

The National Organ Retrieval Service and Usage of Organs

Key messages

- National Organ Retrieval Service teams attended 793 possible DBD donors and 587 possible DCD donors; 97% of these DBD donors and 71% 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 85% for kidneys, 63% for livers, 17% for pancreases, 29% for hearts, 13% for lungs and 9% for bowels
- The number of deceased donors per million of population was 17.6, however 4% of actual donors resulted in no organ transplants, compared with 8% 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'.

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 2020-2021 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 in the UK, 1 April 2020 – 31 March 2021

NORS team	DBD				DCD			
	Proceeding ²	Non-proceeding	% non-proc	No. attended	Proceeding ²	Non-proceeding	% non-proc	No. attended
Abdominal								
Birmingham ¹	94	1	1	95	43	25	37	68
Cambridge	76	2	3	78	65	19	23	84
Cardiff ¹	24	4	14	28	10	4	29	14
Edinburgh	82	2	2	84	39	18	32	57
King's	138	2	1	140	56	20	26	76
Leeds ¹	79	2	2	81	48	15	24	63
Manchester ¹	61	3	5	64	53	28	35	81
Newcastle	74	3	4	77	31	13	30	44
Oxford ¹	75	5	6	80	39	15	28	54
Royal Free ¹	61	3	5	64	30	16	35	46
Abdominal total	764	27	3	791	414	173	29	587
Cardiothoracic¹								
Birmingham	31	24	44	55	0	5	100	5
Glasgow	21	14	40	35	0	2	100	2
Harefield	43	42	49	85	14	21	60	35
Manchester	39	22	36	61	8	7	47	15
Newcastle	26	14	35	40	4	9	69	13
Papworth	32	17	35	49	23	8	26	31
Cardiothoracic total	192	133	41	325	49	52	51	101
Total donors attended	766	27	3	793	414	173	29	587

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 2020-2021, 4% of actual donors resulted in no organ transplants, less than the previous year (8%). Note that the COVID-19 pandemic affected the number of offered, retrieved and transplanted organs in 2020-2021.

Table 4.2 Consented, offered, actual and utilised deceased donors in the UK, 1 April 2020 - 31 March 2021					
	DBD (pmp)		DCD (pmp)		Total (pmp)
Consented donors ¹	888	(13.2)	747	(11.1)	1635 (24.4)
Offered donors ²	834	(12.4)	677	(10.1)	1511 (22.5)
<i>Kidneys offered</i>	1613		1316		2929
<i>Livers offered</i>	803		611		1414
<i>Pancreases offered</i>	492		259		751
<i>Bowels offered</i>	132		0		132
<i>Hearts offered</i>	508		135		643
<i>Lungs offered</i>	1028		596		1624
Actual donors ³	766	(11.4)	414	(6.2)	1180 (17.6)
Utilised donors ⁴	742	(11.1)	388	(5.8)	1130 (16.9)

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 1,180 actual deceased organ donors in 2020-2021, 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 766 DBD and 414 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 1180 deceased donors in the UK, 1 April 2020 – 31 March 2021

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	1491	1380	93	1251	91	84	87
Liver	742	688	93	593	86	80	23
Pancreas ¹	464	159	34	87	55	19	33
Bowel ²	127	14	11	12	86	9	0
Heart ³	482	142	29	139	98	29	1
Lung ⁴	944	159	17	140	88	15	8
Total	4250	2542	60	2222	87	52	152
DCD donor organs ⁵							
Kidney	815	799	98	699	87	86	71
Liver	383	182	48	119	65	31	25
Pancreas ¹	181	52	29	24	46	13	12
Lung ⁴	386	52	13	35	67	9	8
Total	1765	1085	61	877	81	50	116
Deceased donor organs							
Kidney	2306	2179	94	1950	89	85	158
Liver	1125	870	77	712	82	63	48
Pancreas ¹	645	211	33	111	53	17	45
Bowel ²	127	14	11	12	86	9	0
Heart ³	482	142	29	139	98	29	1
Lung ⁴	1330	211	16	175	83	13	16
Total	6015	3627	60	3099	85	52	268

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 766 DBD and 414 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 84% of the kidneys from the 414 DCD donors were transplanted, a slight rise from 78% 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 2020 – 31 March 2021

