

**NHS BLOOD AND TRANSPLANT
OCULAR TISSUE ADVISORY GROUP**

SUITABILITY OF CORNEAS DONATED TO NHSBT EYE BANKS

SUMMARY

BACKGROUND

- 1 Corneas donated to NHSBT Eye Banks can be deemed suitable and issued for transplantation or may be discarded in the Eye Banks, for several reasons. Corneas can be deemed unsuitable for transplantation, discarded for medical reasons, or expire in the Eye Banks. The purpose of this paper is to monitor the outcome and suitability of corneas donated to NHSBT Eye Banks.

DATA AND METHODS

- 2 Outcomes over 10 years are summarised on an annual basis, by calendar year, for corneas donated from 1 January 2013 to 31 December 2023. Further, outcomes are broken down by quarter over the last five and half years. Summary statistics were used to compare activity over time.

SUMMARY

- 3 Prior to Covid-19, the proportion of corneas issued for transplantation from NHSBT had increased from 63% in 2013 to 82% in 2019. However, in the last three years, the proportion of corneas discarded at the Eye Bank has risen to 25%. This increase is primarily attributed to a higher number of corneas being discarded due to low endothelial cell densities/dead cells, medical contraindications, poor sample quality and cases not reported.
- 4 In the last year, 77% of corneas donated to NHSBT were issued from Filton Eye Bank compared to 72% issued from David Lucas. Corneas processed by Filton saw a reduction in the proportion of corneas deemed to be unsuitable. Whereas David Lucas discarded a higher proportion of corneas due to low endothelial cell densities/dead cells. Aside from that, last year, the reason corneas were discarded was comparable for both Eye Banks.
- 5 Corneas from solid organ donors have higher rates of issue (83%) as they tend to have higher endothelial cell densities and less medical contraindications, as they are generally younger than cornea-only donors. There are initiatives to increase corneal donation from solid organ donors.

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BACKGROUND

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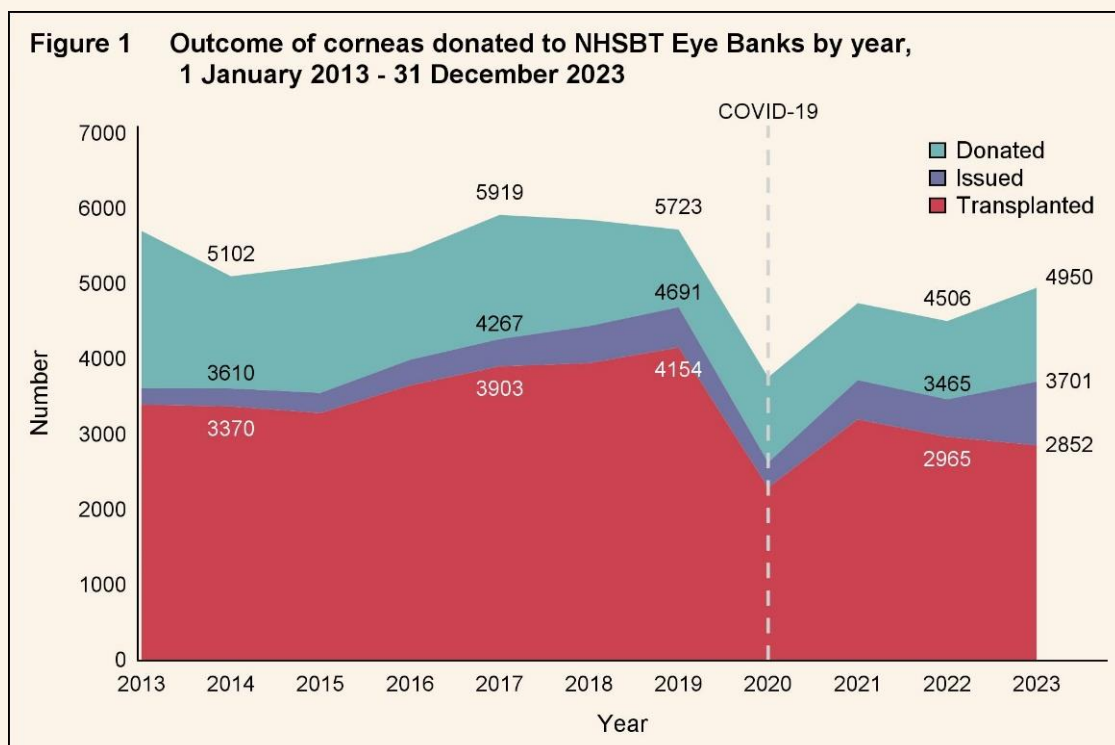
DATA AND METHODS

7 Outcomes over 10 years are summarised on an annual basis for corneas donated from 1 January 2013 to 31 December 2023. Further, outcomes are broken down by quarter over the last five and a half years. Summary statistics were used to compare activity over time. Data were extracted on 16 February 2024.

