

# The National Organ Retrieval Service and Usage of Organs

## Key messages

- National Organ Retrieval Service teams attended 977 possible DBD donors and 965 possible DCD donors; 98% of these DBD donors and 66% of these DCD donors attended proceeded to donation
- Overall, 54% of organs offered from those donors that did proceed were transplanted, but individually, these rates were 84% for kidneys, 62% for livers, 25% for pancreases, 26% for hearts, 18% for lungs and 11% for bowels
- The number of deceased donors per million of population was 24.2, however 5% of actual donors resulted in no organ transplants, the same as the previous year

## 4.1 The National Organ Retrieval Service (NORS)

There are 16 NORS teams in total, ten abdominal and six cardiothoracic. From 4 April 2016, following the NORS review, there have been seven abdominal and three cardiothoracic NORS teams available to retrieve organs from deceased donors in the UK for transplantation, at any given time. Prior to the NORS review there were six cardiothoracic teams available at any given time. To facilitate this reduction, all six cardiothoracic teams are part-time. Six out of the abdominal NORS teams are part-time.

NORS teams are 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', which applied for April 2018 – January 2018 for the current report. The new system was introduced in February 2019 following a Demand and Capacity review.

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.

The number of possible DBD and DCD donors that were attended by each of the teams in 2018-2019 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 (proceeding 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 proceeding and non-proceeding donors attended by each NORS team**

NORS team	DBD				DCD			
	Proceeding <sup>5</sup>	Non-proceeding	% non-proc	No. attended	Proceeding <sup>5</sup>	Non-proceeding	% non-proc	No. attended
<b>Abdominal</b>								
Birmingham <sup>1</sup>	128	3	2	131	95	29	23	124
Cambridge	128	1	1	129	90	47	34	137
Cardiff <sup>1</sup>	29	0	-	29	30	13	30	43
Edinburgh	82	3	4	85	35	25	42	60
King's	177	0	-	177	110	64	37	174
Leeds <sup>2</sup>	79	0	-	79	59	32	35	91
Manchester <sup>2</sup>	71	2	3	73	56	34	38	90
Newcastle	112	4	3	116	62	37	37	99
Oxford <sup>3</sup>	80	2	2	82	55	27	33	82
Royal Free <sup>3</sup>	72	1	1	73	43	15	26	58
<b>Abdominal total</b>	<b>958</b>	<b>16</b>	<b>2</b>	<b>974</b>	<b>635</b>	<b>323</b>	<b>34</b>	<b>958</b>
<b>Cardiothoracic<sup>4</sup></b>								
Birmingham	33	43	57	76	7	9	56	16
Glasgow	16	18	53	34	2	4	67	6
Harefield	50	27	35	77	24	16	40	40
Manchester	51	42	45	93	8	20	71	28
Newcastle	32	26	45	58	8	8	50	16
Papworth	55	37	40	92	30	23	43	53
<b>Cardiothoracic total</b>	<b>237</b>	<b>193</b>	<b>45</b>	<b>430</b>	<b>80</b>	<b>80</b>	<b>50</b>	<b>159</b>
<b>Total donors attended</b>	<b>962</b>	<b>15</b>	<b>2</b>	<b>977</b>	<b>638</b>	<b>327</b>	<b>34</b>	<b>965</b>

<sup>1,2,3,4</sup> Share on-call responsibilities

<sup>5</sup> For abdominal, at least one abdominal organ retrieved. For cardiothoracic, at least one cardiothoracic organ retrieved

For more detailed information regarding the National Organ Retrieval Service and individual team activity, an annual NORS report is available here: <https://www.odt.nhs.uk/statistics-and-reports/annual-national-organ-retrieval-service-report/>

## 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**. Note that organs are not always offered from 'consented' donors, e.g. because the donor's condition deteriorates, or it is discovered the donor is unsuitable for organ donation. The number of organs offered from '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 2018-2019, 5% of actual donors resulted in no organ transplants, the same as the previous year.

