

# The National Organ Retrieval Service and Usage of Organs

## Key messages

- National Organ Retrieval Service teams attended 808 DBD donors and 901 DCD donors; 97% of DBD donors and 64% of DCD donors attended proceeded to donation
- Overall, 53% of organs offered from those donors that did proceed were transplanted, but individually, these rates were 84% for kidneys, 62% for livers, 34% for hearts, 31% for pancreases, 18% for lungs and 9% for bowels
- The number of deceased donors per million of population was 21.0, however 6% of actual donors resulted in no organ transplants, the same as last year

## 4.1 The National Organ Retrieval Service (NORS)

During 2015-2016 there were 7 abdominal and 6 cardiothoracic NORS teams available at any given time to retrieve organs from deceased donors in the UK for transplantation. Each team had a designated area for which they were first on-call, based on the proximity of their base to each donor hospital. If a team were first on-call for a particular donor hospital, they were required to attend donors at that hospital within an agreed timescale if at least one organ has been accepted for transplantation. If the team were already retrieving when they were called to attend, then a second team were called in to retrieve and so on. In two areas of the country, two abdominal teams shared the on call responsibilities, each being on-call for different weeks of the year, which means there were 9 abdominal teams in total.

The number of DBD and DCD donors that were attended by each of the teams in 2015-2016 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 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 cause unsuitability of organs for transplantation. A small number of 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.

<b>Table 4.1 Number of actual and non-proceeding donors attended by each NORS team</b>								
NORS team	DBD				DCD			
	Actual	Non-proceeding	% non-proc	No. attended	Actual	Non-proceeding	% non-proc	No. attended
<b>Abdominal</b>								
Birmingham	99	2	2	<b>101</b>	65	33	34	<b>98</b>
Cambridge	94	2	2	<b>96</b>	119	41	26	<b>160</b>
Cardiff	46	0	0	<b>46</b>	23	16	41	<b>39</b>
King's College	148	5	3	<b>153</b>	87	55	39	<b>142</b>
Leeds / Manchester	110	6	5	<b>116</b>	88	65	42	<b>153</b>
Newcastle	89	6	6	<b>95</b>	62	40	39	<b>102</b>
Oxford	68	1	1	<b>69</b>	36	28	44	<b>64</b>
Royal Free	72	1	1	<b>73</b>	45	17	27	<b>62</b>
Scotland	56	1	2	<b>57</b>	49	26	35	<b>75</b>
<b>Abdominal total</b>	<b>782</b>	<b>24</b>	<b>3</b>	<b>806</b>	<b>574</b>	<b>321</b>	<b>36</b>	<b>895</b>
<b>Cardiothoracic</b>								
Birmingham	45	32	42	<b>77</b>	8	15	65	<b>23</b>
Harefield	60	42	41	<b>102</b>	16	25	61	<b>41</b>
Manchester	50	12	19	<b>62</b>	7	23	77	<b>30</b>
Newcastle	34	13	28	<b>47</b>	8	18	69	<b>26</b>
Papworth	61	31	34	<b>92</b>	19	24	56	<b>43</b>
Scotland	14	10	42	<b>24</b>	-	-	-	<b>-</b>
<b>Cardiothoracic total</b>	<b>264</b>	<b>140</b>	<b>35</b>	<b>404</b>	<b>58</b>	<b>105</b>	<b>64</b>	<b>163</b>
<b>Total donors attended</b>	<b>785</b>	<b>23</b>	<b>3</b>	<b>808</b>	<b>579</b>	<b>322</b>	<b>36</b>	<b>901</b>

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

## 4.2 Retrieval and usage of organs

The number of consented donors and 'offered' donors (where at least one organ was offered for transplant) are shown in **Table 4.2**. 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 2015-2016, 6% 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 2015 - 31 March 2016</b>						
	<b>DBD (pmp)</b>		<b>DCD (pmp)</b>		<b>Total (pmp)</b>	
Consented donors <sup>1</sup>	880	(13.6)	1130	(17.4)	2010	(31.0)
Offered donors <sup>2</sup>	844	(13.0)	1034	(15.9)	1878	(29.0)
<i>Kidneys offered</i>	1642		1996		3638	
<i>Livers offered</i>	825		954		1779	
<i>Pancreases offered</i>	572		369		941	
<i>Bowels offered</i>	196		0		196	
<i>Hearts offered</i>	493		48		541	
<i>Lungs offered</i>	1106		778		1884	
Actual donors	785	(12.1)	579	(8.9)	1364	(21.0)
Utilised donors <sup>3</sup>	762	(11.8)	521	(8.0)	1283	(19.8)

