Australian Corneal Graft Registry Annual Report 2025

1 The Database

The Australian Corneal Graft Registry (ACGR) was established in 1985 and has now been in continuous operation for 40 years. The following document summarises the data contained in the Registry database on 30th June 2025. Only grafts performed up to 31st December 2024 had been entered by this date.

The database contains the following types of graft. The date range given for each graft type shows the years these have been registered with the ACGR.

- Penetrating Keratoplasty (PK): 1985 to 2024.
- Descemet's Stripping (Automated) Endothelial Keratoplasty (DS(A)EK): 2006* to 2024. *Encompassing both manual (from 2006) and automated (from 2008) versions of the technique, as well as an ultra-thin variant (from 2012).
- Descemet's Membrane Endothelial Keratoplasty (DMEK): 2007 to 2024.
- Deep Anterior Lamellar Keratoplasty (DALK): 2000 to 2024.
- Traditional/Tectonic Lamellar Keratoplasty (TLK): 1985 to 2024.
- Corneal Allogenic Intrastromal Ring Segments (CAIRS): 2021 to 2024.
- Limbal/Stem Cell: 1987 to 2024.

Table 1 shows the number of grafts registered, and the percentage of registered grafts with follow-up provided, known to have failed, and known to have failed within the early post-operative period. Early failure was defined as grafts that failed within 92 days (3 months).

Table 1 Overview of the Australian Corneal Graft Registry database at 30th June 2024

	Registered	Followed	Failed	Early Failure
PK	29211	83%	28%	2%
DS(A)EK	9300	77%	26%	6%
DMEK	6171	66%	18%	9%
DALK	2473	63%	9%	2%
TLK	1863	76%	22%	7%
Limbal	89	79%	42%	7%
CAIRS	194	32%	5%	<1%
Total	**49301**	**79%**	**25%**	**2%**

Note: Percentage failed includes early failures

For further information on the Australian Corneal Graft Registry, visit https://www.flinders.edu.au/fhmri/research/fhmri-eye-vision/corneal-graft-registry or email miriam.keane@flinders.edu.au. The latest major report from the ACGR can be accessed at https://doi.org/10.25957/vfa8-8r43.

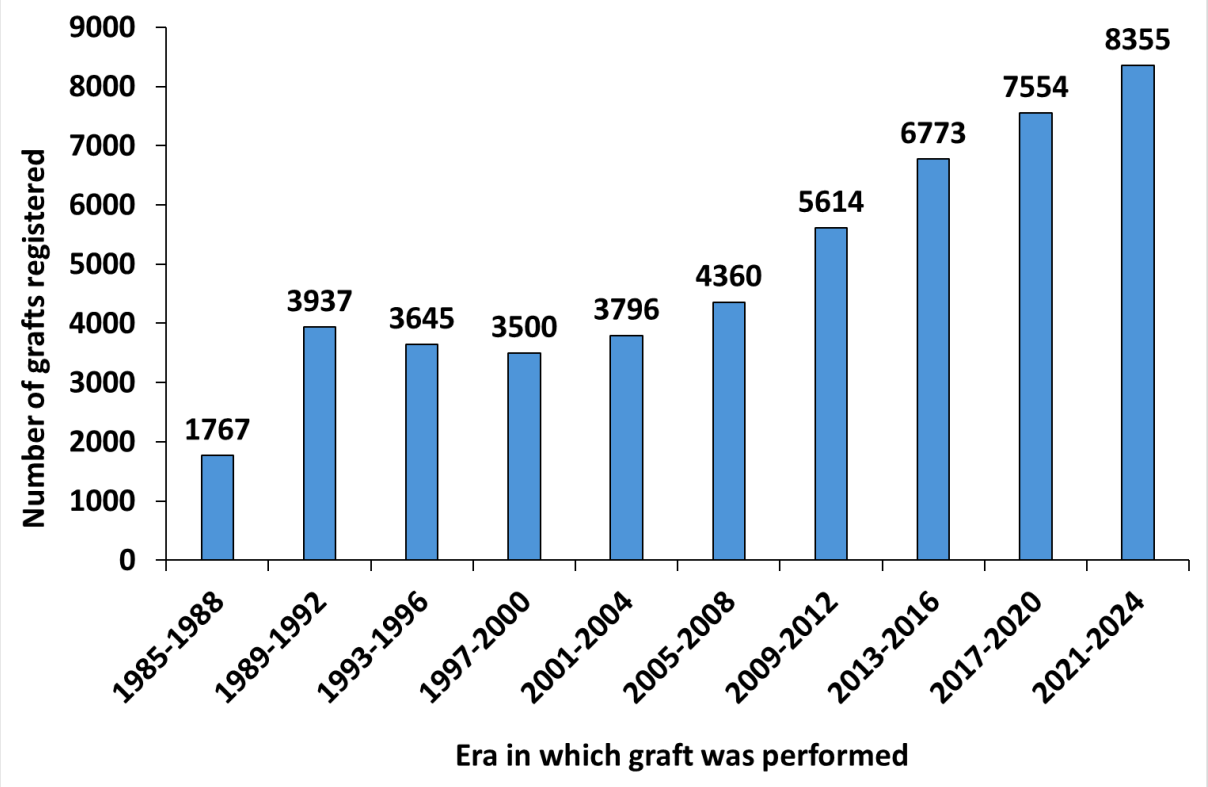
An annual follow-up request is sent to contributing surgeons in September. In some instances, the ACGR may be informed that the graft recipient is known to have died, or has been "lost to follow-up", i.e., is no longer seen by the surgeon. Grafts lost to follow-up can be reactivated if the recipient is subsequently seen, e.g. for a contralateral or repeat graft. Linkage with the National Death Index is undertaken, where consent has been granted, to finalise records for deceased recipients. This is performed no more than once every 5 years, with the most recent linkage prior to the census date for this report completed in 2022. Table 2 shows the status of registered grafts in the database, including the number of each graft type for which follow-up information is still actively sought.

Table 2 Status of grafts in the Australian Corneal Graft Registry database at 30th June 2025

	PK	DS(A)EK	DMEK	DALK	TLK	Limbal	CAIRS	Total
Registered grafts	29211	9300	6171	2473	1863	89	194	49301
Failed graft	28%	26%	18%	9%	22%	42%	5%	25%
Lost without follow-up received	7%	5%	6%	19%	9%	12%	0%	7%
Lost post follow-up	24%	13%	11%	29%	27%	21%	12%	20%
Died without follow-up received	5%	3%	2%	<1%	9%	4%	0%	4%
Died with surviving followed graft	20%	11%	3%	3%	18%	12%	0%	15%
Active in database	**17%**	**42%**	**59%**	**39%**	**16%**	**8%**	**84%**	**28%**

Following the introduction of the new varieties of partial thickness endothelial grafts from 2006 onwards, there was a steady increase in the number of grafts registered annually, as shown in Figure 1.

Figure 1 Number of grafts registered with the ACGR stratified by graft era, 1985 to 2024



The annual number of registrations was stable, with small levels of fluctuation, over the eight years from 2015 to 2022 (Figure 2). The impact of restrictions placed on elective surgery due to COVID-19 may have influenced figures from 2020 to 2022. With these restrictions lifted, 2023 saw an increase of approximately 180 registrations, with a further increase of more than 270 in 2024. There has been a shift in the type of grafts being registered (Figure 2 and Table 3). Fewer PK registrations have coincided with increases in registrations of EK. In 2019, registrations of PK, DS(A)EK and DMEK were almost equal, with DMEK subsequently becoming the most registered graft type. This cohort has had a 53% increase in numbers in 2024 compared to 2019, with a conservative increase of 4% for DS(A)EK and a 2% reduction for PK. The number of CAIRS procedures has doubled each year from 2022 to 2024.

