



# **2020 EYE BANKING STATISTICAL REPORT**

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# 2020 Analysis of Surgical Use and Indications for Corneal Transplant

## Introduction:

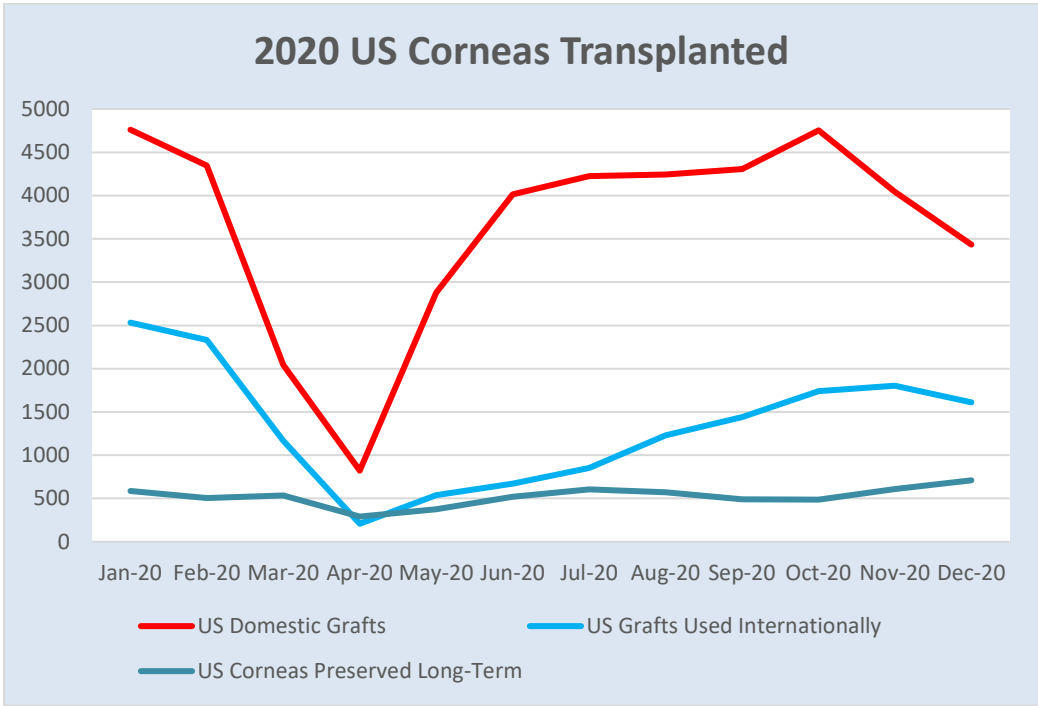
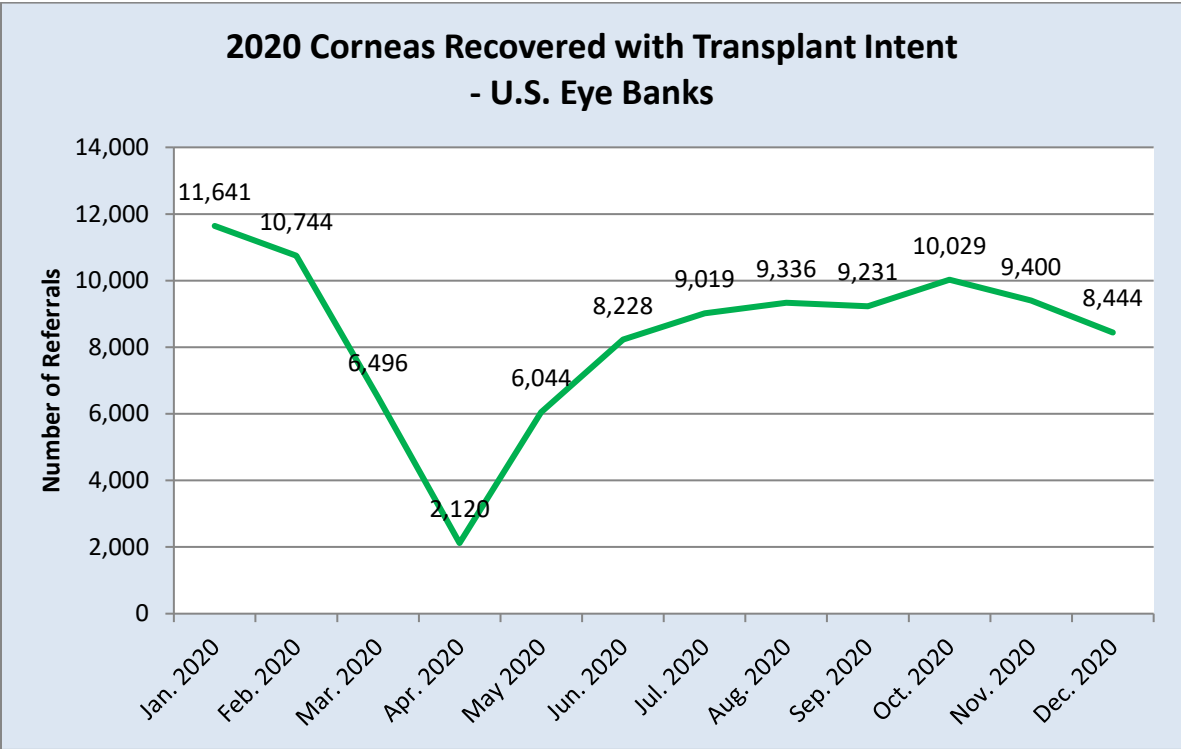
The 2020 Eye Banking Statistical Report from the Eye Bank Association of America (EBAA) includes information on all EBAA member eye banks (58) and EBAA accredited entities (1) reporting data for the 2020 calendar year and represents an essentially complete picture of eye banking activity in the United States. Data on utilization of tissue are provided for all tissue recovered by EBAA eye banks, with detailed analysis of outcomes of all tissue recovered with intent for transplant use.

## Details of This Year's Analysis:

Starting in 2017, the summarized data for Indications for Transplant were segregated by where the tissue from domestic eye banks was used - domestically or internationally. Previously, the analysis of indications for transplant came from all internationally and domestically used corneas supplied by U.S. eye banks. However, the large number of unknowns, mostly from internationally used corneas, diminished the validity of the overall conclusions. As one can see in **figure 8**, the large percentage of unknown indications in U.S. tissue shipped internationally for transplant invalidates any conclusions drawn about surgical indications in the combined pool. For this reason, the indications for transplant data (**Table 7**) are presented only on domestic utilization of corneas supplied by U.S. eye banks.

## Donations and Tissue Supply:

There were 59 U.S. eye banks reporting in 2020. The COVID-19 crisis made 2020 an unusual year in eye banking. Most physician offices and out-patient surgery centers were closed or offered substantially reduced services over a three-month period March – May, with only a few eye banks providing emergency services during this time. During the shutdown, many eye banks and surgeons reported work as low as 20% of usual capacity, and many eye banking functions were curtailed internationally because of reduced demand for tissue. As a result, many eligible donors were not recovered during this time period. The statistical report would have shown a more draconian decrease in transplant numbers if there had not been some pent-up demand at the end of the slowdown. Because most eye banks kept their doors open and maintained minimal functions during the slowdown, the majority of eye banks were able to efficiently ramp up service when demand for tissue rose to previous levels late in the year (see **Figures 1 a and b** below).



**Figure 1a and b. Graphs of monthly activity of US eye banks in 2020 shows the effect of COVID-19: (1a) the decrease in number of corneas recovered with intent to transplant and (1b) the reduced number of corneas transplanted.**

Total donors and total corneas donated were down 20% in 2020. There were 54,740 total donors and 108,382 total eyes/corneas recovered (20.4% decrease in both from 2019). Please see **Table 1** below for details on donations and distribution of tissue. Total corneal grafts were down 22.8%. Intermediate term preserved corneas, which included all refrigerated tissue stored in Optisol GS™, Life4°C™, or Cornea Cold™ used for full thickness and lamellar procedures, decreased 24.6 % from 79,534 in 2019 to 59,996 in 2020. Domestic transplants were down 14.5% and international transplants were down 43.2%. The transplant rate surprisingly decreased only 2.8% to 65.8% from 68.6% in 2019, with some tissues ruled out due to SARS-CoV-2 testing and some expiring during the nationally-advised moratorium on elective surgeries (March 15, 2020 through April 30, 2020). More corneas in long term preservation were distributed this year (9,093 in 2020, compared to 8,614 in 2019 and 13,521 in 2018).

**Table1: Total Donations and Distribution of Tissue in 2020**

<b>Donations</b>	<b>2019</b>	<b>2020</b>	<b>% Change</b>
Total Number of Donors	68,759	54,740	(-20.4%)
Total Whole Globes and Corneas Donated	136,130	108,382	(-20.4%)
Total Eyes/Corneas Donated with Surgical Intent	124,843	100,732	(-19.3%)
<b>Use of Donated Tissues</b>	<b>2019</b>	<b>2020</b>	<b>% Change</b>
Total Corneal Grafts	85,601	66,278	(-22.8%)
Intermediate-Term Preserved Corneas	79,534	59,996	(-24.6%)
Total Domestic Transplants	51,336	43,873	(-14.5%)
Total International Transplants	28,402	16,123	(-43.2%)
Sclera	5,999	3,151	(-47.5%)
Long-Term Preserved Corneas	8,614	9,093	5.6%
Research	13,743	11,336	(-17.5%)
Training	9,487	6,504	(-31.4%)

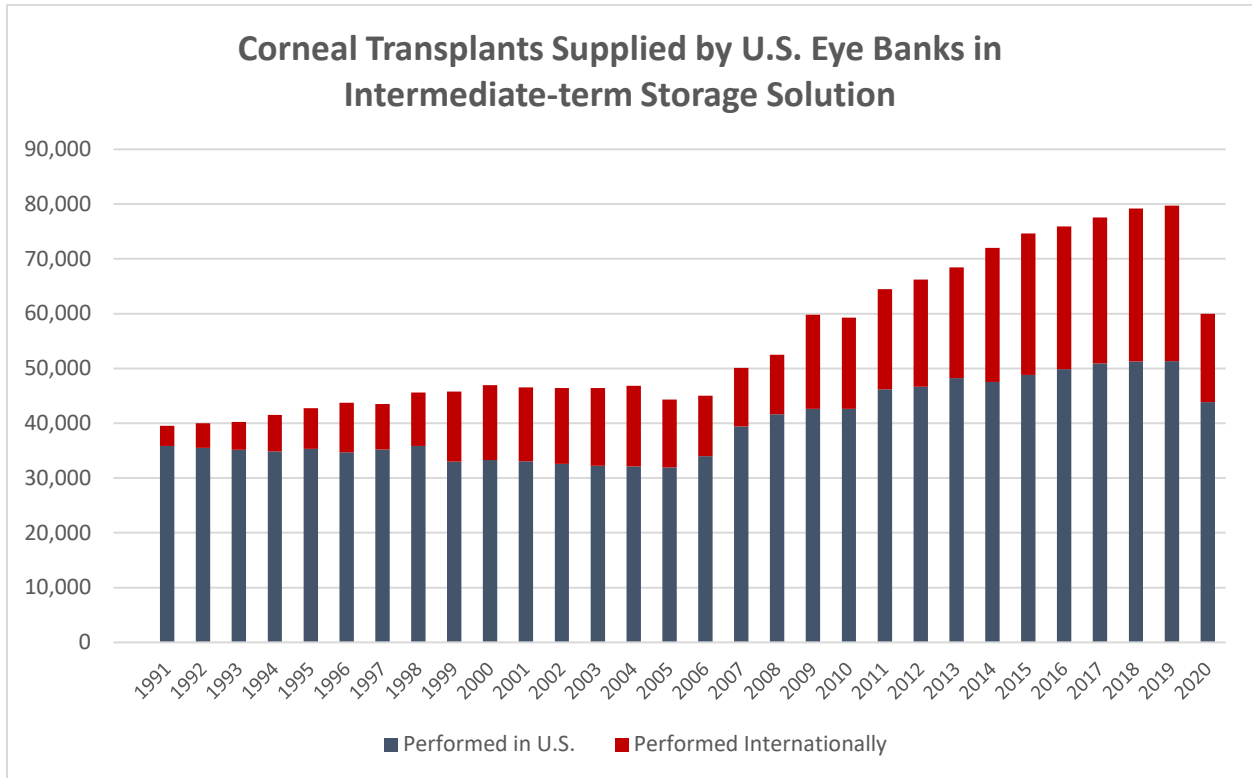
**Table 2: Corneal Transplants Supplied by U.S. Eye Banks**

Year	Total Provided by U.S.	Performed in U.S.	Performed Internationally
1991	39,515	35,831	3,684
1992	39,973	35,525	4,448
1993	40,215	35,173	5,042
1994	41,539	34,842	6,697
1995	42,740	35,300	7,440
1996	43,711	34,668	9,043
1997	43,492	35,209	8,283
1998	45,579	35,861	9,718
1999	45,765	33,020	12,745
2000	46,949	33,260	13,689
2001	46,532	33,035	13,497
2002	46,440	32,559	13,881
2003	46,436	32,240	14,196
2004	46,841	32,106	14,735
2005	44,329	31,952	12,377
2006	45,035	33,962	11,073
2007	50,122	39,391	10,731
2008	52,487	41,652	10,835
2009	59,784	42,606	17,178
2010	59,271	42,642	16,629
2011	67,590	46,196	18,307
2012	68,681	46,684	19,546
2013	72,736	48,229	20,213
2014	76,431	47,530	24,483
2015	79,304	48,792	25,832
2016	82,994	49,869	26,057
2017	84,297	50,934	26,645
2018	85,441	51,294	27,913
2019	85,601	51,336	28,402
2020	66,287	43,873	16,123

**Table 2** shows the total number of corneas intended for transplant supplied by US eye banks in 2020 (see **Table 1**, above), stratified by domestic and international usage. The decrease in tissue supplied in 2020 was due to the COVID-19 pandemic, discussed elsewhere in this report. This table is shown graphically in **Figure 2**, below.

In 2020, U.S. eye banks continued to meet the growing needs of surgeons in the U.S., but also provided tissue for international surgeons. This trend demonstrates the continuing commitment of U.S. eye bank and donors to help meet international needs and reduce global blindness due to corneal disease (**Figure 2** and **Table 2**).

**Figure 2: Corneal Transplants Supplied by U.S. Banks in Intermediate-Term Storage**



**Figure 2.** Usage of keratoplasty tissue in the U.S. decreased due to COVID-19 in 2020 after being essentially flat for the previous 10 years. Tissue exported abroad last year also decreased. Still, as in previous years, approximately one third of cornea tissue recovered by US eye banks was exported internationally.

**Tissue Utilization:**

Utilization of tissue supplied by U.S. eye banks in 2020 is shown below in **Table 3** below and includes all tissue used both domestically and internationally. Total grafts in 2020 decreased to 66,278 from 85,601 in 2019 (-22.6%). Penetrating keratoplasty (PK) use decreased 30.3% in 2020 to 25,023 from 35,919 in 2019. Tissue used for endothelial keratoplasty (EK) in 2020 decreased 15.8% from 35,555 in 2019 to 29,947. There was an 50% decrease in tissue used for lamellar keratoplasty (ALK) from 2,146 in 2019 to 1,072 in 2020. The number of corneas used for keratolimbal allograft (KLA) increased slightly from 110 in 2019 to 119 in 2020 (+8.1%). Corneas used for keratoprosthesis (K-Pro) decreased 34.9% from 267 in 2019 to 174 in 2020. The number of corneas used for ALK, KLA and K-Pro procedures remain relatively small: these three procedures combined made up just 2% of total grafts in the U.S in 2020 (see **Table 3** below). U.S. eye banks also provided 23,230 ocular tissues for research and training, continuing their support of education and advancement of cornea surgery.

**Table 3. Use of donated tissue shows most corneal graft procedures were down in 2020.**

Use of Donated Tissue	2016	2017	2018	2019	2020
Corneal Grafts Total	82,994	84,297	85,441	85,601	66,278
Penetrating Keratoplasty	38,413	38,025	36,028	35,919	25,023
Anterior Lamellar Keratoplasty	2,386	2,541	2,355	2,146	1,072
Endothelial Keratoplasty	32,221	33,397	35,071	35,555	29,947
Keratolimbic Allograft	97	104	87	110	119
Keratoprosthesis (K-Pro)	313	344	243	267	174
Glaucoma Shunt Patch or other non-keratoplasty use	917	1,368	1,058	1,018	873
Other keratoplasty (experimental surgery)	65	232	64	44	11
Unknown or Unspecified	1,514	1,568	4,301	4,679	2,777
Sclera	3,380	3,253	2,959	5,999	3,151
Long-Term Preserved Corneas	18,133	12,543	13,521	8,614	9,093
Keratoplasty	1,335	197	298	126	125
Glaucoma Shunt Patching	16,683	12,345	13,066	8,420	7,037
Other Surgical Uses	115	1	157	68	1,931
Research	17,023	13,859	12,495	13,743	11,336
Training	9,916	10,539	10,666	9,487	6,504

#### Domestic Use of Keratoplasty Tissue from US Eye Banks:

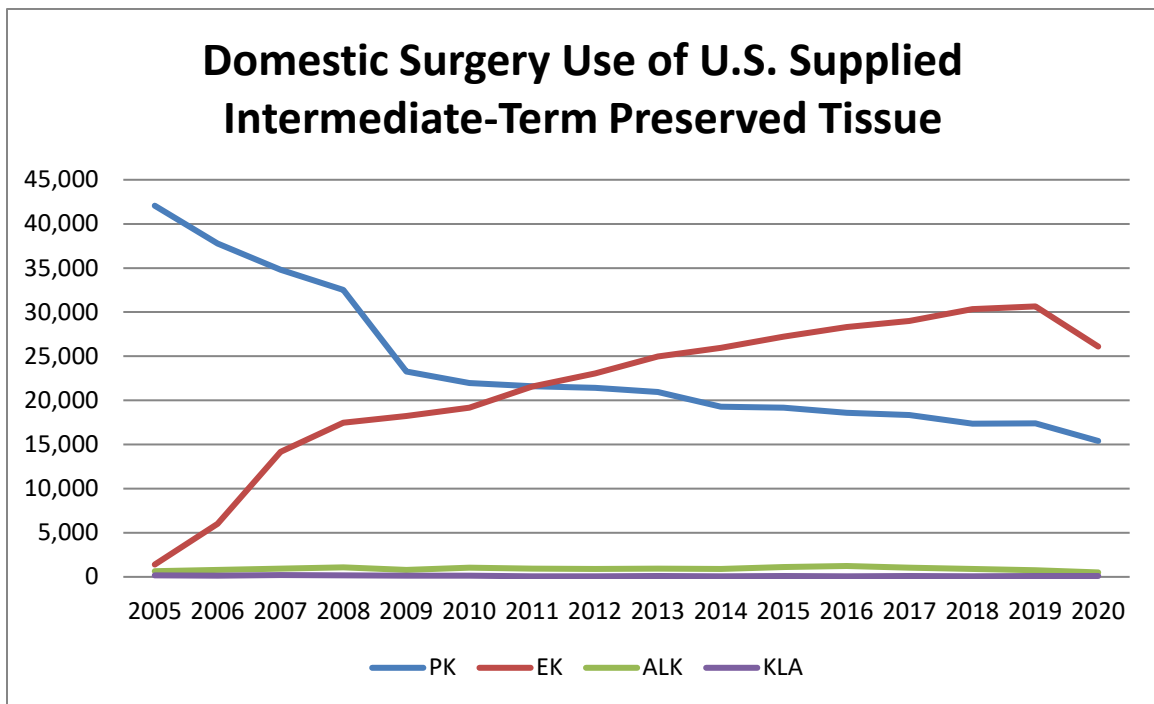
Trends in the domestic use of tissue (tissue supplied by domestic eye banks used in the US) are shown in **Table 4** below. The number of penetrating grafts performed in the U.S. using intermediate-term preservation decreased 11.6% this year from 17,409 to 15,402, exacerbating a decrease seen in each of the previous 13 years from a high of 42,063 in 2005. EK procedures in 2020 decreased from 30,650 in 2019 to 26,095 (14.9%) predominantly due to COVID-19. DSAEK and DMEK numbers are discussed separately below in Table 5. The number of corneas used domestically for EK increased every year since tracking started in 2005 to 2019, surpassing PK in 2012, as noted in the graph in **Figure 3** below. EK was still the most common keratoplasty procedure performed in the U.S. in 2020, although the numbers of all keratoplasty procedures were down across the board in last year. ALK procedures in the U.S. decreased 32% in 2020 to 505 from 745 in 2019. KLA and K-Pro procedures have been essentially flat in the U.S. over the past 10 years. Combined, ALK, KLAL and K-Pro make up 1.8% of intermediate-term preserved tissue use in the U.S. in 2020.



