

The National Organ Retrieval Service and Usage of Organs

Key messages

- National Organ Retrieval Service teams attended 980 possible DBD donors and 929 possible DCD donors; 97% of these DBD donors and 67% of these DCD donors attended proceeded to donation
- Overall, 58% of organs offered from those donors that did proceed were transplanted, but individually, these rates were 85% for kidneys, 66% for livers, 28% for pancreases, 33% for hearts, 25% for lungs and 14% for bowels
- The number of deceased donors per million of population was 23.9, however 5% of actual donors resulted in no organ transplants, the same as the previous year

4.1 The National Organ Retrieval Service (NORS)

As of 4 April 2016 there have been 7 abdominal and 3 cardiothoracic NORS teams available at any given time to retrieve organs from deceased donors in the UK for transplantation. This represents a change in the service which was implemented as a result of a review of the National Organ Retrieval Service, which recommended the reduction in the number of cardiothoracic teams from 6 to 3. Occasionally an off duty team will be called out when all 3 cardiothoracic on-call teams are out attending a donor. The first on-call NORS team is the closest available team to the donor, whereas before this was previously based on designated areas of the UK.

If a team is first on-call 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. In three areas of the country, two abdominal teams share the on-call responsibilities, each being on-call for different weeks of the year, which means there are in fact 10 abdominal teams in total.

The number of possible DBD and DCD donors that were attended by each of the teams in 2017-2018 is shown in **Table 4.1**. The geographical distribution of donors and the on-call arrangements lead to variation in these numbers across teams. The figures are broken down by whether the possible donor proceeded to organ donation (actual donors) or not. Non-proceeding donors are more common in the pool of potential DCD donors as prolonged time to death after treatment withdrawal can result in unsuitability of organs for transplantation. A small number of possible donors are attended by local kidney transplant teams. This is typically for DCD donors when only the kidneys have been accepted for transplantation and the teams are appropriately reimbursed if they are willing and able to retrieve.

Table 4.1 Number of actual and non-proceeding donors attended by each NORS team

NORS team	DBD				DCD			
	Actual	Non-proceeding	% non-proc	No. attended	Actual	Non-proceeding	% non-proc	No. attended
Abdominal								
Birmingham ¹	111	2	2	113	80	44	35	124
Cambridge	139	3	2	142	100	42	30	142
Cardiff ¹	32	1	3	33	27	16	37	43
Edinburgh	72	1	1	73	47	27	36	74
King's	185	8	4	193	102	44	30	146
Leeds ²	78	1	1	79	68	29	30	97
Manchester ²	83	1	1	84	45	34	43	79
Newcastle	94	3	3	97	62	36	37	98
Oxford ³	80	1	1	81	44	22	33	66
Royal Free ³	74	1	1	75	41	16	28	57
Abdominal total	948	22	2	970	616	310	33	926
Cardiothoracic⁴								
Birmingham	47	22	32	69	8	17	68	25
Glasgow	21	15	42	36	1	6	86	7
Harefield	67	35	34	102	11	22	67	33
Manchester	57	29	34	86	12	15	56	27
Newcastle	45	15	25	60	9	11	55	20
Papworth	68	41	38	109	25	24	49	49
Cardiothoracic total	305	157	34	462	66	95	59	161
Total donors attended	955	25	3	980	619	310	33	929

Note: there was 1 additional donor attended by a local abdominal team (Belfast)

^{1,2,3,4} Share on-call responsibilities

4.2 Retrieval and usage of organs

The number of 'consented' donors ('authorised' donors in Scotland) and 'offered' donors (where at least one organ was offered for transplant) are shown in **Table 4.2**. On occasion a 'consented' donor may not have organs offered because the donor's condition deteriorates or it is discovered the donor is unsuitable for organ donation. The number of organs offered from these 'offered' donors is also shown. Each year a number of actual organ donors result in no transplants. Donors resulting in at least one transplant are termed 'utilised' donors and the number of actual and utilised donors is shown in **Table 4.2**. The number of donors per million of population (pmp) is also shown. In 2017-2018, 5% of actual donors resulted in no organ transplants, the same as the previous year.