Figure 2 Number of grafts registered annually with the ACGR, by graft type, 2015 to 2024

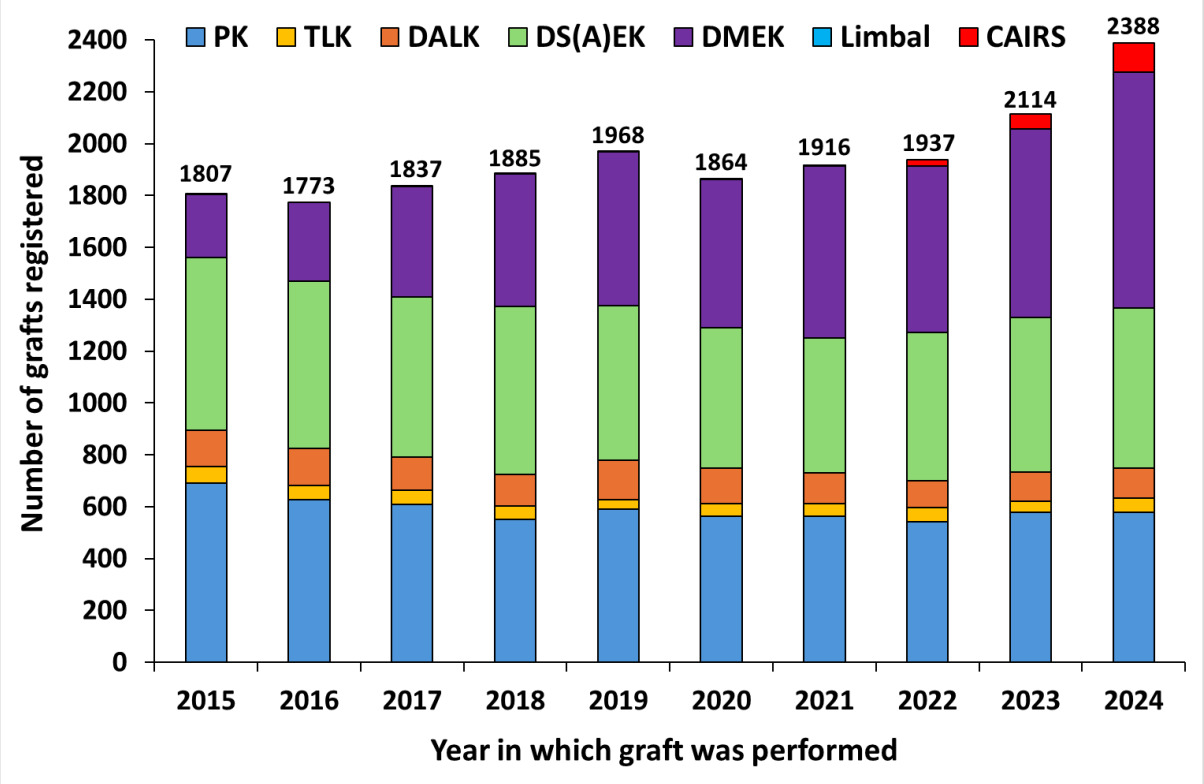


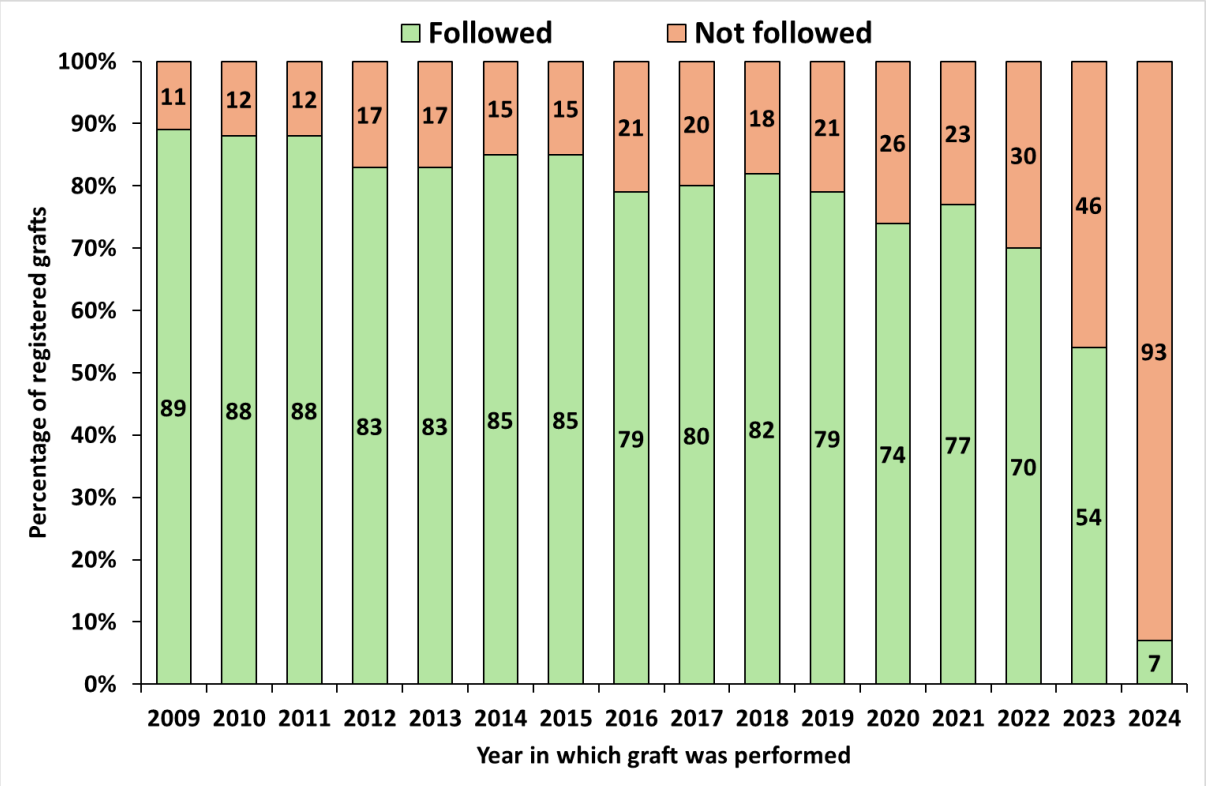
Table 3 Percentage of grafts registered annually with the ACGR, by graft type, 2015 to 2024

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
PK	38%	35%	33%	29%	30%	30%	29%	28%	27%	24%
TLK	3%	3%	3%	3%	2%	3%	3%	3%	2%	2%
DALK	8%	8%	7%	6%	8%	7%	6%	5%	5%	5%
DS(A)EK	37%	36%	34%	34%	30%	29%	27%	30%	28%	26%
DMEK	13%	17%	23%	27%	30%	31%	35%	33%	34%	38%
Limbal	<1%	0%	<1%	<1%	<1%	<1%	<1%	0%	<1%	<1%
CAIRS	0%	0%	0%	0%	0%	0%	<1%	1%	3%	5%
Total	**1807**	**1773**	**1837**	**1885**	**1968**	**1864**	**1916**	**1937**	**2114**	**2388**

The ACGR requests follow-up in September. The first follow-up request will occur the year following the graft, between 9 and 21 months after it is performed. Because of the delay in time to first follow-up, the percentage of grafts with follow-up is lowest, the more recently the graft was performed, as shown in Figure 3. Most grafts with follow-up in the first year post-graft will be failed grafts where the eye has been regrafted.

Three-quarters of grafts will have follow-up provided at least once by 5 years post-graft. A final request for first follow-up will be sent at 5-years post-graft, and if none is received, the graft will be recorded as lost to follow-up. From 5-years onwards, the proportion of grafts followed in single annual cohorts averages 85%.

Figure 3 Percentage of grafts with follow-up provided to the ACGR, stratified by year of graft



2 Indication for Graft

The four most common indications for graft in the database are failed previous graft (26%), keratoconus (22%), Fuchs' endothelial dystrophy (20%), and endothelial failure/bullous keratopathy (17%). These account for 84% of grafts. Type of graft varies depending on the indication for graft. Table 4 shows the top three indications for each type of graft, excluding repeat procedures, showing the variation across groups. Table 5 shows these data for the 10-year period from 2015 to 2024. Fuchs' endothelial dystrophy is now the most common indication for first graft, followed by endothelial failure/bullous keratopathy, and then keratoconus.