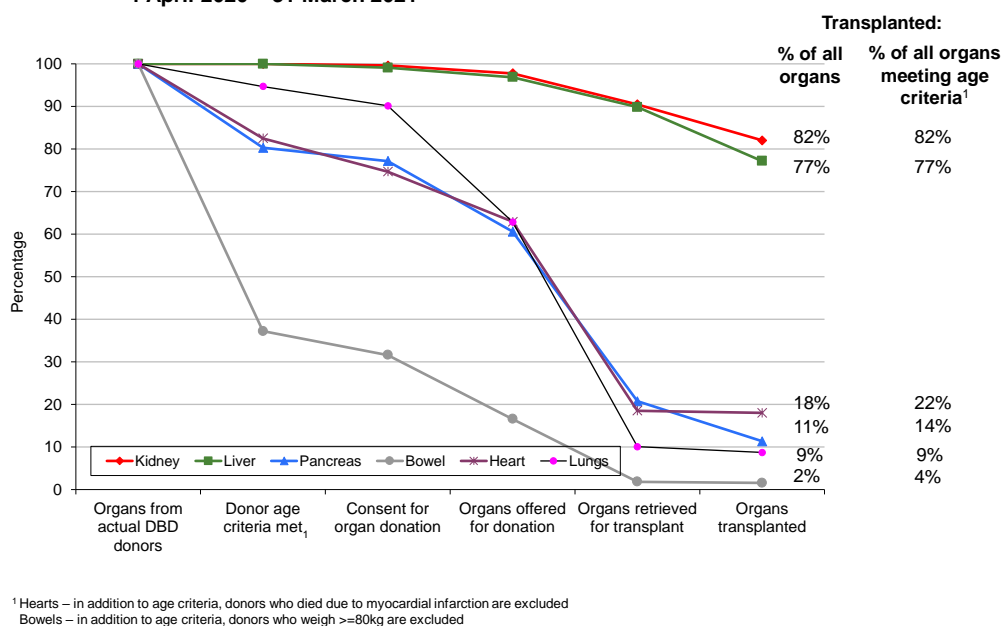
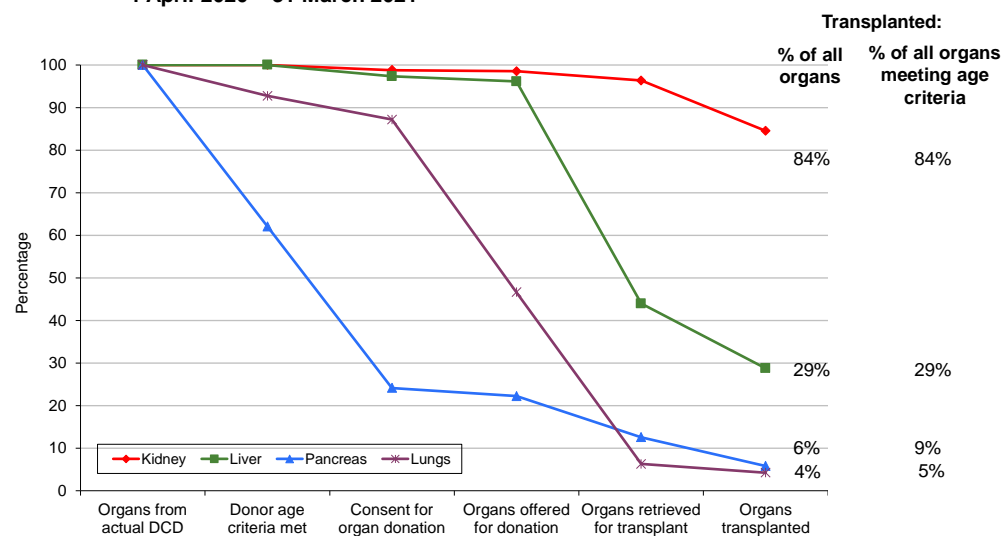


Figure 4.2 Donation and transplantation rates of organs from DCD organ donors in the UK, 1 April 2020 – 31 March 2021



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 2020-2021 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 2020-2021 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 2020 - 31 March 2021