Table 4.2 Consented, offered, actual and utilised deceased donors in the UK, 1 April 2017 - 31 March 2018						
	DBD (pmp)		DCD (pmp)		Total (pmp)	
Consented donors ¹	1073	(16.3)	1160	(17.6)	2233	(33.9)
Offered donors ²	1027	(15.6)	1038	(15.8)	2065	(31.3)
<i>Kidneys offered</i>	1974		1995		3969	
<i>Livers offered</i>	972		961		1933	
<i>Pancreases offered</i>	694		349		1043	
<i>Bowels offered</i>	218		0		218	
<i>Hearts offered</i>	587		128		715	
<i>Lungs offered</i>	1260		732		1992	
Actual donors ³	955	(14.5)	619	(9.4)	1574	(23.9)
Utilised donors ⁴	930	(14.1)	565	(8.6)	1495	(22.7)

¹ Consented donors defined as patients where consent for at least one organ was given
² Offered donors defined as donors where one or more organs were offered for transplantation
³ Actual donors defined as donors where one or more organs were retrieved
⁴ Utilised donors defined as donors where one or more organs were retrieved and transplanted

There were 1,574 actual deceased organ donors in 2017-2018, but not all organs from these donors were offered for transplantation. **Table 4.3** shows the number of organs offered, retrieved and transplanted from the 955 DBD and 619 DCD actual donors. The number of organs from these donors that were subsequently used for research purposes is also shown. The number of organs offered for transplantation excludes those where the donor did not meet the nationally agreed age criteria for suitability for donation of that specific organ. There are no nationally agreed age criteria for kidney and liver donation.

Table 4.3 Donation and transplantation of organs from 1574 deceased donors in the UK, 1 April 2017 – 31 March 2018

Organ	Organs meeting initial suitability criteria and offered for transplantation	Organs retrieved for transplantation		Organs transplanted			Organs used for research (from actual organ donors)
		N	% of offered	N	% of retrieved	% of offered	
DBD donor organs							
Kidney	1857	1748	94	1598	91	86	79
Liver	912	850	93	774	91	85	44
Pancreas ¹	581	356	61	174	49	30	111
Bowel ^{2,3}	176	25	14	24	96	14	0
Heart ⁴	545	190	35	181	95	33	5
Lung ⁵	1080	354	33	313	88	29	37
Total	5151	3523	68	3064	87	59	276
DCD donor organs⁶							
Kidney	1210	1179	97	1024	87	85	73
Liver	576	299	52	201	67	35	59
Pancreas ¹	243	116	48	55	47	23	31
Lung ⁶	444	82	18	74	90	17	2
Total	2473	1676	68	1354	81	55	165
Deceased donor organs							
Kidney	3067	2927	95	2622	90	85	152
Liver	1488	1149	77	975	85	66	103
Pancreas ¹	824	472	57	229	49	28	142
Bowel ^{2,3}	176	25	14	24	96	14	0
Heart ⁴	545	190	35	181	95	33	5
Lung ⁵	1524	436	29	387	89	25	39
Total	7624	5199	68	4418	85	58	441

¹ Excludes donors aged > 60 years

² Excludes 1 bowel transplant from an overseas donor

³ Excludes donors aged >= 56 years or weighing >= 80kg

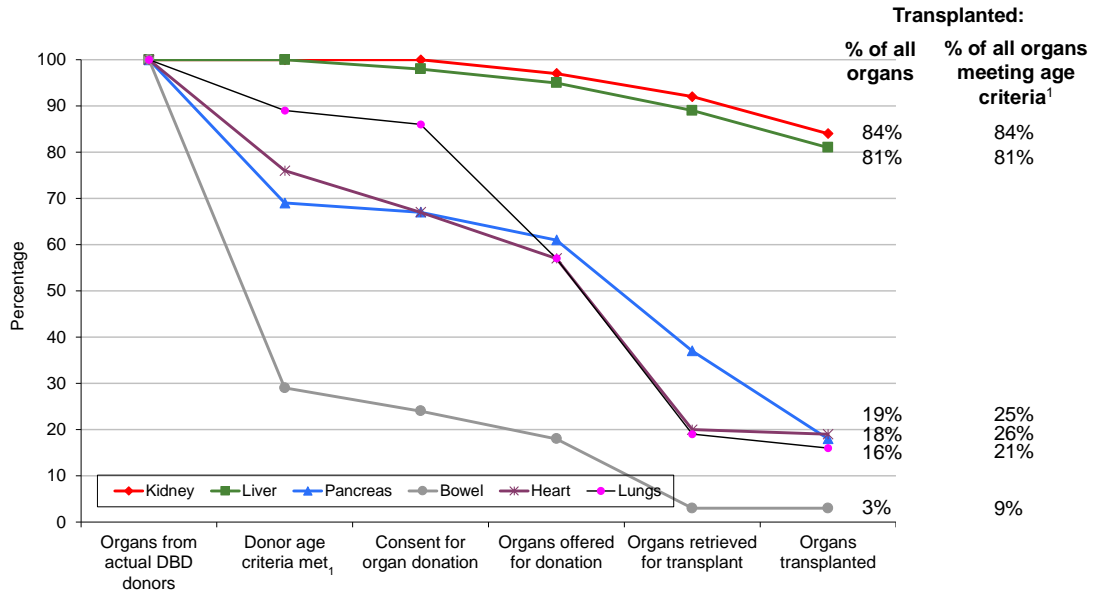
⁴ Excludes donors aged > 65 years or died due to myocardial infarction