Table 4 Indication for graft, 1985 to 2024, stratified by type of graft

	PK	TLK	DALK	DS(A)EK	DMEK	Limbal	CAIRS	Total
Failed previous graft	29%	15%	4%	26%	21%	9%	3%	26%
Keratoconus	**29%**	6%	**74%**	0%	0%	1%	**91%**	22%
Fuchs' endothelial dystrophy	**7%**	0%	0%	**41%**	**64%**	0%	0%	20%
Endothelial failure/bullous keratopathy	**16%**	<1%	<1%	**29%**	**14%**	1%	0%	17%
Trauma	3%	3%	<1%	**2%**	**<1%**	**24%**	0%	2%
Herpetic eye disease	3%	5%	**3%**	<1%	<1%	2%	0%	2%
Non-herpetic infection	3%	3%	**4%**	<1%	0%	**4%**	0%	2%
Corneal ulcers/perforations	2%	**12%**	1%	<1%	0%	**4%**	0%	2%
Corneal degenerations	<1%	5%	3%	<1%	<1%	3%	**3%**	1%
Beta-radiation	<1%	**13%**	<1%	0%	0%	**4%**	0%	<1%
Pterygium	<1%	**12%**	0%	0%	0%	2%	0%	<1%
Congenital abnormalities	<1%	<1%	<1%	<1%	<1%	**11%**	0%	<1%
LASIK	<1%	<1%	<1%	0%	0%	0%	**3%**	<1%
Other	7%	23%	9%	1%	1%	33%	0%	6%
Total	**29211**	**1864**	**2473**	**9300**	**6171**	**89**	**193**	**49301**

Table 5 Indication for graft, 2015 to 2024, stratified by type of graft

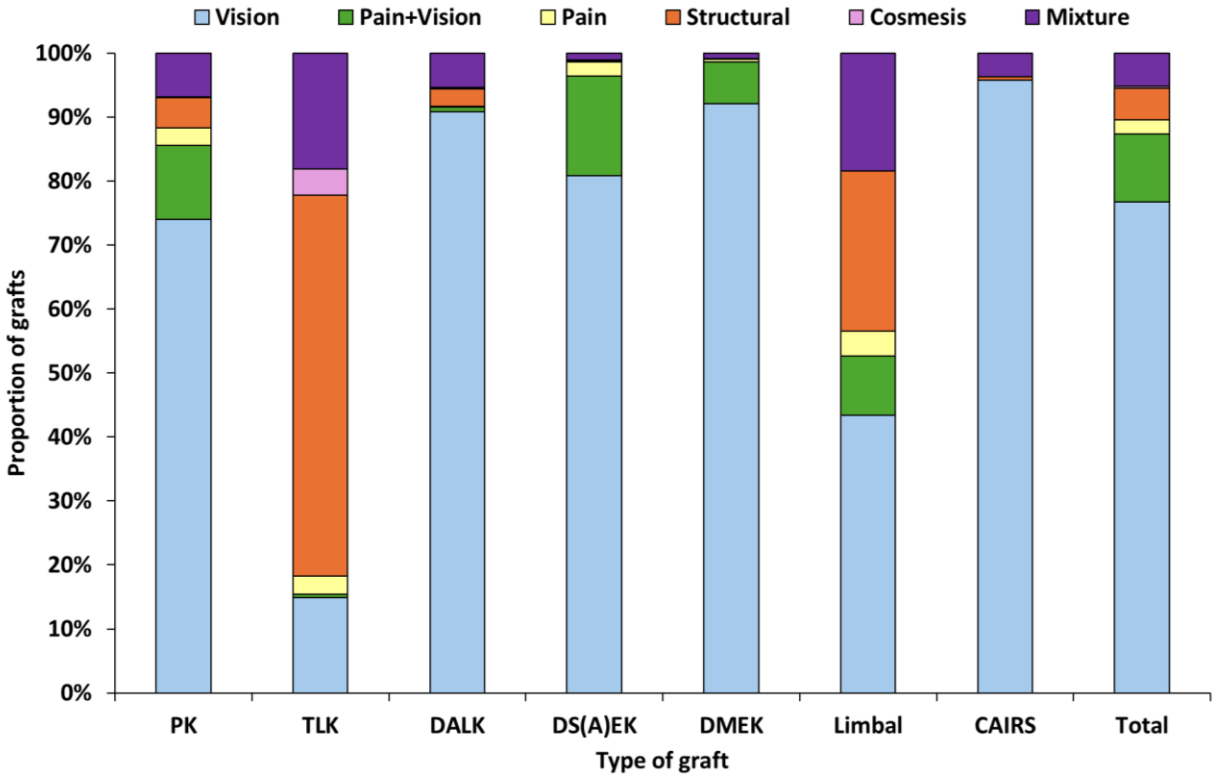
	PK	TLK	DALK	DS(A)EK	DMEK	CAIRS	Total
Failed previous graft	50%	17%	5%	30%	20%	3%	31%
Fuchs' endothelial dystrophy	2%	0%	0%	**36%**	**65%**	0%	30%
Endothelial failure/bullous keratopathy	**4%**	0%	<1%	**30%**	**13%**	0%	14%
Keratoconus	**23%**	3%	**71%**	0%	0%	**91%**	13%
Trauma	3%	3%	<1%	**2%**	**<1%**	0%	2%
Non-herpetic infections	**4%**	5%	**3%**	<1%	0%	0%	2%
Corneal ulcers/perforations	3%	**20%**	2%	<1%	0%	0%	2%
Herpetic eye disease	3%	8%	3%	<1%	<1%	0%	1%
Corneal degenerations	1%	6%	**4%**	<1%	<1%	**3%**	<1%
Glaucoma	0%	**10%**	0%	<1%	0%	0%	<1%
Beta-radiation	0%	**9%**	<1%	0%	0%	0%	<1%
LASIK	<1%	0%	<1%	0%	0%	**3%**	<1%
Other	5%	18%	10%	2%	1%	0%	4%
Total	**5890**	**516**	**1270**	**6017**	**5588**	**193**	**19474**

Note: Excludes limbal grafts as n<20.

3 Desired Outcome from Graft

Surgeons are asked to report the desired outcome from corneal transplantation. They can select any applicable answers from the following options: relief of pain, visual rehabilitation, structural repair, cosmesis. The desired outcome has been provided for 89% of grafts. The most common desired outcome is visual rehabilitation, at 92%. In one-sixth of cases, this is in conjunction with another desired outcome, most often pain relief. The desired outcome varies depending on type of graft, as shown in Figure 4.

Figure 4 Desired outcome from graft, 1985 to 2024, stratified by type of graft, excluding unspecified



Desired outcome from graft was provided for 69% of grafts performed prior to 2000, and for >95% of grafts from 2000 onwards (Table 6). The proportion performed solely for visual rehabilitation has increased, to four-in-five grafts performed from 2020 to 2024. In contrast, the proportion performed for pain, either individually or in conjunction with other desired outcomes, has more than halved.