<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> Utilised donors defined as donors where one or more organs were retrieved and transplanted

There were 1,364 actual deceased organ donors last year, 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 785 DBD and 579 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 1364 deceased donors in the UK, 1 April 2015 – 31 March 2016**

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	1569	1462	93	1346	92	86	92
Liver	778	715	92	637	89	82	67
Pancreas <sup>1</sup>	480	335	70	173	52	36	128
Bowel <sup>2</sup>	160	16	10	15	94	9	0
Heart <sup>3</sup>	527	186	35	179	96	34	5
Lung <sup>4</sup>	1126	303	27	282	93	25	6
<b>Total</b>	<b>4640</b>	<b>3017</b>	<b>65</b>	<b>2632</b>	<b>87</b>	<b>57</b>	<b>298</b>
<b>DCD donor organs<sup>5</sup></b>							
Kidney	1158	1103	95	940	85	81	127
Liver	572	296	52	206	70	36	78
Pancreas <sup>1</sup>	250	123	49	55	45	22	53
Lung <sup>4</sup>	778	75	10	66	88	8	6
<b>Total</b>	<b>2758</b>	<b>1597</b>	<b>58</b>	<b>1267</b>	<b>79</b>	<b>46</b>	<b>264</b>
<b>Deceased donor organs</b>							
Kidney	2727	2565	94	2286	89	84	219
Liver	1350	1011	75	843	83	62	145
Pancreas <sup>1</sup>	730	458	63	228	50	31	181
Bowel <sup>2</sup>	160	16	10	15	94	9	0
Heart <sup>3</sup>	527	186	35	179	96	34	5
Lung <sup>4</sup>	1904	378	20	348	92	18	12
<b>Total</b>	<b>7398</b>	<b>4614</b>	<b>62</b>	<b>3899</b>	<b>85</b>	<b>53</b>	<b>562</b>

<sup>1</sup> Excludes donors aged > 60 years

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

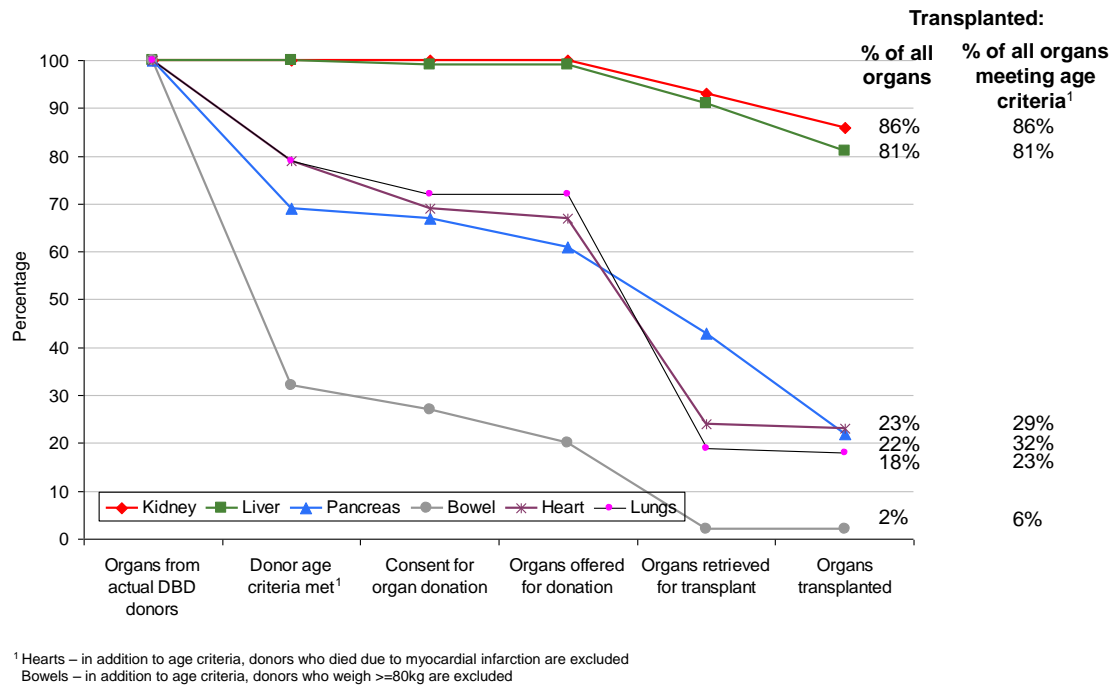
<sup>3</sup> Excludes donors aged > 65 years or died due to myocardial infarction

