



Blood and Transplant

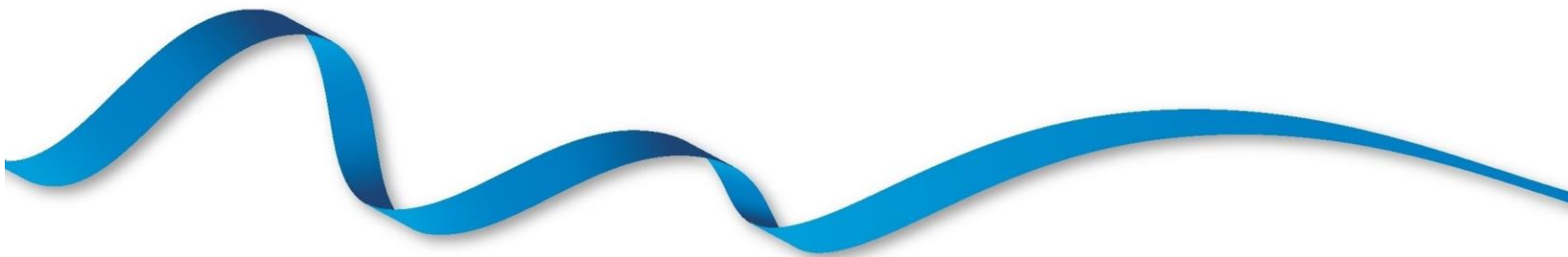
**ANNUAL REPORT ON
THE NATIONAL ORGAN RETRIEVAL SERVICE
(NORS)**

**REPORT FOR 2020/2021
(1 April 2020 - 31 March 2021)**

PUBLISHED SEPTEMBER 2021



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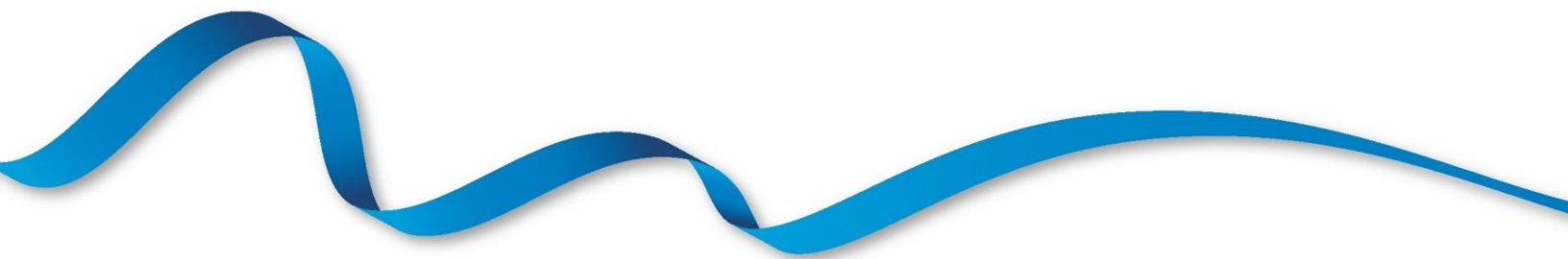
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EXECUTIVE SUMMARY



Executive Summary

The National Organ Retrieval Service (NORS) was introduced on 1 April 2010, comprised of 16 NORS teams; 10 abdominal and 6 cardiothoracic surgical teams available to retrieve organs for transplantation from deceased donors in the UK.

This report presents organ retrieval data from the most recent financial year, 1 April 2020 to 31 March 2021. Data were extracted from the UK Transplant Registry on 7 July 2021.

As a result of the COVID-19 pandemic, there has been a reduction in activity in the National Organ Retrieval Service due to changes in other aspects of organ donation and transplantation in the UK. There were also changes to the operational workings of NORS, with changes to how teams were mobilised in the first part of the pandemic and team availability.

Key findings:

- From 1 April 2020 to 31 March 2021, 1,381 potential organ donors were attended by a retrieval team. 1,178 (85%) of these proceeded to abdominal organ donation and 241 (57% of the 426 attended by a cardiothoracic team) proceeded to cardiothoracic organ donation.
- There was a 29% decrease in the number of donors attended in this financial year compared to the previous year (from 1,942 to 1,381).
- On average, 3.9 potential donors were attended by a retrieval team per day, which is a decrease from the previous year (5.4).
- On average, abdominal teams attended at least one donor on 42% of on-call days in the year (58% the previous year), while cardiothoracic teams attended at least one donor on 30% of on-call days (39% the previous year).
- There were statistically significant differences in the mean number of DBD abdominal organs transplanted and the mean number of DCD abdominal organs retrieved across teams.
- The transplantation rates for retrieved organs were variable across organs from 46.2% for DCD pancreases up to 97.9% for DBD hearts. Additionally, 29 DCD hearts were retrieved, 22 of which were transplanted in that period.

Use of the contents of this report should be acknowledged as follows: *Annual Report on The National Organ Retrieval Service 2020/2021, NHS Blood and Transplant*

INTRODUCTION



Introduction

The National Organ Retrieval Service (NORS) was introduced on 1 April 2010, comprised of 16 NORS teams; 10 abdominal and 6 cardiothoracic surgical teams available to retrieve organs for transplantation from deceased donors in the UK.

This report presents organ retrieval activity from the latest full financial year, 1 April 2020 to 31 March 2021. Data were provided by retrieval teams and Specialist Nurses for Organ Donation (SN-ODs) via the Retrieval Team Information (RTI) and Organ Retrieval Information (ORI) forms. A small proportion (0.1% and 0.2% for RTI and ORI, respectively) of forms were missing at time of data extraction, 7 July 2021.

The abdominal service is made up of four full-time teams (52 weeks on-call per annum) and six part-time teams (varying between 15 and 38 weeks on-call per annum). Since 6 January 2020, there have been eight abdominal teams on-call at any time, previously this was seven. Since April 2016, following the NORS Review, all six teams in the cardiothoracic service are part-time (26 weeks on-call per annum) making three teams on-call at any time. Prior to the NORS Review all six cardiothoracic teams were on-call full-time.

Some potential donors are attended by both an abdominal retrieval team and a cardiothoracic retrieval team, but many are only attended by an abdominal retrieval team. Statistics in this report are often presented separately for abdominal and cardiothoracic organ retrieval teams, as well as for donors after brain death (DBD) and donors after circulatory death (DCD).

Some potential donors are attended by a retrieval team but do not proceed to donation, i.e. no organs are retrieved. Non-proceeding donors are more common in the pool of potential DCD donors as prolonged time to circulatory arrest and death after treatment withdrawal can cause unsuitability of organs for transplantation. Note that a donor may be a non-proceeding cardiothoracic donor but proceed to abdominal organ donation, or vice-versa. Some of the information presented in this report is not relevant for non-proceeding donors and related only to actual donors. We cannot be sure that we have full reporting on all non-proceeding donors attended by retrieval teams as it is only possible to identify these through receipt of an RTI or ORI form.

Since February 2019, NORS teams have been mobilised using a sequence, the first and second teams in the sequence are defined for each UK hospital (largely based on travel times but adjusted to give a more even workload across NORS teams), while subsequent teams in the sequence are ordered based on travel time and availability, known as 'closest available'.

If a team is first in sequence for a particular donor hospital, they are required to attend possible donors at that hospital within an agreed timescale if at least one organ has

been accepted for transplantation. If the team is already retrieving when they are called to attend, then a second team is called in to retrieve and so on.

From April 2016 to February 2019, teams were mobilised entirely based on the 'closest available' system. The move to the defined sequence model resulted from a Demand and Capacity review in 2018.

In response to the COVID-19 pandemic, several operational changes were made to allow NORS to safely continue. Between April and August 2020, team mobilisation reverted to the 'closest available' system in order to reduce travel times as much as possible for teams. There was also a reduction in the availability of some part-time abdominal teams, meaning during those months there were occasions when only seven abdominal NORS teams were on-call. After August 2020, these changes were reverted, with mobilisation returning to using a sequence and part-time team availability back to usual levels.

Despite the challenges faced by hospitals, organ donation and transplantation continued to happen throughout the COVID-19 pandemic. By being able to adapt to the constantly changing situation, a full NORS capacity was able to be provided with minimal disruption. This allowed transplant activity to continue for the most urgent patients during the first wave of the pandemic, and adapted for the rapid increase back to pre-COVID levels.

ACTIVITY



Donor Attendances

The number of DBD and DCD donors that were attended by each retrieval team between 1 April 2020 and 31 March 2021 is shown in **Table 1a**. The number of donors attended varies due to the geographical distribution of donors and the on-call arrangements, where on-call arrangements for part-time NORS teams are always in a block of seven consecutive days (Monday to Monday), however, handover times vary.

Table 1a Number of donor attendances (proceeding and non-proceeding) per retrieval team, 1 April 2020 - 31 March 2021, by donor type (DBD/DCD)							
Attending retrieval team (Weeks on-call per annum)	DBD		DCD		Total	% of all donors attended	(% attended in 2019/20)
	N	%	N	%			
Abdominal							
Birmingham (38w)	95	58.3	68	41.7	163	11.8	(12.1)
Cambridge (52w)	78	48.1	84	51.9	162	11.8	(14.5)
Cardiff (15w)	28	66.7	14	33.3	42	3.0	(3.8)
Edinburgh (52w)	84	59.6	57	40.4	141	10.2	(8.1)
King's College (52w)	140	64.8	76	35.2	216	15.7	(18.0)
Leeds (38w)	81	56.3	63	43.8	144	10.4	(8.6)
Manchester (38w)	64	44.1	81	55.9	145	10.5	(8.6)
Newcastle (52w)	77	63.6	44	36.4	121	8.8	(10.5)
Oxford (38w)	80	59.7	54	40.3	134	9.7	(8.2)
Royal Free (38w)	64	58.2	46	41.8	110	8.0	(7.5)
Abdominal total	791	57.4	587	42.6	1378	-	(-)
Cardiothoracic							
Birmingham (26w)	55	91.7	5	8.3	60	14.1	(14.4)
Glasgow (26w)	35	94.6	2	5.4	37	8.7	(9.6)
Harefield (26w)	85	70.8	35	29.2	120	28.2	(20.4)
Manchester (26w)	61	80.3	15	19.7	76	17.8	(19.2)
Newcastle (26w)	40	75.5	13	24.5	53	12.4	(11.5)
Papworth (26w)	49	61.3	31	38.8	80	18.8	(24.7)
Cardiothoracic total	325	76.3	101	23.7	426	-	(-)
Total no. attendances	1116	61.9	688	38.1	1804	100	(100)
Total no. donors attended	793	57.4	588	42.6	1381	100	(100)
There were 29 potential donors attended by an off-duty cardiothoracic NORS team (16 Harefield, 10 Papworth, 1 Birmingham, 1 Manchester, 1 Newcastle).							

These figures are broken down by whether the donor proceeded to organ donation (actual donors) or not in **Table 1b**. In total in the last financial year there were 1,381 donors attended by a retrieval team. Of these 793 (57%) were potential DBD donors and 588 (43%) were potential DCD donors. 764 of the potential DBD donors attended by an abdominal retrieval team (97%) proceeded to abdominal organ donation, while 192 (59%) of the potential DBD donors attended by a cardiothoracic team proceeded to cardiothoracic donation. For potential DCD donors, 414 (70%) of those attended by an abdominal team proceeded to abdominal donation, while 49 (49%) of those attended by a cardiothoracic team proceeded to cardiothoracic organ donation.

