



**Blood and Transplant**

**QUARTERLY REPORT ON  
NRP RETRIEVALS**

**1 April 2015 - 30 September 2021**

**As at 6 January 2022**



## **Cohorts considered**

This report presents information on NRP activity in the UK for the period 1 April 2015 to 30 September 2021, and compares to standard DCD retrievals in the same period. Note that NRP activity is recorded against the team who performed NRP which may be different from the main retrieval team in attendance. TA-NRP cases have been excluded from the NRP activity analysis, TA-NRP activity is presented in Tables 14 and 15.

Tables 1, 2 and 3 show activity for all teams who have at least one NRP attendance reported to NHSBT. The remainder of the report considers DCD attendances by Cambridge and Edinburgh only, as an evaluation of established services. The exception to this is Table 5 which presents liver graft failure reasons for all other NRP attendances combined.

Transplant and graft survival analyses are based on first transplants only performed at any transplant centre in the period 1 April 2015 to 30 September 2020 where the organ was retrieved by Cambridge or Edinburgh, and survival information is available, and is reported for liver only, kidney only, or simultaneous pancreas and kidney (SPK) transplants respectively. Delayed graft function information is provided for all transplants of the specified organ, with islet transplants included in pancreas numbers.

## Activity

**Table 1 DCD attendances by period and retrieval team, 1 April 2015 - 30 September 2021**

<b>Period</b>	<b>Retrieval team</b>	<b>All DCD attendances</b>	<b>Total proceeding<sup>1</sup></b>	<b>NRP attendances</b>	<b>NRP proceeding<sup>1</sup></b>
<b>2015/16</b>	Oxford	64	36	-	-
	Birmingham	98	65	-	-
	Edinburgh	75	49	3	2
	Cambridge	152	111	3	2
	Royal Free	62	45	-	-
<b>2016/17</b>	Oxford	79	48	-	-
	Birmingham	101	62	-	-
	Edinburgh	78	57	20	15
	Cambridge	125	83	8	4
	Royal Free	51	29	-	-
<b>2017/18</b>	Oxford	66	43	-	-
	Birmingham	124	80	-	-
	Edinburgh	74	48	27	19
	Cambridge	138	96	17	15
	Royal Free	57	41	-	-
<b>2018/19</b>	Oxford	81	55	4	4
	Birmingham	125	95	-	-
	Edinburgh	60	35	18	10
	Cambridge	132	85	26	16
	Royal Free	58	43	-	-
<b>2019/20</b>	Oxford	90	60	1	1
	Birmingham	111	74	4	3
	Edinburgh	60	47	18	16
	Cambridge	162	114	32	25
	Royal Free	74	45	-	-
<b>2020/21</b>	Oxford	54	39	-	-
	Birmingham	68	43	-	-
	Edinburgh	57	39	27	20
	Cambridge	83	64	39	30
	Royal Free	46	30	-	-
<b>2021/22 Q1</b>	Oxford	20	18	-	-
	Birmingham	26	21	-	-
	Edinburgh	19	15	15	12
	Cambridge	32	27	15	14
	Royal Free	14	9	1	1
<b>2021/22 Q2</b>	Oxford	27	18	-	-
	Birmingham	23	18	-	-
	Edinburgh	22	17	15	13
	Cambridge	25	16	6	5
	Royal Free	15	13	-	-

<sup>1</sup>Proceeded to donate at least one organ for the purpose of transplantation