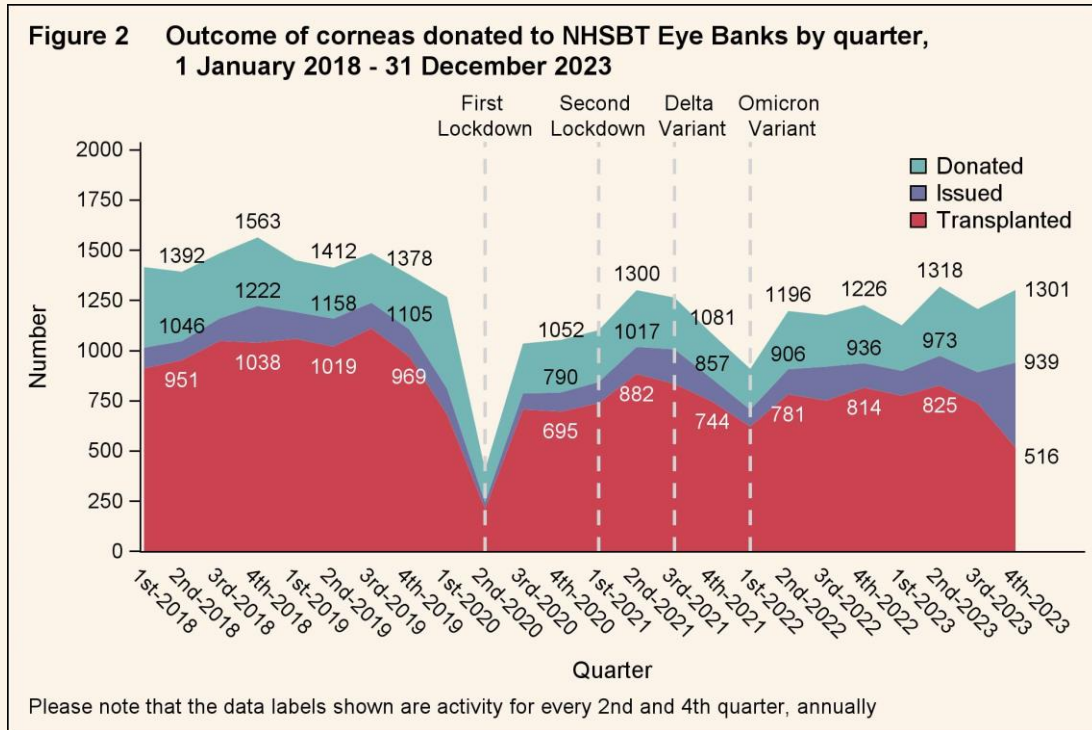
RESULTS

8 **Figure 1** and **Figure 2** show the outcome of corneas donated to NHSBT Eye Banks by year and quarter, respectively. Over the last 10 years, corneas donated to NHSBT have fluctuated to 5723 corneas prior to the pandemic. In the last year, corneal donation has increased by 10%, despite the improvements in donation figures, corneal donation and transplantation activity have yet to return to pre-pandemic levels.