**Table 4: Domestic Use of Intermediate-Term Preserved Tissue from U.S. Eye Banks  
Annual Comparison 2010 - 2020**

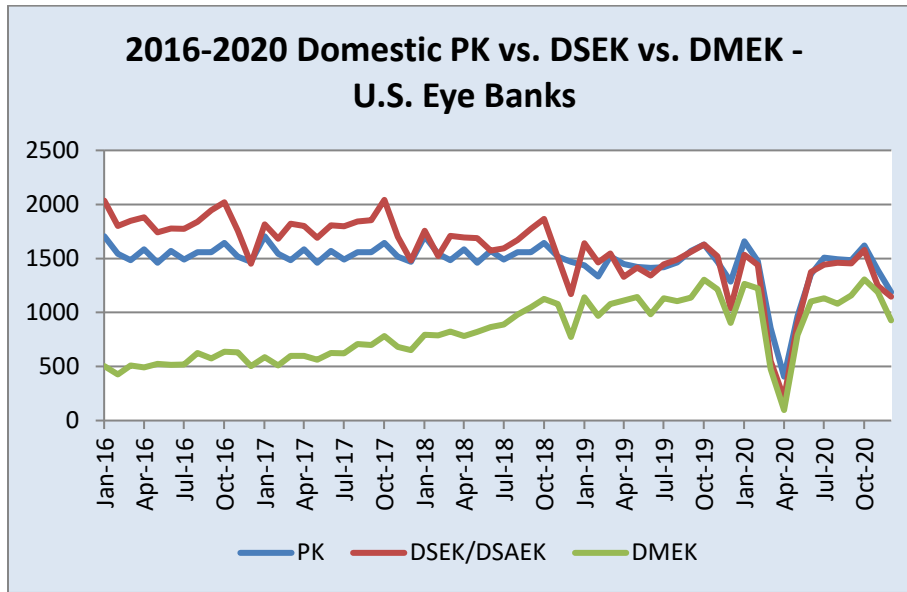
Domestic Surgery Use	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Penetrating Keratoplasty	21,970	21,620	21,422	20,954	19,294	19,160	18,579	18,346	17,347	17,409	15,402
Endothelial Keratoplasty	19,159	21,555	23,049	24,987	25,965	27,208	28,327	28,993	30,336	30,650	26,095
Anterior Lamellar Keratoplasty	1,041	932	883	951	914	1,115	1,232	1,027	884	745	505
Keratolimbal Allograft	130	69	80	91	80	97	82	93	68	95	109
K-Pro	342	332	236	223	260	323	279	304	225	251	161

**Domestic PK vs. EK vs. ALK Surgery Trends 2005-2020**



**Figure 3:** Domestic PK vs. EK vs. ALK Surgery Trends. The relative frequency of PK, EK, and ALK procedures performed in the U.S. over the last 16 years can be seen above. In 2012, the EK procedures exceeded PK. All three procedures were down in 2020 because of COVID-19.

### Domestic PK, DSEK, and DMEK Trends, 2016-2020



**Figure 4:** The number of domestic PK, DSAEK, and DMEK procedures using tissue from U.S Eye Banks are shown monthly for the last five years. In this graph, PK appears constant, DSAEK is decreasing slightly, and DMEK is increasing. DMEK growth has been linear since 2015, similar to the growth profile of DSAEK starting in 2005. The effect of COVID-19 can be seen in April 2020.

**Table 5: Annual Domestic Endothelial Keratoplasty Numbers (2014 – 2020)**

Domestic Surgery Use	2014	2015	2016	2017	2018	2019	2020
Total Endothelial Keratoplasty Procedures	25,965	27,208	28,327	28,991	30,336	30,650	26,095
DSEK, DSAEK, DLEK Procedures	23,100	22,514	21,868	21,337	19,526	17,428	14,391
DMEK or DMAEK Procedures	2,865	4,694	6,459	7,628	10,773	13,215	11,749
PDEK				21	26	6	4
Other EK				7	11	1	11

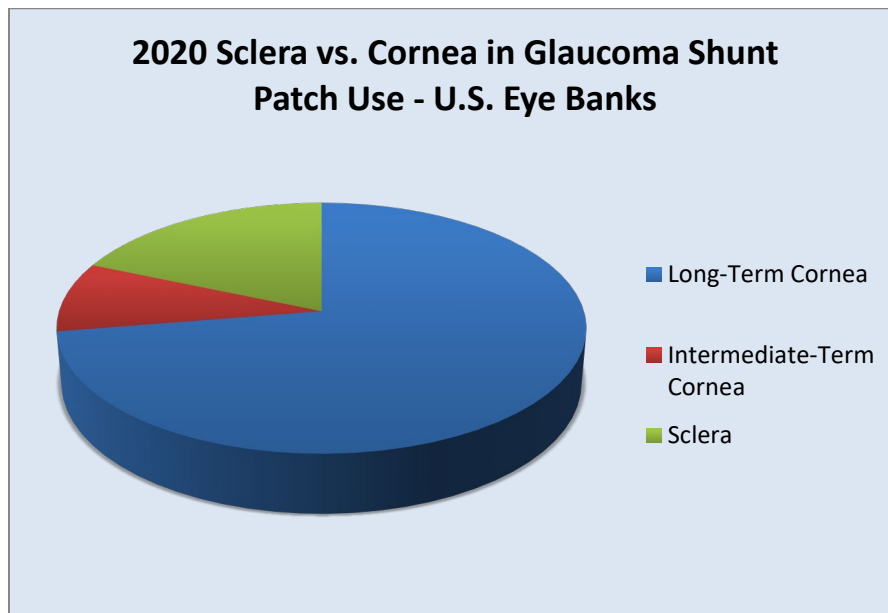
Domestic Endothelial Keratoplasty numbers are shown above in **Table 5**. The increased use of DMEK tissue in the past has accounted for the yearly increase in endothelial keratoplasty numbers since 2014: as DSAEK numbers declined, DMEK numbers have risen. DSAEK procedures decreased to 14,391 in 2020 (-14.7%), but still exceeded DMEK numbers (11,749). DMEK procedures declined 11.1% in 2020.

## Tissue for Glaucoma Shunts:

Use of eye bank tissue to cover glaucoma shunt procedures is shown below in **Table 6**. In 2011, sclera was the most commonly used tissue for glaucoma shunt patching but use of corneas stored in long-term solution (where endothelial cell counts are irrelevant) increased yearly from 2014 to 2018 but declined substantially in 2019 (36%) due to reimbursement issues. Corneal tissue used for covering tube shunts for glaucoma continues to be very popular with glaucoma surgeons. In 2020, corneas in long term storage made up 72.4% of all ocular tissue used for shunt patching. Of 9,093 long-term preserved corneas used in 2020, 7,037 (77.4%) went for glaucoma shunt patching, 126 (1.4%) were used for keratoplasty, and 68 were used for other surgical indications (like eyelid retraction).

**Table 6. Ocular Tissue Used for Glaucoma Shunt Patching 2011-2020**

Ocular Tissue Used for Glaucoma Shunt Patching - U.S. Eye Banks											
Ocular Tissue Used for Glaucoma Shunt Patching	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Long-Term Cornea	3,802	4,435	4,040	6,212	10,843	16,683	12,345	13,066	8,420	7,037	
Intermediate-Term Cornea	604	676	687	755	527	917	1,368	1,058	1,018	873	
Sclera	4,285	2,260	2,293	2,199	2,175	1,944	2,266	1,900	1,989	1,804	



**Figure 5: Tissue used for glaucoma shunt patching 2020.** Corneas in long-term storage medium comprise 72.4% of all ocular tissue used to cover glaucoma shunts.

**Table 7: Indications for 3 Keratoplasty Procedures Reported by US Banks, 2020**

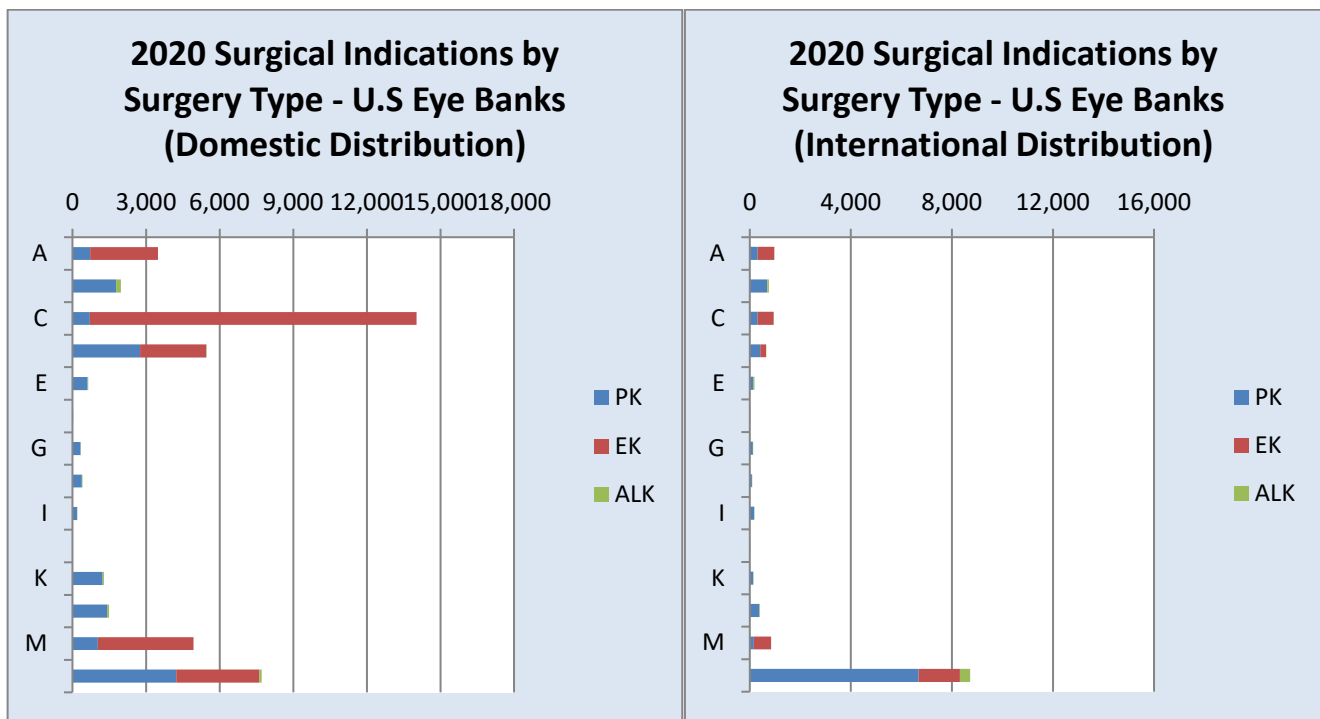
<b>Indications for Penetrating Keratoplasty 2020</b>	<b>Domestic Use</b>		<b>International Use</b>		<b>TOTAL</b>
A. Post-cataract surgery edema	716	4.6%	308	3.2%	
B. Ectasias/Thinning	1,772	11.5%	697	7.2%	
C. Endothelial Dystrophies	705	4.6%	312	3.2%	
D. Repeat Corneal Transplant	2,756	17.9%	407	4.2%	
E. Other degenerations or dystrophies	623	4.0%	153	1.6%	
F. Refractive	22	0.1%	5	0.1%	
G. Microbial keratitis	328	2.1%	123	1.3%	
H. Mechanical or chemical trauma	385	2.5%	83	0.9%	
I. Congenital opacities	187	1.2%	172	1.8%	
J. Pterygium	3	0.0%	2	0.0%	
K. Non-infectious ulcerative keratitis or perforation	1,233	8.0%	139	1.4%	
L. Other causes of corneal dysfunction or distortion	1,410	9.2%	371	3.9%	
M. Other causes of endothelial dysfunction	1,032	6.7%	164	1.7%	
Z. Unknown, unreported, or unspecified	4,230	27.5%	6,685	69.5%	
<b>Total Indications for Penetrating Keratoplasty</b>	<b>15,402</b>		<b>9,621</b>		<b>25,023</b>
<b>Indications for Anterior Lamellar Keratoplasty</b>	<b>Domestic use</b>		<b>International Use</b>		<b>TOTAL</b>
B. Ectasias/Thinning	199	39.4%	61	10.8%	
D. Repeat Corneal Transplant	18	3.6%	5	0.9%	
E. Other degenerations or dystrophies	25	5.0%	35	6.2%	
F. Refractive	1	0.2%	0	0.0%	
G. Microbial keratitis	14	2.8%	2	0.4%	
H. Mechanical or chemical trauma	17	3.3%	1	0.2%	
I. Congenital opacities	13	2.6%	14	2.5%	
J. Pterygium	0	0.0%	0	0.0%	
K. Non-infectious ulcerative keratitis or perforation	49	9.7%	14	2.5%	
L. Other causes of corneal dysfunction or distortion	82	16.2%	34	6.0%	
Z. Unknown, unreported, or unspecified	87	17.2%	401	70.7%	
<b>Total for Anterior Keratoplasty</b>	<b>505</b>		<b>567</b>		<b>1,072</b>
<b>Indications for Endothelial Keratoplasty</b>	<b>Domestic Use</b>		<b>International Use</b>		<b>TOTAL</b>
A. Post-Cataract Surgery Edema	2,771	10.6%	665	17.3%	
C. Endothelial Dystrophy	13,325	51.1%	633	16.4%	
D. Repeat Corneal Transplant	2,697	10.3%	235	6.1%	
M. Other Causes of Endothelial Dysfunction	3,905	15.0%	684	17.8%	
Z. Unknown, unreported, or unspecified	3,397	13.0%	1,635	42.4%	
<b>Total for Endothelial Keratoplasty</b>	<b>26,095</b>		<b>3,852</b>		<b>29,947</b>
<b>Total Number of PK, ALK, and EK Procedures</b>	<b>42,002</b>		<b>14,040</b>		<b>56,042</b>

### Indications for Keratoplasty:

The indications for the three main keratoplasty procedures performed utilizing corneas provided by U.S. eye banks were segregated by domestic and international use in **Table 7**, above:

Indications for Corneal Transplant Reported by U.S. Banks, 2020. The large number of “unknowns” is a persistent problem and compromises any analysis using that data. For example, 69.5% of tissue shipped internationally for penetrating keratoplasty has no diagnosis provided (71.9% last year). To improve the validity of any conclusions drawn, the information in **Table 7** has been split for domestic and international use and domestic data only is used for statistical analysis. For this reason, the data in **Table 7** may not be suitable for comparison with data from previous years when domestic and international figures were combined. A side-by-side comparison of the information in **Table 7** is shown in **Figure 6** below.

**Figure 6. 2020 Keratoplasty Indications, US Eye Banks: Domestic vs. International Distribution**



**Figure 6.** Surgical indication for 2020 domestic (right panel) and international (left panel) tissue distribution for keratoplasty. Note the high number of unknowns by Z.

**A** – Post-Cataract Surgery Edema. **B** – Ectasias/Thinning. **C** – Endothelial Dystrophies.

**D** - Repeat Corneal Transplant. **E** – Other Degenerations/Dystrophies. **F** – Refractive.

**G** – Microbial Keratitis. **H** – Mechanical (Non-Surgical) or Chemical Trauma. **I** – Congenital

Opacities. **J** – Pterygium. **K** – Non-Infectious Ulcerative Keratitis, Thinning or Perforation.

**L** - Other unknown Causes of Corneal Opacification or Distortion. **M** – Other causes of

Endothelial Dysfunction. **Z** – Unknown or unreported.

**Figure 6** above shows domestic eye bank data from **Table 7** in bar graph format. Domestic utilization is shown on the right and international utilization is on the left. The large percentage of unknown indications from keratoplasty tissue sent internationally listed in **Table 7** can be seen in the bottom bars in **Figure 5**. Because of the incomplete utilization information on international tissue, international data is **not** included in the indications for transplant data in **Table 8**.

**Table 8**, Indications for Transplant, Domestic Utilization of Tissue from US Eye Banks, on the following page, is arranged into four basic categories for which keratoplasty is performed: 1) endothelial cell failure, 2) stromal or full thickness (non-endothelial) disease, 3) re-grafts and 4) unknown. Specific diagnoses are listed in each general category. Endothelial cell failure is the leading indication as a group for keratoplasty from U.S. provided tissue. 53.5% of all keratoplasty procedures in the US in 2020 were performed for endothelial failure (Fuchs' endothelial dystrophy, post cataract surgery edema and other causes of endothelial cell failure). Within this endothelial disease category, 89.1% of grafts were EK and 10.9% were PK. 15.1% percent of all keratoplasty procedures were performed for stromal or full thickness disease: 93.7% were PK and 6.3% were ALK. The "Unknown" category is still the second most common indication listed (18.4%), and repeat transplants were fourth (13%). Specific re-graft rates were PK 18%, EK 10% and ALK 4%. Other than an increase in Unknowns from 14.8% in 2019 to 18.4% in 2020, these percentages changed very little from 2019 although the overall numbers were down.

