Cornea Activity

Key messages

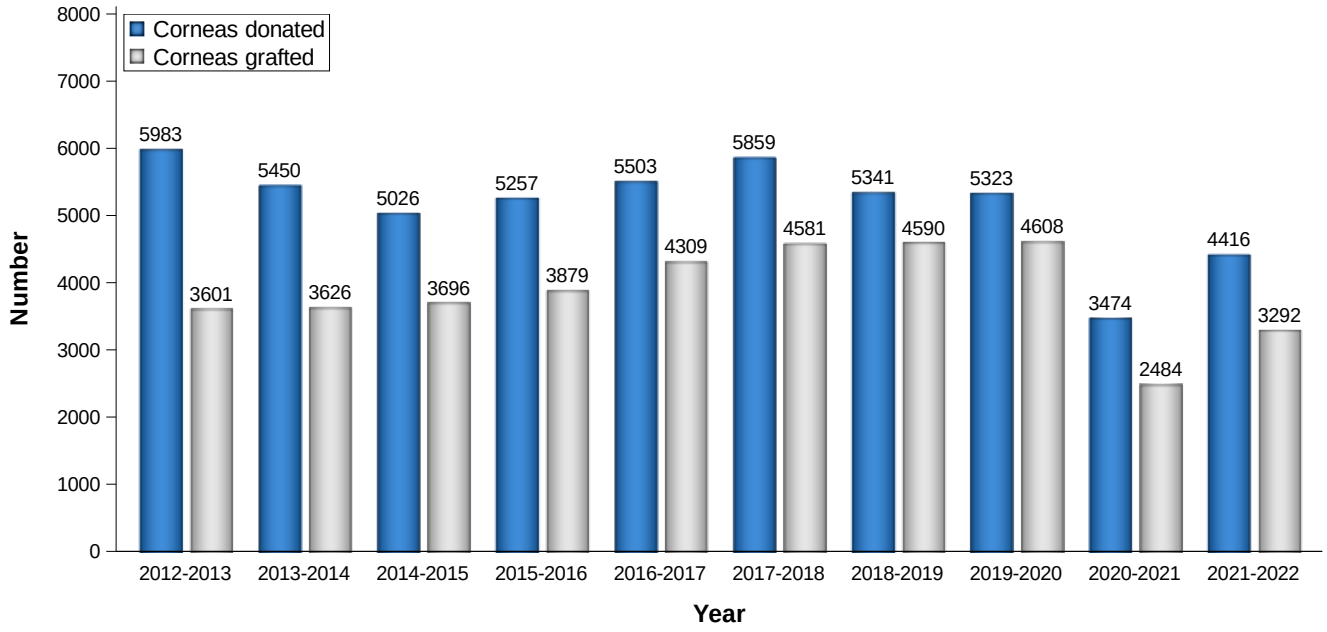
- **4,416 corneas were supplied to NHSBT Eye Banks**
- **Corneas were retrieved from 1,787 cornea-only donors and from 483 solid organ donors after brain death (55%) or after circulatory death (45%)**
- **The number of transplants increased to 3,292 after the pandemic**
- **11%, 33% and 14% of corneal transplants were for keratoconus, Fuchs endothelial dystrophy and pseudophakic bullous keratopathy patients, respectively**
- **Descemet membrane endothelial keratoplasty transplants are now the most popular technique for corneal transplantation**
- **650 (15%) corneas were issued for non-clinical use to support research or training from corneas that were considered unsuitable for transplantation**

10.1 Overview

As a result of the COVID-19 pandemic, the number of corneas transplanted (N=2,484) decreased by 46% in 2020-2021 compared with the previous year. In the last financial year, the total number of corneal transplants has risen to 3,292. The number of corneas donated was 4,416, representing an increase of 27% as shown in **Figure 10.1**. Overall, corneal donation and transplantation figures have not fully recovered to pre-pandemic levels.

It should be noted that not all corneal donations in the UK are reported to NHSBT and thus the donation data reported are not the full national data.

