

The Australian Corneal Graft Registry

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**The ACGR is funded by the Commonwealth Government of Australia via the
Organ and Tissue Authority (DonateLife)**

The ACGR Database - 16th Feb 2023

**1985
onwards**

	Registered	Followed	Failed	EGF*	PNF*
Total	44173	79%	24%	7%	2%
PK	27875	83%	26%	6%	<1%
Patch/TLK	1770	74%	21%	12%	1%
Limbal	92	74%	34%	15%	1%
DALK	2222	63%	8%	3%	<1%
DS(A)EK	7877	77%	24%	9%	5%
DMEK	4337	64%	17%	12%	9%

Introduced in

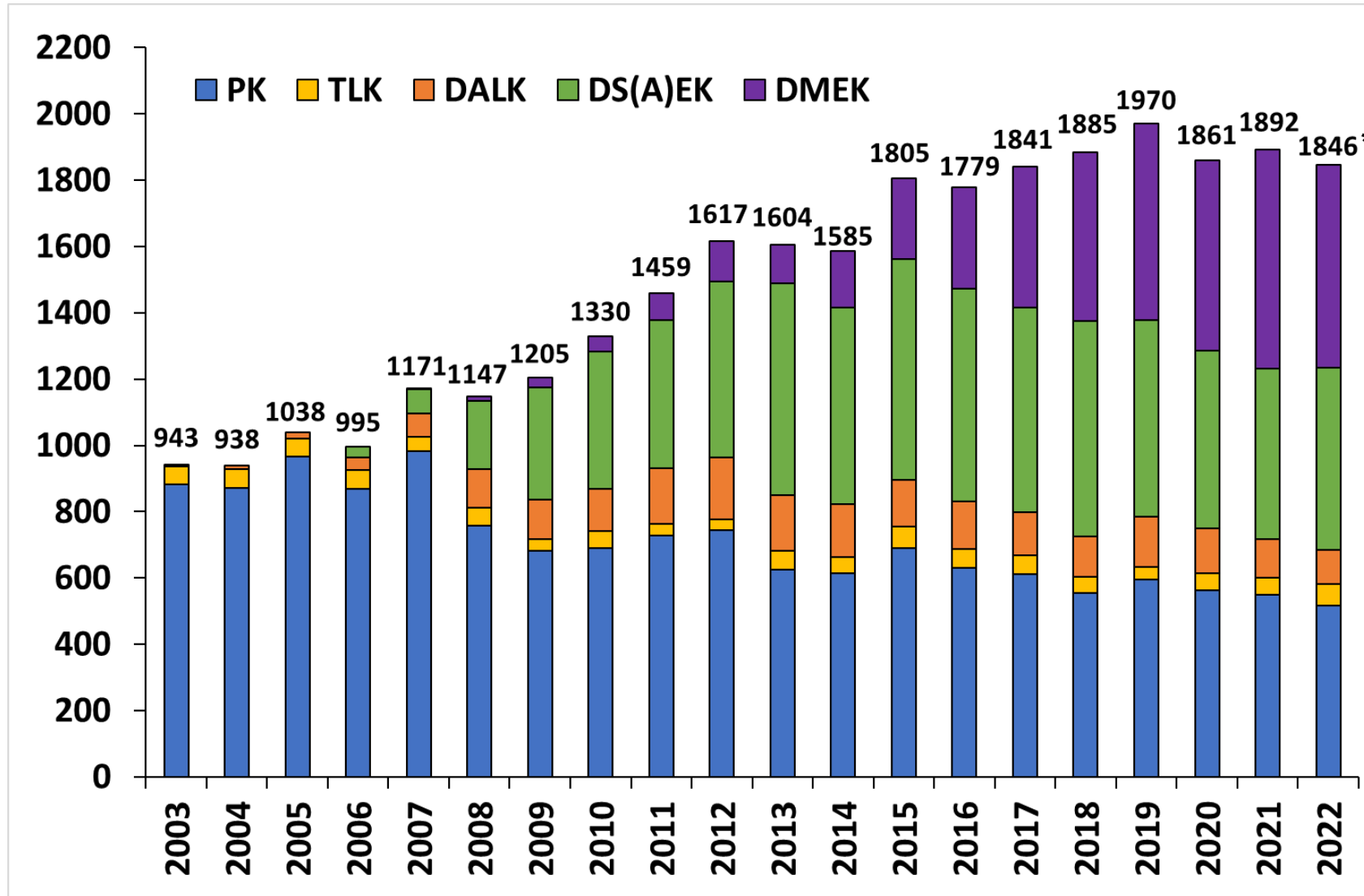
- 2000
- 2006
- 2007

EGF = Early graft failure, failed within 12 months of graft

PNF = Primary non-functioning graft, surgeon specified that graft never cleared/attached

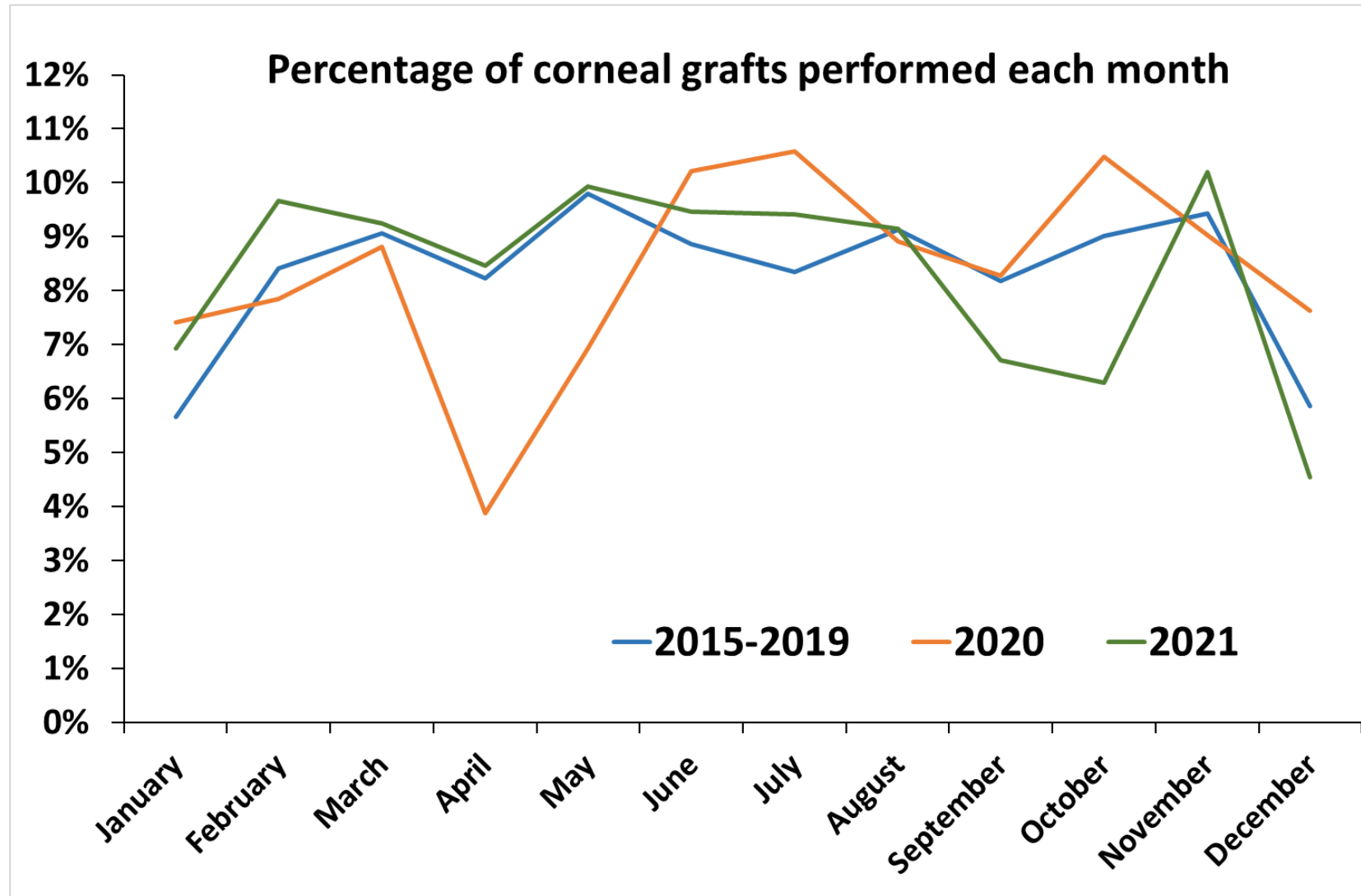
***Both likely to be underreported for grafts from 2021 and 2022**

Registered Grafts 2003 to 2022

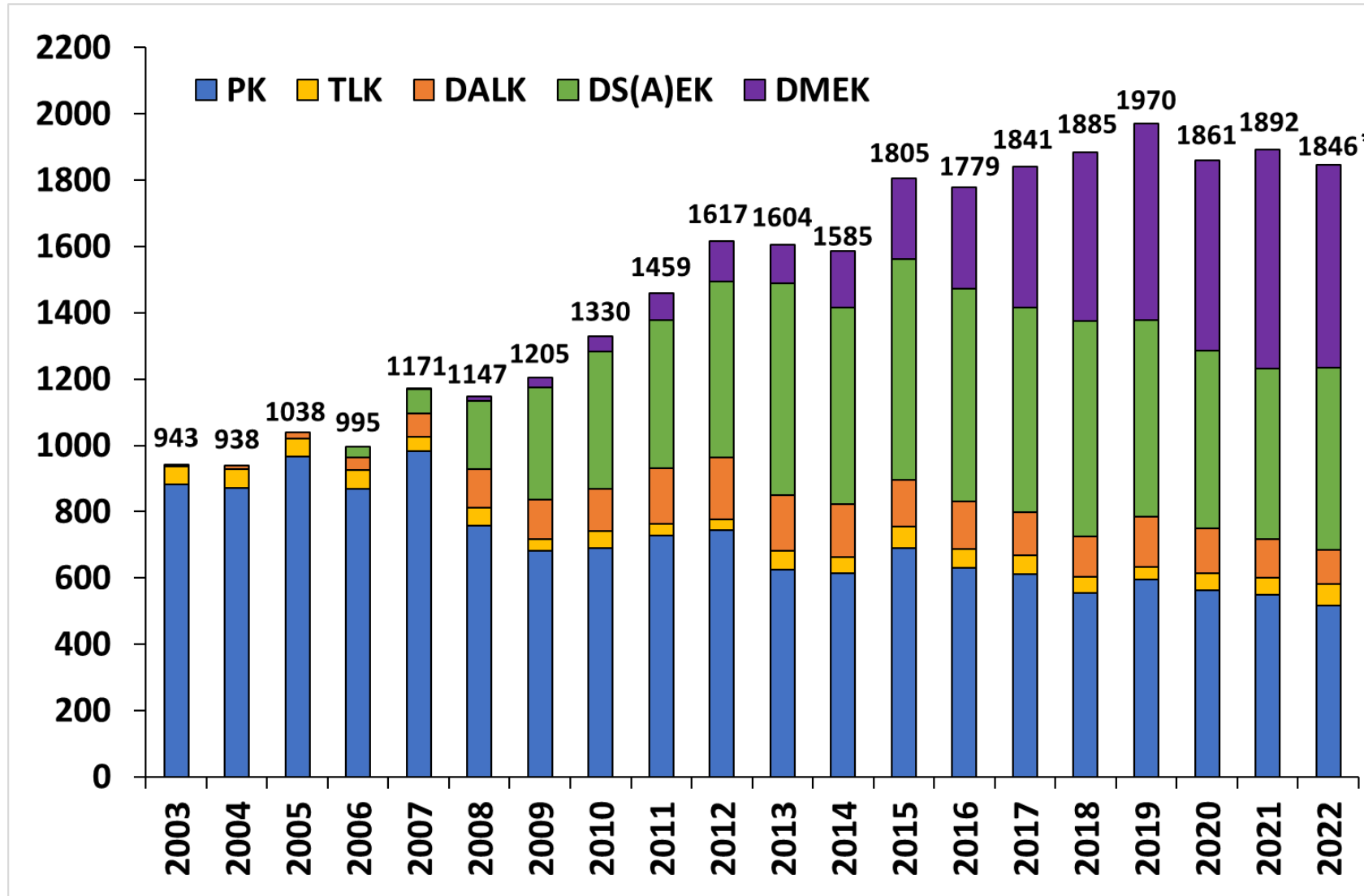


*Registrations for grafts performed in 2022 are still being received and entered

The effect of COVID-19 on Corneal Grafting in Australia 2020-2021



Registered Grafts 2003 to 2022



*Registrations for grafts performed in 2022 are still being received and entered

Registered Grafts 2003 to 2022

- ▶ Consent boxes added to registration forms
 - ▶ Linkage with NDI is optional
 - ▶ Data to be registered with ACGR
 - ▶ **Cannot enter data without this ticked!**

