



Blood and Transplant

QUARTERLY REPORT ON NRP RETRIEVALS

1 April 2015 - 30 June 2022

As at 18 August 2022



Cohorts considered

This report presents information on NRP activity in the UK for the period 1 April 2015 to 30 June 2022, 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.

On 22 July 2021, a new damage grading system was introduced and so Table 4 has been split into Table 4a to capture damage information prior to this change and Table 4b for all retrievals since the change.

Transplant and graft survival analyses are based on first transplants only performed at any transplant centre in the period 1 April 2015 to 30 June 2021 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 June 2022

Period	Retrieval team	All DCD attendances	Total proceeding¹	NRP attendances	NRP proceeding¹
2015/16	Oxford	64	36	-	-
	Cardiff	39	23	-	-
	Birmingham	98	65	-	-
	Edinburgh	75	49	3	2
	Cambridge	152	111	3	2
	Royal Free	62	45	-	-
2016/17	Oxford	79	48	-	-
	Cardiff	39	26	-	-
	Birmingham	101	62	-	-
	Edinburgh	78	57	20	15
	Cambridge	125	83	8	4
	Royal Free	51	29	-	-
2017/18	Oxford	66	43	-	-
	Cardiff	43	27	-	-
	Birmingham	124	80	-	-
	Edinburgh	74	48	27	19
	Cambridge	138	96	17	15
	Royal Free	57	41	-	-
2018/19	Oxford	81	55	4	4
	Cardiff	43	30	-	-
	Birmingham	125	95	-	-
	Edinburgh	60	35	18	10
	Cambridge	132	85	26	16
	Royal Free	58	43	-	-
2019/20	Oxford	90	60	1	1
	Cardiff	26	17	-	-
	Birmingham	111	74	4	3
	Edinburgh	60	47	18	16
	Cambridge	162	114	32	25
	Royal Free	74	45	-	-
2020/21	Oxford	54	39	-	-
	Cardiff	14	10	-	-
	Birmingham	68	43	-	-
	Edinburgh	57	39	28	20
	Cambridge	83	64	39	30
	Royal Free	46	30	-	-
2021/22	Oxford	93	72	-	-
	Cardiff	25	20	2	2
	Birmingham	89	68	-	-
	Edinburgh	70	46	56	37
	Cambridge	131	104	49	44
	Royal Free	65	51	4	3

Table 1 DCD attendances by period and retrieval team, 1 April 2015 - 30 June 2022

Period	Retrieval team	All DCD attendances	Total proceeding¹	NRP attendances	NRP proceeding¹
2022/23 Q1	Oxford	13	11	-	-
	Cardiff	10	8	3	1
	Birmingham	25	19	1	1
	Edinburgh	20	16	16	13
	Cambridge	35	28	15	12
	Royal Free	21	19	-	-

