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## 10 CORNEA ACTIVITY

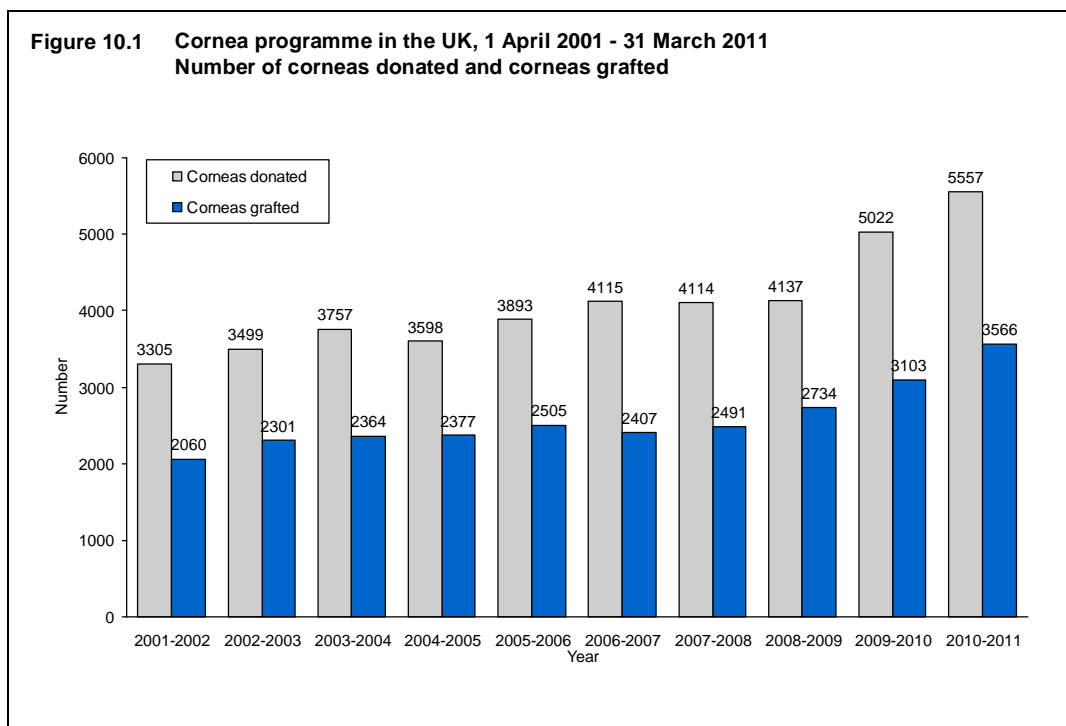
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### Key messages

- 5,091 corneas were supplied to the Corneal Transplant Service (CTS) eye banks, leading to a 15% increase in the number of transplants to 3,566
- Corneas were retrieved from 31% of organ donors after brain death and 38% of organ donors after circulatory death
- 59% of cornea only donors were 70 years of age or over
- Cornea donation and transplant rates continue to vary considerably across the countries of the UK, with donation rates ranging from 19 to 48 per million population (pmp), and transplant rates ranging from 44.7 pmp to 57.6 pmp

### 10.1 Overview

The reported number of corneas donated in 2010-2011 was 5,557, representing an increase of 11% on last year, as shown in **Figure 10.1**. This increase is mainly due to the Eye Retrieval Scheme (ERS) but also due to the fact that more corneas are being donated from solid donors. ERS consists of 10 teams embedded in the selected trusts/boards across the UK, that are funded by NHSBT for the purpose of promoting, procuring and retrieving ocular tissue for the clinical use. Additionally, 281 sclera were issued and used. It should be noted that not all cornea donors and transplants in the UK are reported to the UK Transplant Registry and thus the data reported are not the full national data.



In 2010-2011 there were 2,812 tissue donors, of whom 2,474 donated corneas only and 338 donated corneas and solid organs: see **Table 10.1**. Compared to 2009-

2010, the number of cornea only donors increased by 225, and the number of cornea and solid organ donors increased by 69. In 2010-2011, corneas were retrieved from 31% of organ donors after brain death compared with 27% in 2009-2010. Of the 373 organ donors after cardiac death in 2010-2011, 141 also donated corneas.