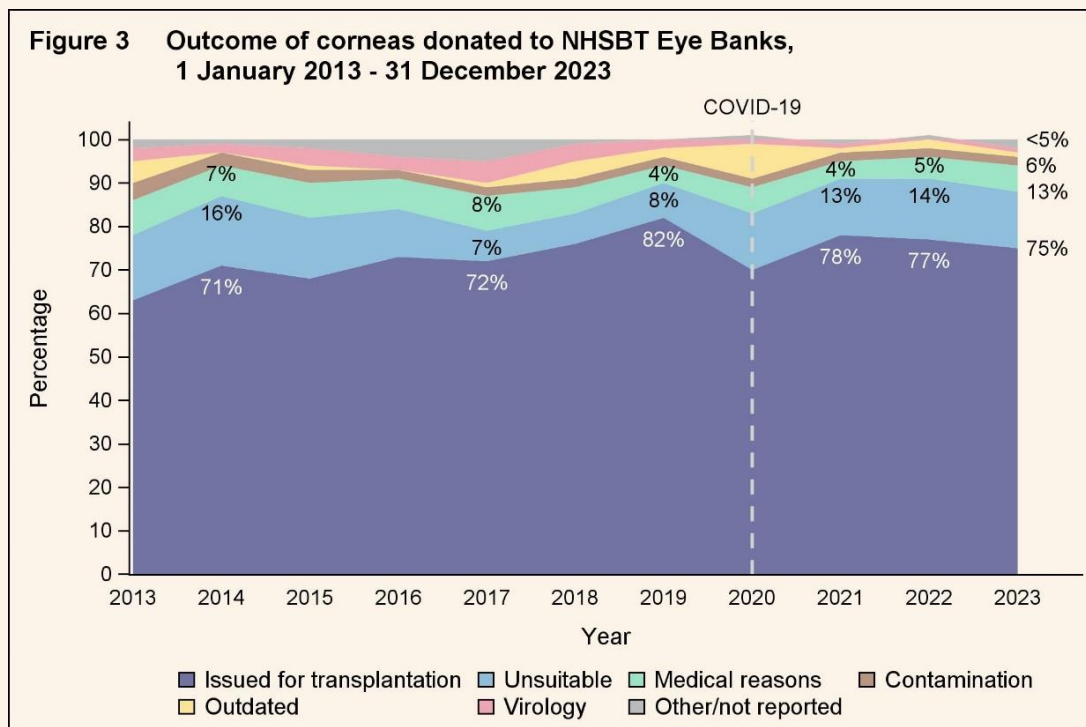
9 In the last financial year, 4950 corneas were donated to NHSBT. Of those, 3701 (75%) were issued for transplantation and 2852 (52%) were subsequently transplanted. However, this low rate is likely due to delays in reporting corneal transplants to NHSBT.



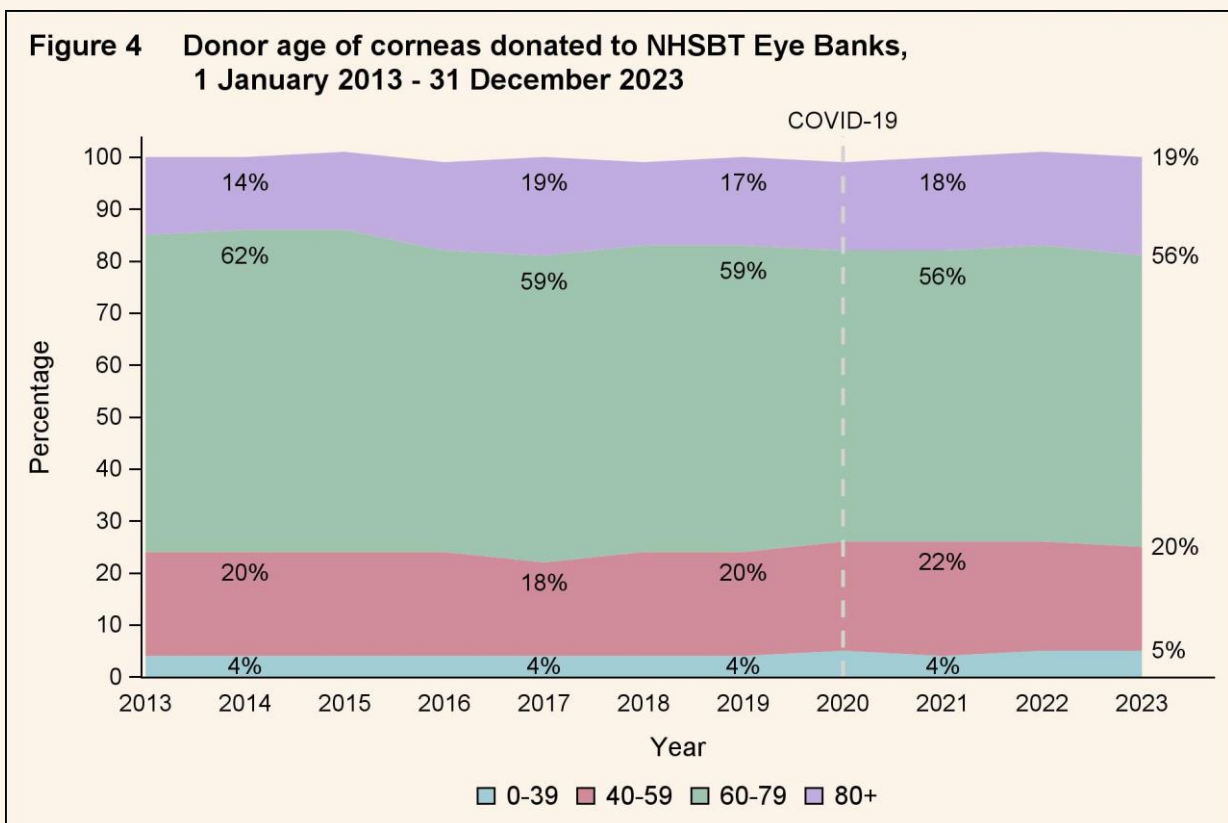
10 **Figure 2** shows in more detail the impact on activity throughout the pandemic. In the last three quarters, the number of corneas donated to NHSBT has reached its highest since the pandemic began. In the most recent quarter, 1301 corneas were donated and 939 corneas were issued for transplantation. However, this still reflects approx. 200 fewer corneas donated and issued each quarter.