Table 1b Number of donor attendances per retrieval team, 1 April 2020 - 31 March 2021 by donor type (DBD/DCD) and proceeding/non-proceeding						
Attending retrieval team (Weeks on-call per annum)	DBD			DCD		
	Actual	Non- proceeding	% non- proceeding	Actual	Non- proceeding	% non- proceeding
Abdominal						
Birmingham (38w)	94	1	1.1	43	25	36.8
Cambridge (52w)	76	2	2.6	65	19	22.6
Cardiff (15w)	24	4	14.3	10	4	28.6
Edinburgh (52w)	82	2	2.4	39	18	31.6
King's College (52w)	138	2	1.4	56	20	26.3
Leeds (38w)	79	2	2.5	48	15	23.8
Manchester (38w)	61	3	4.7	53	28	34.6
Newcastle (52w)	74	3	3.9	31	13	29.5
Oxford (38w)	75	5	6.3	39	15	27.8
Royal Free (38w)	61	3	4.7	30	16	34.8
Abdominal total	764	27	3.4	414	173	29.5
Cardiothoracic						
Birmingham (26w)	31	24	43.6	0	5	100
Glasgow (26w)	21	14	40.0	0	2	100
Harefield (26w)	43	42	49.4	14	21	60.0
Manchester (26w)	39	22	36.1	8	7	46.7
Newcastle (26w)	26	14	35.0	4	9	69.2
Papworth (26w)	32	17	34.7	23	8	25.8
Cardiothoracic total	192	133	40.9	49	52	51.5
Total donors (abdominal and/or cardiothoracic)	766	27	3.4	414	174	29.6

There were 29 potential donors attended by an off-duty cardiothoracic NORS team (16 Harefield, 10 Papworth, 1 Birmingham, 1 Manchester, 1 Newcastle).

Figure 1a shows the proportion of donors attended by any abdominal retrieval team. In the last financial year, King's College attended the highest proportion of abdominal donors (16%) and Cardiff attended the lowest proportion (3%), as teams on call for less than 52 weeks a year will naturally attend fewer donors. **Figure 3b** reflects donors per day when on call, which gives a more balanced metric.

Figure 1a Proportion of donors attended by an abdominal team between 1 April 2016 - 31 March 2021

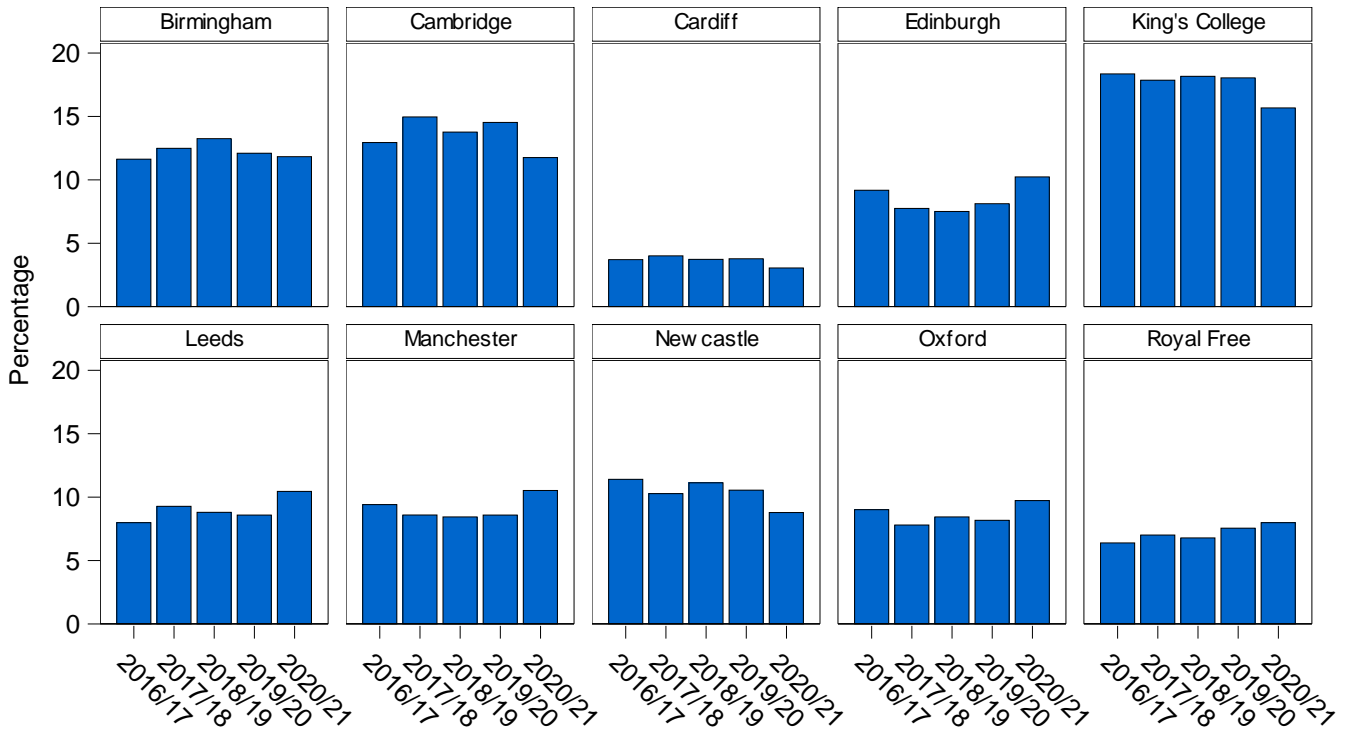


Figure 1b shows the proportion of donors attended by any cardiothoracic retrieval team. In the last financial year, Harefield attended the largest proportion of cardiothoracic donors (28%) and Glasgow attended the lowest proportion (9%).

Figure 1b Proportion of donors attended by a cardiothoracic team between 1 April 2016 - 31 March 2021

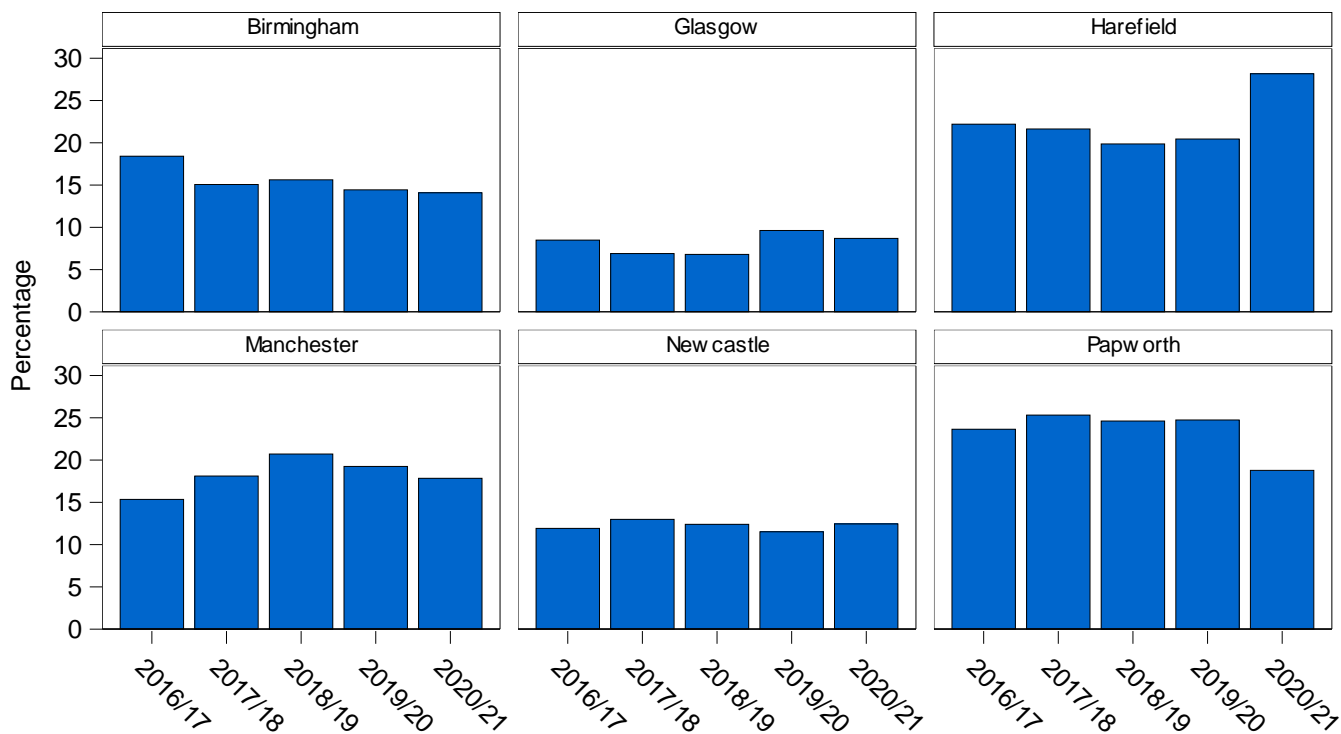


Figure 2 shows the distribution of the number of actual and non-proceeding donors attended by at least one retrieval team, per day in 2020/21. The number of donors per day ranged from 0 (15 days) to 12 (1 day). The mean number of donors per day was 3.9.

Figure 2 Distribution of the number of actual and non-proceeding donors attended by at least one retrieval team on any one day during 1 April 2020 - 31 March 2021

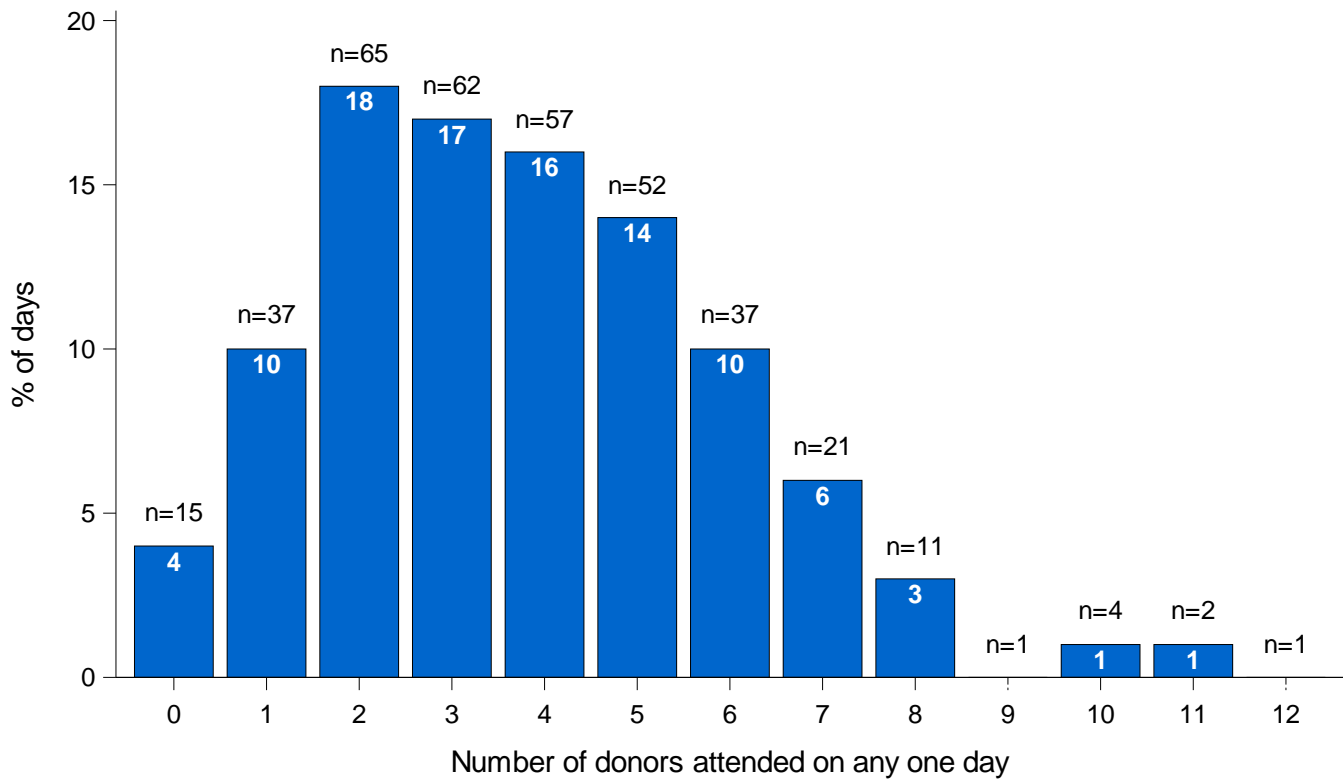


Figure 3a shows the distribution of the number of abdominal teams out on any one day during 2020/21. For example, there were 74 days in the 12-month period (20% of days) where two abdominal teams were out attending donors.

