Cornea Activity

Key messages

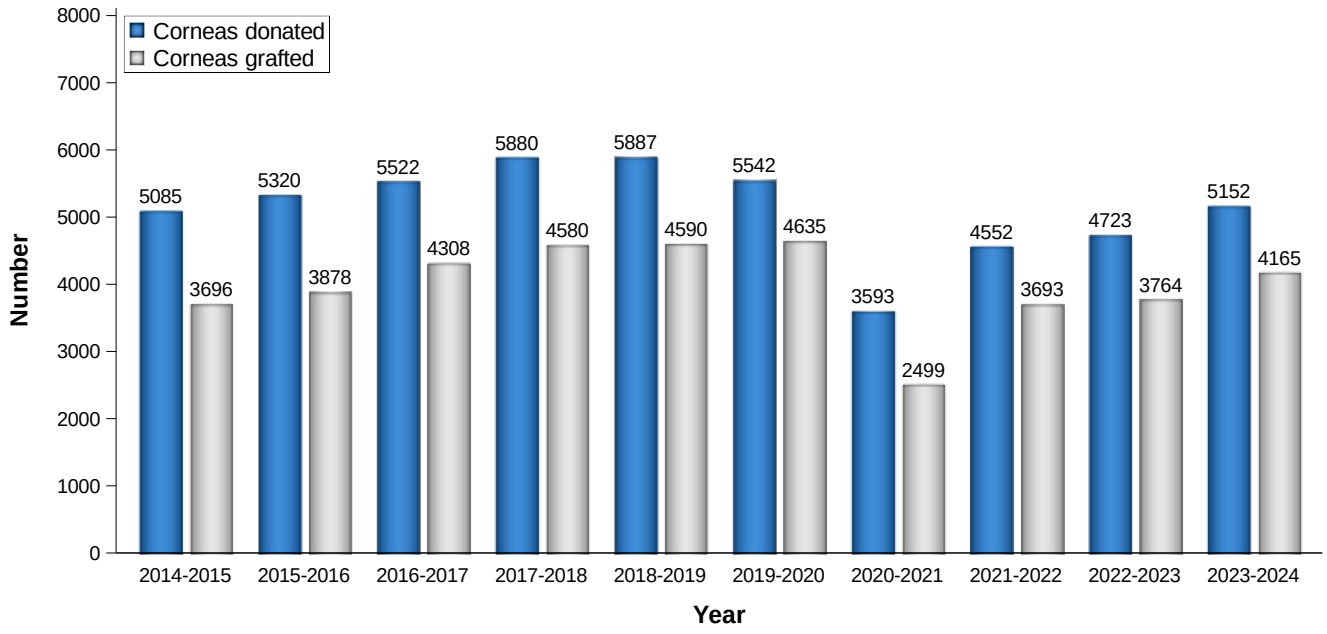
- **5,152 corneas were supplied to NHSBT Eye Banks**
- **Corneas were retrieved from 2,154 cornea-only donors and from 435 solid organ donors after brain death (49%) or after circulatory death (51%)**
- **The number of transplants increased by 11% to 4,165, although figures are an underestimate due to delays in reporting**
- **10%, 35% and 14% of corneal transplants were for keratoconus, Fuchs endothelial dystrophy and pseudophakic bullous keratopathy patients, respectively**
- **Descemet membrane endothelial keratoplasty transplants are the most popular technique for corneal transplantation (33% of all transplants)**
- **540 (10%) 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=2,499) decreased by 46% in 2020-2021 compared with the previous year. In 2021-2022, corneal transplants rose to 3,693, and in the last year, the number of transplants has increased further by 11% to 4,165. These figures are an underestimate due to delays in reporting the transplant outcome to NHSBT. The number of corneas donated in 2023-2024 was 5,152, representing an increase of 9% compared with the previous year 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 corneas donated or transplanted 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 2014 - 31 March 2024, Number of corneas retrieved to NHSBT Eye Banks and corneas grafted



In 2023-2024, of 2,589 donors whose corneas were retrieved to NHSBT Eye Banks, 2,154 were cornea-only donors and 435 were cornea and solid organ donors: see **Table 10.1**. Compared to 2022-2023, the number of cornea-only donors increased by 12%, and the number of cornea and solid organ donors fell by 3%. In 2023-2024, corneas were retrieved from 215 organ donors after brain death and 220 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 2023-2024, by country and NHS region. Information for 2022-2023 is shown for comparison. No adjustments have been made for potential demographic differences in populations.

In 2023-2024, the corneal donor rate increased across England and Scotland. England (42.6 pmp) had the highest corneal donor rate of countries in the UK (38.3 pmp). Across the NHS regions, the corneal donor rate ranged from 17.1 pmp to 71.2 pmp. This variation is largely attributed to the location of NHSBT Eye Retrieval Schemes, NHSBT Eye Banks and non-NHSBT Eye Banks (East Grinstead).

