)	1024 (18)
HCC downstaging	14 (0)	31 (1)	45 (1)
Variant syndrome	222 (8)	164 (6)	386 (7)
Hepatoblastoma	0 (0)	1 (0)	1 (0)
Liver and cardiothoracic	3 (0)	9 (0)	12 (0)
<i>Paediatric elective²</i>	<i>268 (9)</i>	<i>253 (8)</i>	<i>521 (8)</i>
Hepatoblastoma	18 (7)	40 (16)	58 (11)
Non hepatoblastoma	250 (93)	212 (84)	462 (89)
Liver and cardiothoracic	0 (0)	1 (0)	1 (0)

¹ Includes 15 CLD, 4 HCC and 1 HCC Downstaging patients aged 17 years or over and weighing 40kg or under (8 in the thirty-six months prior and 12 in the thirty-six months post); 12 were dual-listed as small adults (5 in the thirty-six months prior and 7 in the thirty-six months post)

² Includes 84 non hepatoblastoma patients aged less than 17 years and weighing 40kg or over (48 in the thirty-six months prior and 36 in the thirty-six months post); 37 were dual-listed as large paediatrics (5 in the thirty-six months prior and 32 in the thirty-six months post)

3.3.2. **Table 4** compares the thirty-six months pre and post the introduction of NLOS for each type of adult patient registered over the last 72 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=0.34).

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 4 Transplant number by time period for adult elective registrations in the UK, 20 March 2015 to 19 March 2021

	Thirty-six months prior	Thirty-six months post	Total
CLD¹ (Fishers exact p-value=0.57)			
1 st graft	1816 (89)	1901 (90)	3717 (89)
2 nd graft	186 (9)	187 (9)	373 (9)
3 rd graft	28 (1)	32 (2)	60 (1)
4 th graft	7 (0)	3 (0)	10 (0)
6 th graft	1 (0)	0 (0)	1 (0)
HCC (Fishers exact p-value>0.99)			
1 st graft	525 (100)	497 (100)	1022 (100)
2 nd graft	1 (0)	1 (0)	2 (0)
Variant syndrome (Fishers exact p-value=0.66)			
1 st graft	197 (89)	151 (92)	348 (90)
2 nd graft	21 (9)	12 (7)	33 (9)
3 rd graft	2 (1)	1 (1)	3 (1)
4 th graft	2 (1)	0 (0)	2 (1)
Overall adult elective² (Fishers exact p-value=0.34)			
1 st graft	2558 (91)	2590 (92)	5148 (91)
2 nd graft	208 (7)	200 (7)	408 (7)
3 rd graft	30 (1)	33 (1)	63 (1)
4 th graft	9 (0)	3 (0)	12 (0)
6 th graft	1 (0)	0 (0)	1 (0)
Total	2807 (100)	2828 (100)	5635 (100)

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

² 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 thirty-six months pre and post the introduction of NLOS for each type of adult patient registered over the last 72 months. There were no statistically significant differences in the median recipient age (Kruskal-Wallis p-value \geq 0.27).

Table 5 Median (IQR) age by time period for adult elective NHS Group 1 registrations in the UK, 20 March 2015 to 19 March 2021			
	Thirty-six months prior	Thirty-six months post	Total
CLD¹ (Kruskal-Wallis p-value=0.27)			
N	2039	2125	4164
Median (IQR)	53 (44 - 60)	54 (44 - 61)	54 (44 - 61)
Range	17 - 76	17 - 74	17 - 76
HCC (Kruskal-Wallis p-value=0.58)			
N	526	498	1024
Median (IQR)	60 (55 - 65)	60.5 (55 - 66)	60 (55 - 65)
Range	18 - 75	19 - 73	18 - 75
Variant syndrome (Kruskal-Wallis p-value=0.89)			
N	222	164	386
Median (IQR)	50 (37 - 57)	49 (38.5 - 57)	49 (38 - 57)
Range	17 - 72	18 - 70	17 - 72
Overall adult elective² (Kruskal-Wallis p-value=0.28)			
N	2807	2828	5635
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 thirty-six months prior and 7 in the thirty-six 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-three months since the implementation of the NLOS along with the equivalent thirty-three month period in 2015/2017. There were 2609 adult elective registrations in the first thirty-three months of NLOS and 1262 (49%) received a transplant within 3 months of registration. The corresponding three-month transplant rate for patients registered during the equivalent thirty-three months in 2015/2017 was 43%. 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).

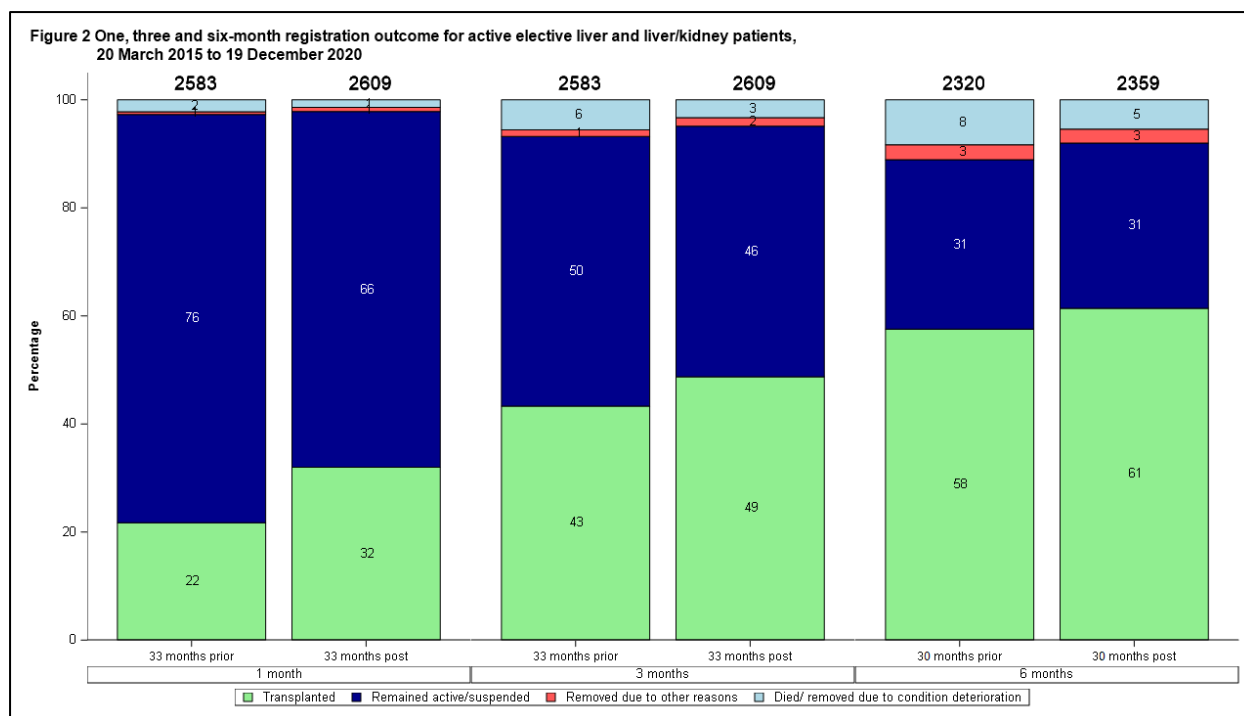
3.4.2. **Table 6 and Figure 2** also show the six-month registration outcome for adult elective patients registered during the first thirty months of NLOS and the equivalent thirty month period in 2015/2017. There were statistically significant differences between the two time periods and registration outcome at six months (Fishers exact p-value<0.0001). 1444 (61%) of the 2359 registrations were transplanted within 6 months compared with 58% in the thirty months prior. However, the proportion of patients who either died on the list or were removed due to condition deterioration within six months was 5% in the thirty months post compared with 8% in the thirty months prior.

Table 6 Registration outcome for adult elective NHS Group 1 registrations on the UK liver transplant list, 20 March 2015 to 19 December 2020

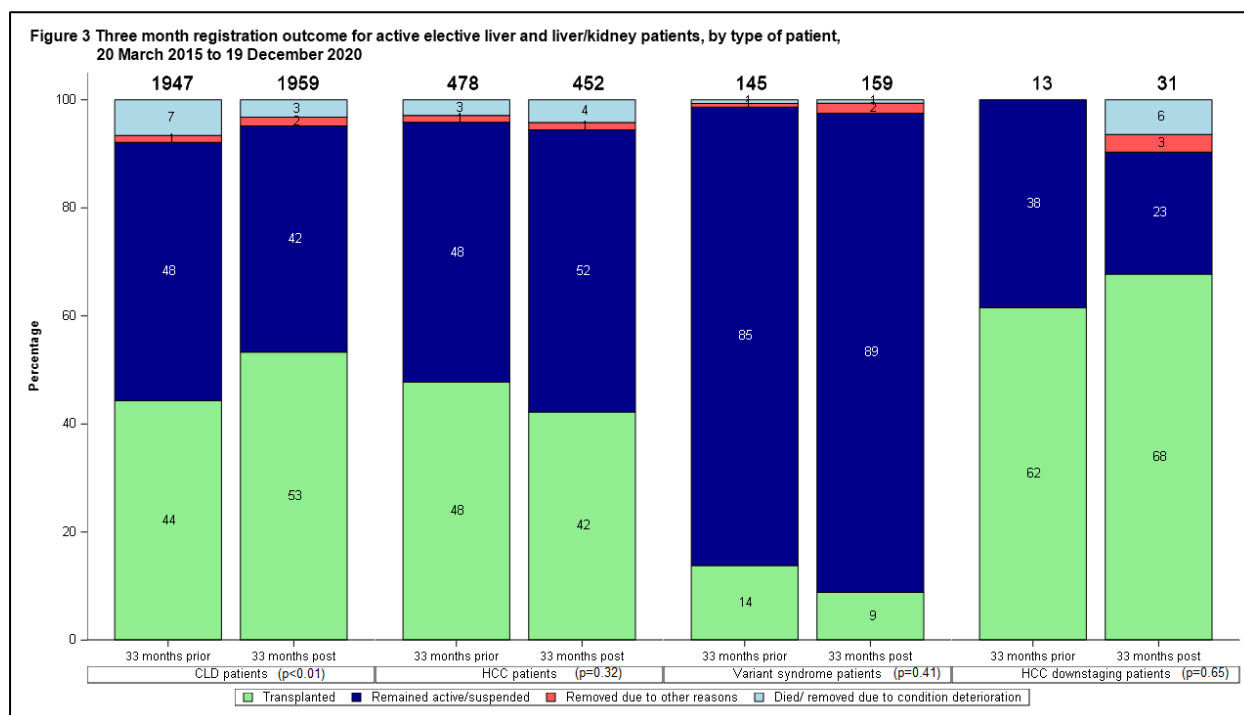
Registration outcome	One-month outcome ¹		Three-month outcome ¹		Six-month outcome ²	
	33 months prior	33 months post	33 months prior	33 months post	30 months prior	30 months post
Remained active/suspended	1951 (76)	1705 (66)	1289 (50)	1201 (46)	727 (31)	719 (31)
Died/ removed due to condition deterioration	58 (2)	37 (1)	144 (6)	86 (3)	194 (8)	128 (5)
Removed due to other reasons	13 (1)	20 (1)	32 (1)	41 (2)	64 (3)	61 (3)
Transplanted	561 (22)	828 (32)	1118 (43)	1262 (49)	1335 (58)	1444 (61)
Total	2583 (100)	2609 (100)	2583 (100)	2609 (100)	2320 (100)	2359 (100)
Fishers exact p-value	<0.0001		<0.0001		<0.0001	

¹ 20 March 2015 to 19 December 2017 (prior) and 20 March 2018 to 19 December 2020 (post)

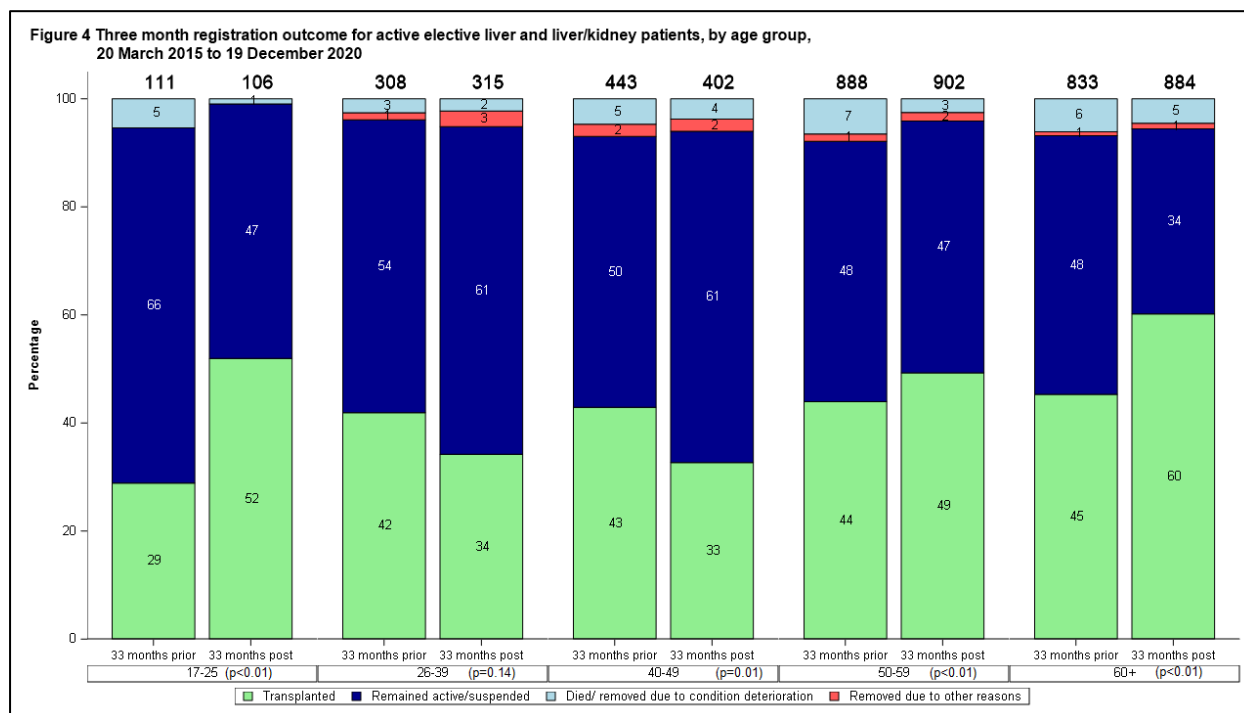
² 20 March 2015 to 19 September 2017 (prior) and 20 March 2018 to 19 September 2020 (post)



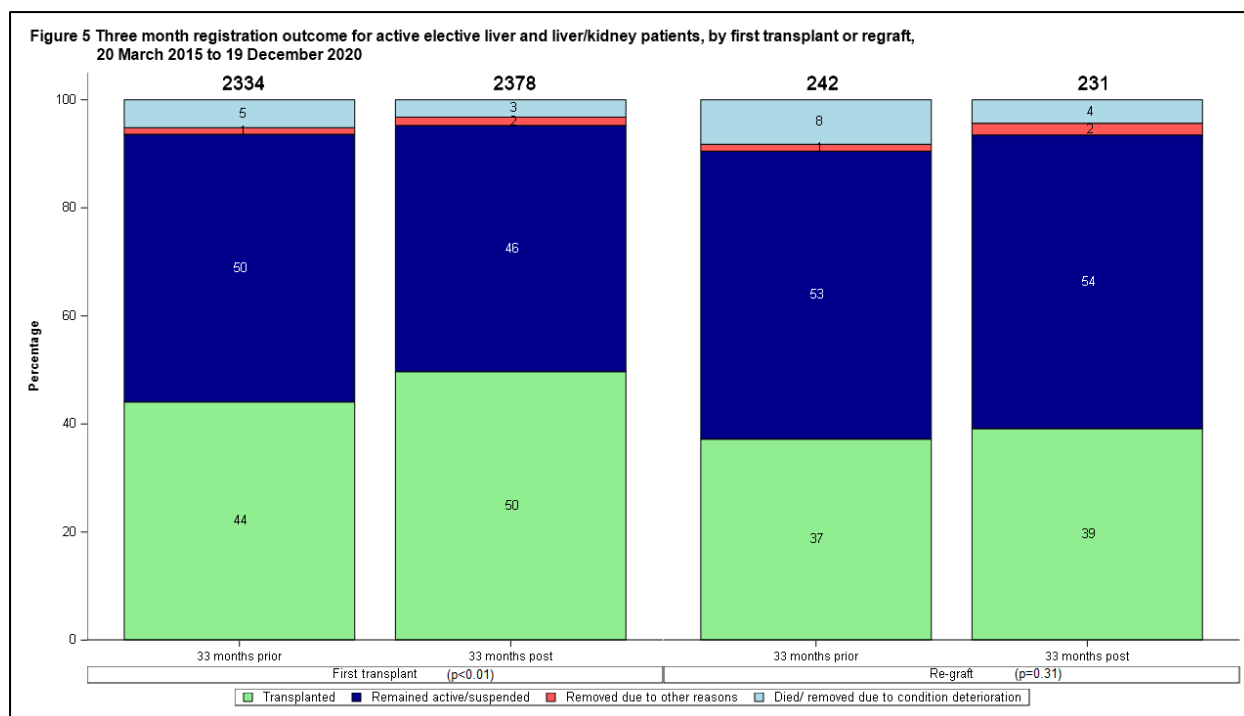
3.4.3. **Figure 3** shows the three-month registration outcome by time period and type of adult elective patient. A higher proportion of new CLD and HCC downstaging registrations post NLOS were transplanted in the first three months post-registration than registrations during the same period in 2015/2017. 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 \geq 0.32). Equivalent charts for six-month are presented in **Figure B1** in **Appendix B** and show consistent results with the three-month outcome chart.



