

The National Organ Retrieval Service and Usage of Organs

Key messages

- National Organ Retrieval Service teams attended 969 possible DBD donors and 971 possible DCD donors; 98% of these DBD donors and 65% of these DCD donors attended proceeded to donation
- Overall, 52% of organs offered from those donors that did proceed were transplanted, but individually, these rates were 82% for kidneys, 59% for livers, 25% for pancreases, 29% for hearts, 19% for lungs and 12% for bowels
- The number of deceased donors per million of population was 23.8, however 8% of actual donors resulted in no organ transplants, slightly more than the previous year
- On 6 January 2020 the National Organ Retrieval Service increased capacity to provide 8 abdominal surgical teams on-call at any given time. The cardiothoracic service provides 3 surgical teams at any given time

4.1 The National Organ Retrieval Service (NORS)

There are 16 NORS teams in total, ten abdominal and six cardiothoracic. On 6 January 2020, the abdominal aspect of the service increased capacity to eight abdominal NORS teams available to retrieve organs from deceased donors in the UK for transplantation, at any given time. Prior to this change there were seven abdominal teams available. Three cardiothoracic NORS teams are available at any given time, this has been in place since April 2016.

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 2019 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 2019-2020 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 may be 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 ²	Non-proceeding	% non-proc	No. attended	Proceeding ²	Non-proceeding	% non-proc	No. attended
Abdominal								
Birmingham ¹	120	3	2	123	74	36	33	110
Cambridge	114	3	3	117	116	48	29	164
Cardiff ¹	46	0	-	46	18	9	33	27
Edinburgh	95	2	2	97	47	13	22	60
King's	185	2	1	187	107	55	34	162
Leeds ¹	72	2	3	74	55	37	40	92
Manchester ¹	75	1	1	76	50	40	44	90
Newcastle	100	4	4	104	61	39	39	100
Oxford ¹	66	2	3	68	60	30	33	90
Royal Free ¹	67	5	7	72	45	29	39	74
Abdominal total	940	24	2	964	633	336	35	969
Cardiothoracic¹								
Birmingham	42	30	42	72	4	8	67	12
Glasgow	19	30	61	49	4	3	43	7
Harefield	49	28	36	77	16	26	62	42
Manchester	45	41	48	86	9	16	64	25
Newcastle	33	22	40	55	4	10	71	14
Papworth	61	25	29	86	33	24	42	57
Cardiothoracic total	249	176	41	425	70	87	55	157
Total donors attended	946	23	2	969	634	337	35	971

¹ Part-time teams

² 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 2019-2020, 8% of actual donors resulted in no organ transplants, slightly more than the previous year (5%). Note that the COVID-19 pandemic affected the number of offered, retrieved and transplanted organs in 2019-2020.

Table 4.2 Consented, offered, actual, and utilised deceased donors in the UK, 1 April 2019 - 31 March 2020						
	DBD (pmp)		DCD (pmp)		Total (pmp)	
Consented donors ¹	1053	(15.8)	1250	(18.8)	2303	(34.7)
Offered donors ²	1015	(15.3)	1101	(16.6)	2116	(31.8)
<i>Kidneys offered</i>	1953		2148		4101	
<i>Livers offered</i>	985		1019		2004	
<i>Pancreases offered</i>	673		382		1055	
<i>Bowels offered</i>	175		0		175	
<i>Hearts offered</i>	565		201		766	
<i>Lungs offered</i>	1296		888		2184	
Actual donors ³	946	(14.2)	634	(9.5)	1580	(23.8)
Utilised donors ⁴	898	(13.5)	557	(8.4)	1455	(21.9)

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 1,580 actual deceased organ donors in 2019-2020, 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 946 DBD and 634 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 1580 deceased donors in the UK, 1 April 2019 – 31 March 2020