Figure 3a Distribution of the number of abdominal retrieval teams out on any one day, between 1 April 2020 - 31 March 2021

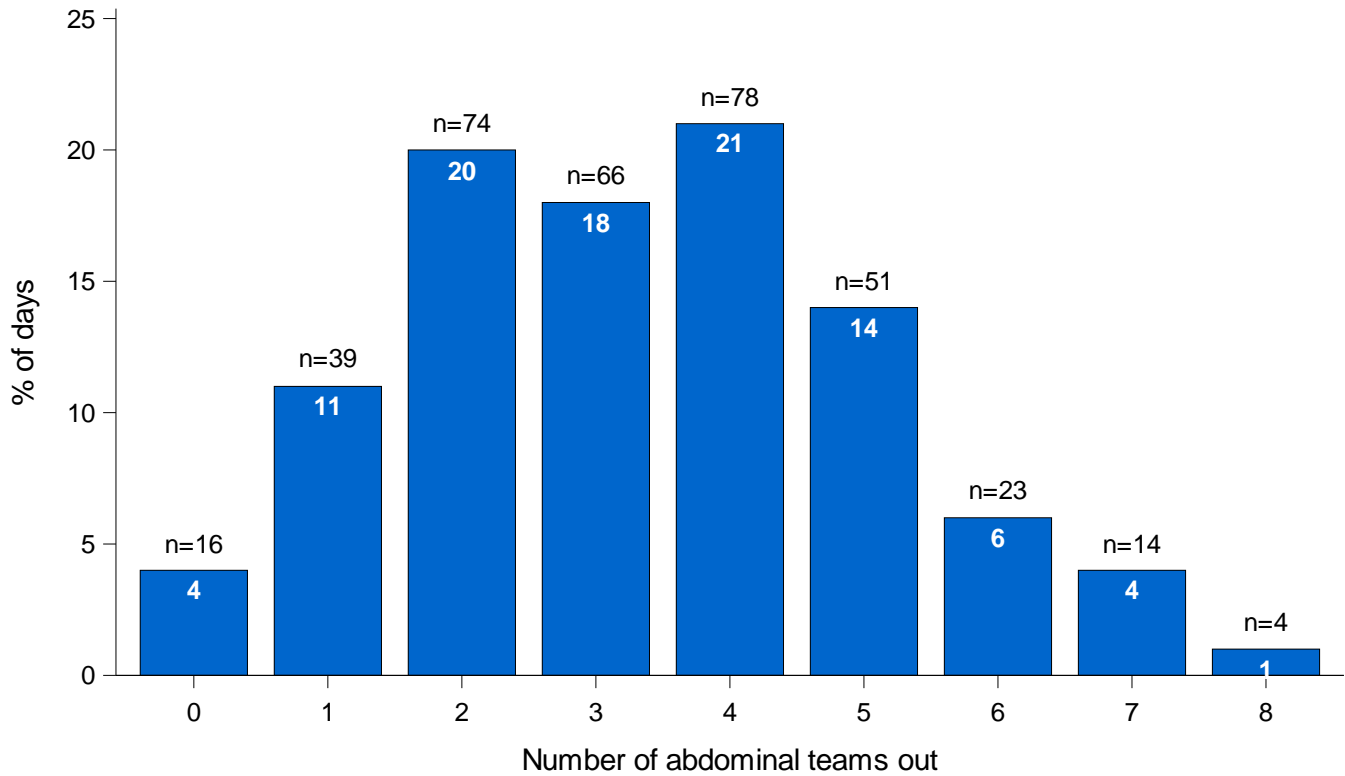


Figure 3b shows the distribution of the number of donors (actual and non-proceeding) attended by each abdominal team on any one day (that they were on call) during the year. On average abdominal teams did not attend any donors on 58% of the days in the year, attended one donor 36% of days, attended two donors 5% of days, attended three donors 1% of days and attended four donors on 0% of days. The 'busiest' team in 2020/21 in terms of days active was Birmingham (when on call).

Figure 3b Distribution of the number of actual and non-proceeding donors attended by each abdominal team on any one day, between 1 April 2020 - 31 March 2021

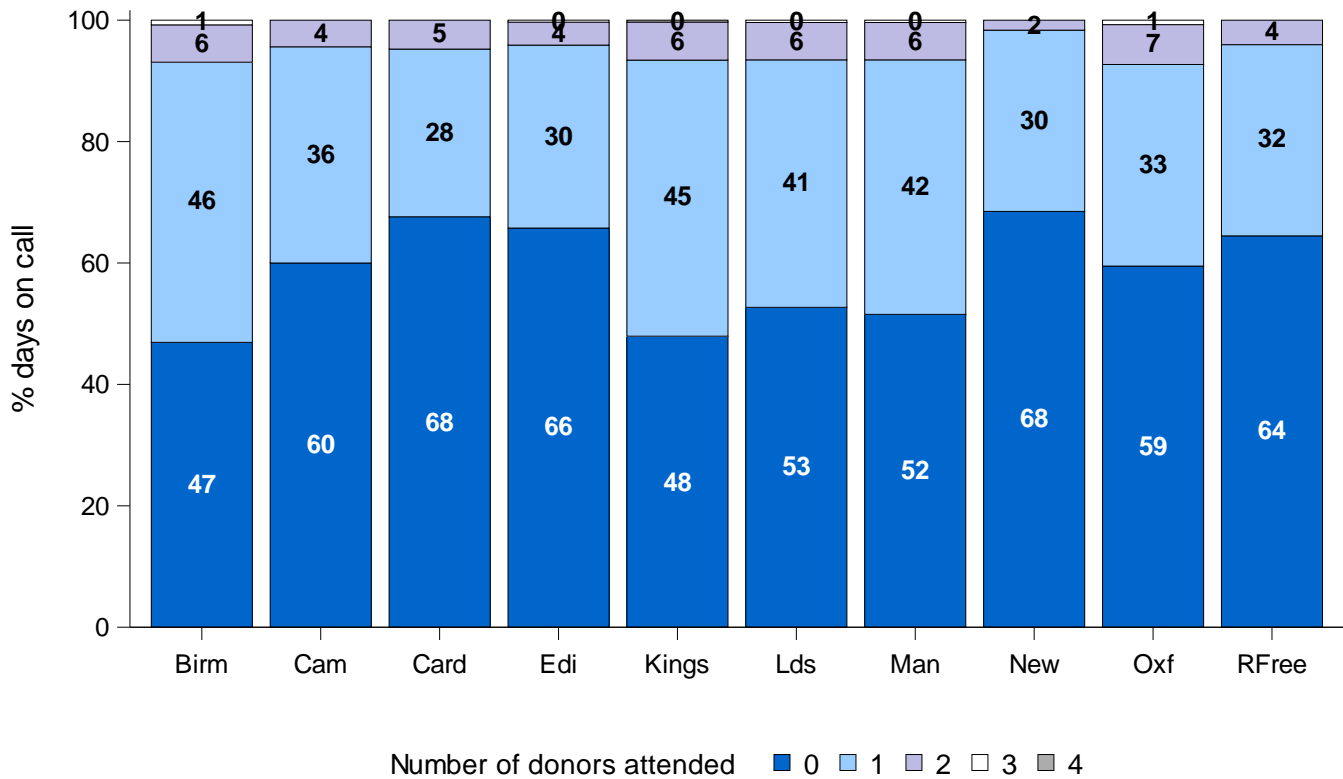


Figure 4a shows the distribution of the number of cardiothoracic teams out on any one day during 2020/21. It is most common for one cardiothoracic team to be out on any given day.

Figure 4a Distribution of the number of cardiothoracic retrieval teams out on any one day, between 1 April 2020 - 31 March 2021