<sup>4</sup> Excludes donors aged > 65 years

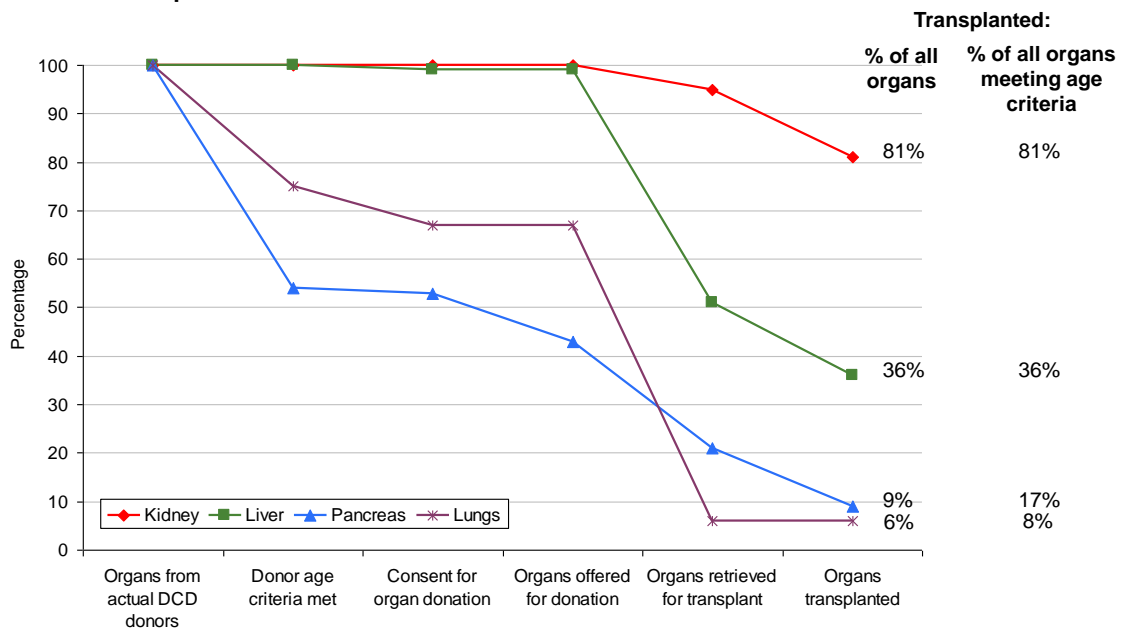
<sup>5</sup> Excludes DCD hearts

**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 785 DBD and 579 DCD donors. The proportion of these organs where any national donor age criteria are met is then shown, followed by the proportion with consent (authorisation in Scotland), the proportion offered, the proportion retrieved and finally the proportion transplanted. For example, **Figure 4.1** shows that only 22% of the pancreases from the 785 DBD donors were transplanted. 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 2015 – 31 March 2016**



**Figure 4.2 Donation and transplantation rates of organs from DCD organ donors in the UK, 1 April 2015 – 31 March 2016**



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 2015-2016 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 percentages of organs retrieved that were not transplanted are shown in **Figure 4.3**, **Figure 4.4** and **Figure 4.5** for kidneys, livers, and pancreases, 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. The majority of 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 2015 – 31 March 2016**