	Kidney	Liver	Pancreas	Bowel
All actual DBD organ donors	766	766	766	766
Donors from whom organs not offered for donation	17	24	302	639
Reasons for organs not being offered¹				
Family permission refused	1	3	15	32
Permission refused by coroner	1	3	5	5
Permission refused other	1	1	4	6
Donor unsuitable - medical	1	0	1	3
Donor unsuitable - non-medical	0	0	12	6
Donor unsuitable - age	1	0	151	0
Organ unsuitable - clinical	8	13	42	22
Poor function	4	2	0	1
Donor age ≥ 56 or donor weight ≥ 80kg	0	0	0	481
Other	0	2	72	83
TOTAL DONORS WITH ORGANS NOT OFFERED	17	24	302	639
Organs offered for donation	1491	742	464	127
Organs not retrieved (% of organs offered for donation)	111 (7)	54 (7)	305 (66)	113 (89)
Reasons for non-retrieval				
Donor unsuitable - medical	6	2	9	20
Donor unsuitable - non-medical	0	0	32	8
Donor unsuitable - age	18	0	86	4
Organ unsuitable - clinical	47	39	111	29
Poor function	19	8	21	2
Other	21	5	46	50
TOTAL ORGANS OFFERED, NOT RETRIEVED	111	54	305	113
Organs retrieved (% of organs offered for donation)	1380 (93)	688 (93)	159 (34)	14 (11)
Organs transplanted in the UK	1251	591	87	12
Organs transplanted overseas	0	2	0	0
Organs not transplanted	129	95	72	2
Reasons for organ not being transplanted				
Donor unsuitable - medical	37	10	5	0
Donor unsuitable - non-medical	1	1	1	0
Donor unsuitable - age	3	0	2	0
Organ unsuitable - clinical	41	54	38	0
Poor function	10	6	2	0
Other	37	24	24	2
TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)	129 (87)	95 (23)	72 (33)	2

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 2020 - 31 March 2021

	Kidney	Liver	Pancreas
All actual DCD organ donors	414	414	414
Donors from whom organs not offered for donation	6	31	233
Reasons for organs not being offered¹			
Family permission refused	0	2	4
Permission refused by coroner	0	3	4
Donor unsuitable - non-medical	0	0	18
Donor unsuitable - age	1	11	157
Organ unsuitable - clinical	3	13	23
Poor function	1	1	0
Other	1	1	27
TOTAL DONORS WITH ORGANS NOT OFFERED	6	31	233
Organs offered for donation	817	383	181
Organs not retrieved (% of organs offered for donation)	18 (2)	201 (52)	129 (71)
Reasons for non-retrieval			
Donor unsuitable - medical	2	1	2
Donor unsuitable - non-medical	0	8	12
Donor unsuitable - age	1	30	37
Organ unsuitable - clinical	10	90	48
Poor function	3	21	3
Other	2	51	27
TOTAL ORGANS OFFERED, NOT RETRIEVED	18	201	129
Organs retrieved (% of organs offered for donation)	799 (98)	182 (48)	52 (29)
Organs transplanted in the UK	699	119	24
Organs transplanted overseas	0	0	0
Organs not transplanted	100	63	28
Reasons for organ not being transplanted			
Donor unsuitable - medical	21	9	5
Donor unsuitable - non-medical	3	3	0
Donor unsuitable - age	1	1	3
Organ unsuitable - clinical	43	18	15
Poor function	4	10	0
Other	26	22	5
TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED (Number used for research)	100 (71)	63 (25)	28 (12)

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 2020 - 31 March 2021

	Heart (DBD)	Lung (DBD)	Lung (DCD)
All actual organ donors	766	766	414
Donors from whom organs not offered for donation	284	294	221
Reasons for organs not being offered¹			
Family permission refused	28	9	10
Permission refused by coroner	29	23	12
Permission refused other	3	4	1
Donor unsuitable - medical	0	1	5
Donor unsuitable - non-medical	5	4	2
Donor unsuitable - age	134	42	30
Donor unsuitable - cause of death	1	0	0
Organ unsuitable - clinical	46	89	83
Poor function	35	110	74
Other	3	12	4
TOTAL DONORS WITH ORGANS NOT OFFERED	284	294	221
Organs offered for donation	482	944	386
Organs not retrieved (% of organs offered for donation)	340 (71)	785 (83)	334 (87)
Reasons for non-retrieval			
Donor unsuitable - medical	11	20	8
Donor unsuitable - non-medical	29	54	28
Donor unsuitable - age	44	19	4
Organ unsuitable - clinical	71	186	116
Poor function	117	254	96
Other	68	252	82
TOTAL ORGANS OFFERED, NOT RETRIEVED	340	785	334
Organs retrieved (% of organs offered for donation)	142 (29)	159 (17)	52 (13)
Organs transplanted in the UK	138	138	35
Organs transplanted overseas	1	2	0
Organs not transplanted	3	19	17
Reasons for organ not being transplanted			
Donor unsuitable - medical	0	0	1
Donor unsuitable - non-medical	0	1	0
Organ unsuitable - clinical	0	2	4
Poor function	2	8	5
Other	1	8	7
TOTAL ORGANS RETRIEVED, NOT TRANSPLANTED	3 (1)	19 (8)	17 (8)
(Number used for research)			