⁵ Excludes donors aged > 65 years

⁶ Excludes DCD hearts because this is not part of the national service, see cardiothoracic section for DCD heart detail

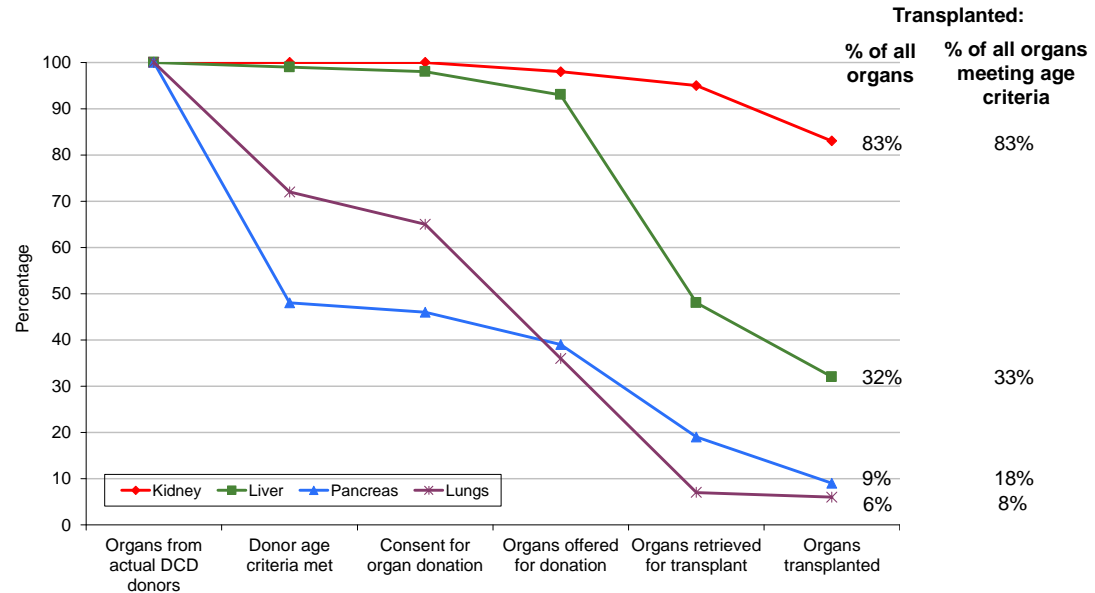
Figures 4.1 and 4.2 show line graphs of the pathway for all donor organs through to transplantation. The charts start at 100% for each organ, representing all organs from the 955 DBD and 619 DCD donors. The proportion of these organs where any national donor age criteria are met is then shown, followed by the proportion with consent, the proportion offered, the proportion retrieved and finally the proportion transplanted. For example, **Figure 4.2** shows that 83% of the kidneys from the 619 DCD donors were transplanted, a slight fall from 84% in the previous year. Transplantation rates for kidneys and livers are generally high, while for other organs, even after allowing for the agreed age criteria, the rates are generally low.