¹Proceeded 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 June 2022

Period	Retrieval team	Standard DCD										NRP Performed									
		Liv ret	Liv txd	Kid ret	Kid txd	Panc ret	Panc txd	Lng ret	Lng txd	Hrt ret	Hrt txd	Liv ret	Liv txd	Kid ret	Kid txd	Panc ret	Panc txd	Lng ret	Lng txd	Hrt ret	Hrt txd
2015/16	Oxford	17	12	70	68	7	5	14	10	1	1	-	-	-	-	-	-	-	-	-	-
	Cardiff	12	9	46	45	4	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-
	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	5	4	1	1	4	4	1	1	-	-	-	-
	Royal Free	22	15	86	81	6	2	8	8	2	1	-	-	-	-	-	-	-	-	-	-
2016/17	Oxford	29	16	86	80	8	3	6	4	1	1	-	-	-	-	-	-	-	-	-	-
	Cardiff	15	9	48	43	5	3	4	4	1	1	-	-	-	-	-	-	-	-	-	-
	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	3	3	4	4	8	6	1	1	-	-	-	-
	Royal Free	13	9	57	54	4	3	6	6	-	-	-	-	-	-	-	-	-	-	-	-
2017/18	Oxford	23	15	82	75	5	3	5	5	2	2	-	-	-	-	-	-	-	-	-	-
	Cardiff	15	6	50	47	5	2	-	-	1	1	-	-	-	-	-	-	-	-	-	-
	Birmingham	38	29	153	143	14	7	6	6	1	-	-	-	-	-	-	-	-	-	-	-
	Edinburgh	4	4	53	49	4	1	2	-	-	-	11	7	34	31	4	3	-	-	-	-
	Cambridge	37	21	157	143	12	4	12	12	1	1	12	11	30	25	6	1	2	2	-	-
	Royal Free	20	14	81	74	7	3	4	4	3	2	-	-	-	-	-	-	-	-	-	-
2018/19	Oxford	24	14	100	93	7	5	14	11	-	-	1	1	8	5	2	2	-	-	-	-
	Cardiff	12	7	58	53	6	4	6	4	1	1	-	-	-	-	-	-	-	-	-	-
	Birmingham	45	36	181	168	19	6	14	10	5	4	-	-	-	-	-	-	-	-	-	-
	Edinburgh	3	1	49	45	1	-	-	-	-	-	8	6	20	19	3	3	2	-	-	-
	Cambridge	26	18	135	127	13	7	5	5	4	4	14	12	32	31	2	2	6	4	2	1
	Royal Free	20	16	86	80	5	1	4	4	1	1	-	-	-	-	-	-	-	-	-	-
2019/20	Oxford	25	15	117	106	12	6	13	11	4	1	-	-	2	2	-	-	-	-	-	-
	Cardiff	9	6	34	31	3	2	4	2	-	-	-	-	-	-	-	-	-	-	-	-
	Birmingham	39	28	141	130	11	7	10	6	4	4	1	1	6	4	1	-	2	2	-	-
	Edinburgh	7	2	62	55	4	1	4	2	1	-	10	5	28	23	1	-	4	4	-	-
	Cambridge	25	14	172	162	13	5	8	6	7	6	21	16	50	39	7	3	-	-	1	1
	Royal Free	20	14	84	77	9	1	6	4	2	2	-	-	-	-	-	-	-	-	-	-
2020/21	Oxford	20	12	73	69	5	4	8	7	4	4	-	-	-	-	-	-	-	-	-	-
	Cardiff	6	2	20	18	1	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-
	Birmingham	20	13	84	82	6	2	6	6	1	1	-	-	-	-	-	-	-	-	-	-
	Edinburgh	4	1	38	31	3	-	6	4	3	3	13	9	40	37	3	2	-	-	1	-
	Cambridge	15	8	62	60	5	3	6	-	5	3	27	24	60	52	5	3	4	1	1	1
	Royal Free	9	4	54	51	1	-	2	1	1	1	-	-	-	-	-	-	-	-	-	-

Table 2 DCD organs retrieved and transplanted, by retrieval team and period, 1 April 2015 - 30 June 2022

Period	Retrieval team	Standard DCD										NRP Performed									
		Liv ret	Liv txd	Kid ret	Kid txd	Panc ret	Panc txd	Lng ret	Lng txd	Hrt ret	Hrt txd	Liv ret	Liv txd	Kid ret	Kid txd	Panc ret	Panc txd	Lng ret	Lng txd	Hrt ret	Hrt txd
2021/22	Oxford	31	18	139	131	9	6	10	7	3	2	-	-	-	-	-	-	-	-	-	-
	Cardiff	9	4	35	33	1	1	2	2	-	-	1	1	4	4	-	-	-	-	-	-
	Birmingham	38	29	130	122	21	12	6	4	6	6	-	-	-	-	-	-	-	-	-	-
	Edinburgh	-	-	18	16	-	-	-	-	-	-	29	19	68	55	5	-	2	2	1	1
	Cambridge	25	14	113	100	6	3	6	6	10	8	39	34	86	78	9	4	4	2	3	3
	Royal Free	24	11	93	86	3	1	2	2	5	5	3	2	6	4	-	-	-	-	-	-
2022/23 Q1	Oxford	5	3	22	21	1	-	2	-	2	2	-	-	-	-	-	-	-	-	-	-
	Cardiff	4	2	13	11	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
	Birmingham	12	9	36	33	6	3	2	2	1	1	1	1	-	-	-	-	-	-	-	-
	Edinburgh	1	1	6	6	1	-	-	-	-	-	11	9	22	22	4	3	4	4	-	-
	Cambridge	10	3	32	30	5	3	-	-	2	2	12	11	24	23	2	-	-	-	1	1
	Royal Free	8	6	38	36	2	2	2	2	2	2	-	-	-	-	-	-	-	-	-	-