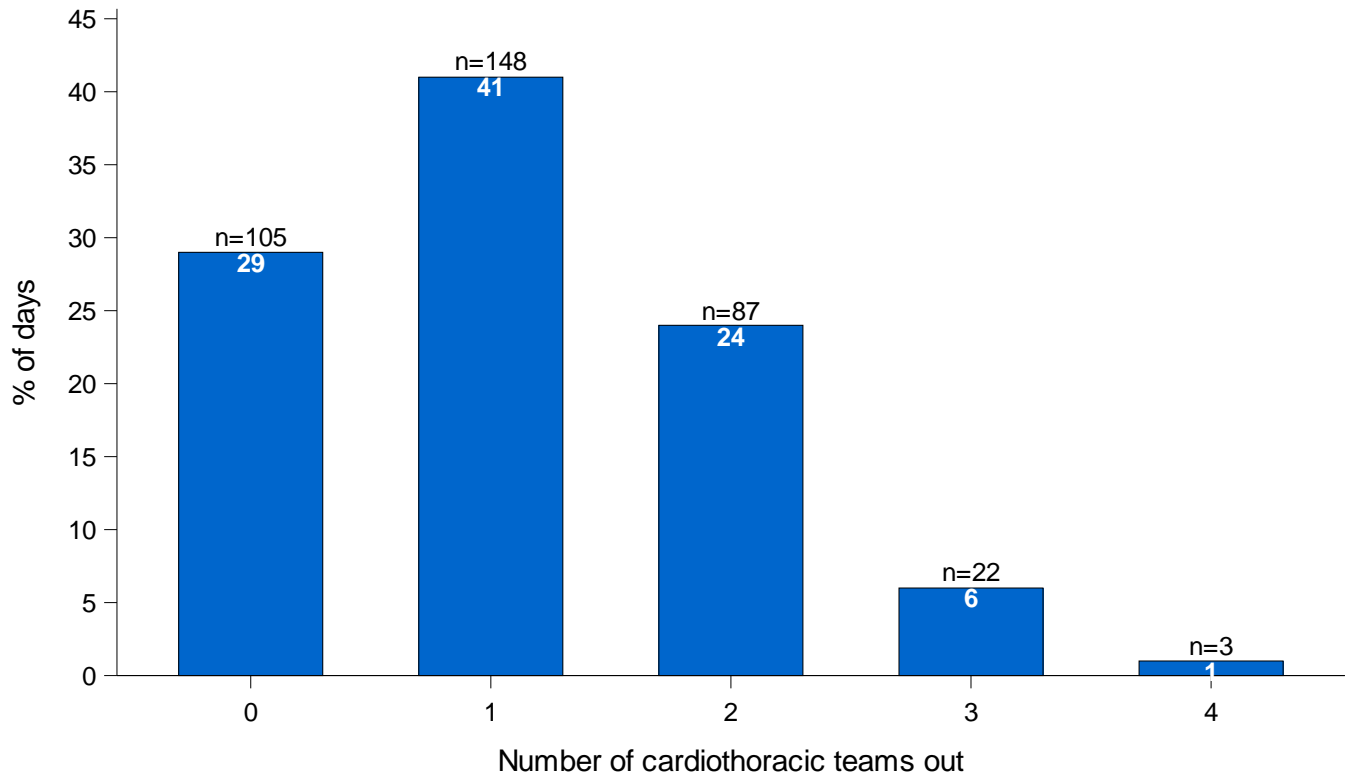
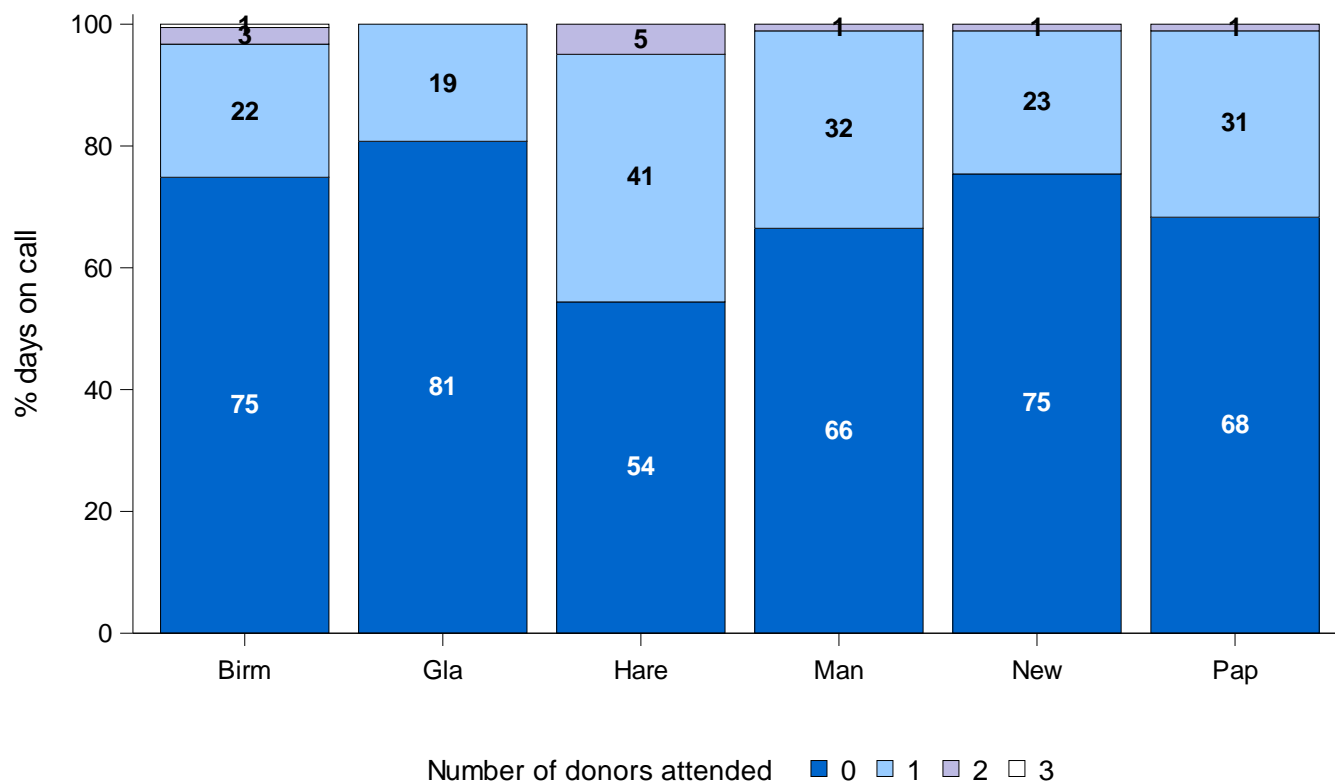


Figure 4b shows the distribution of the number of donors (actual and non-proceeding) attended by each cardiothoracic team on any one day (that they were on call) during the year. On average cardiothoracic teams did not attend any donors on 70% of the days in the year, attended one donor 28% of days, attended two donors 2% of days, and attended three donors 1% of days. The 'busiest' team in 2020/21 in terms of days active was Harefield (when on call).

Figure 4b Distribution of the number of actual and non-proceeding donors attended by each cardiothoracic team on any one day, between 1 April 2020 - 31 March 2021



The time taken for teams to attend a donor is shown by team for the most recent five financial years in **Figures 5a and 5b**. The time shown is the time from the beginning of muster time (one hour prior to departure from base) to return to base, which is estimated from theatre departure times and travel times. The median is the horizontal line in the box, and the box shows the interquartile range. Cases where retrieval took more than 48 hours have been removed along with cases where not all date/time points required were reported.

Figure 5a Median (IQR) time an abdominal team is out attending a donor from departure to return to base, between 1 April 2016 - 31 March 2021

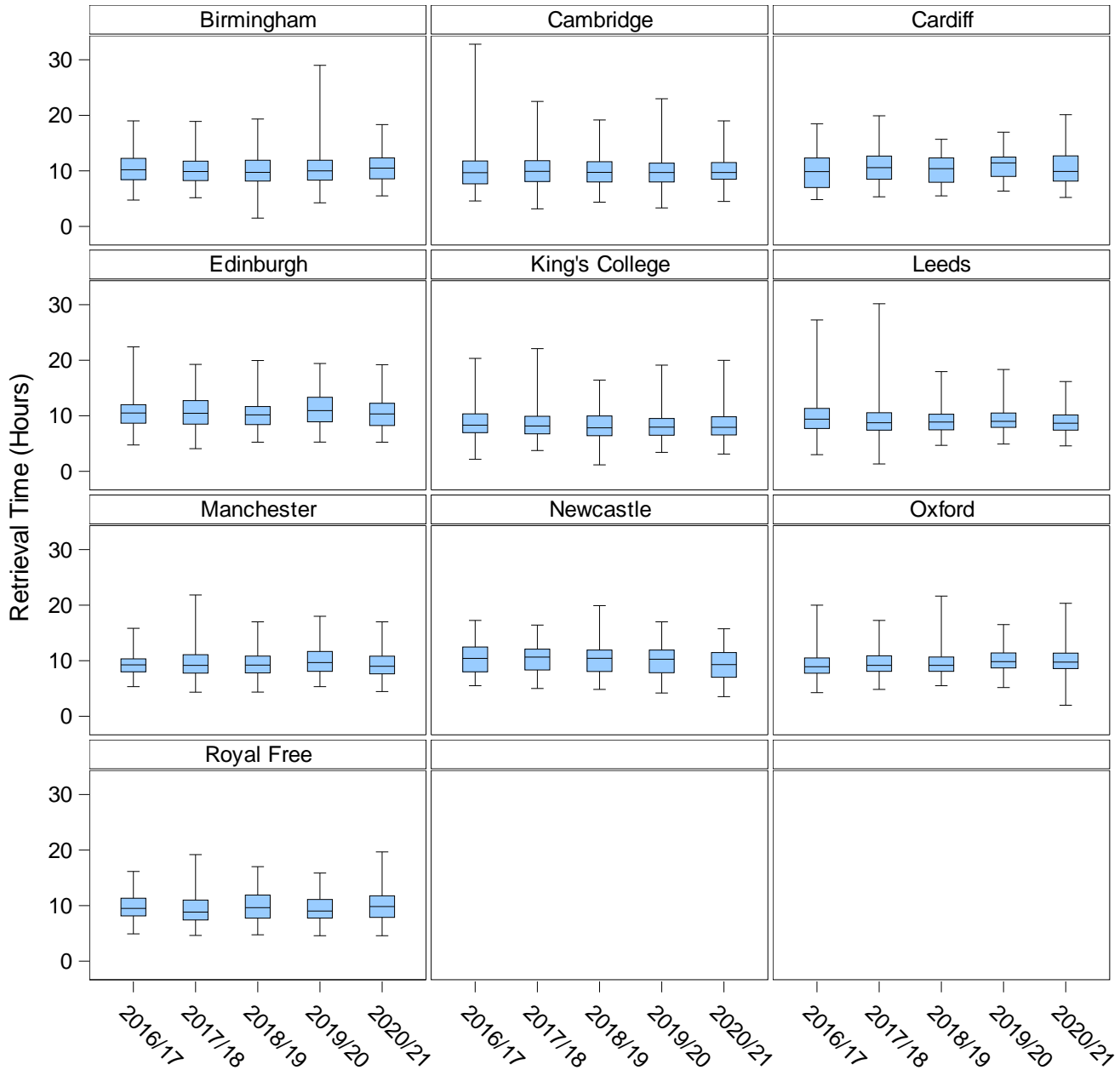
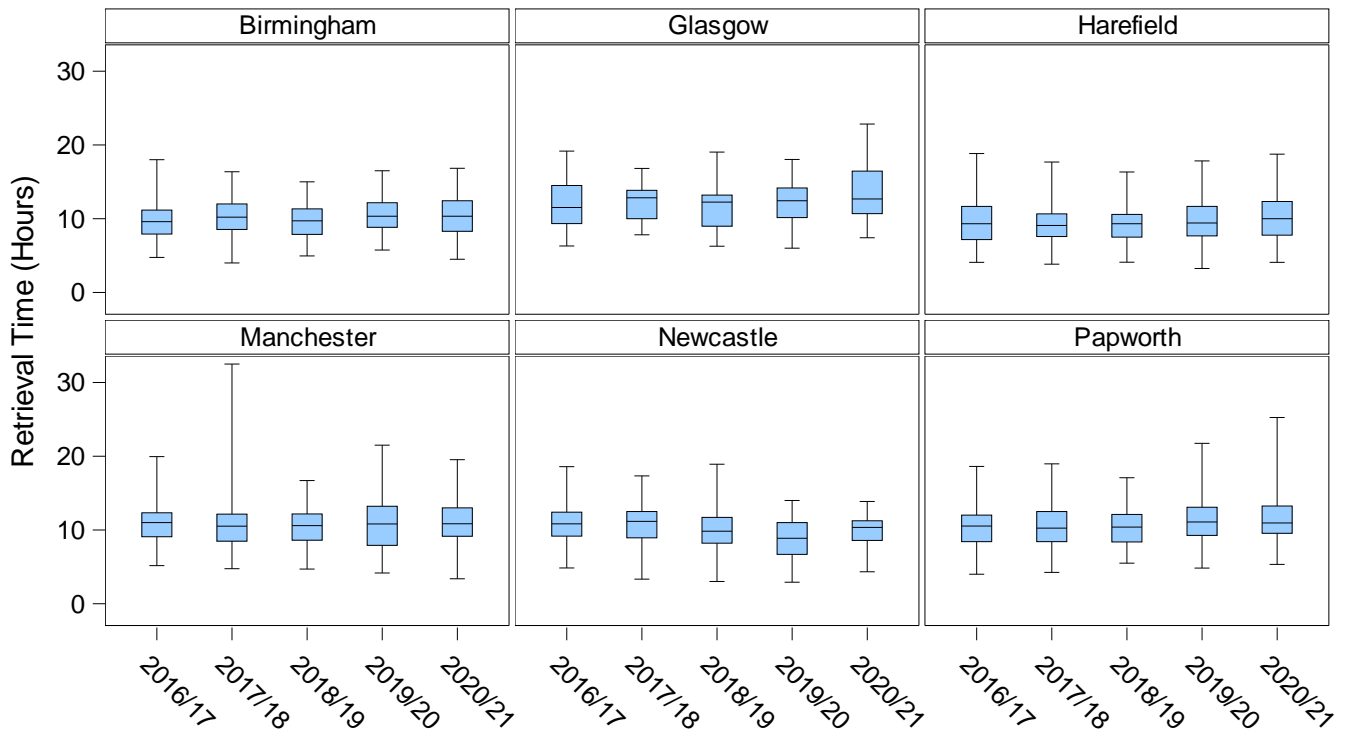


Figure 5b Median (IQR) time a cardiothoracic team is out attending a donor from departure to return to base, between 1 April 2016 - 31 March 2021



The day of week and time of day at which mobilisation of NORS teams occurred throughout the year, and for the previous year are presented as heat maps in **Figures 6a and 6b**, for abdominal and cardiothoracic teams, respectively. Mobilisation time is the time that the team actually departed from their base. Heat maps are used here to indicate the level of activity, darker shades are used to indicate higher activity.