Figure 4.1 Donation and transplantation rates of organs from DBD organ donors in the UK, 1 April 2017 – 31 March 2018



¹ Hearts – in addition to age criteria, donors who died due to myocardial infarction are excluded
 Bowels – in addition to age criteria, donors who weigh >=80kg are excluded

Figure 4.2 Donation and transplantation rates of organs from DCD organ donors in the UK, 1 April 2017 – 31 March 2018



Reasons for organs not being offered for transplantation, being offered but not accepted and being retrieved but not subsequently transplanted are shown in **Table 4.4** and **Table 4.5** for abdominal organs from DBD and DCD donors, respectively. **Table 4.6** shows the same information for cardiothoracic organs. Reasons for the medical unsuitability of an organ include infections, tumours, anatomy and disease. Non-medical reasons include donor size and donor instability. Clinical unsuitability of an organ encompasses poor perfusion, prolonged ischaemia, past history of the donor and, in the case of pancreases for islet usage, insufficiency of viable islet yield. Reasons reported under 'other' include logistical and recipient related issues in addition to un-coded reasons reported of a miscellaneous nature.

These tables also show the number of organs from UK donors that were transplanted overseas. These organs were not accepted for transplantation by any UK transplant centre, but were accepted for suitable recipients identified elsewhere, usually in Europe. In 2017-2018 only a small number of livers, hearts and lungs were exported for transplantation outside the UK. Organs from outside the UK are occasionally imported for transplant. Further information on the import and export of organs can be found in **Appendix IV**.

The percentage of organs retrieved that were not transplanted are shown in **Figure 4.3**, **Figure 4.4**, **Figure 4.5**, **Figure 4.6** and **Figure 4.7** for kidneys, livers, pancreases, hearts and lungs respectively. The rates are shown over the last decade. Some organs are found not to be suitable for transplantation after they have been retrieved and this 'non-utilisation rate' is generally increasing over time for each organ, reflecting the ageing donor population. Many organs retrieved but found not to be suitable for transplantation are instead used for research (with appropriate consent).

Table 4.4 Reasons for non-retrieval and non-use of abdominal organs from DBD donors in the UK, 1 April 2017 – 31 March 2018

	Kidney	Liver	Pancreas	Bowel
All actual DBD organ donors	955	955	955	955
Donors from whom organs not offered for donation	23	43	374	779
Reasons for organs not being offered				
Family permission refused	3	11	18	40
Permission refused by coroner	0	9	6	4
Donor unsuitable – age	0	1	293 ¹	0
Donor unsuitable – past history	10	19	31	12
Poor function	9	0	1	1
Donor age >=56 or donor weight >=80kg	0	0	0	679
Other	1	3	25	43
TOTAL DONORS WITH ORGANS NOT OFFERED	23	43	374	779
Organs offered for donation	1857	912	581	176
Organs not retrieved (% of organs offered for donation)	109 (6)	62 (7)	225 (39)	151 (86)
Reasons for non-retrieval				
<i>Donor</i>				
Donor unsuitable – medical	12	0	7	4
Donor unsuitable – non-medical	1	0	19	101
Donor age	21	3	16	7
<i>Organ</i>				
Organ unsuitable – clinical	50	34	140	19
Poor function	20	11	13	2
<i>Other</i>				
Other	5	14	30	18
TOTAL ORGANS OFFERED, NOT RETRIEVED	127	62	225	151
Organs retrieved (% of organs offered for donation)	1748 (94)	850 (93)	356 (61)	25 (14)
Organs transplanted in the UK	1598	770	174	24
Organs transplanted overseas	0	4 ²	0	0
Organs not transplanted	150	76	182	1
Reasons for organ not being transplanted				
<i>Donor</i>				
Donor unsuitable – medical	24	6	6	0
Donor unsuitable – non-medical	0	1	0	0
Donor age	0	0	0	0
<i>Organ</i>				
Organ unsuitable – clinical	16	11	39	0
Poor function	0	0	0	0
<i>Other</i>				
Other	110	58	137	1
TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)	150 (79)	76 (44)	182 (111)	1 (0)

¹ Includes donors whose organs may have been offered but are outside of organ specific criteria

² 3 transplanted into super-urgent patients in the Republic of Ireland, 1 transplanted in Europe