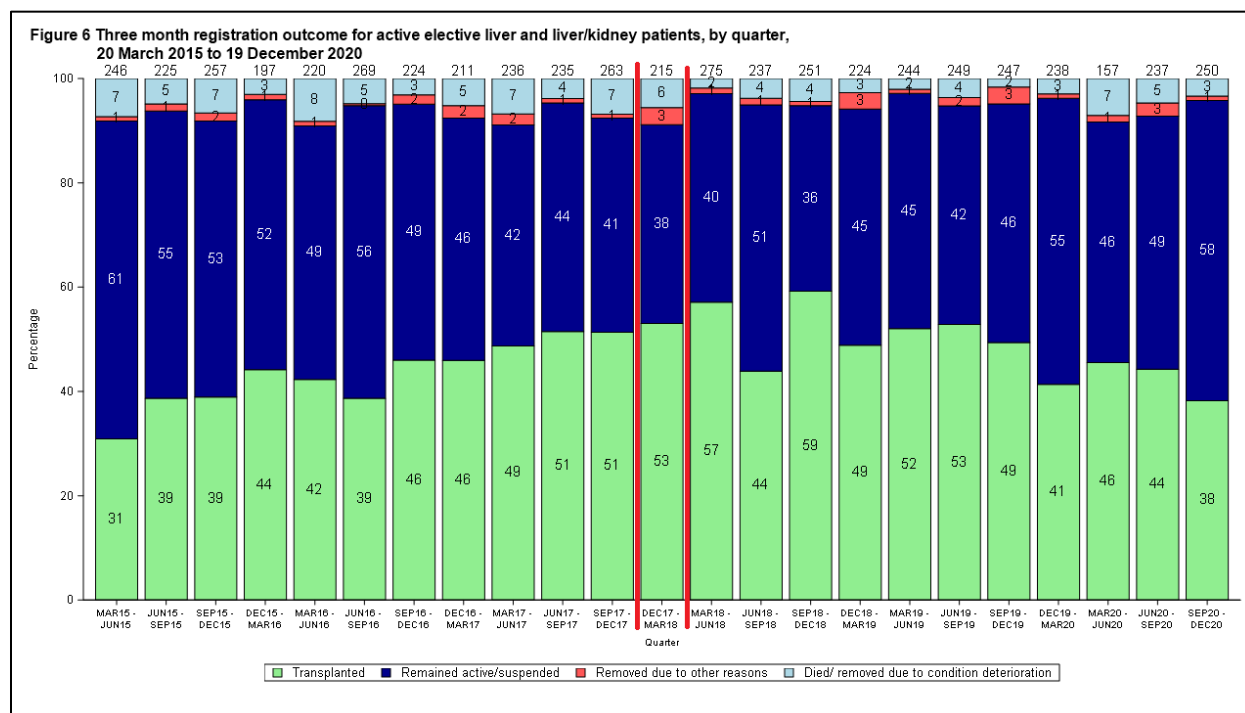
3.4.4. **Figure 4** shows the three-month registration outcome by time period and age group. A higher proportion of patients aged either 17-29, 50-59 or 60+ years registered post NLOS were transplanted in the first three months post-registration than registrations during the same period in 2015/2017. There was a statistically significant association between registration outcome and time period of registration for all age groups apart from patients aged 26-39 years. Equivalent charts for six-month are presented in **Figure B2** in **Appendix B** and show consistent results with the three-month outcome chart.



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 regrant. 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 2015/2017. There was a statistically significant association between registration outcome and time period of registration for patients registered for a first graft but not for regrant patients (Fishers exact p -value < 0.01 and 0.31 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 7% 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 thirty-six months since the implementation of the NLOS. Since the scheme was implemented, 2828 adult elective patients joined the liver transplant list and 1922 (68%) of the 2828 patients have received a transplant. The corresponding transplant rate for patients active on the list on 19 March 2018 was 64%.

3.5.2. **Table 7** also shows that 278 adult elective liver patients, either active/suspended on the list on 19 March 2018 or registered in the first thirty-six months, either passed away while on the transplant list or were removed due to their condition deteriorating between 20 March 2018 and 31 March 2021. One-hundred-and-thirteen of the 278 patients died on the list while 165 patients were removed due to their condition deteriorating. Twenty of the 165 patients 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 7 Adult elective NHS group 1 liver transplant list and new registrations in the UK, 20 March 2018 to 19 March 2021 as at 31 March 2021			
Outcome of patient at 31 March 2021	Active and suspended patients at 19 March 2018 N (%)	New registrations between 20 March 2018 and 19 March 2021¹ N (%)	Total N (%)
Remained active/ suspended	32 (8)	564 (20)	596 (18)
Transplanted	271 (65)	1922 (68)	2193 (68)
Removed due to other reasons	69 (17)	110 (4)	179 (6)
Died/ removed due to condition deteriorated	46 (11)	232 (8)	278 (9)
TOTAL	418 (100)	2828 (100)	3246 (100)

¹ Includes re-registrations for second or subsequent transplants

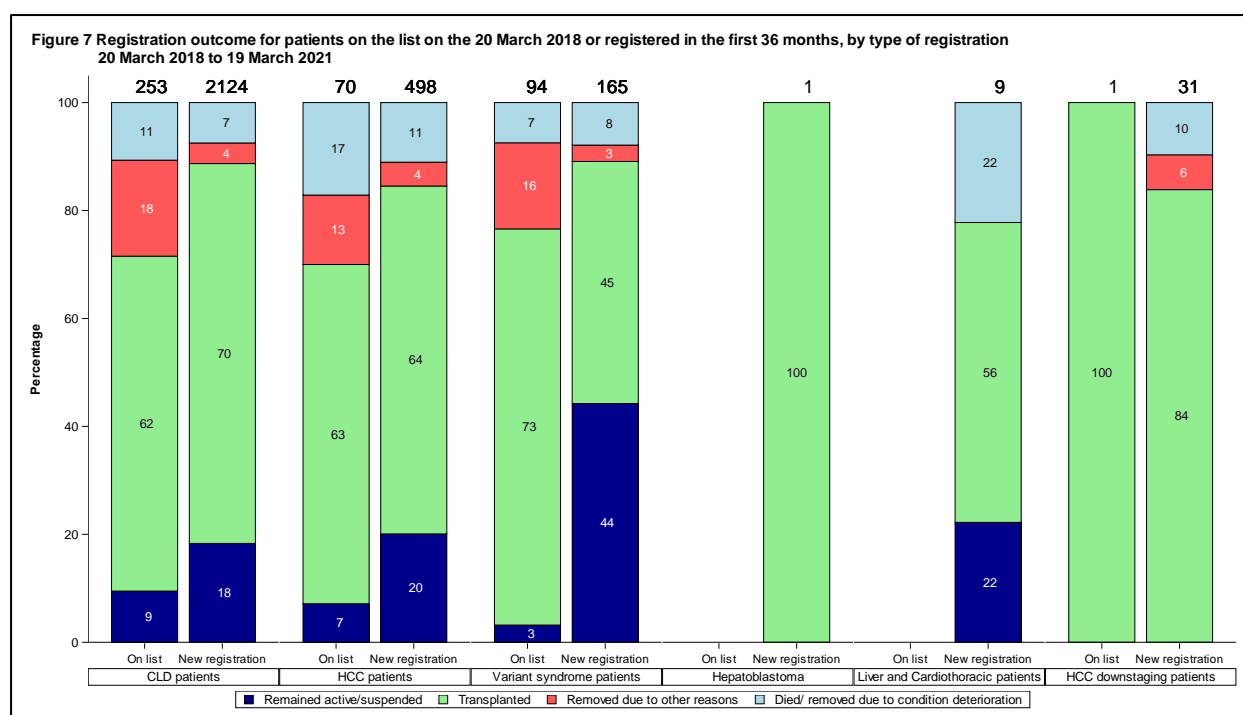
3.5.4. **Table 7A** shows the reasons for removals for the 179 patients removed from the list due to reasons other than condition deterioration. Forty five patients on the list on 20 March 2018 and 56 new registrations were removed from the list due to condition improved whilst 39 were removed due to either patient/ parent request or non-compliance.

Table 7A Reason for removal for 179 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 March 2021 as at 31 March 2021

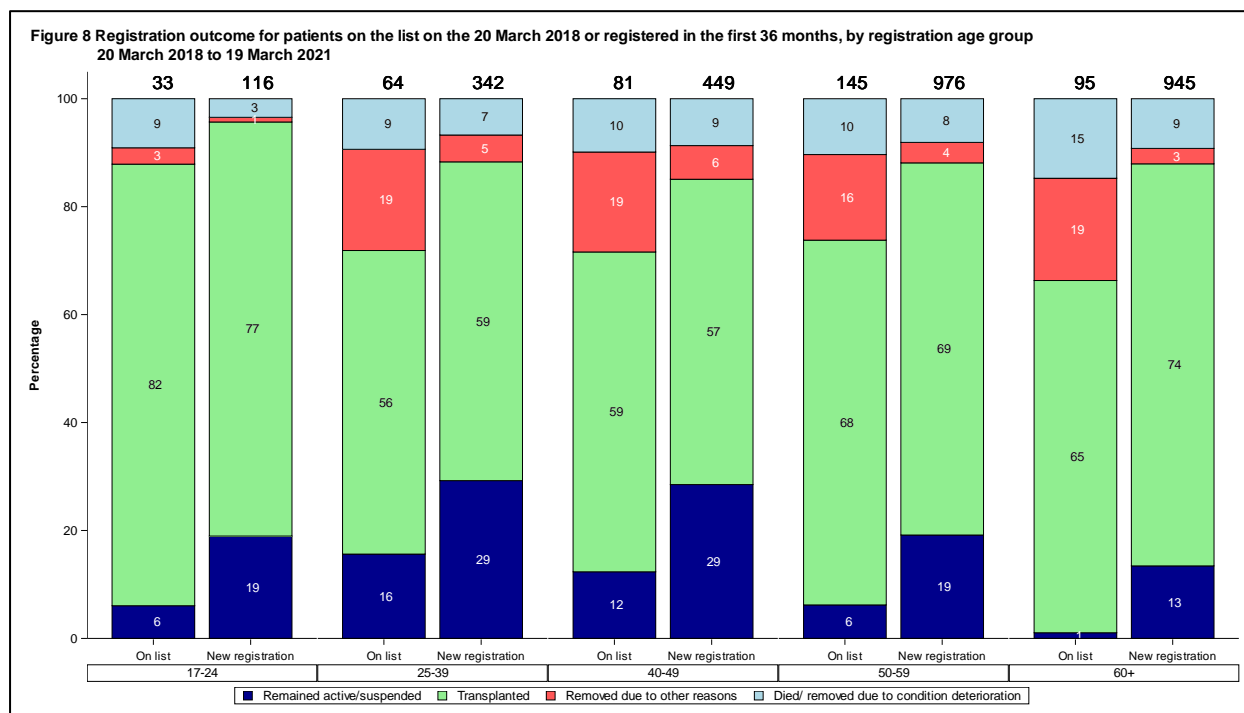
	Active and suspended patients at 19 March 2018 N (%)	New registrations between 20 March 2018 and 19 March 2021 ¹ N (%)	Total N (%)
Condition improved	45 (65%)	56 (51%)	101 (56)
Patient/parent request	8 (12%)	6 (5%)	14 (8)
Patient/ non-compliant	8 (12%)	17 (15%)	25 (14)
Registered on super-urgent list	0 (0%)	4 (4%)	4 (2)
Patient fallen outside of agreed listing criteria	1 (1%)	8 (7%)	9 (5)
Other	7 (10%)	19 (17%)	26 (15)
TOTAL	69 (100)	110 (100)	179 (100)

¹ Includes re-registrations for second or subsequent transplants

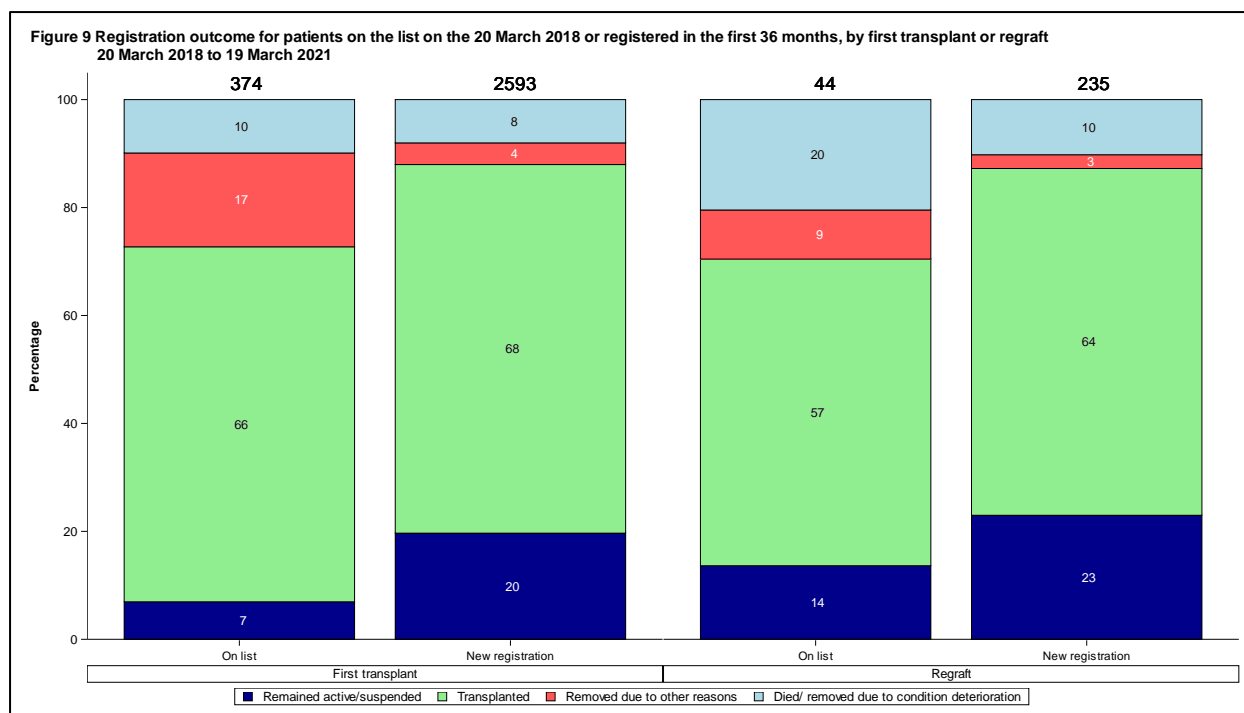
3.5.5. **Figure 7** shows the registration outcome by whether the patients were on the list on 20 March 2018 and type of adult elective patient. A higher proportion of new CLD and HCC registrations were transplanted in the first thirty-six months than patients on the list on 20 March 2018. Due to the 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<0.002).



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 thirty-six 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 apart from those aged 17-24 years (Fishers exact p-value<0.01 for 25-39, 40-49, 50-59, 60+ and p-value=0.10 for 17-24).



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 regrant. A higher proportion of new registrations were transplanted in the first thirty-six 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) and for regrafts (Fishers exact p-value=0.03).



3.5.8. Twenty-five patients listed for a regraft, either on the list on 20 March 2018 or registered during the thirty-six months post NLOS, were removed from the transplant list (regardless of reason). Of these twenty-five patients, ten were on the list on the 20 March 2018 and fifteen were registered in the first thirty-six months of NLOS. **Table 8** shows the reasons for removal from the transplant list for each of the 25 patients. No additional patients have been removed from the list since the last report.

Table 8 Reasons for removal for 25 regrant 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 list on 20 March 2018						
1	Birmingham	March 2018	1940	2562	Condition deteriorated	Deterioration of Hocum therefore not fit for OLTx
2	Kings College	May 2018	1178	266	Condition improved	
3	Birmingham	July 2018	1106	247	Condition improved	
4	Kings College	August 2018	40	596	Condition deteriorated	Awaiting cardiology review, episode of SVT yesterday
5	Kings College	May 2018	527	212	Condition deteriorated	
6	Royal Free	March 2019	2220	392	Condition improved	
7	Cambridge	February 2019	1903	337	Condition deteriorated	Further investigations required for anaemia and cardiac function
8	Birmingham	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	Kings College	February 2020	808	604	Condition deteriorated	Requires Haematology review and bone marrow biopsy due to neutropenia.
10	Birmingham	July 2020	5537	764	Other	Patient now for palliative care in their local hospital
Patient registered between 20 March 2018 and 19 March 2020						
11	Kings College	December 2018	2799	24	Condition deteriorated	Has extra hepatic collections, needs addressing
12	Kings College	April 2018	1245	2	Other	At patients request
13	Kings College	September 2018	1220	55	Condition deteriorated	Patient has developed lung cancer
14	Royal Free	April 2019	2736	6	Condition deteriorated	Patient has deteriorated and is no longer a transplant candidate.
15	Birmingham	June 2019	2564	74	Condition improved	
16	Cambridge	September 2019	158	150	Condition deteriorated	HCC in nodes outside liver
17	Royal Free	October 2019	3351	66	Condition deteriorated	Patient has developed multi-organ failure, rising lactate in the context of sepsis.
18	Cambridge	December 2019	49	13	Condition improved	Clinically improving. No longer has an indication for transplant
19	Edinburgh	January 2020	179	117	Condition Deteriorated	HCC metastases
20	Kings College	February 2020	7655	164	Condition Deteriorated	super urgent request sent through via National appeal.
21	Royal Free	February 2020	103	30	Condition improved	OPA 13.2.20
22	Cambridge	February 2020	645	93	Condition improved	

23	Newcastle	March 2020	6929	10	Condition deteriorated	
24	Kings College	July 2020	2907	609	Condition deteriorated	
25	Cambridge	September 2020	56	1	Condition improved	Not clinically urgent

3.6. LIVER OFFERING

- 3.6.1. **Table 9** shows the overall UK deceased donor liver offering outcome between 20 March 2015 and 19 March 2021, by donor type and time period. In the first thirty-six months of the scheme, 2784 DBD livers were offered for transplantation compared with 2632 during the thirty-six months prior to the implementation. Of the livers offered, 2400 (86%) were retrieved for the purposes of transplantation and 2085 (87%) were transplanted (all but 14 were transplanted in the UK). The proportion of DBD livers offered and retrieved is very similar to the percentage for the thirty-six months prior to the introduction of the new scheme.
- 3.6.2. Solid organs were not retrieved from 184 DBD donors and 1053 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 thirty-six months, 34 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=186) and other reasons (n=101).
- 3.6.5. Three hundred and fifteen DBD livers were retrieved for the purposes of transplantation but were not transplanted in the first thirty-six months of the new scheme. 197 of these 315 livers were not transplanted due to other reasons whilst 90 were not transplanted due to organ unsuitable, 19 due to donor medical history, 7 due to poor function and two due to donor non-medical reasons.
- 3.6.6. All fourteen livers transplanted overseas in the first thirty-six months were transplanted into super-urgent patients in Dublin.