Table 6 Desired outcome from graft, 2000 to 2024, stratified by era of graft

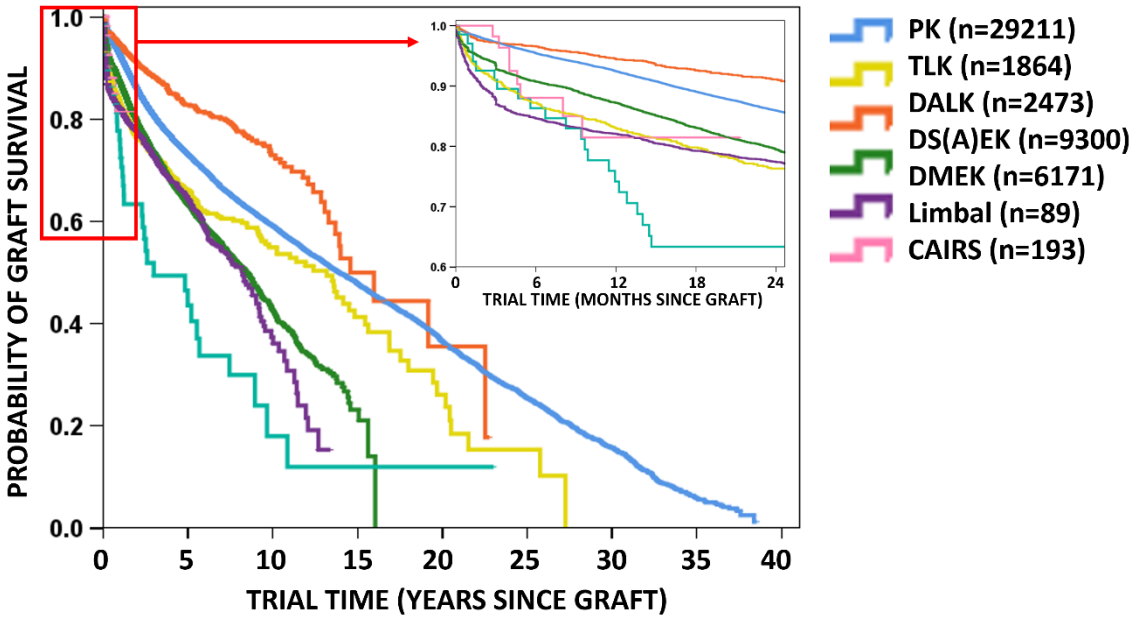
	Vision	Vision + Pain	Pain	Structural	Cosmesis	Other Mix*	Not specified	Total
1985-1999	49%	9%	4%	4%	<1%	3%	31%	11940
2000-2004	67%	15%	2%	7%	<1%	6%	3%	4705
2005-2009	70%	13%	1%	5%	<1%	6%	4%	5565
2010-2014	72%	11%	2%	4%	<1%	5%	5%	7602
2015-2019	76%	8%	1%	5%	<1%	4%	6%	9270
2020-2024	80%	6%	<1%	4%	<1%	5%	4%	10219
Total	68%	9%	2%	4%	<1%	5%	11%	49301

*May also include pain and/or vision.

4 Graft Survival

Surgeons report graft survival to the date they last saw the patient, rather than at standardised time-points, and this is calculated in terms of days since graft. Grafts for which follow-up information has not yet been received are assumed to be surviving at one day post-graft. The survival of registered grafts is assessed using Kaplan-Meier survival curves. The number at risk tables show how many grafts have been followed in each group, at each time point. The survival probability tables extend to the point where a minimum of 20 grafts have follow-up data available. Survival of all grafts, stratified by type of graft, is shown in Figure 5.

Figure 5 Survival of all grafts registered from 1985 to 2024, stratified by type of graft



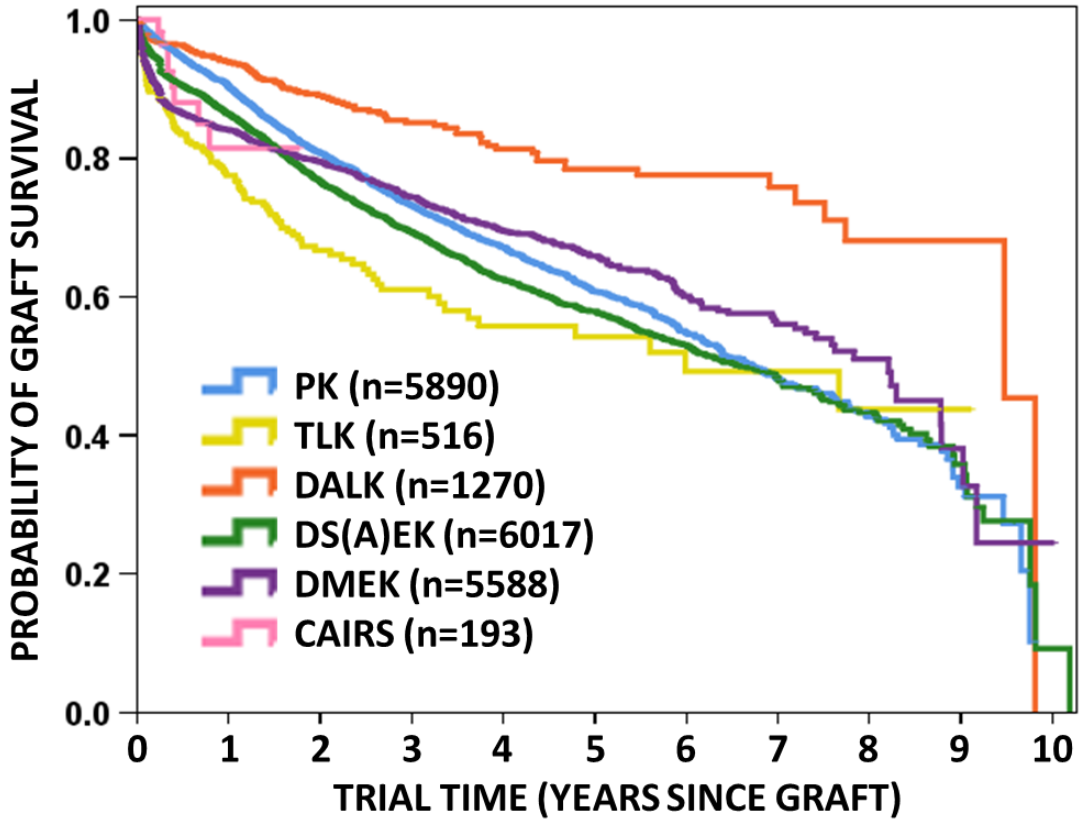
Number at risk	6 Months	1 Year	2 Years	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years	35 Years
PK	22176	20404	15676	8779	4117	2214	1210	609	259	46
TLK	1048	883	616	289	86	31	11	3	NA	NA
DALK	1463	1338	950	403	109	14	4	NA	NA	NA
DS(A)EK	6004	5340	4029	1901	371	13	NA	NA	NA	NA
DMEK	3069	2575	1704	463	30	NA	NA	NA	NA	NA
Limbal	53	42	30	15	3	2	2	NA	NA	NA
CAIRS	36	14	NA	NA	NA	NA	NA	NA	NA	NA

Survival probability	6 Months	1 Year	2 Years	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years	35 Years
PK	0.96	0.93	0.86	0.73	0.59	0.48	0.37	0.25	0.16	0.06
TLK	0.87	0.83	0.76	0.66	0.55	0.41	NA	NA	NA	NA
DALK	0.97	0.95	0.91	0.83	0.73	NA	NA	NA	NA	NA
DS(A)EK	0.91	0.87	0.80	0.63	0.43	NA	NA	NA	NA	NA
DMEK	0.85	0.82	0.77	0.65	0.37	NA	NA	NA	NA	NA
Limbal	0.86	0.74	0.63	NA	NA	NA	NA	NA	NA	NA
CAIRS	0.88	NA	NA	NA	NA	NA	NA	NA	NA	NA

Note: NA=Not Applicable, no followed grafts for number at risk, <20 followed grafts for survival probability.

As shown earlier in Figure 3, the different era in which each type of graft has been performed affects the likelihood that follow-up information will have been received. Figure 6 and the associated tables show the survival of grafts performed in the ten-year period from 2015 to 2024, stratified by type of graft. Limbal grafts are excluded from this analysis as fewer than 20 were performed during this time period.