Table 10.1 Corneal donation rates per million population (pmp) in the UK, 1 April 2023 - 31 March 2024 (2022 - 2023), 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	314	(274)	62	(58)	376	(332)	45.7	(40.4)
North West	448	(338)	38	(54)	486	(392)	64.6	(52.1)
Midlands	292	(273)	60	(63)	352	(336)	32.1	(30.7)
East of England	223	(221)	48	(40)	271	(261)	42.3	(40.8)
London	101	(131)	49	(61)	150	(192)	16.9	(21.6)
South East	105	(83)	74	(77)	179	(160)	19.1	(17.1)
South West	360	(358)	60	(52)	420	(410)	72.9	(71.2)
England	**2042**	**(1814)**	**391**	**(405)**	**2433**	**(2219)**	**42.6**	**(38.9)**
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	**62**	**(67)**	**16**	**(19)**	**78**	**(86)**	**24.9**	**(27.5)**
Scotland	**38**	**(25)**	**21**	**(18)**	**59**	**(43)**	**10.8**	**(7.9)**
Northern Ireland	**12**	**(16)**	**7**	**(7)**	**19**	**(23)**	**9.9**	**(12.0)**
TOTAL[1]	**2154**	**(1922)**	**435**	**(449)**	**2589**	**(2371)**	**38.3**	**(35.1)**

[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 2023-2024, a total of 5,152 corneas were retrieved to NHSBT, of which 3,875 (75%) were subsequently issued for transplantation. Filton Eye Bank (in Bristol) processed 58% of corneas retrieved in the last financial year.

Of 1,277 corneas not issued for transplantation, 540 (42%) were issued for non-clinical use to support research or training. These corneas were primarily unsuitable for transplantation due to a low endothelial cell density or dead cells.

Table 10.2 Corneas retrieved into NHSBT Eye Banks, by year 1 April 2023 - 31 March 2024 (2022-2023)

Eye bank	Total retrieved		Number issued[1]		% issued		Difference between number retrieved and issued	
Filton	2963	(2674)	2309	(2086)	78	(78)	654	(588)
David Lucas	2189	(2049)	1566	(1576)	72	(77)	623	(473)
Total	**5152**	**(4723)**	**3875**	**(3662)**	**75**	**(78)**	**1277**	**(1061)**

[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 2022-2023 and 2023-2024 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 55.7 pmp in 2022-2023 which increased to 61.6 pmp in 2023-2024. Transplant rates increased in England, Wales, Scotland and Northern Ireland. England had the highest transplant rate in the UK: 64.9 pmp, and this ranged from 46.9 pmp to 84.0 pmp across the NHS regions.

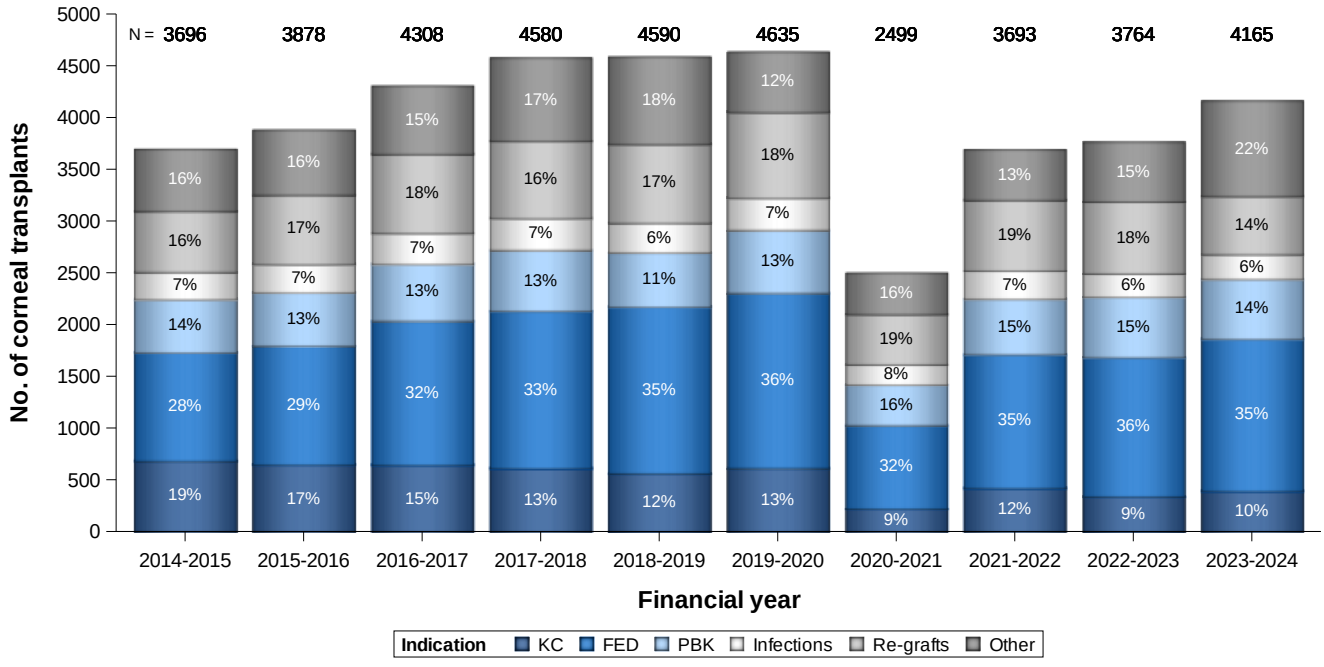
Table 10.3 Cornea transplants performed per million population (pmp) in the UK, 1 April 2022 - 31 March 2024, by country/NHS region