<b>Table 4.2 Consented, offered, actual and utilised deceased donors in the UK, 1 April 2018 - 31 March 2019</b>						
	<b>DBD (pmp)</b>		<b>DCD (pmp)</b>		<b>Total (pmp)</b>	
Consented donors <sup>1</sup>	1070	(16.2)	1209	(18.3)	2279	(34.5)
Offered donors <sup>2</sup>	1032	(15.6)	1082	(16.4)	2114	(32.0)
<i>Kidneys offered</i>	1993		2100		4093	
<i>Livers offered</i>	998		987		1985	
<i>Pancreases offered</i>	671		356		1027	
<i>Bowels offered</i>	183		0		183	
<i>Hearts offered</i>	607		152		759	
<i>Lungs offered</i>	1352		868		2220	
Actual donors <sup>3</sup>	962	(14.6)	638	(9.7)	1600	(24.2)
Utilised donors <sup>4</sup>	933	(14.1)	583	(8.8)	1516	(23.0)

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

There were 1,600 actual deceased organ donors in 2018-2019, 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 962 DBD and 638 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 1600 deceased donors in the UK, 1 April 2018 – 31 March 2019**

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	
<b>DBD donor organs</b>							
Kidney	1867	1749	94	1578	90	85	64
Liver	934	856	92	762	89	82	52
Pancreas <sup>1</sup>	630	363	58	159	44	25	91
Bowel <sup>2</sup>	166	21	13	19	90	11	0
Heart <sup>3</sup>	570	153	27	149	97	26	1
Lung <sup>4</sup>	1230	269	22	243	90	20	15
<b>Total</b>	<b>5397</b>	<b>3411</b>	<b>63</b>	<b>2910</b>	<b>85</b>	<b>54</b>	<b>223</b>
<b>DCD donor organs<sup>5</sup></b>							
Kidney	1259	1236	98	1043	84	83	89
Liver	588	257	44	186	72	32	40
Pancreas <sup>1</sup>	233	104	45	55	53	24	15
Lung <sup>4</sup>	482	107	22	73	68	15	29
<b>Total</b>	<b>2562</b>	<b>1704</b>	<b>67</b>	<b>1357</b>	<b>80</b>	<b>53</b>	<b>173</b>
<b>Deceased donor organs</b>							
Kidney	3126	2985	95	2621	88	84	153
Liver	1522	1113	73	948	85	62	92
Pancreas <sup>1</sup>	863	467	54	214	46	25	106
Bowel <sup>2</sup>	166	21	13	19	90	11	0
Heart <sup>3</sup>	570	153	27	149	97	26	1
Lung <sup>4</sup>	1712	376	22	316	84	18	44
<b>Total</b>	<b>7959</b>	<b>5115</b>	<b>64</b>	<b>4267</b>	<b>83</b>	<b>54</b>	<b>396</b>

<sup>1</sup> Excludes donors with a BMI > 40 or aged > 65 years (DBD) or aged > 55 years (DCD)

<sup>2</sup> Excludes donors aged >= 56 years or weighing >= 80kg

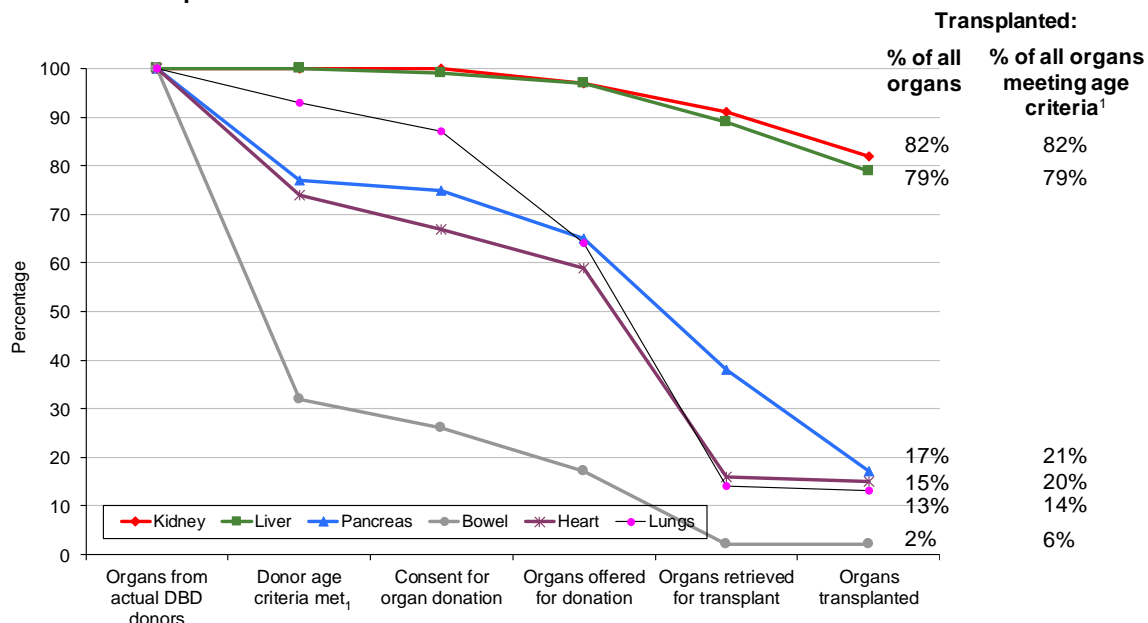
<sup>3</sup> Excludes donors aged >= 65 years or died due to myocardial infarction