**Table 9 Overall deceased donor liver offering outcome, 20 March 2015 to 19 March 2021,
as at 11 April 2021**

	DBD liver		DCD liver	
	Thirty-six months prior	Thirty-six months post	Thirty-six months prior	Thirty-six months post
1. ALL DECEASED DONORS				
Number donors	2862	3019	3438	3215
Liver not offered for donation	230 (8)	225 (7)	606 (18)	601 (19)
Liver offered for donation	2632 (92)	2794 (93)	2832 (82)	2614 (81)
Liver not retrieved (% offered)	333 (13)	394 (14)	1952 (69)	1900 (73)
Liver retrieved (% offered)	2299 (87)	2400 (86)	880 (31)	714 (27)
Liver transplanted overseas (% retrieved)	13 (1)	14 (1)	0 (0)	0 (0)
Liver transplanted in the UK (% retrieved)	2062 (90)	2071 (86)	607 (69)	480 (67)
Liver not transplanted (% retrieved)	224 (10)	315 (13)	273 (31)	234 (33)
Liver used for research (% not transplanted)	161 (72)	125 (40)	195 (71)	106 (45)
2. ALL SOLID ORGAN DONORS				
Number donors	2559	2684	1760	1683
Liver not offered for donation	86 (3)	74 (3)	107 (6)	122 (7)
Liver offered for donation	2473 (97)	2610 (97)	1653 (94)	1561 (93)
Liver not retrieved (% offered)	174 (7)	210 (8)	773 (47)	847 (54)
Liver retrieved (% offered)	2299 (93)	2400 (92)	880 (53)	714 (46)
Liver transplanted overseas (% retrieved)	13 (1)	14 (1)	0 (0)	0 (0)
Liver transplanted in the UK (% retrieved)	2062 (90)	2071 (86)	607 (69)	480 (67)
Liver not transplanted (% retrieved)	224 (10)	315 (13)	273 (31)	234 (33)
Liver used for research (% not transplanted)	161 (72)	125 (40)	195 (71)	106 (45)

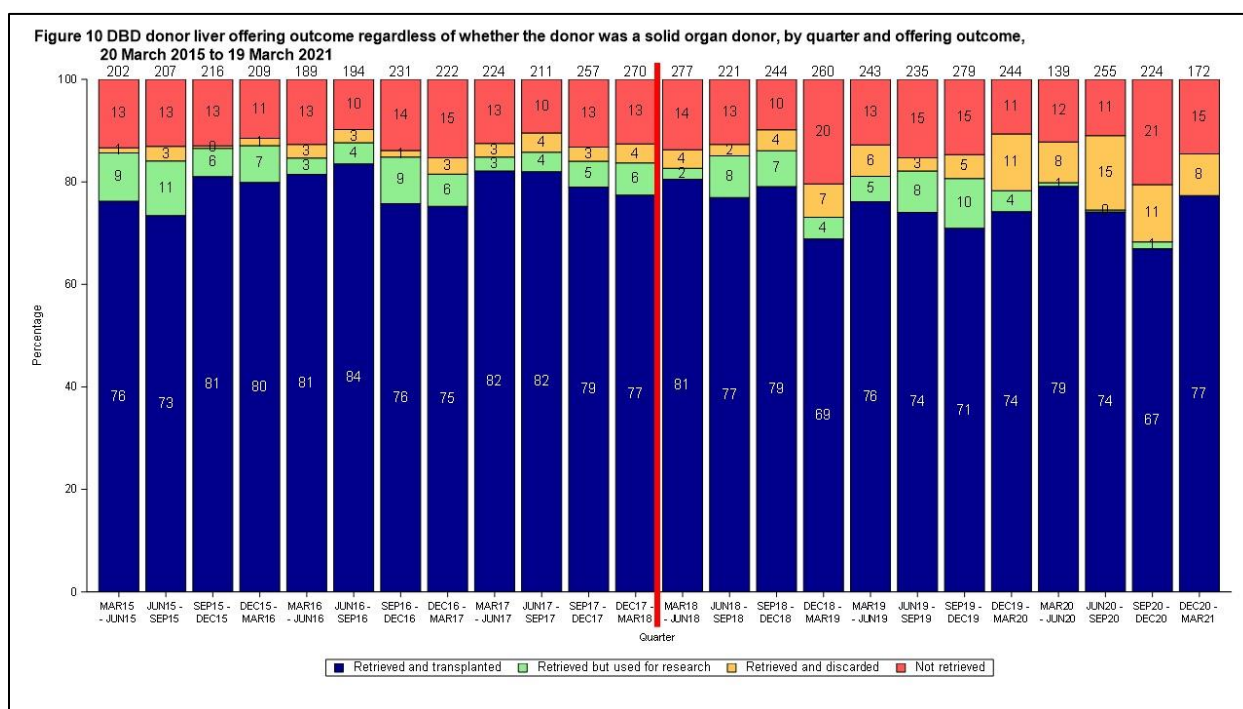
Table 10 Reasons for non-retrieval and non-use of livers from deceased donors (solid organ donors), 20 March 2015 to 19 March 2021, as at 11 April 2021

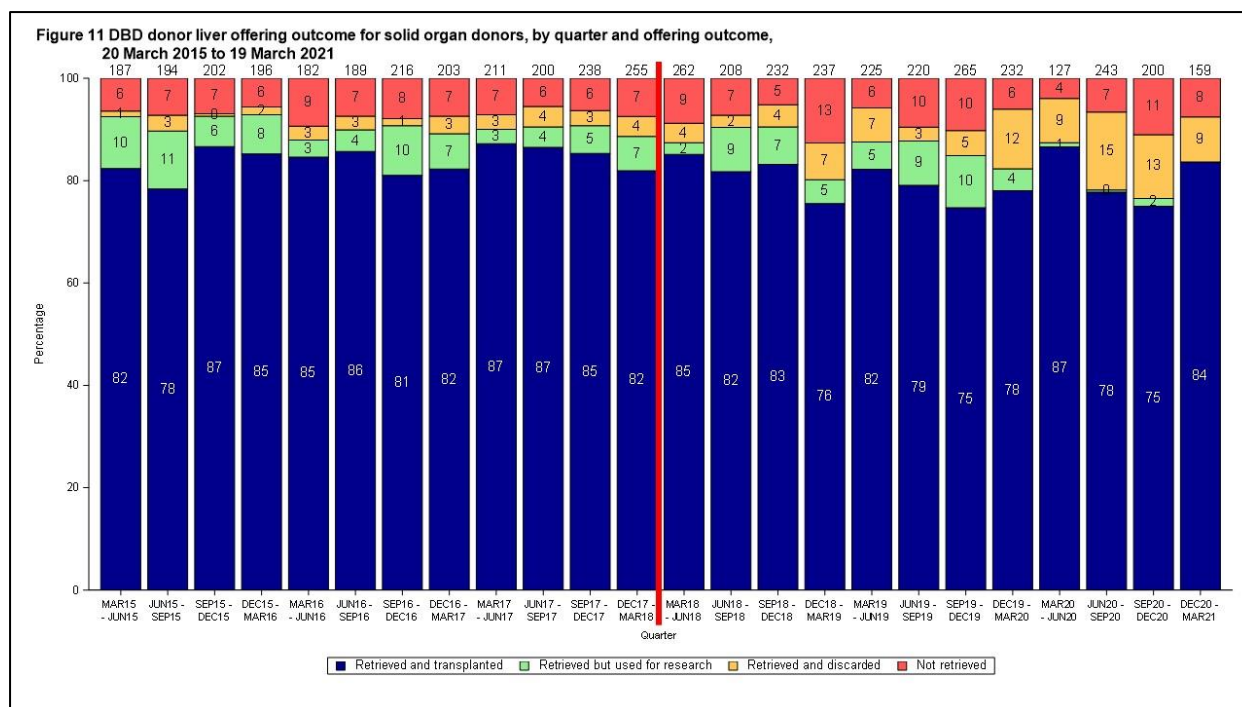
	DBD liver		DCD liver	
	Thirty-six months prior	Thirty-six months post	Thirty-six months prior	Thirty-six months post
REASONS NOT OFFERED				
Family permission not sought	1 (1)	1 (1)	5 (2)	3 (3)
Family permission refused	57 (28)	21 (11)	91 (14)	30 (9)
Permission refused by coroner	37 (15)	12 (7)	36 (8)	23 (11)
Donor unsuitable - age	2 (2)	0 (0)	31 (8)	41 (19)
Donor unsuitable - past history	62 (33)	57 (43)	177 (58)	129 (57)
Donor unstable	7 (0)	2 (0)	21 (3)	3 (1)
Donor unsuitable - size	0 (0)	0 (0)	0 (0)	1 (1)
Poor function	4 (2)	11 (10)	27 (8)	30 (14)
Infection	0 (0)	0 (0)	5 (0)	1 (0)
Other disease	0 (0)	0 (0)	0 (0)	1 (0)
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)	3 (0)	1 (.)
Donor unsuitable - medical reason	1 (1)	0 (0)	2 (0)	0 (0)
Other	22 (2)	12 (2)	102 (5)	52 (5)
Not reported	31 (1)	109 (0)	106 (1)	284 (0)
Total not offered	230 (86)	225 (74)	606 (107)	601 (122)
REASONS FOR NON-RETRIEVAL				
<i>Donor</i>				
Donor unsuitable - medical	41 (7)	35 (8)	30 (3)	35 (8)
Donor unsuitable - non medical	14 (3)	16 (8)	75 (37)	64 (41)
Donor age	7 (5)	8 (6)	381 (157)	438 (203)
<i>Organ</i>				
Organ unsuitable - clinical	151 (85)	186 (116)	475 (242)	524 (285)
Poor function	37 (29)	48 (29)	147 (79)	130 (80)
<i>Other</i>				
Other	83 (45)	101 (43)	844 (255)	709 (230)
Total offered, not retrieved	333 (174)	394 (210)	1952 (773)	1900 (847)
REASONS RETRIEVED BUT NOT TRANSPLANTED				
<i>Donor</i>				
Donor unsuitable - medical	17 (17)	19 (19)	12 (12)	13 (13)
Donor unsuitable - non medical	3 (3)	2 (2)	2 (2)	5 (5)
Donor age	0 (0)	0 (0)	0 (0)	0 (0)
<i>Organ</i>				
Organ unsuitable - clinical	87 (87)	90 (90)	90 (90)	52 (52)
Poor function	2 (2)	7 (7)	0 (0)	6 (6)
<i>Other</i>				
Other	115 (115)	197 (197)	169 (169)	158 (158)
Total retrieved, not transplanted	224 (224)	315 (315)	273 (273)	234 (234)

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 5 year period.

3.6.8. The percentage of organs retrieved and transplanted per quarter ranged from 73% to 84% in the thirty-six months prior and 67% to 81% in the thirty-six months post the introduction of NLOS. The percentage of livers retrieved and used for research ranged between 3% and 11% in the thirty-six months prior and 0% to 10% for the thirty-six 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.

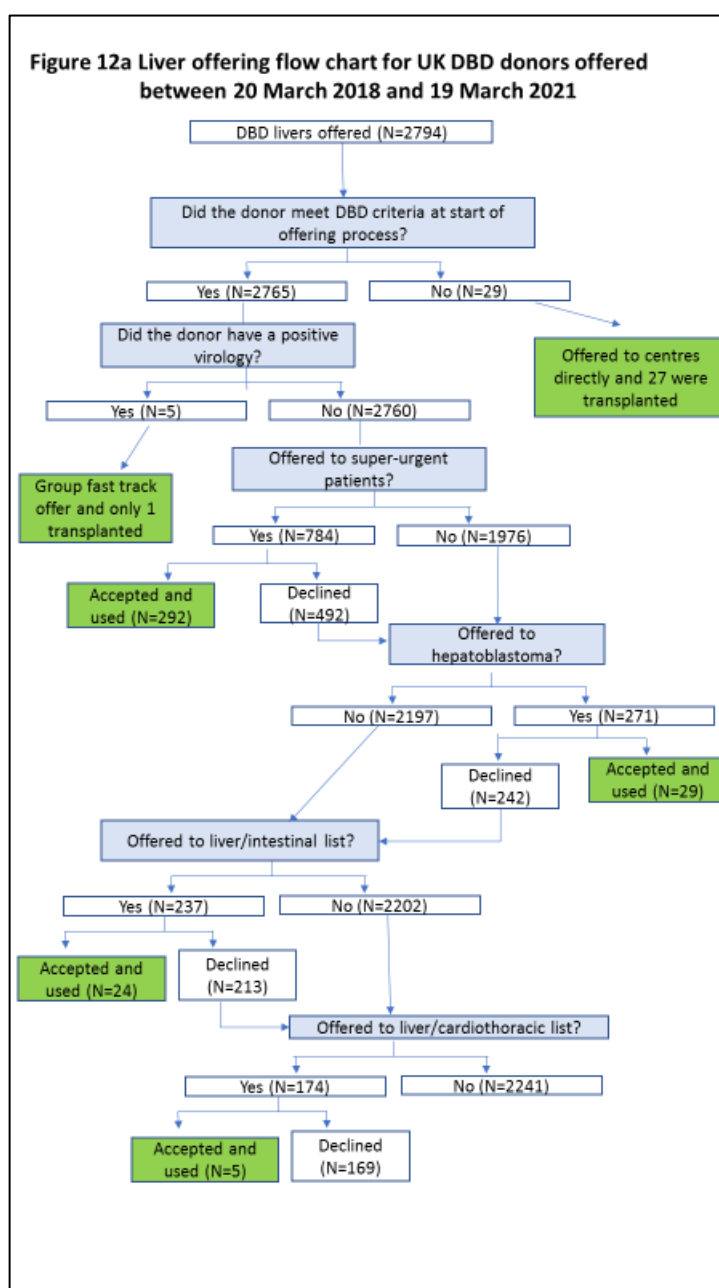


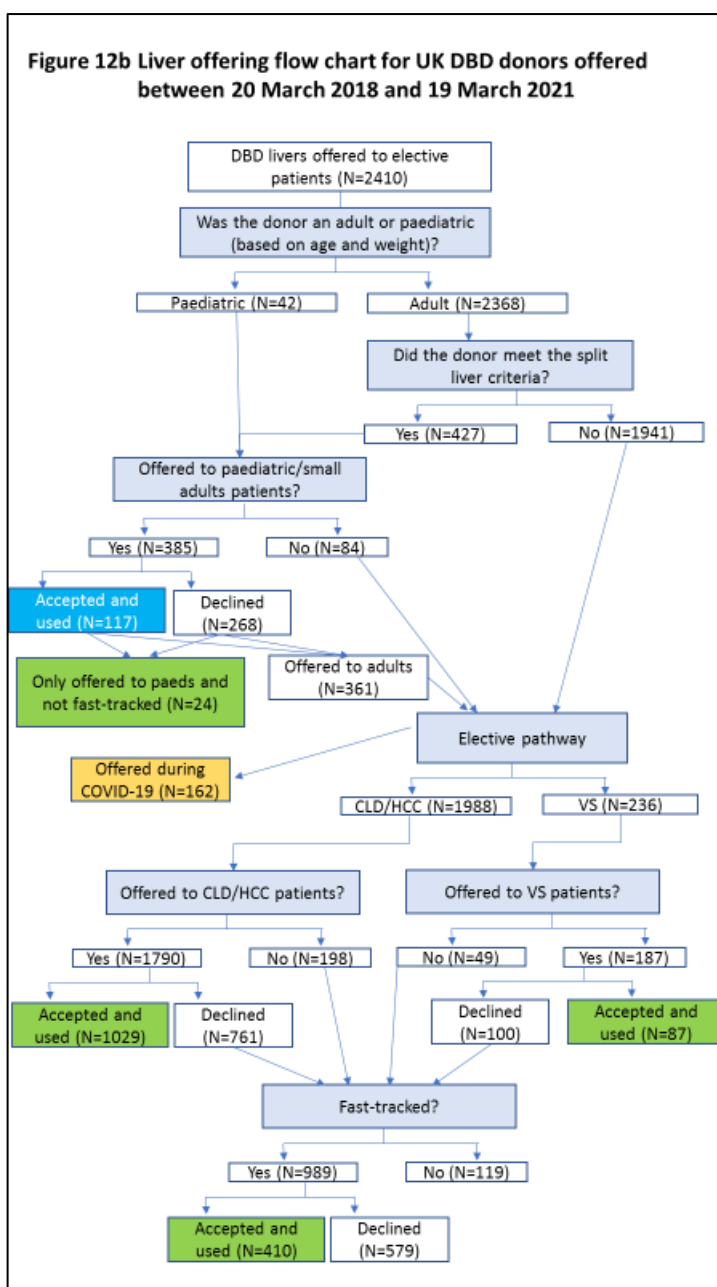


- 3.6.10. **Figure 12a** show the number of livers offered during the first thirty-six months of the new scheme at each stage of the liver offering pathway up to and including the liver and cardiothoracic section. Livers offered during COVID are included in **Figure 12a** but excluded at the elective stage of **Figure 12b**. 29 of the 2794 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 292 donors meeting the DBD criteria were accepted and transplanted into super-urgent patients (including 14 super-urgent patients in Dublin). Two hundred and seventy one livers were offered to hepatoblastoma patients and 29 were accepted and transplanted. Two hundred and thirty seven livers were offered to the liver and intestinal list and 24 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. One hundred and seventy four livers were offered to liver and cardiothoracic patients and five 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 2410 livers offered to elective patients, 2368 were adult donors and 42 were paediatric donors (aged less than 16 years or weighing 40 kg or less). 427 adult donors met the split criteria and 385 livers were offered to paediatric centres for paediatric/small adult patients.

117 of the 385 livers were accepted and transplanted. Twenty-four 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. Eighty nine percent of livers offered to elective patients were randomly allocated to the elective CLD/HCC pathway while eleven percent were allocated to the variant syndrome pathway. Of the 1988 livers allocated to the CLD/HCC pathway, 1790 (90%) were offered to named patients and 1029 (57%) were accepted and transplanted. Of the 236 livers allocated to the VS pathway, 187 (79%) were offered and 87 (47%) 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 thirty-six months prior to the new scheme or during the first thirty-six 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 60% from 8096 to 12988.

Table 11 Number of DBD liver only offers (excludes intestinal offers) per UK transplant centre, 20 March 2015 to 19 March 2021

Centre offered	Thirty-six months prior to NLOS		Thirty-six months post NLOS		% increase in offers
	No. of offers (no. of donors)	Median number (IQR) of offers per donor	No. of offers (no. of donors)	Median number (IQR) of offers per donor	
A. All liver offers					
Newcastle	944 (903)	1 (1, 1)	1420 (1172)	1 (1, 1)	50%
Leeds	1357 (1187)	1 (1, 1)	2010 (1469)	1 (1, 2)	48%
Cambridge	941 (875)	1 (1, 1)	1405 (1156)	1 (1, 1)	49%
Royal Free	1051 (949)	1 (1, 1)	1519 (1248)	1 (1, 1)	45%
Kings College	1429 (1223)	1 (1, 1)	2730 (1800)	1 (1, 2)	91%
Birmingham	1348 (1151)	1 (1, 1)	2414 (1659)	1 (1, 2)	79%
Edinburgh	1026 (961)	1 (1, 1)	1490 (1236)	1 (1, 1)	45%
Total	8096 (2632)	2 (1, 5)	12988 (2794)	4 (2, 8)	60%
B. All liver offers for livers ultimately transplanted					
Newcastle	481 (458)	1 (1, 1)	739 (612)	1 (1, 1)	54%
Leeds	850 (747)	1 (1, 1)	1172 (859)	1 (1, 2)	38%
Cambridge	489 (447)	1 (1, 1)	763 (637)	1 (1, 1)	56%
Royal Free	579 (521)	1 (1, 1)	808 (659)	1 (1, 1)	40%
Kings College	896 (763)	1 (1, 1)	1714 (1163)	1 (1, 2)	91%
Birmingham	862 (728)	1 (1, 1)	1488 (1057)	1 (1, 2)	73%
Edinburgh	567 (528)	1 (1, 1)	777 (640)	1 (1, 1)	37%
Total	4724 (2075)	1 (1, 3)	7461 (2085)	2 (1, 5)	58%

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 thirty-six months prior to the new scheme or during the first thirty-six 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.