**Table 10.1** also shows the number and rate per million population (pmp) of donors in 2010-2011 by country and English Strategic Health Authority (SHA), with figures for 2009-2010 in parentheses. No adjustments have been made for potential demographic differences in populations. Wales had the highest cornea donor rate in the UK in 2010-2011 (48 pmp). In 2010-2011, the cornea donor rate increased in England, Scotland, Wales and Northern Ireland. Across the SHAs the cornea donor rate ranged from 13.3 pmp to 96.6 pmp.

<b>Country/ Strategic Health Authority of residence</b>	<b>Cornea only donors</b>		<b>Solid organ and cornea donors</b>		<b>TOTAL</b>		<b>TOTAL pmp</b>	
North East	193	(182)	22	(9)	215	(191)	83.3	(74.0)
North West	580	(622)	32	(31)	612	(653)	88.7	(94.6)
Yorkshire and The Humber	103	(81)	20	(16)	123	(97)	23.4	(18.4)
East Midlands	195	(189)	14	(4)	209	(193)	47.0	(43.4)
West Midlands	57	(46)	15	(13)	72	(59)	13.3	(10.9)
East of England	174	(201)	31	(19)	205	(220)	35.5	(38.1)
London	170	(27)	57	(60)	227	(87)	29.3	(11.2)
South East Coast	49	(69)	19	(17)	68	(86)	15.7	(19.8)
South Central	205	(144)	27	(23)	232	(167)	56.6	(40.7)
South West	462	(508)	43	(37)	505	(545)	96.6	104.2)
<b>England</b>	<b>2188</b>	<b>(2069)</b>	<b>280</b>	<b>(229)</b>	<b>2468</b>	<b>(2298)</b>	<b>47.6</b>	<b>(44.4)</b>
<b>Isle of Man</b>	<b>0</b>	<b>(0)</b>	<b>0</b>	<b>(0)</b>	<b>0</b>	<b>(0)</b>	<b>0.0</b>	<b>(0.0)</b>
<b>Channel Islands</b>	<b>0</b>	<b>(0)</b>	<b>0</b>	<b>(0)</b>	<b>0</b>	<b>(0)</b>	<b>0.0</b>	<b>(0.0)</b>
<b>Wales</b>	<b>120</b>	<b>(59)</b>	<b>24</b>	<b>(15)</b>	<b>144</b>	<b>(74)</b>	<b>48.0</b>	<b>(24.7)</b>
<b>Scotland</b>	<b>141</b>	<b>(113)</b>	<b>20</b>	<b>(20)</b>	<b>161</b>	<b>(133)</b>	<b>31.0</b>	<b>(25.6)</b>
<b>Northern Ireland</b>	<b>20</b>	<b>(5)</b>	<b>14</b>	<b>(5)</b>	<b>34</b>	<b>(10)</b>	<b>19.0</b>	<b>(5.6)</b>
<b>TOTAL</b>	<b>2474</b>	<b>(2249)</b>	<b>338</b>	<b>(269)</b>	<b>2812</b>	<b>(2518)</b>	<b>45.3</b>	<b>(40.6)</b>

## 10.2 Donor and tissue supply

In 2010-2011, 91.6% (96.0% in 2009-2010) of retrieved corneas reported to the UK Transplant Registry were supplied to the Corneal Transplant Service (CTS) Eye Banks in Bristol and Manchester. **Table 10.2** shows the number of corneas supplied to, and taken from, the CTS Eye Banks for those centres that supplied more than 25 corneas in 2010-2011. The difference between the number supplied and number taken is also shown, together with the number of corneas that were deemed suitable for a penetrating keratoplasty (PK). Centres with a negative balance have taken more corneas than they supplied to the CTS Eye Banks.