**Table 3 Number of liver transplants by transplant centre and retrieval team for NRP cases,
1 April 2015 - 30 June 2022**

Transplant centre	Cambridge team		Edinburgh team		Birmingham team		Oxford team		Cardiff team		Royal Free team	
	N	%	N	%	N	%	N	%	N	%	N	%
Birmingham	-	-	2	3	2	100	1	100	-	-	-	-
Cambridge	111	98	3	5	-	-	-	-	-	-	-	-
Edinburgh	1	1	53	84	-	-	-	-	1	100	-	-
King's College	-	-	-	-	-	-	-	-	-	-	-	-
Leeds	-	-	1	2	-	-	-	-	-	-	-	-
Newcastle	-	-	1	2	-	-	-	-	-	-	-	-
Royal Free	1	1	3	5	-	-	-	-	-	-	2	100

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

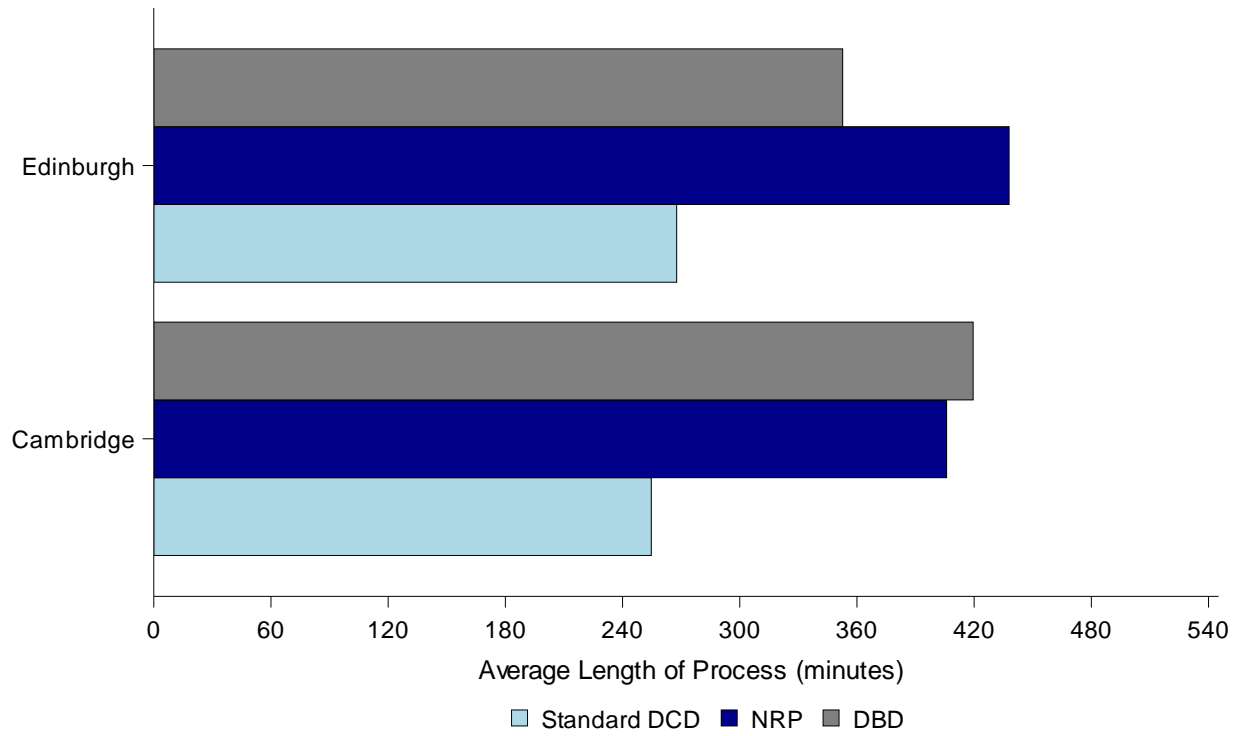
	Liver		Kidney		Pancreas		Lung	
	Std	NRP	Std	NRP	Std	NRP	Std	NRP
Organs retrieved	257	154	1303	396	118	39	71	20
Damage information recorded on HTA-B (% of retrieved)	241 (94%)	146 (95%)	1268 (97%)	390 (98%)	106 (90%)	36 (92%)	65 (92%)	16 (80%)
Damage (% of reported)								
None	203 (84%)	139 (95%)	1120 (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%)	8 (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 June 2022