Table 12 Offer outcome for DBD livers that were offered and ultimately transplanted, 20 March 2015 to 19 March 2021, by centre, time period and offer outcome

Centre offered	Thirty-six months prior to NLOS (N (%))				Thirty-six months post to NLOS (N (%))			
	Declined	Accepted but subsequently declined	Accepted and transplanted	Total	Declined	Accepted but subsequently declined	Accepted and transplanted	Total
A. All liver only offers								
Newcastle	364 (76)	10 (2)	107 (22)	481	634 (86)	18 (2)	87 (12)	739
Leeds	452 (53)	45 (5)	353 (42)	850	750 (64)	129 (11)	293 (25)	1172
Cambridge	259 (53)	17 (3)	213 (44)	489	529 (69)	45 (6)	189 (25)	763
Royal Free	288 (50)	21 (4)	270 (47)	579	446 (55)	101 (13)	261 (32)	808
Kings College	361 (40)	43 (5)	492 (55)	896	982 (57)	183 (11)	549 (32)	1714
Birmingham	312 (36)	41 (5)	509 (59)	862	738 (50)	194 (13)	556 (37)	1488
Edinburgh	315 (56)	9 (2)	243 (43)	567	492 (63)	65 (8)	220 (28)	777
Total	2351 (50)	186 (4)	2187 (46)	4724	4571 (61)	735 (10)	2155 (29)	7461
B. Excluding fast-track offers that were not accepted and transplanted or all positive virology/ DCD offers								
Newcastle	302 (72)	10 (2)	107 (26)	419	318 (76)	16 (4)	85 (20)	419
Leeds	395 (50)	43 (5)	353 (45)	791	515 (56)	117 (13)	288 (31)	920
Cambridge	208 (48)	16 (4)	213 (49)	437	301 (58)	38 (7)	184 (35)	523
Royal Free	234 (45)	20 (4)	270 (52)	524	246 (41)	94 (16)	257 (43)	597
Kings College	323 (38)	42 (5)	492 (57)	857	766 (52)	163 (11)	541 (37)	1470
Birmingham	273 (33)	41 (5)	509 (62)	823	565 (44)	176 (14)	553 (43)	1294
Royal Free	244 (49)	9 (2)	243 (49)	496	220 (44)	61 (12)	219 (44)	500
Total	1979 (46)	181 (4)	2187 (50)	4347	2931 (51)	665 (12)	2127 (37)	5723

- 3.6.18. 4170 (32%) of the 12988 offers made in the first 36 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-two patients at 6 centres were offered 11 or more livers in the thirty-six month time period (nine were offered 11 livers, 4 were offered 12 livers, 4 were offered 13 livers, 2 were offered 14 livers, 2 were offered 17 and 1 was offered 27 livers).
- 3.6.20. **Table 13** shows the outcome of named patient liver offers made during the first thirty-six 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-five percent of named patient offers were accepted and 27% 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 thirty-six 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 33% for elective CLD/HCC patients and 6% to 35% for elective variant syndrome patients.
- 3.6.22. **Table 15** shows the outcome of named patient liver offers made during the first thirty-six 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 thirty-six 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.

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

Type of patient	Disease group Disease group	Offer outcome for all named patient offers				Offer outcome for all named patient offers for livers that were ultimately transplanted			
		Declined	Accepted but not used	Transplanted	Total	Declined	Accepted but not used	Transplanted	Total
Chronic Liver Disease (CLD)	Hepatitis C	56 (55)	16 (16)	30 (29)	102	30 (43)	9 (13)	30 (43)	69
	ALD	570 (51)	231 (20)	326 (29)	1127	310 (42)	101 (14)	326 (44)	737
	Hepatitis B	14 (41)	3 (9)	17 (50)	34	13 (42)	1 (3)	17 (55)	31
	PSC	209 (53)	76 (19)	112 (28)	397	137 (48)	37 (13)	112 (39)	286
	PBC	160 (52)	52 (17)	94 (31)	306	92 (43)	30 (14)	94 (44)	216
	AID	168 (51)	67 (20)	94 (29)	329	108 (45)	40 (17)	94 (39)	242
	Metabolic	410 (57)	114 (16)	196 (27)	720	232 (48)	53 (11)	196 (41)	481
	Other	70 (63)	17 (15)	25 (22)	112	45 (55)	12 (15)	25 (30)	82
	Retransplant	290 (61)	82 (17)	101 (21)	473	186 (54)	55 (16)	101 (30)	342
Hepatocellular carcinoma (HCC)		91 (51)	37 (21)	51 (28)	179	60 (46)	20 (15)	51 (39)	131
Total elective CLD/HCC		2038 (53)	695 (18)	1046 (28)	3779	1213 (46)	358 (14)	1046 (40)	2617
Variant syndrome		230 (59)	74 (19)	87 (22)	391	143 (53)	39 (14)	87 (32)	269
Total named patient offers		2268 (54)	769 (18)	1133 (27)	4170	1356 (47)	397 (14)	1133 (39)	2886

Table 14 Offer outcome for named elective CLD/HCC patient offers made between 20 March 2018 and 19 March 2021 (excluding 27 March 2020 to 9 July 2020), by aetiology and centre

Type of patient	Centre	Offer outcome for all named patient offers				Offer outcome for all named patient offers for livers that were ultimately transplanted			
		Declined	Accepted but not used	Transplanted	Total	Declined	Accepted but not used	Transplanted	Total
Chronic Liver Disease (CLD)	Newcastle	233 (75)	27 (9)	50 (16)	310	140 (71)	8 (4)	50 (25)	198
	Leeds	221 (50)	96 (22)	128 (29)	445	121 (41)	47 (16)	128 (43)	296
	Cambridge	273 (64)	57 (13)	95 (22)	425	171 (58)	29 (10)	95 (32)	295
	Royal Free	262 (52)	108 (21)	133 (26)	503	163 (44)	72 (20)	133 (36)	368
	Kings College	440 (54)	136 (17)	233 (29)	809	263 (48)	54 (10)	233 (42)	550
	Birmingham	302 (43)	170 (24)	230 (33)	702	160 (33)	92 (19)	230 (48)	482
	Edinburgh	216 (53)	64 (16)	126 (31)	406	135 (45)	36 (12)	126 (42)	297
Hepatocellular carcinoma (HCC)	Newcastle	2 (25)	1 (13)	5 (63)	8	2 (29)	0 (0)	5 (71)	13
	Leeds	14 (39)	12 (33)	10 (28)	36	9 (33)	8 (30)	10 (37)	27
	Cambridge	19 (83)	1 (4)	3 (13)	23	14 (78)	1 (6)	3 (17)	18
	Royal Free	7 (35)	4 (20)	9 (45)	20	5 (31)	2 (13)	9 (56)	16
	Kings College	15 (50)	7 (23)	8 (27)	30	10 (45)	4 (18)	8 (36)	22
	Birmingham	18 (60)	4 (13)	8 (27)	30	9 (45)	3 (15)	8 (40)	20
	Edinburgh	16 (50)	8 (25)	8 (25)	32	11 (52)	2 (10)	8 (38)	21
Total elective CLD/HCC	Newcastle	235 (74)	28 (9)	55 (17)	318	142 (69)	8 (4)	55 (27)	205
	Leeds	235 (49)	108 (22)	138 (29)	481	130 (40)	55 (17)	138 (43)	323
	Cambridge	292 (65)	58 (13)	98 (22)	448	185 (59)	30 (10)	98 (31)	313
	Royal Free	269 (51)	112 (21)	142 (27)	523	168 (44)	74 (19)	142 (37)	384
	Kings College	455 (54)	143 (17)	241 (29)	839	273 (48)	58 (10)	241 (42)	572
	Birmingham	320 (44)	174 (24)	238 (33)	732	169 (34)	95 (19)	238 (47)	502
	Edinburgh	232 (53)	72 (16)	134 (31)	438	146 (46)	38 (12)	134 (42)	318

Table 14A **Offer outcome for named elective variant syndrome patient offers made between 20 March 2018 and 19 March 2021 (excluding 27 March 2020 to 9 July), by aetiology and centre**

Type of patient	Centre	Offer outcome for all named patient offers				Offer outcome for all named patient offers for livers that were ultimately transplanted			
		Declined	Accepted but not used	Transplanted	Total	Declined	Accepted but not used	Transplanted	Total
Variant syndrome	Newcastle	13 (76)	3 (18)	1 (6)	17	6 (75)	1 (13)	1 (13)	8
	Leeds	39 (62)	9 (14)	15 (24)	63	21 (49)	7 (16)	15 (35)	43
	Cambridge	12 (57)	6 (29)	3 (14)	21	6 (60)	1 (10)	3 (30)	10
	Royal Free	11 (48)	4 (17)	8 (35)	23	7 (39)	3 (17)	8 (44)	18
	Kings College	101 (63)	29 (18)	31 (19)	161	72 (60)	17 (14)	31 (26)	120
	Birmingham	36 (46)	18 (23)	24 (31)	78	19 (37)	8 (16)	24 (47)	51
	Edinburgh	18 (64)	5 (18)	5 (18)	28	12 (63)	2 (11)	5 (26)	19

Table 15 Offer outcome for named elective CLD/HCC patient offers made between 20 March 2018 and 19 March 2021 (excluding 27 March 2020 to 9 July 2020), by aetiology and blood group

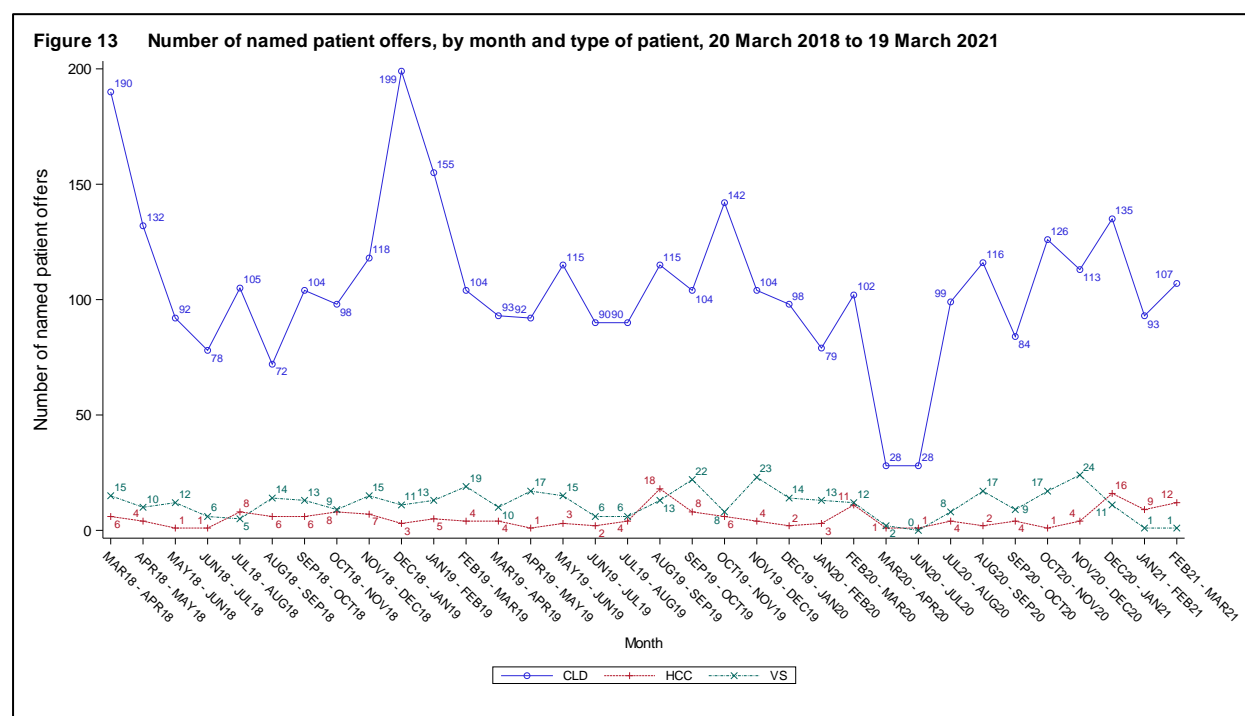
Type of patient	Blood group	Offer outcome for all named patient offers				Offer outcome for all named patient offers for livers that were ultimately transplanted			
		Declined	Accepted but not used	Transplanted	Total	Declined	Accepted but not used	Transplanted	Total
Chronic Liver Disease (CLD)	O	855 (56)	271 (18)	403 (26)	1529	513 (48)	150 (14)	403 (38)	1066
	A	800 (53)	281 (19)	419 (28)	1500	482 (46)	142 (14)	419 (40)	1043
	B	181 (51)	69 (19)	105 (30)	355	97 (42)	31 (13)	105 (45)	233
	AB	111 (51)	37 (17)	68 (31)	216	61 (42)	15 (10)	68 (47)	144
Hepatocellular carcinoma (HCC)	O	26 (47)	13 (24)	16 (29)	55	18 (45)	6 (15)	16 (40)	40
	A	49 (60)	10 (12)	23 (28)	82	32 (52)	6 (10)	23 (38)	61
	B	9 (43)	8 (38)	4 (19)	21	5 (38)	4 (31)	4 (31)	13
	AB	7 (33)	6 (29)	8 (38)	21	5 (29)	4 (24)	8 (47)	17
Total elective CLD/HCC	O	881 (56)	284 (18)	419 (26)	1584	531 (48)	156 (14)	419 (38)	1106
	A	849 (54)	291 (18)	442 (28)	1582	514 (47)	148 (13)	442 (40)	1104
	B	190 (51)	77 (20)	109 (29)	376	102 (41)	35 (14)	109 (44)	246
	AB	118 (50)	43 (18)	76 (32)	237	66 (41)	19 (12)	76 (47)	161
Variant syndrome	O	139 (62)	37 (17)	47 (21)	223	92 (59)	17 (11)	47 (30)	156
	A	75 (55)	30 (22)	32 (23)	137	44 (47)	17 (18)	32 (34)	93
	B	10 (43)	6 (26)	7 (30)	23	5 (31)	4 (25)	7 (44)	16
	AB	6 (75)	1 (13)	1 (13)	8	2 (50)	1 (25)	1 (25)	4

Table 16 Offer outcome for named elective HCC patient offers between 20 March 2018 and 19 March 2021 (excluding 27 March 2020 to 9 July 2020), by UKELD, ascites and encephalopathy grade

Ascites and encephalopathy grade	Offer outcome for all named patient offers				Offer outcome for all named patient offers for livers that were ultimately transplanted			
	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	1 (100)	0 (0)	0 (0)	1	1 (100)	0 (0)	0 (0)	1
Moderate ascites and encephalopathy grade 0	2 (67)	1 (33)	0 (0)	3	1 (100)	0 (0)	0 (0)	1
TOTAL	19 (53)	7 (19)	10 (28)	36	11 (44)	4 (16)	10 (40)	25
UKELD 49 - 53								
No ascites and encephalopathy grade 0	12 (48)	6 (24)	7 (28)	25	7 (39)	4 (22)	7 (39)	18
Mild ascites and encephalopathy grade 0	2 (50)	2 (50)	0 (0)	4	2 (50)	2 (50)	0 (0)	4
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	2 (100)	0 (0)	0 (0)	2	2 (100)	0 (0)	0 (0)	2
No ascites and encephalopathy grade 1	3 (100)	0 (0)	0 (0)	3	2 (100)	0 (0)	0 (0)	2
Mild ascites and encephalopathy grade 1	0 (0)	0 (0)	1 (100)	1	0 (0)	0 (0)	1 (100)	1
Moderate ascites and encephalopathy grade 1	0 (0)	0 (0)	1 (100)	1	0 (0)	0 (0)	1 (100)	1
TOTAL	20 (53)	9 (24)	9 (24)	38	14 (48)	6 (21)	9 (31)	29
UKELD 54 or over								
No ascites and encephalopathy grade 0	14 (48)	7 (24)	8 (28)	29	9 (47)	2 (11)	8 (42)	19
Mild ascites and encephalopathy grade 0	18 (53)	7 (21)	9 (26)	34	14 (50)	5 (18)	9 (32)	28
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	2 (25)	4 (50)	2 (25)	8	2 (40)	1 (20)	2 (40)	5
Severe ascites and encephalopathy grade 1	0 (0)	0 (0)	2 (100)	2	0 (0)	0 (0)	2 (100)	2
TOTAL	52 (50)	21 (20)	32 (30)	105	35 (45)	10 (13)	32 (42)	77

OVERALL								
No ascites and encephalopathy grade 0	42 (49)	19 (22)	25 (29)	86	25 (42)	10 (17)	25 (42)	60
Mild ascites and encephalopathy grade 0	21 (54)	9 (23)	9 (23)	39	17 (52)	7 (21)	9 (27)	33
Moderate ascites and encephalopathy grade 0	9 (56)	2 (13)	5 (31)	16	6 (55)	0 (0)	5 (45)	11
Severe ascites and encephalopathy grade 0	6 (100)	0 (0)	0 (0)	6	5 (100)	0 (0)	0 (0)	5
No ascites and encephalopathy grade 1	6 (50)	3 (25)	3 (25)	12	3 (38)	2 (25)	3 (38)	8
Mild ascites and encephalopathy grade 1	5 (56)	0 (0)	4 (44)	9	2 (33)	0 (0)	4 (67)	6
Moderate ascites and encephalopathy grade 1	2 (22)	4 (44)	3 (33)	9	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

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 103 and ranged between 28 and 199 whilst the median number of HCC offers per month was 4 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 1155 days and ranged between -138 and 1627 days. The median TBS ranged between 989 days for other aetiology and 1255 days for Autoimmune and cryptogenic disease (AID). For blood group, the median TBS ranged between 987 days for blood group AB and 1208 days for blood group O.