Registry No. <small>Registry use only</small>	THE AUSTRALIAN CORNEAL GRAFT REGISTRY REGISTRATION FORM	Date Rec'd <small>Registry use only</small>
OPERATING SURGEON (surname and initial): _____ CONSULTANT (if different): _____		STATE: _____
RECIPIENT IDENTIFICATION		
Patient's name: _____		
SURNAME		FIRST NAME
Patient's record number (if applicable): _____		Please select applicable boxes
Patient's date of birth: / /	Patient's sex: Male <input type="checkbox"/>	Female <input type="checkbox"/>
Date of graft: / /	Eye grafted: R <input type="checkbox"/>	L <input type="checkbox"/>
CONFIRMATION OF CONSENT (please tick) I have gained consent from the corneal graft recipient to: Forward their data to the Australian Corneal Graft Registry (ACGR) <input type="checkbox"/> Allow the ACGR to perform confidential linkage with the National Death Index to determine if recipients have died <input type="checkbox"/>		

603 not ticked initially

24 no consent stated
Excluded

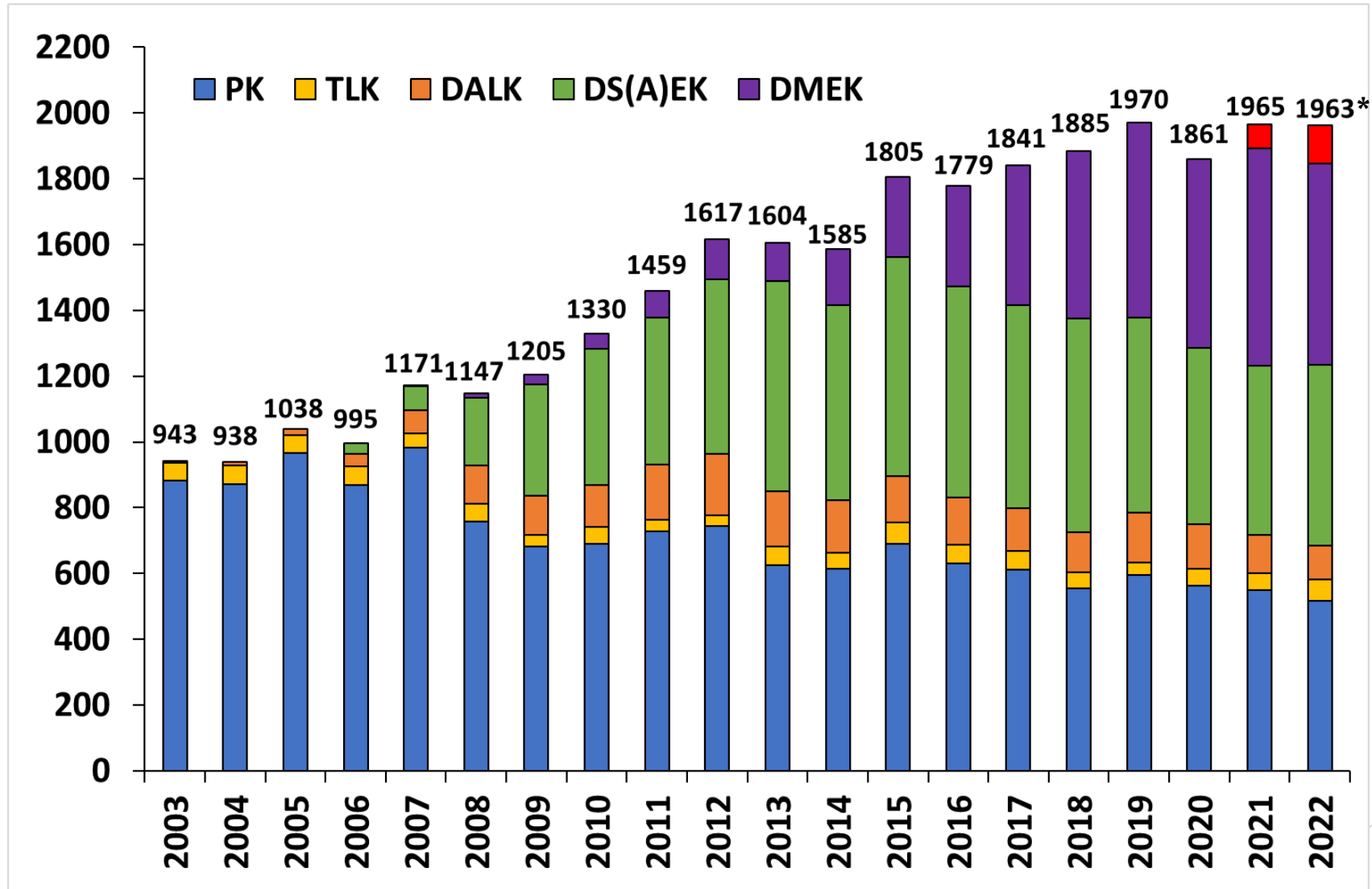
579 returned for clarification

364 returned ticked
Entered

25 returned still not ticked
Excluded

190 not yet returned
Unknown

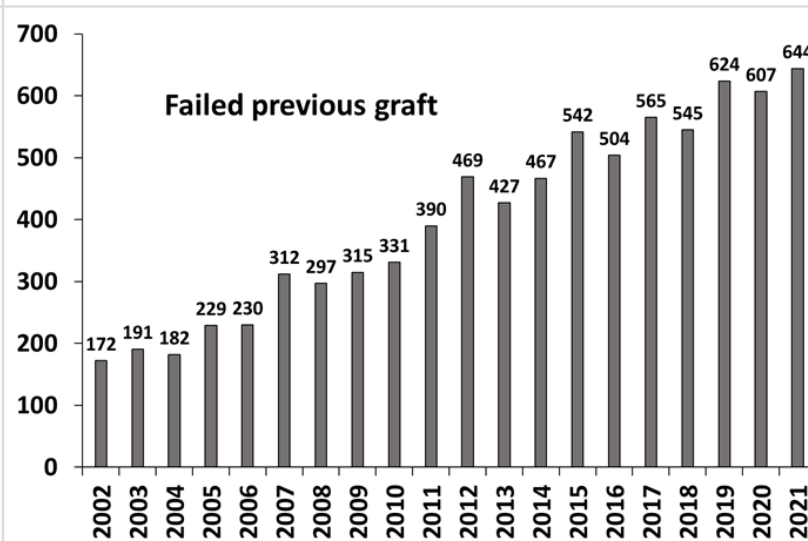
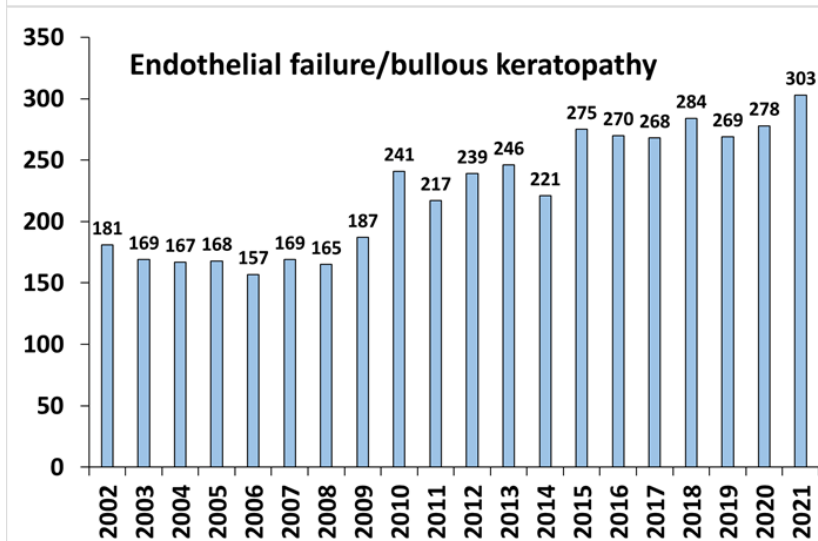
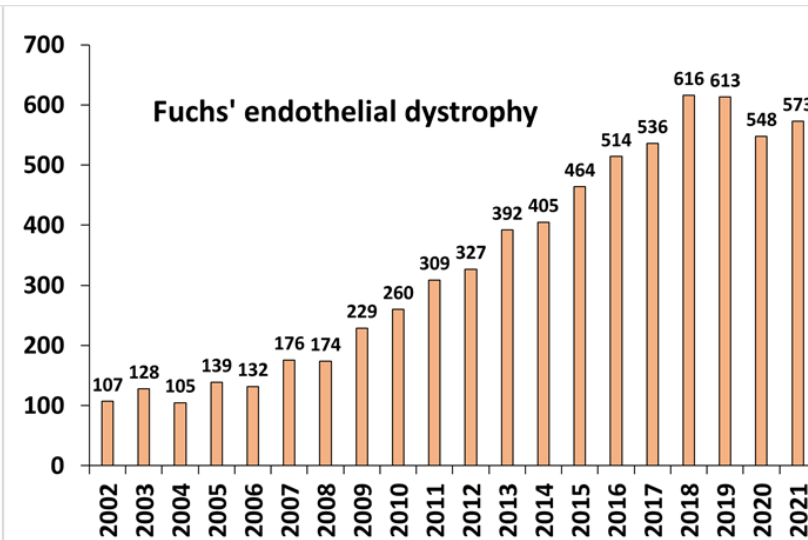
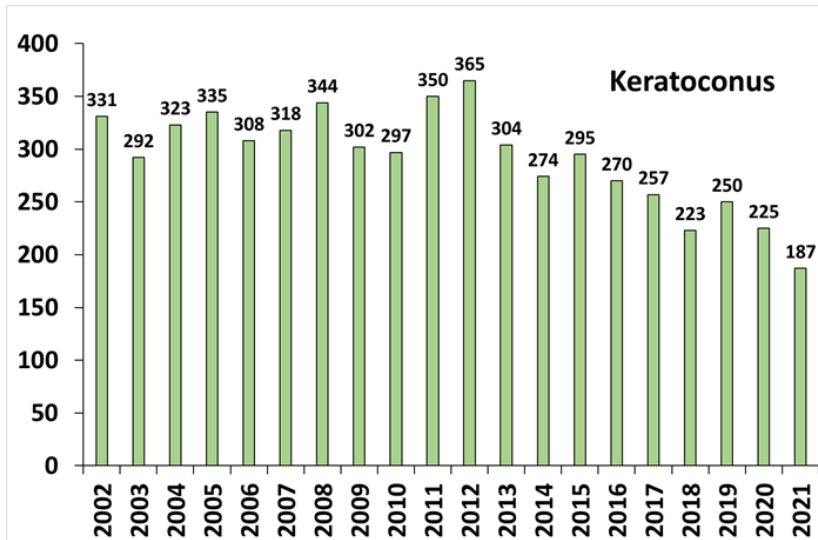
Registered Grafts 2003 to 2022