Figure 6 Survival of all grafts registered from 2015 to 2024, stratified by type of graft

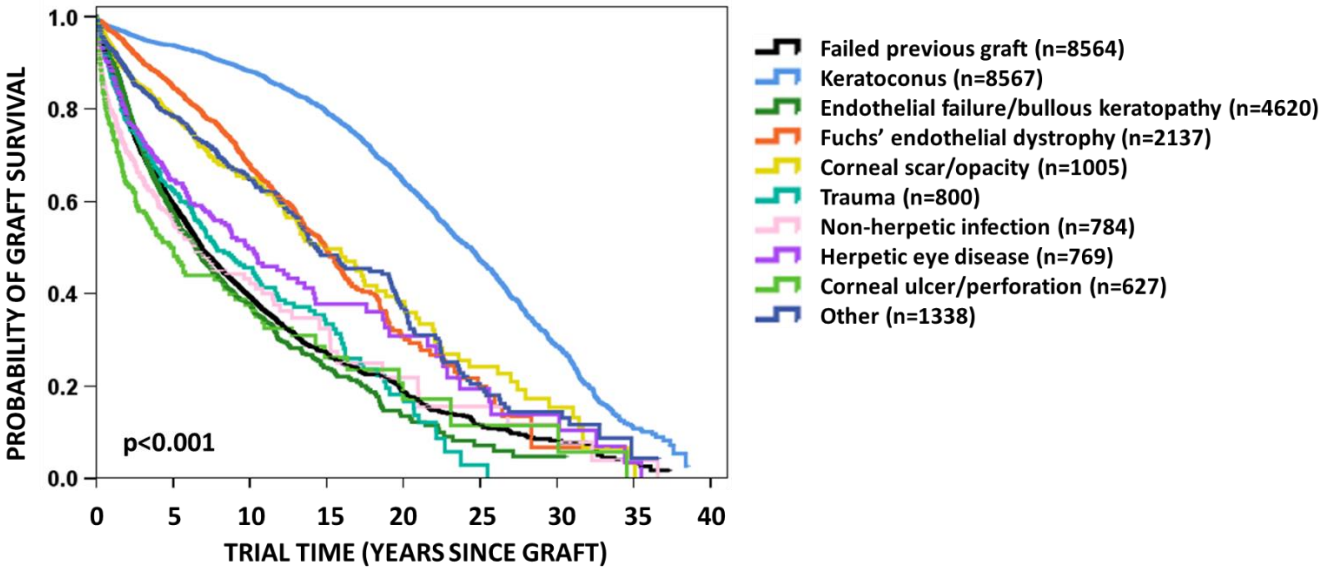


Number at risk	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years	10 Years
PK	3238	2179	1465	1035	703	434	233	103	24	NA
TLK	191	110	69	44	33	18	14	7	2	NA
DALK	560	382	243	171	111	72	40	18	4	NA
DS(A)EK	3020	2101	1521	1053	744	470	252	109	25	1
DMEK	2339	1526	935	580	350	187	106	35	7	NA
CAIRS	14	NA	NA	NA	NA	NA	NA	NA	NA	NA

Survival probability	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years
PK	0.90	0.81	0.73	0.67	0.61	0.55	0.48	0.43	0.33
TLK	0.78	0.67	0.61	0.56	0.54	NA	NA	NA	NA
DALK	0.94	0.89	0.85	0.81	0.78	0.78	0.76	NA	NA
DS(A)EK	0.86	0.77	0.69	0.63	0.58	0.53	0.48	0.43	0.36
DMEK	0.84	0.80	0.74	0.70	0.66	0.60	0.56	0.51	NA

One of the major factors affecting graft survival has consistently been found to be indication for graft. The following analyses show the survival for each individual type of graft, stratified by the indications for graft, for each type of graft. Grafts where an underlying condition is known to have led to endothelial failure or perforation, are categorised according to the original condition. Grafts for scarring from historic infection without current recurrence, are categorised as scar/opacity, along with instances where a reason for the scar was not given.

Figure 7 Survival of PK performed from 1985 to 2024, stratified by indication for graft

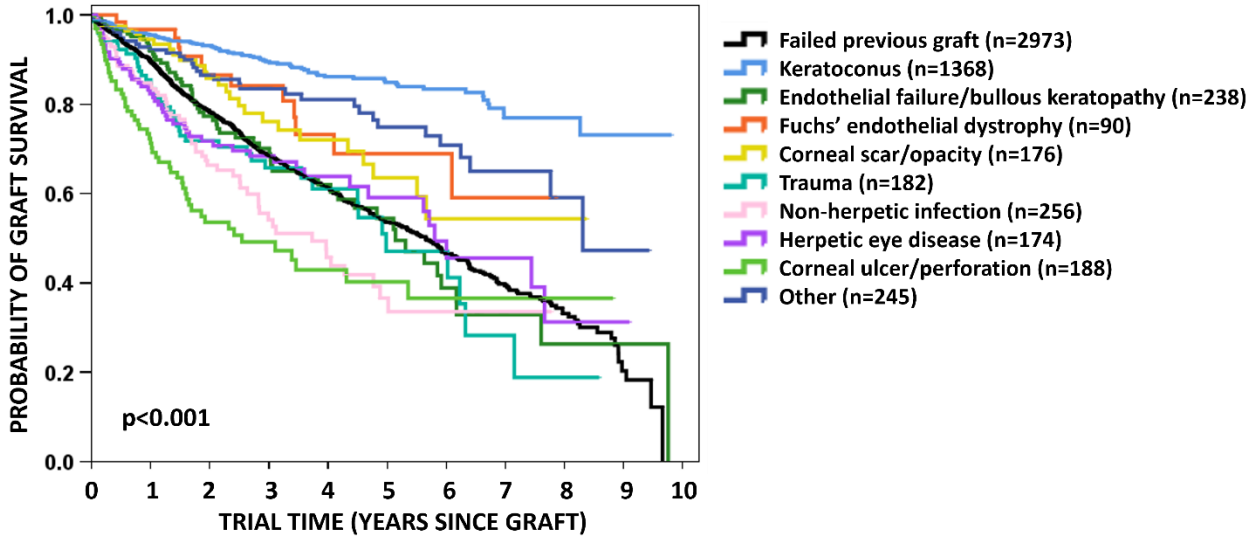


Number at risk	1 Year	2 Years	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years	35 Years
Failed previous graft	5669	4279	2186	811	316	152	55	21	6
Keratoconus	6539	5270	3367	2055	1367	857	479	205	36
Endothelial failure/BK	3092	2146	886	263	80	23	7	1	NA
Fuchs' endothelial dystrophy	1727	1471	975	463	193	45	11	1	NA
Corneal scar/opacity	700	523	295	118	60	33	18	8	1
Trauma	511	386	194	76	34	12	1	NA	NA
Non-herpetic infection	404	276	126	41	14	7	4	3	1
Herpetic eye disease	515	376	184	83	30	17	7	4	1
Corneal ulcer/perforation	286	188	83	30	11	5	2	2	NA
Other	961	761	483	238	109	59	24	14	1

Survival probability	1 Year	2 Years	5 Years	10 Years	15 Years	20 Years	25 Years	30 Years	35 Years
Failed previous graft	0.89	0.79	0.59	0.39	0.27	0.19	0.12	0.08	NA
Keratoconus	0.98	0.97	0.94	0.88	0.79	0.64	0.47	0.29	0.11
Endothelial failure/BK	0.92	0.81	0.57	0.38	0.24	0.14	NA	NA	NA
Fuchs' endothelial dystrophy	0.97	0.94	0.85	0.68	0.50	0.31	NA	NA	NA
Corneal scar/opacity	0.94	0.88	0.78	0.65	0.50	0.38	NA	NA	NA
Trauma	0.87	0.78	0.62	0.47	0.33	NA	NA	NA	NA
Non-herpetic infection	0.80	0.71	0.56	0.43	NA	NA	NA	NA	NA
Herpetic eye disease	0.88	0.79	0.65	0.50	NA	NA	NA	NA	NA
Corneal ulcer/perforation	0.76	0.64	0.50	0.38	NA	NA	NA	NA	NA
Other	0.93	0.88	0.78	0.65	0.48	0.37	0.20	NA	NA

As shown in tables 4 and 5, the indications reported for PKs have changed in recent years. Figure 8, and its related tables, present the results for PK performed from 2015 to 2024.