**Table 2 DCD organs retrieved and transplanted, by retrieval team and period, 1 April 2015 - 30 September 2021**

Period	Retrieval team	Standard DCD								NRP Performed							
		Liv ret	Liv txd	Kid ret	Kid txd	Panc ret	Panc txd	Lng ret	Lng txd	Liv ret	Liv txd	Kid ret	Kid txd	Panc ret	Panc txd	Lng ret	Lng txd
<b>2015/16</b>	Oxford	17	12	70	68	7	5	14	10	-	-	-	-	-	-	-	-
	Birmingham	39	27	121	112	14	8	10	8	-	-	-	-	-	-	-	-
	Edinburgh	23	17	90	86	14	7	2	2	2	2	4	3	-	-	-	-
	Cambridge	54	37	212	194	24	12	9	9	1	1	4	4	1	1	-	-
	Royal Free	22	15	86	81	6	2	8	8	-	-	-	-	-	-	-	-
<b>2016/17</b>	Oxford	29	16	86	80	8	3	6	4	-	-	-	-	-	-	-	-
	Birmingham	29	22	122	114	7	3	6	6	-	-	-	-	-	-	-	-
	Edinburgh	11	10	82	75	6	1	4	2	7	6	28	28	1	-	-	-
	Cambridge	42	30	155	143	18	10	9	7	4	4	8	6	1	1	-	-
	Royal Free	13	9	57	54	4	3	6	6	-	-	-	-	-	-	-	-
<b>2017/18</b>	Oxford	23	15	82	75	5	3	5	5	-	-	-	-	-	-	-	-
	Birmingham	38	29	153	143	14	7	6	6	-	-	-	-	-	-	-	-
	Edinburgh	4	4	53	49	4	1	2	-	11	7	34	31	4	3	-	-
	Cambridge	37	21	157	143	12	4	12	12	12	11	30	25	6	1	2	2
	Royal Free	20	14	81	74	7	3	4	4	-	-	-	-	-	-	-	-
<b>2018/19</b>	Oxford	24	14	100	93	7	5	14	11	1	1	8	5	2	2	-	-
	Birmingham	45	36	181	168	19	6	14	10	-	-	-	-	-	-	-	-
	Edinburgh	3	1	49	45	1	-	-	-	8	6	20	19	3	3	2	-
	Cambridge	26	18	135	127	13	7	5	5	14	12	32	31	2	2	6	4
	Royal Free	20	16	86	80	5	1	4	4	-	-	-	-	-	-	-	-
<b>2019/20</b>	Oxford	25	15	117	106	12	6	13	11	-	-	2	2	-	-	-	-
	Birmingham	39	28	141	130	11	7	10	6	1	1	6	4	1	-	2	2
	Edinburgh	7	2	62	55	4	1	4	2	10	5	28	23	1	-	4	4
	Cambridge	25	14	172	162	13	5	8	6	21	16	50	39	7	3	-	-
	Royal Free	20	14	84	77	9	1	6	4	-	-	-	-	-	-	-	-
<b>2020/21</b>	Oxford	20	12	73	69	5	4	8	7	-	-	-	-	-	-	-	-
	Birmingham	20	13	84	82	6	2	6	6	-	-	-	-	-	-	-	-
	Edinburgh	4	1	38	31	3	-	6	4	13	9	40	37	3	2	-	-
	Cambridge	15	8	62	60	5	3	6	-	27	24	60	52	5	3	4	1
	Royal Free	9	4	54	51	1	-	2	1	-	-	-	-	-	-	-	-
<b>2021/22 Q1</b>	Oxford	11	5	36	32	2	1	2	1	-	-	-	-	-	-	-	-
	Birmingham	11	6	39	35	4	2	4	2	-	-	-	-	-	-	-	-
	Edinburgh	-	-	6	5	-	-	-	-	10	6	22	20	3	-	-	-
	Cambridge	5	5	24	19	-	-	2	2	11	9	26	24	2	1	-	-
	Royal Free	3	2	16	13	-	-	-	-	1	1	2	2	-	-	-	-

**Table 2 DCD organs retrieved and transplanted, by retrieval team and period, 1 April 2015 - 30 September 2021**

Period	Retrieval team	Standard DCD								NRP Performed							
		Liv ret	Liv txd	Kid ret	Kid txd	Panc ret	Panc txd	Lng ret	Lng txd	Liv ret	Liv txd	Kid ret	Kid txd	Panc ret	Panc txd	Lng ret	Lng txd
2021/22 Q2	Oxford	5	4	33	32	2	-	-	-	-	-	-	-	-	-	-	-
	Birmingham	11	9	36	33	6	4	2	2	-	-	-	-	-	-	-	-
	Edinburgh	-	-	8	7	-	-	-	-	10	5	26	19	1	-	-	-
	Cambridge	6	2	22	21	2	1	2	2	5	4	8	8	1	-	-	-
	Royal Free	7	3	24	24	1	-	2	2	-	-	-	-	-	-	-	-

**Table 3 Number of liver transplants by transplant centre and retrieval team for NRP cases,  
1 April 2015 - 30 September 2021**

Transplant centre	Cambridge team		Edinburgh team		Birmingham team		Oxford team		Royal Free team	
	N	%	N	%	N	%	N	%	N	%
Birmingham	-	-	1	2	1	100	1	100	-	-
Cambridge	81	100	2	4	-	-	-	-	-	-
Edinburgh	-	-	39	85	-	-	-	-	-	-
King's College	-	-	-	-	-	-	-	-	-	-
Leeds	-	-	-	-	-	-	-	-	-	-
Newcastle	-	-	1	2	-	-	-	-	-	-
Royal Free	-	-	3	7	-	-	-	-	1	100