<sup>4</sup> Excludes donors aged > 70 years

<sup>5</sup> Excludes DCD hearts because this is not part of the national service, see cardiothoracic section for DCD heart detail

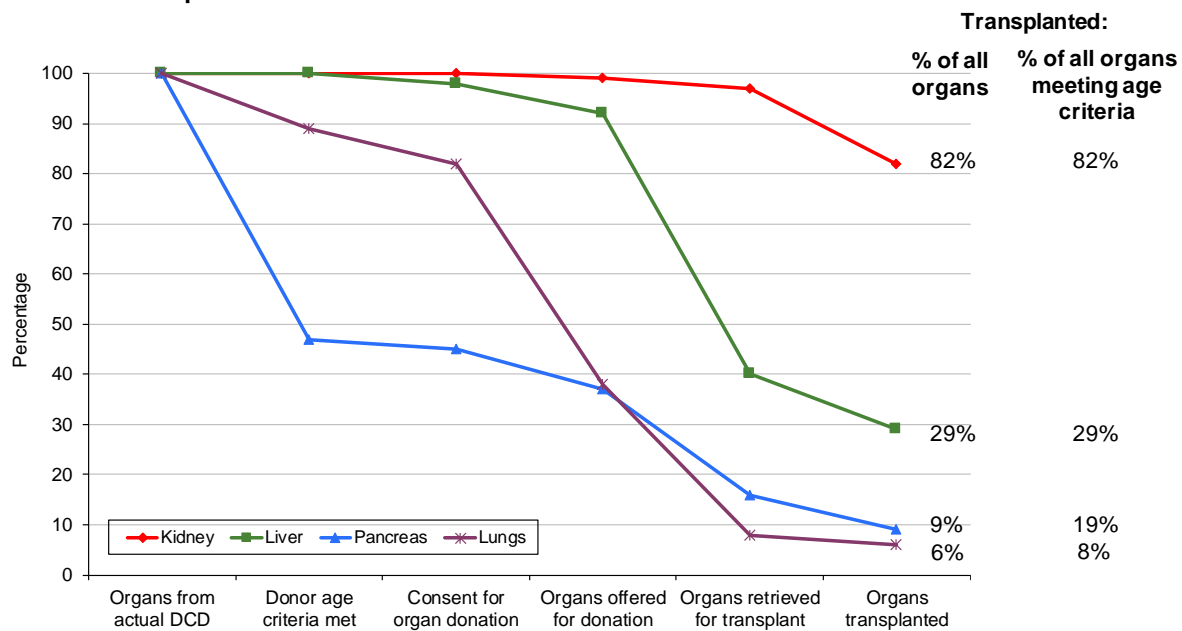
**Figures 4.1 and 4.2** show line graphs of the pathway for all donor organs through to transplantation. The charts start at 100% for each organ, representing all organs from the 962 DBD and 638 DCD donors. The proportion of these organs where any national donor age criteria are met is then shown, followed by the proportion with consent, the proportion offered, the proportion retrieved and finally the proportion transplanted. For example, **Figure 4.2** shows that 82% of the kidneys from the 638 DCD donors were transplanted, a slight fall from 83% 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 2018 – 31 March 2019**