	Kidney	Liver	Pancreas	Bowel
<b>All DBD organ donors</b>	<b>785</b>	<b>785</b>	<b>785</b>	<b>785</b>
Donors from whom organs not offered for donation	1	7	305	625
<b>Reasons for organs not being offered</b>				
Family permission refused	1 <sup>1</sup>	7	15	37
Permission refused by coroner	0	0	2	1
Donor unsuitable – age	0	0	244	0
Donor unsuitable – past history	0	0	28	7
Donor age >=56 or donor weight >=80kg	0	0	0	532
Other	0	0	16	48
<b>TOTAL DONORS WITH ORGANS NOT OFFERED</b>	<b>1</b>	<b>7</b>	<b>305</b>	<b>625</b>
<b>Organs offered for donation</b>	<b>1569</b>	<b>778</b>	<b>480</b>	<b>160</b>
<b>Organs not retrieved (% of organs offered for donation)</b>	<b>107 (7)</b>	<b>63 (8)</b>	<b>145 (30)</b>	<b>144 (90)</b>
<b>Reasons for non-retrieval</b>				
<i>Donor</i>				
Donor unsuitable – medical	12	4	12	6
Donor unsuitable – non-medical	2	2	9	86
Donor age	15	1	14	1
<i>Organ</i>				
Organ unsuitable – clinical	54	29	84	21
Poor function	14	15	8	6
<i>Other</i>				
Other	10	12	18	24
<b>TOTAL ORGANS OFFERED, NOT RETRIEVED</b>	<b>107</b>	<b>63</b>	<b>145</b>	<b>144</b>
<b>Organs retrieved (% of organs offered for donation)</b>	<b>1462 (93)</b>	<b>715 (92)</b>	<b>335 (70)</b>	<b>16 (10)</b>
Organs transplanted in the UK	1346	634	173	15
Organs transplanted overseas	0	3 <sup>2</sup>	0	0
Organs not transplanted	116	78	162	1
<b>Reasons for organ not being transplanted</b>				
<i>Donor</i>				
Donor unsuitable – medical	19	8	12	0
Donor unsuitable – non-medical	2	2	3	0
Donor age	0	0	0	0
<i>Organ</i>				
Organ unsuitable – clinical	21	53	124	0
Poor function	0	1	0	0
<i>Other</i>				
Other	74	14	23	1
<b>TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)</b>	<b>116 (92)</b>	<b>78 (67)</b>	<b>162 (128)</b>	<b>1 (0)</b>

<sup>1</sup> One kidney from a donor not offered for donation due to family permission refused  
<sup>2</sup> Transplanted into super-urgent patients in the Republic of Ireland

**Table 4.5 Reasons for non-retrieval and non-use of abdominal organs from DCD donors in the UK, 1 April 2015 – 31 March 2016**