**Table 10.2 Corneas supplied to and taken from the CTS Eye Banks,  
1 April 2010 - 31 March 2011**

Centre	Corneas supplied	Suitable for PK (%)	Corneas taken	Balance
ERS Merseyside	362	223 (62)	166	196
ERS Royal Devon	342	220 (64)	30	312
ERS Bristol	326	194 (60)	88	238
ERS Newcastle	323	233 (72)	65	258
ERS Nottingham	314	224 (71)	132	182
ERS Bolton	310	185 (60)	20	290
ERS Southampton	306	172 (56)	68	238
ERS Norfolk	284	215 (76)	48	236
ERS Preston	215	148 (69)	26	189
ERS Glasgow	166	136 (82)	153	13
Manchester, Royal Eye Hospital	127	93 (73)	214	-87
Cardiff, University of Wales Hospital	90	68 (76)	22	68
Middlesbrough, James Cook University Hospital	88	63 (72)	5	83
East Grinstead, Queen Victoria Hospital	70	41 (59)	28	42
Blackburn, Royal Infirmary	68	41 (60)	11	57
Plymouth, Royal Eye Infirmary	60	37 (62)	41	19
Belfast, Royal Victoria Hospital	54	32 (59)	58	-4
Newport, Royal Gwent Hospital	53	36 (68)	13	40
Leicester, Royal Infirmary	50	35 (70)	62	-12
Oxford, John Radcliffe Hospital	44	33 (75)	43	1
Taunton, Taunton & Somerset Hospital	42	26 (62)	3	39
Yeovil District Hospital	39	15 (38)	0	39
Leeds, Teaching hospitals	82	47 (57)	96	-14
Swindon, Great Western Hospital	34	16 (47)	5	29
Edinburgh, Princess Alexandra Eye Pavilion	66	56 (85)	34	32
Cambridge, Addenbrookes Hospital	32	14 (44)	32	0
Barnstaple, North Devon District Hospital	32	25 (78)	3	29
Lancaster, Royal Lancaster Hospital	31	24 (77)	0	31
Salisbury, District Hospital	30	23 (77)	3	27
Dundee, Ninewells Hospital	30	26 (87)	0	30
London, Moorfields Eye Hospital	28	11 (39)	96	-68
Hull, East Yorkshire Eye Hospital	26	18 (69)	33	-7
Stoke, North Staffordshire Royal Infirmary	26	16 (62)	20	6
<b>Eye retrieval scheme centres</b>	<b>2948</b>	<b>1950 (66)</b>	<b>796</b>	<b>2152</b>
<b>Centres supplying more than 25 corneas</b>	<b>1202</b>	<b>796 (66)</b>	<b>822</b>	<b>380</b>
<b>All other centres</b>	<b>941</b>	<b>619 (66)</b>	<b>1688</b>	<b>-747</b>
<b>TOTAL</b>	<b>5091</b>	<b>3365 (66)</b>	<b>3306</b>	<b>1785</b>

ERS – Eye Retrieval Scheme  
PK - Penetrating keratoplasty

Of the 5,091 corneas supplied to the CTS Eye Banks, 3,365 (66%) were suitable for a PK. This was an increase compared with 2009-2010, when 64% of corneas supplied to the CTS Eye Banks were suitable for a PK.

### 10.3 CTS Eye Bank activity

The activity levels for the Bristol and Manchester Eye Banks are shown in **Table 10.3**. The numbers of corneas received by the CTS Eye Banks increased in 2010-2011 by 6%, and the number of corneas issued increased by 8%. In 2010-2011, 5,091 corneas were received into the CTS Eye Banks, of which 3,527 (69%) were subsequently issued for grafting. The remaining corneas were unsuitable for transplantation.