<sup>1</sup>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 2018 – 31 March 2019**



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' primarily include recipient related issues (such as no suitable recipients), but may also include logistical reasons and 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 2018-2019 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 2018 - 31 March 2019**

	Kidney	Liver	Pancreas	Bowel
<b>All actual DBD organ donors</b>	<b>962</b>	<b>962</b>	<b>962</b>	<b>962</b>
Donors from whom organs were not offered for donation	25	28	332	796
<b>Reasons for organs not being offered<sup>1</sup></b>				
Family permission refused	0	3	17	48
Permission refused by coroner	1	4	3	5
Permission refused other	0	0	3	3
Donor unsuitable - medical	1	0	1	0
Donor unsuitable - non-medical	0	0	3	1
Donor unsuitable - age	0	0	218	3
Organ unsuitable - clinical	16	14	47	16
Poor function	7	6	6	5
Donor age >=56 or donor weight >=80kg	0	0	0	654
Other	0	1	34	61
<b>TOTAL DONORS WITH ORGANS NOT OFFERED</b>	<b>25</b>	<b>28</b>	<b>332</b>	<b>796</b>
<b>Organs offered for donation</b>	<b>1867</b>	<b>934</b>	<b>630</b>	<b>166</b>
<b>Organs not retrieved (% of organs offered for donation)</b>	<b>118 (6)</b>	<b>78 (8)</b>	<b>267 (42)</b>	<b>145 (87)</b>
<b>Reasons for non-retrieval</b>				
Donor unsuitable - medical	14	2	15	20
Donor unsuitable - non-medical	0	5	19	29
Donor unsuitable - age	10	4	60	3
Organ unsuitable - clinical	65	35	113	47
Poor function	18	12	15	8
Other	11	20	45	38
<b>TOTAL ORGANS OFFERED, NOT RETRIEVED</b>	<b>118</b>	<b>78</b>	<b>267</b>	<b>145</b>
<b>Organs retrieved (% of organs offered for donation)</b>	<b>1749 (94)</b>	<b>856 (92)</b>	<b>363 (58)</b>	<b>21 (13)</b>
Organs transplanted in the UK	1578	753	159	19
Organs transplanted overseas	0	9	0	0
Organs not transplanted	171	94	204	2
<b>Reasons for organ not being transplanted</b>				
Donor unsuitable - medical	27	4	12	0
Organ unsuitable - clinical	15	27	64	0
Poor function	2	1	0	0
Other	127	62	128	2
<b>TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)</b>	<b>171 (64)</b>	<b>94 (52)</b>	<b>204 (91)</b>	<b>2 (0)</b>

<sup>1</sup> Includes donors whose organ may have been offered but are outside of organ specific criteria