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	1829	1705	93	1522	89	83	86
Liver	923	848	92	721	85	78	69
Pancreas ¹	629	333	53	166	50	26	75
Bowel ²	166	21	13	20	95	12	0
Heart ³	523	161	31	153	95	29	3
Lung ⁴	1161	274	24	256	93	22	9
Total	5231	3342	64	2838	85	54	242
DCD donor organs⁵							
Kidney	1252	1225	98	991	81	79	98
Liver	595	278	47	170	61	29	61
Pancreas ¹	256	116	45	51	44	20	24
Lung ⁴	508	89	18	63	71	12	18
Total	2611	1708	65	1275	75	49	201
Deceased donor organs							
Kidney	3081	2930	95	2513	86	82	184
Liver	1518	1126	74	891	79	59	130
Pancreas ¹	885	449	51	217	48	25	99
Bowel ²	166	21	13	20	95	12	0
Heart ³	523	161	31	153	95	29	3
Lung ⁴	1669	363	22	319	88	19	27
Total	7842	5050	64	4113	81	52	443

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

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

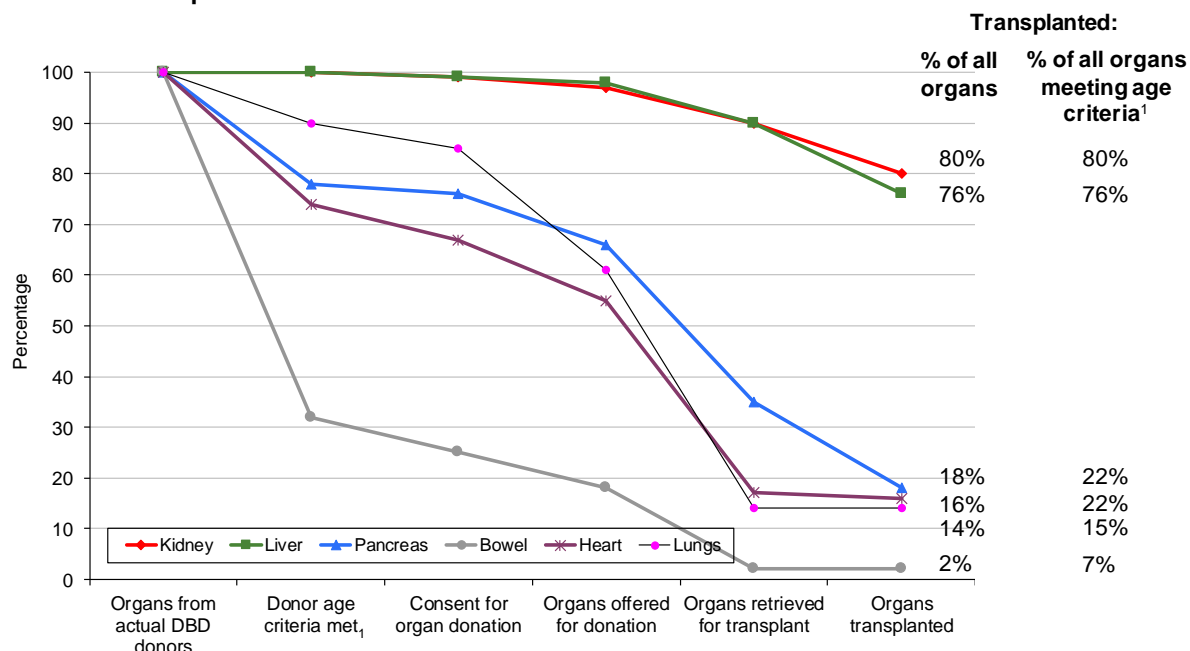
³ Excludes donors aged >= 65 years or died due to myocardial infarction