*Registrations for grafts performed in 2022 are still being received and entered

Indication for Graft 2002 to 2021

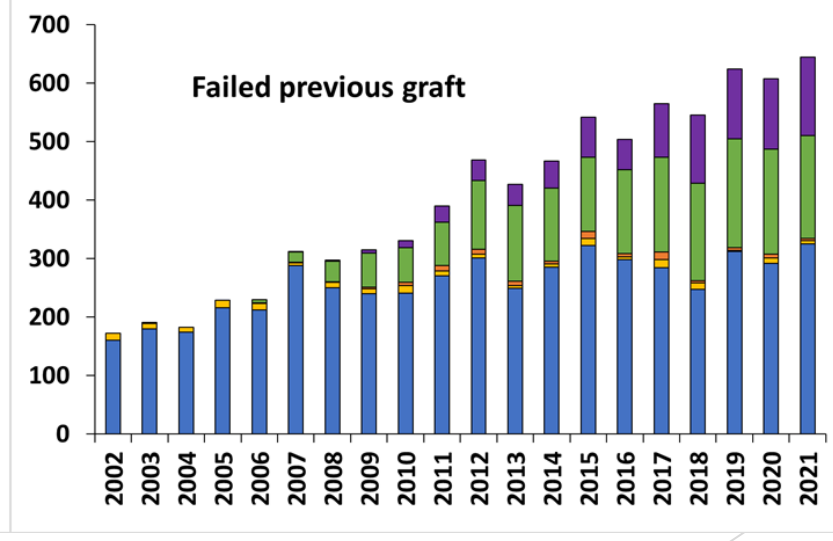
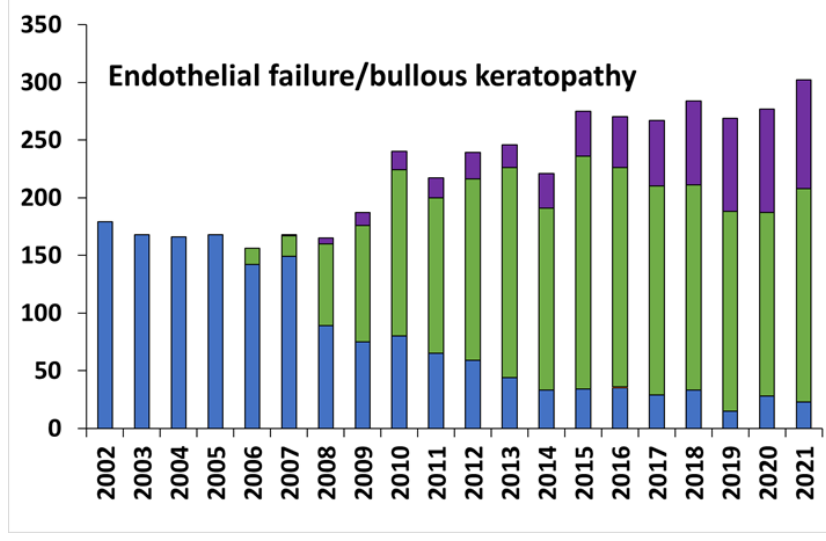
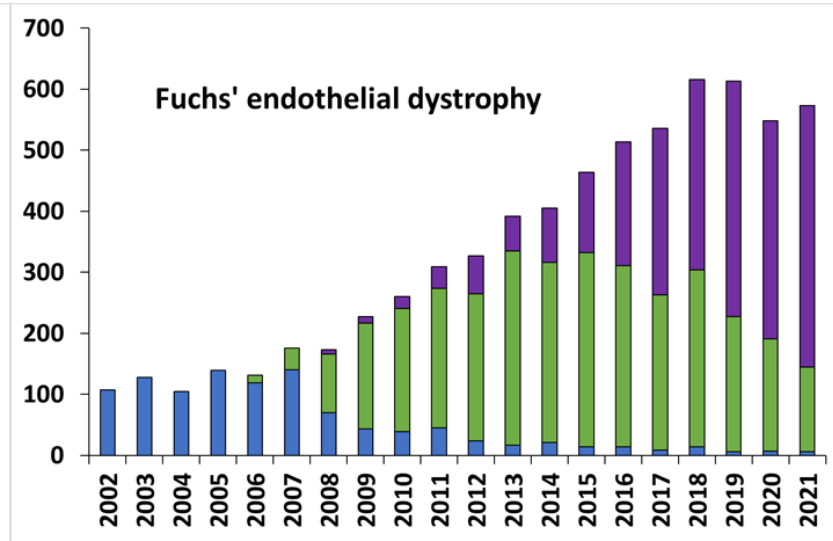
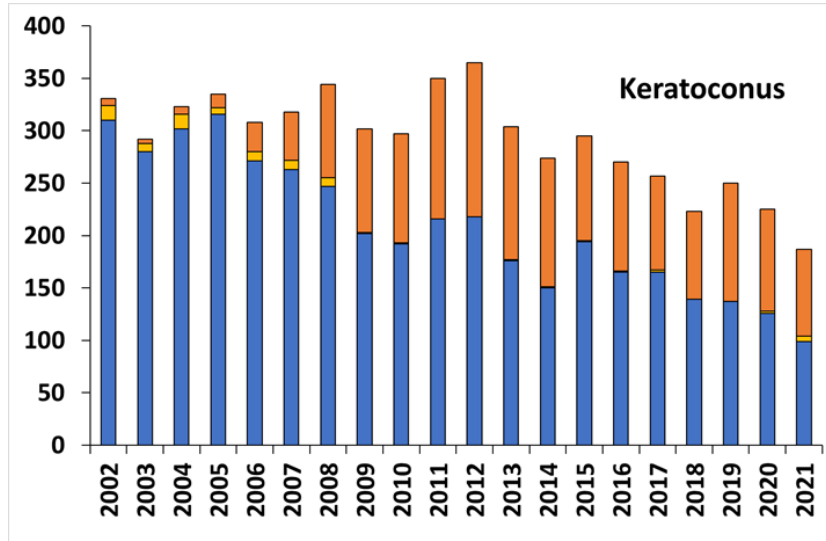
NUMBER OF GRAFTS