**Figure 6a Mobilisation time of abdominal teams
1 April 2019 - 31 March 2021**

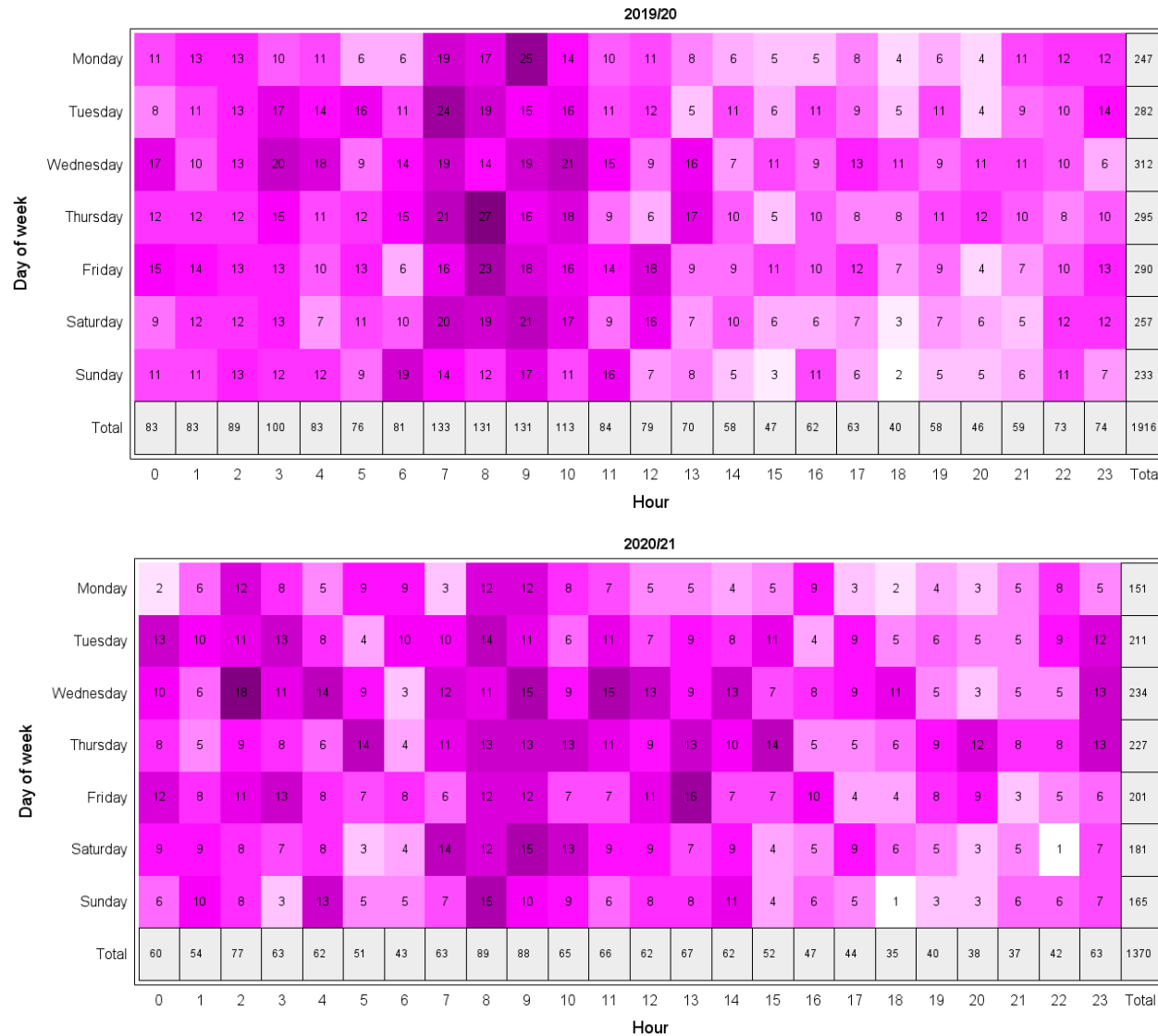
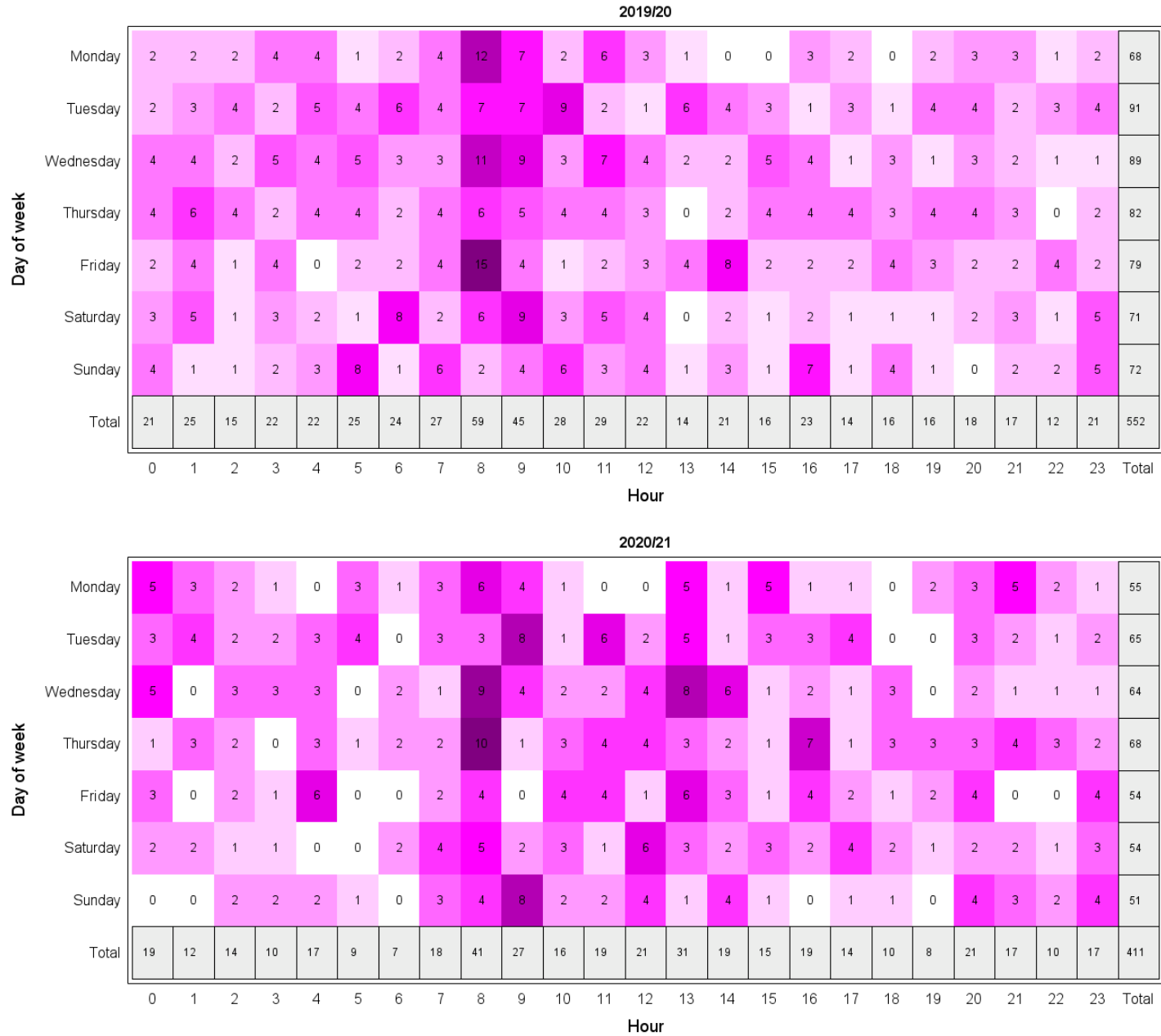


Figure 6b

Mobilisation time of cardiothoracic teams
1 April 2019 - 31 March 2021



The proportion of occasions where the travel time to a donor hospital is greater than three hours is shown in **Figures 7a and 7b**, for abdominal and cardiothoracic teams, respectively. Both figures exclude donor attendances where flights were used.

Figure 7a Proportion of donor attendances (actual and non-proceeding) outside of 3 hours travel time for each abdominal team, between 1 April 2020 - 31 March 2021