⁴ Excludes donors aged > 70 years

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

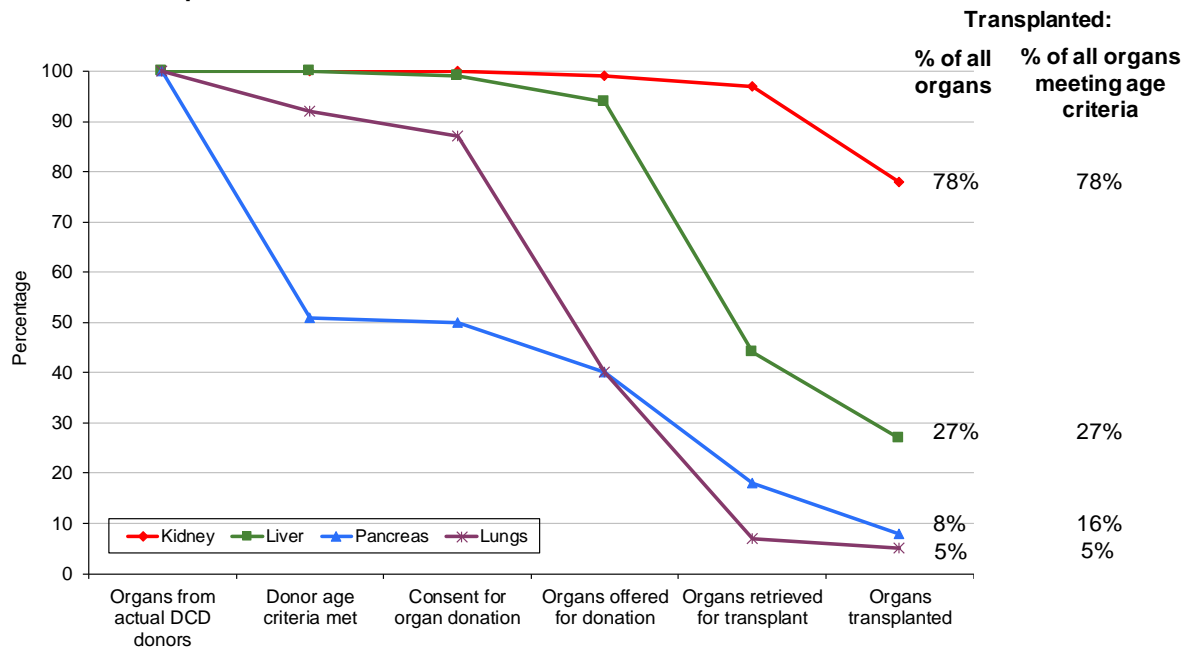
Figures 4.1 and 4.2 show line graphs of the pathway for all donor organs through to transplantation. The charts start at 100% for each organ, representing all organs from the 946 DBD and 634 DCD donors. The proportion of these organs where any national donor age criteria are met is then shown, followed by the proportion with consent, the proportion offered, the proportion retrieved and finally the proportion transplanted. For example, **Figure 4.2** shows that 78% of the kidneys from the 634 DCD donors were transplanted, a slight fall from 82% 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 2019 – 31 March 2020



¹Hearts – 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 2019 – 31 March 2020



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. Note that reasons associated with the COVID-19 pandemic may also be included under either medical unsuitability or 'other'.

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 2019-2020 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. Note that the COVID-19 pandemic will have affected the 2019-2020 non-utilisation rate. 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 2019 - 31 March 2020

	Kidney	Liver	Pancreas	Bowel
All actual DBD organ donors	946	946	946	946
Donors from whom organs were not offered for donation	28	23	317	780
Reasons for organs not being offered¹				
Family permission refused	4	5	14	54
Permission refused by coroner	1	0	2	2
Permission refused other	0	0	4	7
Donor unsuitable - medical	0	0	0	1
Donor unsuitable - non-medical	0	0	1	3
Donor unsuitable - age	0	0	208	2
Organ unsuitable - clinical	14	16	41	15
Poor function	6	2	4	1
Donor age >=56 or donor weight >=80kg	0	0	0	642
Other	3	0	43	53
TOTAL DONORS WITH ORGANS NOT OFFERED	28	23	317	780
Organs offered for donation	1829	923	629	166
Organs not retrieved (% of organs offered for donation)	124 (7)	75 (8)	296 (47)	145 (87)
Reasons for non-retrieval				
Donor unsuitable - medical	10	4	7	16
Donor unsuitable - non-medical	0	3	17	6
Donor unsuitable - age	12	2	83	4
Organ unsuitable - clinical	54	41	122	46
Poor function	30	9	23	17
Other	18	16	44	56
TOTAL ORGANS OFFERED, NOT RETRIEVED	124	75	296	145
Organs retrieved (% of organs offered for donation)	1705 (93)	848 (92)	333 (53)	21 (13)
Organs transplanted in the UK	1522	718	166	20
Organs transplanted overseas	0	3	0	0
Organs not transplanted	183	127	167	1
Reasons for organ not being transplanted				
Donor unsuitable - medical	29	10	15	0
Donor unsuitable - non-medical	0	2	3	0
Donor unsuitable - age	6	0	2	0
Organ unsuitable - clinical	40	61	82	0
Poor function	7	2	1	0
Other	101	52	64	1
TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)	183 (86)	127 (69)	167 (75)	1 (0)