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

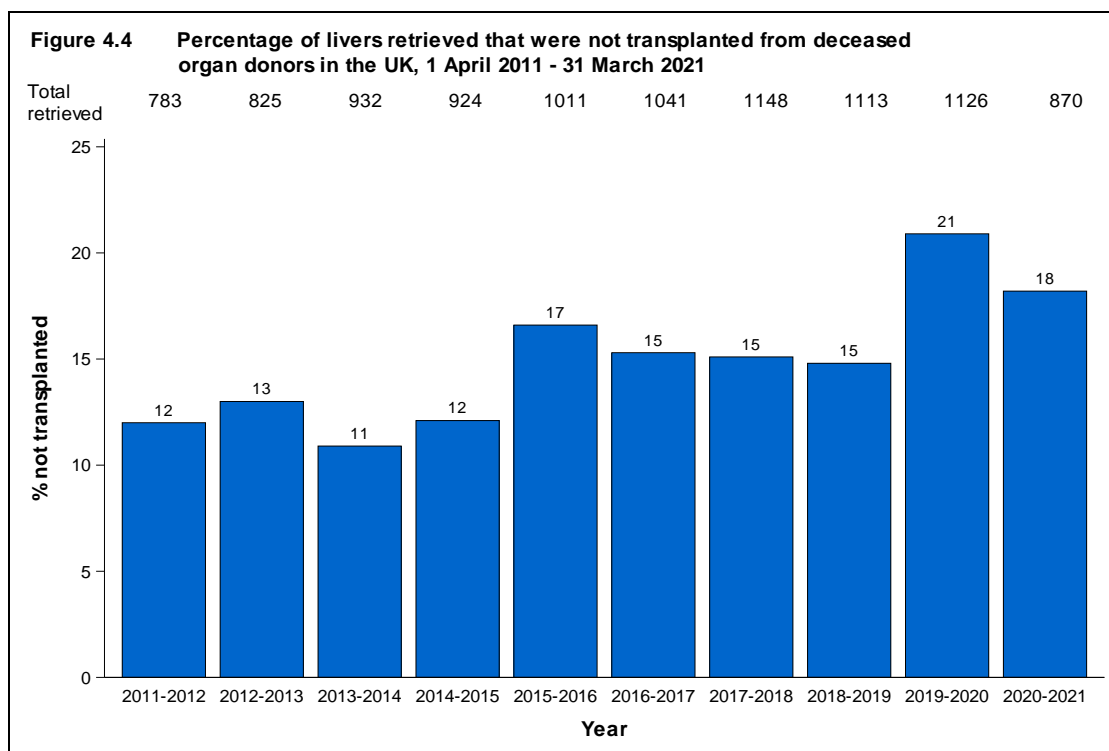
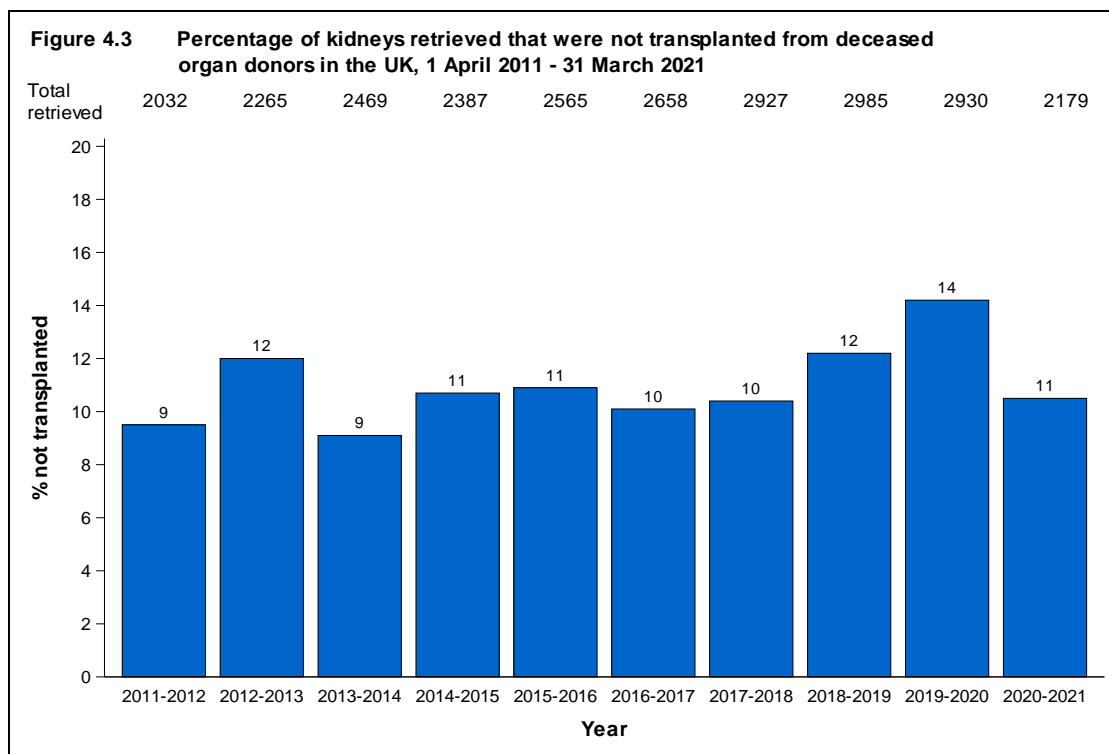
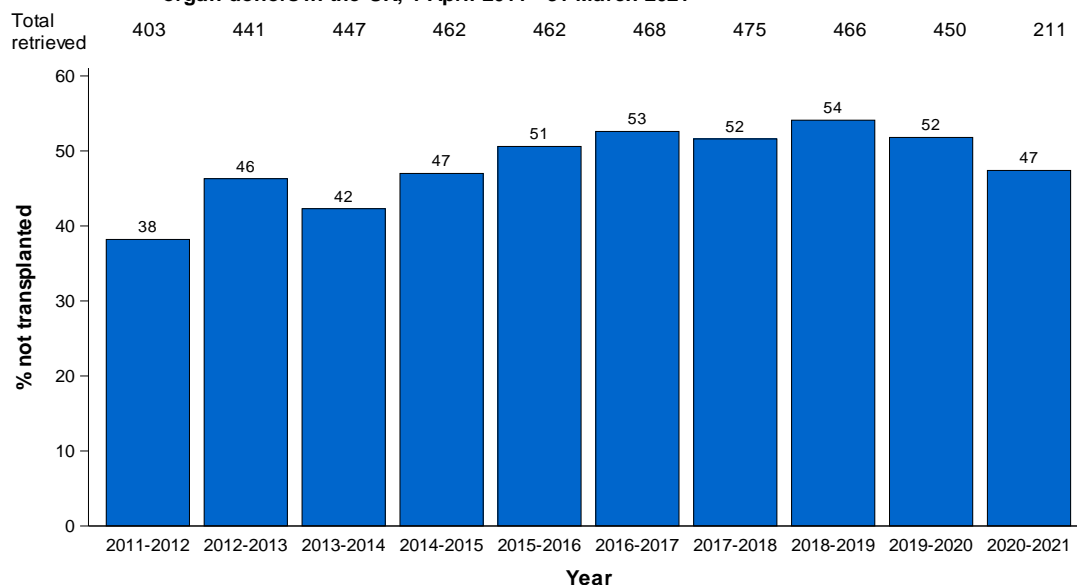