Table 17 Median (Range) Transplant Benefit Score (TBS) for named elective chronic liver disease (CLD) patient offers, 20 March 2018 to 19 March 2021 (excluding 27 March 2020 to 9 July 2020)

	Number of offers	Median TBS	Interquartile range	Range
Disease group				
Hepatitis C	102	1098.51080	919 - 1304	-43 - 1431
ALD	1127	1215.05504	1031 - 1333	-138 - 1626
Hepatitis B	34	1214.94607	998 - 1392	748 - 1617
PSC	397	1138.47644	1002 - 1300	68 - 1560
PBC	306	1079.04710	980 - 1222	484 - 1452
AID	329	1255.40991	1068 - 1363	-93 - 1620
Metabolic	720	1168.64606	1035 - 1310	235 - 1627
Other	112	988.72091	832 - 1106	-118 - 1480
Retransplant	473	1087.43946	981 - 1199	9 - 1512
Blood group				
O	1529	1208.46062	1074 - 1333	-53 - 1627
A	1500	1115.34177	952 - 1276	-118 - 1620
B	355	1134.67383	969 - 1289	96 - 1560
AB	216	986.91354	735 - 1214	-138 - 1551
Centre				
Newcastle	310	1186.95880	1006 - 1305	11 - 1592
Leeds	445	1123.15122	993 - 1294	-138 - 1574
Cambridge	425	1170.21421	1015 - 1294	235 - 1591
Royal Free	503	1162.18748	993 - 1313	96 - 1562
Kings College	809	1154.81475	1014 - 1312	-118 - 1627
Birmingham	702	1156.83614	1006 - 1306	-53 - 1626
Edinburgh	406	1131.67237	1009 - 1276	106 - 1620
OVERALL	3600	1154.79632	1006 - 1302	-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 March 2021 (excluding 27 March 2020 to 9 July 2020)

	Number of offers	Median TBS	Interquartile range	Range
Blood group				
O	55	1106.12263	929 - 1285	23 - 1450
A	82	926.90524	463 - 1164	-192 - 1493
B	21	762.51590	355 - 1028	-130 - 1289
AB	21	414.75382	219 - 549	-256 - 1011
Centre				
Newcastle	8	668.41582	-35 - 1161	-192 - 1369
Leeds	36	900.58973	366 - 1013	-130 - 1246
Cambridge	23	866.27496	355 - 1329	30 - 1493
Royal Free	20	788.77517	455 - 1308	-256 - 1414
Kings College	30	1054.83352	545 - 1148	-118 - 1319
Birmingham	30	1014.76655	642 - 1111	-75 - 1350
Edinburgh	32	931.71544	363 - 1105	-66 - 1450
UKELD group				
<49	36	186.98991	9 - 409	-256 - 1016
49-53	38	756.67220	402 - 999	-118 - 1360
≥ 54	105	1104.12367	934 - 1256	30 - 1493
UKELD, Current ascites and encephalopathy grade				
<49				
No ascites and encephalopathy grade 0	32	133.51099	-4 - 409	-256 - 1016
Mild ascites and encephalopathy grade 0	1	632.85962	633 - 633	633 - 633
Moderate ascites and encephalopathy grade 0	3	276.31535	219 - 276	219 - 276
49 - 53				
No ascites and encephalopathy grade 0	25	914.58815	668 - 1081	229 - 1360
Mild ascites and encephalopathy grade 0	4	756.81151	240 - 942	-118 - 967
Moderate ascites and encephalopathy grade 0	2	128.83332	-66 - 324	-66 - 324
Severe ascites and encephalopathy grade 0	2	318.48762	235 - 402	235 - 402
No ascites and encephalopathy grade 1	3	704.68803	632 - 756	632 - 756
Mild ascites and encephalopathy grade 1	1	-14.34200	-14 - -14	-14 - -14
Moderate ascites and encephalopathy grade 1	1	603.31420	603 - 603	603 - 603
≥ 54				
No ascites and encephalopathy grade 0	29	1106.12263	1034 - 1229	493 - 1319
Mild ascites and encephalopathy grade 0	34	1260.57006	889 - 1366	515 - 1493
Moderate ascites and encephalopathy grade 0	11	1104.48748	1062 - 1173	642 - 1450
Severe ascites and encephalopathy grade 0	4	941.63945	546 - 1036	236 - 1045
No ascites and encephalopathy grade 1	9	931.17751	763 - 976	30 - 1437
Mild ascites and encephalopathy grade 1	8	1058.00760	917 - 1164	676 - 1287
Moderate ascites and encephalopathy grade 1	8	1138.79533	889 - 1234	355 - 1350
Severe ascites and encephalopathy grade 1	2	866.82466	570 - 1164	570 - 1164
OVERALL	179	939.77469	493 - 1157	-256 - 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. Although a higher proportion of super-urgent transplants were performed in the first thirty-six months of the new NLOS than during the thirty-six months prior to the new scheme, there was no evidence of a statistically significant difference for DBD liver and liver/kidney transplants (overall Fishers exact p-value=0.57 for adult patients and 0.47 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 for deceased donor liver transplants performed in the UK, 20 March 2015 to 19 March 2021, as at 8 April 2021

	DBD liver		DCD liver	
	Thirty-six months prior N (%)	Thirty-six months post N (%)	Thirty-six months prior N (%)	Thirty-six months post N (%)
Adult elective liver and liver/kidney	1720 (76.9)	1709 (77.4)	584 (96.2)	467 (97.1)
Adult elective Multivisceral	13 (0.6)	12 (0.5)	0 (0)	0 (0)
Adult elective liver/ cardiothoracic	3 (0.1)	5 (0.2)	0 (0)	0 (0)
Adult super-urgent liver and liver/kidney	260 (11.6)	244 (11.1)	6 (1.0)	6 (1.2)
Adult super-urgent Multivisceral	2 (0.1)	0 (0)	0 (0)	0 (0)
Paediatric elective liver and liver/kidney	189 (8.5)	183 (8.3)	17 (2.8)	6 (1.2)
Paediatric elective Multivisceral	11 (0.5)	9 (0.4)	0 (0)	0 (0)
Paediatric super-urgent liver and liver/kidney	38 (1.7)	45 (2.0)	0 (0)	2 (0.4)
Total UK transplants	2236 (100)	2207 (100)	607 (100)	481 (100)

3.7.2. One hundred and forty one of the 1709 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 has been excluded from the rest of the 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=0.31 DBD, 0.43 DCD), type of liver transplanted for DBD (p=0.28) and gender (p=0.17 DBD, 0.23 DCD).

3.7.4. For DBD transplants, there was evidence of a statistically significant association between time period and age group (p=0.0005), disease group (p<0.0001), transplant centre (p=0.05), zonal (p<0.0001), type of patient (p=0.0001) and blood group compatibility (p<0.0001).

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 ($p<0.0001$) and blood group compatibility ($p=0.0005$). There was no evidence of a statistically significant association for age group ($p=0.14$) and zonal transplants ($p=0.60$).

Table 20 Adult elective liver and liver/kidney transplants performed in the UK using livers from deceased donors, 20 March 2015 to 19 March 2021 (excluding 27 March to 9 July 2020) as at 8 April 2021

	DBD liver		DCD liver	
	Thirty-six months prior	Thirty-six months post	Thirty-six months prior	Thirty-six months post
	N (%)	N (%)	N (%)	N (%)
Total	1720	1590	584	444
Transplant Type				
Liver only	1674 (97.3)	1557 (97.9)	584 (100)	443 (99.8)
Liver & kidney	46 (2.7)	33 (2.1)	0 (-)	1 (0.2)
Type of Liver transplanted				
Whole liver	1584 (92.1)	1487 (93.5)	584 (100)	444 (100)
Split liver	135 (7.8)	102 (6.4)	0 (-)	0 (-)
Reduced liver	1 (0.1)	1 (0.1)	0 (-)	0 (-)
Recipient Age Group				
17-25 years	87 (5.1)	95 (6.0)	10 (1.7)	11 (2.5)
26-39 years	215 (12.5)	158 (9.9)	35 (6.0)	43 (9.7)
40-49 years	288 (16.7)	198 (12.5)	94 (16.1)	62 (14.0)
50-59 years	568 (33.0)	547 (34.4)	235 (40.2)	160 (36.0)
60-69 years	528 (30.7)	561 (35.3)	192 (32.9)	158 (35.6)
70+ years	34 (2.0)	31 (1.9)	18 (3.1)	10 (2.3)
Recipient Sex				
Male	1117 (64.9)	996 (62.6)	372 (63.7)	299 (67.3)
Female	603 (35.1)	594 (37.4)	212 (36.3)	145 (32.7)
Type of Patient				
CLD	1269 (73.8)	1265 (79.5)	385 (65.9)	250 (56.3)
HCC	298 (17.3)	188 (11.8)	177 (30.3)	174 (39.2)
VS	142 (8.3)	127 (8.0)	19 (3.3)	7 (1.6)
HCC downstaging	11 (0.6)	11 (0.7)	3 (0.5)	13 (2.9)
Robert's Disease Group				
HCC	309 (18.0)	199 (12.5)	180 (30.8)	187 (42.1)
HCV	65 (3.8)	37 (2.3)	19 (3.3)	8 (1.8)
ALD	403 (23.4)	418 (26.3)	153 (26.2)	93 (20.9)
HBV	25 (1.5)	21 (1.3)	10 (1.7)	3 (0.7)
PSC	207 (12.0)	169 (10.6)	52 (8.9)	43 (9.7)
PBC	109 (6.3)	132 (8.3)	62 (10.6)	31 (7.0)
AID	100 (5.8)	130 (8.2)	28 (4.8)	14 (3.2)
NAFLD	150 (8.7)	186 (11.7)	55 (9.4)	25 (5.6)
Metabolic (excluding NAFLD)	33 (1.9)	44 (2.8)	8 (1.4)	7 (1.6)
Other	151 (8.8)	112 (7.0)	12 (2.1)	18 (4.1)
Retransplant	168 (9.8)	142 (8.9)	5 (0.9)	15 (3.4)

Table 21 Adult elective liver and liver/kidney transplants performed in the UK using livers from deceased donors, 20 March 2015 to 19 March 2021 (excluding 27 March to 9 July 2020) as at 8 April 2021

	DBD liver		DCD liver	
	Thirty-six months prior	Thirty-six months post	Thirty-six months prior	Thirty-six months post
	N (%)	N (%)	N (%)	N (%)
Total UK adult elective liver & liver/kidney transplants	1720	1590	584	444
Transplant Centre				
Newcastle	93 (5.4)	71 (4.5)	16 (2.7)	8 (1.8)
Leeds	265 (15.4)	202 (12.7)	67 (11.5)	55 (12.4)
Cambridge	178 (10.3)	151 (9.5)	97 (16.6)	102 (23.0)
Royal Free	225 (13.1)	220 (13.8)	44 (7.5)	72 (16.2)
Kings College	356 (20.7)	378 (23.8)	145 (24.8)	106 (23.9)
Birmingham	381 (22.2)	384 (24.2)	163 (27.9)	78 (17.6)
Edinburgh	222 (12.9)	184 (11.6)	52 (8.9)	23 (5.2)
Liver Transplant Number				
First liver transplant	1552 (90.2)	1447 (91.0)	579 (99.1)	429 (96.6)
Second	136 (7.9)	123 (7.7)	4 (0.7)	15 (3.4)
Third	25 (1.5)	16 (1.0)	1 (0.2)	0 (-)
Fourth	6 (0.3)	4 (0.3)	0 (-)	0 (-)
Sixth	1 (0.1)	0 (-)	0 (-)	0 (-)
Blood Group Compatibility				
Identical	1694 (98.5)	1524 (95.8)	580 (99.3)	427 (96.2)
Compatible	25 (1.5)	66 (4.2)	3 (0.5)	17 (3.8)
Incompatible	1 (0.1)	0 (-)	1 (0.2)	0 (-)
Zonal Transplants				
Non zonal	445 (25.9)	1274 (80.1)	215 (36.8)	171 (38.5)
Zonal	1275 (74.1)	316 (19.9)	369 (63.2)	273 (61.5)
Blood group matching (D=donor, R=recipient)				
DO, RO	730 (42.4)	699 (44.0)	285 (48.8)	194 (43.7)
DO, RA	1 (0.1)	7 (0.4)	0 (-)	4 (0.9)
DO, RB	5 (0.3)	9 (0.6)	2 (0.3)	10 (2.3)
DO, RAB	0 (-)	0 (-)	0 (-)	1 (0.2)
DA, RO	1 (0.1)	0 (-)	1 (0.2)	0 (-)
DA, RA	741 (43.1)	623 (39.2)	233 (39.9)	188 (42.3)
DA, RAB	19 (1.1)	39 (2.5)	1 (0.2)	1 (0.2)
DB, RB	176 (10.2)	153 (9.6)	53 (9.1)	35 (7.9)
DB, RAB	0 (-)	11 (0.7)	0 (-)	1 (0.2)
DAB, RAB	47 (2.7)	49 (3.1)	9 (1.5)	10 (2.3)

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 thirty-six months post NLOS compared with the thirty-six months prior (38 and 82 days respectively, Kruskal-Wallis p-value<0.0001). The median time to DCD transplants was slightly lower in the thirty-six months post NLOS compared with the thirty-six months prior (58 and 67 days respectively) and was not statistically significant (Kruskal-Wallis p-value=0.11).

Table 22 Median (IQR; range) time to transplant (days) for adult elective liver and liver/kidney transplants performed in the UK using livers from deceased donors, 20 March 2015 to 19 March 2021 (excluding 27 March to 9 July 2020) as at 8 April 2021

	DBD						DCD					
	Thirty-six months prior			Thirty-six months post			Thirty-six months prior			Thirty-six months post		
	N	Median (IQR)	Range	N	Median (IQR)	Range	N	Median (IQR, range)	Range	N	Median (IQR, range)	Range
Overall	1713	82 (28 - 224)	0 - 2307	1589	38 (9 - 143)	0 - 1711	584	67 (26 - 184)	0 - 1202	444	58 (23 - 144)	0 - 1278
Type of patient												
CLD	1264	75 (25 - 197.5)	0 - 1752	1263	27 (7 - 100)	0 - 1687	385	71 (25 - 185)	0 - 1202	250	58 (20 - 144)	0 - 1101
HCC	297	83 (35 - 213)	1 - 1030	188	62.5 (23.5 - 150.5)	0 - 739	177	63 (26 - 168)	0 - 1026	174	60.5 (25 - 144)	2 - 1278
VS	142	236.5 (81 - 553)	2 - 2307	127	361 (171 - 667)	2 - 1711	19	246 (38 - 373)	7 - 870	7	98 (44 - 300)	5 - 559
HCC downstaging	10	91.5 (78 - 131)	16 - 384	11	22 (10 - 65)	4 - 204	3	51 (13 - 55)	13 - 55	13	39 (17 - 55)	11 - 323
Centre												
Newcastle	92	60 (17.5 - 162.5)	1 - 787	71	38 (11 - 100)	1 - 607	16	92 (26 - 236)	5 - 458	8	185 (119 - 378)	22 - 588
Leeds	263	59 (23 - 173)	1 - 1402	202	36 (10 - 145)	1 - 1405	67	70 (24 - 178)	0 - 1026	55	41 (12 - 99)	2 - 565
Cambridge	176	75 (27.5 - 209)	0 - 1343	150	24 (9 - 74)	1 - 760	97	65 (25 - 192)	0 - 870	102	60 (20 - 140)	2 - 625
Royal Free	224	118 (50 - 261.5)	0 - 1107	220	31.5 (8.5 - 105.5)	0 - 1261	44	71.5 (31 - 180.5)	1 - 369	72	56 (24 - 141.5)	2 - 693
Kings College	356	154 (63.5 - 323.5)	1 - 1813	378	45 (10 - 182)	1 - 1711	145	135 (51 - 264)	4 - 1202	106	84 (37 - 183)	3 - 1101
Birmingham	380	64.5 (25 - 183.5)	0 - 2307	384	48.5 (9 - 167)	0 - 1657	163	42 (17 - 100)	0 - 548	78	44.5 (16 - 102)	0 - 487
Edinburgh	222	48.5 (19 - 124)	0 - 1835	184	39.5 (9 - 140)	1 - 1124	52	68.5 (23.5 - 191.5)	0 - 808	23	51 (38 - 333)	6 - 1278
Recipient blood group												
O	728	119 (49 - 308.5)	0 - 2307	698	54 (12 - 207)	0 - 1711	286	99.5 (34 - 229)	0 - 1026	194	80 (27 - 183)	0 - 1278
A	740	62 (21 - 149)	0 - 1321	630	26 (7 - 98)	0 - 1056	233	47 (18 - 110)	0 - 711	192	50 (19.5 - 104)	2 - 588
B	179	129 (60 - 287)	0 - 1813	162	57.5 (17 - 151)	2 - 1518	55	109 (41 - 257)	4 - 1202	45	100 (43 - 171)	2 - 607
AB	66	38.5 (11 - 104)	0 - 540	99	21 (7 - 62)	1 - 466	10	41 (9 - 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. Note that Centre 1= Newcastle, Centre 2= Leeds, Centre 3= Cambridge, Centre 4= Royal Free, Centre 5= Kings College, Centre 6= Birmingham, Centre 7= Edinburgh. There was no statistically significant difference in the overall median cold ischaemia time for DCD transplants (Kruskal-Wallis p-value=0.83).
- 3.7.8. There was a statistically significant difference in the cold ischaemia time for adult elective DBD transplants when comparing the first thirty-six months with the previous thirty-six 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.

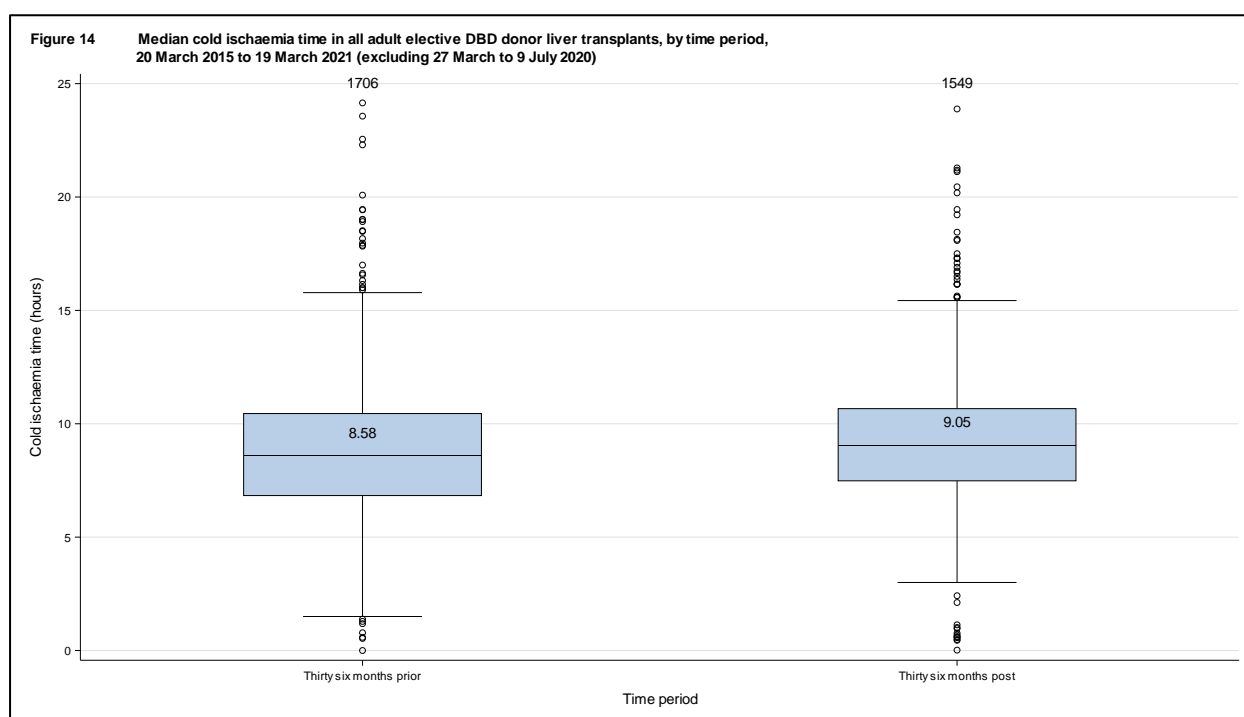


Figure 15 Median cold ischaemia time in all adult elective DBD donor liver transplants, by transplant centre, 20 March 2015 to 19 March 2021 (excluding 27 March to 9 July 2020)