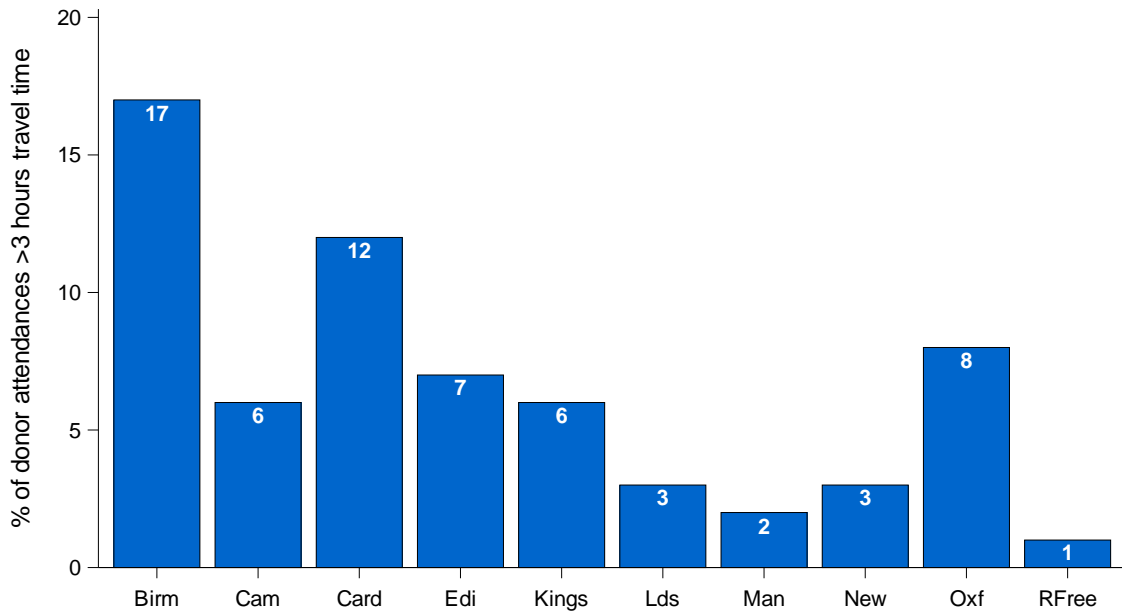
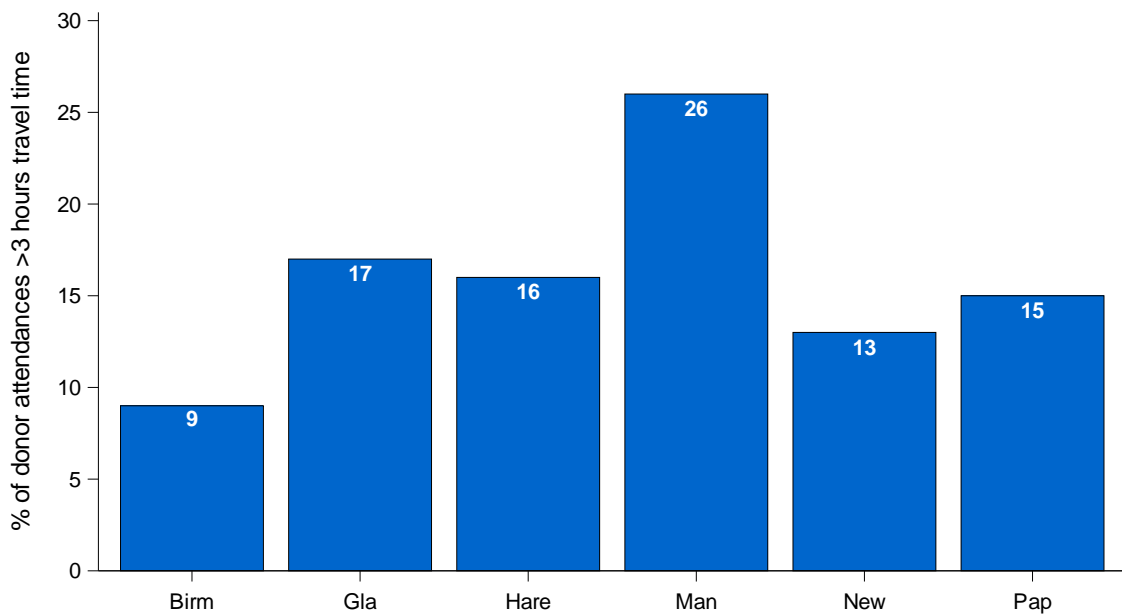


Figure 7b Proportion of donor attendances (actual and non-proceeding) outside of 3 hours travel time for each cardiothoracic team, between 1 April 2020 - 31 March 2021



Organs Retrieved

Table 2a shows the percentage of actual abdominal donors donating their kidneys, livers, pancreases and bowels by the team that attended and the donor type. Overall, 91.8% of actual DBD donors (donating at least one abdominal organ) donated their kidneys, 90.1% donated their liver, 20.8% donated their pancreas and 1.8% donated their bowel. The overall donation rates for actual DCD donors are lower for livers and pancreases and higher for kidneys. DCD donors cannot donate their small bowel.

Table 2a Organs retrieved from actual abdominal donors, 1 April 2020 - 31 March 2021, by attending retrieval team											
% donors donating											
Attending retrieval team	No. of abdo. donors		Kidneys		Livers		Pancreases		Bowel		
	DBD	DCD	DBD	DCD	DBD	DCD	DBD	DCD	DBD	DCD	
Birmingham	94	43	92.6	97.7	94.7	46.5	20.2	14.0	5.3	-	
Cambridge	76	65	90.8	96.9	93.4	66.2	23.7	15.4	9.2	-	
Cardiff	24	10	91.7	100	91.7	60.0	25.0	10.0	0.0	-	
Edinburgh	82	39	96.3	100	93.9	43.6	20.7	15.4	0.0	-	
King's College	138	56	87.7	94.6	92.0	50.0	25.4	10.7	1.4	-	
Leeds	79	48	93.7	100	87.3	31.3	22.8	20.8	0.0	-	
Manchester	61	53	86.9	100	90.2	30.2	14.8	9.4	0.0	-	
Newcastle	74	31	94.6	100	82.4	25.8	24.3	6.5	0.0	-	
Oxford	75	39	94.7	97.4	88.0	51.3	10.7	12.8	0.0	-	
Royal Free	61	30	90.2	93.3	83.6	30.0	18.0	3.3	0.0	-	
Total	764	414	91.8	97.8	90.1	44.0	20.8	12.6	1.8	-	

Table 2b shows the number of abdominal organs retrieved and the percentage that were transplanted, this is broken down by organ type and the attending retrieval team.

Table 2b Abdominal organs retrieved and percentage that went on to be transplanted, 1 April 2020 - 31 March 2021, by attending retrieval team								
Attending retrieval team	Kidneys		Livers		Pancreases		Bowel	
	Retrieved	% txd	Retrieved	% txd	Retrieved	% txd	Retrieved	% txd
DBD								
Birmingham	171	91.8	89	89.9	19	63.2	5	100
Cambridge	135	91.1	71	93.0	18	88.9	7	85.7
Cardiff	43	86.0	22	90.9	6	83.3	0	-
Edinburgh	157	91.1	77	88.3	17	52.9	0	-
King's College	240	87.5	127	85.0	35	37.1	2	50.0
Leeds	142	93.0	69	87.0	18	38.9	0	-
Manchester	104	86.5	55	70.9	9	44.4	0	-
Newcastle	139	93.5	61	86.9	18	61.1	0	-
Oxford	141	91.5	66	86.4	8	50.0	0	-
Royal Free	108	92.6	51	82.4	11	54.5	0	-
Total	1380	90.7	688	86.2	159	54.7	14	85.7
DCD								
Birmingham	84	92.9	20	65.0	6	33.3	-	-
Cambridge	124	88.7	43	76.7	10	60.0	-	-
Cardiff	20	85.0	6	33.3	1	0.0	-	-
Edinburgh	78	80.8	17	58.8	6	33.3	-	-
King's College	105	86.7	28	71.4	6	50.0	-	-
Leeds	96	77.1	15	66.7	10	40.0	-	-
Manchester	103	90.3	16	62.5	5	20.0	-	-
Newcastle	62	91.9	8	62.5	2	100	-	-
Oxford	73	93.2	20	60.0	5	80.0	-	-
Royal Free	54	88.9	9	44.4	1	0.0	-	-
Total	799	87.5	182	65.4	52	46.2	-	-
Total	2179	89.5	870	81.8	211	52.6	14	85.7

Figures 8a and 8b show the number of organs retrieved, by attending retrieval team, for DBD and DCD donors, respectively.

Figure 8a DBD abdominal organs retrieved, 1 April 2020 - 31 March 2021 by attending retrieval team

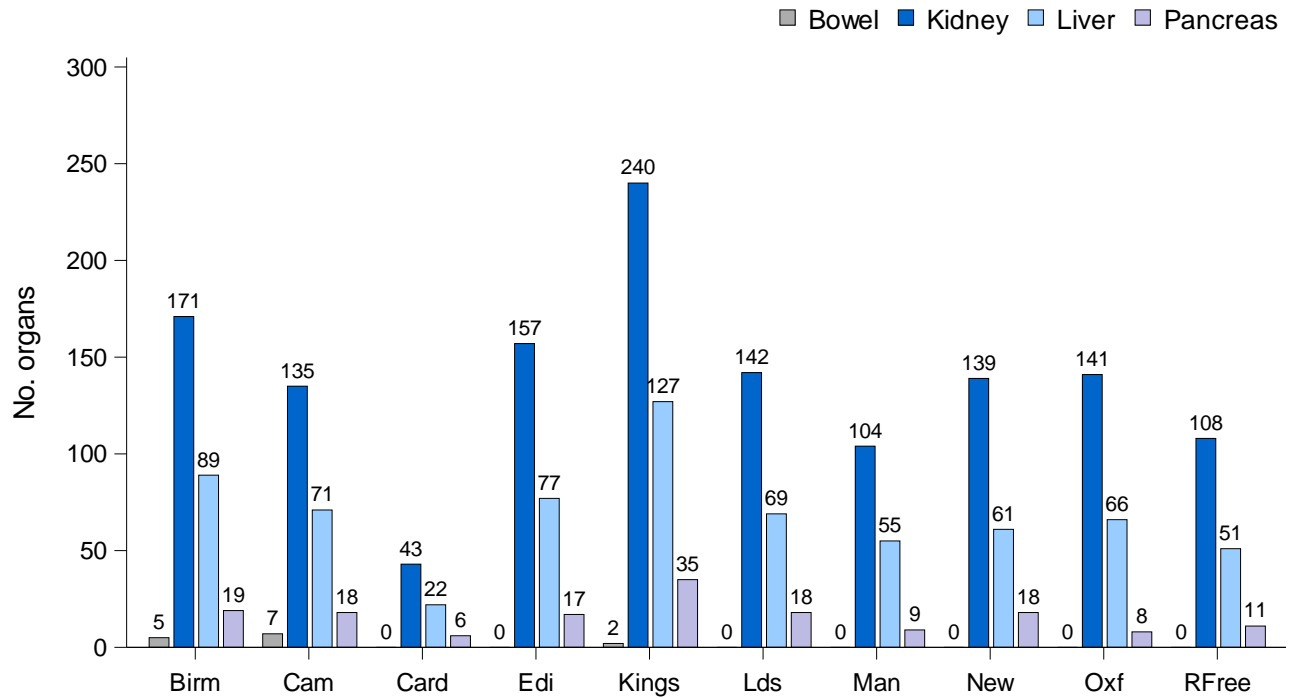


Figure 8b DCD abdominal organs retrieved, 1 April 2020 - 31 March 2021 by attending retrieval team

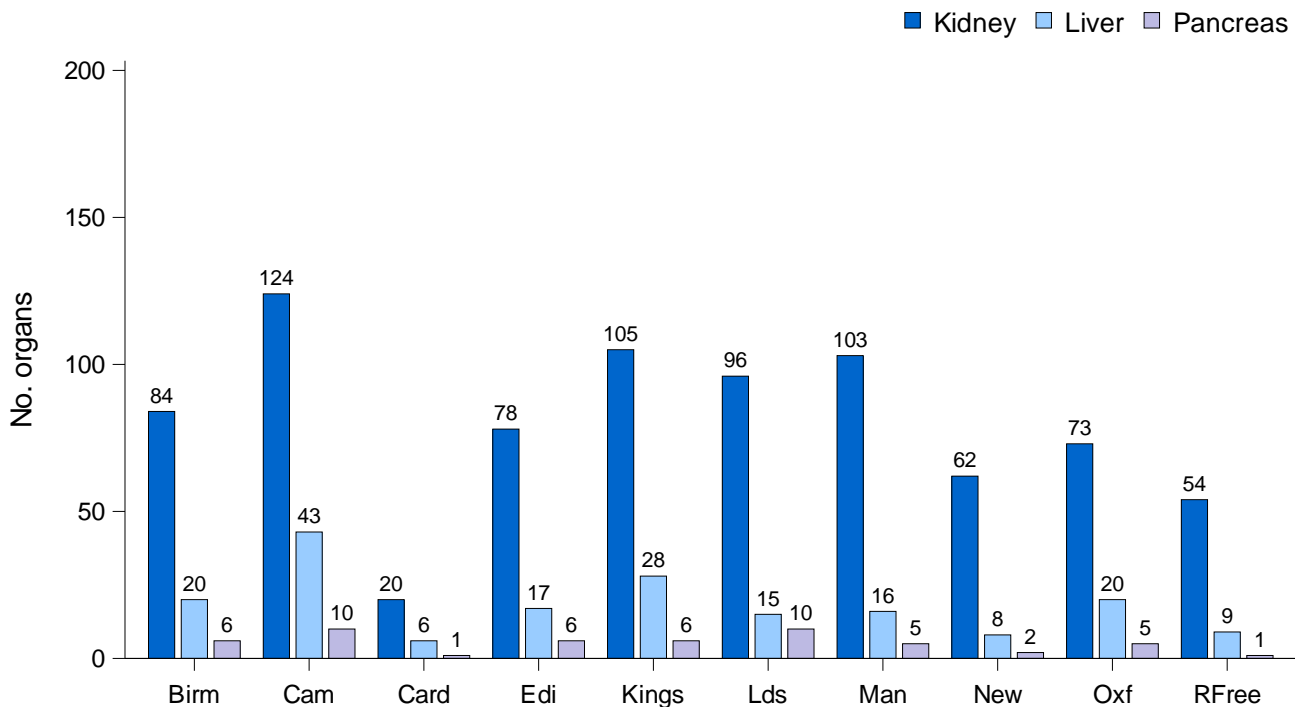


Table 2c shows the mean number of abdominal organs retrieved and transplanted for each proceeding abdominal donor, by attending retrieval team and donor type. Mean donor age is also reported.