YEAR GRAFT PERFORMED

Indication for Graft 2002 to 2021

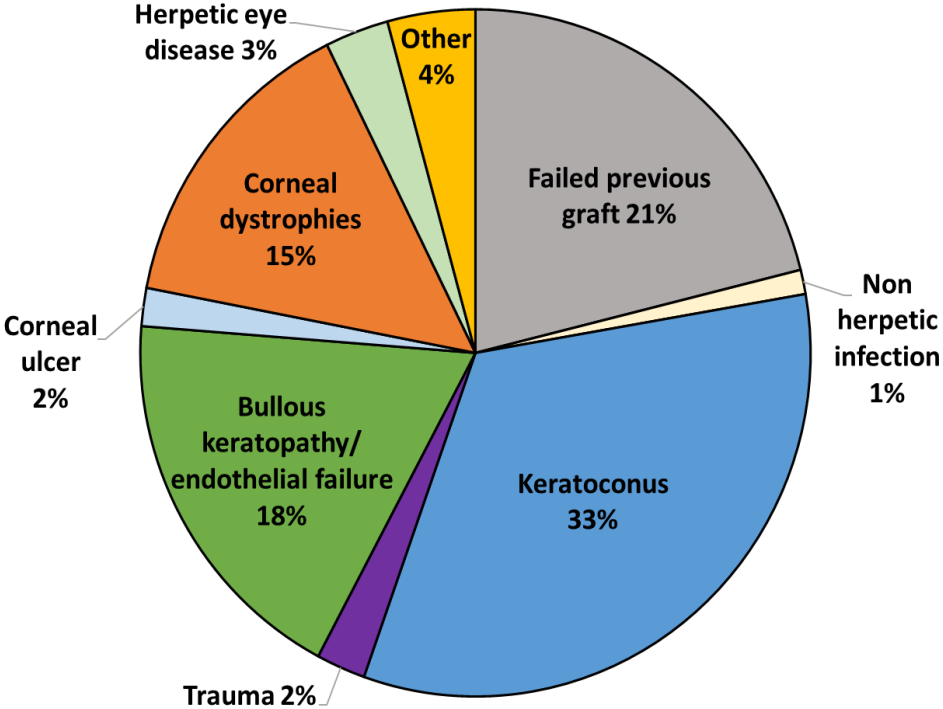
NUMBER OF GRAFTS



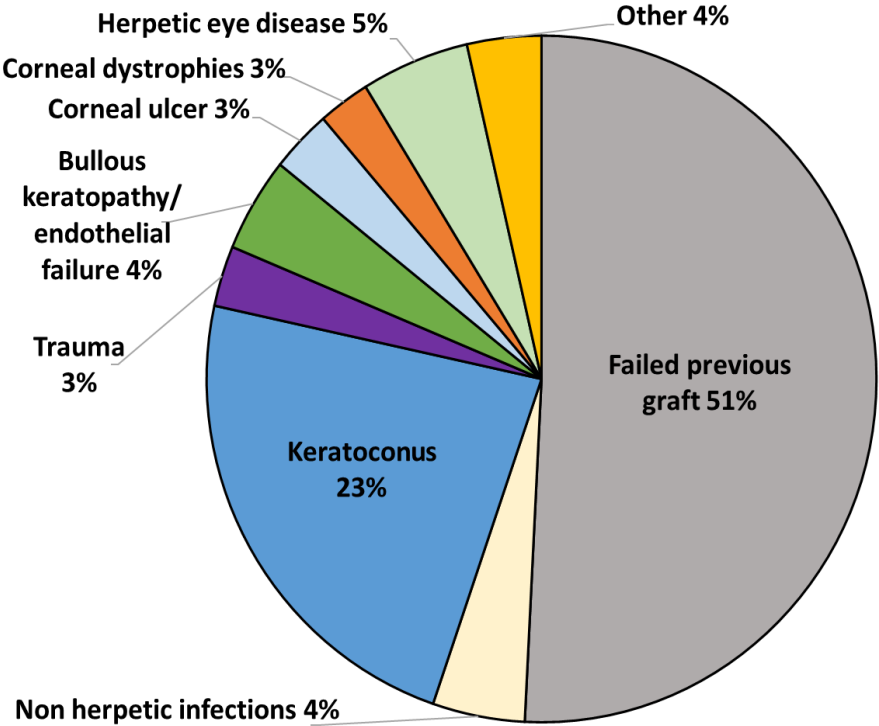
YEAR GRAFT PERFORMED

Shift in Indication for PK

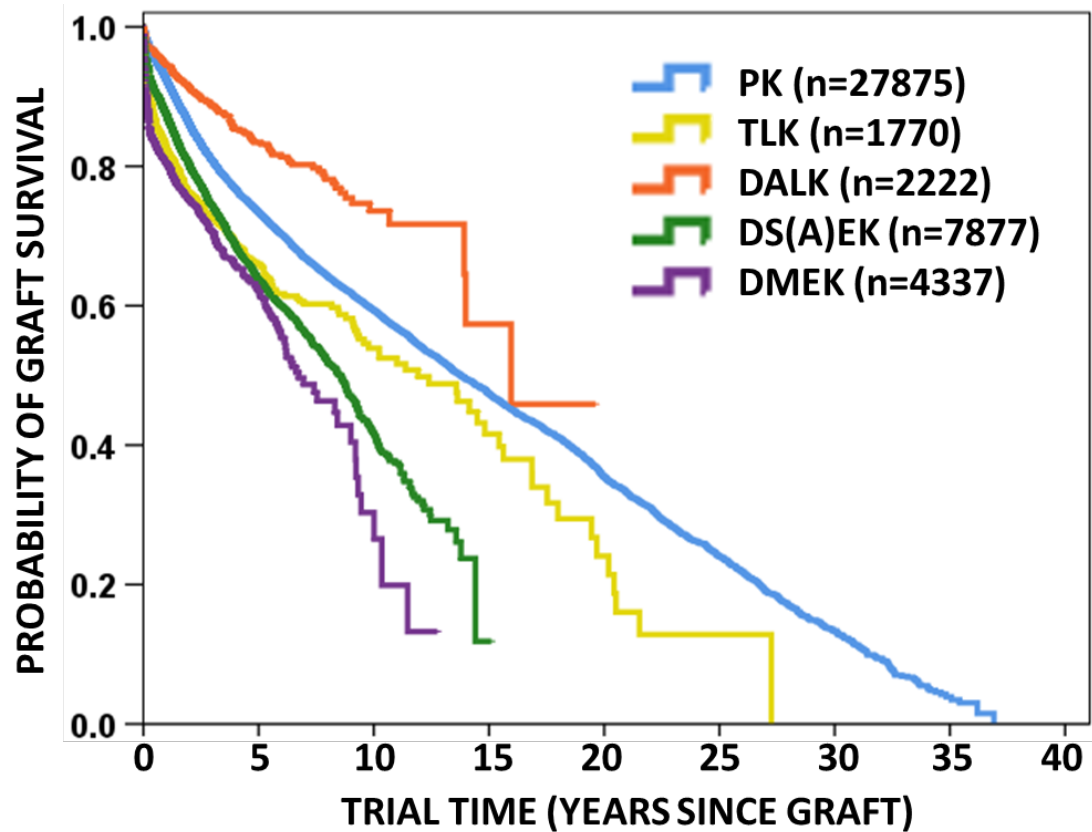
2002 to 2006



2017 to 2021



Overall survival of registered grafts



	1	2	5	10	15	20	25	30	35
PK	19344	14768	8073	3692	1839	928	433	148	9
TLK	816	574	268	79	25	9	1	NA	NA
DALK	1182	829	317	60	7	NA	NA	NA	NA
DS(A)EK	4457	3370	1398	200	1	NA	NA	NA	NA
DMEK	1662	985	205	8	NA	NA	NA	NA	NA

Reasons for Graft Failure

Of registered grafts

	PK	DS(A)EK	DMEK	All grafts
Endothelial failure	6%	9%	5%	6%
Rejection	7%	3%	1%	5%
Primary non-function	<1%	5%	8%	2%

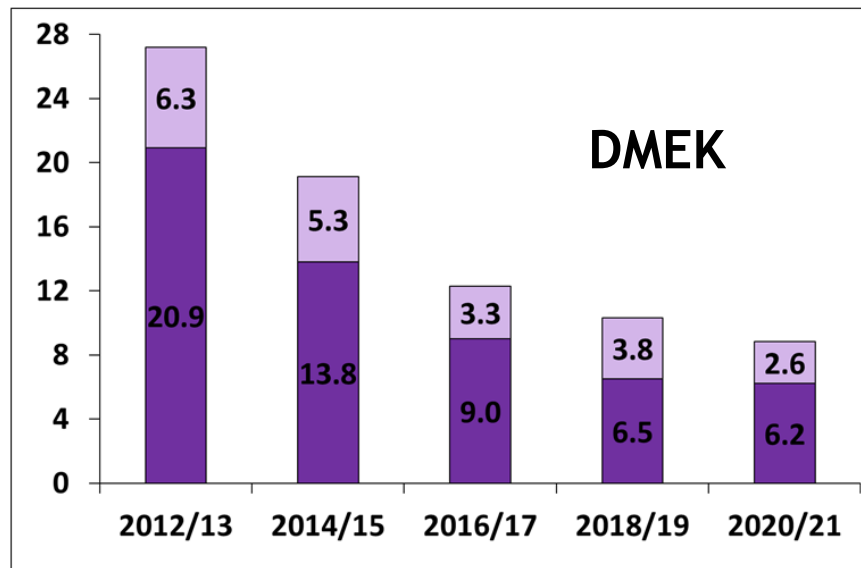
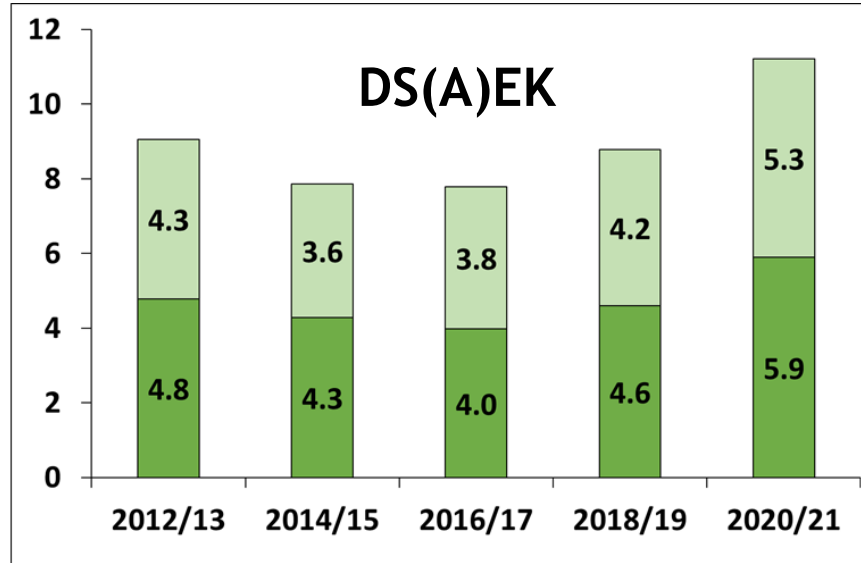
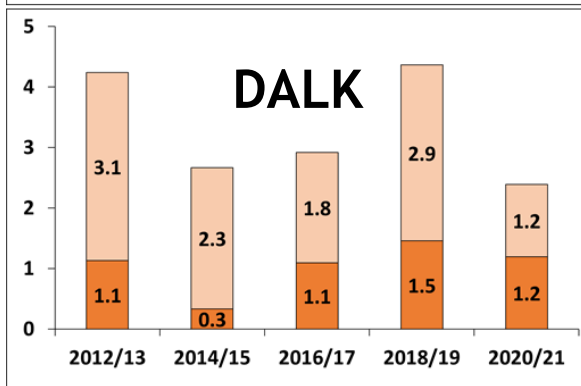
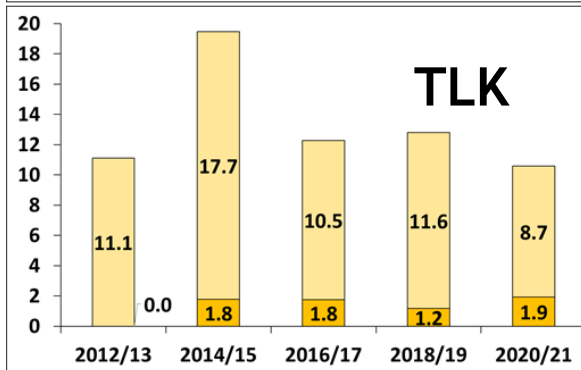
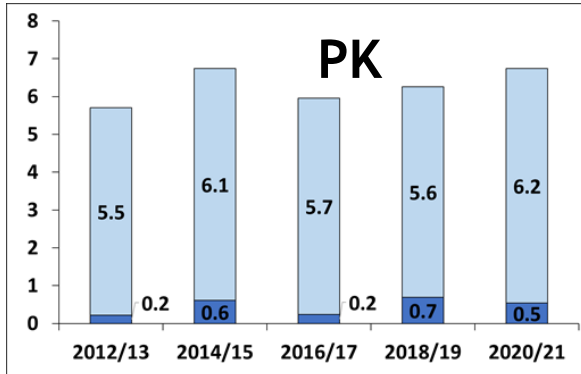
Of failed grafts

	PK	DS(A)EK	DMEK	All grafts
Endothelial failure	23%	40%	28%	25%
Rejection	26%	12%	8%	21%
Primary non-function	3%	22%	49%	10%

Note: Reasons for failure of TLK and DALK not shown but included in overall figures