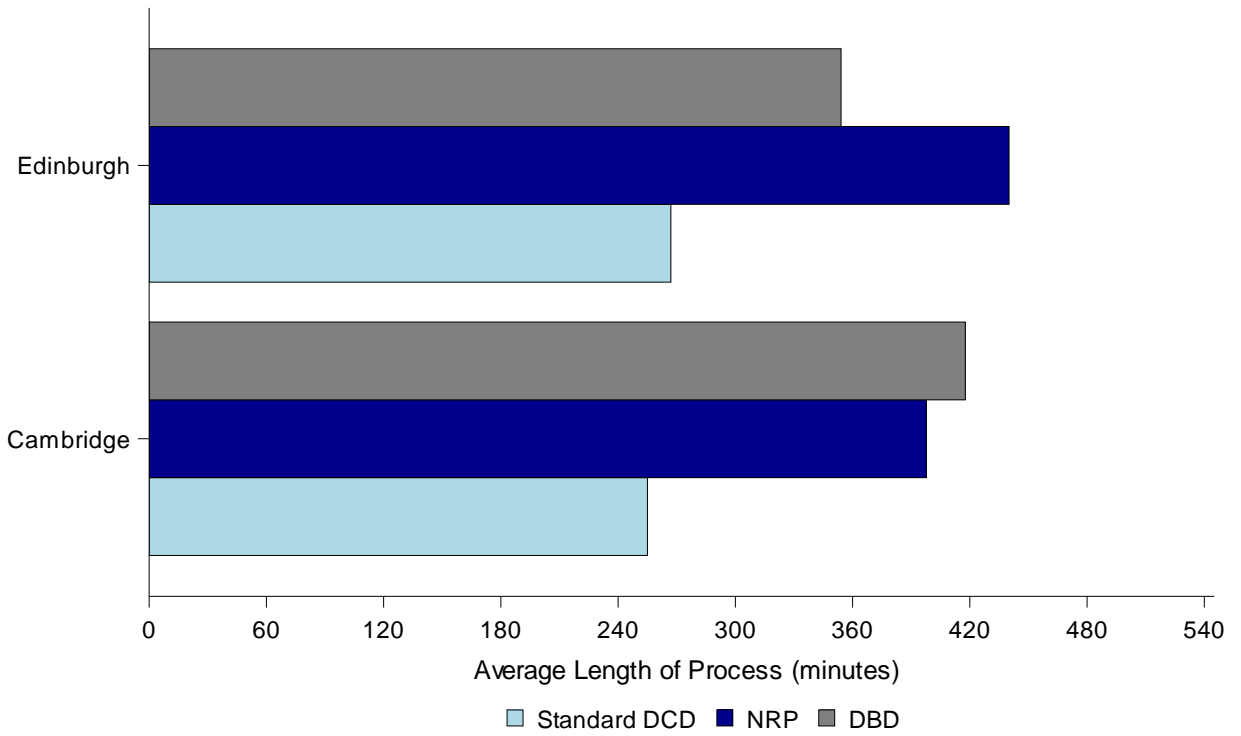
**Table 4a Organ damage reported for DCD organs retrieved, by organ and method, 1 April 2015 - 21 July 2021**

	Liver		Kidney		Pancreas		Lung	
	Std	NRP	Std	NRP	Std	NRP	Std	NRP
Organs retrieved	257	155	1303	394	118	39	71	18
Damage information recorded on HTA-B (% of retrieved)	240 (93%)	144 (93%)	1268 (97%)	388 (98%)	106 (90%)	36 (92%)	65 (92%)	16 (89%)
<b>Damage (% of reported)</b>								
None	202 (84%)	137 (95%)	1120 (88%)	334 (86%)	94 (89%)	34 (94%)	51 (78%)	16 (100%)
Mild	22 (9%)	6 (4%)	85 (7%)	30 (8%)	4 (4%)	1 (3%)	8 (12%)	0 (0%)
Moderate	13 (5%)	1 (1%)	50 (4%)	18 (5%)	3 (3%)	0 (0%)	4 (6%)	0 (0%)
Severe	3 (1%)	0 (0%)	13 (1%)	6 (2%)	5 (5%)	1 (3%)	2 (3%)	0 (0%)

**Table 4b Organ damage reported for DCD organs retrieved, by organ and method, 22 July 2021 - 30 September 2021**

	Liver		Kidney		Pancreas		Lung	
	Std	NRP	Std	NRP	Std	NRP	Std	NRP
Organs retrieved	5	11	24	26	1	2	0	0
Damage information recorded on HTA-B (% of retrieved)	4 (80%)	8 (73%)	22 (92%)	23 (88%)	1 (100%)	2 (100%)	0 (0%)	0 (0%)
<b>Damage (% of reported)</b>								
No effect/no damage	3 (75%)	7 (88%)	21 (95%)	20 (87%)	1 (100%)	2 (100%)	0 (0%)	0 (0%)
Mild effect	1 (25%)	1 (13%)	1 (5%)	3 (13%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Moderate effect	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Severe effect	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