- The mean number of organs retrieved per DBD donor ranged from 2.8 to 3.1 across teams, analysis of variance indicated that the differences were not statistically significant ($p=0.38$).
- The mean number of organs transplanted per DBD donor ranged from 2.2 to 2.8 across teams, analysis of variance indicated that the differences were statistically significant ($p=0.01$).
- The mean number of organs retrieved per DCD donor ranged from 2.1 to 2.7 across teams, analysis of variance indicated that the differences were statistically significant ($p=0.01$).
- The mean number of organs transplanted per DCD donor ranged from 1.7 to 2.3 across teams, analysis of variance indicated that the differences were not statistically significant ($p=0.12$).

Table 2c

Mean donor age, organs retrieved, and organs transplanted, per proceeding abdominal donor, 1 April 2020 - 31 March 2021, by attending retrieval team

Attending retrieval team	Actual abdo. donors	DBD						DCD						
		Donor age		Orgs. retrieved		Orgs. txd		Donor age		Orgs. retrieved		Orgs. txd		
		Mean	(SD.)	Mean	(SD.)	Mean	(SD.)	Mean	(SD.)	Mean	(SD.)	Mean	(SD.)	
Birmingham	94	46.0	(16.7)	3.0	(0.8)	2.7	(0.9)	43	48.6	(15.9)	2.6	(0.8)	2.2	(0.8)
Cambridge	76	49.6	(16.7)	3.0	(1.0)	2.8	(1.2)	65	47.7	(16.4)	2.7	(0.8)	2.3	(1.0)
Cardiff	24	45.1	(18.3)	3.0	(0.9)	2.6	(1.1)	10	50.9	(11.3)	2.7	(0.7)	1.9	(0.3)
Edinburgh	82	45.5	(15.7)	3.1	(0.7)	2.7	(0.9)	39	48.9	(14.4)	2.6	(0.7)	1.9	(1.0)
King's College	138	49.7	(16.8)	2.9	(0.9)	2.4	(1.0)	56	49.9	(19.4)	2.5	(0.7)	2.0	(1.0)
Leeds	79	51.3	(14.4)	2.9	(0.8)	2.5	(0.9)	48	47.1	(16.6)	2.5	(0.7)	1.8	(1.0)
Manchester	61	47.0	(15.4)	2.8	(0.9)	2.2	(1.0)	53	49.8	(15.1)	2.3	(0.7)	2.0	(0.7)
Newcastle	74	46.5	(15.3)	2.9	(0.8)	2.6	(0.9)	31	48.2	(13.1)	2.3	(0.6)	2.1	(0.7)
Oxford	75	53.0	(15.7)	2.9	(0.7)	2.5	(0.8)	39	46.3	(18.3)	2.5	(0.7)	2.2	(0.8)
Royal Free	61	51.6	(14.2)	2.8	(0.9)	2.4	(1.0)	30	54.7	(10.7)	2.1	(0.6)	1.7	(0.7)
Total	764	48.8	(16.0)	2.9	(0.8)	2.5	(1.0)	414	48.9	(16.0)	2.5	(0.7)	2.0	(0.9)

Table 3a shows the number of cardiothoracic organs retrieved and the percentage that were transplanted, this is broken down by organ type and the attending retrieval team. Overall, 58.9% of DBD donors (donating at least one cardiothoracic organ) donated their heart only, 26% donated their lung(s) only, and 15.1% donated their heart and lung(s).

DCD donors in the UK have, until recently, been able only to donate lungs for transplant. DCD heart retrieval is a highly complex procedure which was developed in the UK, but had not been performed on a large scale. DCD heart retrieval is currently supported by specific NORS teams, however it remains non-commissioned, and is funded on a temporary basis until 2022. Despite this, 49% of actual DCD donors donated their heart only, 40.8% donated their lung(s) only, and 10.2% donated their heart and lung(s). DCD heart retrieval contributed to 14% of all heart transplant in the UK in 2020/21. The Novel Technologies section of this report contains more information on DCD heart activity.

Table 3a Organs retrieved from actual cardiothoracic donors, 1 April 2020 - 31 March 2021, by attending retrieval team								
Attending retrieval team	DBD donors donating				DCD donors donating			
	N	Heart only %	Lung only %	Heart & lung %	N	Heart only %	Lung only %	Heart & lung %
Birmingham	31	67.7	25.8	6.5	0	-	-	-
Glasgow	21	66.7	19.0	14.3	0	-	-	-
Harefield	43	58.1	20.9	20.9	14	35.7	50.0	14.3
Manchester	39	51.3	30.8	17.9	8	37.5	62.5	-
Newcastle	26	57.7	30.8	11.5	4	25.0	75.0	-
Papworth	32	56.3	28.1	15.6	23	65.2	21.7	13.0
Total	192	58.9	26.0	15.1	49	49.0	40.8	10.2

Table 3b shows the number of cardiothoracic organs retrieved and the percentage that were transplanted, this is broken down by organ type and the attending retrieval team. For example, there were 155 DBD lungs retrieved and of these 90.3% were transplanted. **Table 6** shows more information on where DCD heart transplant activity occurred.

Table 3b Cardiothoracic organs retrieved and percentage that went on to be transplanted, 1 April 2020 - 31 March 2021, by attending retrieval team				
Attending retrieval team	Hearts		Lungs	
	Retrieved	% txd	Retrieved	% txd
DBD				
Birmingham	23	100	18	100
Glasgow	17	100	14	100
Harefield	34	91.2	36	72.2
Manchester	27	100	37	94.6
Newcastle	18	100	22	95.5
Papworth	23	100	28	92.9
Total	142	97.9	155	90.3
DCD¹				
Birmingham	0	-	0	-
Glasgow	0	-	0	-
Harefield	7	57.1	18	83.3
Manchester	3	66.7	10	50.0
Newcastle	1	100	6	100
Papworth	18	83.3	16	56.3
Total	29	75.9	50	70.0
Total	171	94.2	205	85.4

¹ DCD heart retrieval is a non-commissioned service and is only undertaken by select teams

Figures 9a and 9b show the number of organs retrieved, by attending retrieval team, by DBD and DCD donors, respectively.

Figure 9a DBD cardiothoracic organs retrieved, 1 April 2020 - 31 March 2021 by attending retrieval team

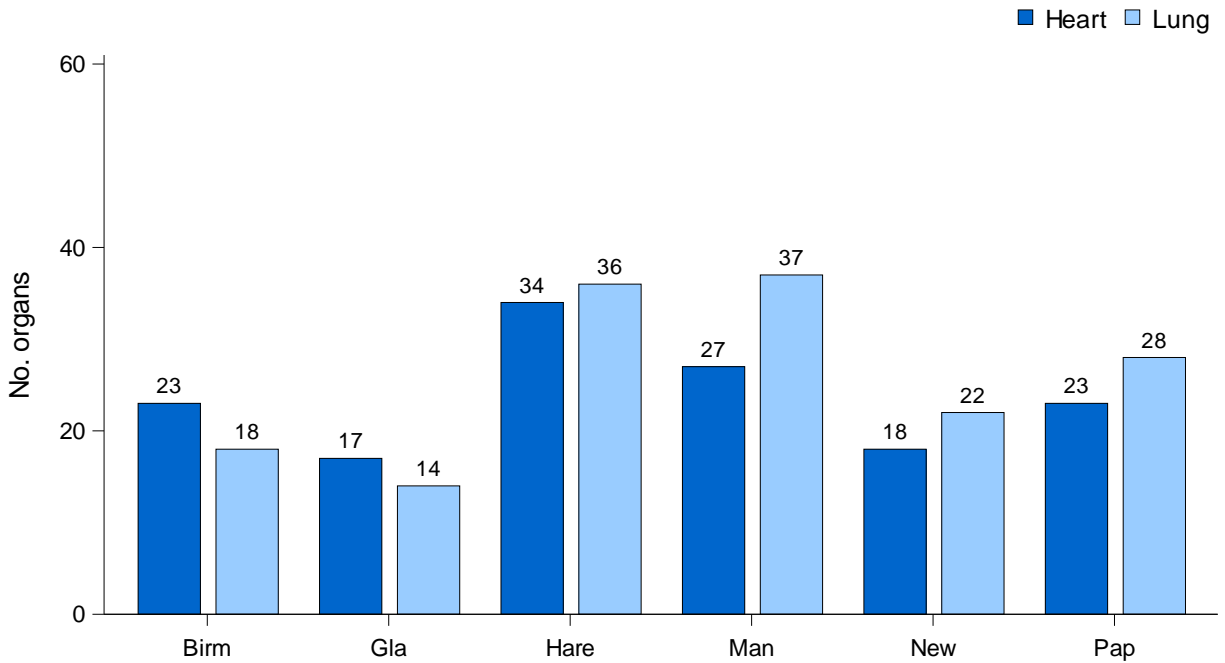


Figure 9b DCD cardiothoracic organs retrieved, 1 April 2020 - 31 March 2021 by attending retrieval team