EGF and PNFG rates over time

PERCENTAGE OF GRAFTS



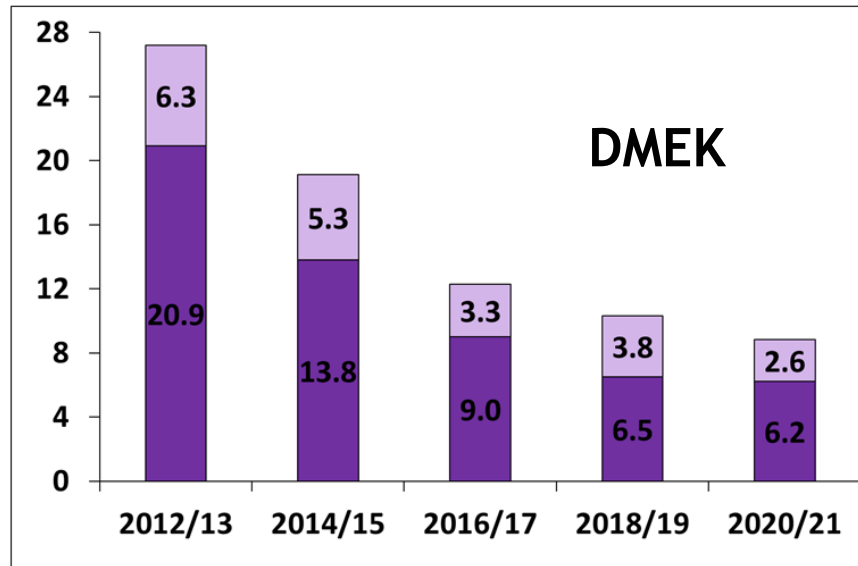
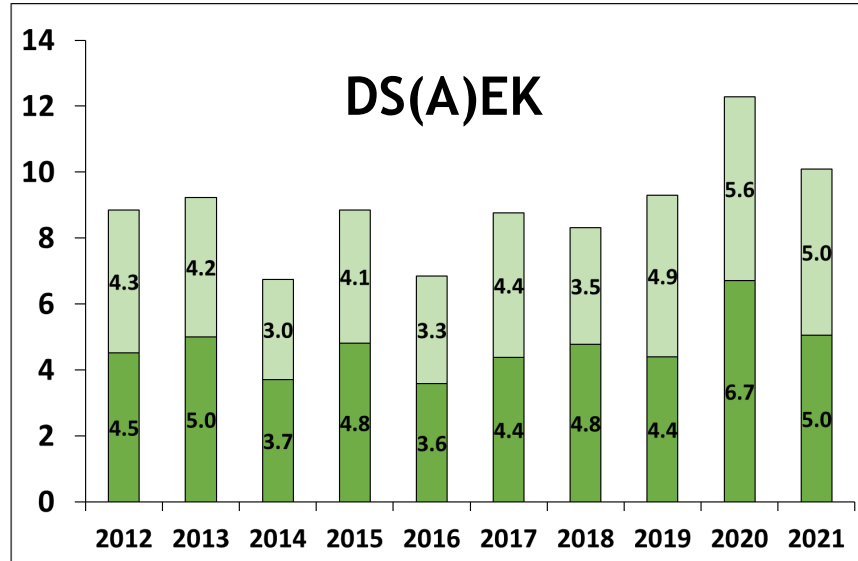
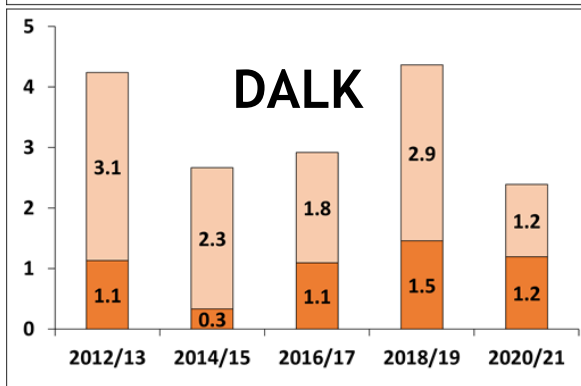
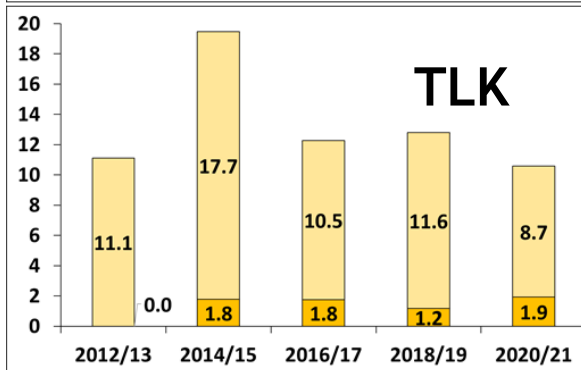
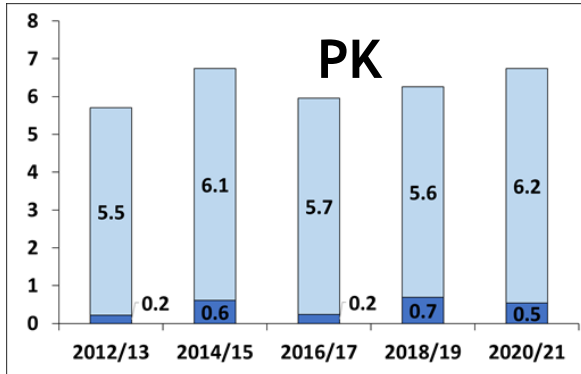
YEAR GRAFT PERFORMED

Darker portion = PNFG

Lighter portion = EGF (1 year)

EGF and PNFG rates over time

PERCENTAGE OF GRAFTS

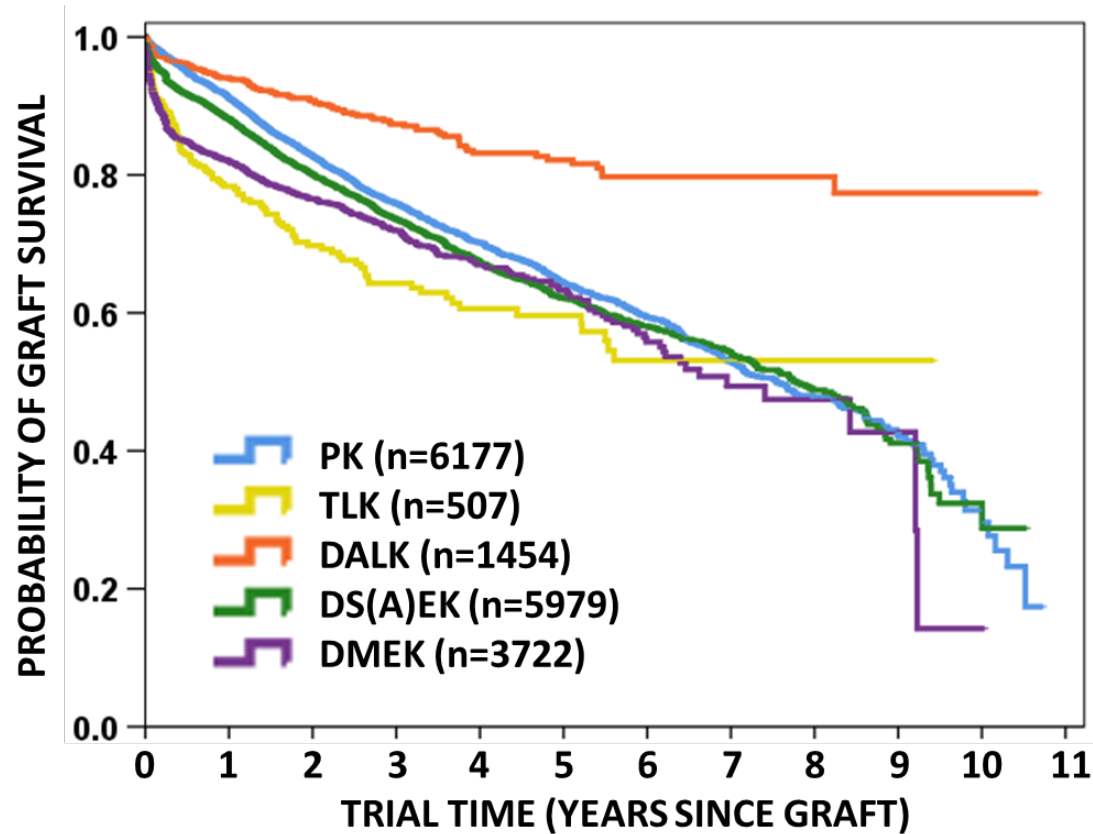


Darker portion = PNFG

Lighter portion = EGF (1 year)

YEAR GRAFT PERFORMED

Survival of registered grafts 2012-2021



Survival probability

	3m	6m	1y	2y	5y
PK	0.97	0.95	0.91	0.83	0.64
TLK	0.89	0.83	0.78	0.70	0.60
DALK	0.97	0.96	0.94	0.91	0.82
DS(A)EK	0.94	0.92	0.88	0.80	0.62
DMEK	0.87	0.85	0.82	0.77	0.63

	1	2	3	4	5	6	7	8	9	10
PK	3742	2584	1823	1297	884	592	353	210	82	18
TLK	209	139	103	73	52	28	15	9	5	NA
DALK	709	502	341	223	152	102	69	40	17	4
DS(A)EK	3401	2493	1804	1248	860	560	348	179	63	9
DMEK	1587	945	564	316	184	91	34	16	4	1

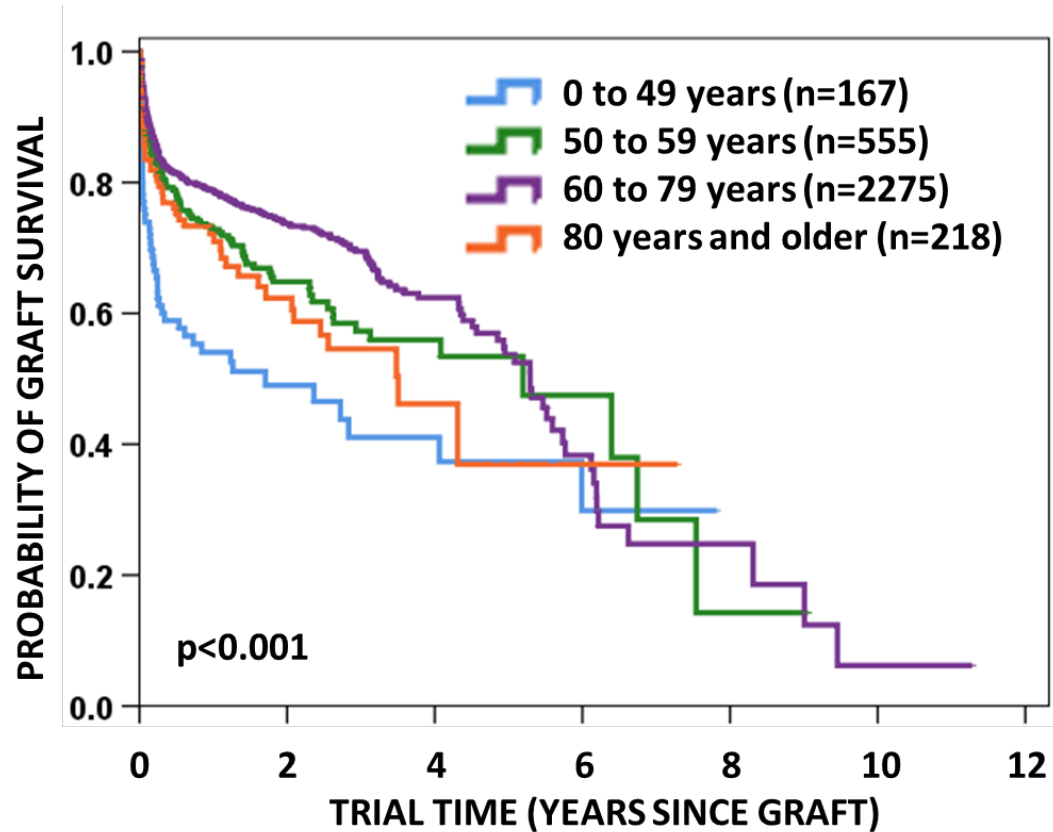
2021/22 Major Report

- ▶ Latest major report released *May 2022*
 - ▶ Census date 31st December 2020
 - ▶ Individual chapters per graft type
 - ▶ Univariate Kaplan-Meier survival curves
 - ▶ Cox proportional hazard regression
 - ▶ Best corrected visual acuity in surviving grafts
 - ▶ Comparisons across graft types
 - ▶ Available: <https://doi.org/10.25957/9vyp-0j93>