¹ 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 2019 - 31 March 2020

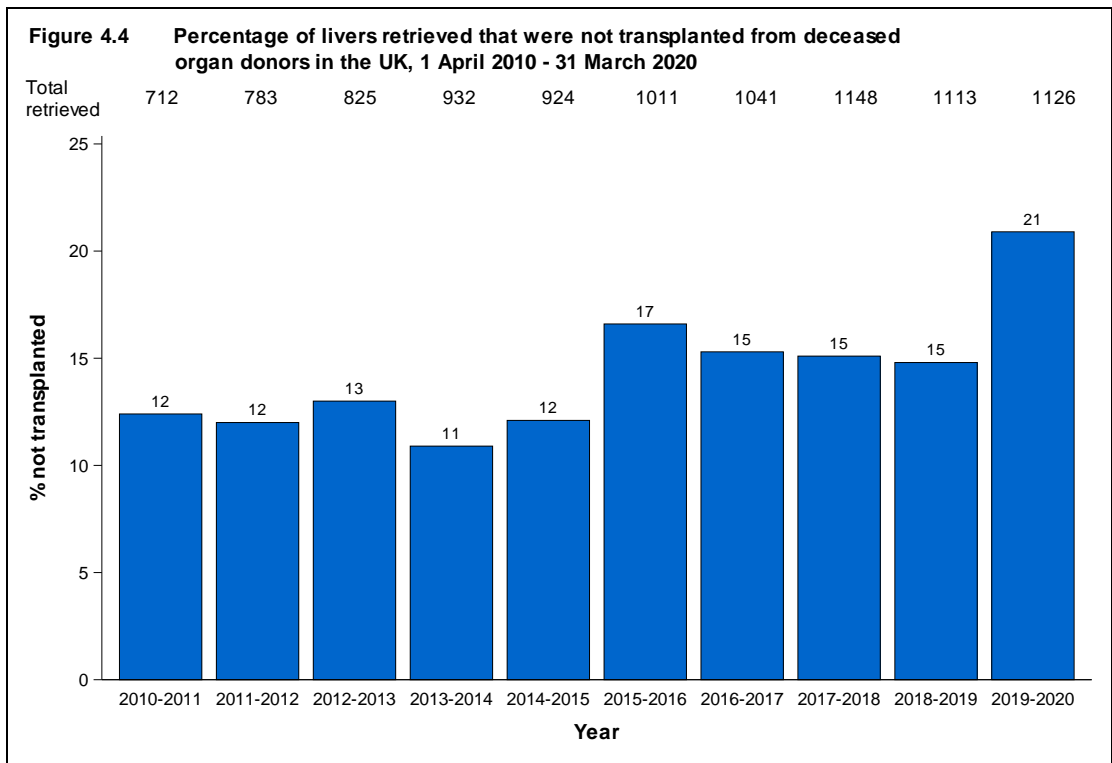
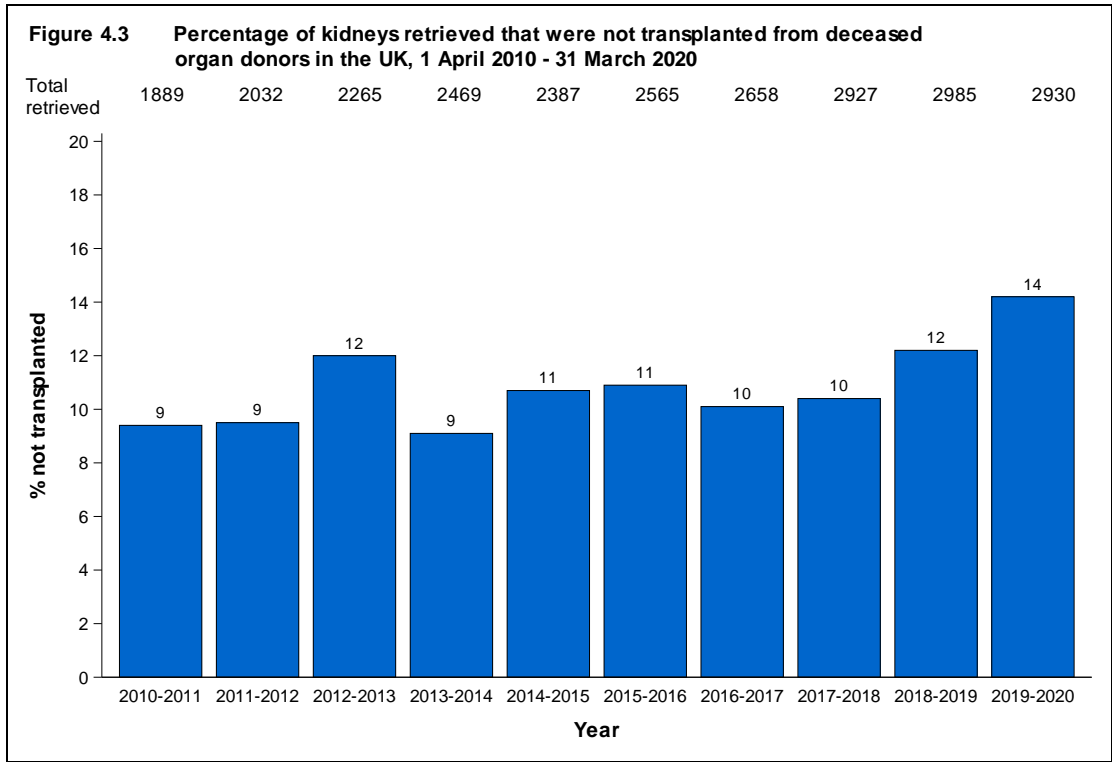
	Kidney	Liver	Pancreas
All actual DCD organ donors	634	634	634
Donors from whom organs were not offered for donation	6	39	378
Reasons for organs not being offered¹			
Family permission refused	0	1	3
Permission refused by coroner	1	3	1
Permission refused other	0	1	1
Donor unsuitable - medical	0	0	1
Donor unsuitable - non-medical	0	1	0
Donor unsuitable - age	2	4	311
Organ unsuitable - clinical	3	19	24
Poor function	0	6	0
Other	0	4	37
TOTAL DONORS WITH ORGANS NOT OFFERED	6	39	378
Organs offered for donation	1252	595	256
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Organs not retrieved (% of organs offered for donation)	27 (2)	317 (53)	140 (55)
Reasons for non-retrieval			
Donor unsuitable - medical	1	4	4
Donor unsuitable - non-medical	0	16	11
Donor unsuitable - age	0	81	27
Organ unsuitable - clinical	15	95	55
Poor function	5	27	6
Other	6	94	37
TOTAL ORGANS OFFERED, NOT RETRIEVED	27	317	140
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Organs retrieved (% of organs offered for donation)	1225 (98)	278 (47)	116 (45)
Organs transplanted in the UK	991	170	51
Organs transplanted overseas	0	0	0
Organs not transplanted	234	108	65
Reasons for organ not being transplanted			
Donor unsuitable - medical	46	9	8
Donor unsuitable - non-medical	1	1	5
Donor unsuitable - age	3	4	2
Organ unsuitable - clinical	65	37	21
Poor function	6	9	0
Other	113	48	29
TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)	234 (98)	108 (61)	65 (24)