Figure 10.1 Cornea programme in the UK, 1 April 2012 - 31 March 2022, Number of corneas retrieved to NHSBT Eye Banks and corneas grafted



In 2021-2022, of 2,270 donors whose corneas were retrieved to NHSBT Eye Banks, 1,787 were cornea-only donors and 483 were cornea and solid organ donors: see **Table 10.1**. Compared to 2020-2021, the number of cornea-only donors increased by 26.6%, and the number of cornea and solid organ donors increased by 25.5%. In 2021-2022, corneas were retrieved from 264 organ donors after brain death and 219 organ donors after circulatory death.

Table 10.1 also shows the number and rate per million population (pmp) of donors whose corneas were retrieved to NHSBT Eye Banks in 2021-2022, by country and NHS region. Information for 2020-2021 is shown for comparison. No adjustments have been made for potential demographic differences in populations.

In 2021-2022, the corneal donor rate increased across England, Scotland, Wales and Northern Ireland. England had the highest corneal donor rate of countries in the UK (32.9 pmp). Across the NHS regions, the corneal donor rate ranged from 15.3 pmp to 68.6 pmp, demonstrating the impact of the NHSBT National Retrieval Centre and the location of non-NHSBT Eye Banks (East Grinstead).

Table 10.1 Corneal donation rates per million population (pmp) in the UK, 1 April 2021 - 31 March 2022 (2020 - 2021), by country/ NHS region for donors whose corneas were retrieved to NHSBT Eye Banks

Country of residence/ NHS region	Cornea-only		Solid organ and cornea		TOTAL		TOTAL pmp	
North East and Yorkshire	228	(181)	62	(49)	290	(230)	33.6	(26.6)
North West	247	(293)	49	(46)	296	(339)	41.7	(47.8)
Midlands	256	(178)	78	(29)	334	(207)	31.3	(19.4)
East of England	212	(160)	46	(45)	258	(205)	39.3	(31.3)
London	56	(55)	82	(56)	138	(111)	15.3	(12.3)
South East	79	(73)	74	(71)	153	(144)	17.1	(16.1)
South West	343	(255)	46	(46)	389	(301)	68.6	(53.1)
England	**1421**	**(1195)**	**437**	**(342)**	**1858**	**(1537)**	**32.9**	**(27.2)**
Isle of Man	**0**	**(0)**	**0**	**(0)**	**0**	**(0)**	**0.0**	**(0.0)**
Channel Islands	**0**	**(0)**	**0**	**(0)**	**0**	**(0)**	**0.0**	**(0.0)**
Wales	**53**	**(41)**	**12**	**(17)**	**65**	**(58)**	**20.5**	**(18.3)**
Scotland	**37**	**(20)**	**19**	**(17)**	**56**	**(37)**	**10.2**	**(6.8)**
Northern Ireland	**16**	**(7)**	**10**	**(5)**	**26**	**(12)**	**13.7**	**(6.3)**
TOTAL[1]	**1787**	**(1412)**	**483**	**(385)**	**2270**	**(1797)**	**33.8**	**(26.8)**

[1] Includes UK donors where the hospital/hospice postcode was unspecified

10.2 NHSBT Eye Bank activity

NHSBT Eye Bank activity levels for Filton (Bristol) and, David Lucas (in Liverpool) Eye Banks are shown in **Table 10.2**. In 2021-2022, a total of 4,416 corneas were retrieved to NHSBT, of which 3,464 (78%) were subsequently issued for transplantation. Filton Eye Bank (in Bristol) processed 57% of corneas retrieved in the last financial year.

Of 4,416 corneas retrieved, 650 (15%) were issued for non-clinical use to support research or training. These corneas were primarily unsuitable for transplantation (N=596), corneas in ethanol that had expired in the Eye Bank (N=38) or whole eyes strictly retrieved for the purposes of research (N=2).

Table 10.2 Corneas retrieved into NHSBT Eye Banks, by year 1 April 2021 - 31 March 2022 (2020-2021)

Eye bank	Total retrieved		Number issued[1]		% issued		Difference between number retrieved and issued	
Filton	2540	(2274)	1993	(1730)	78	(76)	547	(544)
David Lucas	1876	(1200)	1471	(817)	78	(68)	405	(383)
Total	**4416**	**(3474)**	**3464**	**(2547)**	**78**	**(73)**	**952**	**(927)**

[1] Number issued of those retrieved in each year

10.3 Transplants

Corneal transplant activity in the UK by country of residence and NHS regions for the years 2020-2021 and 2021-2022 is detailed in **Table 10.3**. Corneas were supplied by NHSBT and non-NHSBT Eye Banks for corneal transplants in the UK. No adjustments have been made for potential demographic differences in populations.