**Figure 1** Average length of process (theatre arrival to end of operation) for DBD, standard DCD and NRP by team, 1 April 2015 - 30 September 2021





## Liver outcomes

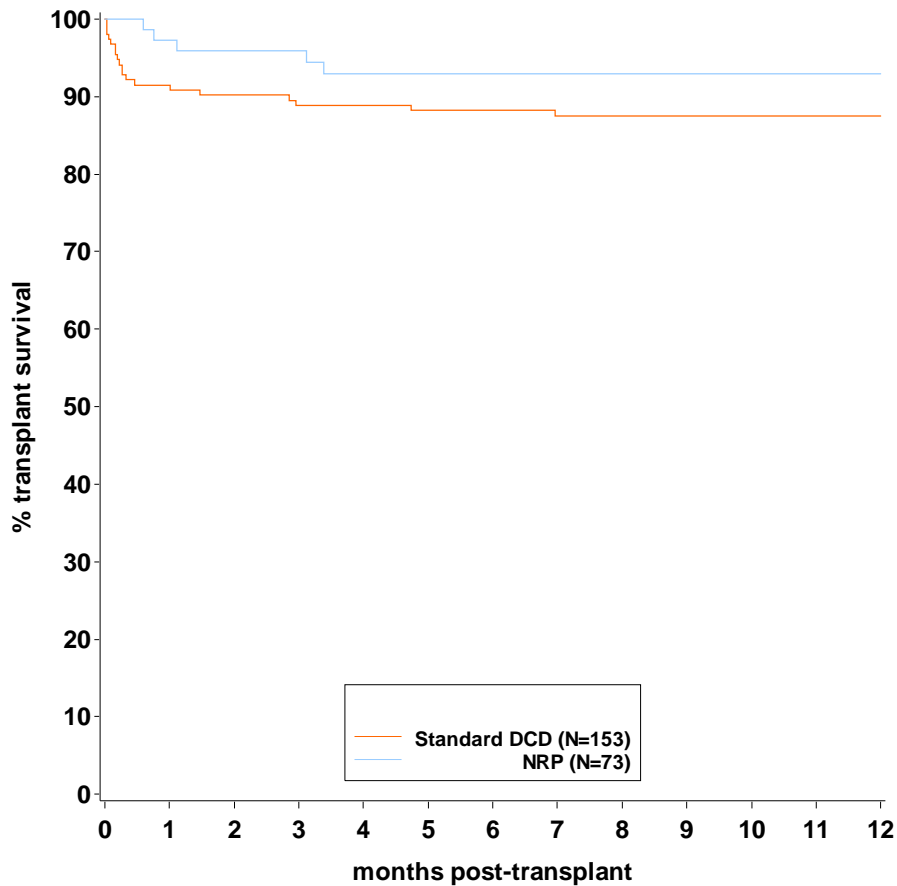
**Table 5 Cause of failure for liver transplant recipients where failure has been reported by retrieval team and NRP status, 1 April 2015 - 30 September 2021**

Cause	Cambridge				Edinburgh				Other team	
	Standard N	%	N	NRP %	Standard N	%	N	NRP %	N	%
<b>Total transplanted</b>	<b>135</b>	<b>100</b>	<b>81</b>	<b>100</b>	<b>35</b>	<b>100</b>	<b>46</b>	<b>100</b>	<b>3</b>	<b>100</b>
Acute rejection	1	1	1	1	1	3	0	0	0	0
Chronic rejection	1	1	0	0	0	0	0	0	0	0
Primary non-function	6	4	0	0	2	6	0	0	0	0
Hepatic artery thrombosis	0	0	0	0	0	0	0	0	0	0
Vascular occlusion	0	0	0	0	0	0	1	2	0	0
Non-thrombotic infarction	1	1	0	0	0	0	0	0	0	0
Recurrent disease	1	1	0	0	0	0	0	0	0	0
Biliary complications	3	2	0	0	1	3	0	0	0	0
Recipient died, graft was functioning at time of death	14	10	5	6	2	6	3	7	0	0
Other	5	4	1	1	2	6	0	0	0	0
Unknown	2	1	0	0	0	0	0	0	0	0
<b>Total failed</b>	<b>34</b>	<b>25</b>	<b>7</b>	<b>8</b>	<b>8</b>	<b>24</b>	<b>4</b>	<b>9</b>	<b>0</b>	<b>0</b>