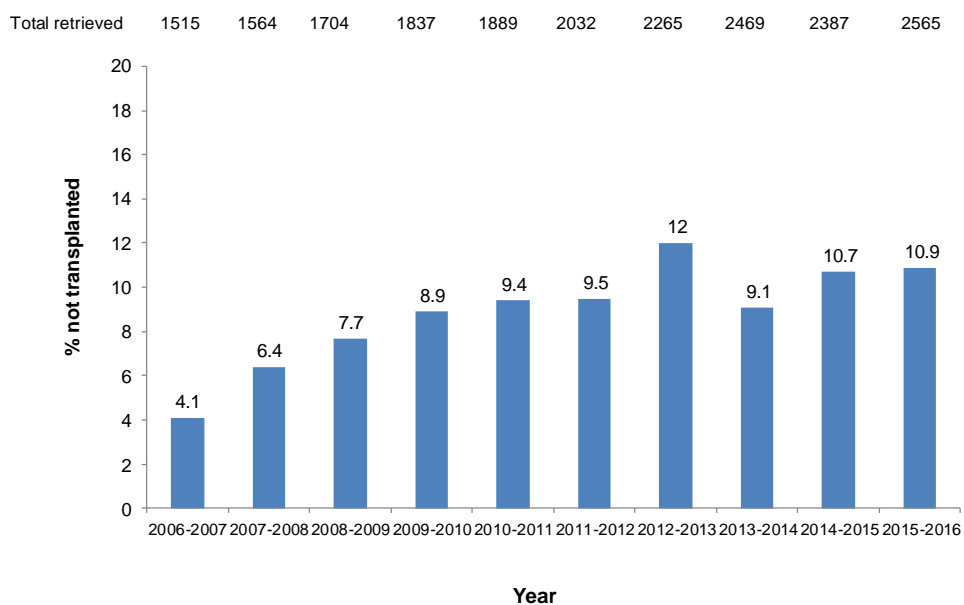
	Kidney	Liver	Pancreas
<b>All DCD organ donors</b>	<b>579</b>	<b>579</b>	<b>579</b>
Donors from whom organs not offered for donation	0	7	329
<b>Reasons for organs not being offered</b>			
Family permission refused	0	4	6
Permission refused by coroner	0	3	1
Donor unsuitable – age	0	0	268
Donor unsuitable – past history	0	0	27
Other	0	0	27
<b>TOTAL DONORS WITH ORGANS NOT OFFERED</b>	<b>0</b>	<b>7</b>	<b>329</b>
<b>Organs offered for donation</b>	<b>1158</b>	<b>572</b>	<b>250</b>
<b>Organs not retrieved (% of organs offered for donation)</b>	<b>55 (5)</b>	<b>276 (48)</b>	<b>127 (51)</b>
<b>Reasons for non-retrieval</b>			
<i>Donor</i>			
Donor unsuitable – medical	10	2	3
Donor unsuitable – non-medical	1	15	15
Donor age	4	54	12
<i>Organ</i>			
Organ unsuitable – clinical	30	105	68
Poor function	5	26	4
<i>Other</i>			
Other	5	74	25
<b>TOTAL ORGANS OFFERED, NOT RETRIEVED</b>	<b>55</b>	<b>276</b>	<b>127</b>
<b>Organs retrieved (% of organs offered for donation)</b>	<b>1103 (95)</b>	<b>296 (52)</b>	<b>123 (49)</b>
Organs transplanted in the UK	940	206	55
Organs transplanted overseas	0	0	0
Organs not transplanted	163	90	68
<b>Reasons for organ not being transplanted</b>			
<i>Donor</i>			
Donor unsuitable – medical	59	5	3
Donor unsuitable – non-medical	0	3	2
Donor age	0	0	0
<i>Organ</i>			
Organ unsuitable – clinical	37	48	46
Poor function	0	0	0
<i>Other</i>			
Other	67	34	17
<b>TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)</b>	<b>163 (127)</b>	<b>90 (78)</b>	<b>68 (53)</b>



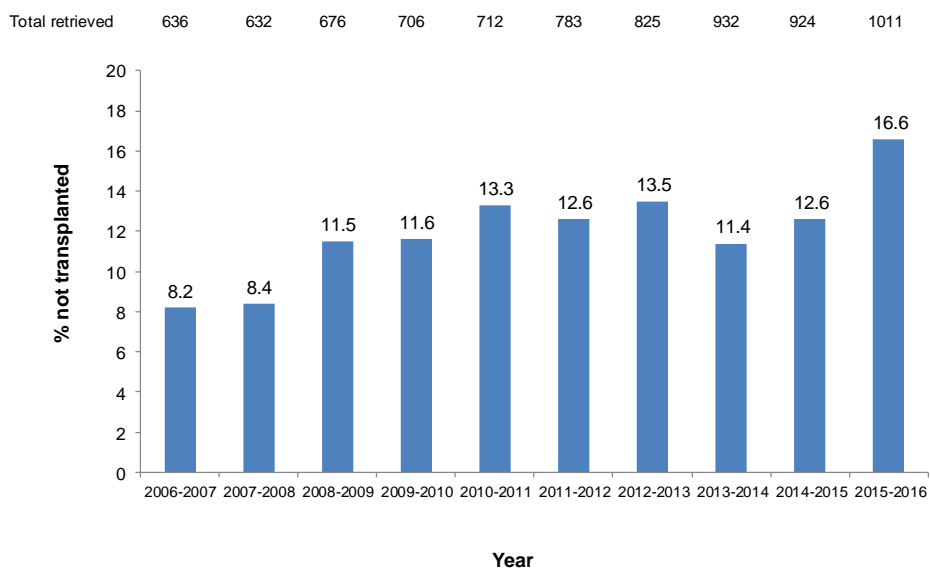
**Table 4.6 Reasons for non-retrieval and non-use of cardiothoracic organs from organ donors in the UK, 1 April 2015 – 31 March 2016**