11 Overall, there has been a general increase in the suitability of corneas for transplantation as deemed by the Eye Banks over the last 10 years, as shown in **Figure 3**, where the proportion of donated corneas subsequently issued for transplantation has increased from 63% in 2013 to 82% in 2019 prior to the pandemic. In the last three years, the proportion of corneas issued for transplantation has fallen to 75%.



- 12 Corneas that are deemed to be unsuitable for transplantation are the main reason corneas are discarded by the Eye Bank, followed by other medical reasons. Overall, there has been a decline in corneas discarded due to contamination and virology over the last 10 years. Numbers of outdated/expired corneas were highest in 2020 due to the pandemic but have since fallen.
- 13 **Table 1** and **Table 2** in the **Appendix** show the outcome of corneas donated and the detailed reasons corneas were discarded, broken down by Eye Bank and donation type, respectively. Corneas were primarily discarded due to low endothelial cell densities or dead cells (9%), followed by medical contraindications (6%), damaged tissue (2%) and corneas contaminated (2%). In the last year, 74 (1%) corneas were outdated either because the product expired (N=56) or the request for a cornea was cancelled (N=16).
- 14 In the last year, 77% of corneas donated to NHSBT were issued from Filton Eye Bank compared to 72% issued from David Lucas. Corneas processed by Filton saw a reduction in the proportion of corneas deemed to be unsuitable. Whereas David Lucas discarded a higher proportion of corneas due to low endothelial cell densities/dead cells. Aside from that, last year, the reason corneas were discarded was comparable for both Eye Banks.
- 15 In regard to donation type, corneas that were sourced from solid organ donors were more likely to be found suitable for transplantation (83%) compared to corneas from cornea-only donors (73%). Solid organ donors who donated a cornea had fewer exclusions due to low endothelial cell densities/dead cells and medical contraindications.
- 16 The proportion of corneas donated to NHSBT Eye Banks by age is shown in **Figure 4**. Donor age has remained fairly stable over the last 10 years. The proportion of corneas donated from 80+ year olds has increased slightly from 14% in 2014 to 19% in 2023. The proportion of corneas donated from 80+ year olds has increased slightly from 14% in 2014 to 19% in 2023. The proportion of corneas donated by the 60-79 age group has decreased from 62% in 2014 to 56% in 2023. A quarter of corneas donated are from those aged less than 60 years old.