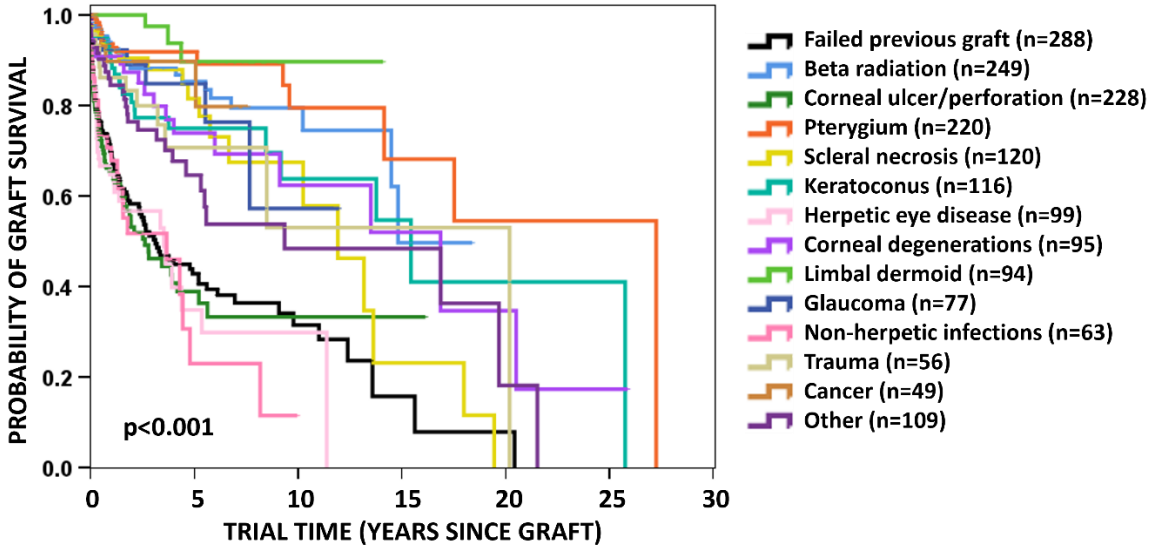
Figure 8 Survival of PK performed from 2015 to 2024, stratified by indication for graft



Number at risk	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years
Failed previous graft	1638	1114	741	522	354	215	114	51	10
Keratoconus	794	557	365	269	190	125	70	32	9
Endothelial failure/BK	141	85	56	38	22	14	6	3	1
Fuchs' endothelial dystrophy	56	40	30	17	12	8	3	NA	NA
Corneal scar/opacity	93	61	41	29	20	6	2	1	NA
Trauma	86	56	40	22	12	9	3	2	NA
Non-herpetic infection	122	65	37	25	12	7	2	NA	NA
Herpetic eye disease	101	68	53	37	23	13	10	4	1
Corneal ulcer/perforation	68	41	28	17	12	7	6	1	NA
Other	139	92	74	59	46	31	17	9	3

Survival probability	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years
Failed previous graft	0.90	0.78	0.69	0.61	0.54	0.47	0.39	0.33
Keratoconus	0.96	0.93	0.90	0.86	0.85	0.83	0.77	0.77
Endothelial failure/BK	0.92	0.77	0.70	0.62	0.55	NA	NA	NA
Fuchs' endothelial dystrophy	0.97	0.87	0.84	NA	NA	NA	NA	NA
Corneal scar/opacity	0.95	0.86	0.76	0.72	0.64	NA	NA	NA
Trauma	0.85	0.72	0.66	0.61	NA	NA	NA	NA
Non-herpetic infection	0.84	0.66	0.54	0.463	NA	NA	NA	NA
Herpetic eye disease	0.82	0.72	0.68	0.64	0.59	NA	NA	NA
Corneal ulcer/perforation	0.71	0.54	0.49	NA	NA	NA	NA	NA
Other	0.92	0.87	0.84	0.81	0.75	0.71	NA	NA

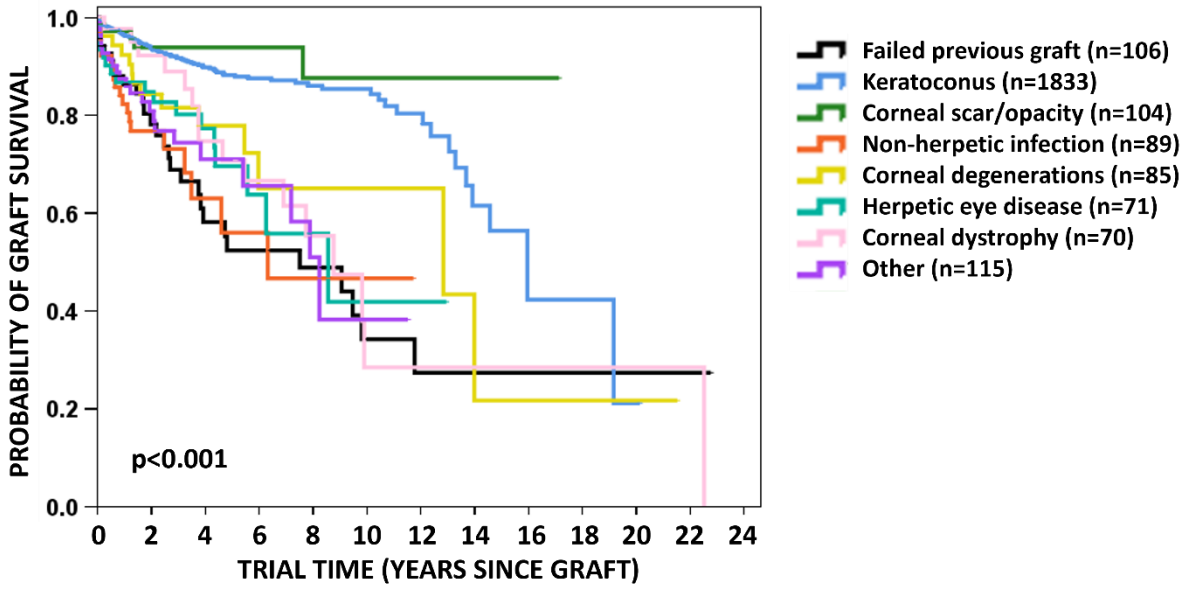
Figure 9 Survival of TLK performed from 1985 to 2024, stratified by indication for graft



Number at Risk	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	8 Years	10 Years
Failed previous graft	120	84	60	47	41	32	17	11
Beta radiation	130	91	75	64	48	41	28	16
Corneal ulcer/perforation	76	44	28	26	22	10	7	2
Pterygium	115	77	60	45	36	30	23	14
Scleral necrosis	54	41	35	29	22	15	8	7
Keratoconus	64	47	38	28	24	21	14	11
Herpetic eye disease	35	22	16	8	7	5	4	2
Corneal degeneration	61	39	31	26	22	15	13	7
Limbal dermoid	60	45	36	25	21	16	10	5
Glaucoma	31	27	17	14	11	6	3	1
Non-herpetic infection	24	13	10	6	3	2	2	NA
Trauma	33	28	22	13	10	6	5	1
Cancer	22	15	11	9	9	4	NA	NA
Other	58	43	35	27	20	13	11	9

Survival probability	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	8 Years
Failed previous graft	0.69	0.58	0.51	0.46	0.43	0.39	NA
Beta radiation	0.93	0.88	0.88	0.88	0.85	0.82	0.80
Corneal ulcer/perforation	0.65	0.53	0.46	0.43	0.41	NA	NA
Pterygium	0.94	0.92	0.92	0.92	0.92	0.89	0.89
Scleral necrosis	0.92	0.90	0.88	0.88	0.82	NA	NA
Keratoconus	0.90	0.81	0.77	0.75	0.75	0.75	NA
Herpetic eye disease	0.65	0.57	NA	NA	NA	NA	NA
Corneal degeneration	0.91	0.87	0.83	0.77	0.74	NA	NA
Limbal dermoid	1.00	1.00	0.98	0.94	0.90	NA	NA
Glaucoma	0.92	0.89	NA	NA	NA	NA	NA
Non-herpetic infection	0.68	NA	NA	NA	NA	NA	NA
Trauma	0.86	0.83	0.80	NA	NA	NA	NA
Cancer	0.90	NA	NA	NA	NA	NA	NA
Other	0.85	0.76	0.75	0.68	0.65	NA	NA