**Table 6 Days in ITU and hospital for first liver only transplant, by team and method, 1 April 2015 - 30 September 2021**

		Cambridge			Edinburgh		
		Total	Total Reported	Median (IQR)	Total	Total Reported	Median (IQR)
Hospital Stay	NRP DCD	69	63	16 (13-23)	44	37	13 (10-21)
	Standard DCD	132	117	13 (10-19)	34	30	16 (11-22)
ITU Stay	NRP DCD	69	63	2 (2-4)	44	37	2 (1-2)
	Standard DCD	132	128	3 (2-5)	34	32	3 (2-5)

**Figure 2** Kaplan-Meier transplant survival function for DCD first liver only transplant recipients by NRP status, 1 April 2015 - 30 September 2020



**Table 7** Transplant survival rates following DCD first liver only transplant by NRP status, 1 April 2015 - 30 September 2020

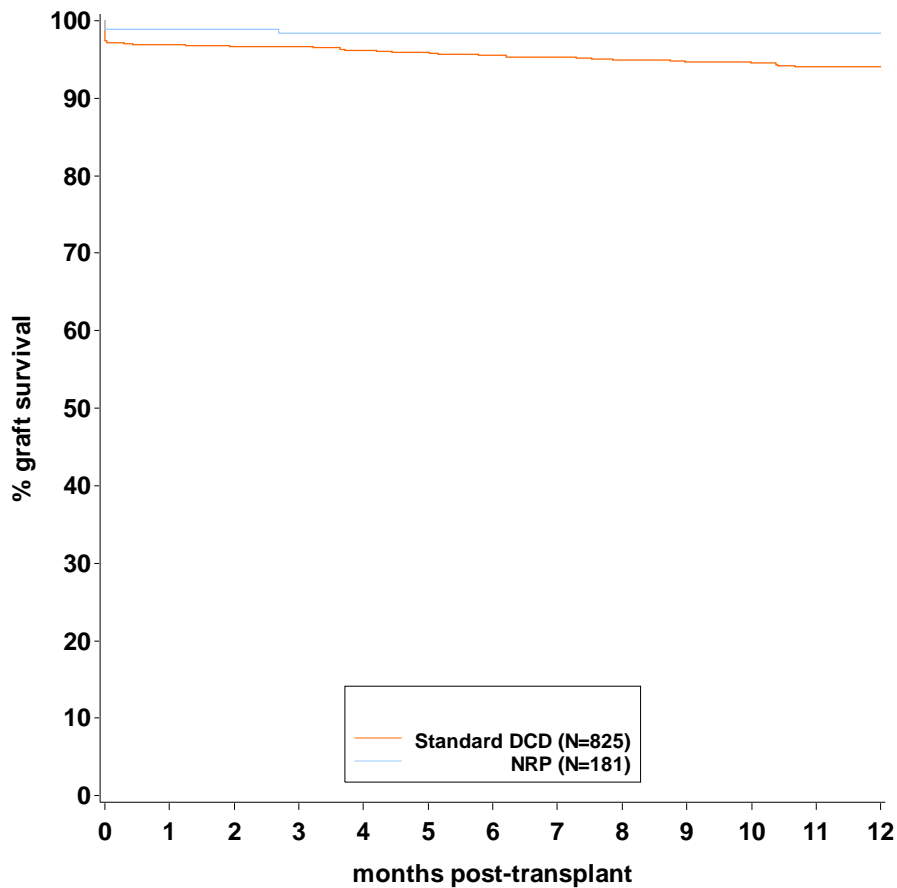
Method	Number of txs	30 day survival (95% CI)		90 day survival (95% CI)		1 year survival (95% CI)	
NRP	73	97.3	(89.5 - 99.3)	95.9	(87.8 - 98.7)	92.9	(83.8 - 97.0)
Standard DCD	153	91.5	(85.8 - 95.0)	88.9	(82.7 - 92.9)	87.5	(81.2 - 91.9)
Log-rank p-value		0.1		0.08		0.2	
<b>Total</b>	<b>226</b>	<b>93.4</b>	<b>(89.2 - 95.9)</b>	<b>91.1</b>	<b>(86.6 - 94.2)</b>	<b>89.3</b>	<b>(84.5 - 92.7)</b>

## Kidney outcomes

**Table 8 Delayed graft function rates following kidney transplantation, 1 April 2015 - 30 September 2021**

Graft function	NRP		Non-NRP		Total	
	N	%	N	%	N	%
Immediate function	233	63.5	613	57.5	846	59.0
Delayed graft function	66	18.0	316	29.6	382	26.7
Primary non-function	2	0.5	27	2.5	29	2.0
Not reported	66	18.0	110	10.3	176	12.3
<b>Total</b>	<b>367</b>	<b>100</b>	<b>1066</b>	<b>100</b>	<b>1433</b>	<b>100</b>