2021/22 Major Report - DMEK

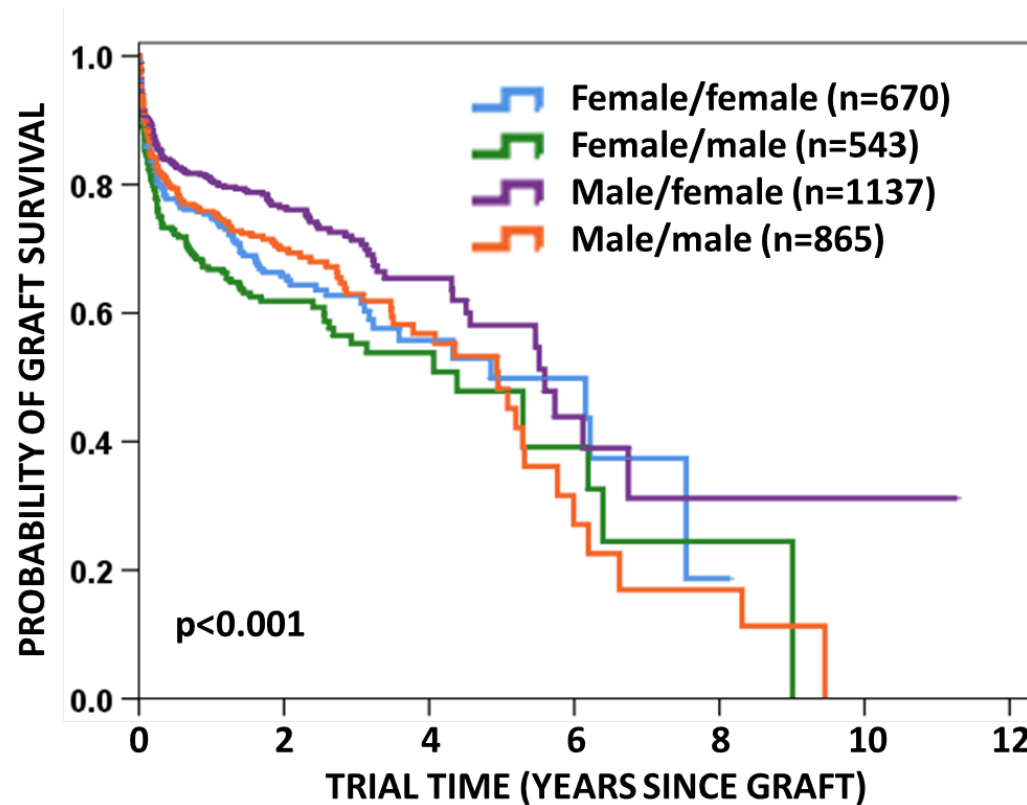
- ▶ **3215 grafts, 1756 followed**
 - ▶ 2018 report: 1250 graft, 600 followed
- ▶ **Significant results**
 - ▶ Donor age
 - ▶ Donor and recipient sex
 - ▶ Graft era
 - ▶ Graft size
 - ▶ Use of Geuder injector
 - ▶ Surgeon caseload and follow-up

DMEK - Donor Age



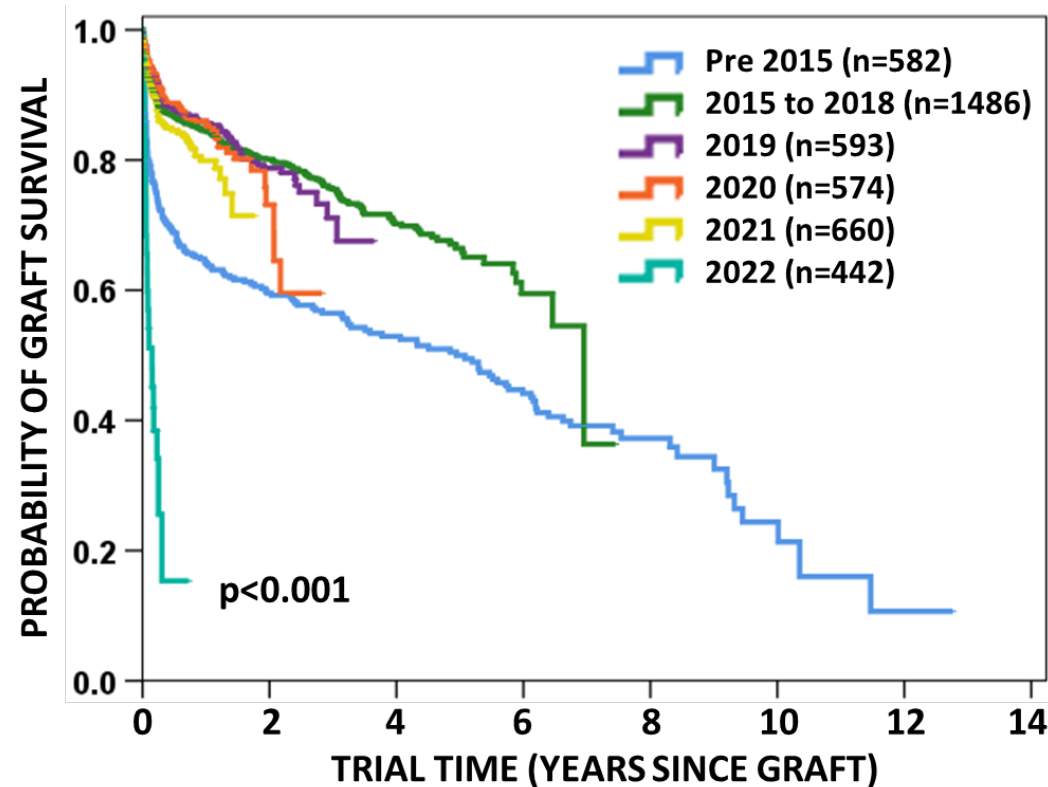
- ▶ Under 50 years significantly poorer than 60 to 79 years
 - ▶ Hazard ratio: 1.62
- ▶ No significant differences 50+ years

DMEK - Donor and Recipient Sex



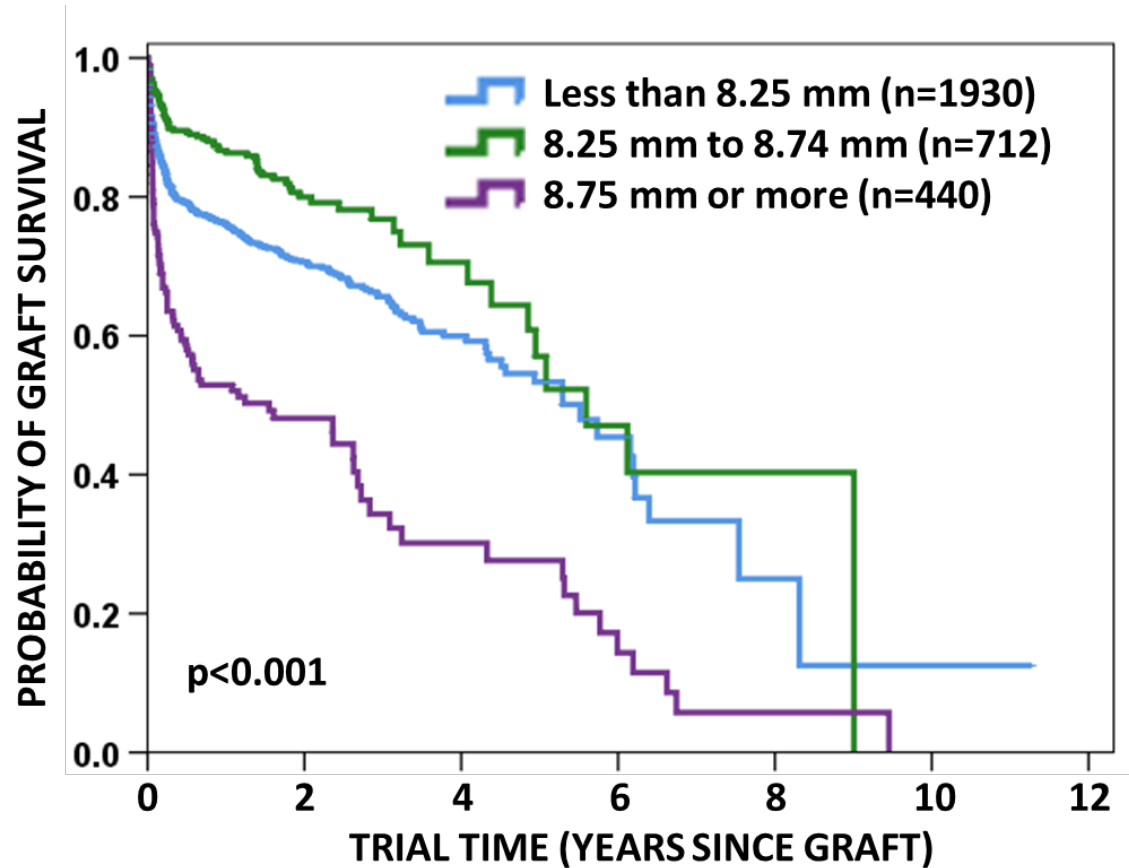
- ▶ Both significant individually
 - ▶ Male donors better outcomes
 - ▶ Female recipients better outcomes
- ▶ M>F better than F>M and F>F

DMEK - Graft Era - Current Data



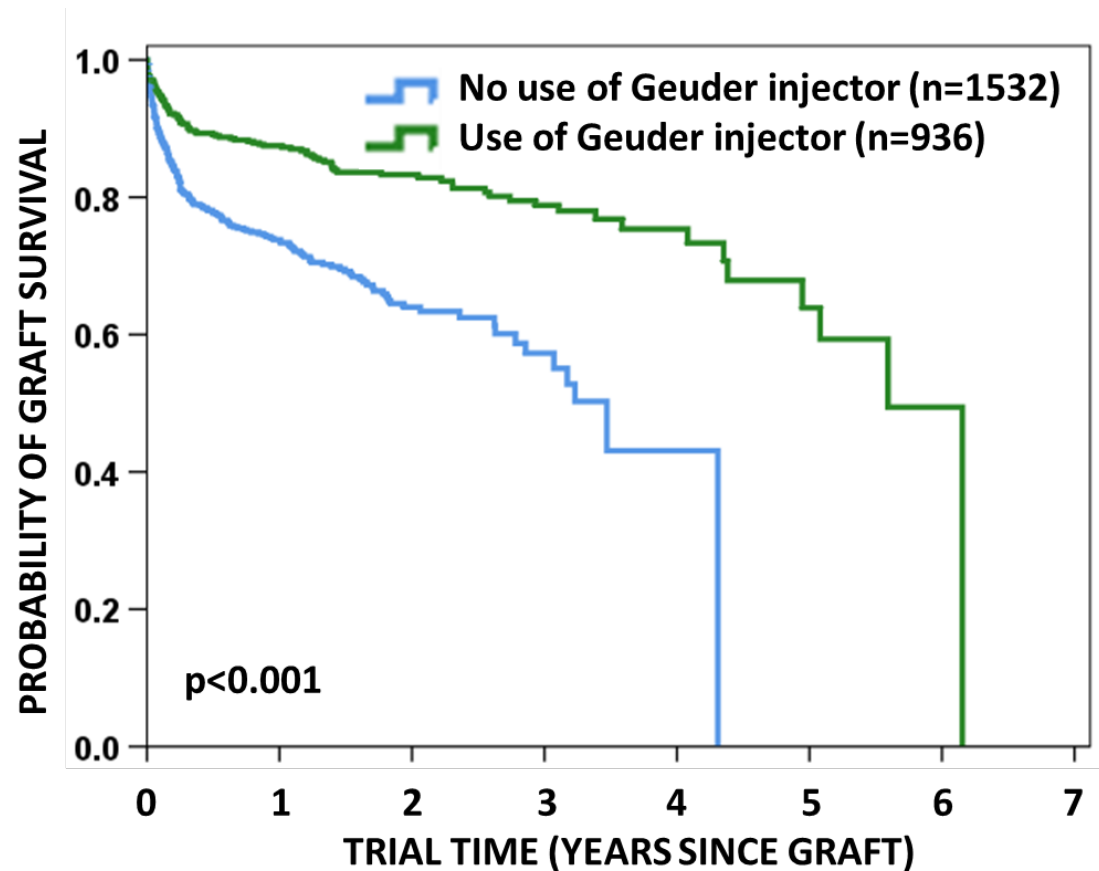
- ▶ 2015 to 2018 better than pre 2015
- ▶ Lag time to follow-up for 2019 and 2020
 - ▶ Results similar to 2015 to 2018
- ▶ Helps to account for effect of lack of FU in Cox model