¹ 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 2019 - 31 March 2020

	Heart (DBD)	Lung (DBD)	Lung (DCD)
All actual organ donors	946	946	634
Donors from whom organs were not offered for donation	423	365	380
Reasons for organs not being offered¹			
Family permission refused	32	24	17
Permission refused by coroner	36	21	13
Permission refused other	2	1	1
Donor unsuitable - medical	1	0	4
Donor unsuitable - non-medical	6	1	1
Donor unsuitable - age	242	98	52
Organ unsuitable - clinical	59	97	153
Poor function	39	103	129
Other	6	20	10
TOTAL DONORS WITH ORGANS NOT OFFERED	423	365	380
Organs offered for donation	523	1161	508
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Organs not retrieved (% of organs offered for donation)	362 (69)	887 (76)	419 (82)
Reasons for non-retrieval			
Donor unsuitable – medical	16	14	12
Donor unsuitable - non-medical	15	40	16
Donor unsuitable – age	30	14	10
Organ unsuitable - clinical	96	274	132
Poor function	154	345	132
Other	51	200	117
TOTAL ORGANS OFFERED, NOT RETRIEVED	362	887	419
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Organs retrieved (% of organs offered for donation)	161 (31)	274 (24)	89 (18)
Organs transplanted in the UK	152	238	63
Organs transplanted overseas	1	18	0
Organs not transplanted	8	18	26
Reasons for organ not being transplanted			
Organ unsuitable - clinical	1	0	2
Poor function	4	0	0
Other	3	18	24
TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)	8 (3)	18 (9)	26 (18)