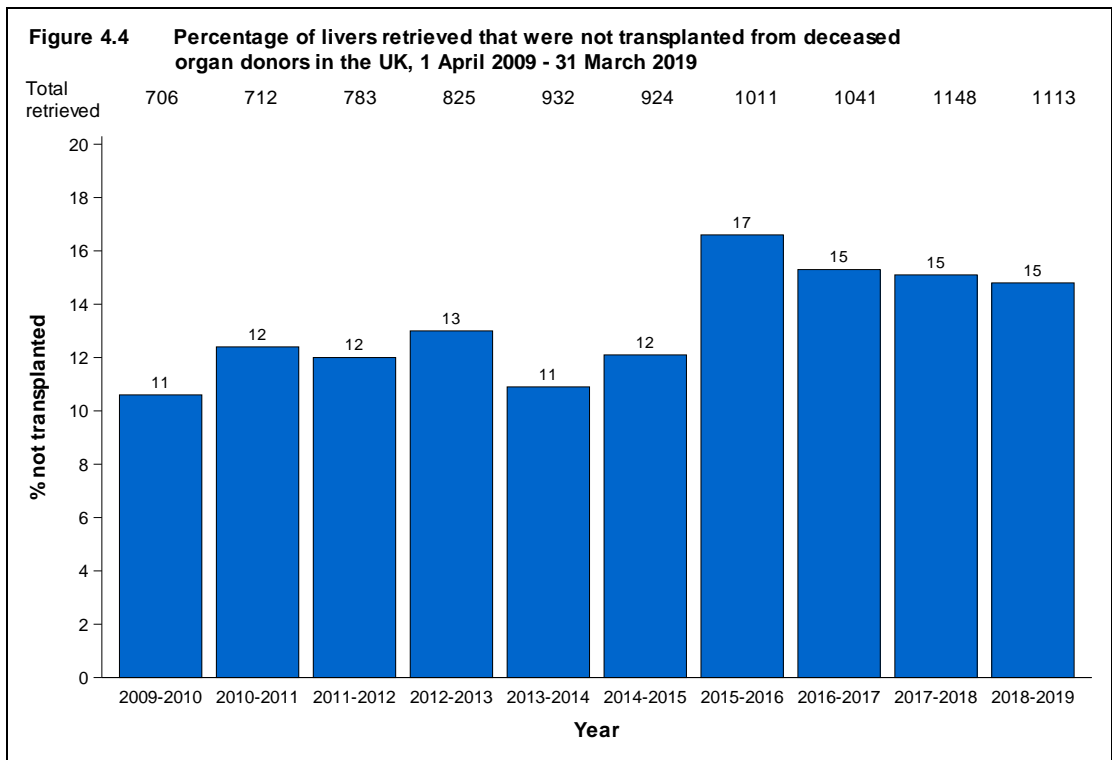
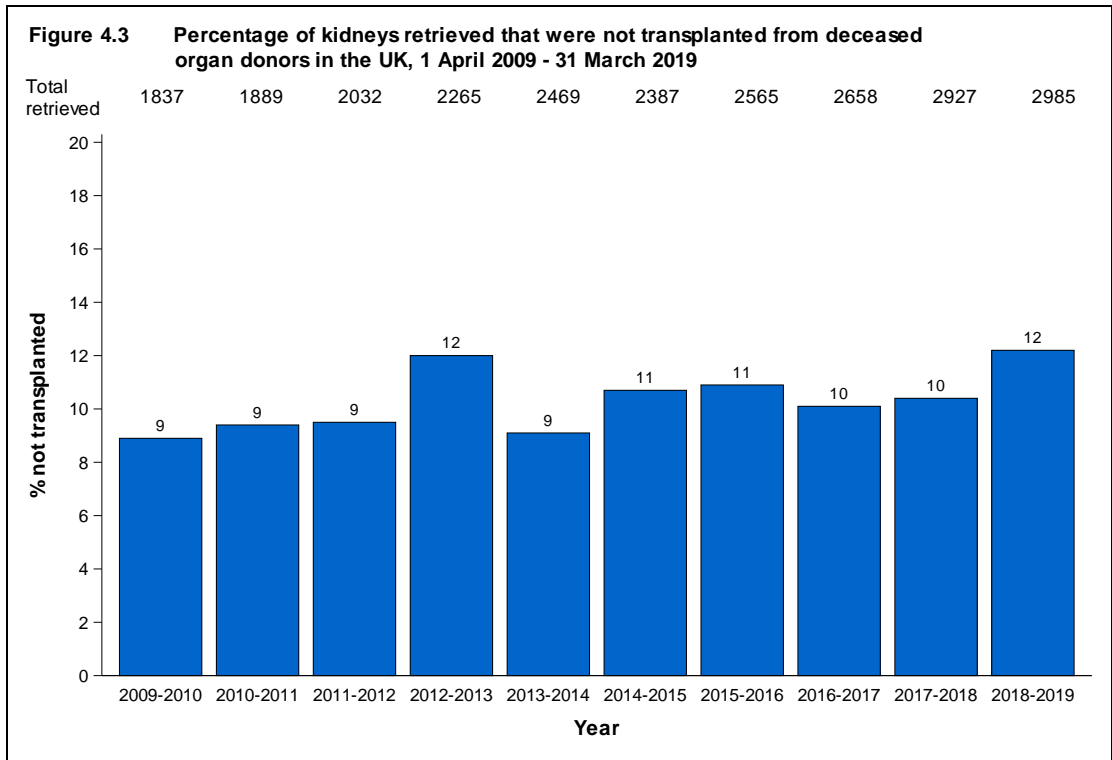
**Table 4.5 Reasons for non-retrieval and non-use of abdominal organs from DCD donors in the UK, 1 April 2018 - 31 March 2019**