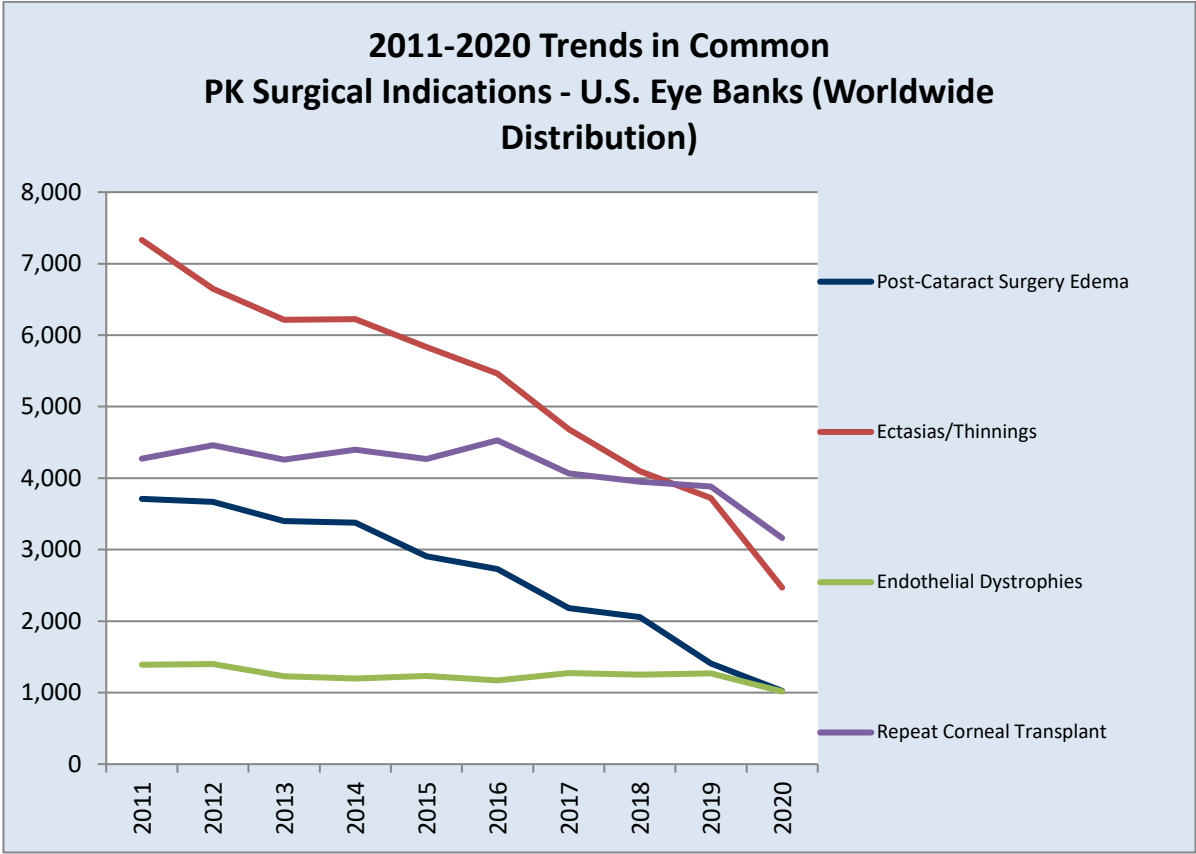
Within these anatomic diagnosis categories, the most common specific indication reported for keratoplasty in 2020 was Fuchs' Dystrophy (14,030, 33.4%), as has been the case the last 7 years. 95% of patients with Fuchs' dystrophy were treated with EK and 5% had PK. Unknowns (7,714, 18.4%) and re-grafts (5,471, 13%) were the second and third most common indication for transplant. "Other causes of endothelial cell failure" (than Fuchs') was the fourth most common indication (4,937, 11.7%) and Post-Cataract Surgery Corneal Edema (PCE) was fifth (3,487, 8.3%). Excluding re-grafts and unknowns, the top three specific indications for keratoplasty were for endothelial disease.

As in past years, keratoconus and other ectasias were the sixth most common specific indication for transplant (1,971, 4.5%) in 2020. There were 1,772 (90%) PK and 199 (10%) ALK procedures performed for keratoconus. Although the number of procedures for corneal ectasias (including keratoconus) continued to decrease, PK continues to be the preferred surgical procedure for treatment of corneal ectasia. However, PK for keratoconus decreased 27.2% in 2020 as PK numbers in general continue to decline. The technical difficulty of ALK and uncertainty over reimbursement continue to hold this ratio essentially unchanged for the past six years. Treatment of keratoconus by cross-linking and newer technologies in RGP contact lens fitting have reduced the number of keratoplasty procedures for this indication.

**Table 8: Domestic Indications for Keratoplasty Reported by US Banks, 2020**

<b>Endothelial Cell Failure</b>								
<b>Surgical Diagnosis</b>		<b>PK</b>		<b>ALK</b>		<b>EK</b>		<b>TOTAL</b>
A	Post-cataract surgery edema	716	20.5%	--	--	2,771	79.5	3,487
C	Endothelial Dystrophies	705	5.0%	--	--	13,325	95.0%	14,030
M	Other causes of endothelial dysfunction	1,032	20.9%	--	--	3,905	79.1%	4,937
	<b>Subtotal</b>	<b>2,453</b>	<b>10.9%</b>	<b>0</b>	<b>0.0%</b>	<b>20,001</b>	<b>89.1%</b>	<b>22,454</b>
		15.9% of PK				76.6% EK		53.5% of grafts
<b>Stromal or Full Thickness (non-endothelial) Disease</b>								
<b>Surgical Diagnosis</b>		<b>PK</b>		<b>ALK</b>		<b>EK</b>		<b>TOTAL</b>
B	Ectasias /Thinnings	1,772	89.9%	199	10.1%	--	--	1,971
E	Other Degenerations of Dystrophies	623	96.1%	25	3.9%	--	--	648
F	Refractive	22	95.7%	1	4.3%	--	--	23
G	Microbial Keratitis	328	95.9%	14	4.1%	--	--	342
H	Mechanical or Chemical Trauma	385	95.8%	17	4.2%	--	--	402
I	Congenital Opacities	187	93.5%	13	6.5%	--	--	200
J	Pterygium	3	100.0%	0	0.0%	--	--	3
K	Non-infectious ulcerative keratitis or perforations	1,233	96.2%	49	3.8%	--	--	1,282
L	Other causes of corneal dysfunction or distortion	1,410	94.5%	82	5.5%	--	--	1,492
	<b>Subtotal</b>	<b>5,963</b>	<b>93.7%</b>	<b>400</b>	<b>6.3%</b>	<b>0</b>	<b>0%</b>	<b>6,363</b>
		38.7% of PK		79.2% of ALK				15.1% of grafts
<b>Regraft</b>								
<b>Surgical Diagnosis</b>		<b>PK</b>		<b>ALK</b>		<b>EK</b>		<b>TOTAL</b>
D	Repeat Corneal Transplant	2,756	50.4%	18	0.3%	2,697	49.3%	5,471
		17.9% of PK		3.6% of ALK		10.3% of EK		13.0% of grafts
<b>Unknown / Unspecified</b>								
<b>Surgical Diagnosis</b>		<b>PK</b>		<b>ALK</b>		<b>EK</b>		<b>TOTAL</b>
Z.	Unknown, unreported, or unspecified	4,230	54.8%	87	1.1%	3,397	44.0%	7,714
		27.5% of PK		17.2% of ALK		13.0% of EK		18.4% of grafts
		<b>PK</b>		<b>ALK</b>		<b>EK</b>		<b>TOTAL</b>
	<b>Total for Each Procedure</b>	<b>15,402</b>	<b>36.7%</b>	<b>505</b>	<b>1.2%</b>	<b>26,095</b>	<b>62.1%</b>	<b>42,002</b>

World-wide, the number of PK procedures continues to decrease, and in 2020, the number of primary PKs for keratoconus dipped for the first time below the number of PKs for re-grafts (See **Figure 7**, below). Note the big drops in both PK for both keratoconus (red) and for post-cataract surgery corneal edema (dark blue). PK for keratoconus may be down because of cross linking and because of newer RGP CL, a trend present for the past 8 years. PK for post-cataract surgery corneal edema also dropped as more surgeons become comfortable with endothelial keratoplasty. Another possibility exists: fewer surgeons in training are being taught penetrating keratoplasty technique.



**Figure 7.** Line graph of common keratoplasty indications over the past nine years shows the number of procedures for keratoconus (red) and post-cataract surgery corneal edema (dark blue) are declining.



## Conclusions:

- 1) COVID-19 reduced both donor corneas and transplanted corneas in 2020 by 20%.
- 2) Endothelial keratoplasty continues to be the most common domestic keratoplasty procedure in 2019 for the seventh year in a row (since 2012, see **Figure 2**).
- 3) The leading diagnosis for keratoplasty in 2020 was endothelial disease (53.5%) (see **Table 8**).
- 4) DSAEK is still the leading EK procedure in 2020 (DSAEK 14,391, DMEK 11,749).
- 5) The number of domestic penetrating keratoplasty procedures using tissue in intermediate-term storage solution from US eye banks decreased 11.5% in 2020 to 15,402 (see **Table 7**). PK procedures in the U.S. have declined from a high of 42,063 in 2005.
- 6) As PK and DSAEK numbers decrease and DMEK numbers increase, the number of each of the three keratoplasty procedures performed in 2020 should be about the same (**Table 4**).
- 7) The number of anterior lamellar keratoplasty, keratolimbal allografts and keratoprosthesis procedures have been essentially flat over the last 8 years. These three procedures combined make up 1.8% of all keratoplasty procedures performed in the U.S. (see **Table 4**).
- 8) Corneas in long term storage solution are the most common ocular tissue (72.4%) used by glaucoma surgeons to cover glaucoma drainage devices. (see **Table 6**).
- 9) The number of keratoplasty procedures for keratoconus has decreased for the past 8 years and continues to fall due to cross-linking and newer RGP/scleral contact lenses (see **Figure 7** and **Table 7**).
- 10) 69.7% of all U.S. eye bank tissue shipped internationally has no recipient diagnosis (**Table 7**). The unknown rate for domestic tissue in 2020 was 18.3% (see **Table 7**). Eye banks still need to diligently try to collect recipient information on tissue used domestically and internationally, as well as when exporting tissue to other eye banks.

Respectfully submitted,

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University of Kentucky  
Medical Director, Kentucky Lions Eye Bank

## 2020 EBAA Statistical Report: Pandemic Observations and Commentary

### Regarding Fulfillment of Surgical Demand:

There were distinct phases of the pandemic that affected the eye bank in 2020: *pre-pandemic*, *near-pandemic*, *pandemic lockdown*, *emergence from lockdown*, and *operational pandemic*. The brief series of bullet points below uses data to characterize these distinct phases.

- **Jan-Feb (*pre-pandemic*):** There was a normal January surgical activity spike following the 2019 end of the year holidays. Typically, February takes a dip to a general monthly average, but in 2020, February activity also spiked above average, just not quite as high as January. This is likely due to some pushing to get cases taken care of before the news of what was then a possible pandemic, became a reality. The previous 12 months (March 2019 through February 2020) saw an average 4,326 keratoplasties (1,481 for PK; 2,575 for EK) per month – this may be termed “normal” or at least a recent representation thereof.
- **March (*near-pandemic/pandemic lockdown*):** Surgical activity was 857 for PK (58% normal for PK) and 1,030 for EK (40% normal for EK). This may be evidence of the relative elective, or less urgent, nature of EK compared to PK. Overall activity for the month was 2,043 keratoplasties (47% normal). The month, notably, was quite distinctly cut in half, as the nationally-advised moratorium on elective surgeries (lockdown) began March 13. The first half of the month was operational with a bias of knowing that a moratorium on elective surgical activity was looming, while testing for the pandemic organism was in its infancy and less was known about the virus than now (overlapping fear and safety biases).
- **April (*pandemic lockdown*):** The entirety of April was under lockdown. PK surgical activity was 406, while EK was 305. April saw 822 domestic keratoplasties (19% normal).
- **May (*emergence from lockdown*):** The nationally-advised moratorium on elective surgeries was lifted on May 1 (though notably there was less unity in the end date regionally than there was in the start date). There was a slow rebound over May toward normalcy. May saw 2,880 domestic keratoplasties (67% normal).
- **June-Dec (*operational pandemic*):** Surgical activity returned to near pre-pandemic activity June through December. The year ended with a typical October spike (+14% over the average) and December dip (-17% below the average). The overall activity rate for June through December 2020 was 96% normal with 4,146 average domestic keratoplasties per month.

While domestic distribution of US transplant tissue has reached near normal by the end of 2020, international distribution remains depressed. In **Figure 1b**, the activity of domestic transplants, international transplants, and long-term preservation are shown. Domestic distribution follows the same pattern of November and December “holiday decline” as with every year. **Figure 4** shows this “heartbeat” pattern and holiday period trend. In **Figure 1b**, however, the international distribution showed a more gradual pattern of growth and did not reach pre-pandemic rates. This is a result of both logistical challenges, as well as pandemic response in destination countries and concerns about receiving tissue from the most pandemic-stricken nation in the world.

### Regarding Tissues Recovered for Transplant That Were Not Used for Transplant:

There were a few notable changes to otherwise steady patterns regarding tissue recovered for transplant, but not used for transplant. New diagnostic tests were introduced that could rule out tissue for transplant use (SARS-CoV-2 PCR tests), which were used either during clinical care of a patient prior to death, or after death (post-mortem) by eye banks, tissue banks, and organ procurement organizations, as well as medical examiners, coroners, and whole-body donation agencies. However, the most significant factor for ensuring continued, safe operation of eye banking was the introduction of EBAA's COVID-19 Screening Guidance.

- Corneas released for transplant use but not transplanted – increased from 4.8% in 2019 to 7.2% in 2020.
  - Expired tissue/unable to place – increased from 2.5% in 2019 to 4.6% in 2020.
    - Highest in March (10.1%) and April (9.3%)
    - High, but declining, in May (6.6%), June (6.6%), July (6.5%), and August (4.8%)
    - Returned to normal rates September and beyond
  - Returned tissue/unable to place again – increased from 0.4% in 2019 to 0.5% in 2020.
    - Twice normal rates (0.8%) in March and April
- Corneas not released for transplant – increased from 26.6% in 2019 to 27.1% in 2020.
  - Other tests, including SARS-CoV-2 testing, available from May 15 through December 31 – increased from 0.4% in 2019 to 0.6% in 2020.
    - The months with the highest rates of “other test rule outs” were May (0.8%), June (0.7%), July (0.7%), October (0.7%), November (1.1%), and December (1.4%)
  - Medical record findings, including the myriad of COVID-19 symptom screening – increased from 5.3% in 2019 to 6.1% in 2020.
    - The months with the highest rates of “medical record rule outs” were March (9.0%) and April (8.6%)
    - The subsequent months appears to stabilize between 5.4% and 6.7%, positively impacted by available SARS-CoV-2 testing and EBAA COVID-19 Screening Guidance.

### Regarding the Impact of Logistics:

Eye banks rely primarily on commercial airlines, FedEx, and UPS for the rapid transportation of blood specimens for serologic testing, transportation of nasopharyngeal swab specimens for SARS-CoV-2 testing; and the transportation of ocular tissue grafts to processing facilities and end-users. Depending on proximity to a serologic testing facility that is FDA registered and CLIA certified, an eye bank may have suffered significant logistical delays due to serologic testing. SARS-CoV-2 testing offered to HCT/P entities is only performed at a limited number of testing facilities.

Pandemic lockdown from mid-March 2020 through the end of April 2020 hit the airlines especially hard. In addition to reduced flights, several airports changed their hours of operation, including those for cargo. In some instances, this resulted in complete airport shutdown on the weekends. Meanwhile, logistics companies like FedEx and UPS took on a significant amount of surging transport activity, no longer able to push significant portions

of their packages to commercial airlines. Compounding this problem was a general corrosion of the US Postal Service (USPS) package handling activity as a result of election-related USPS manipulation.

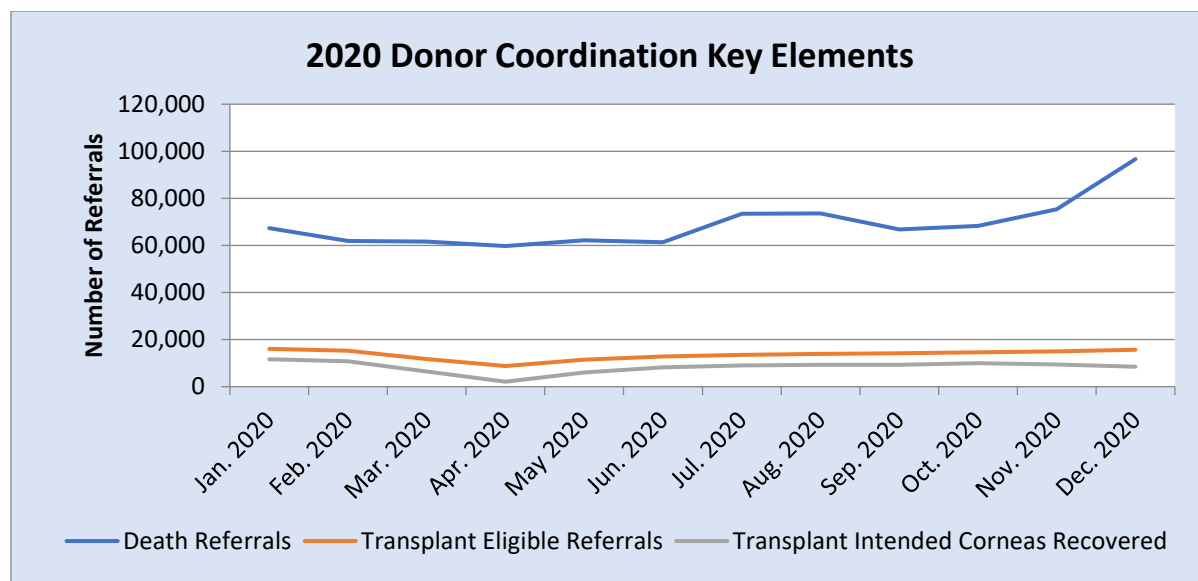
The combined logistical challenges have resulted in a general increase in frequency of delayed release of donor tissue for transplant use (e.g., increased death to release and death to surgery intervals), as well as delayed delivery of tissue to processing locations, allocation entities, and end-users. Most notably, the combined logistical challenges have resulted in increased transport costs to the eye banks. Logistical challenges and a decline in tissue availability have also impacted surgeons' selectivity.

In addition to logistical impacts, there was increased incidence of scheduled surgery cancellation due to COVID-19 impacting recipients. This has resulted in an unmeasured, but observed, increase in the frequency of returned tissue with increased struggle to find suitable allocation.

### Regarding the Impact of Screening and Testing on Death Referrals:

The EBAA does not measure the reasons death referrals are ruled out by eye banks. Unfortunately, this is where the bulk of the impact to eye donation is indicated.

**Figure 8** demonstrates the remarkable uptick in death referral activity while simultaneously demonstrating the decreased availability of transplant-eligible donors and the even further decreased number of transplant-intended corneas recovered. This represents a significant added burden of screening and death referral handling for Donor Coordinators with a depressed yield.