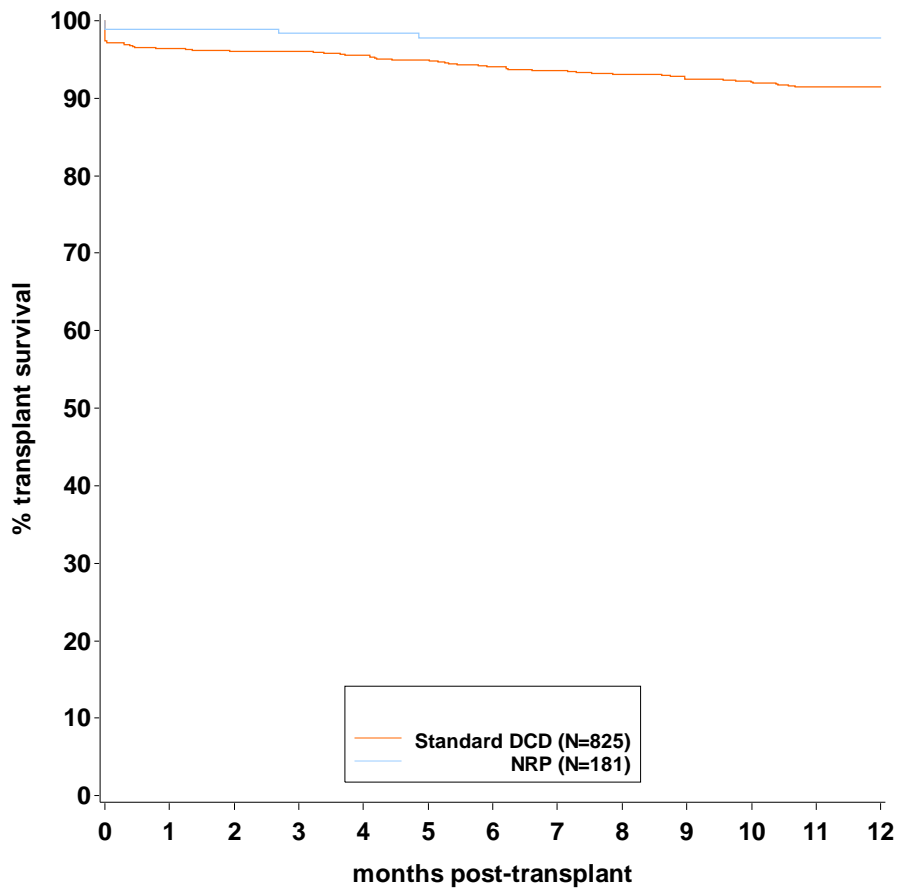
**Figure 3 Kaplan-Meier graft survival function for DCD first kidney only transplant recipients by NRP status, 1 April 2015 - 30 September 2020**



**Table 9 Graft survival rates following DCD first kidney only transplant by NRP status,  
1 April 2015 - 30 September 2020**

<b>Method</b>	<b>Number of txs</b>	<b>30 day survival (95% CI)</b>		<b>90 day survival (95% CI)</b>		<b>1 year survival (95% CI)</b>	
NRP	181	98.9	(95.7 - 99.7)	98.3	(94.9 - 99.5)	98.3	(94.9 - 99.5)
Standard DCD	825	96.8	(95.4 - 97.8)	96.6	(95.1 - 97.6)	94.1	(92.2 - 95.5)
Log-rank p-value		0.13		0.22		0.02	
<b>Total</b>	<b>1006</b>	<b>97.2</b>	<b>(96.0 - 98.1)</b>	<b>96.9</b>	<b>(95.6 - 97.8)</b>	<b>94.9</b>	<b>(93.3 - 96.1)</b>

**Figure 4** Kaplan-Meier transplant survival function for DCD first kidney only transplant recipients by NRP status, 1 April 2015 - 30 September 2020



**Table 10** Transplant survival rates following DCD first kidney only transplant by NRP status, 1 April 2015 - 30 September 2020