The overall transplant rate was 37.0 pmp in 2020-2021. This increased to 49.1 pmp in 2021-2022. Transplant rates increased across England, Scotland, Wales and Northern Ireland. England had the highest transplant rate in the UK: 50.1 pmp, this ranged from 44.1 pmp to 55.9 pmp across the NHS regions.

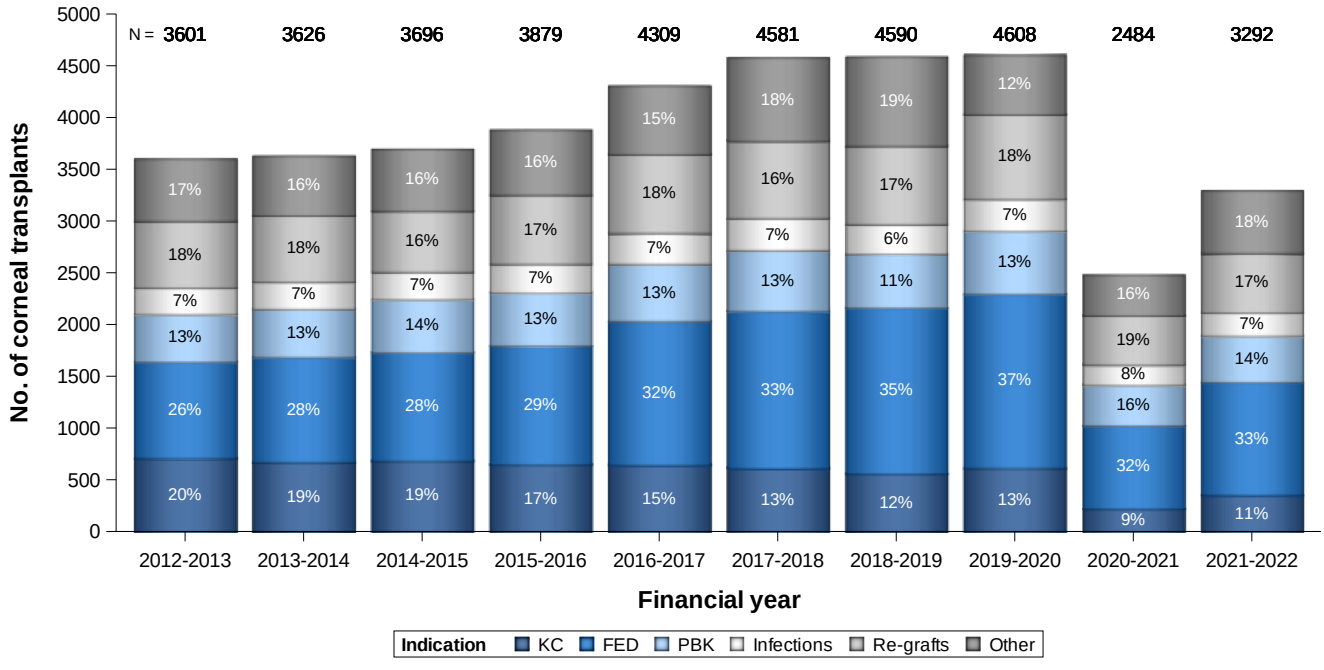
Table 10.3 Cornea transplants performed per million population (pmp) in the UK, 1 April 2020 - 31 March 2022, by country/NHS region

Country of residence/ NHS region	Number of transplants (pmp) 2020-2021		2021-2022	
North East and Yorkshire	255	(29.5)	381	(44.1)
North West	359	(50.6)	381	(53.7)
Midlands	272	(25.5)	500	(46.9)
East of England	297	(45.3)	356	(54.3)
London	408	(45.3)	455	(50.6)
South East	394	(44.1)	499	(55.9)
South West	249	(43.9)	260	(45.9)
England	**2234**	**(39.5)**	**2832**	**(50.1)**
Isle of Man	**0**	**(0)**	**3**	**(37.5)**
Channel Islands	**2**	**(11.8)**	**6**	**(35.3)**
Wales	**70**	**(22.1)**	**129**	**(40.7)**
Scotland	**128**	**(23.4)**	**192**	**(35.1)**
Northern Ireland	**17**	**(8.9)**	**25**	**(13.2)**
TOTAL[1]	**2484**	**(37.0)**	**3292**	**(49.1)**

[1] Includes UK recipients where the postcode was unspecified and non-UK recipients

Figure 10.2 shows the number of corneal transplants in the UK by indication for transplant from 1 April 2012 to 31 March 2022. For corneas transplanted in 2020-2021 and 2021-2022, a further breakdown by indication is shown in **Table 10.4**.