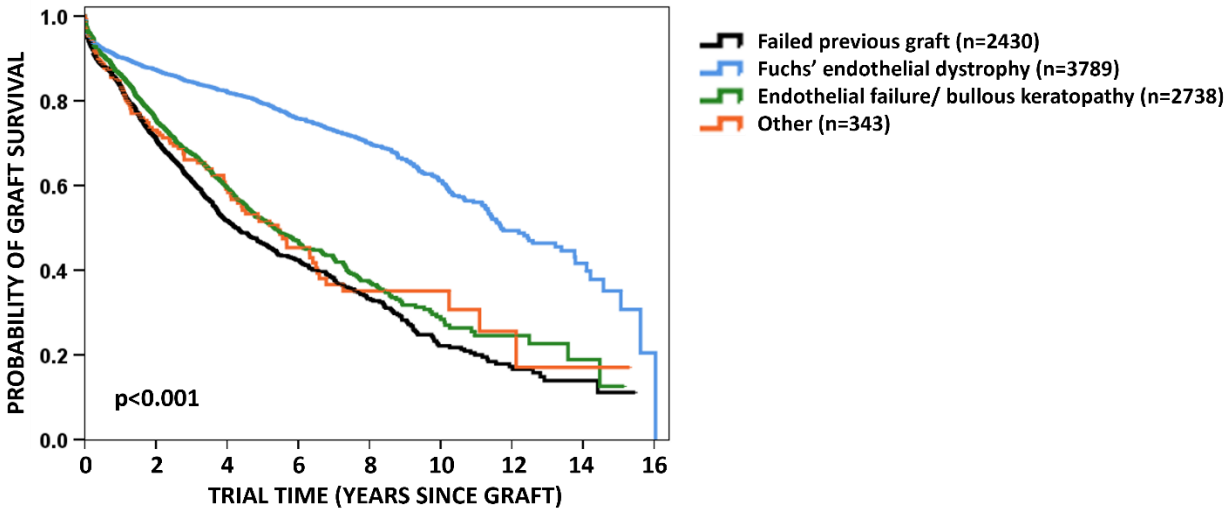
Figure 10 Survival of DALK performed from 2000 to 2024, stratified by indication for graft



Number at risk	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	8 Years	10 Years	12 Years	14 Years
Failed previous graft	51	36	29	21	18	18	14	7	3	2
Keratoconus	981	687	489	375	290	232	142	81	39	15
Corneal scar/opacity	63	53	37	30	25	20	14	7	3	2
Non-herpetic infection	47	27	15	11	8	6	3	1	NA	NA
Corneal degenerations	47	34	27	20	14	9	7	5	3	1
Herpetic eye disease	48	41	32	27	15	9	4	3	2	NA
Corneal dystrophy	39	30	25	20	18	15	8	3	3	2
Other	62	42	30	20	15	9	6	2	NA	NA

Survival probability	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	8 Years	10 Years	12 Years
Failed previous graft	0.86	0.78	0.69	0.58	NA	NA	NA	NA	NA
Keratoconus	0.96	0.94	0.92	0.90	0.88	0.88	0.86	0.85	0.80
Corneal scar/opacity	0.97	0.94	0.94	0.94	0.94	0.94	NA	NA	NA
Non-herpetic infection	0.82	0.77	NA	NA	NA	NA	NA	NA	NA
Corneal degenerations	0.92	0.84	0.82	0.78	NA	NA	NA	NA	NA
Herpetic eye disease	0.87	0.85	0.80	0.77	NA	NA	NA	NA	NA
Corneal dystrophy	0.98	0.92	0.89	0.75	NA	NA	NA	NA	NA
Other	0.88	0.81	0.74	0.71	NA	NA	NA	NA	NA

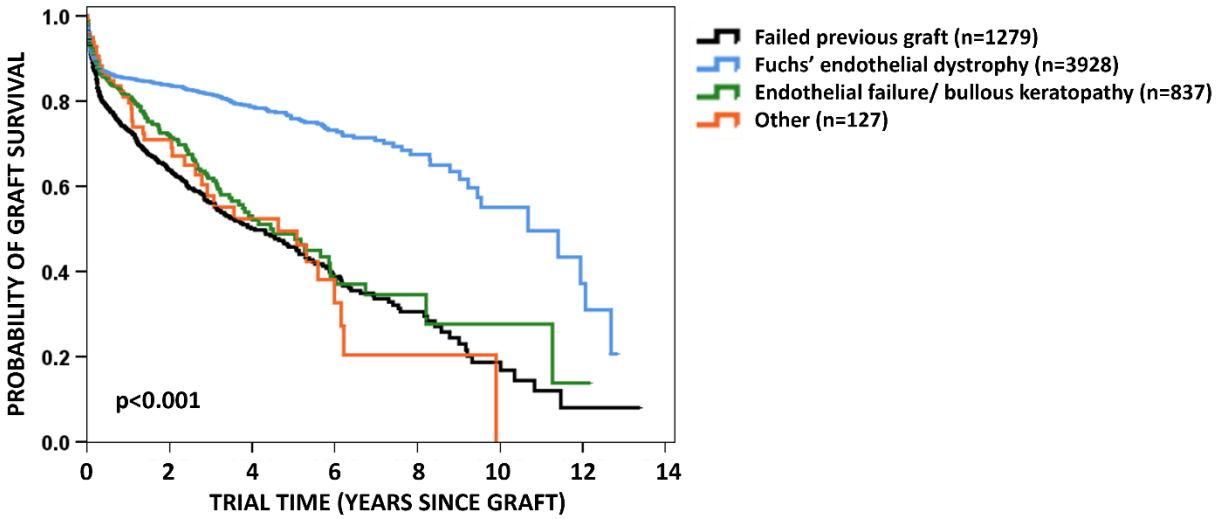
Figure 11 Survival of DS(A)EK performed from 2006 to 2024, stratified by indication for graft



Number at risk	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	8 Years	10 Years	12 Years	14 Years
Failed previous graft	1333	922	647	441	339	244	128	58	27	7
Fuchs' endothelial dystrophy	2418	2006	1684	1409	1151	880	517	256	93	26
Endothelial failure/bullous keratopathy	1404	977	701	492	357	261	115	46	17	5
Other	185	124	97	73	55	42	19	11	3	1

Survival probability	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	8 Years	10 Years	12 Years	14 Years
Failed previous graft	0.84	0.71	0.61	0.52	0.46	0.42	0.33	0.22	0.17	NA
Fuchs' endothelial dystrophy	0.90	0.87	0.85	0.82	0.79	0.76	0.70	0.61	0.49	0.42
Endothelial failure/bullous keratopathy	0.86	0.76	0.68	0.60	0.52	0.47	0.37	0.29	NA	NA
Other	0.83	0.73	0.66	0.59	0.52	0.45	NA	NA	NA	NA

Figure 12 Survival of DMEK performed from 2007 to 2024, stratified by indication for graft



Number at risk	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	8 Years	10 Years
Failed previous graft	537	340	236	159	111	78	31	10
Fuchs' endothelial dystrophy	1670	1131	714	469	297	173	62	17
Endothelial failure/bullous keratopathy	312	195	106	58	40	22	6	3
Other	58	38	22	18	15	6	2	NA