Table 4.5 Reasons for non-retrieval and non-use of abdominal organs from DCD donors in the UK, 1 April 2017 – 31 March 2018			
	Kidney	Liver	Pancreas
All actual DCD organ donors	619	619	619
Donors from whom organs not offered for donation	11	43	376
Reasons for organs not being offered			
Family permission refused	0	6	9
Permission refused by coroner	0	1	3
Donor unsuitable – age	0	4	320 ¹
Donor unsuitable – past history	8	22	19
Poor function	3	5	4
Other	0	5	21
TOTAL DONORS WITH ORGANS NOT OFFERED	11	43	376
Organs offered for donation	1210	576	243
Organs not retrieved (% of organs offered for donation)	31 (3)	277 (48)	127 (52)
Reasons for non-retrieval			
<i>Donor</i>			
Donor unsuitable – medical	1	1	2
Donor unsuitable – non-medical	0	13	16
Donor age	2	57	15
<i>Organ</i>			
Organ unsuitable – clinical	12	85	70
Poor function	8	33	7
<i>Other</i>			
Other	8	88	17
TOTAL ORGANS OFFERED, NOT RETRIEVED	31	277	127
Organs retrieved (% of organs offered for donation)	1179 (97)	299 (52)	116 (48)
Organs transplanted in the UK	1024	201	55
Organs transplanted overseas	0	0	0
Organs not transplanted	155	98	61
Reasons for organ not being transplanted			
<i>Donor</i>			
Donor unsuitable – medical	30	1	2
Donor unsuitable – non-medical	0	0	0
Donor age	0	0	0
<i>Organ</i>			
Organ unsuitable – clinical	17	16	17
Poor function	0	1	0
<i>Other</i>			
Other	108	80	42
TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)	155 (73)	98 (59)	61 (31)

¹ Includes donors whose organs may have been offered but are outside of organ specific criteria

Table 4.6 Reasons for non-retrieval and non-use of cardiothoracic organs from organ donors in the UK, 1 April 2017 – 31 March 2018

	Heart (DBD)	Lung (DBD)	Lung (DCD)
All actual organ donors	955	955	619
Donors from whom organs not offered for donation	410	415	397
Reasons for organs not being offered			
Family permission refused	35	27	21
Permission refused by coroner	51	36	21
Donor unsuitable – age ¹	215	200	172
Donor unsuitable – cause of death	10 ¹	0	1
Poor function	29	71	70
Other	70	81	112
TOTAL DONORS WITH ORGANS NOT OFFERED	410	415	397
Organs offered for donation	545	1080	444
Organs not retrieved (% of organs offered for donation)	355 (65)	726 (67)	362 (82)
Reasons for non-retrieval			
<i>Donor</i>			
Donor unsuitable – medical	14	14	6
Donor unsuitable – non-medical	37	57	34
Donor age	28	26	6
<i>Organ</i>			
Organ unsuitable – clinical	92	200	120
Poor function	143	341	128
<i>Other</i>			
Other	41	88	68
TOTAL ORGANS OFFERED, NOT RETRIEVED	355	726	362
Organs retrieved (% of organs offered for donation)	190 (35)	354 (33)	82 (18)
Organs transplanted in the UK	177	304	74
Organs transplanted overseas	4	9	0
Organs not transplanted	9	41	8
Reasons for organ not being transplanted			
<i>Donor</i>			
Donor unsuitable – medical	0	1	2
Donor unsuitable – non-medical	0	0	0
<i>Organ</i>			
Organ unsuitable – clinical	1	0	0
Poor function	2	0	0
<i>Other</i>			
Other	6	40	6
TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)	9 (5)	41 (37)	8 (2)

¹ Includes donors whose organs may have been offered but are outside of organ specific criteria

Figure 4.3 Percentage of kidneys retrieved that were not transplanted from deceased organ donors in the UK, 1 April 2008 – 31 March 2018