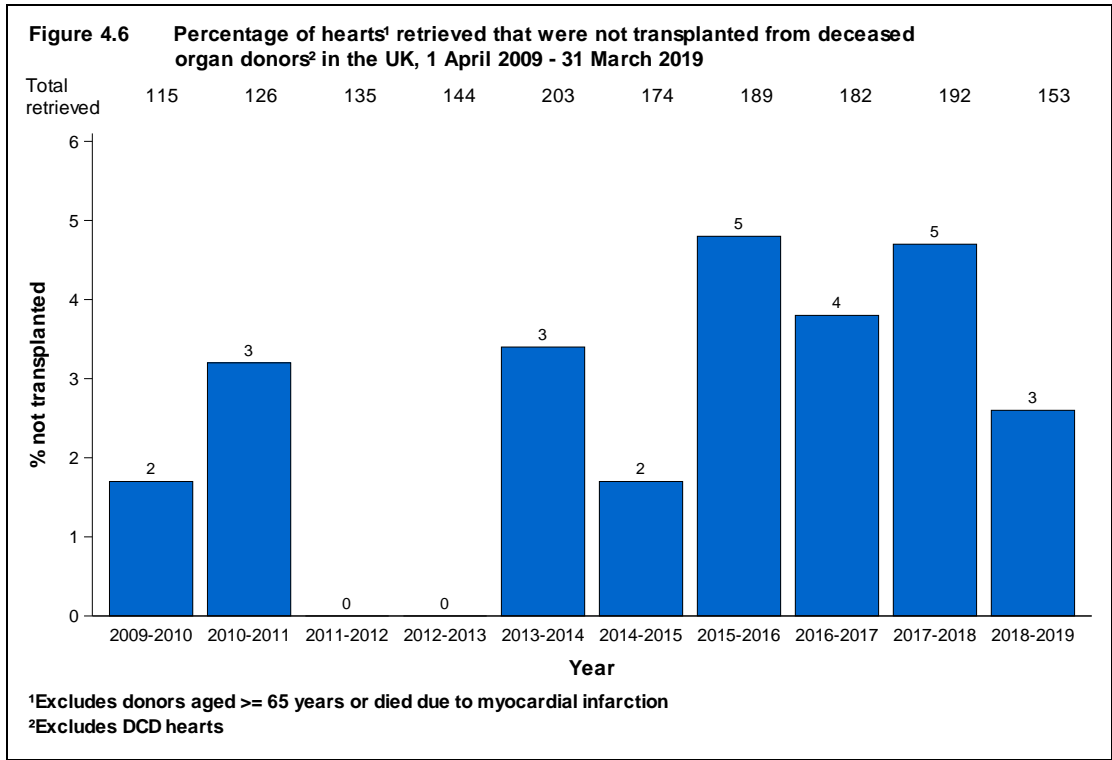
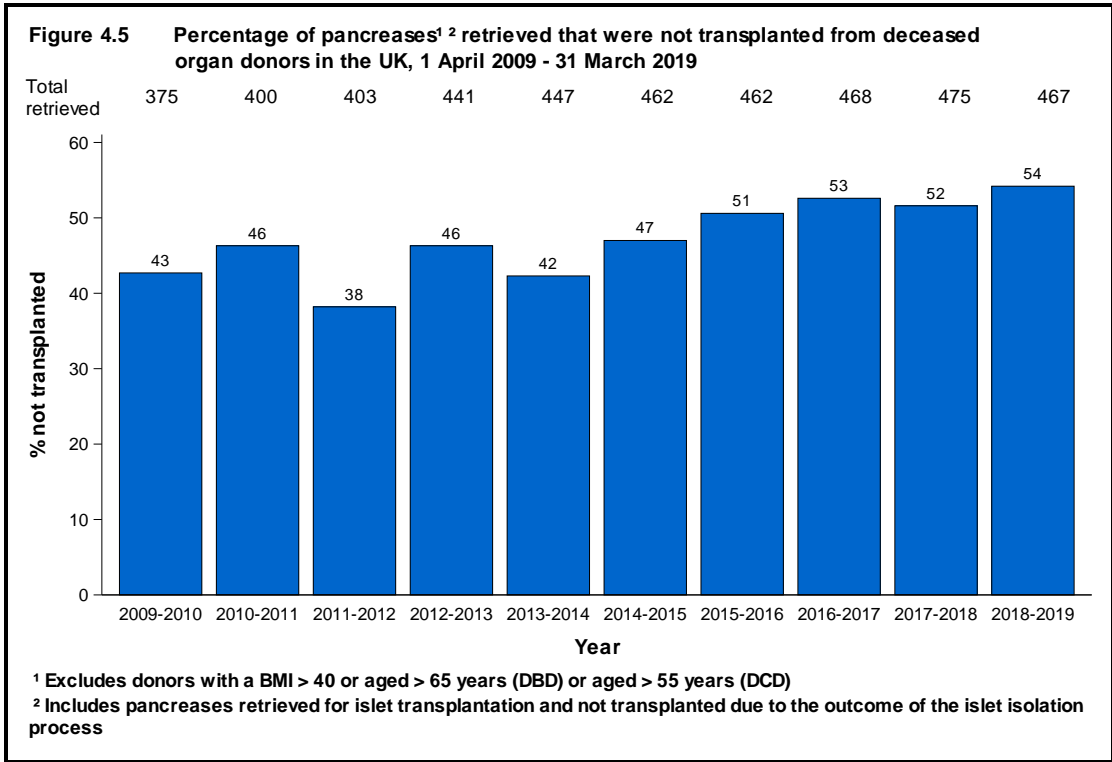
	Kidney	Liver	Pancreas
<b>All actual DCD organ donors</b>	<b>638</b>	<b>638</b>	<b>638</b>
Donors from whom organs were not offered for donation	7	50	405
<b>Reasons for organs not being offered<sup>1</sup></b>			
Family permission refused	0	6	6
Permission refused by coroner	0	4	2
Permission refused other	0	2	0
Donor unsuitable - medical	0	0	1
Donor unsuitable - non-medical	0	1	3
Donor unsuitable - age	0	2	341
Organ unsuitable - clinical	4	28	24
Poor function	3	7	3
Other	0	0	25
<b>TOTAL DONORS WITH ORGANS NOT OFFERED</b>	<b>7</b>	<b>50</b>	<b>405</b>
<b>Organs offered for donation</b>	<b>1259</b>	<b>588</b>	<b>233</b>
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<b>Organs not retrieved (% of organs offered for donation)</b>	<b>23 (2)</b>	<b>331 (56)</b>	<b>129 (55)</b>
<b>Reasons for non-retrieval</b>			
Donor unsuitable - medical	0	3	0
Donor unsuitable - non-medical	0	16	9
Donor unsuitable - age	2	90	14
Organ unsuitable - clinical	11	105	74
Poor function	3	34	5
Other	7	83	27
<b>TOTAL ORGANS OFFERED, NOT RETRIEVED</b>	<b>23</b>	<b>331</b>	<b>129</b>
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<b>Organs retrieved (% of organs offered for donation)</b>	<b>1236 (98)</b>	<b>257 (44)</b>	<b>104 (45)</b>
Organs transplanted in the UK	1043	186	55
Organs transplanted overseas	0	0	0
Organs not transplanted	193	71	49
<b>Reasons for organ not being transplanted</b>			
Donor unsuitable - medical	28	0	4
Donor unsuitable - non-medical	0	1	0
Organ unsuitable - clinical	38	21	18
Other	127	49	27
<b>TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)</b>	<b>193 (89)</b>	<b>71 (40)</b>	<b>49 (15)</b>
<sup>1</sup> Includes donors whose organ 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 2018 - 31 March 2019**