SUMMARY

- 17 The number of corneas donated has fluctuated over the last 10 years, whilst the number of corneas issued for transplantation has steadily increased. In the last three years, corneas donated, issued, and transplanted haven't recovered to pre-pandemic levels. In the last year and in the last quarter, corneal transplants have fallen, which is likely due to delays in the transplant outcome form being returned to NHSBT.
- 18 Corneas are generally discarded by Eye Banks due to low endothelial cell densities/dead cells. In the last year, this was more common at David Lucas (12%) than Filton (7%). Moreover, the proportion of corneas discarded due to medical contraindications, virology and not reported cases has also increased for both Eye Banks. The proportion of corneas discarded due to damaged tissue, opacities, pre-cut DSAEK failure, contamination and outdated corneas have remained stable.
- 19 Solid organ donors who donated a cornea have higher rates of issue (83%) compared to cornea-only donors (73%). There was a slight decrease in the proportion of corneas issued for transplantation from cornea-only donors this year. The majority of cornea donors are between the ages of 60 and 79 (56%). The proportion of corneas donated from 80+ year olds has increased slightly to 19% over the last 10 years.

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Statistics and Clinical Research

February 2024

APPENDIX

Table 1 Outcome of corneas donated to NHSBT Eye Banks by Eye Bank, 1 January 2022 - 31 December 2023												
Outcome	Filton				David Lucas				Total			
	2022		2023		2022		2023		2022		2023	
	N	%	N	%	N	%	N	%	N	%	N	%
Issued for transplantation	1930	77	1961	77	1535	77	1740	72	3465	77	3701	75
Deemed unsuitable												
Low ECD/dead cells	199	8	173	7	188	9	297	12	387	9	470	9
Damaged tissue	73	3	43	2	41	2	44	2	114	3	87	2
Opacities	41	2	21	1	45	2	49	2	86	2	70	1
Pre-cut DSAEK failure	28	1	20	1	1	0			29	1	20	0
Consent withdrawn					2	0	2	0	2	0	2	0
Sub-total	341	14	257	10	277	14	392	16	618	14	649	13
Medical contraindications	116	5	159	6	89	4	147	6	205	5	306	6
Corneas Contaminated	64	3	54	2	40	2	59	2	104	2	113	2
Outdated corneas												
Product out of time	30	1	24	1	30	2	32	1	60	1	56	1
Cancelled request	9	0	10	0	6	0	6	0	15	0	16	0
Not reported			2	0							2	0
Sub-total	39	2	36	1	36	2	38	2	75	2	74	1
Discarded due to virology												
Poor sample quality	8	0	19	1	8	0	25	1	16	0	44	1
Serum positive bloods	12	0	6	0	2	0			14	0	6	0
Sub-total	20	1	25	1	10	1	25	1	30	1	50	1
Not reported	5	0	39	2	4	0	18	1	9	0	57	1
Corneas donated	2515	100	2531	100	1991	100	2419	100	4506	100	4950	100

Table 2 Outcome of corneas donated to NHSBT Eye Banks by donor type, 1 January 2022 - 31 December 2023

Outcome	Cornea-only				Cornea and solid organs				Total			
	2022		2023		2022		2023		2022		2023	
	N	%	N	%	N	%	N	%	N	%	N	%
Issued for transplantation	2732	76	2980	73	733	82	721	83	3465	77	3701	75
Deemed unsuitable												
Low ECD/dead cells	345	10	424	10	42	5	46	5	387	9	470	9
Damaged tissue	87	2	73	2	27	3	14	2	114	3	87	2
Opacities	62	2	55	1	24	3	15	2	86	2	70	1
Pre-cut DSAEK failure	18	0	16	0	11	1	4	0	29	1	20	0
Consent withdrawn	2	0					2	0	2	0	2	0
Sub-total	514	14	568	14	104	12	81	9	618	14	649	13
Medical contraindications	194	5	288	7	11	1	18	2	205	5	306	6
Corneas Contaminated	85	2	110	3	19	2	3	0	104	2	113	2
Outdated corneas												
Product out of time	44	1	48	1	16	2	8	1	60	1	56	1
Cancelled request	12	0	14	0	3	0	2	0	15	0	16	0
Not reported			2	0							2	0
Sub-total	56	2	64	2	19	2	10	1	75	2	74	1
Discarded due to virology												
Poor sample quality	16	0	44	1					16	0	44	1
Serum positive bloods	12	0	6	0	2	0			14	0	6	0
Sub-total	28	1	50	1	2	0			30	1	50	1
Not reported	8	0	17	0	1	0	40	5	9	0	57	1
Corneas donated	3617	100	4077	100	889	100	873	100	4506	100	4950	100