	Liver		Kidney		Pancreas		Lung	
	Std	NRP	Std	NRP	Std	NRP	Std	NRP
Organs retrieved	30	67	133	142	11	15	2	8
Damage information recorded on HTA-B (% of retrieved)	25 (83%)	64 (96%)	126 (95%)	135 (95%)	10 (91%)	13 (87%)	2 (100%)	8 (100%)
Damage (% of reported)								
No effect/no damage	23 (92%)	59 (92%)	113 (90%)	124 (92%)	10 (100%)	12 (92%)	2 (100%)	6 (75%)
Mild effect	2 (8%)	5 (8%)	11 (9%)	11 (8%)	0 (0%)	0 (0%)	0 (0%)	2 (25%)
Moderate effect	0 (0%)	0 (0%)	1 (1%)	0 (0%)	0 (0%)	1 (8%)	0 (0%)	0 (0%)
Severe effect	0 (0%)	0 (0%)	1 (1%)	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 June 2022



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 June 2022

Cause	Cambridge				Edinburgh				Other team	
	Standard N	%	N	NRP %	Standard N	%	N	NRP %	N	%
Total transplanted	145	100	113	100	36	100	63	100	6	100
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	1	1	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	1	3	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	16	11	7	6	2	6	5	8	0	0
Other	6	4	1	1	2	6	0	0	0	0
Unknown	4	3	0	0	0	0	0	0	0	0
Total failed	39	28	10	9	9	27	6	10	0	0

Table 6 Days in ITU and hospital for first liver only transplant, by team and method, 1 April 2015 - 30 June 2022

		Cambridge			Edinburgh		
		Total	Total Reported	Median (IQR)	Total	Total Reported	Median (IQR)
Hospital Stay	NRP DCD	100	82	16 (13-23)	61	51	12 (9-21)
	Standard DCD	142	126	14 (10-20)	35	30	16 (11-22)
ITU Stay	NRP DCD	100	82	2 (2-4)	61	52	2 (2-2)
	Standard DCD	142	137	3 (2-5)	35	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 June 2021