Country of residence/ NHS region	Number of transplants (pmp) 2022-2023		2023-2024	
North East and Yorkshire	428	(52.1)	482	(58.6)
North West	453	(60.2)	568	(75.5)
Midlands	453	(41.3)	579	(52.8)
East of England	247	(38.6)	300	(46.9)
London	967	(109.0)	745	(84.0)
South East	434	(46.3)	612	(65.2)
South West	386	(67.0)	423	(73.4)
England	**3368**	**(59.0)**	**3709**	**(64.9)**
Isle of Man	**0**	**(0)**	**0**	**(0)**
Channel Islands	**0**	**(0)**	**0**	**(0)**
Wales	**98**	**(31.3)**	**130**	**(41.5)**
Scotland	**218**	**(40.0)**	**226**	**(41.5)**
Northern Ireland	**65**	**(34.0)**	**84**	**(44.0)**
TOTAL[1]	**3764**	**(55.7)**	**4165**	**(61.6)**

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

Figure 10.2 shows the number of corneal transplants in the UK by indication for transplant from 1 April 2014 to 31 March 2024. For corneas transplanted in 2022-2023 and 2023-2024, 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 2014 - 31 March 2024



The most common indication for transplantation is FED, representing 35% of corneal transplants in 2023-2024.

Table 10.4 Corneal transplants in the UK by indication and financial year, 1 April 2022 - 31 March 2024

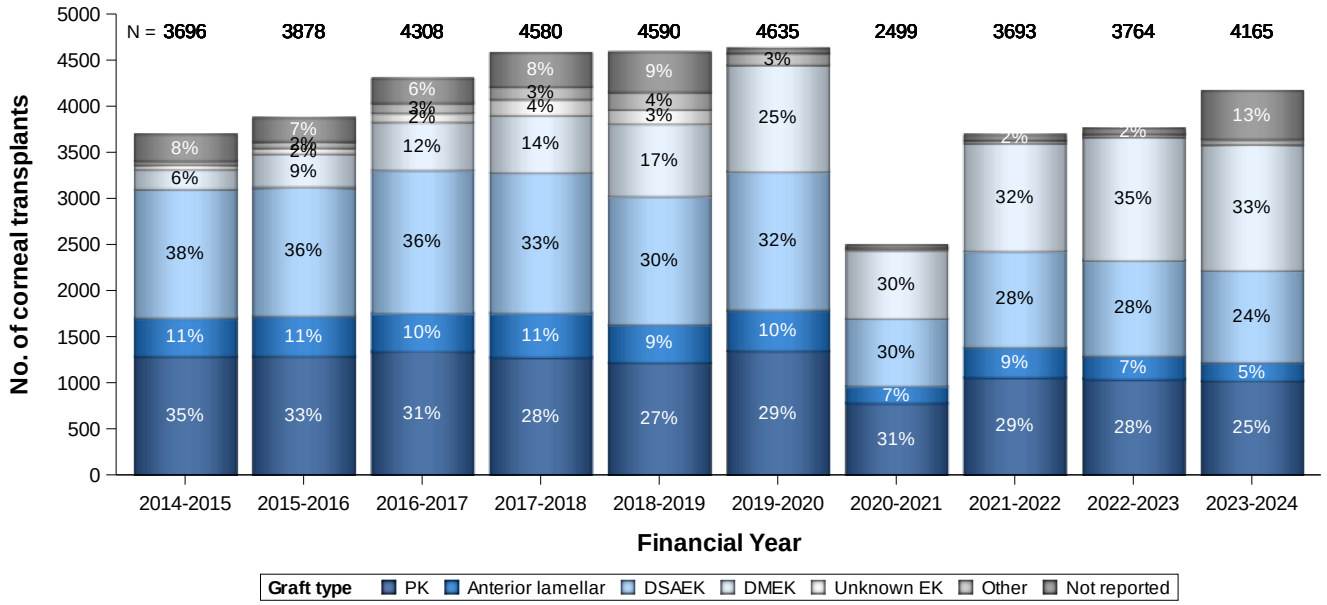
Indication for transplant	2022 - 2023		2023 - 2024	
	N	%	N	%
Keratoconus (KC)	**345**	**9.2**	**398**	**9.6**
Fuchs endothelial dystrophy (FED)	**1341**	**35.6**	**1469**	**35.3**
Pseudophakic bullous keratopathy (PBK)	**583**	**15.5**	**577**	**13.9**
Infections	**226**	**6.0**	**236**	**5.7**
Re-grafts	**696**	**18.5**	**565**	**13.6**
Other (listed below)	**573**	**15.2**	**920**	**22.1**
Ectasias	23	0.6	15	0.4
Dystrophies	65	1.7	60	1.4
Previous ocular surgery	115	3.1	85	2.0
Injury	62	1.6	49	1.2
Ulcerative keratitis	44	1.2	41	1.0
Opacification	82	2.2	73	1.8
Miscellaneous	153	4.1	103	2.5
Not reported	29	0.8	494	11.9
Total	**3764**	**100.0**	**4165**	**100.0**