**Figure 8.** Line graph shows the increased death referral activity and further decreased corneas recovered.

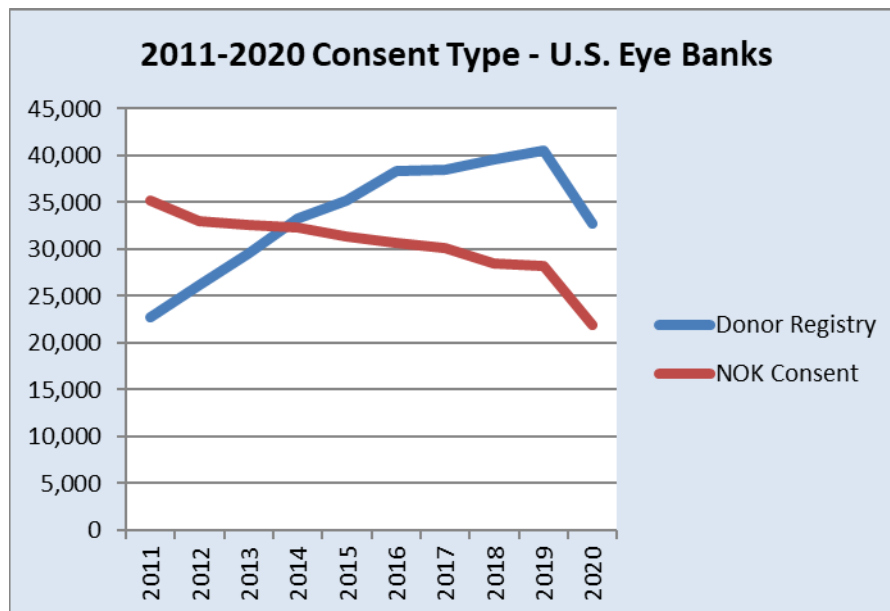
Submitted with a hopeful outlook,  
Brian Philippy, BChE, BS, CEPT  
EBAA Statistical Report Committee Chair

## 2020 Eye Banking Statistics Reported by U.S. Banks: Death Referrals and Tissue Recoveries

Donations	2016	2017	2018	2019	2020
Number of Eye Bank Reporting Entities*	62	57	57	57	59
Total Whole Eyes and Corneas Donated	136,318	135,203	133,576	136,130	108,382
Total Number of Donors	69,049	68,565	68,102	68,759	54,740

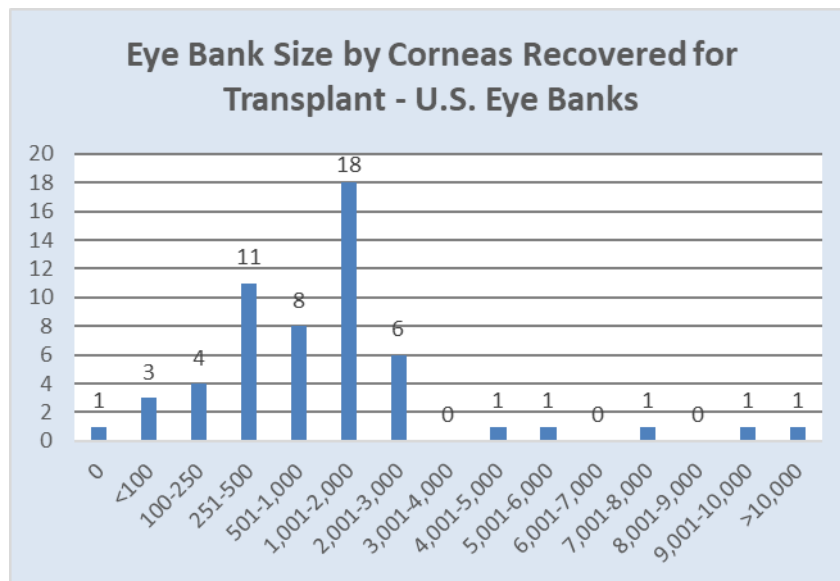
\* Reporting entities may not reflect number of physical eye banks

Death Referrals	2018	2019	2020
Total Death Referrals	718,221	717,316	828,391
Death referrals determined eligible	168,569	176,262	163,074
Tissue Recoveries			
Total Donors	68,102	68,759	54,740
Donors recovered not found on donor registry or known to have first person consent	28,469	28,217	21,978
Donors recovered found on donor registry or known to have first person consent	39,633	40,542	32,762
Eyes or Corneas Recovered with Intent for Surgical Use	123,222	124,843	100,732
Eyes or Corneas Recovered for Other Uses	10,354	11,287	7,650



## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Comparison of Eye Bank Cornea Recovery Rates

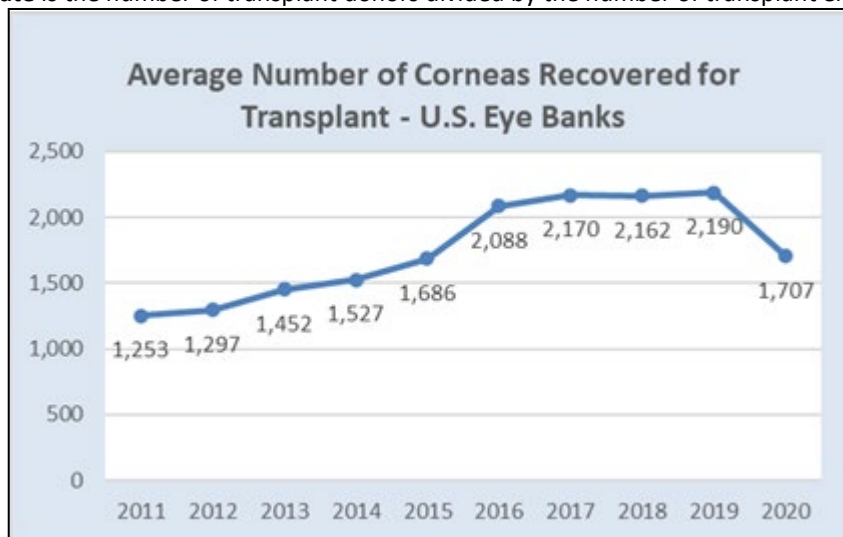
Eye Bank Activity - U.S. Eye Banks											
Recovered Corneas	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
0	2	0	2	2	1	1	0	0	0	1	
<100	2	2	3	4	2	2	3	4	3	3	
100-250	5	5	5	3	5	3	3	2	3	4	
251-500	13	18	16	13	12	8	7	8	6	11	
501-1,000	15	15	14	17	12	13	9	9	9	8	
1,001-2,000	29	20	22	23	19	15	17	17	15	18	
2,001-3,000	5	6	8	6	8	9	6	6	7	6	
3,001-4,000	5	3	1	2	1	1	3	2	3	0	
4,001-5,000	2	2	2	3	2	2	2	1	1	1	
5,001-6,000	1	1	1	1	2	1	1	3	2	1	
6,001-7,000	1	0	0	0	1	1	0	1	0	0	
7,001-8,000	1	0	0	0	0	0	0	0	0	1	
8,001-9,000	0	1	0	0	0	0	1	0	1	0	
9,001-10,000	0	0	1	0	0	1	0	1	1	1	
>10,000	0	0	1	2	2	2	1	1	2	1	
<b>Avg. Corneas Recovered for Transplant</b>	1,253	1,297	1,452	1,527	1,686	2,088	2,170	2,162	2,190	1,707	
<b>Number of Eye Banks</b>	81	80	76	76	71	62	57	57	57	59	



## 2020 Eye Banking Statistics Reported by U.S. Banks: Referral Trends, Transplant and Conversion Rates

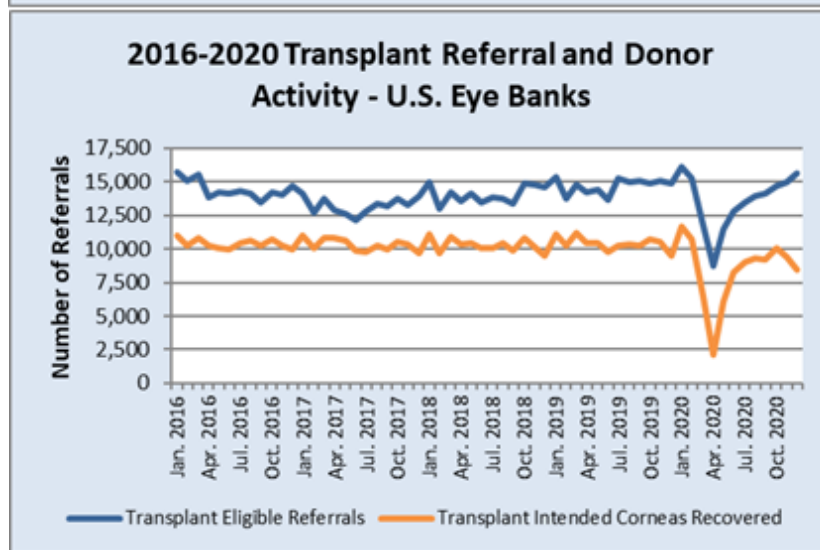
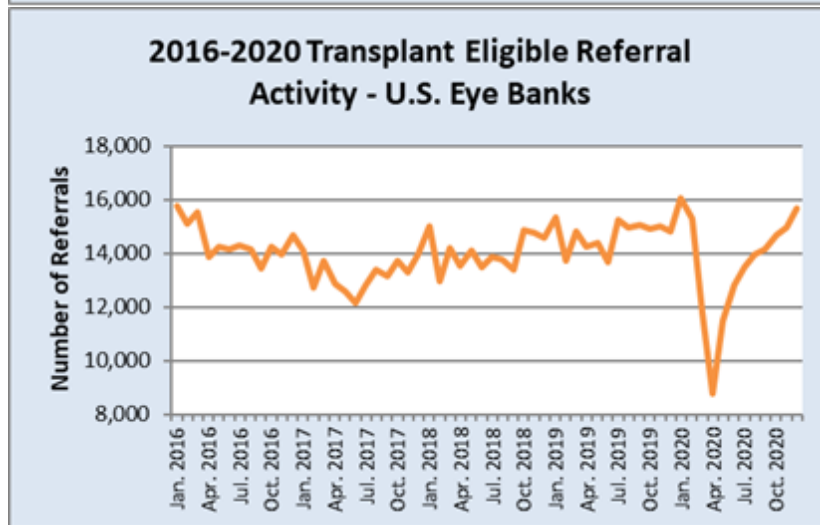
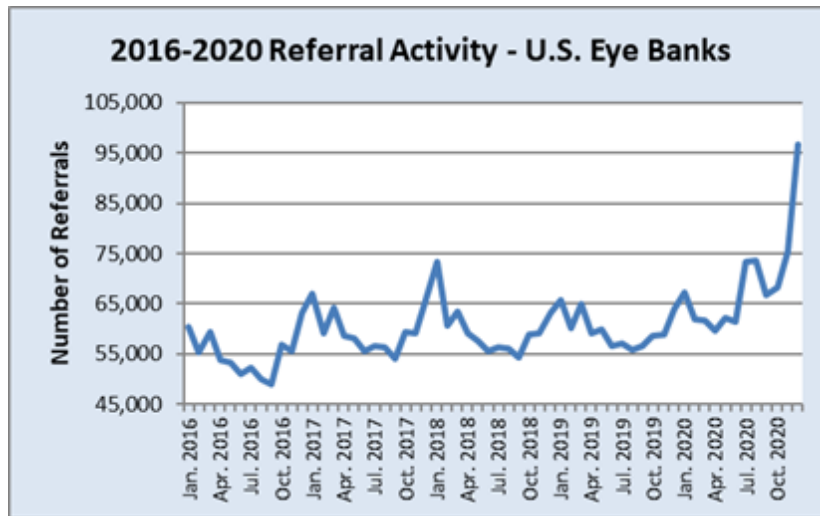
Transplant & Conversion Rates - U.S. Eye Banks					
Month	Transplant Rate	Conversion Rate	Death Referrals	Transplant Eligible Referrals	Transplant Intended Corneas Recovered
Jan. 2020	67.7%	36.6%	67,286	16,073	11,641
Feb. 2020	66.9%	35.4%	61,954	15,296	10,744
Mar. 2020	57.7%	28.1%	61,588	11,747	6,496
Apr. 2020	62.3%	12.2%	59,746	8,772	2,120
May 2020	62.8%	26.6%	62,132	11,503	6,044
Jun. 2020	63.2%	32.4%	61,341	12,796	8,228
Jul. 2020	63.0%	33.7%	73,439	13,490	9,019
Aug. 2020	64.8%	33.6%	73,618	13,970	9,336
Sep. 2020	67.5%	33.0%	66,852	14,136	9,231
Oct. 2020	69.6%	34.7%	68,337	14,657	10,029
Nov. 2020	68.6%	31.8%	75,420	14,951	9,400
Dec. 2020	68.2%	27.2%	96,678	15,683	8,444
<b>2016 Total</b>					
2016 Total	66.6%	35.2%	674,459	179,316	124,649
<b>2017 Total</b>					
2017 Total	68.3%	39.6%	713,795	158,532	123,716
<b>2018 Total</b>					
2018 Total	69.4%	37.3%	718,221	168,569	123,222
<b>2019 Total</b>					
2019 Total	68.7%	35.8%	717,316	176,262	124,843
<b>2020 Total</b>					
2020 Total	65.8%	31.2%	828,391	163,074	100,732
<b>2020 Avg.</b>					
2020 Avg.	N/A	N/A	69,033	13,590	8,394
<b>Std. Dev.</b>					
Std. Dev.	3.5%	6.6%	10,235	2,100	2,527

\***Transplant rate** is the number of corneas used for transplant divided by the number recovered for transplant.  
**Conversion rate** is the number of transplant donors divided by the number of transplant eligible referrals.



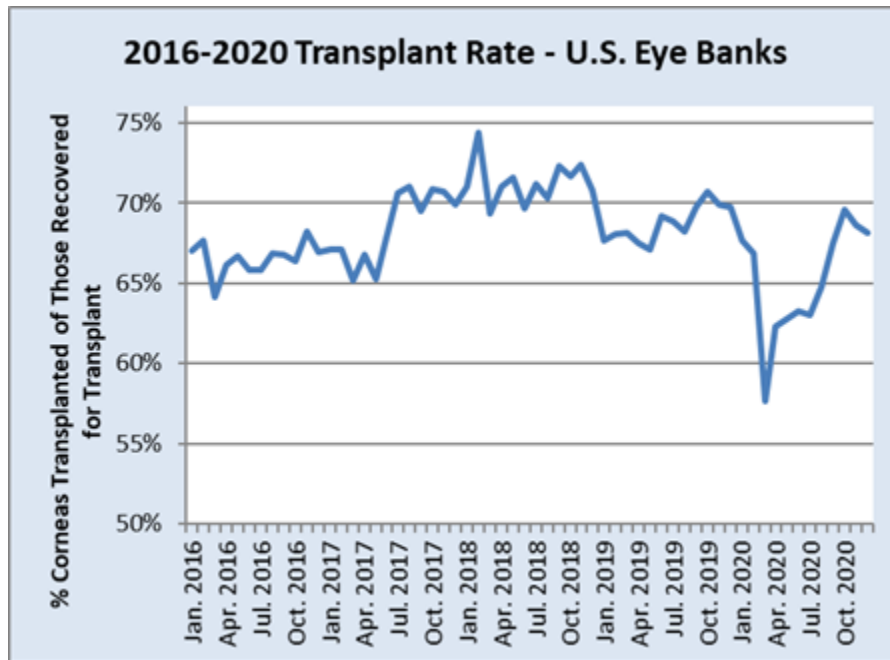


## 2020 Eye Banking Statistics Reported by U.S. Banks: Referral Trends, Transplant and Conversion Rates

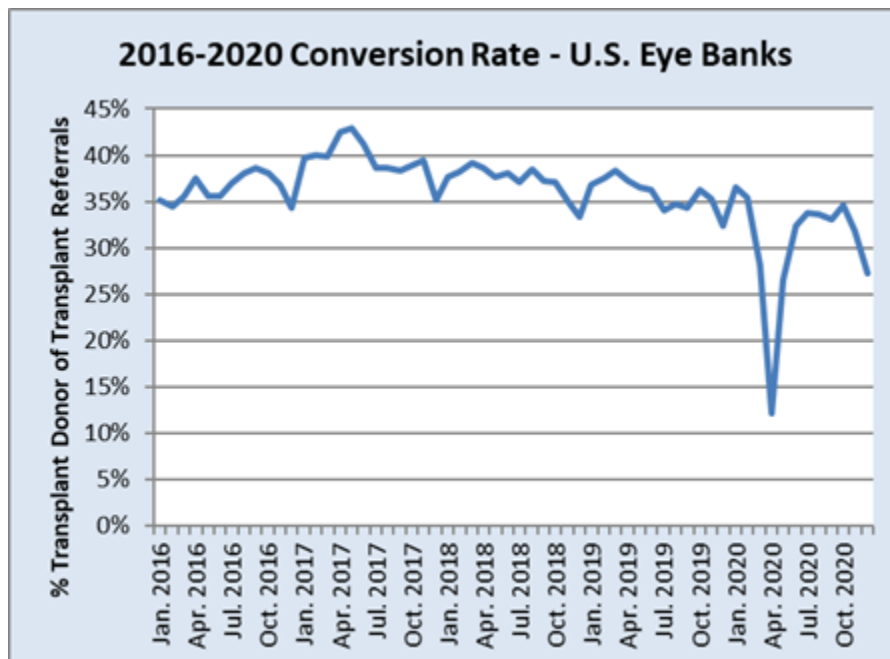




## 2020 Eye Banking Statistics Reported by U.S. Banks: Transplant and Conversion Rates



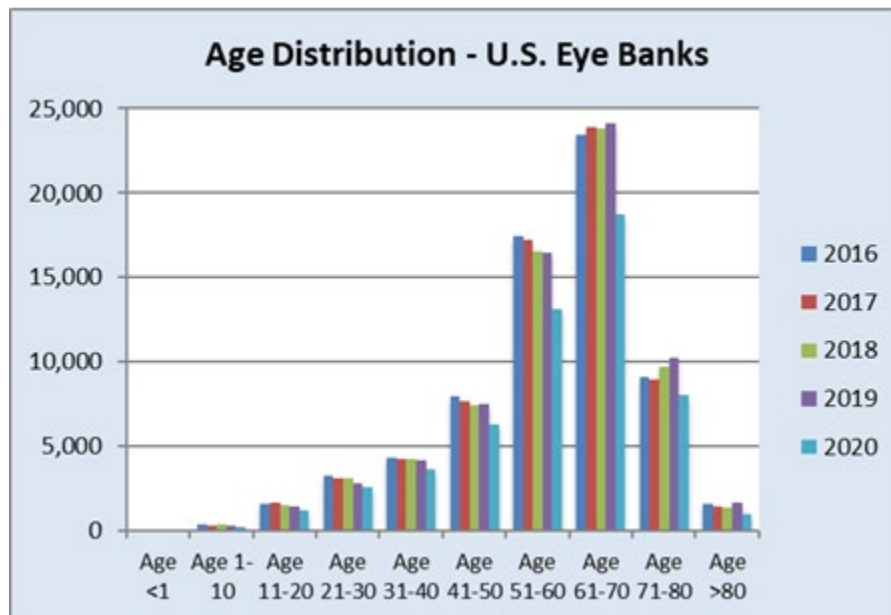
**Transplant rate** is the number of corneas used for transplant divided by the number recovered for transplant.