DMEK - Graft Size



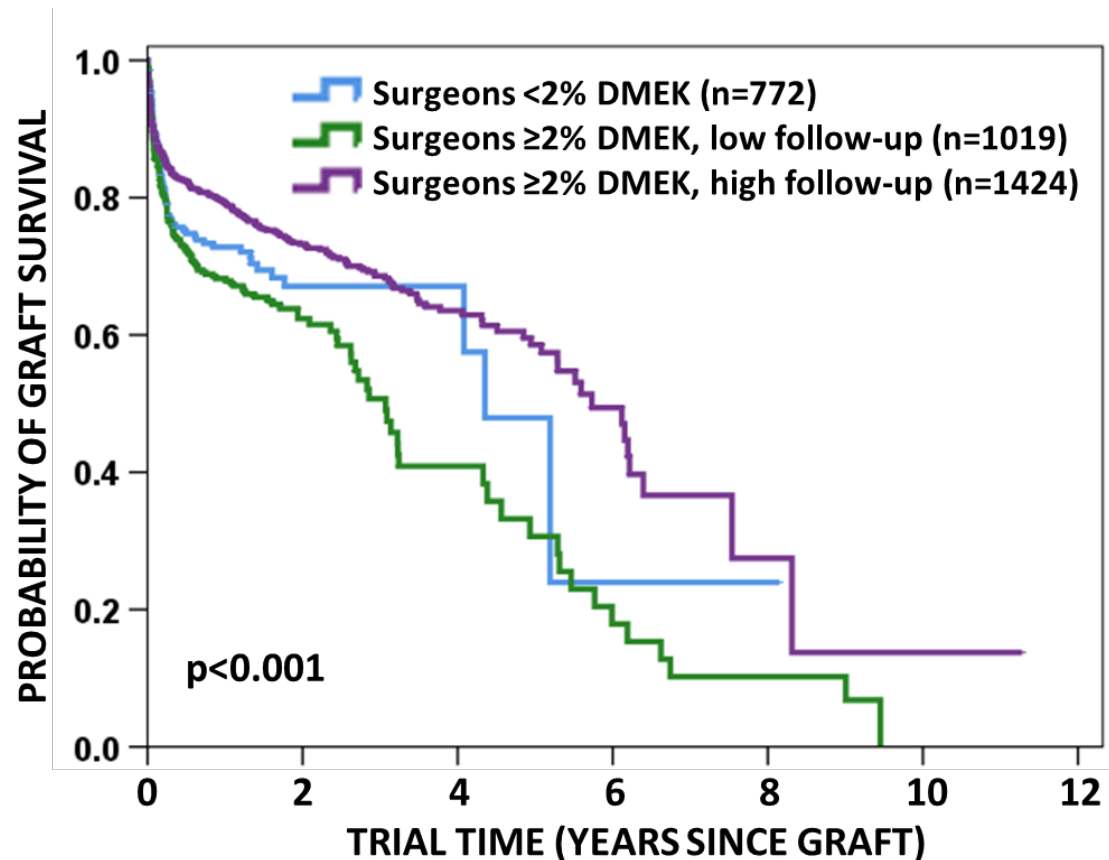
- ▶ 8.25 mm to 8.74 mm significantly better
 - ▶ HR 1.50 vs <8.25 mm; HR 1.91 vs 8.75+ mm

DMEK - Geuder Injector



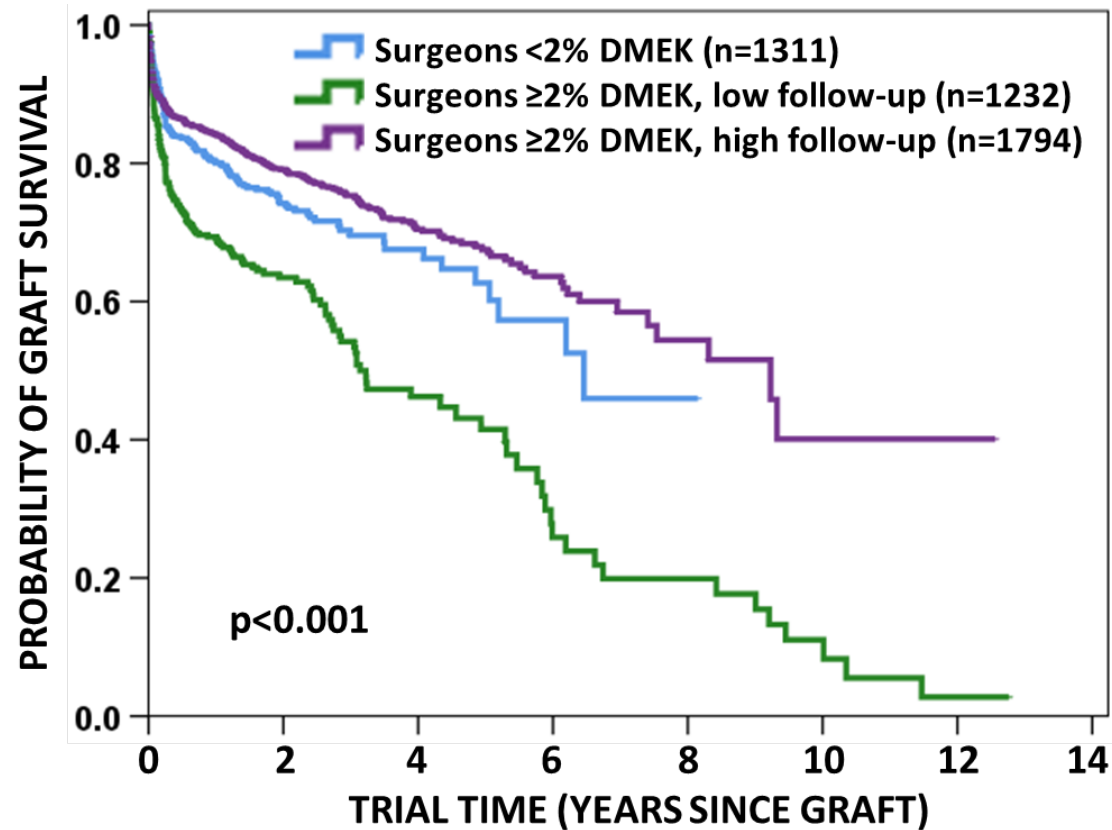
- ▶ Not included in 2018 due to lack of data
- ▶ HR 1.97 vs not used

DMEK - Caseload and Follow-up



- ▶ Surgeons with high follow-up significantly better
 - ▶ HR 1.70 low volume, HR 1.73 low follow-up
- ▶ Helps to account for effect of lack of FU in Cox model

DMEK - Caseload and Follow-up - Current Data

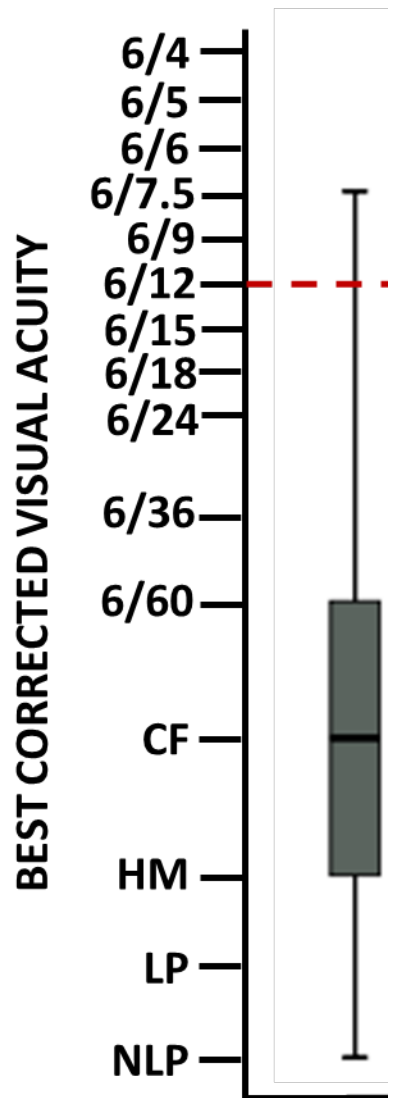


- ▶ Low caseload surgeons getting closer
- ▶ Improved 5 year survival

Reporting of Visual Acuity Outcomes

- ▶ **Clearer way to display data**
- ▶ **Multiple time points**
- ▶ **Allow easy comparison between groups**
- ▶ **Achievement of 6/12**
- ▶ **Focus on surviving grafts**