	Total received		Number issued <sup>1</sup>		% issued		Difference between number received and issued	
Bristol	2266	(2226)	1473	(1530)	65	(69)	793	(696)
Manchester	2825	(2594)	2054	(1744)	73	(67)	771	(850)
<b>Total</b>	<b>5091</b>	<b>(4820)</b>	<b>3527</b>	<b>(3274)</b>	<b>69</b>	<b>(68)</b>	<b>1564</b>	<b>(1546)</b>

<sup>1</sup> Number issued of those received in each year

The outcome of corneas received into the CTS Eye Banks is given in **Table 10.4**. Of the corneas supplied to the Eye Banks in 2010-2011, 61% were issued with an endothelium suitable for penetrating keratoplasty (these corneas may have been used for penetrating keratoplasty, deep anterior lamellar keratoplasty or endothelial keratoplasty), 1% were issued that were suitable for lamellar grafts, 2% were issued for other types of graft and 5% were issued but not used. Of the corneas supplied to the Eye Banks, 13% were unsuitable because of medication contraindications, 12% had endothelial deficiencies or stromal opacity and 4% were discarded because of bacterial or fungal contamination. 1% of corneas became outdated, that is, they exceeded 28 days storage. Corneas that were unsuitable for transplantation were, where possible, used for research when permission had been given by the relatives.

### 10.4 Transplants

Corneal transplant activity by country of residence and Strategic Health Authority in England for the years 2009-2010 and 2010-2011 is detailed in **Table 10.5** for corneas supplied through the CTS Eye Banks and transplants that have been reported to the UK Transplant Registry by Moorfields Eye Bank. Corneas from East Grinstead Eye Bank will be reported to the UK Transplant Registry during 2011-2012. No adjustments have been made for potential demographic differences in populations. The overall transplant rate was 50.0 pmp in 2009-2010; this increased to 57.5 pmp in 2010-2011. The transplant rates increased in England, Scotland, Wales and Northern Ireland. England had the highest transplant rate in the UK: 57.6 pmp, this ranged from 47.5 pmp to 75.1 pmp across the SHAs.

**Table 10.4 Outcome of corneas received into the Bristol and Manchester Eye Banks, 1 April 2010 - 31 March 2011 (2009 - 2010), by year**

Outcome of cornea	Bristol				Manchester				TOTAL			
	N		%		N		%		N		%	
<b>Used</b>												
Penetrating keratoplasty	1338	(1338)	59	(60)	1783	(1491)	63	(57)	3121	(2829)	61	(59)
Lamellar keratoplasty	16	(17)	1	(1)	27	(30)	1	(1)	43	(47)	1	(1)
Other/ not reported	18	(65)	1	(3)	84	(97)	3	(4)	102	(162)	2	(3)
<b>Total used</b>	<b>1372</b>	<b>(1420)</b>	<b>61</b>	<b>(64)</b>	<b>1894</b>	<b>(1618)</b>	<b>67</b>	<b>(62)</b>	<b>3266</b>	<b>(3038)</b>	<b>64</b>	<b>(63)</b>
<b>Not used</b>												
Issued, not used	101	(110)	4	(5)	160	(126)	6	(5)	261	(236)	5	(5)
Unsuitable - endothelium, stromal, opacity, other	350	(219)	15	(10)	269	(301)	10	(12)	619	(520)	12	(11)
Medical reason - virology	172	(218)	8	(10)	141	(247)	5	(10)	313	(465)	6	(10)
Medical reason - other	172	(132)	8	(6)	182	(161)	6	(6)	354	(293)	7	(6)
Contaminated	84	(103)	4	(5)	128	(111)	5	(4)	212	(214)	4	(4)
Other/not reported	15	(24)	1	(1)	51	(30)	2	(1)	66	(54)	1	(1)
<b>Total not used</b>	<b>894</b>	<b>(806)</b>	<b>39</b>	<b>(36)</b>	<b>931</b>	<b>(976)</b>	<b>33</b>	<b>(38)</b>	<b>1825</b>	<b>(1782)</b>	<b>36</b>	<b>(37)</b>
<b>TOTAL</b>	<b>2266</b>	<b>(2226)</b>			<b>2825</b>	<b>(2594)</b>			<b>5091</b>	<b>(4820)</b>		

**Table 10.5 Cornea transplants<sup>1</sup> performed per million population (pmp) in the UK, 1 April 2009 - 31 March 2011, by country and English Strategic Health Authority of residence**