**Conversion rate** is the number of transplant donors divided by the number of transplant eligible referrals.

## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Donors by Age Reported by U.S. Banks

Age Demographics - U.S. Eye Banks										
Year	Age <1	Age 1-10	Age 11-20	Age 21-30	Age 31-40	Age 41-50	Age 51-60	Age 61-70	Age 71-80	Age >80
2016	11	348	1,587	3,223	4,327	7,933	17,460	23,459	9,136	1,565
2017	13	324	1,643	3,079	4,249	7,669	17,244	23,913	8,959	1,472
2018	18	338	1,534	3,119	4,212	7,416	16,570	23,804	9,734	1,357
2019	6	310	1,435	2,778	4,145	7,535	16,490	24,151	10,209	1,700
2020	2	221	1,200	2,553	3,643	6,316	13,087	18,757	8,008	953
<b>Monthly Avg</b>	0	18	100	213	304	526	1,091	1,563	667	79
<b>Std. Dev.</b>	0.4	7.8	22.4	49.3	82.4	137.5	315.5	519.8	251.5	26.5

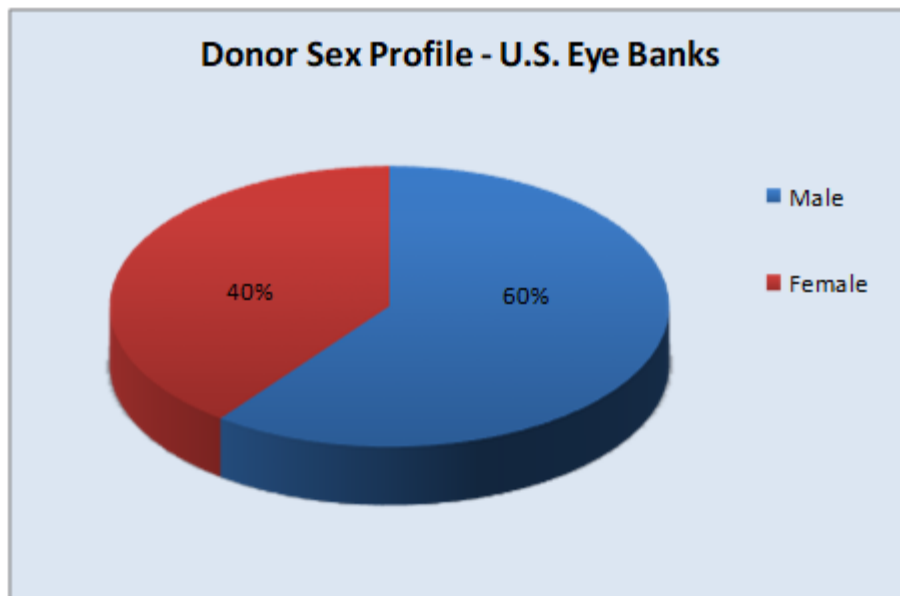


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## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Donors by Gender Reported by U.S. Banks

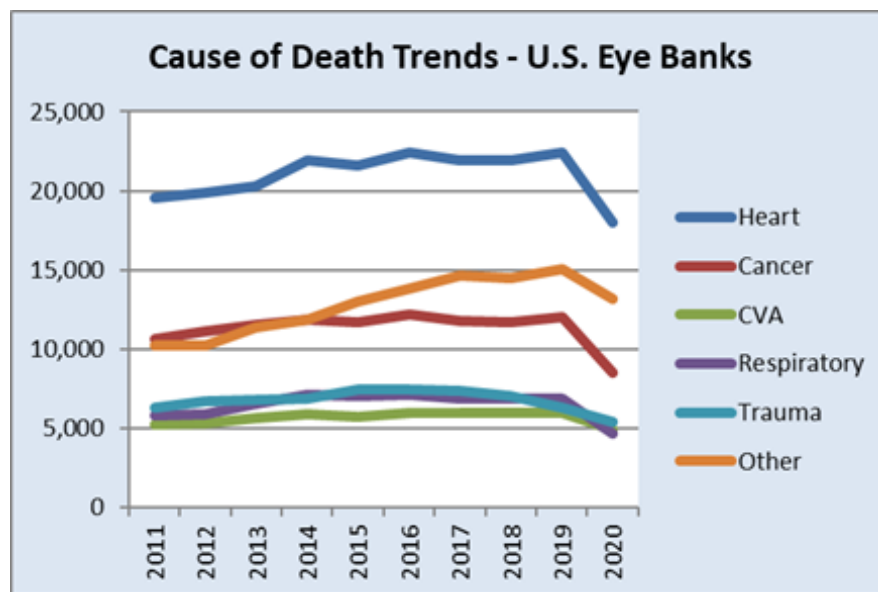
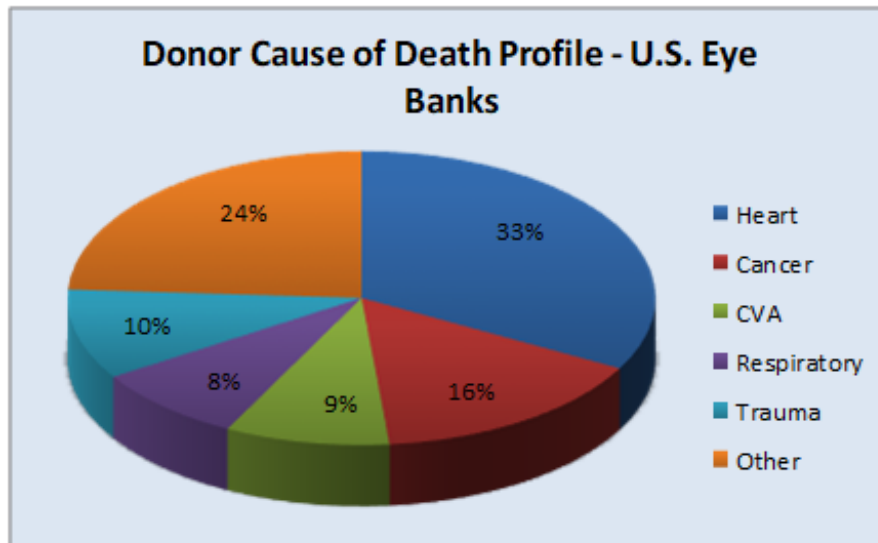
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Donor Sex Demographics U.S. Eye Banks		
Year	Male	Female
2016 Total	42,079	26,970
2017 Total	40,898	27,667
2018 Total	40,856	27,246
2019 Total	41,261	27,498
2020 Total	33,010	21,730
<b>Monthly Avg.</b>		
	2,751	1,811
<b>Std. Dev.</b>		
	796.4	590.8



## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Cause of Death Reported by U.S. Banks

Cause of Death Demographics - U.S. Eye Banks						
Year	Heart	Cancer	CVA	Respiratory	Trauma	Other
2016	22,447	12,201	5,987	7,104	7,479	13,831
2017	21,948	11,758	5,964	6,896	7,354	14,645
2018	21,911	11,724	5,979	6,909	7,064	14,515
2019	22,457	12,033	5,980	6,912	6,310	15,067
2020	18,040	8,499	4,947	4,631	5,440	13,183
<b>Monthly Avg.</b>	1,503	708	412	386	453	1,099
<b>Std. Dev.</b>	444.6	278.6	106.6	160.0	116.5	337.8



## 2020 Eye Banking Statistics Reported by U.S. Banks: Reasons Tissue Intended for Surgery Was Not Released

There are several reasons why tissue intended for surgery may not ultimately be used for surgery. These include positive serology results, defects noted at the time of evaluation (scars, infiltrates, low cell counts, etc.) and/or medical or social history information, all of which occur subsequent to initial screening and procurement.

Contraindications for Transplant <sup>1</sup>	2018		2019		2020	
<b>Positive or Reactive Test for Communicable Disease Agent or Disease</b>	<b>10,065</b>	<b>31.2%</b>	<b>11,183</b>	<b>33.6%</b>	<b>9,308</b>	<b>34.1%</b>
HIV Antibody (HIV I/II Ab)	274	0.9%	265	0.8%	177	0.6%
HIV Nucleic Acid Test (HIV NAT)	96	0.3%	167	0.5%	148	0.5%
Hepatitis B Surface Antigen (HBsAg)	1,028	3.2%	1,344	4.0%	1,267	4.6%
Hepatitis B Core Antibody (HBcAb)	4,954	15.4%	5,115	15.4%	3,940	14.4%
Hepatitis B Nucleic Acid Test (HBV NAT)	350	1.1%	588	1.8%	565	2.1%
Hepatitis C Antibody (HCV Ab)	1,923	6.0%	1,986	6.0%	1,512	5.5%
Hepatitis C Nucleic Acid Test (HCV NAT)	685	2.1%	826	2.5%	728	2.7%
Syphilis	383	1.2%	331	1.0%	206	0.8%
HTLV Antibody (HTLV I/II Ab)	109	0.3%	103	0.3%	139	0.5%
West Nile Virus Nucleic Acid Test (WNV NAT)	8	0.0%	20	0.1%	0	0.0%
Other Positive or Reactive Test	255	0.7%	438	1.3%	626	2.3%
<b>Other Communicable Disease Testing Issue</b>	<b>319</b>	<b>1.0%</b>	<b>323</b>	<b>1.0%</b>	<b>380</b>	<b>1.4%</b>
<b>Medical Record or Autopsy Findings</b>	<b>6,599</b>	<b>20.5%</b>	<b>6,650</b>	<b>20.0%</b>	<b>6,164</b>	<b>22.6%</b>
Dementia / Neurological Issues	732	2.3%	791	2.4%	566	2.1%
Sepsis	3,190	9.9%	3,114	9.4%	2,340	8.6%
Sepsis - (determined by positive blood cultures)	1,337	4.1%	1,352	4.1%	1,063	3.9%
Sepsis - (determined by other indicators)	1,853	5.8%	1,762	5.3%	1,277	4.7%
Plasma Dilution	315	1.0%	261	0.8%	160	0.6%
Unknown Cause of Death	132	0.4%	165	0.5%	98	0.4%
Other	2,230	6.9%	2,319	7.0%	3,000	11.0%
<b>Medical/Social Interview</b>	<b>3,083</b>	<b>9.6%</b>	<b>2,992</b>	<b>9.0%</b>	<b>2,062</b>	<b>7.6%</b>
Travel	507	1.6%	383	1.2%	327	1.2%
Dementia / Neurological Issues	312	1.0%	171	0.5%	162	0.6%
Other	2,264	7.0%	2,438	7.3%	1,573	5.8%
<b>Body Exam</b>	<b>292</b>	<b>0.9%</b>	<b>374</b>	<b>1.1%</b>	<b>226</b>	<b>0.8%</b>
<b>Total eyes/corneas intended for transplant but not released for transplant</b>	<b>32,225</b>		<b>33,258</b>		<b>27,304</b>	

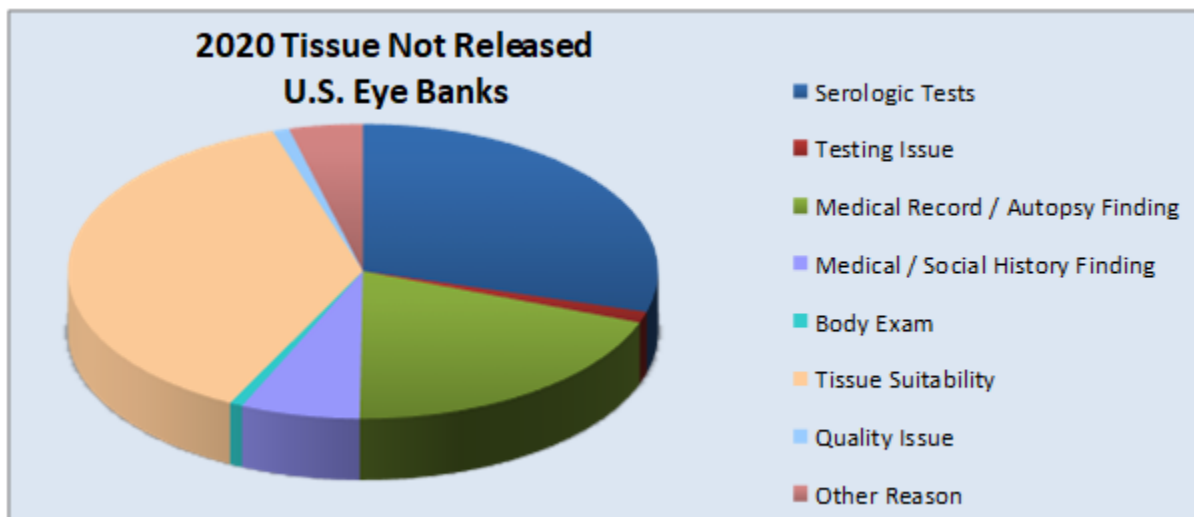
\*Percentages read from this table should be read as "of the tissue not released for transplant"

<sup>1</sup> Some tissues had multiple contraindications.

## 2020 Eye Banking Statistics Reported by U.S. Banks: Reasons Tissue Intended for Surgery Was Not Released

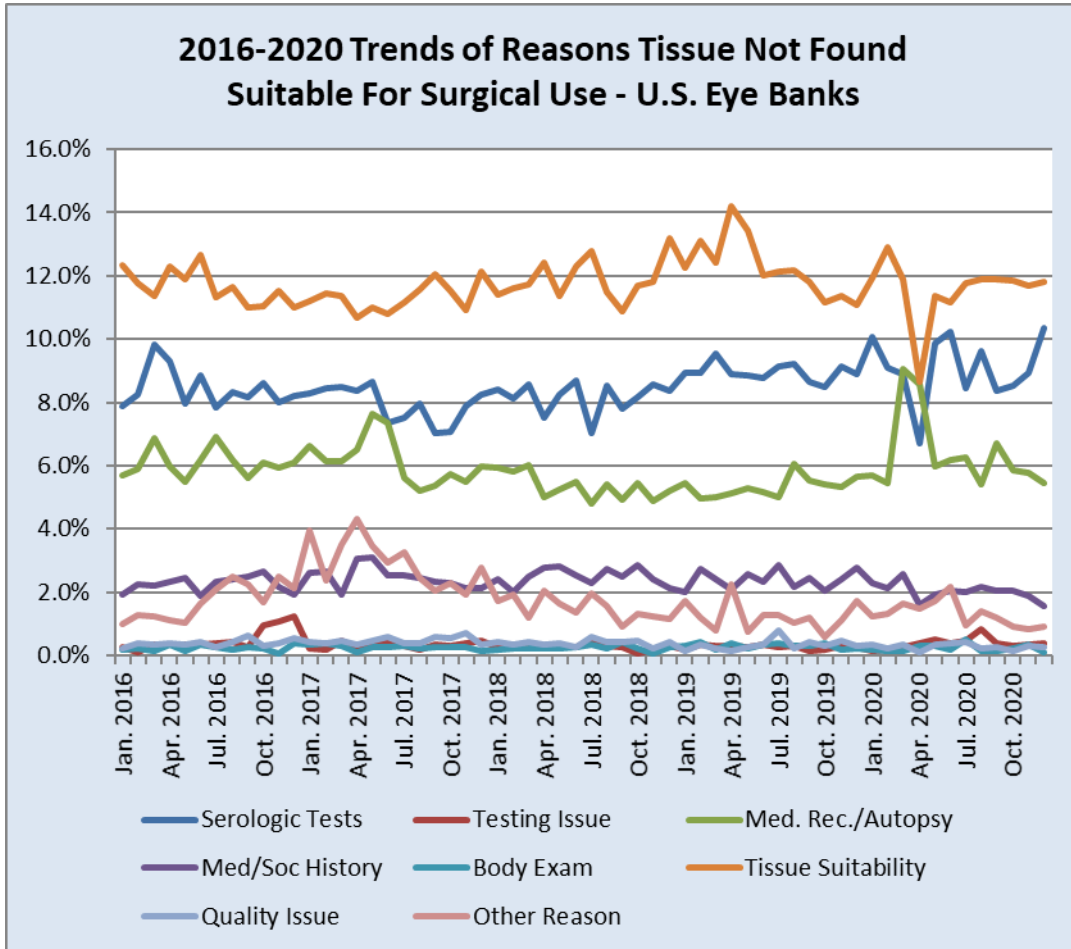
Contraindications for Transplant <sup>2</sup>	2018		2019		2020	
<b>Tissue Suitability (e.g. slit lamp/spec eval)</b>	<b>14,631</b>	<b>45.4%</b>	<b>15,319</b>	<b>46.1%</b>	<b>11,887</b>	<b>43.5%</b>
Epithelium	218	0.7%	133	0.4%	105	0.4%
Stroma	7,092	22.0%	8,265	24.9%	6,334	23.2%
Prior reactive surgery	383	1.2%	609	1.8%	458	1.7%
Scar	943	2.9%	1,069	3.2%	838	3.1%
Infiltrate	3,600	11.2%	3,906	11.7%	3,167	11.6%
Foreign Body	133	0.4%	178	0.5%	91	0.3%
Other	2,033	6.3%	2,503	7.5%	1,780	6.5%
Descemet's membrane	338	1.0%	321	1.0%	269	1.0%
Endothelium	6,983	21.7%	6,600	19.8%	5,179	19.0%
<b>Quality Issue</b>	<b>493</b>	<b>1.5%</b>	<b>405</b>	<b>1.2%</b>	<b>286</b>	<b>1.0%</b>
Storage	108	0.3%	128	0.4%	103	0.4%
Labeling	21	0.1%	3	0.0%	7	0.0%
Processing	303	0.9%	157	0.5%	107	0.4%
Supply or Reagent	37	0.1%	86	0.3%	43	0.2%
Environmental Control	24	0.1%	31	0.1%	26	0.1%
<b>Other Reason prior to Tissue Release</b>	<b>1,857</b>	<b>5.8%</b>	<b>1,542</b>	<b>4.6%</b>	<b>1,279</b>	<b>4.7%</b>
<b>Total eyes/corneas intended for transplant but not released for transplant</b>	<b>32,225</b>		<b>33,258</b>		<b>27,304</b>	

\*Percentages read from this table should be read as "of the tissue not released for transplant."