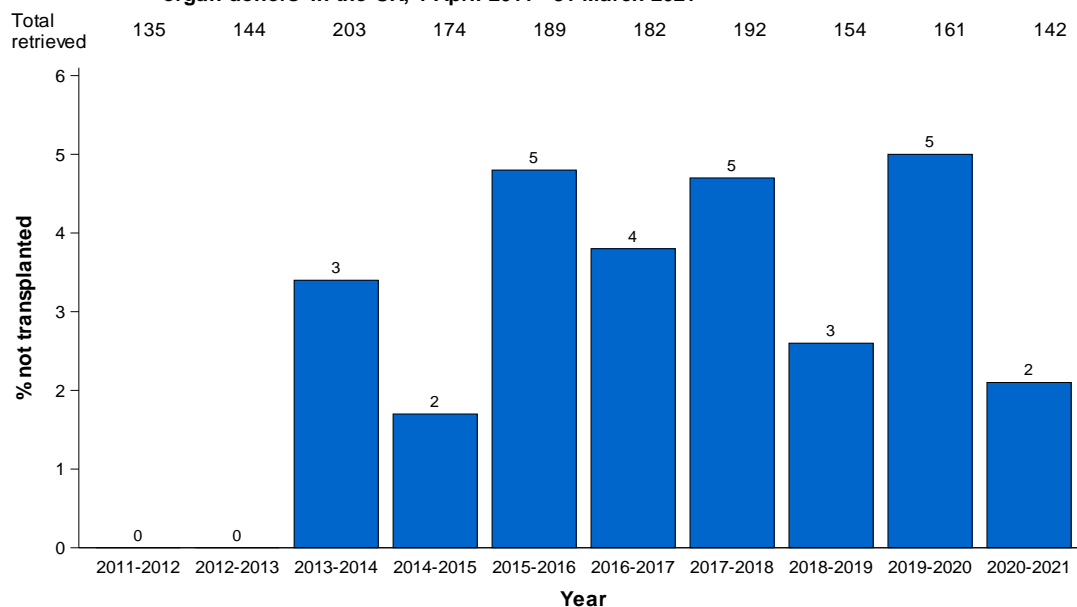
Figure 4.5 Percentage of pancreases^{1 2} retrieved that were not transplanted from deceased organ donors in the UK, 1 April 2011 - 31 March 2021