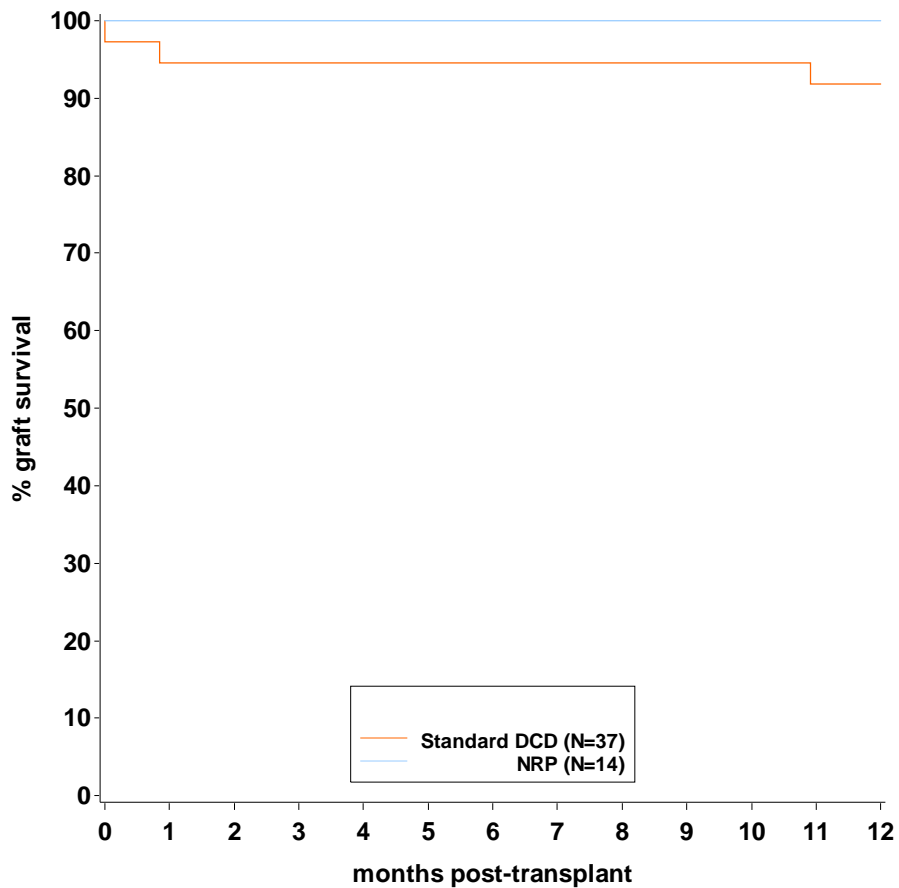
Method	Number of txs	30 day survival (95% CI)		90 day survival (95% CI)		1 year survival (95% CI)	
NRP	181	98.9	(95.7 - 99.7)	98.3	(94.9 - 99.5)	97.7	(94.1 - 99.1)
Standard DCD	825	96.4	(94.8 - 97.4)	96.0	(94.4 - 97.1)	91.5	(89.3 - 93.2)
Log-rank p-value		0.08		0.13		0.01	
<b>Total</b>	<b>1006</b>	<b>96.8</b>	<b>(95.5 - 97.7)</b>	<b>96.4</b>	<b>(95.1 - 97.4)</b>	<b>92.6</b>	<b>(90.7 - 94.1)</b>

## Pancreas outcomes

**Table 11 Delayed graft function rates following pancreas transplantation, 1 April 2015 - 30 September 2021**

Graft function	NRP		Non-NRP		Total	
	N	%	N	%	N	%
Immediate function	17	85.0	39	75.0	56	77.8
Partial function	1	5.0	3	5.8	4	5.6
Primary non-function	1	5.0	1	1.9	2	2.8
Not reported	1	5.0	9	17.3	10	13.9
<b>Total</b>	<b>20</b>	<b>100</b>	<b>52</b>	<b>100</b>	<b>72</b>	<b>100</b>