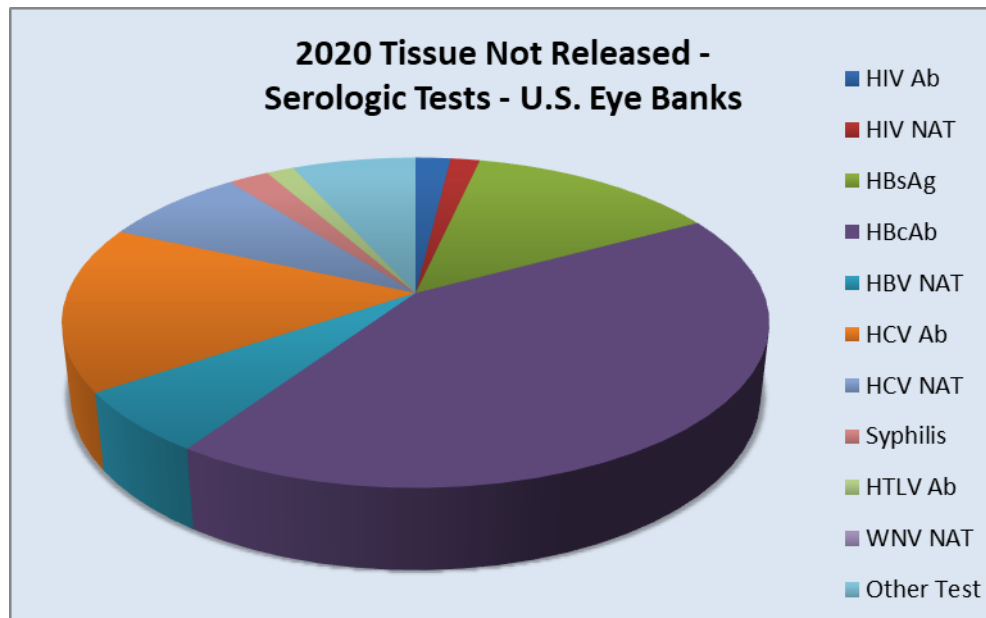
<sup>2</sup> Some tissues had multiple contraindications.

## 2020 Eye Banking Statistics Reported by U.S. Banks: Reasons Tissue Intended for Surgery Was Not Released



Reasons Corneas Recovered for Transplant Were Not Released - U.S. Eye Banks											
Reasons Not Released	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
<b>Serology Tests</b>	8,299	9,250	9,656	10,161	9,903	10,523	9,845	10,067	11,183	9,308	
<b>Testing Issue</b>	246	307	375	423	368	632	385	319	323	380	
<b>Med. Rec./Autopsy Finding</b>	6,756	6,701	7,138	7,313	7,754	7,578	7,614	6,599	6,650	6,164	
<b>Med Soc Hx Finding</b>	1,694	2,158	2,200	2,331	2,745	2,803	3,067	3,083	2,992	2,062	
<b>Body Exam</b>	205	273	189	235	266	280	325	292	374	226	
<b>Tissue Suitability</b>	11,168	12,360	12,384	14,463	15,341	14,511	13,994	14,631	15,319	11,887	
<b>Quality Issue</b>	476	378	416	434	486	477	575	493	405	286	
<b>Other Reason</b>	542	2,296	2,294	2,065	1,708	2,194	3,656	1,857	1,542	1,279	

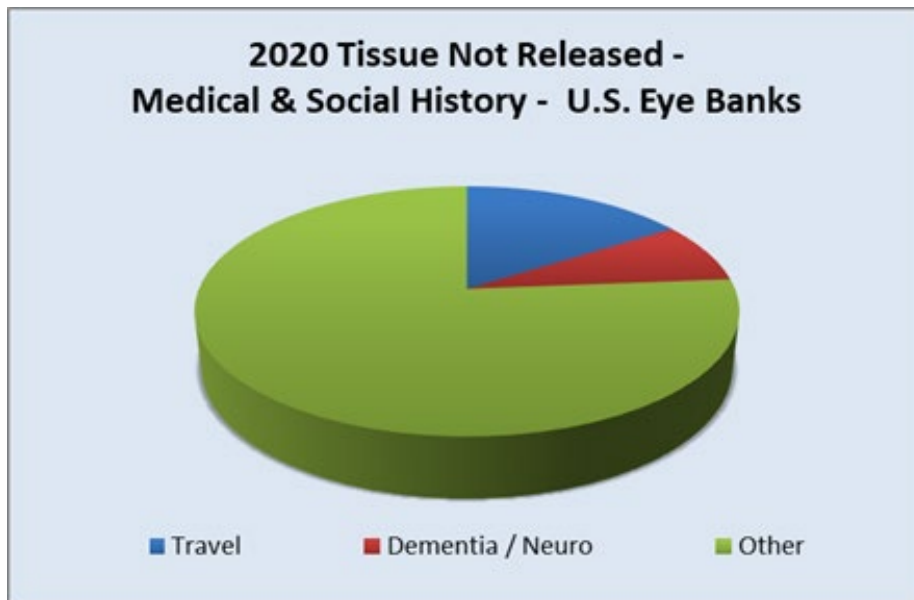
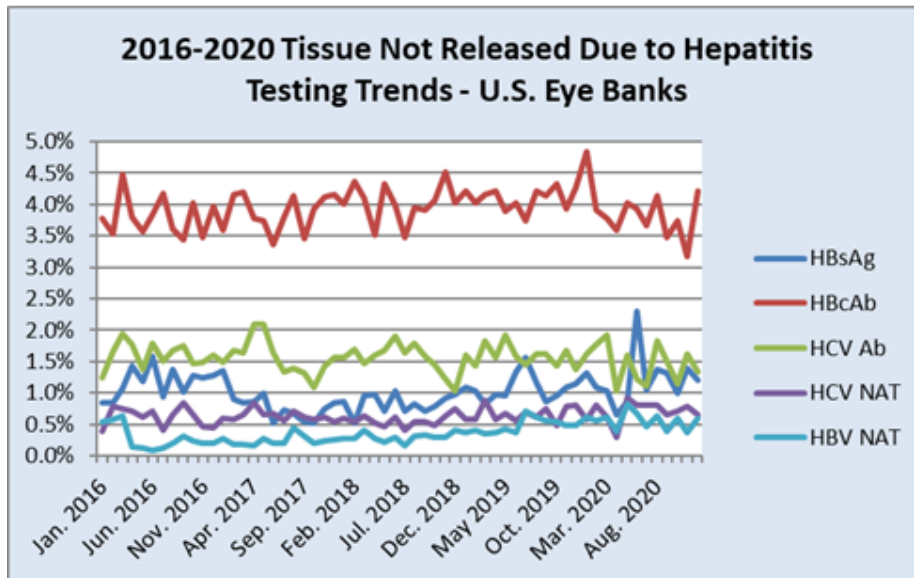
## 2020 Eye Banking Statistics Reported by U.S. Banks: Reasons Tissue Intended for Surgery Was Not Released



Corneas Not Released for Transplant (Serologic Testing) - U.S. Eye Banks											
Not Released - Serology	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trend
<b>HIV</b>	400	258	253	255	300	283	310	370	432	325	
HIV I/II Ab	164	173	169	185	220	185	216	274	265	177	
HIV NAT	236	85	84	70	80	98	94	96	167	148	
<b>HBV</b>	4,261	5,268	5,425	6,366	5,810	6,565	6,075	6,346	7,047	5,772	
HBsAg	723	876	786	1,130	1,070	1,457	986	1,028	1,344	1,267	
HBcAb	3,538	4,392	4,639	4,889	4,453	4,755	4,789	4,956	5,115	3,940	
HBV NAT	0	0	0	347	287	353	300	362	588	565	
<b>HCV</b>	2,637	2,623	2,791	2,598	2,725	2,762	2,719	2,596	2,812	2,240	
HCV Ab	1,925	1,957	2,029	1,889	2,025	1,996	1,936	1,911	1,986	1,512	
HCV NAT	712	666	762	709	700	766	783	685	826	728	
<b>Syphilis</b>	347	348	397	390	358	468	357	383	331	206	
<b>HTLV</b>	313	215	237	206	234	143	80	109	103	139	
<b>WNV</b>	0	0	0	4	10	3	22	8	20	0	
<b>Other</b>	341	538	553	342	466	299	282	255	438	626	

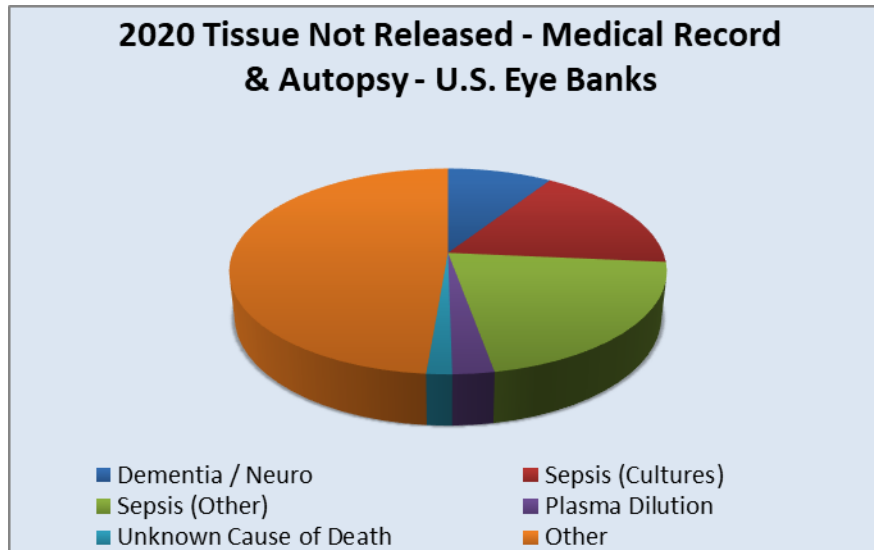


## 2020 Eye Banking Statistics Reported by U.S. Banks: Reasons Tissue Intended for Surgery Was Not Released



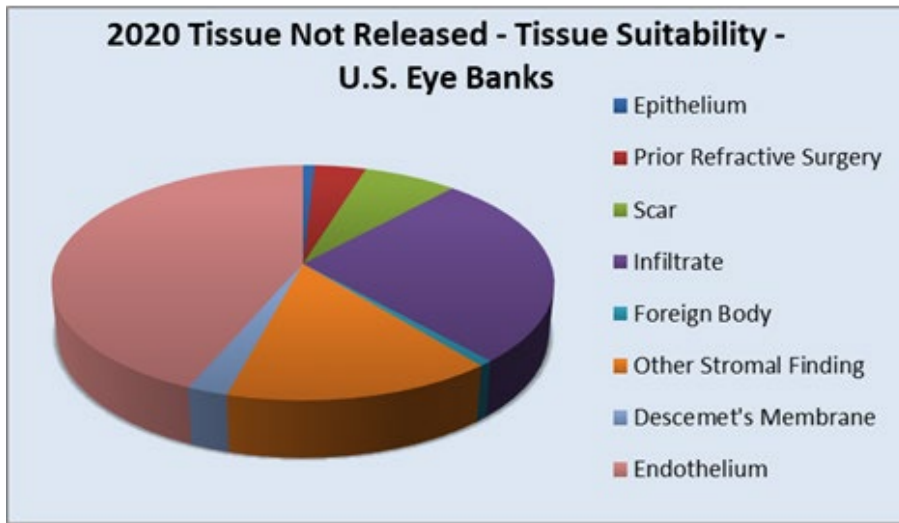
Corneas Not Released for Transplant (Med Soc Hx) - U.S. Eye Banks											
Not Released - Med Soc	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Travel	257	285	338	379	467	418	435	507	383	327	
Dementia/Neuro	146	174	198	139	180	216	256	312	171	162	
Other	1,291	1,699	1,664	1,813	2,098	2,169	2,376	2,264	2,438	1,573	

## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Reasons Tissues Were Not Released

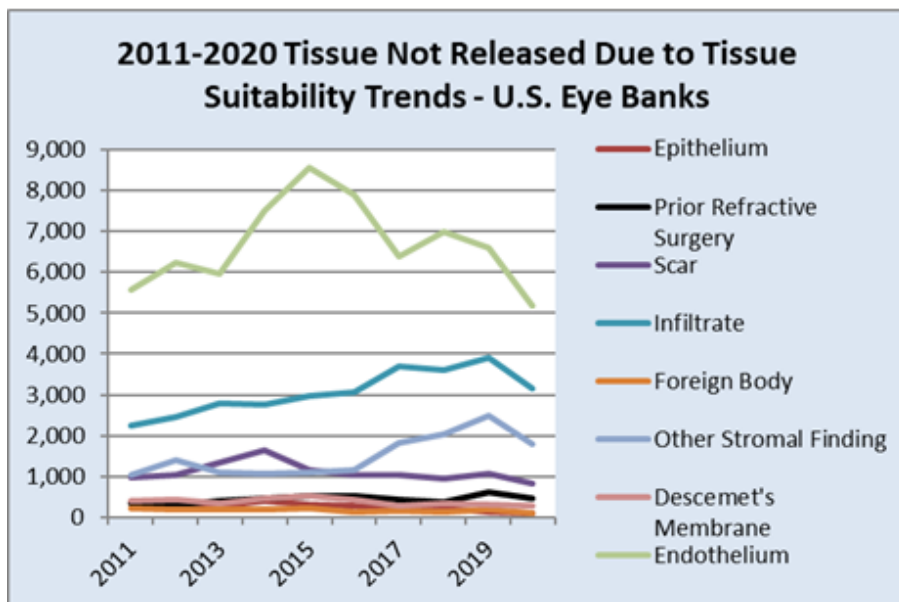


Corneas Not Released for Transplant (Medical Records) - U.S. Eye Banks											
Not Released - Med Rec / Autopsy	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
<b>Dementia/Neuro</b>	491	542	660	733	827	778	723	732	791	566	
<b>Sepsis (Cultures)</b>	925	880	958	1,067	1,078	1,249	1,355	1,337	1,352	1,063	
<b>Sepsis (Other)</b>	2,356	2,511	2,628	2,443	2,443	2,262	1,949	1,853	1,762	1,277	
<b>Plasma Dilution</b>	422	353	447	445	381	346	407	315	261	160	
<b>Unknown COD</b>	507	416	485	388	326	192	179	132	165	98	
<b>Other</b>	2,055	1,999	1,960	2,237	2,699	2,751	3,001	2,230	2,319	3,000	

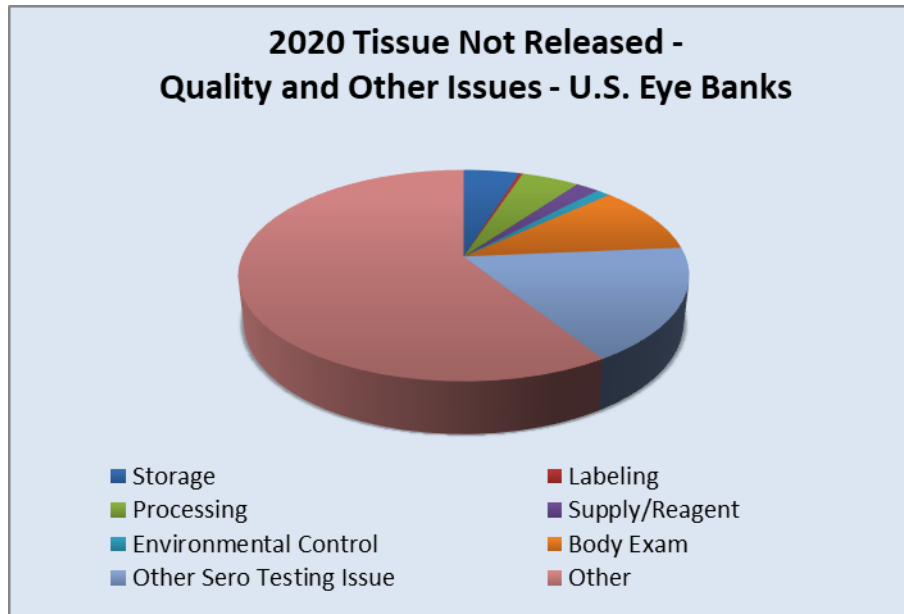
## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Tissue Suitability Reasons Tissues Were Not Released



Corneas Not Released for Transplant (Tissue Suitability) - U.S. Eye Banks											
Not Released - Tissue Suitability	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Epithelium	368	288	279	403	313	272	192	218	133	105	
Prior Refractive Surgery	345	298	390	473	512	508	424	383	609	458	
Scar	989	1,036	1,329	1,628	1,151	1,040	1,030	943	1,069	838	
Infiltrate	2,246	2,455	2,800	2,755	2,983	3,076	3,686	3,600	3,906	3,167	
Foreign Body	218	200	188	187	210	135	170	133	178	91	
Other Stromal Finding	1,034	1,404	1,095	1,068	1,098	1,162	1,825	2,033	2,503	1,780	
Descemet's Membrane	403	438	346	455	520	425	293	338	321	269	
Endothelium	5,565	6,241	5,957	7,494	8,554	7,893	6,374	6,983	6,600	5,179	



## 2020 Eye Banking Statistics Reported by U.S. Banks: Quality Issues for Tissue Not Released

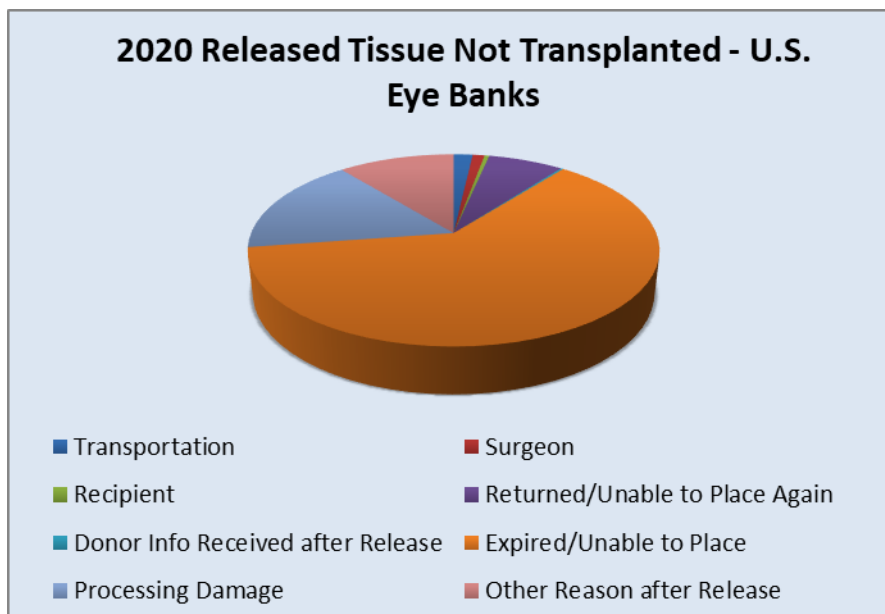


Corneas Not Released for Transplant (Quality) - U.S. Eye Banks											
Not Released - Quality Issues / Other	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Storage Issue	173	123	101	136	135	131	93	108	128	103	
Labeling Issue	44	14	14	11	9	16	9	21	3	7	
Processing Issue (not released)	148	181	225	232	252	251	403	303	157	107	
Supply / Reagent Issue	84	40	47	24	58	57	51	37	86	43	
Environmental Control Issue	27	20	29	31	32	22	19	24	31	26	
Body Exam	205	273	189	235	266	280	325	292	374	226	
Other Sero Testing Issue	246	307	375	423	368	632	385	319	323	380	
Other Issue	542	2,296	2,294	2,065	1,708	2,194	3,656	1,857	1,542	1,279	