	Heart (DBD)	Lung (DBD)	Lung (DCD)
<b>All organ donors</b>	<b>785</b>	<b>785</b>	<b>579</b>
Donors from whom organs not offered for donation	258	222	190
<b>Reasons for organs not being offered</b>			
Family permission refused	50	32	31
Permission refused by coroner	30	23	16
Donor age >65 years	166	166	143
Donor cause of death cardiac arrest or myocardial infarction	11	0	0
Other	1	1	0
<b>TOTAL DONORS WITH ORGANS NOT OFFERED</b>	<b>258</b>	<b>222</b>	<b>190</b>
<b>Organs offered for donation</b>	<b>527</b>	<b>1126</b>	<b>778</b>
<b>Organs not retrieved (% of organs offered for donation)</b>	<b>341 (65)</b>	<b>823 (73)</b>	<b>703 (90)</b>
<b>Reasons for non-retrieval</b>			
<i>Donor</i>			
Donor unsuitable – medical	20	36	44
Donor unsuitable – non-medical	55	50	40
Donor age	30	8	48
<i>Organ</i>			
Organ unsuitable – clinical	80	230	240
Poor function	129	422	230
<i>Other</i>			
Other	27	77	101
<b>TOTAL ORGANS OFFERED, NOT RETRIEVED</b>	<b>341</b>	<b>823</b>	<b>703</b>
<b>Organs retrieved (% of organs offered for donation)</b>	<b>186 (35)</b>	<b>303 (27)</b>	<b>75 (10)</b>
Organs transplanted in the UK	176	278	66
Organs transplanted overseas	3	4	0
Organs not transplanted	7	21	9
<b>Reasons for organ not being transplanted</b>			
<i>Donor</i>			
Donor unsuitable – medical	1	6	0
Donor unsuitable – non-medical	0	1	2
<i>Organ</i>			
Organ unsuitable – clinical	1	4	2
Poor function	0	2	0
<i>Other</i>			
Other	5	8	5
<b>TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)</b>	<b>7 (5)</b>	<b>21 (6)</b>	<b>9 (6)</b>

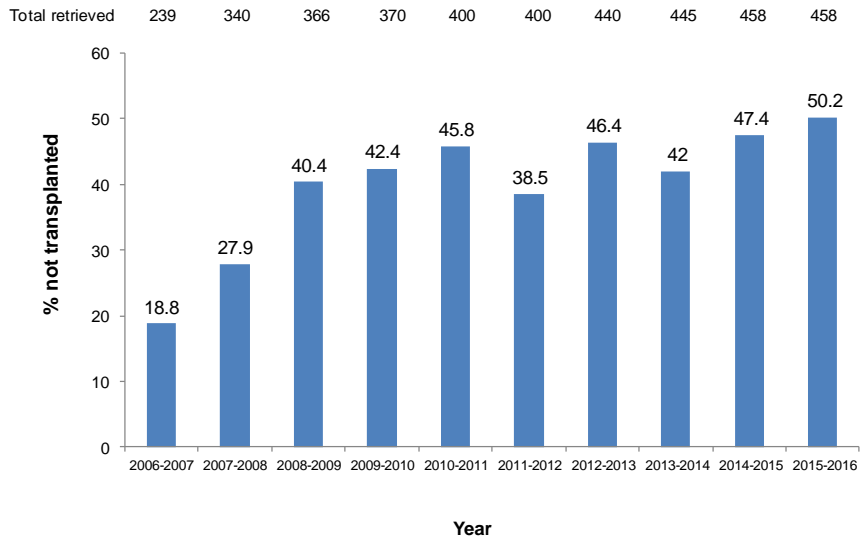
**Figure 4.3 Percentage of kidneys retrieved that are not transplanted from deceased organ donors in the UK, 1 April 2006 – 31 March 2016**



**Figure 4.4 Percentage of livers retrieved that are not transplanted from deceased organ donors in the UK, 1 April 2006 – 31 March 2016**



**Figure 4.5 Percentage of pancreases<sup>1</sup> retrieved that are not transplanted from deceased organ donors in the UK, 1 April 2006 – 31 March 2016**



<sup>1</sup> Excludes donors aged > 60 years