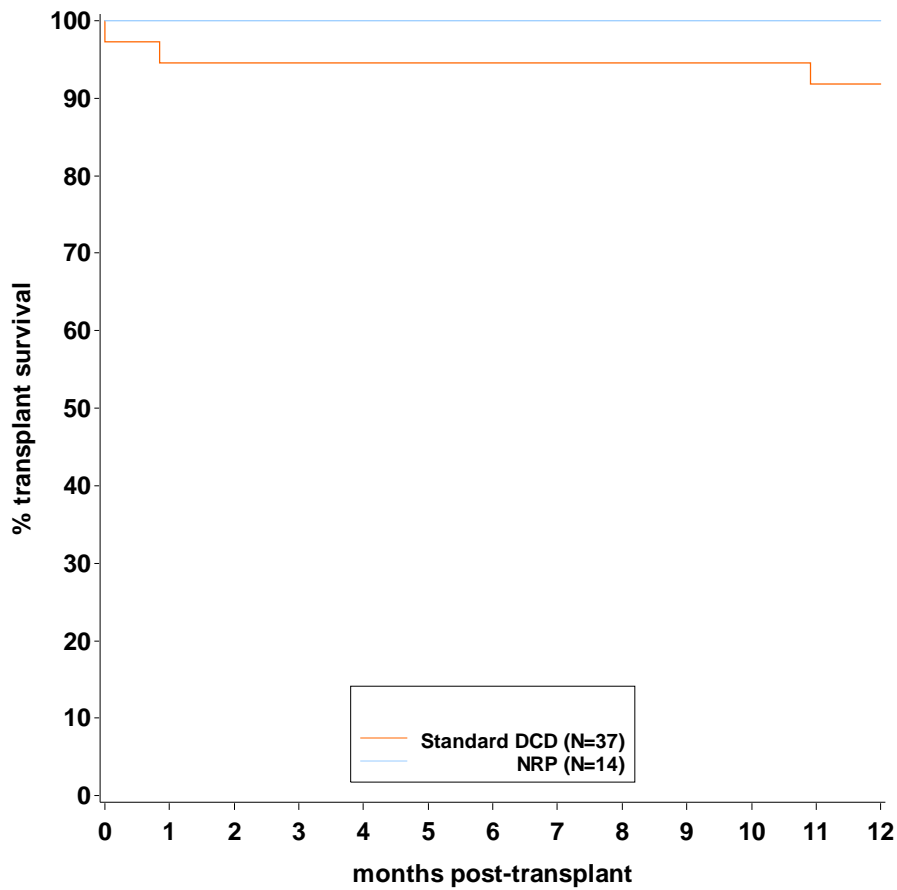
**Figure 5 Kaplan-Meier graft survival function for DCD first SPK transplant recipients by NRP status, 1 April 2015 - 30 September 2020**



**Table 12 Graft survival rates following DCD first SPK transplant by NRP status,  
1 April 2015 - 30 September 2020**

<b>Method</b>	<b>Number of txs</b>	<b>30 day survival (95% CI)</b>		<b>90 day survival (95% CI)</b>		<b>1 year survival (95% CI)</b>	
NRP	14	100	-	100	-	100	-
Standard DCD	37	94.6	(80.1 - 98.6)	94.6	(80.1 - 98.6)	91.8	(76.7 - 97.3)
Log-rank p-value		0.38		0.38		0.29	
<b>Total</b>	<b>51</b>	<b>96.1</b>	<b>(85.2 – 99.0)</b>	<b>96.1</b>	<b>(85.2 – 99.0)</b>	<b>94</b>	<b>(82.5 – 98.0)</b>

**Figure 6** Kaplan-Meier transplant survival function for DCD first SPK transplant recipients by NRP status, 1 April 2015 - 30 September 2020



**Table 13** Transplant survival rates following DCD first SPK transplant by NRP status, 1 April 2015 - 30 September 2020

Method	Number of txs	30 day survival (95% CI)		90 day survival (95% CI)		1 year survival (95% CI)	
NRP	14	100	-	100	-	100	-
Standard DCD	37	94.6	(80.1 - 98.6)	94.6	(80.1 - 98.6)	91.8	(76.7 - 97.3)
Log-rank p-value		0.38		0.38		0.29	
<b>Total</b>	<b>51</b>	<b>96.1</b>	<b>(85.2 – 99.0)</b>	<b>96.1</b>	<b>(85.2 – 99.0)</b>	<b>94</b>	<b>(82.5 – 98.0)</b>



## TA-NRP Activity

**Table 14 TA-NRP attendances by period, 1 April 2015 - 30 September 2021**

<b>Period</b>	<b>TA-NRP attendances</b>	<b>TA-NRP proceeding<sup>1</sup></b>
2015/16	8	8
2016/17	7	7
2017/18	6	6
2018/19	6	6
2019/20	4	4
2020/21	1	1
2021/22 Q1	-	-
2021/22 Q2	-	-

<sup>1</sup>Proceeded to donate at least one organ for the purpose of transplantation

**Table 15 TA-NRP organs retrieved and transplanted, by period, 1 April 2015 - 30 September 2021**

Period	TA-NRP Performed									
	Liv ret	Liv txd	Kid ret	Kid txd	Panc ret	Panc txd	Lng ret	Lng txd	Hrt ret	Hrt txd
2015/16	7	5	14	10	8	2	-	-	8	8
2016/17	5	4	14	11	5	1	-	-	3	3
2017/18	6	6	12	12	3	2	4	4	5	5
2018/19	5	4	12	10	4	4	2	2	4	4
2019/20	3	2	8	8	2	1	-	-	1	1
2020/21	1	1	2	2	-	-	-	-	1	1
2021/22 Q1	-	-	-	-	-	-	-	-	-	-
2021/22 Q2	-	-	-	-	-	-	-	-	-	-