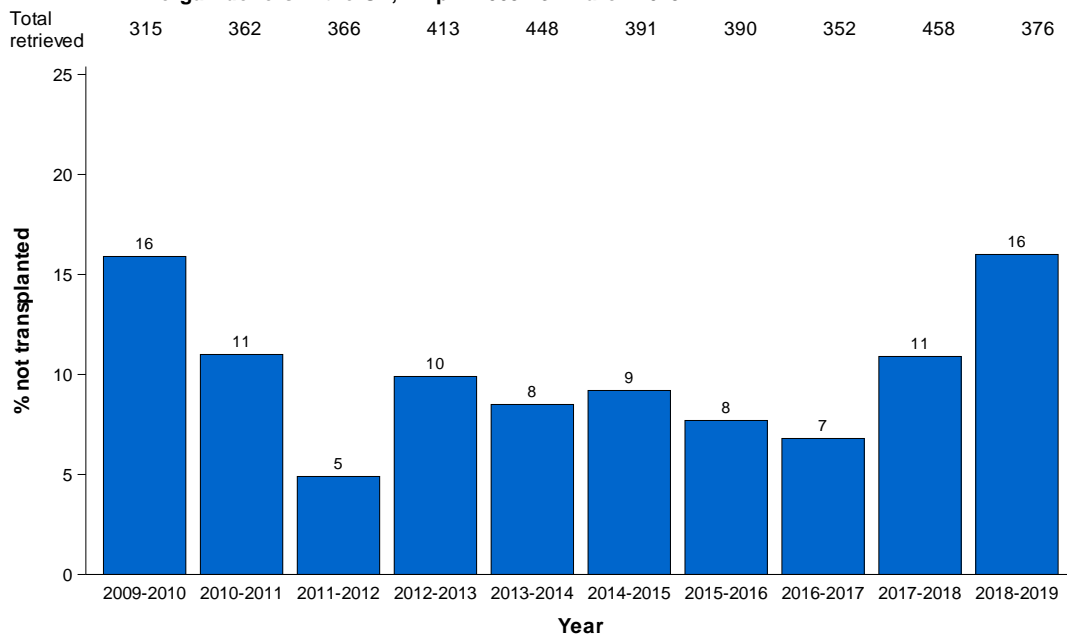
	Heart (DBD)	Lung (DBD)	Lung (DCD)
<b>All actual organ donors</b>	<b>962</b>	<b>962</b>	<b>638</b>
Donors from whom organs were not offered for donation	392	346	397
<b>Reasons for organs not being offered<sup>1</sup></b>			
Family permission refused	28	23	30
Permission refused by coroner	36	29	15
Permission refused other	1	4	6
Donor unsuitable - medical	0	2	10
Donor unsuitable - non-medical	5	4	0
Donor unsuitable - age	231	71	68
Organ unsuitable - clinical	53	100	148
Poor function	35	101	110
Other	3	12	10
<b>TOTAL DONORS WITH ORGANS NOT OFFERED</b>	<b>392</b>	<b>346</b>	<b>397</b>
<b>Organs offered for donation</b>	<b>570</b>	<b>1230</b>	<b>482</b>
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<b>Organs not retrieved (% of organs offered for donation)</b>	<b>417 (73)</b>	<b>961 (78)</b>	<b>375 (78)</b>
<b>Reasons for non-retrieval</b>			
Donor unsuitable - medical	16	22	8
Donor unsuitable - non-medical	22	29	19
Donor unsuitable - age	24	20	10
Organ unsuitable - clinical	120	255	120
Poor function	175	412	103
Other	60	223	115
<b>TOTAL ORGANS OFFERED, NOT RETRIEVED</b>	<b>417</b>	<b>961</b>	<b>375</b>
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<b>Organs retrieved (% of organs offered for donation)</b>	<b>153 (27)</b>	<b>269 (22)</b>	<b>107 (22)</b>
Organs transplanted in the UK	147	239	73
Organs transplanted overseas	2	4	0
Organs not transplanted	4	26	34
<b>Reasons for organ not being transplanted</b>			
Donor unsuitable - non-medical	0	1	1
Poor function	0	1	0
Other	4	24	33
<b>TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)</b>	<b>4 (1)</b>	<b>26 (15)</b>	<b>34 (29)</b>

<sup>1</sup> Includes donors whose organ may have been offered but are outside of organ specific criteria





**Figure 4.7 Percentage of lungs<sup>1</sup> retrieved that were not transplanted from deceased organ donors in the UK, 1 April 2009 - 31 March 2019**



<sup>1</sup>Excludes donors aged > 70 years