<b>Country/ Strategic Health Authority of residence</b>	<b>Number of transplants (pmp)</b>			
	<b>2009-2010</b>		<b>2010-2011</b>	
North East	115	(44.6)	144	(55.8)
North West	405	(58.7)	518	(75.1)
Yorkshire and The Humber	405	(77.0)	365	(69.4)
East Midlands	229	(51.5)	244	(54.8)
West Midlands	249	(45.9)	329	(60.6)
East of England	221	(38.3)	288	(49.9)
London	416	(53.7)	368	(47.5)
South East Coast	182	(41.9)	240	(55.3)
South Central	196	(47.8)	216	(52.7)
South West	233	(44.6)	272	(52.0)
<b>England</b>	<b>2651</b>	<b>(51.2)</b>	<b>2984</b>	<b>(57.6)</b>
<b>Isle of Man</b>	<b>4</b>	<b>(50.0)</b>	<b>4</b>	<b>(50.0)</b>
<b>Channel Islands</b>	<b>4</b>	<b>(26.7)</b>	<b>6</b>	<b>(40.0)</b>
<b>Wales</b>	<b>98</b>	<b>(32.7)</b>	<b>157</b>	<b>(52.3)</b>
<b>Scotland</b>	<b>201</b>	<b>(38.7)</b>	<b>232</b>	<b>(44.7)</b>
<b>Northern Ireland</b>	<b>74</b>	<b>(41.3)</b>	<b>95</b>	<b>(53.1)</b>
<b>TOTAL<sup>2</sup></b>	<b>3103</b>	<b>(50.0)</b>	<b>3564</b>	<b>(57.5)</b>

<sup>1</sup> Corneas supplied through the CTS Eye Banks and Moorfields Eye Bank

<sup>2</sup> Includes UK recipients where the postcode was unspecified and non-UK recipients

## 10.5 Demographic characteristics

The ethnicity of cornea donors and transplant recipients is shown in **Table 10.6**. While 1% of donors in 2010-2011 were non-white, 14% of transplant recipients were non-white.

Ethnicity	Cornea only donors				Solid organ and cornea donors				Transplant recipients			
	2009-2010		2010-2011		2009-2010		2010-2011		2009-2010		2010-2011	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
White	2232	(99.3)	2364	(99.2)	260	(96.7)	328	(97.0)	2563	(84.0)	3036	(86.0)
Asian	12	(0.5)	16	(0.7)	5	(1.9)	4	(1.2)	329	(10.8)	317	(9.0)
Black	2	(0.1)	2	(0.1)	2	(0.7)	3	(0.9)	130	(4.3)	139	(3.9)
Chinese	0	(0.0)	0	(0.0)	0	(0.0)	1	(0.3)	6	(0.2)	11	(0.3)
Other	2	(0.1)	1	(0.0)	2	(0.7)	2	(0.6)	23	(0.8)	28	(0.8)
Not reported	1	-	91	-	0	-	0	-	52	-	33	-
<b>TOTAL</b>	<b>2249</b>		<b>2474</b>		<b>269</b>		<b>338</b>		<b>3103</b>		<b>3564</b>	

The age and sex distribution of donors and recipients in 2010-2011 are shown in **Table 10.7**. Of the 2,474 cornea only donors, 31% were aged  $\geq 80$  years. In contrast, only 19% of transplant recipients were aged  $\geq 80$  years although 23% of transplants were in patients aged 70-79 years.

Age group (years)	Cornea only donors		Solid organ and cornea donors		Transplant recipients	
	N	(%)	N	(%)	N	(%)
0 - 17	15	(1)	4	(1)	67	(2)
18 - 34	49	(2)	35	(10)	563	(16)
35 - 49	144	(6)	75	(22)	508	(14)
50 - 59	249	(10)	88	(26)	346	(10)
60 - 69	549	(22)	91	(27)	585	(16)
70 - 79	693	(28)	41	(12)	819	(23)
80+	775	(31)	4	(1)	676	(19)
<b>TOTAL</b>	<b>2474</b>	<b>(100)</b>	<b>338</b>	<b>(100)</b>	<b>3564</b>	<b>(100)</b>
<b>% Male</b>		<b>(61)</b>		<b>(56)</b>		<b>(53)</b>