Figure 10.2 Number of corneal transplants in the UK by indication, 1 April 2012 - 31 March 2022



There has been a slight increase in the proportion of corneal transplants for keratoconus (KC) and Fuchs endothelial dystrophy (FED) in 2021-2022. Whereas there has been a slight decrease in the proportion of corneal transplants for pseudophakic bullous keratopathy (PBK), infections and regrafts in 2021-2022. These results reflect a reduction in low-risk patients being transplanted throughout the COVID-19 pandemic due to the suspension of routine surgeries. The most common indication for transplantation is FED representing 33% of corneal transplants in 2021-2022.

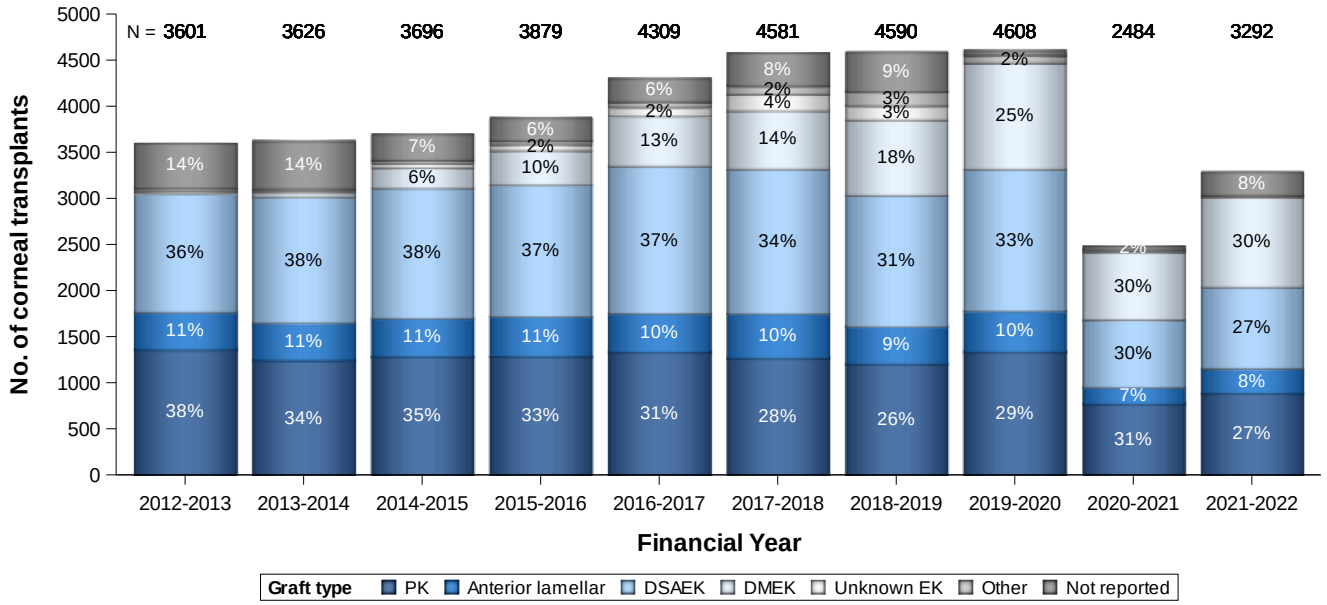
Table 10.4 Corneal transplants in the UK by indication and financial year, 1 April 2020 - 31 March 2022