## 2020 Eye Banking Statistics Reported by U.S. Banks: Reasons Released Tissues Were Not Transplanted

Reasons Released Tissues Were Not Transplanted	2018		2019		2020	
	Count	Percentage	Count	Percentage	Count	Percentage
Transportation Issue	175	3.1%	192	3.2%	132	1.8%
Surgeon Issue	115	2.1%	116	1.9%	83	1.1%
Recipient Issue	36	0.6%	39	0.7%	32	0.4%
Returned and Unable to Place Again	467	8.4%	516	8.6%	524	7.2%
Donor Information Not Available at the Time of Tissue Release	14	0.3%	17	0.3%	17	0.2%
Expired or Unable to Place Tissue	2,473	44.5%	3,176	53.1%	4,615	63.2%
Tissue Damaged During Processing	1,454	26.2%	1,414	23.6%	1,226	16.8%
Other Reason After Release of Tissue	977	17.6%	686	11.5%	808	11.1%
<b>Total eyes/corneas released for transplant but not used for transplant</b>	<b>5,556</b>		<b>5,984</b>		<b>7,297</b>	

\*Percentages read from this table should be read as "of the tissue not released for transplant"



Corneas Released but Not Transplanted - U.S. Eye Banks											
Released but Not Transplanted	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Transport Issue	127	116	109	169	226	139	147	175	192	132	
Surgeon Issue	199	146	162	150	140	103	108	115	116	83	
Recipient Issue	54	37	38	51	35	41	52	36	39	32	
Returned, Unable to Place Again	299	301	267	414	511	475	453	467	516	524	
Donor Info Received After Release	39	12	54	26	50	28	21	14	17	17	
Expired, Unable to Place	3,137	3,798	3,428	4,265	3,958	4,176	2,679	2,473	3,176	4,615	
Processing Damage After Release	283	440	501	596	764	1,030	1,113	1,454	1,414	1,226	
Other Reason After Release	393	270	714	1,063	1,359	1,511	2,007	977	686	808	

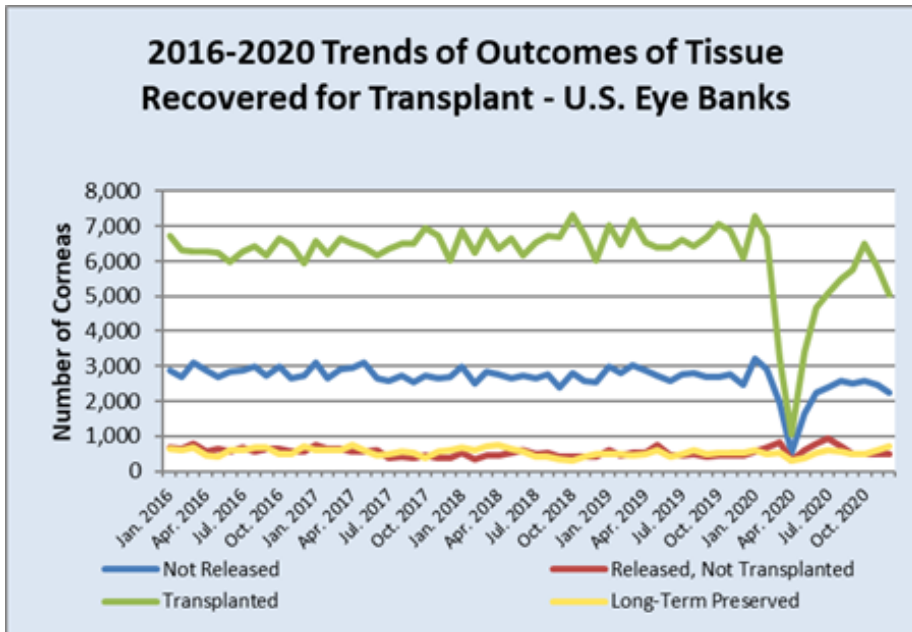
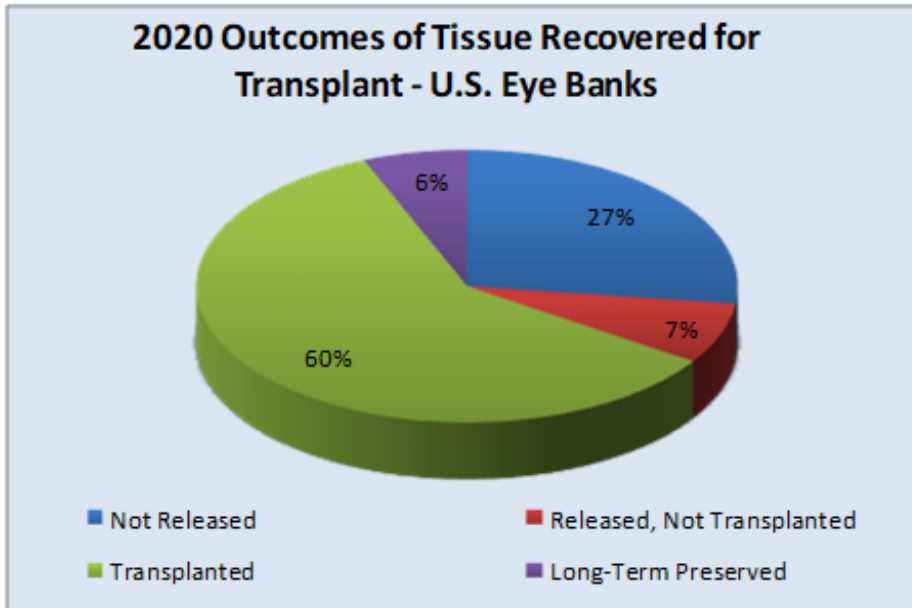
## 2020 Eye Banking Statistics Reported by U.S. Banks: Outcomes of Tissue Recovered for Transplant

Donations	2019	2020	% Change
Eye Banks Reported	57	59	3.5%
Total Whole Globes and Corneas Donated	136,130	108,382	(-20.4%)
Total Number of Donors	68,759	54,740	(-20.4%)
Distribution	2019	2020	% Change
Intermediate-Term Preserved Corneas	79,534	59,996	(-24.6%)
Sclera	5,999	3,151	(-47.5%)
Long-Term Preserved Corneas	8,614	9,093	5.6%
Research	13,743	11,336	(-17.5%)
Training	9,487	6,504	(-31.4%)

Outcomes of Corneas Recovered for Transplant Use - U.S. Eye Banks											
Month	Corneas Recovered for Transplant	Corneas Segmented	Corneal Segments Produced	Not Released		Released but Not Transplanted		Whole Corneas and Segments Transplanted		Preserved Long-Term	
Jan. 2020	11,641	14	35	3,206	27.5%	575	4.9%	7,293	62.5%	588	5.0%
Feb. 2020	10,744	14	28	2,916	27.1%	657	6.1%	6,679	62.1%	506	4.7%
Mar. 2020	6,496	9	18	1,928	29.7%	832	12.8%	3,211	49.4%	534	8.2%
Apr. 2020	2,120	17	34	511	24.1%	305	14.4%	1,030	48.2%	291	13.6%
May 2020	6,044	4	8	1,660	27.5%	595	9.8%	3,417	56.5%	376	6.2%
Jun. 2020	8,228	30	47	2,254	27.4%	787	9.6%	4,684	56.8%	520	6.3%
Jul. 2020	9,019	14	28	2,407	26.7%	945	10.5%	5,076	56.2%	605	6.7%
Aug. 2020	9,336	6	12	2,596	27.8%	699	7.5%	5,476	58.6%	571	6.1%
Sep. 2020	9,231	3	6	2,520	27.3%	480	5.2%	5,745	62.2%	489	5.3%
Oct. 2020	10,029	32	52	2,598	25.9%	472	4.7%	6,494	64.6%	485	4.8%
Nov. 2020	9,400	9	18	2,478	26.4%	478	5.1%	5,846	62.1%	607	6.5%
Dec. 2020	8,444	13	26	2,230	26.4%	472	5.6%	5,045	59.7%	710	8.4%
<b>2016 Total</b>	119,687	1	2	33,577	28.1%	6,806	5.7%	74,624	62.3%	4,681	3.9%
<b>2017 Total</b>	124,649	0	0	34,126	27.4%	7,529	6.0%	75,926	60.9%	7,068	5.7%
<b>2018 Total</b>	123,222	27	56	32,225	26.2%	5,556	4.5%	79,207	64.3%	6,263	5.1%
<b>2019 Total</b>	124,843	269	473	33,258	26.6%	5,984	4.8%	79,738	63.8%	6,067	4.9%
<b>2020 Total</b>	100,732	165	312	27,304	27.1%	7,297	7.2%	59,996	59.5%	6,282	6.2%
<b>2020 Avg.</b>	8,394	14	26	2,275	N/A	608	N/A	5,000	N/A	524	N/A
<b>Std. Dev.</b>	2,527	9.17	14.5	689	1.3%	183	3.3%	1,742	5.2%	110	2.4%

\*Percentages read from this table should be read as "of the tissue recovered with transplant intent"

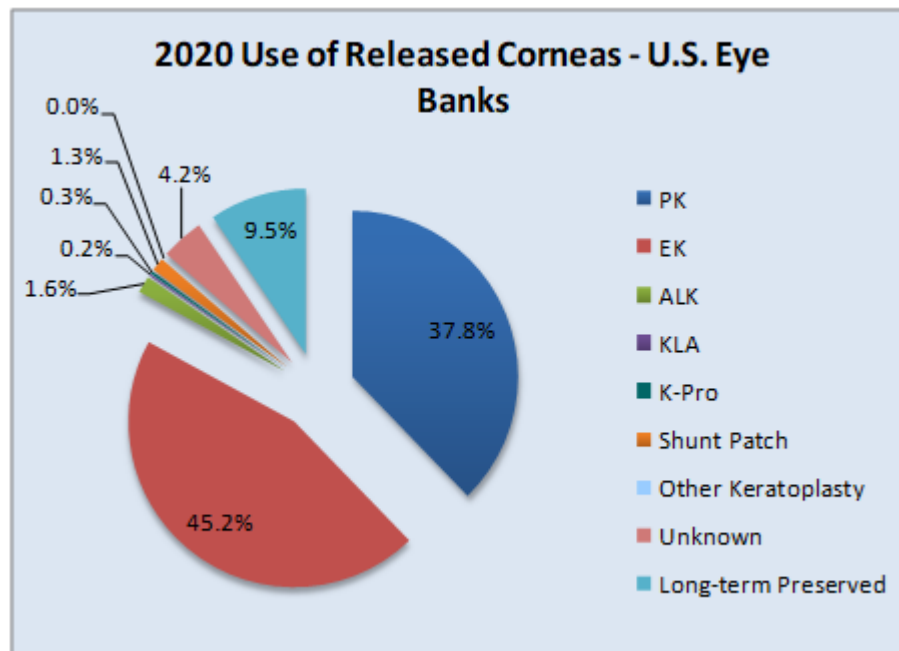
## 2020 Eye Banking Statistics Reported by U.S. Banks: Outcomes of Tissue Recovered for Transplant



General Outcomes of Corneas Recovered for Transplant Use - U.S. Eye Banks											
Outcome	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trend
Not Released	29,407	30,185	32,456	32,958	33,577	34,126	33,310	32,225	33,258	27,304	
Released, Not	4,536	4,908	5,182	6,681	6,806	7,529	6,109	5,556	5,984	7,297	
Transplanted	67,520	68,684	68,442	72,013	74,624	75,926	77,579	79,207	79,738	59,996	
Long-Term Preserved	3,017	2,454	4,294	4,420	4,681	7,068	6,718	6,263	6,067	6,282	

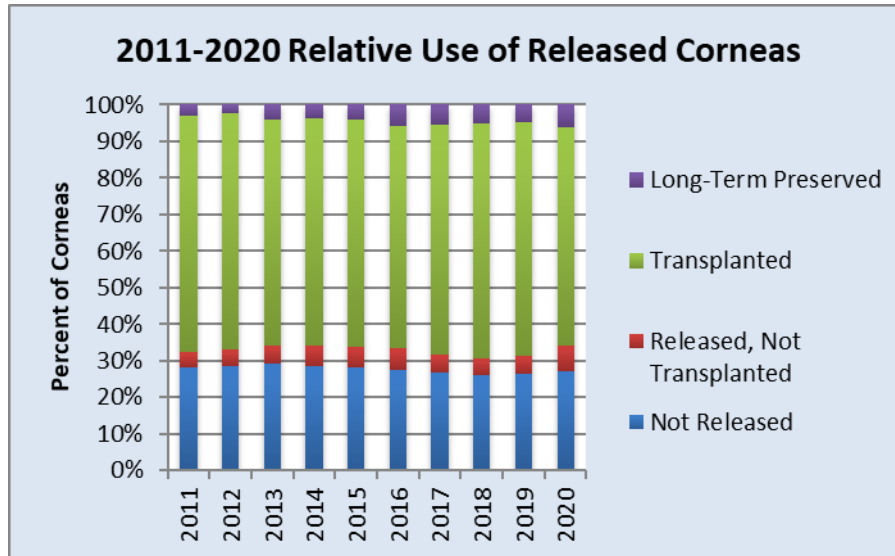
## 2020 Eye Banking Statistics Reported by U.S. Banks: Use of Donated Tissues

Use of Donated Tissue	2016	2017	2018	2019	2020
Corneal Grafts Total	82,994	84,297	85,441	85,601	66,278
Penetrating Keratoplasty	38,413	38,025	36,028	35,919	25,023
Anterior Lamellar Keratoplasty	2,386	2,541	2,355	2,146	1,072
Endothelial Keratoplasty	32,221	33,397	35,071	35,555	29,947
Keratolimbic Allograft	97	104	87	110	119
Keratoprosthesis (K-Pro)	313	344	243	267	174
Glaucoma Shunt Patch or other non-keratoplasty use	917	1,368	1,058	1,018	873
Other keratoplasty (experimental surgery)	65	232	64	44	11
Unknown or Unspecified	1,514	1,568	4,301	4,679	2,777
Sclera	3,380	3,253	2,959	5,999	3,151
Long-Term Preserved Corneas	18,133	12,543	13,521	8,614	9,093
Keratoplasty	1,335	197	298	126	125
Glaucoma Shunt Patching	16,683	12,345	13,066	8,420	7,037
Other Surgical Uses	115	1	157	68	1,931
Research	17,023	13,859	12,495	13,743	11,336
Training	9,916	10,539	10,666	9,487	6,504



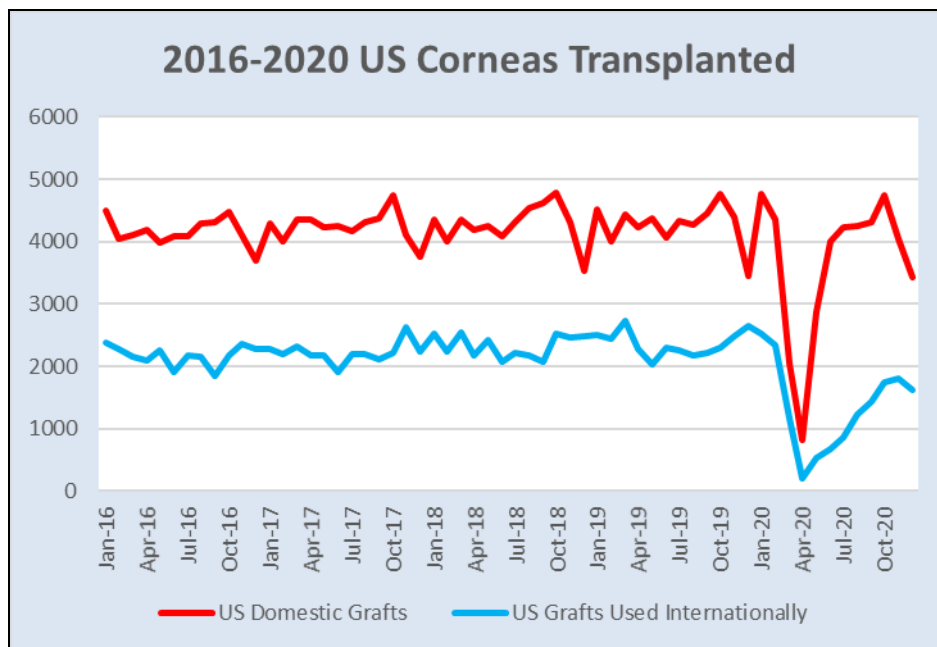
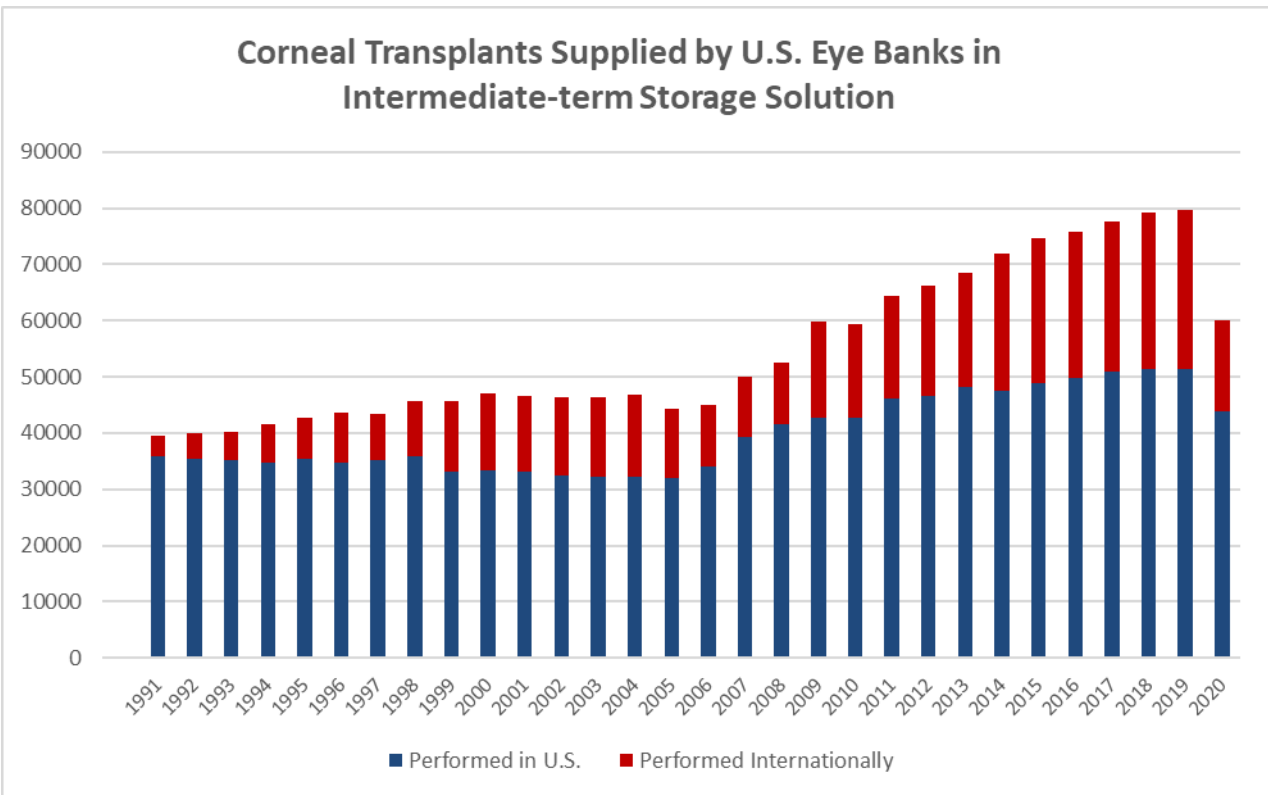