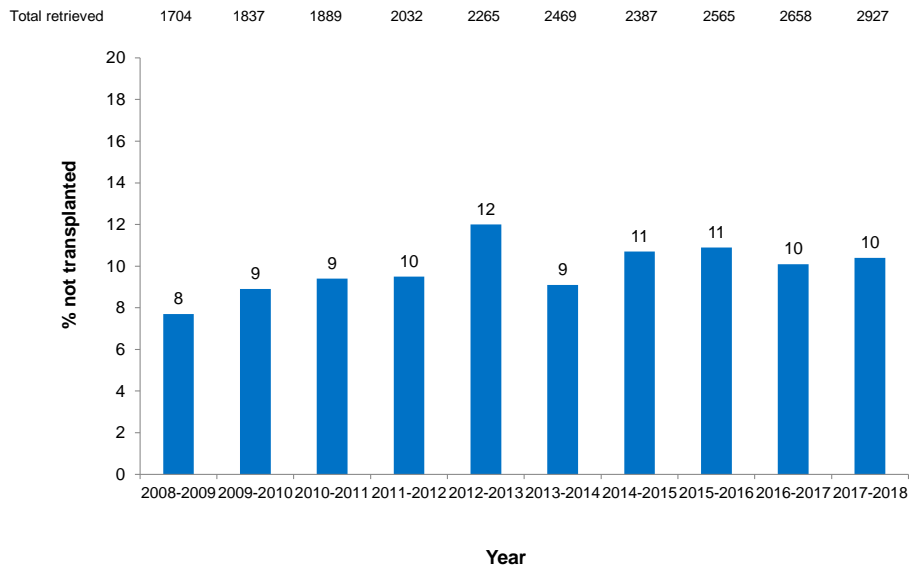


Figure 4.4 Percentage of livers retrieved that were not transplanted from deceased organ donors in the UK, 1 April 2008 – 31 March 2018

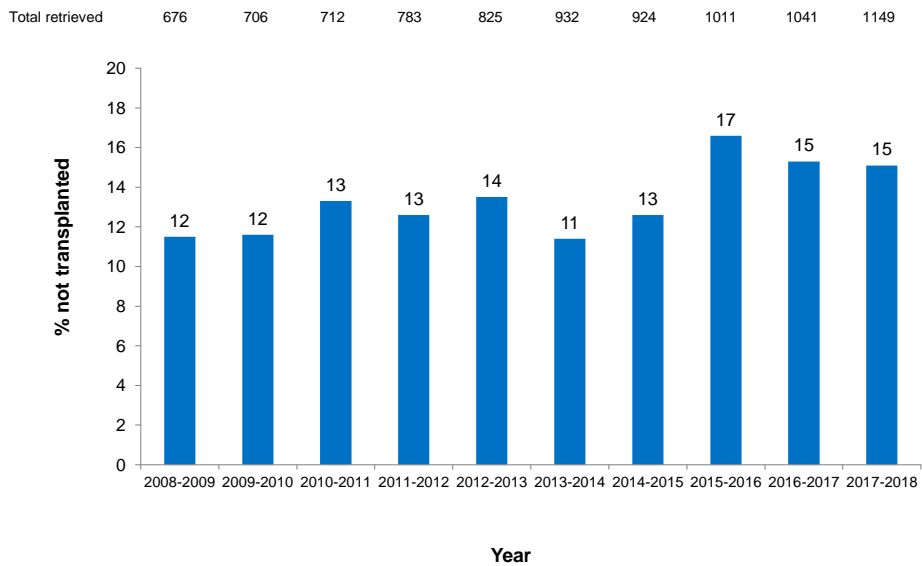
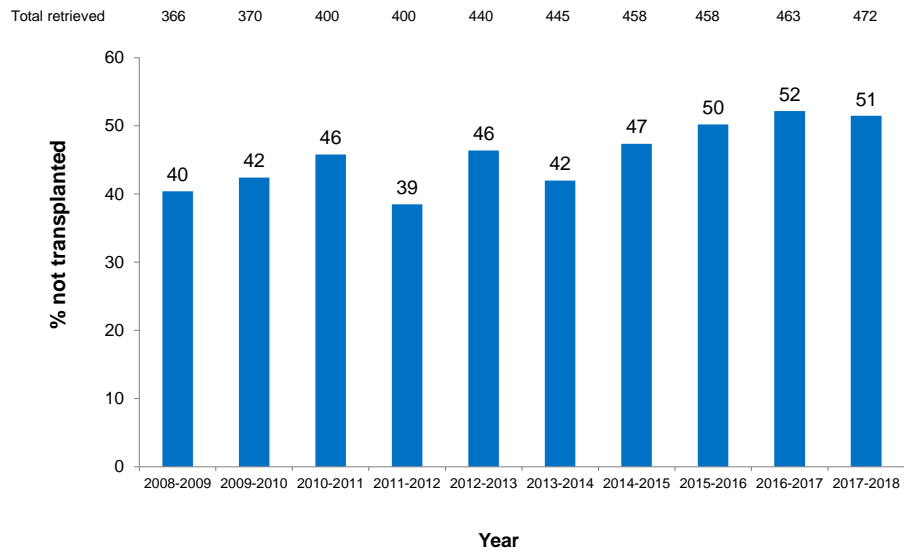
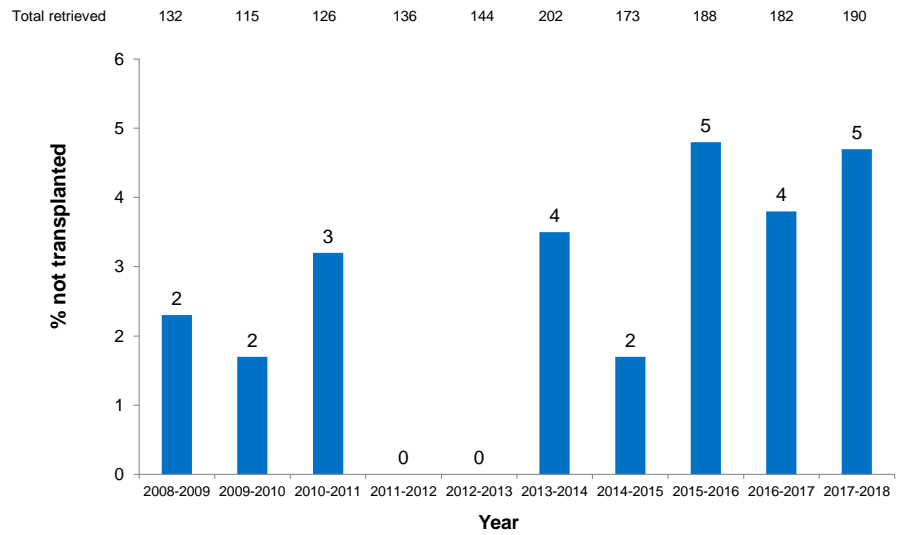