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



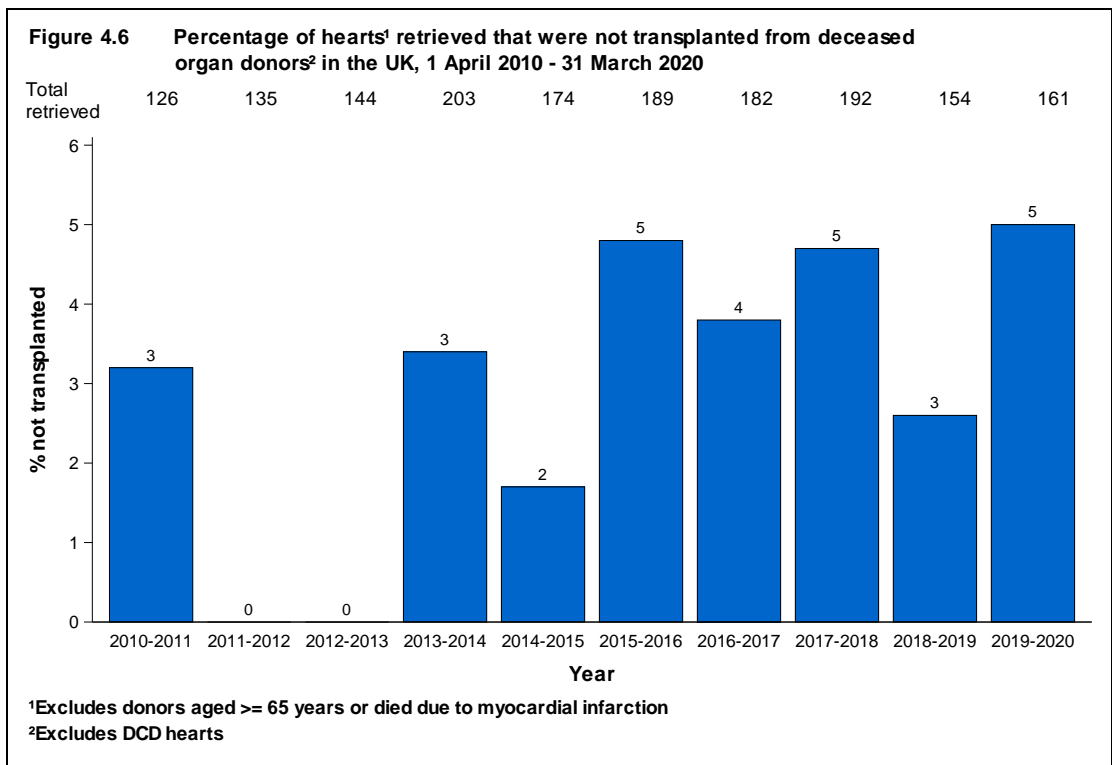
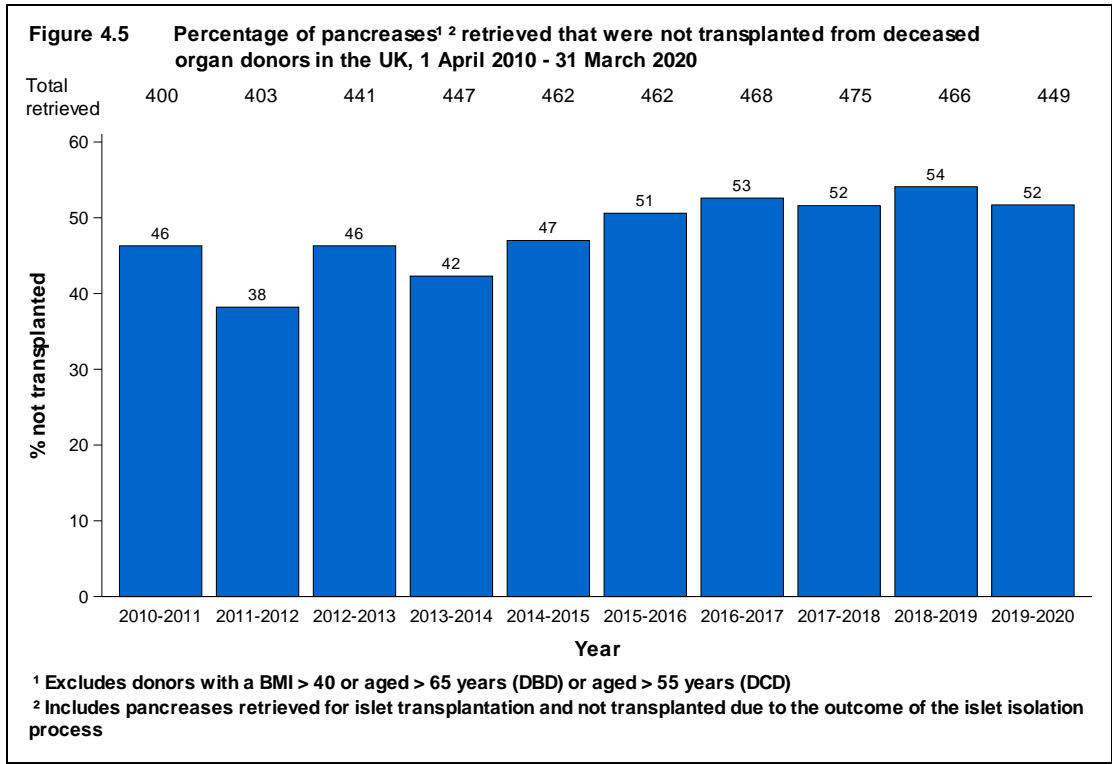
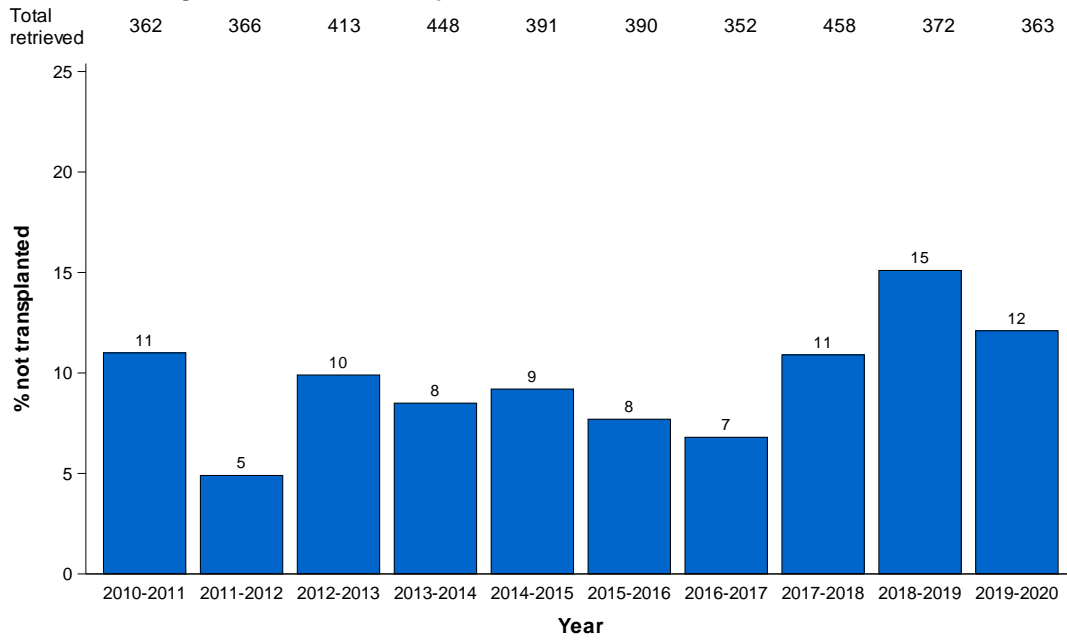


Figure 4.7 Percentage of lungs¹ retrieved that were not transplanted from deceased organ donors in the UK, 1 April 2010 - 31 March 2020



¹Excludes donors aged > 70 years