Indication for transplant	2020 - 2021		2021 - 2022	
	N	%	N	%
Keratoconus (KC)	**224**	**9.0**	**355**	**10.8**
Fuchs endothelial dystrophy (FED)	**803**	**32.3**	**1088**	**33.0**
Pseudophakic bullous keratopathy (PBK)	**394**	**15.9**	**451**	**13.7**
Infections	**194**	**7.8**	**227**	**6.9**
Re-grafts	**478**	**19.2**	**569**	**17.3**
Other (listed below)	**391**	**15.7**	**602**	**18.3**
Ectasias	15	0.6	17	0.5
Dystrophies	35	1.4	53	1.6
Previous ocular surgery	67	2.7	75	2.3
Injury	38	1.5	35	1.1
Ulcerative keratitis	32	1.3	33	1.0
Opacification	56	2.3	51	1.5
Miscellaneous	119	4.8	112	3.4
Not reported	29	1.2	226	6.9
Total	**2484**	**100.0**	**3292**	**100.0**

Figure 10.3 shows the number of corneal transplants in the UK by graft type from 1 April 2012 to 31 March 2022. Over the last 10 years, the proportion of penetrating keratoplasty (PK) grafts has reduced by nearly a third. Descemet Membrane Endothelial Keratoplasty (DMEK) transplants are now the most popular technique for corneal transplantation.

Since March 2014, the type of EK graft has been collected on the Ocular Tissue Outcome and Transplant Record form reported to the UK Transplant Registry. Unknown EK graft types have been imputed such that historic grafts and grafts by surgeons that have never reported a DMEK transplant are assumed to be Descemet Stripping Automated EK (DSAEK) transplants. Further changes to the form were made in April 2019 which has improved the reporting of EK grafts. A further breakdown by graft type for corneas transplanted in 2020-2021 and 2021-2022 is shown in **Table 10.5**.

Figure 10.3 Number of corneal transplants in the UK by graft type, 1 April 2012 - 31 March 2022



Between April 2012 to March 2019, unknown EK grafts have been imputed such that historic grafts and grafts by surgeons that have never reported a DMEK transplant are assumed to be DSAEK transplants

Overall, there has been a decline in the reporting of graft types in the last financial year. In 2021-2022, 27% grafts were DSAEK and 30% were DMEK grafts. PK grafts are still a popular choice for corneal transplantation accounting for 27% of transplants in 2021-2022, anterior lamellar transplants remains a small proportion at 8%.

Table 10.5 Corneal transplants in the UK by graft type and financial year, 1 April 2020 - 31 March 2022

Graft type	2020 - 2021		2021 - 2022	
	N	%	N	%
PK	773	31.1	888	27.0
Anterior lamellar	182	7.3	268	8.1
DSAEK	733	29.5	884	26.9
DMEK	738	29.7	977	29.7
Other	19	0.8	21	0.6
Not reported	39	1.6	254	7.7
All grafts	**2484**	**100.0**	**3292**	**100.0**

Unknown EK grafts have been imputed such that historic grafts and grafts by surgeons that have never reported a DMEK transplant are assumed to be DSAEK transplants

10.4 Demographic characteristics

The age, sex and ethnicity of cornea donors and transplant recipients are shown in **Table 10.6**.

Table 10.6 Demographic characteristics of donors whose corneas were retrieved to NHSBT Eye Banks and transplant recipients in the UK, 1 April 2021 - 31 March 2022

	Cornea-only donors		Solid organ and cornea donors		Transplant recipients	
	N	%	N	%	N	%
Age group (years)						
0 - 17	5	0.3	3	0.6	30	0.9
18 - 34	24	1.3	42	8.7	290	8.8
35 - 49	88	4.9	95	19.7	332	10.1
50 - 59	192	10.7	121	25.1	373	11.3
60 - 69	384	21.5	142	29.4	590	17.9
70-79	700	39.2	80	16.6	1021	31.0
80+	394	22.0	0	0	656	19.9
Mean (SD)	70	(12)	55	(14)	64	(18)
Sex						
Male	1034	57.9	290	60.0	1757	53.4
Female	753	42.1	193	40.0	1535	46.6
Ethnicity						
White	82	4.6	442	91.5	2711	82.4
Asian	6	0.3	11	2.3	269	8.2
Black	0	0	6	1.2	121	3.7
Other	1	0.1	13	2.7	16	0.5
Not reported	1697	95.0	8	1.7	168	5.1
TOTAL	**1787**	**100.0**	**483**	**100.0**	**3292**	**100.0**