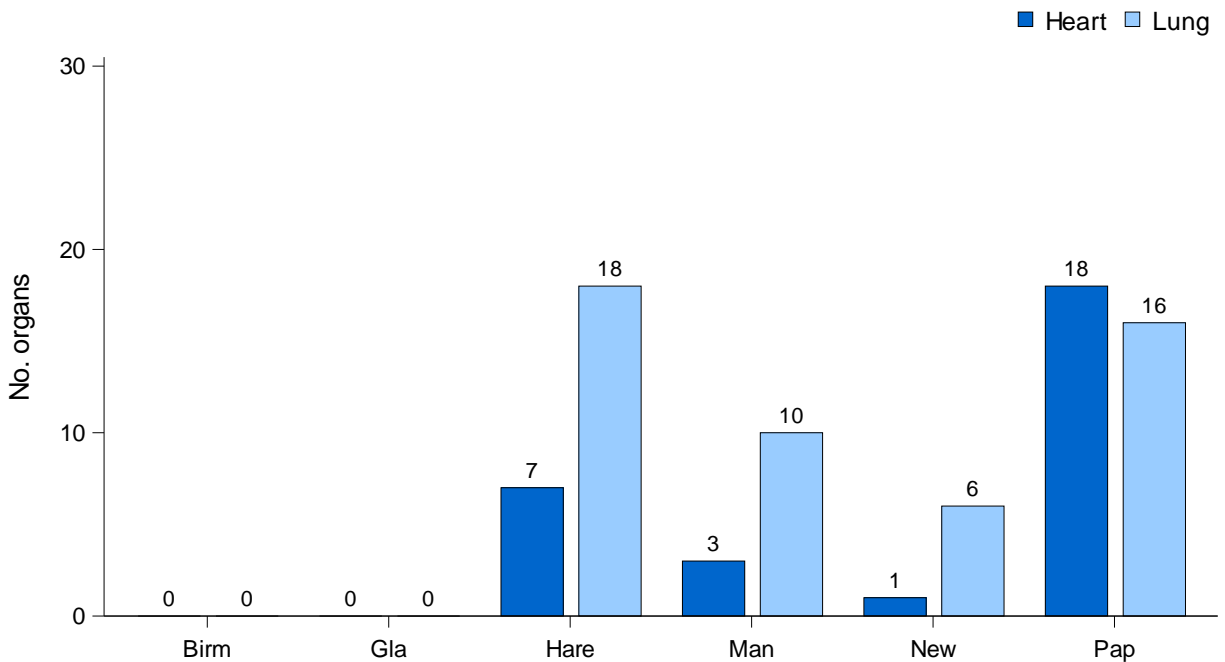


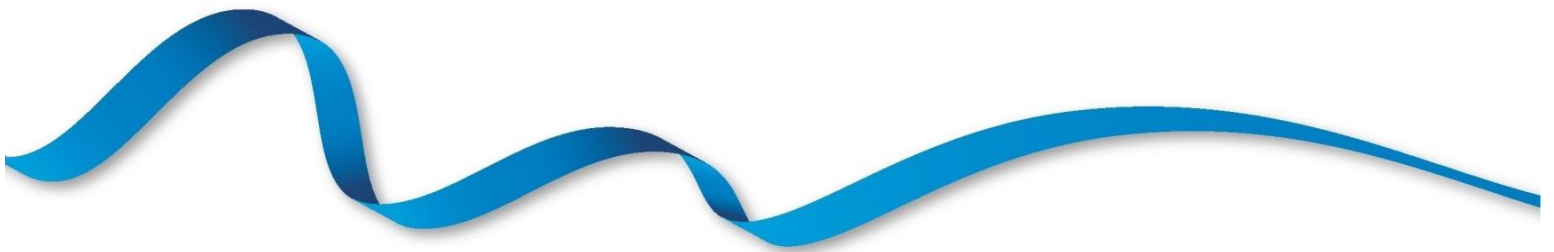
Table 3c shows the mean number of cardiothoracic organs retrieved and transplanted for each proceeding cardiothoracic donor, by attending retrieval team and donor type. Mean donor age is also reported.

- The mean number of organs retrieved per DBD donor ranged from 1.3 to 1.6 across teams, analysis of variance indicated that the differences were not statistically significant ($p=0.51$).
- The mean number of organs transplanted per DBD donor ranged from 1.3 to 1.6 across teams, analysis of variance indicated that the differences were not statistically significant ($p=0.63$).
- The mean number of organs retrieved per DCD donor ranged from 1.5 to 1.8 across teams, analysis of variance indicated that the differences were not statistically significant ($p=0.58$).
- The mean number of organs transplanted per DCD donor ranged from 0.9 to 1.8 across teams, analysis of variance indicated that the differences were not statistically significant ($p=0.21$).

Table 3c Mean donor age, organs retrieved, and organs transplanted, per proceeding cardiothoracic donor, 1 April 2020 - 31 March 2021, by attending retrieval team

Attending retrieval team	Actual cardio. donors	Donor age		DBD Orgs. retrieved		Orgs. txd		Donor age		DCD Orgs. retrieved		Orgs. txd		
		Mean	(SD.)	Mean	(SD.)	Mean	(SD.)	Mean	(SD.)	Mean	(SD.)	Mean	(SD.)	
Birmingham	31	38.2	(14.2)	1.3	(0.6)	1.3	(0.6)	-	-	(-)	-	(-)	-	(-)
Glasgow	21	35.5	(11.5)	1.5	(0.7)	1.5	(0.7)	-	-	(-)	-	(-)	-	(-)
Harefield	43	36.3	(14.0)	1.6	(0.8)	1.3	(1.0)	14	36.1	(16.1)	1.8	(0.7)	1.4	(0.7)
Manchester	39	40.3	(13.8)	1.6	(0.8)	1.6	(0.8)	8	43.4	(12.0)	1.6	(0.5)	0.9	(0.8)
Newcastle	26	36.2	(16.8)	1.5	(0.7)	1.5	(0.7)	4	34.3	(19.3)	1.8	(0.5)	1.8	(0.5)
Papworth	32	35.5	(18.2)	1.6	(0.8)	1.5	(0.8)	23	35.3	(14.3)	1.5	(0.7)	1.0	(0.8)
Total	192	37.2	(14.9)	1.5	(0.7)	1.5	(0.8)	49	36.8	(14.7)	1.6	(0.7)	1.2	(0.8)

NOVEL TECHNOLOGIES



The term ‘Novel Technologies’ refers to the use of non-traditional techniques by which organ retrieval and organ quality is enhanced by novel means. Novel Technologies are still developing, but are already contributing to the successful expansion of clinical organ retrieval from deceased donors, in particular DCD donors. The resulting increase in the numbers of organs for transplant, and the enhanced safety and quality of these organs, contributes significantly to UK clinical transplantation.

Although Novel Technologies are highly successful, there are no sustainably-funded or commissioned programs for the use of Novel Technology in UK organ retrieval at present. They are reported here as the teams delivering Novel Technology retrievals are NORS teams at the core, albeit with additional staffing and equipment part-funded by some of the UK health departments and by employing transplant centres. The DCD heart program is currently supported by the Joint Innovation Fund (NHSBT) which is described below.

Abdominal Normothermic Regional Perfusion

Abdominal Normothermic Regional Perfusion (A-NRP) in DCD donors does not form part of the commissioned NORS service but has been in use in the UK since 2010. This has primarily been performed by Edinburgh and Cambridge teams on donors where they have accepted the liver but has recently expanded to include a wider range of donors. Since 2018/19, limited funding support has been provided by Scotland, Wales and Northern Ireland Health Departments, along with NHSBT and some local funding to sustain the restricted use of A-NRP. An implementation group was set up in November 2020 provide oversight and governance for A-NRP and to support new teams wishing to utilise the technology.

Table 4 shows the number of DCD attendances for the two teams performing A-NRP in the last year, along with how many underwent NRP and the number of donors proceeding to donation. Of Cambridge's 85 attendances, 41 (48%) of their attendances underwent NRP, with 32 (78%) of the NRP donors proceeding to donation. Of Edinburgh's 57 attendances, 27 (47%) underwent NRP, with 20 (74%) proceeding to donation. No other teams undertook A-NRP in this time.

Table 4 DCD and NRP attendances by A-NRP retrieval team, 1 April 2020 - 31 March 2021				
Retrieval team	All DCD attendances	Total proceeding¹	NRP attendances	NRP proceeding¹
Cambridge	85	66	41	32
Edinburgh	57	39	27	20

¹Proceeded to donate at least one organ for the purpose of transplantation

Organ utilisation rates for the 52 proceeding NRP donors between 1 April 2020 and 31 March 2021 is shown in **Table 5** compared to the general DCD donor population donating at least one organ. Transplantation rates for abdominal organs are higher in the NRP population but lower for lungs when comparing to the general DCD population.

Table 5 Abdominal and lung offer outcomes from 52 NRP donors, 1 April 2020 - 31 March 2021				
Outcome	Lungs¹	Kidney¹	Liver	Pancreas
Offered	33	52	52	24
Retrieved	2	52	42	8
Transplanted (% of offered)	1 (3%)	51 (98%)	35 (67%)	5 (21%)
National DCD organ transplant rate* (% of offered)	10%	93%	31%	13%

¹at least one
*Based on all UK proceeding DCD donors between 1 April 2020 and 31 March 2021

DCD Hearts

A service evaluation for DCD heart retrieval and transplantation began in February 2015, initially with two centres, Harefield and Papworth. Funding was limited to 20 transplants. Since then, other centres who acquired short term funding within their organisations were able to retrieve and transplant DCD hearts.

The Joint Innovation Fund (JIF) was established in 2019 to provide funding to enable a 12-month UK wide retrieval and transplantation DCD heart pilot. The pilot began on 7 September 2020 with three retrieval teams (Harefield, Manchester, and Papworth) having responsibility for retrieving hearts from DCD donors for the whole of the UK.

Table 6 shows DCD heart activity by team/centre between 1 April 2020 and 31 March 2021. Overall, there were 31 attendances where DCD heart retrieval was planned, with 29 (94%) proceeding to DCD heart retrieval, resulting in 22 transplants. Attendances are identified through Retrieval Team Information forms as well as DCD Heart Passports. Information on patient outcomes following DCD heart transplantation can be found in the NHSBT Annual Report on Cardiothoracic Organ Transplantation.

Table 6 DCD heart activity by period and centre, 1 April 2020 - 31 March 2021				
Centre	Attended	Retrieved	Transplanted (retrieved by own team)	Transplanted (retrieved by another team)
Birmingham	-	-	-	-
Glasgow	-	-	-	-
Great Ormond Street	-	-	-	5
Harefield	8	7	2	-
Manchester	3	3	-	-
Newcastle	1	1	1	3
Papworth	19	18	8	3
Total	31	29	11	11

Organ utilisation rates for the 29 proceeding DCD heart donors between 1 April 2020 and 31 March 2021 is shown in **Table 7** compared to the general DCD donor population donating at least one organ. Transplantation rates for lungs, kidney, liver and pancreas are higher in the DCD heart population when comparing to the general DCD population.

Table 7 Abdominal and lung offer outcomes from 29 DCD heart donors, 1 April 2020 - 31 March 2021				
Outcome	Lungs¹	Kidney¹	Liver	Pancreas
Offered	21	29	29	25
Retrieved	5	29	17	15
Transplanted (% of offered)	3 (14%)	28 (97%)	13 (45%)	6 (24%)
National DCD organ transplant rate* (% of offered)	10%	93%	31%	13%

¹at least one
*Based on all UK proceeding DCD donors between 1 April 2020 and 31 March 2021

APPENDIX



**Appendix 1 Retrieval data missing form rates,
1 April 2020 - 31 March 2021**

Attending retrieval team	Number of forms due	Retrieval team forms missing		SNOD forms missing	
		N	%	N	%
Abdominal					
Birmingham	163	0	0	0	0
Cambridge	162	0	0	0	0
Cardiff	42	1	2.4	0	0
Edinburgh	141	0	0	0	0
King's College	216	0	0	2	0.9
Leeds	144	0	0	0	0
Manchester	145	0	0	1	0.7
Newcastle	121	0	0	0	0
Oxford	134	0	0	0	0
Royal Free	110	0	0	1	0.9
Cardiothoracic					
Birmingham	60	0	0	0	0
Glasgow	37	0	0	0	0
Harefield	120	0	0	0	0
Manchester	76	0	0	0	0
Newcastle	53	0	0	0	0
Papworth	80	0	0	0	0
Total	1804	1	0.1	4	0.2

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