Reporting of Visual Acuity Outcomes



- ▶ **Box and whisker plots**

- ▶ **BCVA on y-axis (improving)**

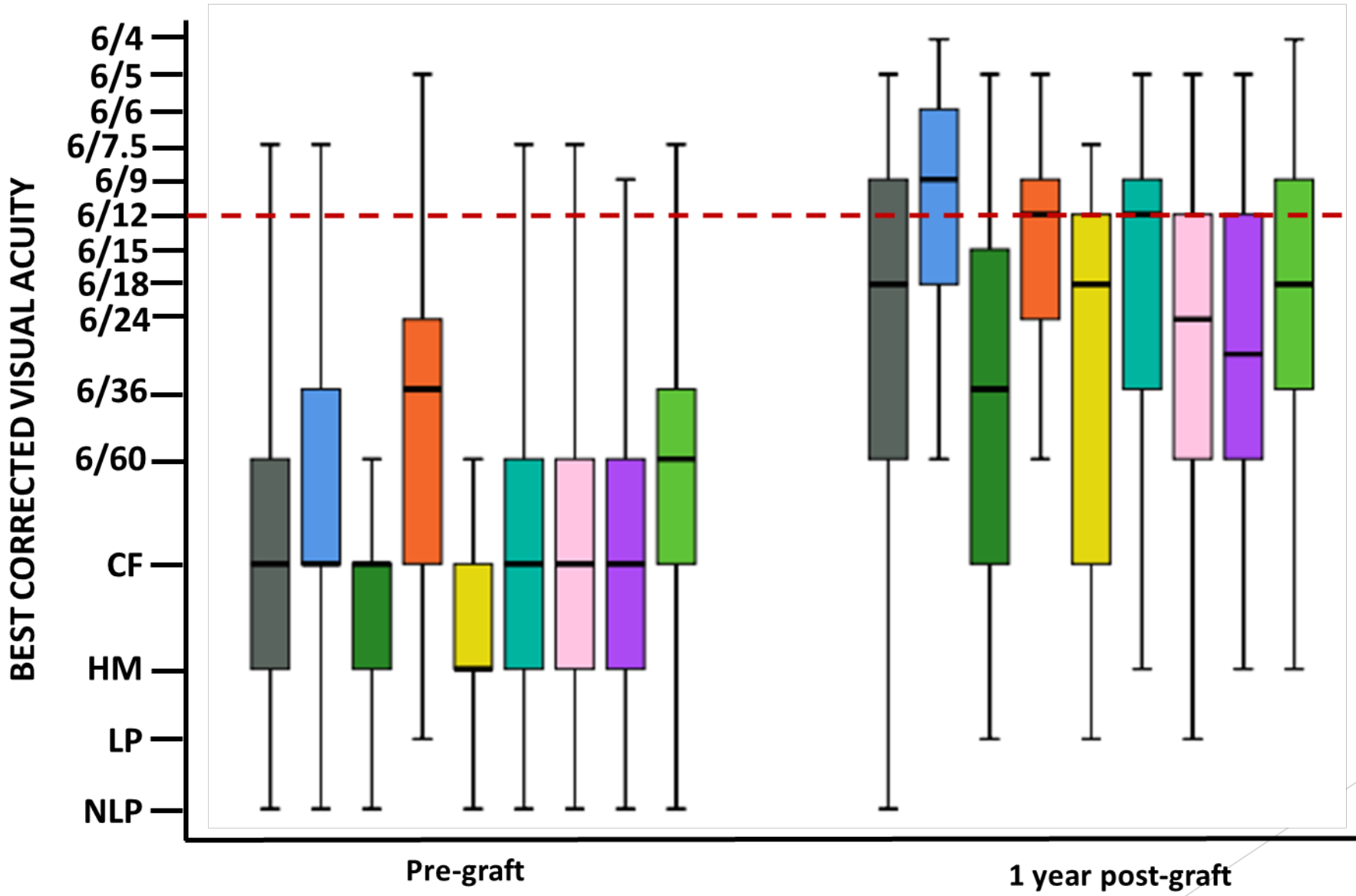
- ▶ **Dashed line shows 6/12 level**

- ▶ **Line: Median BCVA achieved**

- ▶ **Box: Inter-quartile range (50% of cases)**

- ▶ **Whisker: Range (excluding outliers)**

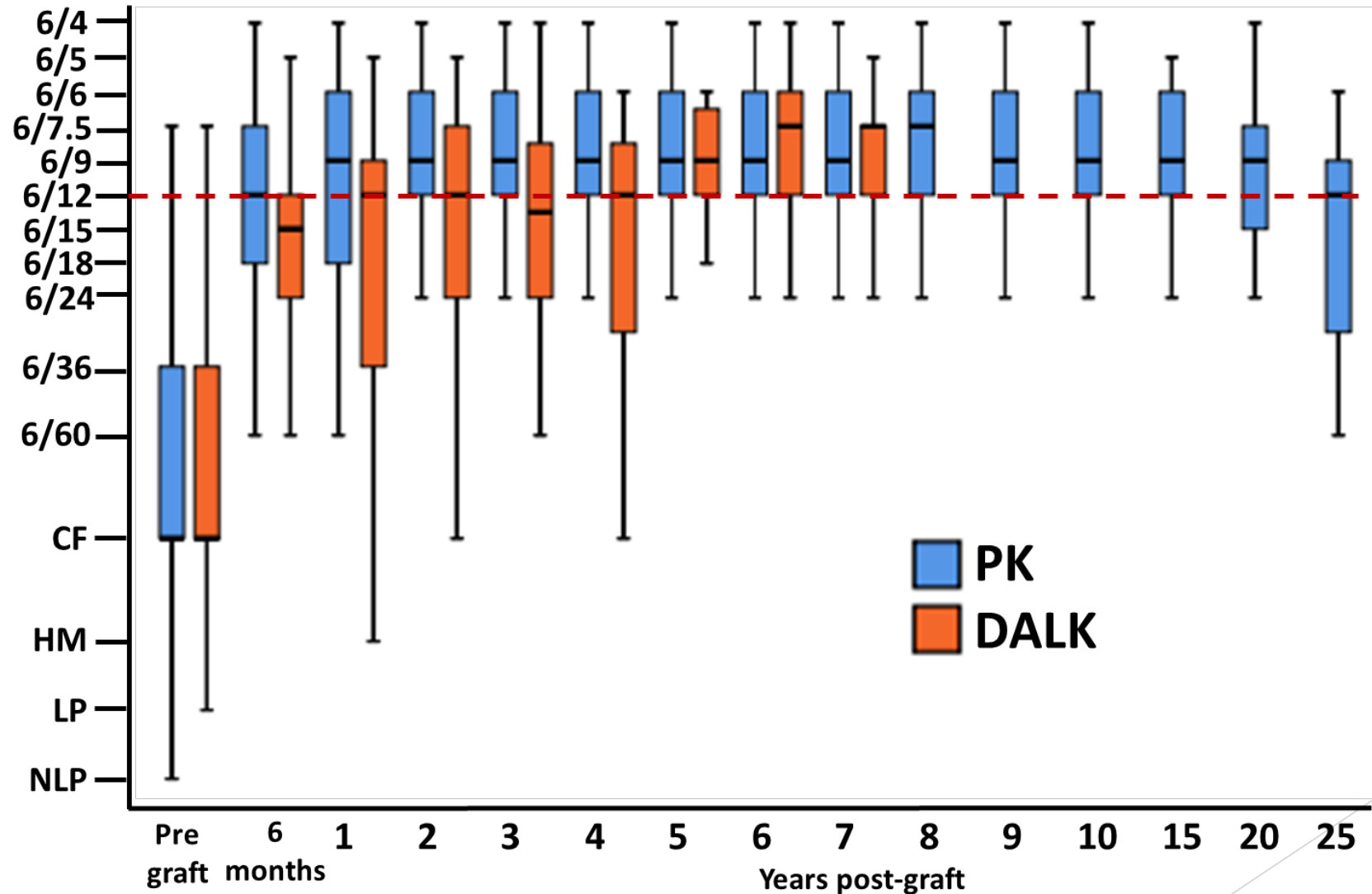
Visual Acuity Outcomes - PK



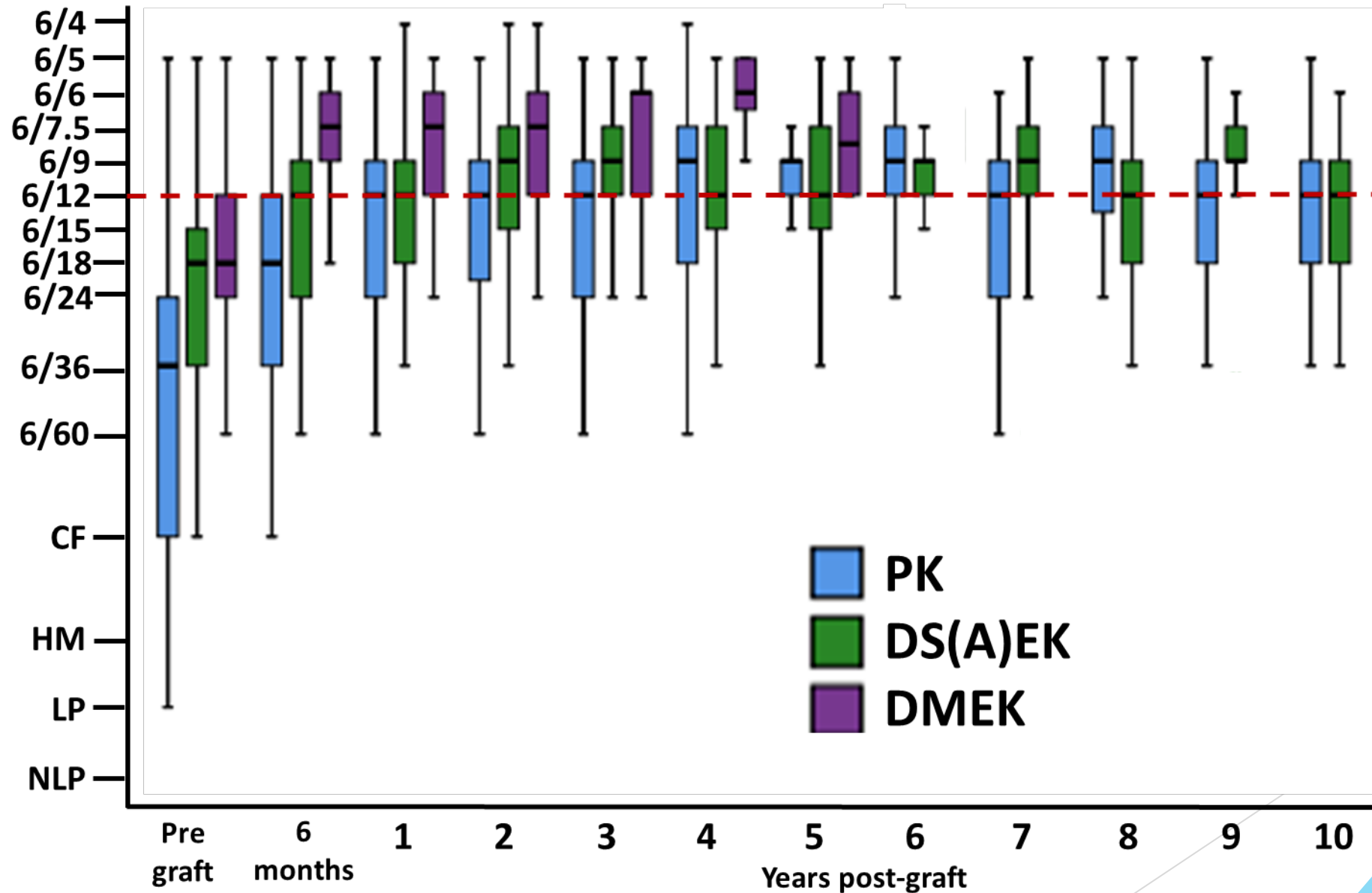
- ▶ Different groups
- ▶ Time points

- Failed previous graft/s
- Keratoconus
- Endothelial failure/bullous keratopathy
- Fuchs' endothelial dystrophy
- Corneal ulcer
- Herpetic eye disease
- Trauma
- Non-herpetic infection
- Other indication

Visual Acuity Outcomes - Keratoconus



Visual Acuity Outcomes - Fuchs' Endothelial Dystrophy



Summary

- ▶ Continued shift in graft type
- ▶ Some impact of COVID,
 - ▶ Previous levels maintained
- ▶ Ongoing changes in indications for graft
 - ▶ Increase in repeat grafts (PK)
- ▶ Reasons for failure
 - ▶ PNFG rates reducing for DMEK
 - ▶ Endothelial failure for DSEK
- ▶ 2021/22 Major report
 - ▶ Factors affecting DMEK survival
 - ▶ Analyses of BCVA outcomes

Acknowledgments

- ▶ **Contributing surgeons and eye banks**
- ▶ **The Australian Government Organ and Tissue Authority**
- ▶ **The ACGR is a declared quality assurance activity under the Commonwealth Qualified Privilege Scheme.**
- ▶ **Assistance with updating the records held within the database is provided by the Australian Institute of Health and Welfare through linkage with the National Death Index.**



Australian Corneal Graft Registry - Phone: 08 8204 5321; Email: miriam.keane@flinders.edu.au
2021/22 report: <https://doi.org/10.25957/9vyp-0j93>