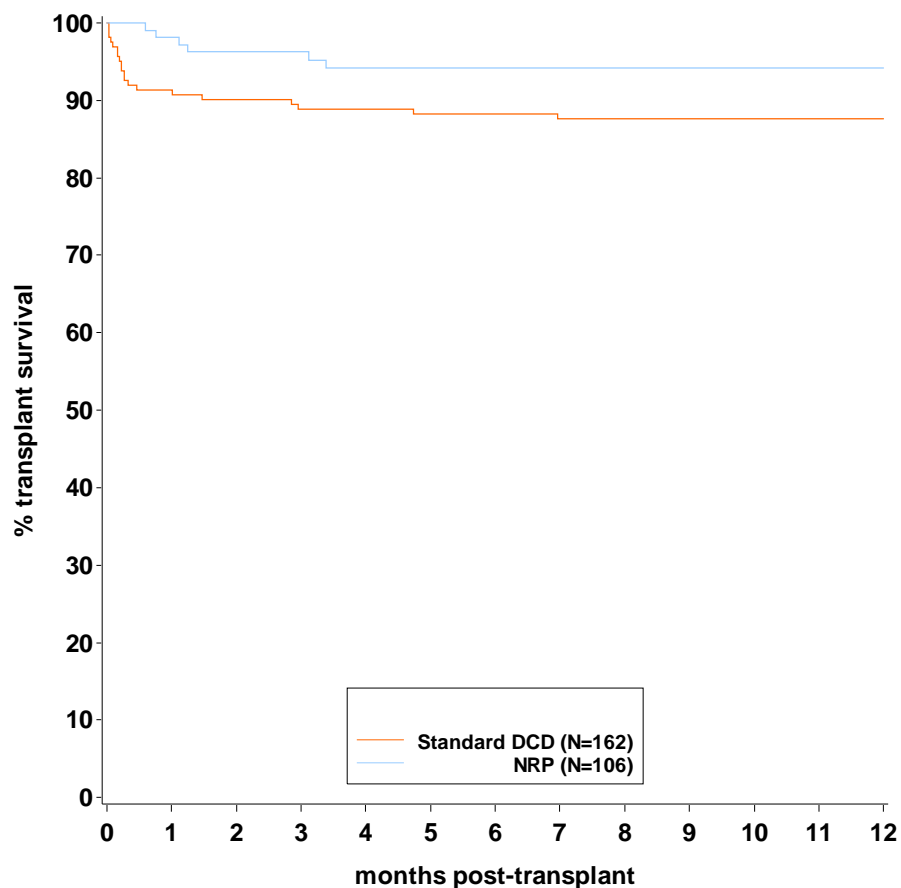


Table 7 Transplant survival rates following DCD first liver only transplant by NRP status, 1 April 2015 - 30 June 2021

Method	Number of txs	30 day survival (95% CI)		90 day survival (95% CI)		1 year survival (95% CI)	
NRP	106	98.1	(92.7 - 99.5)	96.2	(90.3 - 98.6)	94.1	(87.4 - 97.3)
Standard DCD	162	91.4	(85.8 - 94.8)	88.9	(82.9 - 92.8)	87.6	(81.5 - 91.8)
Log-rank p-value		0.02		0.03		0.07	
Total	268	94	(90.4 - 96.3)	91.8	(87.8 - 94.5)	90.2	(85.9 - 93.2)

Kidney outcomes

Table 8 Delayed graft function rates following kidney transplantation, 1 April 2015 - 30 June 2022

Graft function	NRP		Non-NRP		Total	
	N	%	N	%	N	%
Immediate function	274	58.1	658	57.3	932	57.5
Delayed graft function	87	18.4	342	29.8	429	26.5
Primary non-function	2	0.4	29	2.5	31	1.9
Not reported	109	23.1	120	10.4	229	14.1
Total	472	100	1149	100	1621	100

Figure 3 Kaplan-Meier graft survival function for DCD first kidney only transplant recipients by NRP status, 1 April 2015 - 30 June 2021