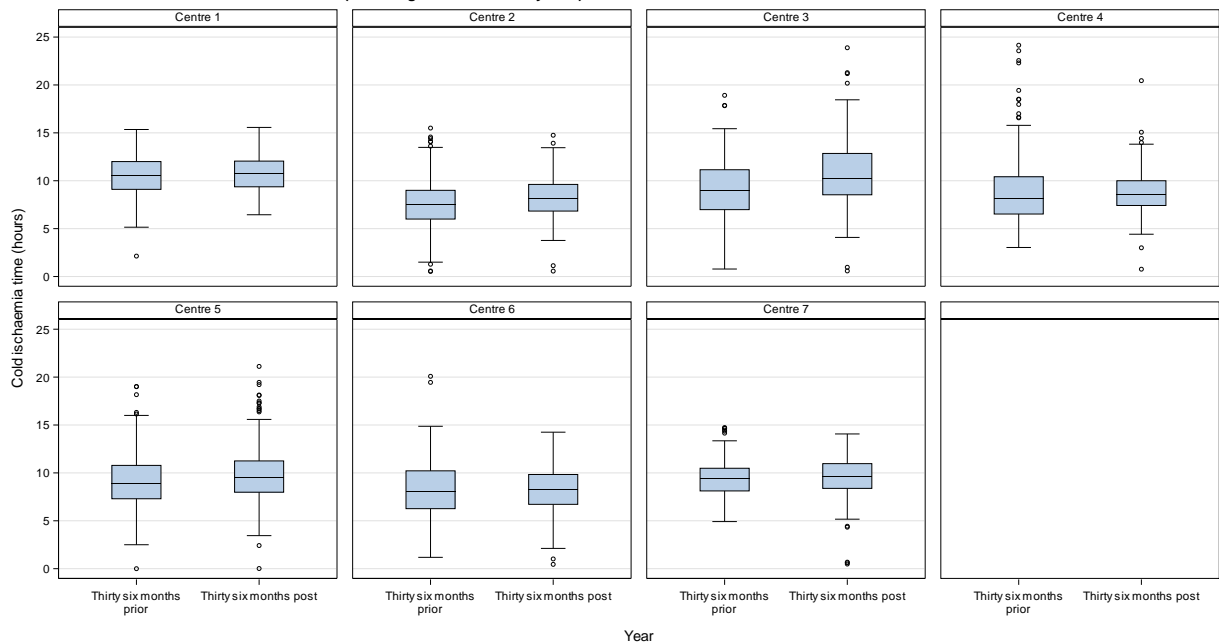
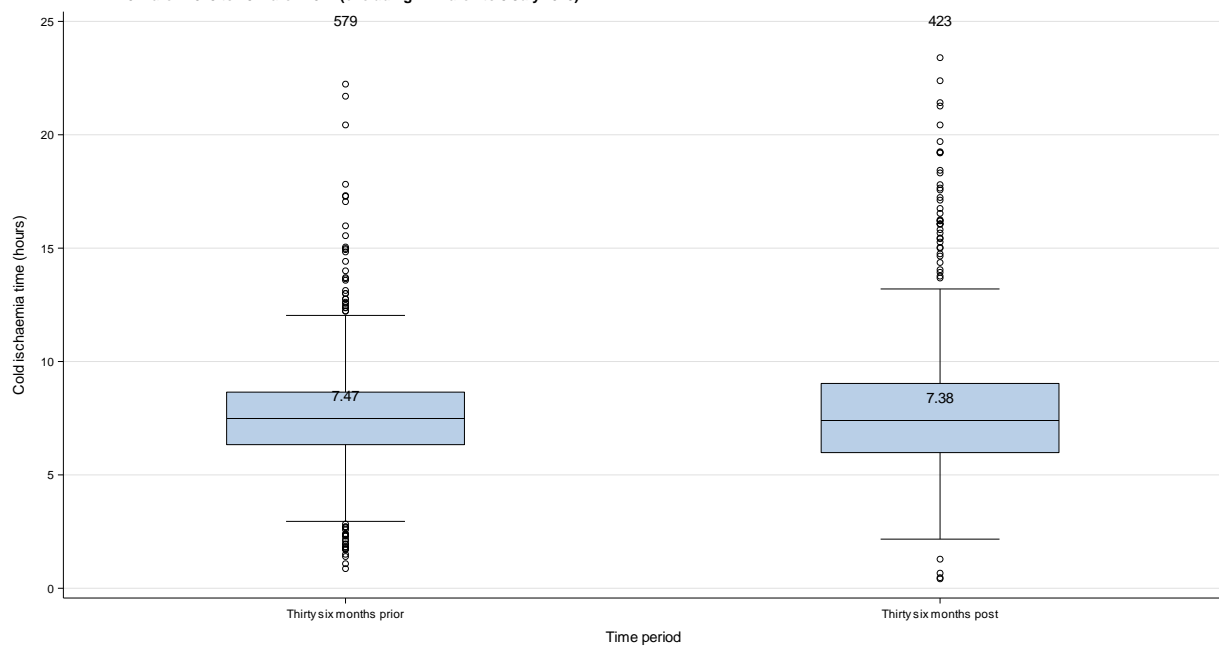
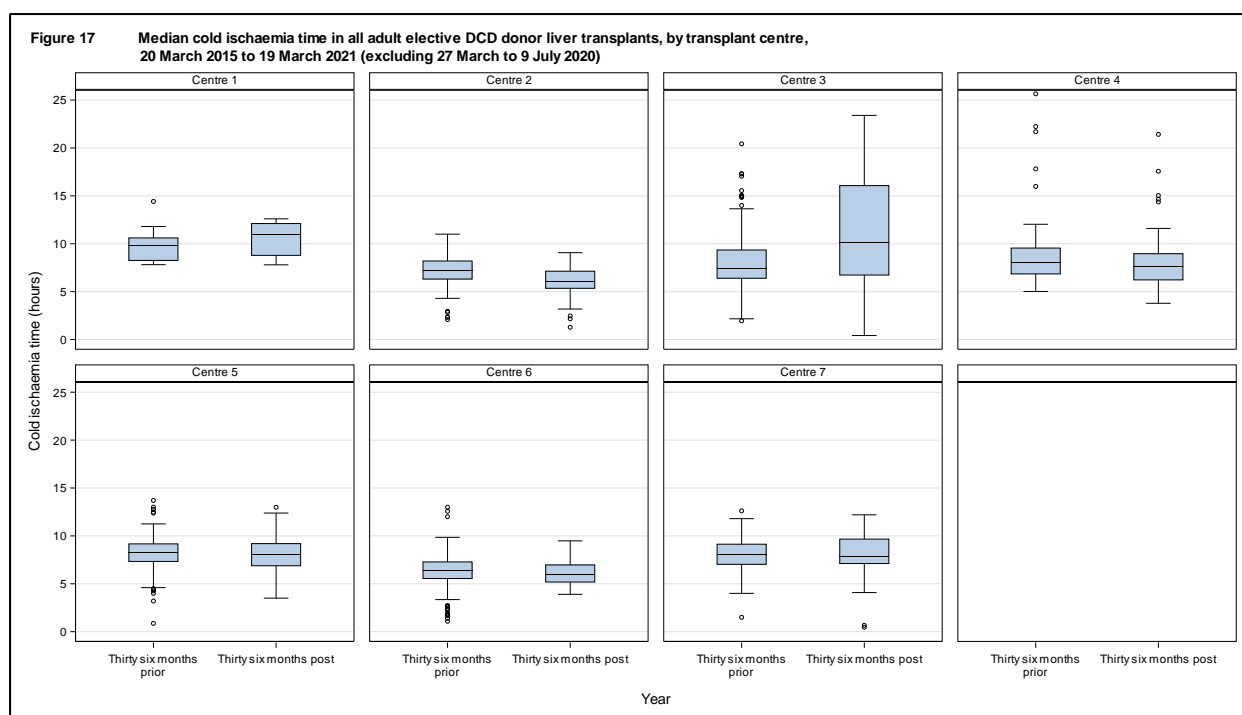


Figure 16 Median cold ischaemia time in all adult elective DCD donor liver transplants, by time period, 20 March 2015 to 19 March 2021 (excluding 27 March to 9 July 2020)





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-three months prior to NLOS or in the first thirty-three 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 90-day patient survival (log-rank p-value=0.18). However, there was a statistically significant difference in ninety-day survival for blood group O patients (log-rank p-value=0.01). There were no statistically significant differences between the two time periods for CLD and HCC (log rank p-value \geq 0.36), and for the individual centres (log-rank p-value \geq 0.18) apart from Edinburgh which had borderline significance p-value=0.054.

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 90-day patient survival (log-rank p-value=0.24). There were no statistically significant differences between the two time periods for CLD and HCC (log rank p-value \geq 0.17), blood groups (log rank p-value \geq 0.14) and for the individual centres (log rank p-value \geq 0.25).

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 December 2020. There were no statistically significant differences in patient survival between the time periods for DBD and DCD (log-rank p-value=0.33 and 0.54 respectively).

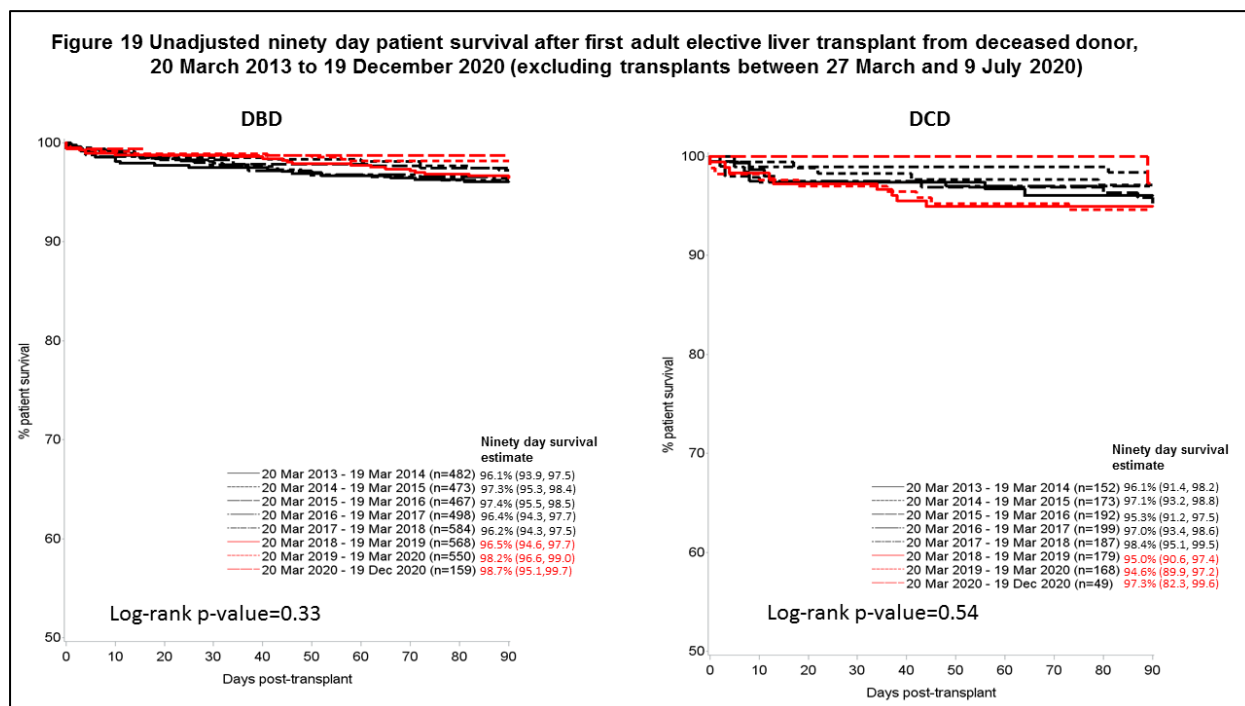
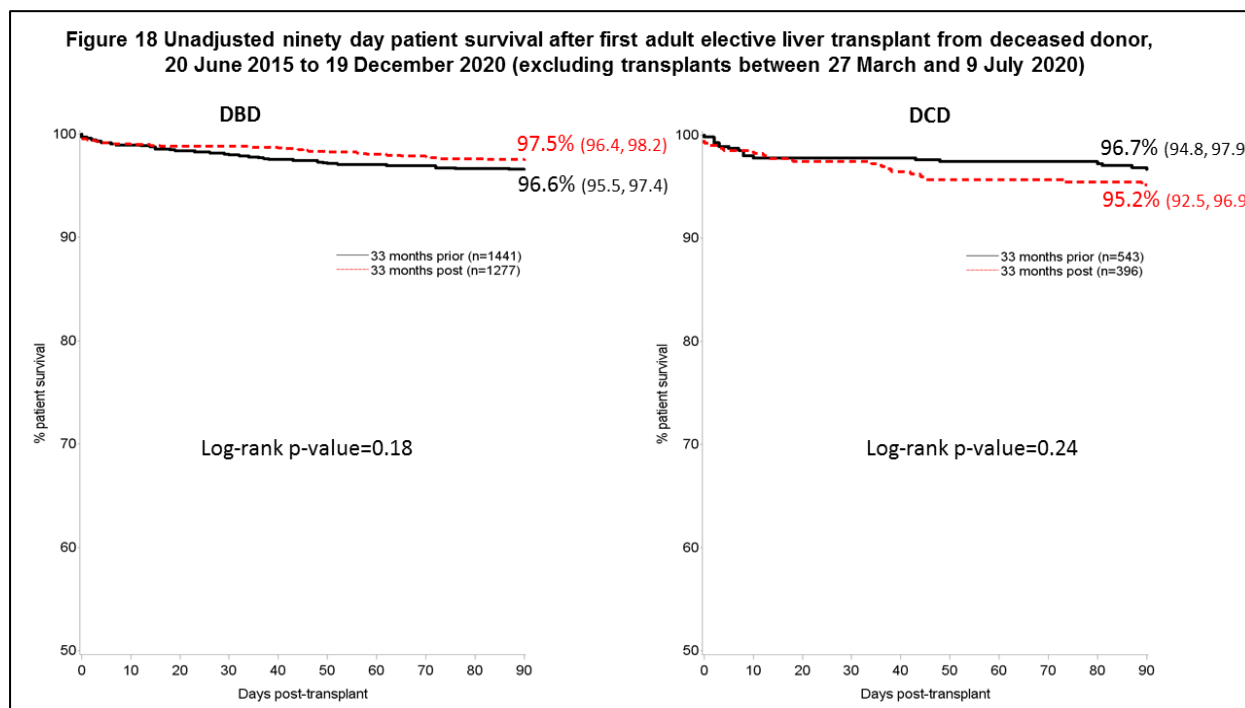


Table 23 90-day patient survival (95% confidence interval) for first adult elective liver and liver/kidney transplants performed in the UK using livers from deceased donors, 20 June 2015 to 19 December 2020 (excluding 27 March to 9 July 2020)

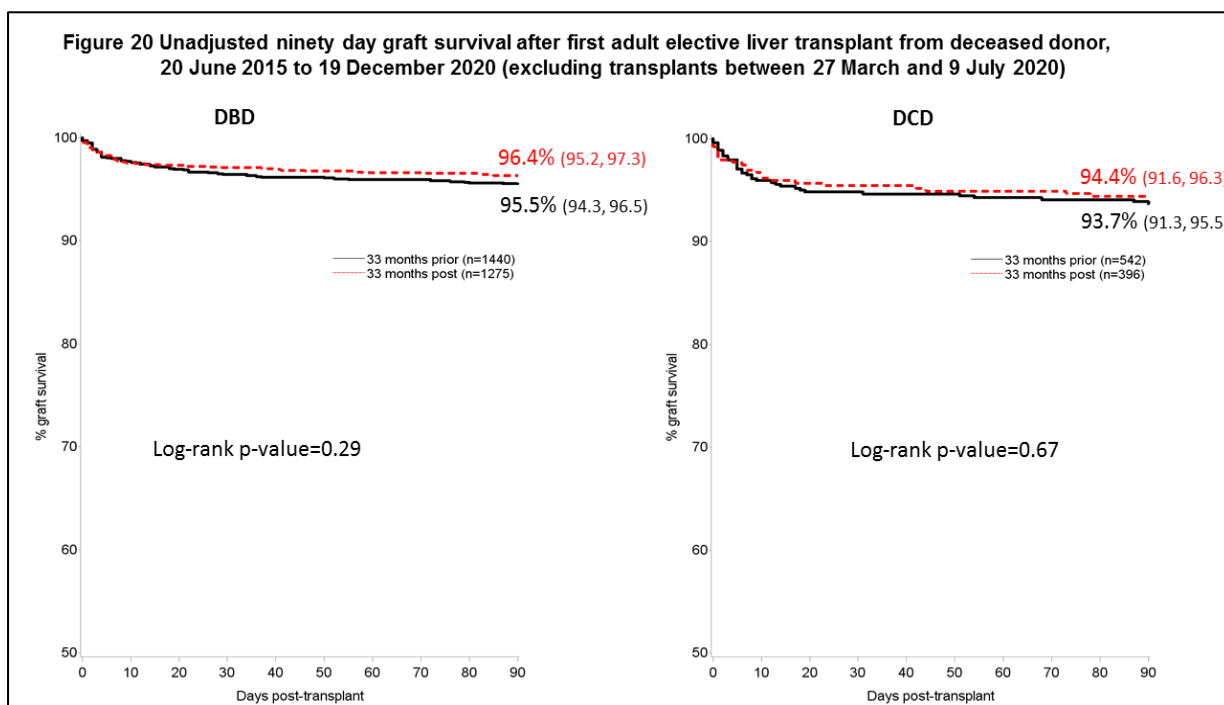
	Thirty-three months prior ¹		DBD Thirty-three months post ²		Log-rank p-value	Thirty-three months prior ¹		DCD Thirty-three months post ²		Log-rank p-value
	No, at risk on day 0	% (95% CI)	No, at risk on day 0	% (95% CI)		No, at risk on day 0	% (95% CI)	No, at risk on day 0	% (95% CI)	
Overall	1441	96.6 (95.5,97.4)	1277	97.5 (96.4,98.2)	0.18	543	96.7 (94.8,97.9)	396	95.2 (92.5,96.9)	0.23
Type of patient										
CLD	1038	96.5 (95.2,97.5)	991	97.2 (96.0,98.1)	0.35	354	96.6 (94.1,98.1)	216	96.7 (93.3,98.4)	0.95
HCC	274	98.5 (96.1,99.4)	164	98.2 (94.4,99.4)	0.75	170	96.5 (92.3,98.4)	162	93.1 (88.0,96.1)	0.18
VS	118	92.4 (85.9,96.0)	111	98.2 (93.0,99.5)	0.04	16	100 (-)	6	100 (-)	-
HCC downstaging	11	100 (-)	11	100 (-)	-	3	100 (-)	12	91.7 (53.9,98.8)	0.62
Recipient blood group										
O	611	95.3 (93.2,96.7)	563	98.0 (96.4,98.9)	0.01	266	97.0 (94.1,98.5)	173	94.1 (89.4,96.8)	0.14
A	629	97.6 (96.1,98.6)	503	97.2 (95.3,98.3)	0.66	218	95.9 (92.2,97.8)	168	97.0 (93.0,98.7)	0.54
B	146	99.3 (95.2,99.9)	126	96.0 (90.7,98.3)	0.07	50	98.0 (86.6,99.7)	43	92.9 (79.6,97.7)	0.24
AB	55	92.7 (81.7,97.2)	85	97.6 (90.9,99.4)	0.16	9	100 (-)	12	91.7 (53.9,98.8)	0.39
Centre										
Newcastle	75	93.3 (84.7,97.2)	54	96.3 (86.0,99.1)	0.47	13	100 (-)	7	100 (-)	-
Leeds	226	93.8 (89.8,96.3)	138	95.6 (90.5,98.0)	0.49	61	96.7 (87.5,99.2)	45	93.3 (80.7,97.8)	0.39
Cambridge	158	98.1 (94.2,99.4)	135	97.8 (93.3,99.3)	0.84	89	95.5 (88.5,98.3)	82	96.3 (89.1,98.8)	0.80
Royal Free	201	96.0 (92.2,98.0)	168	96.9 (92.8,98.7)	0.62	41	97.6 (83.9,99.7)	66	92.1 (82.1,96.7)	0.25
Kings College	283	98.6 (96.3,99.5)	308	99.0 (97.0,99.7)	0.62	137	98.5 (94.3,99.6)	96	96.8 (90.4,99.0)	0.39
Birmingham	315	95.6 (92.6,97.3)	322	97.5 (95.1,98.7)	0.17	154	94.8 (89.9,97.4)	78	94.9 (86.9,98.0)	0.97
Edinburgh	183	99.5 (96.2,99.9)	152	96.6 (91.9,98.6)	0.05	48	97.9 (86.1,99.7)	22	95.5 (71.9,99.3)	0.58