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

² Includes pancreases retrieved for islet transplantation and not transplanted due to the outcome of the islet isolation process

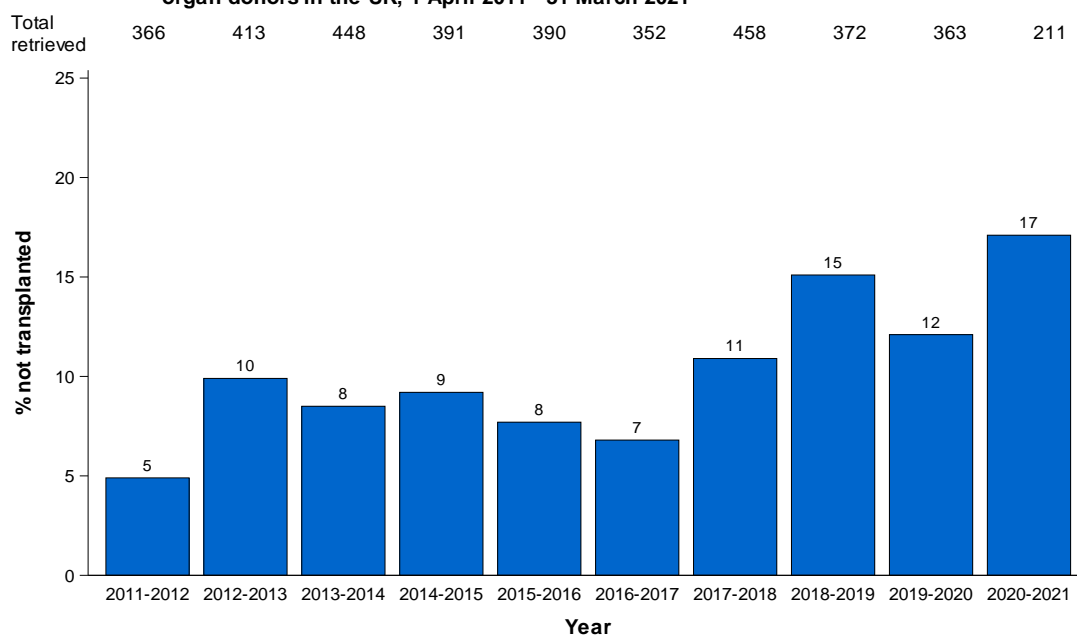
Figure 4.6 Percentage of hearts¹ retrieved that were not transplanted from deceased organ donors² in the UK, 1 April 2011 - 31 March 2021



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

²Excludes DCD hearts

Figure 4.7 Percentage of lungs¹ retrieved that were not transplanted from deceased organ donors in the UK, 1 April 2011 - 31 March 2021



¹Excludes donors aged > 70 years