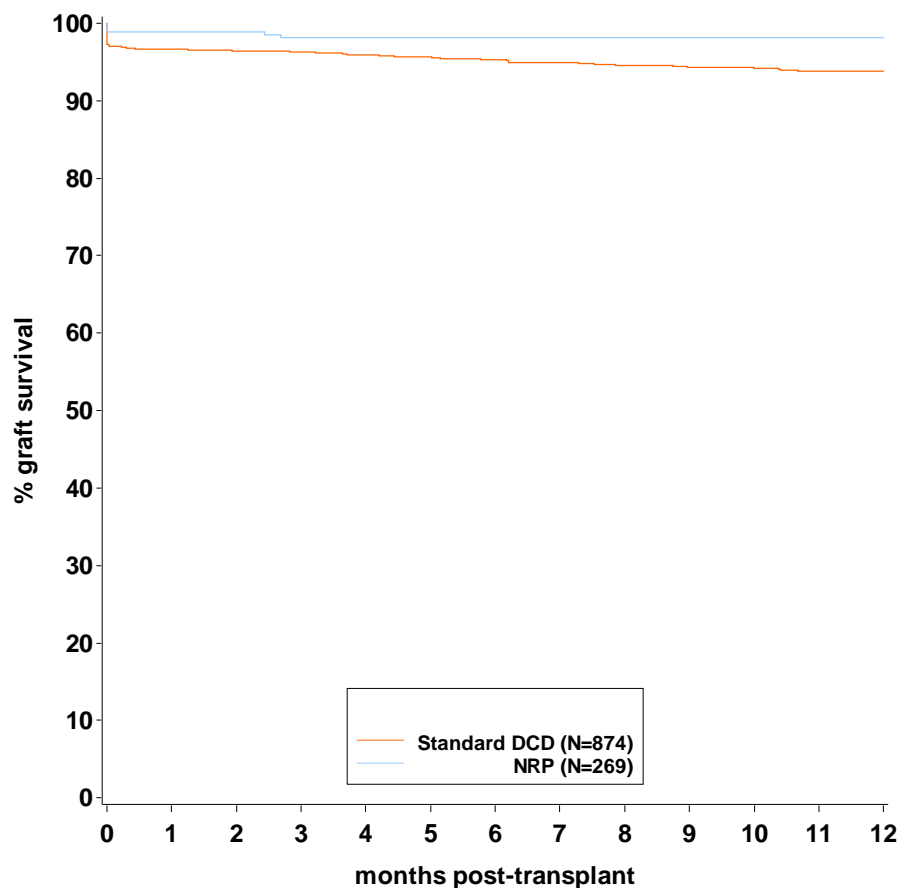


Table 9 Graft survival rates following DCD first kidney only transplant by NRP status, 1 April 2015 - 30 June 2021

Method	Number of txs	30 day survival (95% CI)		90 day survival (95% CI)		1 year survival (95% CI)	
NRP	269	98.9	(96.6 - 99.6)	98.1	(95.6 - 99.2)	98.1	(95.6 - 99.2)
Standard DCD	874	96.7	(95.3 - 97.7)	96.3	(94.9 - 97.4)	93.8	(92.0 - 95.3)
Log-rank p-value		0.06		0.14		0.01	
Total	1143	97.2	(96.1 - 98.0)	96.8	(95.5 - 97.6)	94.8	(93.3 - 96.0)

Figure 4 Kaplan-Meier transplant survival function for DCD first kidney only transplant recipients by NRP status, 1 April 2015 - 30 June 2021

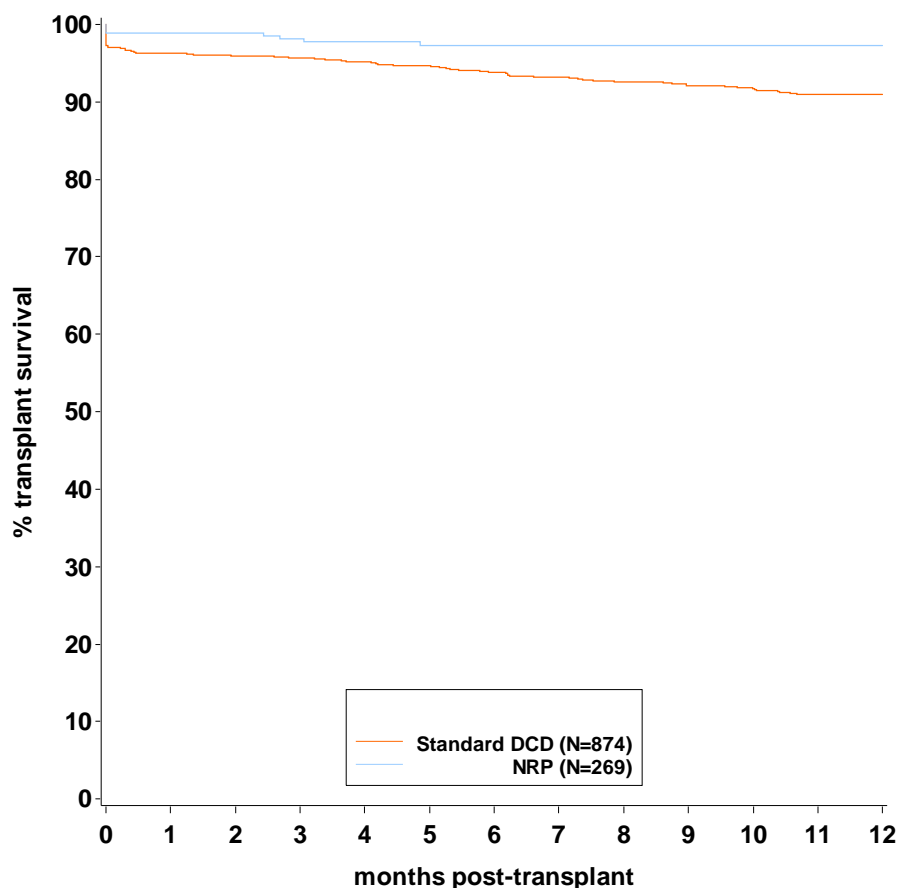


Table 10 Transplant survival rates following DCD first kidney only transplant by NRP status, 1 April 2015 - 30 June 2021