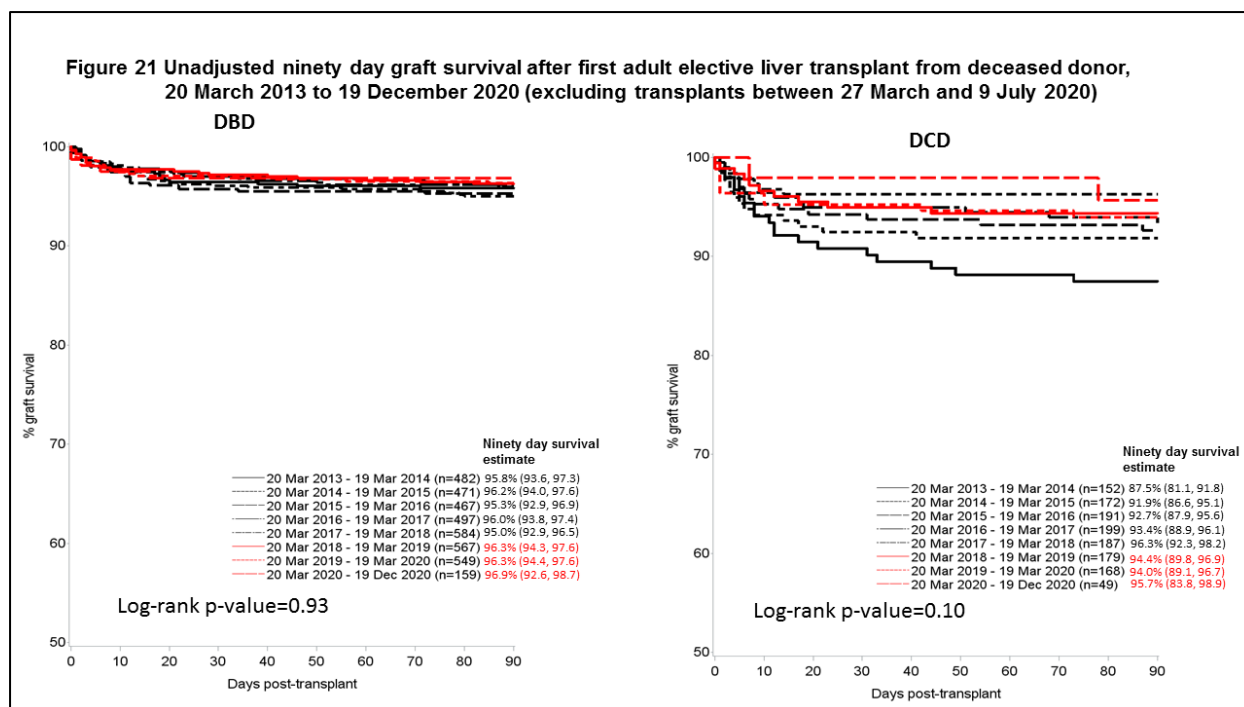
¹ 20 June 2015 to 19 March 2018

² 20 March 2018 to 19 December 2020

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-three months prior to NLOS or in the first thirty-three months of NLOS while **Figure 21** shows the unadjusted graft survival for transplants performed in the last seven 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=0.29 and 0.67) and for DBD and DCD transplants performed over the last seven years (log-rank p-value=0.93 and 0.10).





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-three months prior to NLOS or in the first thirty-three months of NLOS while **Figure 23** shows the unadjusted transplant survival for transplants performed in the last seven 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=0.41 and 0.89) and for DBD and DCD transplants performed over the last seven years (log-rank p-value=0.71 and 0.13).

Figure 22 Unadjusted ninety day transplant survival after first adult elective liver transplant from deceased donor, 20 June 2015 to 19 December 2020 (excluding transplants between 27 March and 9 July 2020)

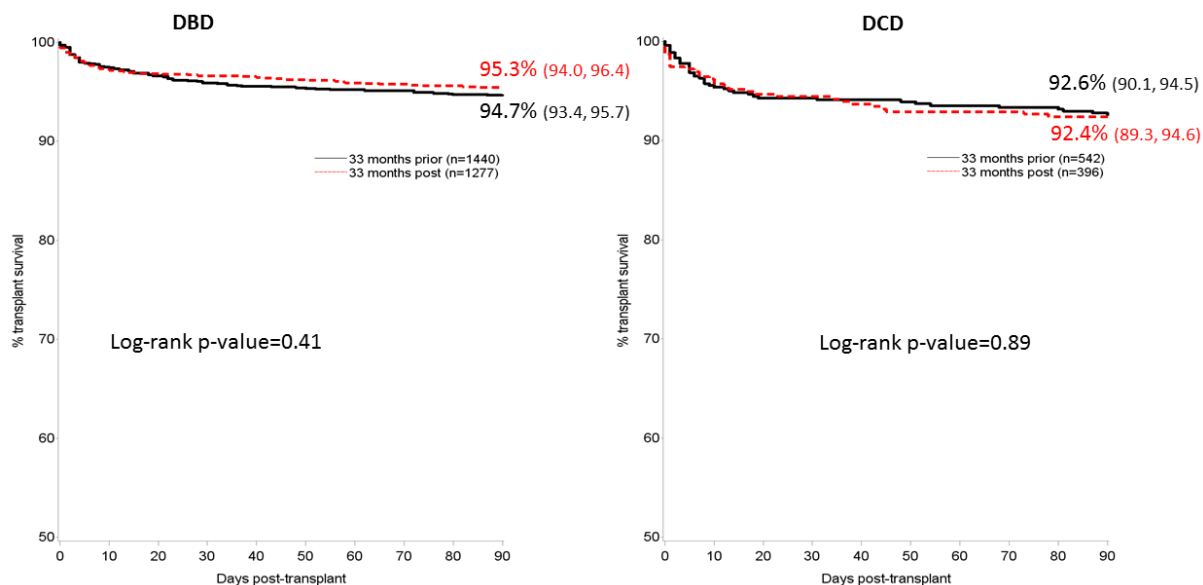
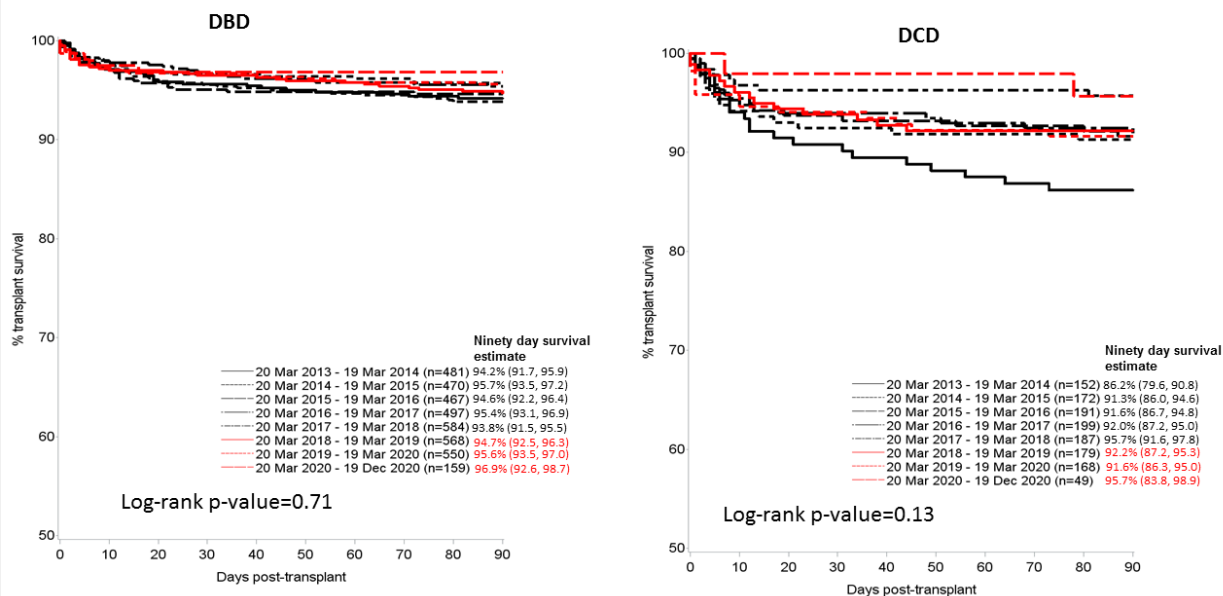
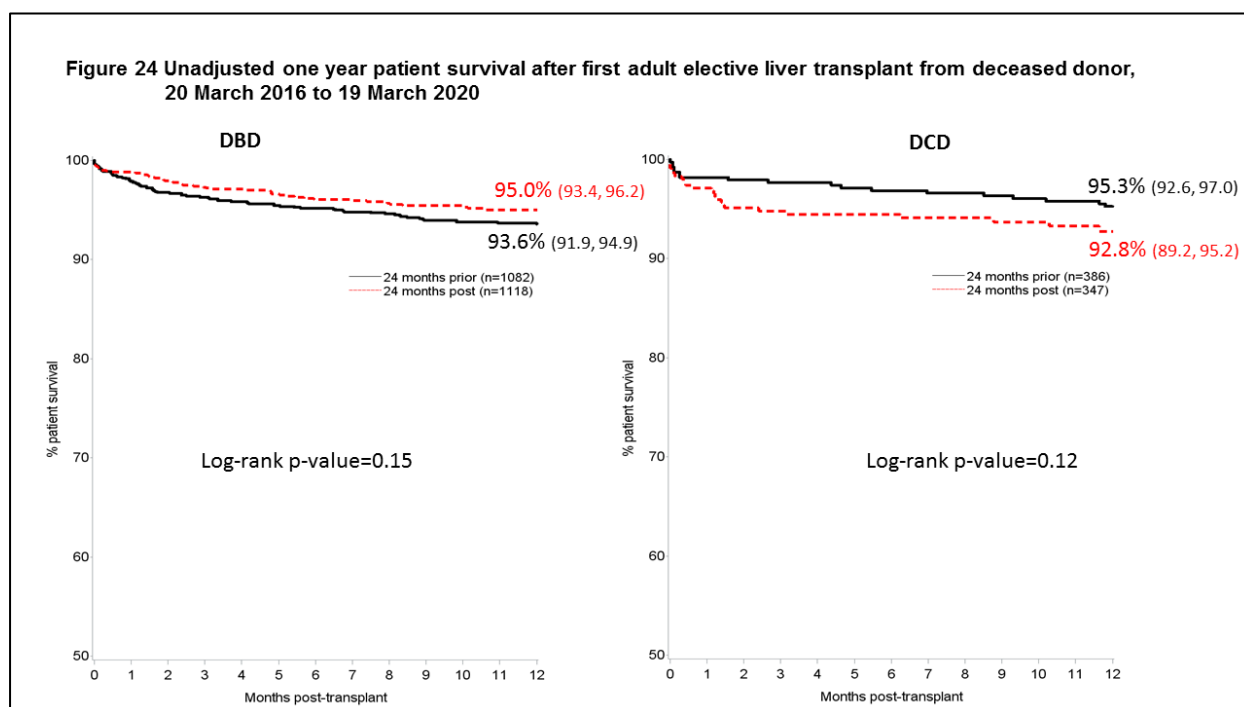


Figure 23 Unadjusted ninety day transplant survival after first adult elective liver transplant from deceased donor, 20 March 2013 to 19 December 2020 (excluding transplants between 27 March and 9 July 2020)



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 twenty-four months prior to NLOS or in the first twenty-four months of NLOS while **Table 24** shows the survival estimates and confidence intervals by blood group and type of patient. 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 1-year patient survival (log-rank p-value=0.15). There were no statistically significant differences between the two time periods for CLD and HCC (log rank p-value \geq 0.22), blood groups (log-rank p-value \geq 0.06) and for the individual centres (log-rank p-value \geq 0.22).
- 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 1-year patient survival (log-rank p-value=0.12). There were no statistically significant differences between the two time periods for CLD and HCC (log rank p-value \geq 0.19), blood groups (log rank p-value \geq 0.21) and for the individual centres (log rank p-value \geq 0.13).
- 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 March 2020. There were no statistically significant differences in patient survival between the time periods for DBD and DCD (log-rank p-value=0.28 and 0.85 respectively).



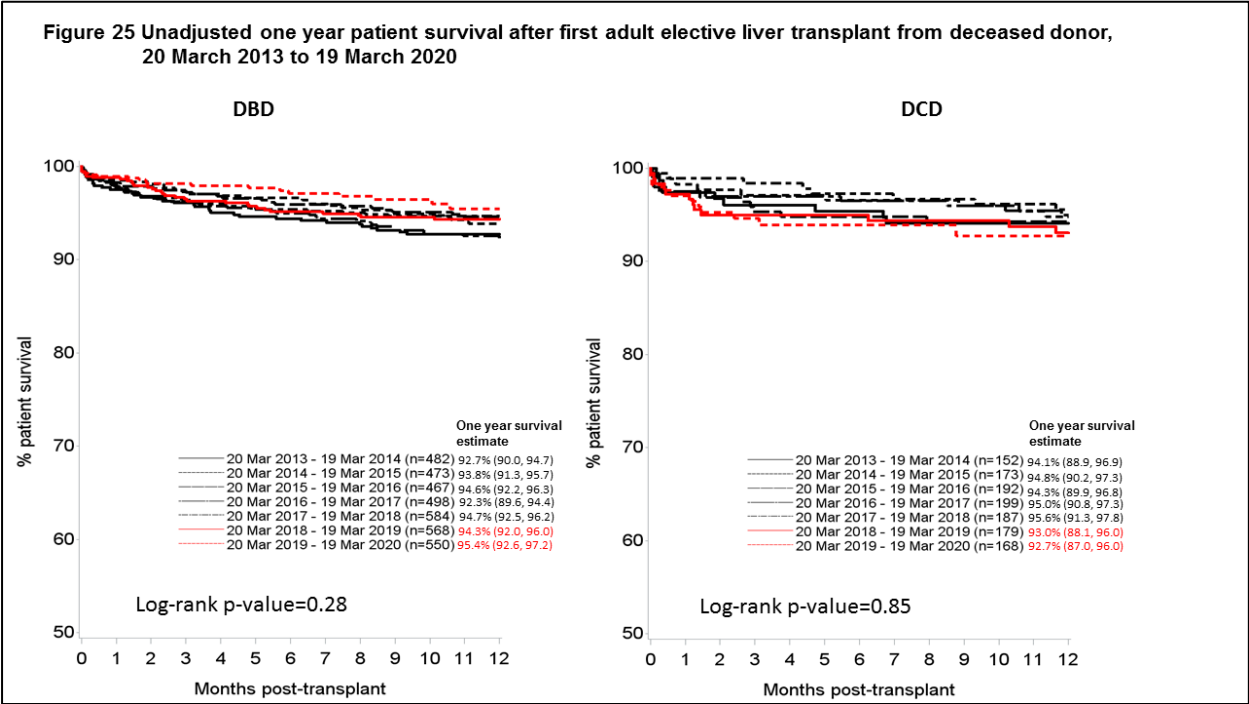


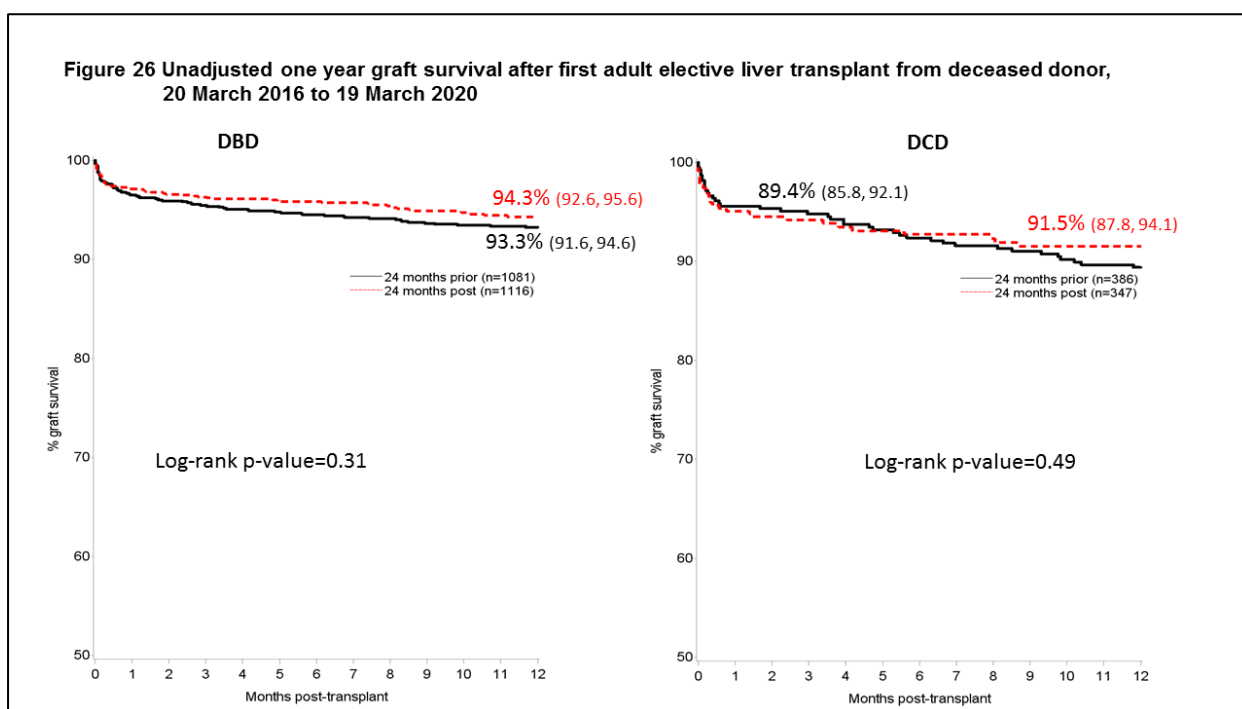
Table 24 1-year patient survival (95% confidence interval) for first adult elective liver and liver/kidney transplants performed in the UK using livers from deceased donors, 20 March 2016 to 19 March 2020