Figure 4.5 Percentage of pancreases¹ retrieved that were not transplanted from deceased organ donors in the UK, 1 April 2008 – 31 March 2018



¹ Excludes donors aged > 60 years

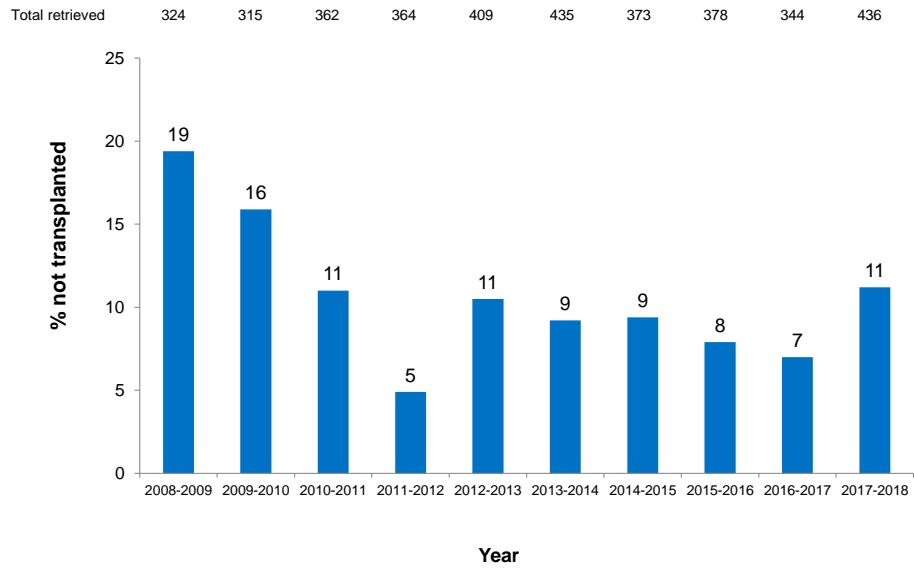
Figure 4.6 Percentage of hearts¹ retrieved that were not transplanted from deceased organ donors² in the UK, 1 April 2008 – 31 March 2018



¹ Excludes donors aged > 65 years or died due to myocardial infarction

² Excludes DCD hearts

Figure 4.7 Percentage of lungs¹ retrieved that were not transplanted from deceased organ donors in the UK, 1 April 2008 – 31 March 2018



¹ Excludes donors aged > 65 years