Method	Number of txs	30 day survival (95% CI)		90 day survival (95% CI)		1 year survival (95% CI)	
NRP	269	98.9	(96.6 - 99.6)	98.1	(95.6 - 99.2)	97.3	(94.4 - 98.7)
Standard DCD	874	96.2	(94.7 - 97.3)	95.6	(94.1 - 96.8)	91.0	(88.9 - 92.7)
Log-rank p-value		0.03		0.06		<0.001	
Total	1143	96.9	(95.7 - 97.7)	96.2	(95.0 - 97.2)	92.4	(90.7 - 93.9)

Pancreas outcomes

Table 11 Delayed graft function rates following pancreas transplantation, 1 April 2015 - 30 June 2022

Graft function	NRP		Non-NRP		Total	
	N	%	N	%	N	%
Immediate function	17	65.4	41	71.9	58	69.9
Partial function	1	3.8	3	5.3	4	4.8
Primary non-function	1	3.8	1	1.8	2	2.4
Not reported	7	26.9	12	21.1	19	22.9
Total	26	100	57	100	83	100

Figure 5 Kaplan-Meier graft survival function for DCD first SPK transplant recipients by NRP status, 1 April 2015 - 30 June 2021

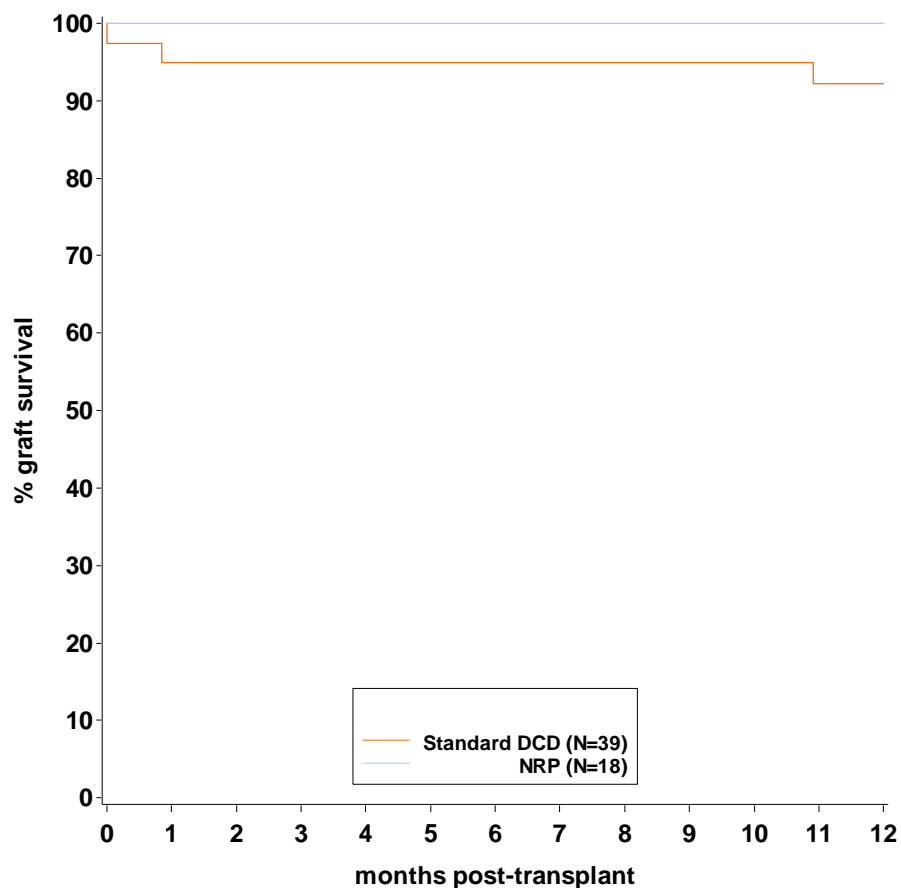


Table 12 Graft survival rates following DCD first SPK transplant by NRP status, 1 April 2015 - 30 June 2021