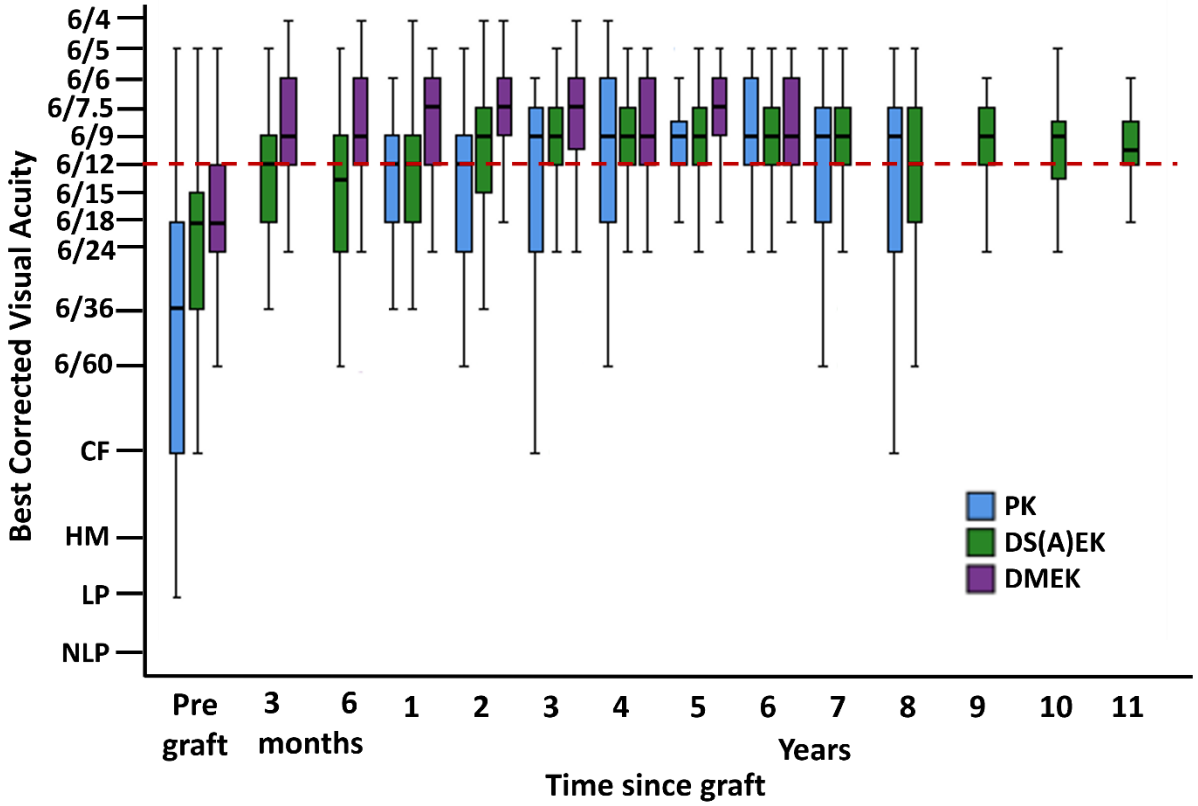
Survival probability	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	8 Years
Failed previous graft	0.73	0.64	0.56	0.50	0.46	0.39	0.31
Fuchs' endothelial dystrophy	0.85	0.84	0.82	0.79	0.76	0.73	0.68
Endothelial failure/bullous keratopathy	0.81	0.72	0.62	0.53	0.49	0.39	NA
Other	0.81	0.71	0.58	NA	NA	NA	NA

5 Visual Acuity

The most commonly reported desired outcome of corneal transplantation is improvement in vision. To be successful, a graft must therefore firstly survive, and then secondly provide a level of visual acuity that is adequate for the recipient's needs. Data from the ACGR chart the visual outcomes in grafts at various time points post-graft.

Figure 13 and Figure 14 show the BCVA in the grafted eye at various time points, for first grafts performed for Fuchs' endothelial dystrophy and keratoconus, respectively. These data are for grafts performed in the last 20 years and include data for **surviving** grafts at each time point. They are stratified by graft type, with box plots presented for groups with data available for 20 or more grafts. The box indicates the interquartile range (middle 50%) of values, with the central line showing the median value. Functional vision of 6/12 is indicated by the red dashed line. The accompanying tables indicate the number of grafts for which data were available at each time point, with analyses performed where at least 20 grafts had data provided. Improvements in BCVA were found in surviving grafts, for all graft types, for both indications for graft.

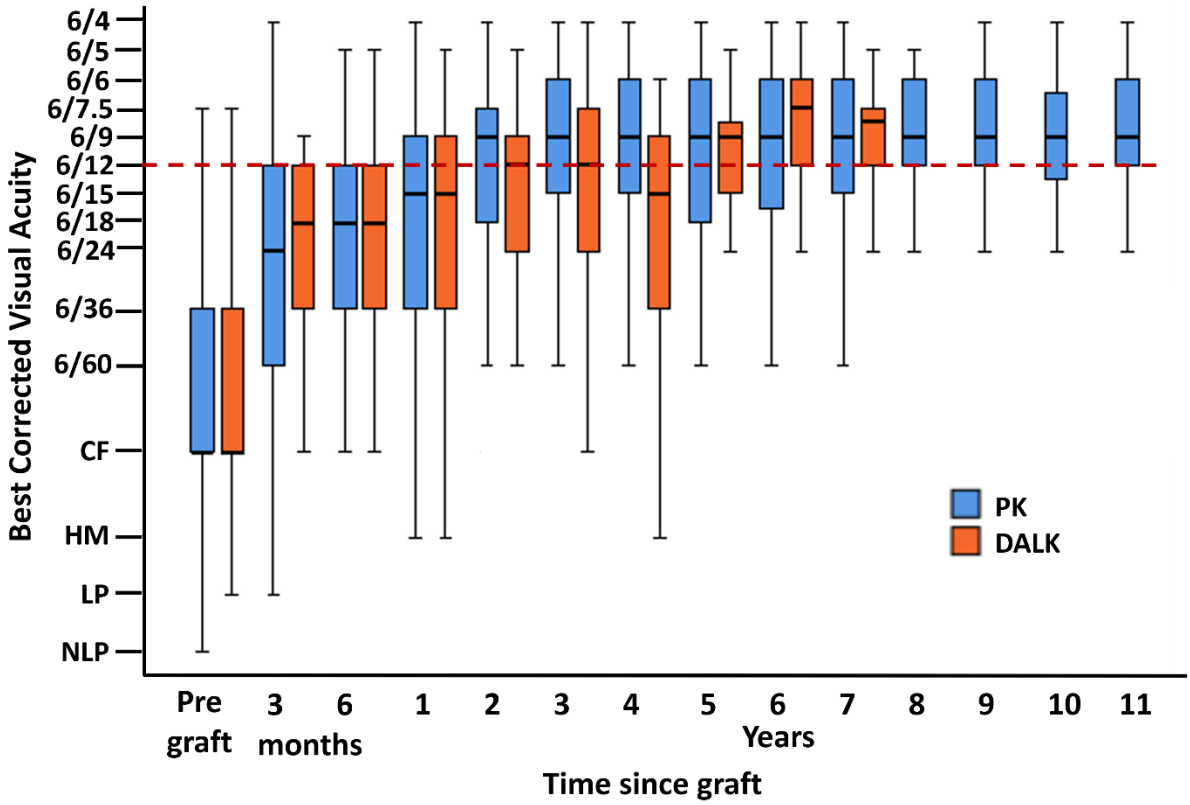
Figure 13 BCVA at various time points pre- and post-graft, in surviving grafts performed for Fuchs' endothelial dystrophy from 2005 to 2024, stratified by type of graft



	Pre graft	3 Months	6 Months	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years	10 Years	11 Years
PK	720	11	9	41	81	42	29	24	35	30	25	15	18	12
DS(A)EK	3537	169	206	340	272	220	140	141	113	99	66	43	35	20
DMEK	3727	217	224	397	223	151	82	58	29	16	8	5	3	1

For Fuchs endothelial dystrophy, the *pre-graft* BCVA varied significantly across graft types, with DMEK performed in eyes with significantly better vision than either PK or DS(A)EK, and DS(A)EK in eyes with better vision than PK (all p<0.001). Functional vision (6/12) was achieved in a majority of eyes with **surviving** grafts at 3 months for both EK groups, while eyes that underwent PK achieved this level at 1 year post-graft. Median BCVA was 6/12 or better in surviving grafts, at yearly intervals up to 6 years post graft for DMEK, 8 years for PK, and 11 years for DS(A)EK. Post-graft BCVA was significantly better (p<0.001) in eyes with surviving DMEK than in those with surviving DS(A)EK up to 5 years post-graft, or surviving PK up to 3 years post-graft. At 2 years post-graft, BCVA in eyes with surviving DS(A)EK was significantly better than in those with surviving PK (p<0.001).

Figure 14 BCVA at various time points pre- and post-graft, in surviving grafts performed for keratoconus from 2005 to 2024, stratified by type of graft



	Pre graft	3 Months	6 Months	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years	10 Years	11 Years
PK	3424	71	56	354	309	180	132	111	84	71	46	59	31	30
DALK	1664	21	59	155	108	62	40	32	28	30	11	8	5	4

Pre-graft visual acuity was significantly poorer in eyes that underwent PK (p<0.001). Median post-graft BCVA achievement reached functional vision by 2 years post-graft for both PK and DALK performed for keratoconus. This was maintained to 11 years for PK and 7 years for DALK. The post-graft BCVA was significantly better following PK compared to DALK at 2 years (p=0.003), and 4 years (p=0.002) post graft.