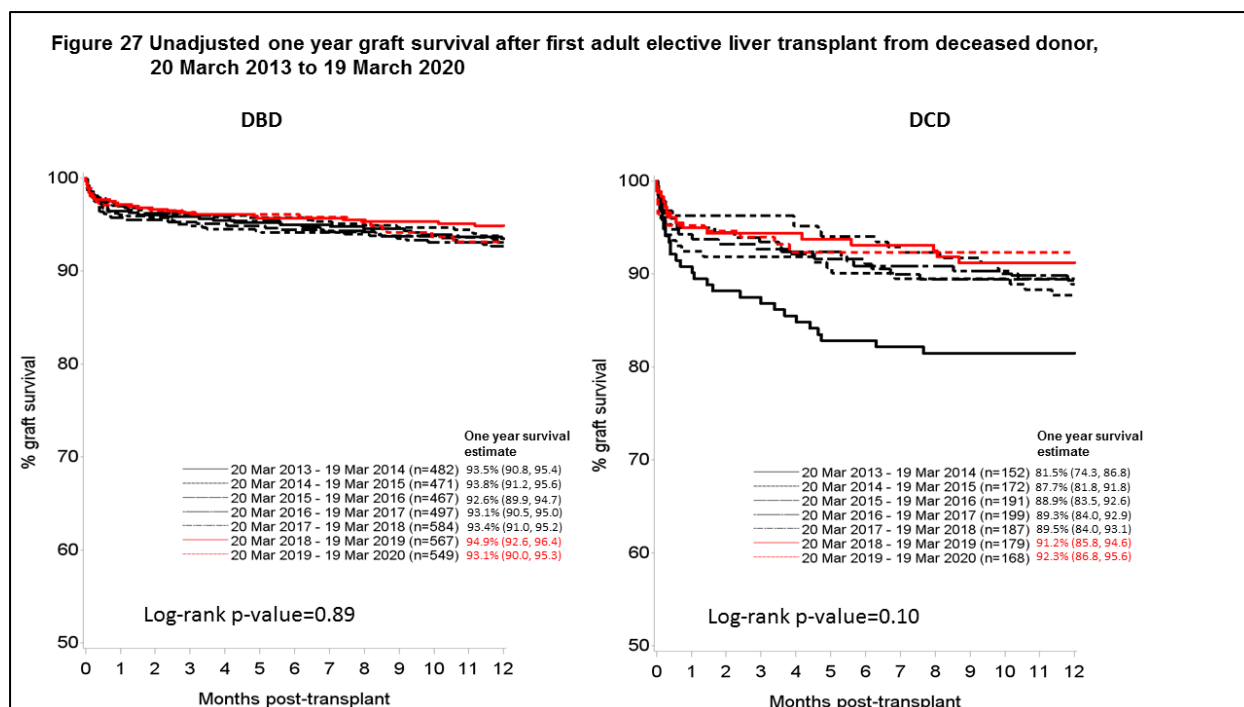
	Twenty-four months prior ¹		DBD Twenty-four months post ²		Log-rank p-value	Twenty-four months prior ¹		DCD Twenty-four months post ²		Log-rank p-value
	No, at risk on day 0	% (95% CI)	No, at risk on day 0	% (95% CI)		No, at risk on day 0	% (95% CI)	No, at risk on day 0	% (95% CI)	
Overall	1082	93.6 (91.9,94.9)	1118	95.0 (93.4,96.2)	0.15	386	95.3 (92.6,97.0)	347	92.8 (89.2,95.2)	0.12
Type of patient										
CLD	789	94.0 (92.1,95.5)	859	95.4 (93.6,96.6)	0.22	257	96.9 (93.8,98.4)	189	94.2 (89.3,96.9)	0.19
HCC	199	91.8 (87.0,94.9)	149	92.7 (86.3,96.2)	0.90	115	91.9 (85.1,95.7)	142	90.9 (84.3,94.8)	0.63
VS	86	93.0 (85.1,96.8)	100	95.2 (87.5,98.2)	0.41	11	90.0 (47.3,98.5)	5	100 (-)	0.53
HCC downstaging	8	100 (-)	10	100 (-)	-	3	100 (-)	11	90.9 (50.8,98.7)	0.60
Recipient blood group										
O	474	91.7 (88.9,93.9)	503	95.4 (91.3,97.6)	0.06	196	95.4 (91.3,97.6)	147	93.9 (88.6,96.8)	0.39
A	456	95.4 (93.0,97.0)	432	96.6 (91.9,98.6)	0.99	149	96.6 (91.9,98.6)	151	92.9 (86.6,96.3)	0.21
B	114	93.7 (87.0,97.0)	110	91.4 (75.7,97.2)	0.87	35	91.4 (75.7,97.2)	38	92.1 (77.5,97.4)	0.96
AB	38	94.7 (80.3,98.6)	73	80.0 (20.4,96.9)	0.80	6	80 (20.4,96.9)	11	81.8 (44.7,95.1)	0.82
Centre										
Newcastle	53	88.7 (76.5,94.7)	46	93.1 (80.1,97.7)	0.43	11	90.0 (50.8,98.7)	7	100 (-)	0.55
Leeds	183	90.7 (85.5,94.1)	124	92.5 (85.3,96.3)	0.56	44	95.5 (83.0,98.8)	40	85.4 (67.9,93.8)	0.13
Cambridge	121	95.0 (89.3,97.7)	120	96.3 (90.4,98.6)	0.66	63	96.8 (87.9,99.2)	68	92.4 (82.7,96.8)	0.28
Royal Free	152	94.0 (88.8,96.8)	168	93.6 (85.8,97.2)	0.95	26	95.7 (72.9,99.4)	64	89.7 (74.6,96.0)	0.33
Kings College	203	96.5 (92.7,98.3)	263	97.5 (94.4,98.9)	0.53	106	96.0 (89.6,98.5)	79	96.1 (88.4,98.7)	0.77
Birmingham	229	92.1 (87.8,95.0)	269	94.8 (91.2,97.0)	0.22	105	92.4 (85.3,96.1)	71	94.4 (85.7,97.8)	0.67
Edinburgh	141	95.7 (90.8,98.1)	128	93.1 (86.6,96.5)	0.30	31	100 (-)	18	94.4 (66.6,99.2)	0.19

¹ 20 March 2016 to 19 March 2018

² 20 March 2018 to 19 March 2020

- 3.9.5 **Figure 26** shows the unadjusted one-year graft survival by time period and donor type for transplants performed in either the twenty-four months prior to NLOS or in the first twenty-four months of NLOS while **Figure 27** shows the unadjusted graft survival for transplants performed in the last seven years. 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=0.31 and 0.49) and for DBD and DCD transplants performed over the last seven years (log-rank p-value=0.89 and 0.10).





3.9.7 **Figure 28** shows the unadjusted one-year transplant survival by time period and donor type for transplants performed in either the twenty-four months prior to NLOS or in the first twenty-four months of NLOS while **Figure 29** shows the unadjusted transplant survival for transplants performed in the last seven years. 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=0.46 and 0.89) and for DBD and DCD transplants performed over the last seven years (log-rank p-value=0.94 and 0.24).

Figure 28 Unadjusted one year transplant survival after first adult elective liver transplant from deceased donor, 20 March 2016 to 19 March 2020

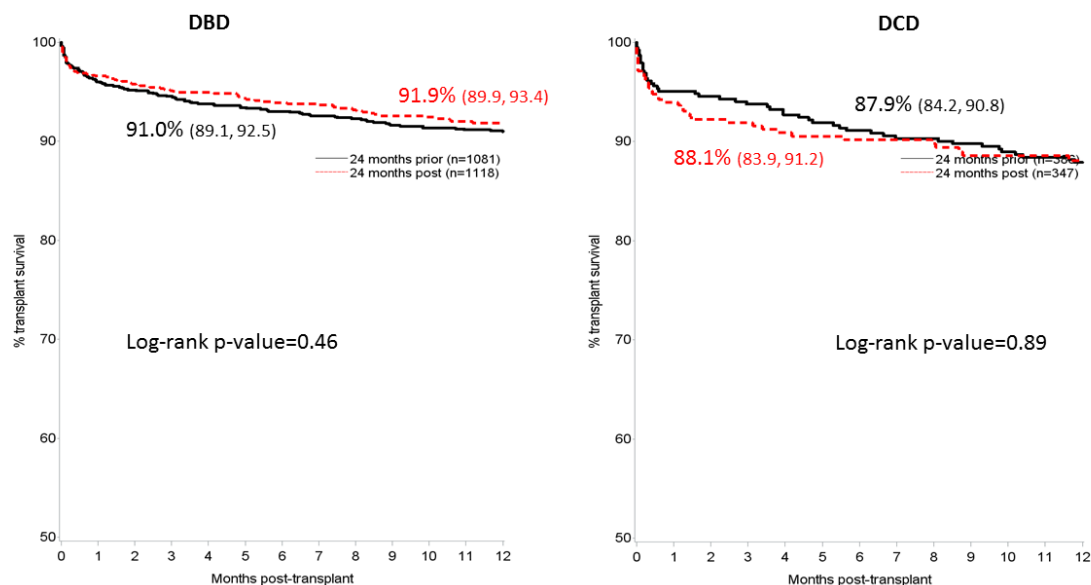
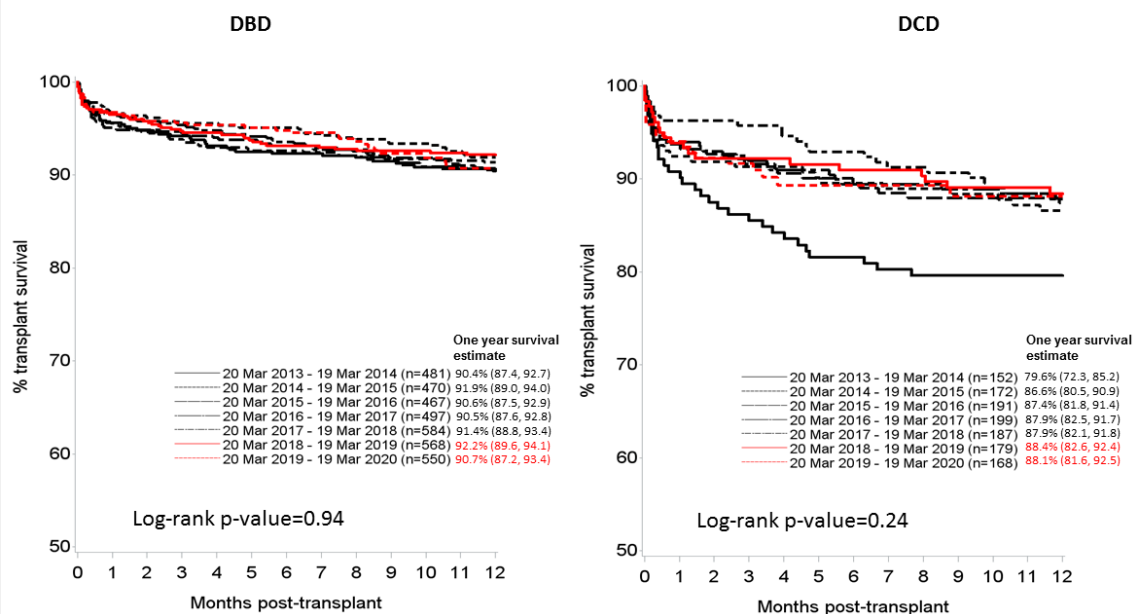


Figure 29 Unadjusted one year transplant survival after first adult elective liver transplant from deceased donor, 20 March 2013 to 19 March 2020



4 CONCLUSIONS

The new National Liver Offering Scheme was implemented on the 20th March 2018. During the first thirty-six months of the scheme, ODT Hub Operations have offered 2794 livers from DBD donors and 2614 livers from DCD donors to UK transplant centres. Of the 2794 DBD liver donors, 2400 were retrieved for the purposes of transplantation and 2085 were transplanted.

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Statistics and Clinical Research

April 2021

APPENDIX A: SUPER-URGENT CATEGORIES

INDICATION FOR REGISTRATION

- 1 - 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 prothrombin 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 ecstasy/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

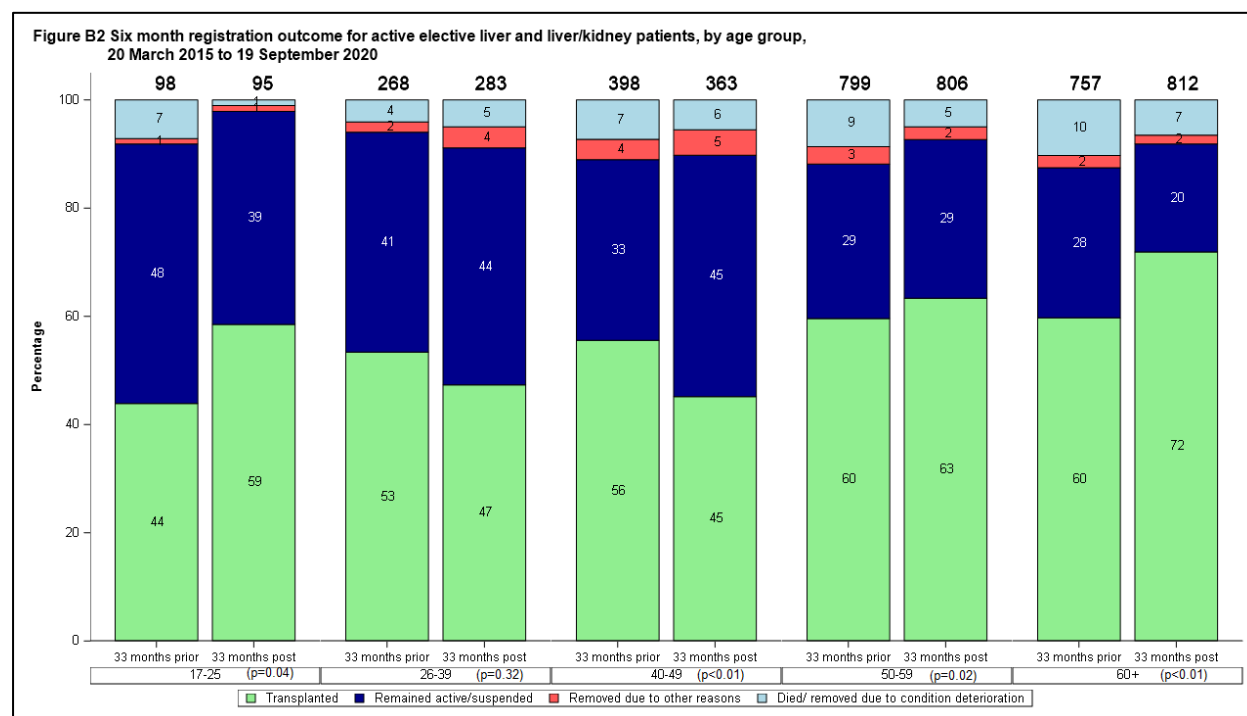
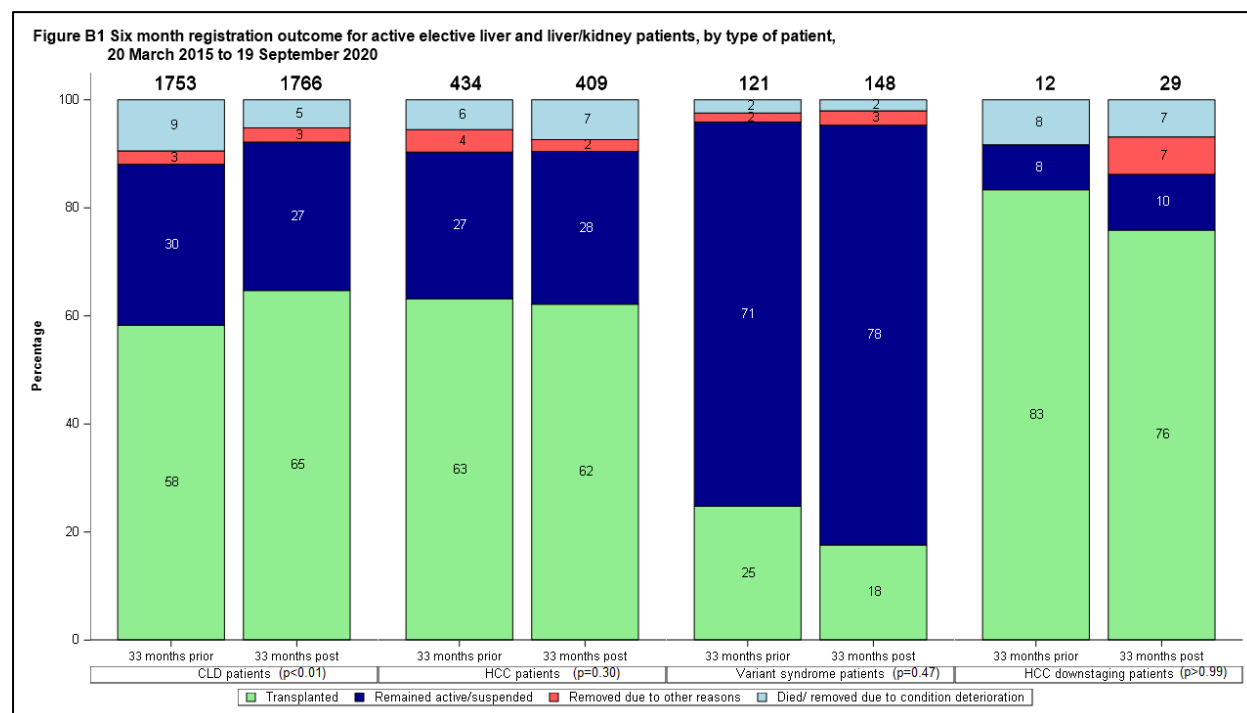


Figure B3 Six month registration outcome for active elective liver and liver/kidney patients, by first transplant or re-graft, 20 March 2015 to 19 September 2020

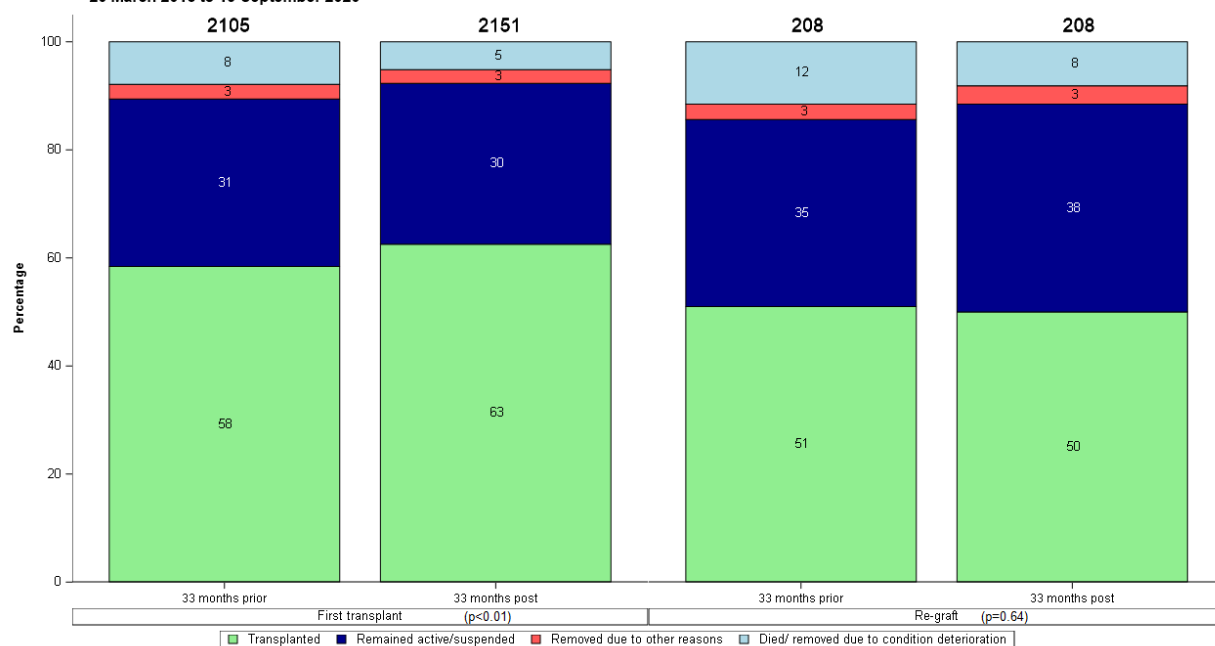


Figure B4 Six month registration outcome for active elective liver and liver/kidney patients, by quarter, 20 March 2015 to 19 September 2020