Method	Number of txs	30 day survival (95% CI)		90 day survival (95% CI)		1 year survival (95% CI)	
NRP	18	100	-	100	-	100	-
Standard DCD	39	94.9	(81.0 - 98.7)	94.9	(81.0 - 98.7)	92.2	(77.6 - 97.4)
Log-rank p-value		0.33		0.33		0.25	
Total	57	96.5	(86.7 - 99.1)	96.5	(86.7 - 99.1)	94.5	(83.8 - 98.2)

Figure 6 Kaplan-Meier transplant survival function for DCD first SPK transplant recipients by NRP status, 1 April 2015 - 30 June 2021

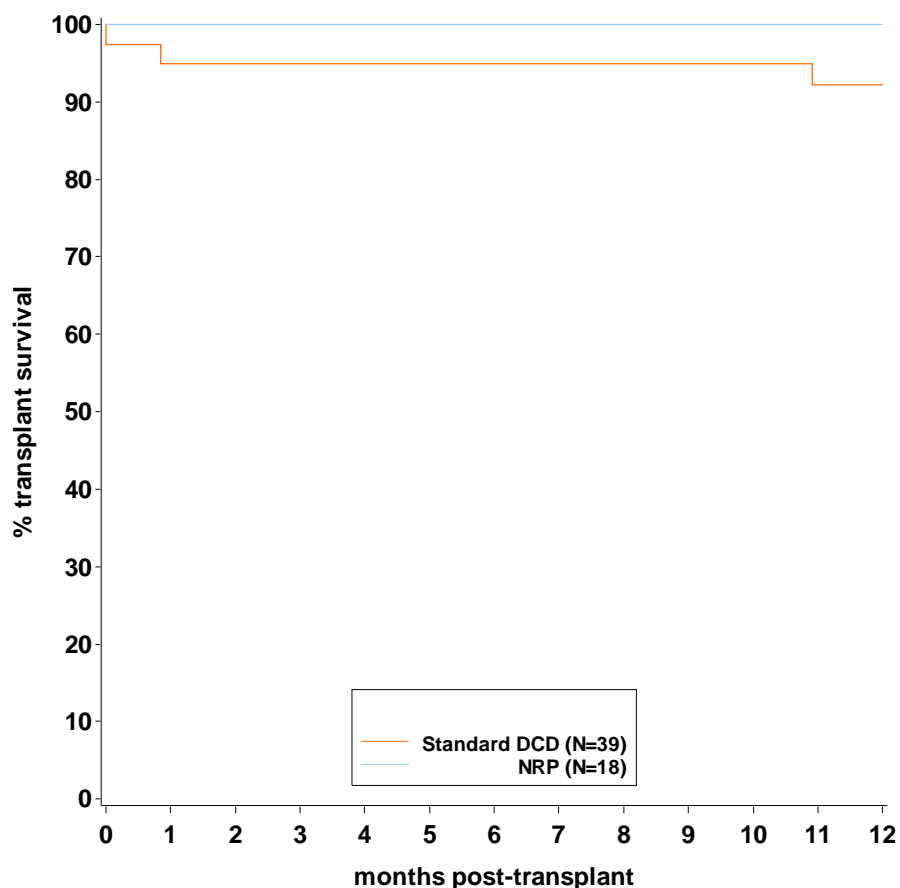


Table 13 Transplant survival rates following DCD first SPK transplant by NRP status, 1 April 2015 - 30 June 2021

Method	Number of txs	30 day survival (95% CI)		90 day survival (95% CI)		1 year survival (95% CI)	
NRP	18	100	-	100	-	100	-
Standard DCD	39	94.9	(81.0 - 98.7)	94.9	(81.0 - 98.7)	92.2	(77.6 - 97.4)
Log-rank p-value		0.33		0.33		0.25	
Total	57	96.5	(86.7 - 99.1)	96.5	(86.7 - 99.1)	94.5	(83.8 - 98.2)

TA-NRP Activity

Table 14 TA-NRP attendances by period, 1 April 2015 - 30 June 2022

Period	TA-NRP attendances	TA-NRP proceeding¹
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	-	-
2022/23 Q1	-	-

¹Proceeded 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 June 2022

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	-	-	-	-	-	-	-	-	-	-
2022/23 Q1	-	-	-	-	-	-	-	-	-	-