Figure 10.3 shows the number of corneal transplants in the UK by graft type from 1 April 2014 to 31 March 2024. 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.

Note that Endothelial Keratoplasty (EK) procedures were first specified on the Ocular Tissue Outcome and Transplant Record form reported to the UK Transplant Registry on 5 May 2010. The type of EK graft, Descemet Stripping Automated EK (DSAEK) and DMEK transplants, were first collected as free text on the form. This meant that all EK transplants were often reported as EK unknown. In April 2019, the form changed so that ‘EK unknown’ was no longer specified.

All unknown EK grafts prior to 2014 are assumed to be DSEK transplants as DMEK transplantation was not a routine form of transplantation at this time. Between January 2014 and April 2019, unknown EK graft types have been imputed such that grafts by surgeons that have never reported a DMEK transplant are assumed to be Descemet Stripping Automated EK (DSAEK) transplants and all transplants prior to the first reported DMEK are considered DSAEK transplants. A further breakdown by graft type for corneas transplanted in 2022-2023 and 2023-2024 is shown in **Table 10.5**.

Figure 10.3 Number of corneal transplants in the UK by graft type, 1 April 2014 - 31 March 2024



Between April 2013 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

In 2023-2024, 24% of grafts were DSAEK and 33% were DMEK grafts. PK grafts are still a popular choice for corneal transplantation accounting for 25% of all transplants in 2023-2024. The proportion of anterior lamellar transplants has declined from 7% in 2022-2023 to 5% in 2023-2024.

Table 10.5 Corneal transplants in the UK by graft type and financial year, 1 April 2022 - 31 March 2024

Graft type	2022 - 2023		2023 - 2024	
	N	%	N	%
PK	1045	27.8	1023	24.6
Anterior lamellar	248	6.6	199	4.8
DSAEK	1043	27.7	997	23.9
DMEK	1335	35.5	1367	32.8
Other	34	0.9	58	1.4
Not reported	59	1.6	521	12.5
All grafts	**3764**	**100.0**	**4165**	**100.0**

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 2023 - 31 March 2024

	Cornea-only donors		Solid organ and cornea donors		Transplant recipients	
	N	%	N	%	N	%
Age group (years)						
0 - 17	4	0.2	10	2.3	19	0.5
18 - 34	29	1.3	32	7.4	301	7.2
35 - 49	107	5.0	87	20.0	388	9.3
50 - 59	248	11.5	103	23.7	466	11.2
60 - 69	478	22.2	126	29.0	770	18.5
70 - 79	780	36.2	72	16.6	1330	31.9
80+	508	23.6	5	1.1	891	21.4
Mean (SD)	70	(12)	55	(15)	66	(17)
Sex						
Male	1262	58.6	254	58.4	2083	50.0
Female	892	41.4	181	41.6	2081	50.0
Ethnicity						
White	83	3.9	406	93.3	3139	75.4
Asian	2	0.1	13	3.0	284	6.8
Black	1	0.0	2	0.5	125	3.0
Other	0	0.0	3	0.7	39	0.9
Not reported	2068	96.0	11	2.5	578	13.9
TOTAL	**2154**	**100.0**	**435**	**100.0**	**4165**	**100.0**