## 2020 Eye Banking Statistics Reported by U.S. Banks: Use of Donated Tissues

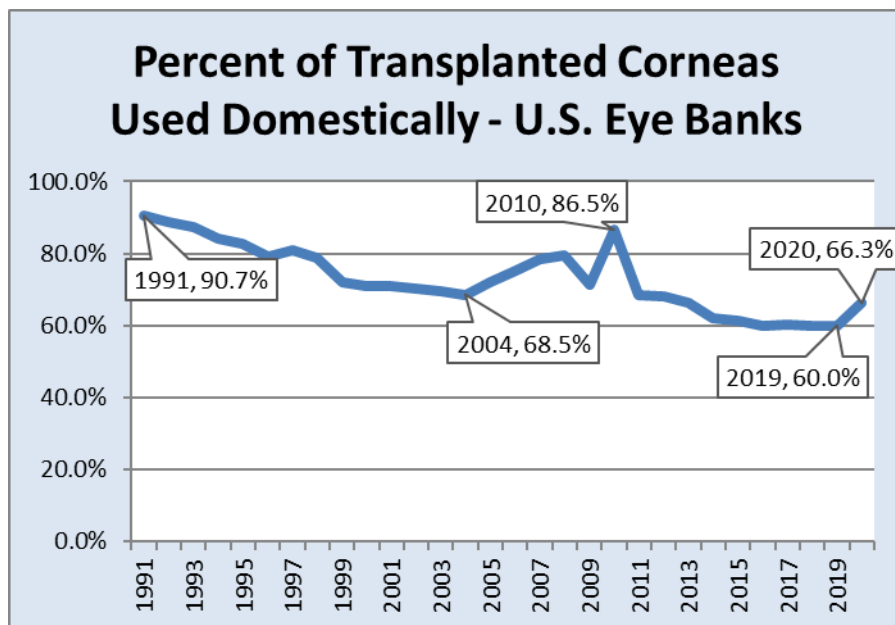
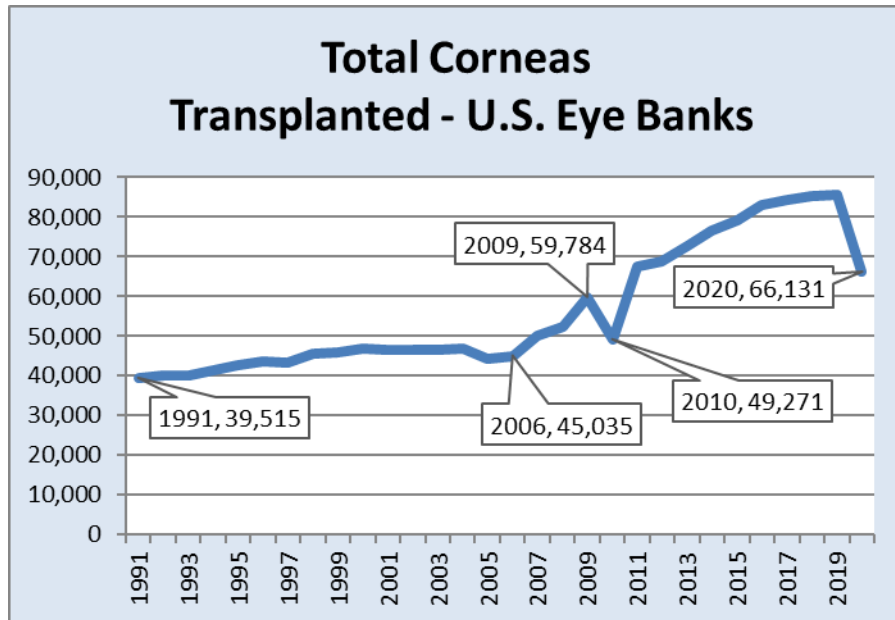


Surgical Outcomes of Corneas Recovered for Transplant Use - U.S. Eye Banks											
Surgery Type	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trend
PK	36,144	36,716	36,998	38,919	39,554	38,413	38,025	36,028	35,919	25,023	
EK	23,287	25,025	27,298	28,961	30,710	32,221	33,397	35,071	35,555	29,947	
ALK	1,778	1,855	2,009	1,953	2,201	2,386	2,541	2,355	2,146	1,072	
KLA	95	97	110	88	107	97	104	87	110	119	
K-Pro	358	263	255	294	364	313	344	243	267	174	
Shunt Patch	604	676	687	755	527	917	1,368	1,058	1,018	873	
Other Keratoplasty	14	44	17	17	19	65	232	64	44	11	
Unknown	2,223	1,554	1,068	1,026	1,142	1,514	1,568	4,301	4,679	2,777	
Long-term Preserved	3,017	2,454	4,294	4,420	4,681	7,068	6,718	6,263	6,067	6,282	

## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Annual Number of Corneal Transplants Supplied by U.S. Banks



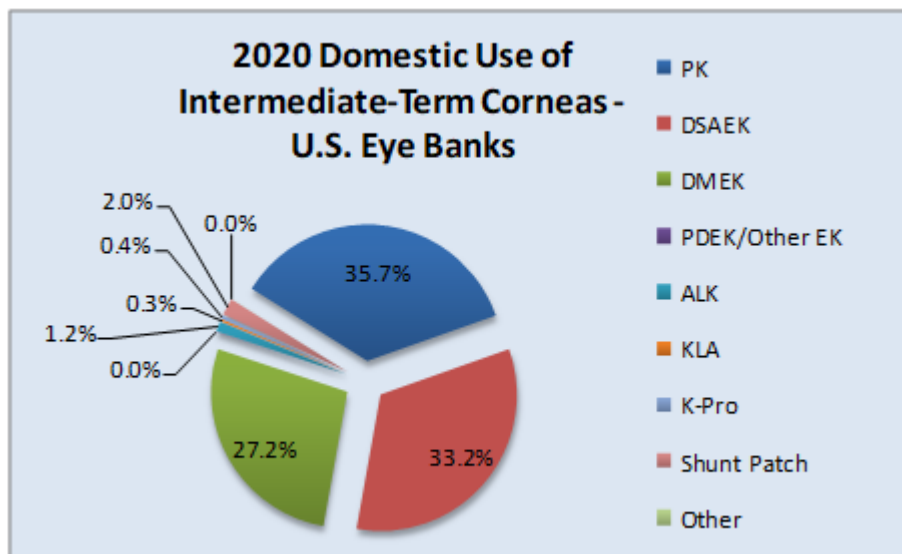
## 2020 Eye Banking Statistics Reported by U.S. Banks: Transplant Activity



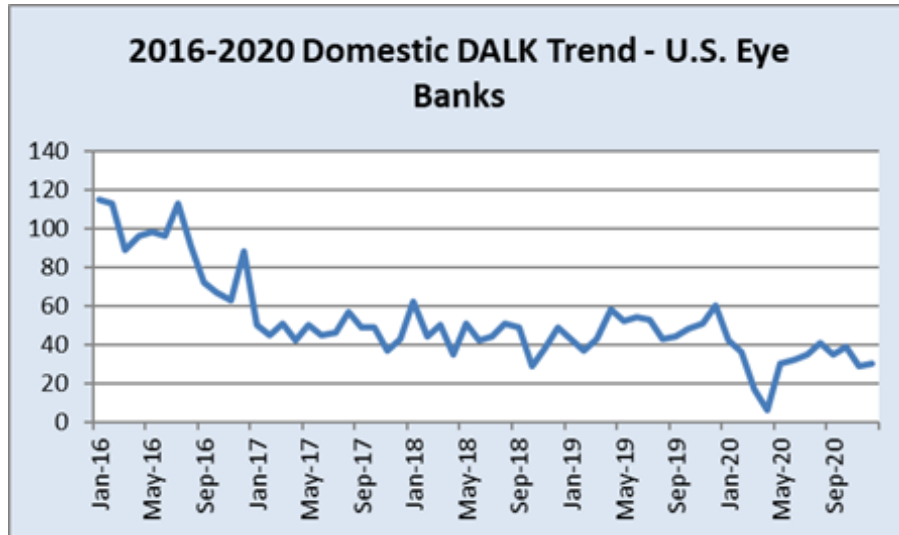
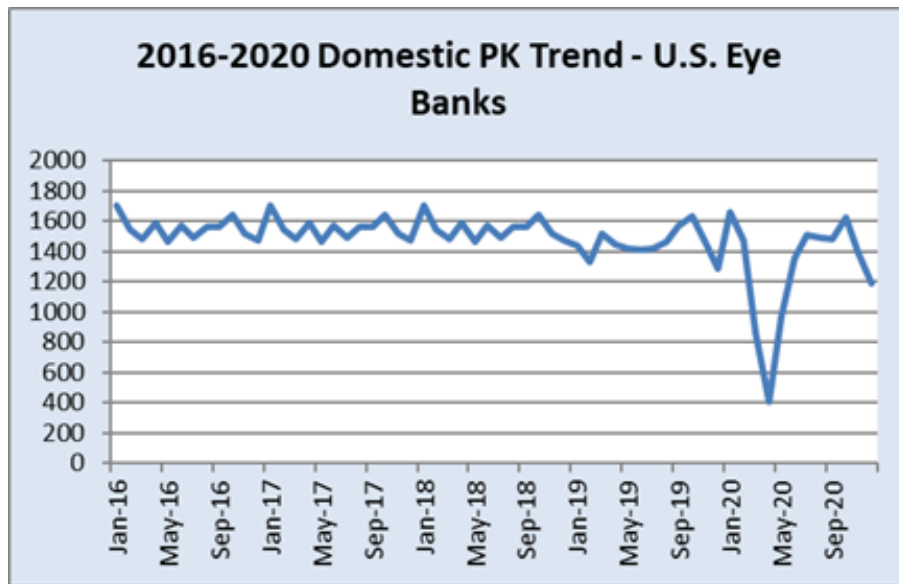
\*In 2010, the first instance of tissue recovered by "recovery-only" entities occurred. The data system at the time did not collect this information. A new data system was introduced in 2011.

## 2020 Eye Banking Statistics Reported by U.S. Banks: Domestic Surgery Use of Intermediate-Term Preserved Tissue

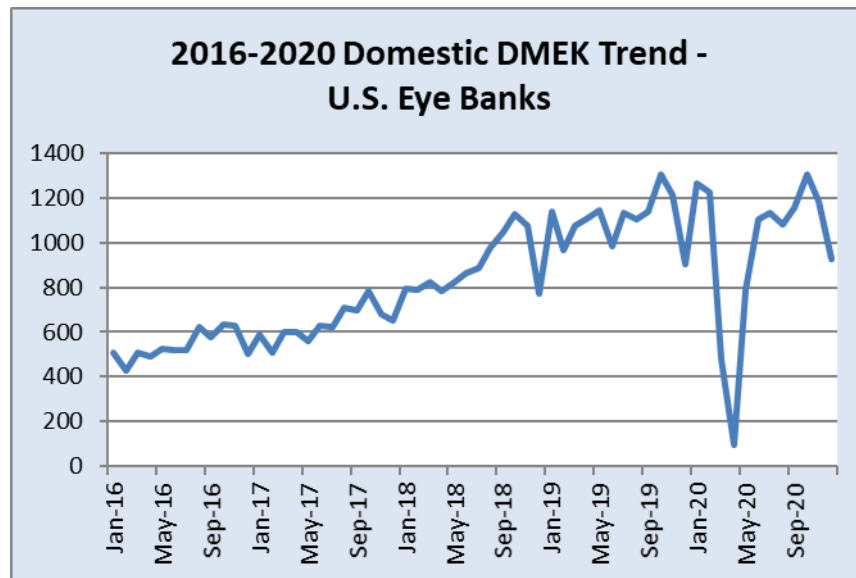
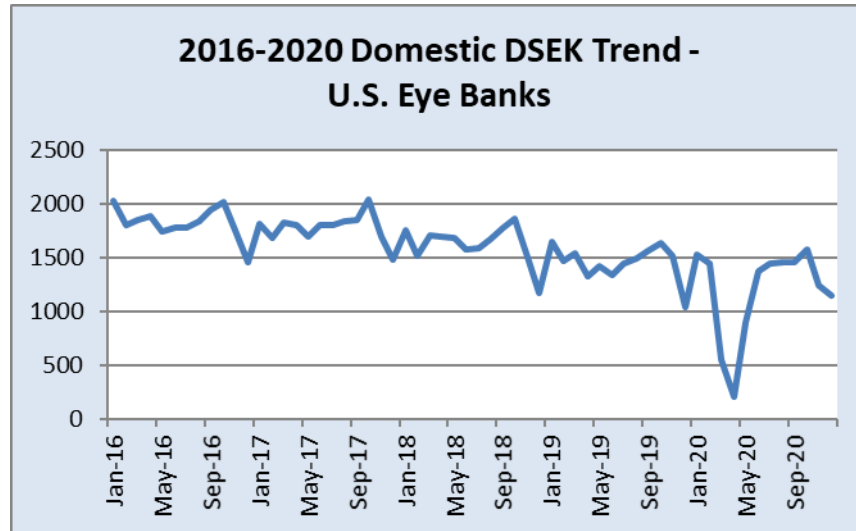
	2019	2020
Intermediate-term preserved corneas processed into corneal segments	269	165
Number of intermediate-term preserved corneas segments produced	473	312
Intermediate-term preserved corneas, corneal segments or whole eyes transplanted in the U.S for:	<b>51,336</b>	<b>43,873</b>
PK	<b>17,409</b>	<b>15,402</b>
EK	<b>30,650</b>	<b>26,095</b>
DSEK, DSAEK, DLEK	17,428	14,331
DMEK or DMAEK	13,215	11,749
PDEK	6	4
Other EK	1	11
ALK	<b>745</b>	<b>505</b>
DALK (Deep Anterior Lamellar Keratoplasty)	586	372
SALK (Superficial Anterior Lamellar Keratoplasty)	10	29
Other ALK (e.g., peripheral, eccentric, etc.)	149	104
KLA	95	109
Keratoprosthesis (K-Pro)	251	161
Glaucoma shunt patch or other non-keratoplasty use	971	854
Other Keratoplasty (e.g., experimental surgery type)	62	7
Unknown or Unspecified	1,393	740



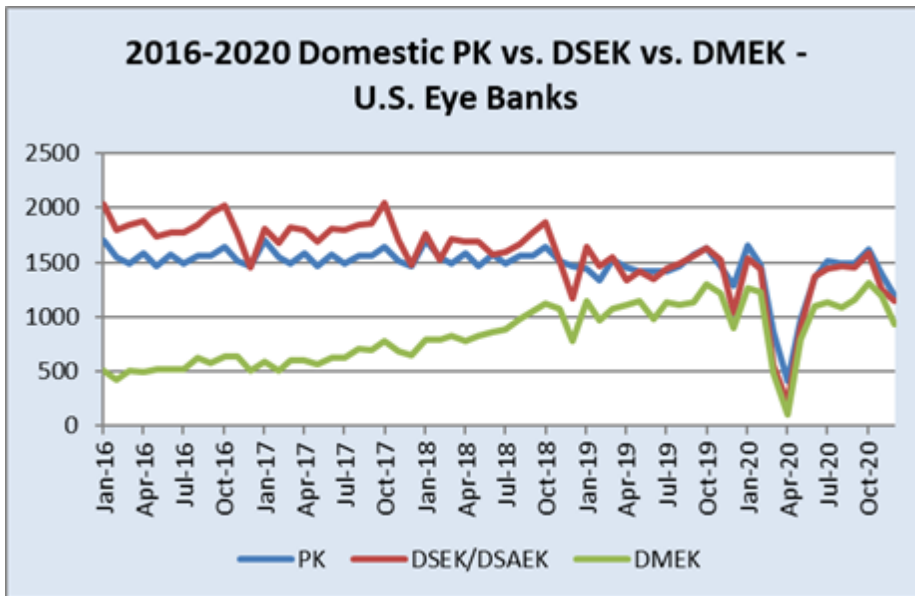
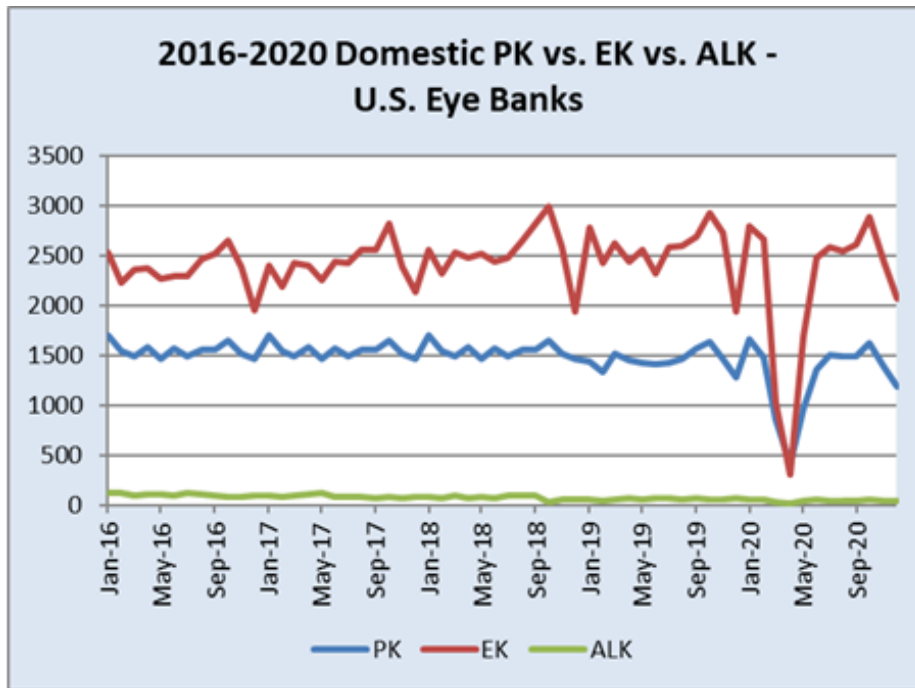
## 2020 Eye Banking Statistics Reported by U.S. Banks: Domestic Surgery Use of Intermediate-Term Preserved Tissue



## 2020 Eye Banking Statistics Reported by U.S. Banks: Domestic Surgery Use of Intermediate-Term Preserved Tissue

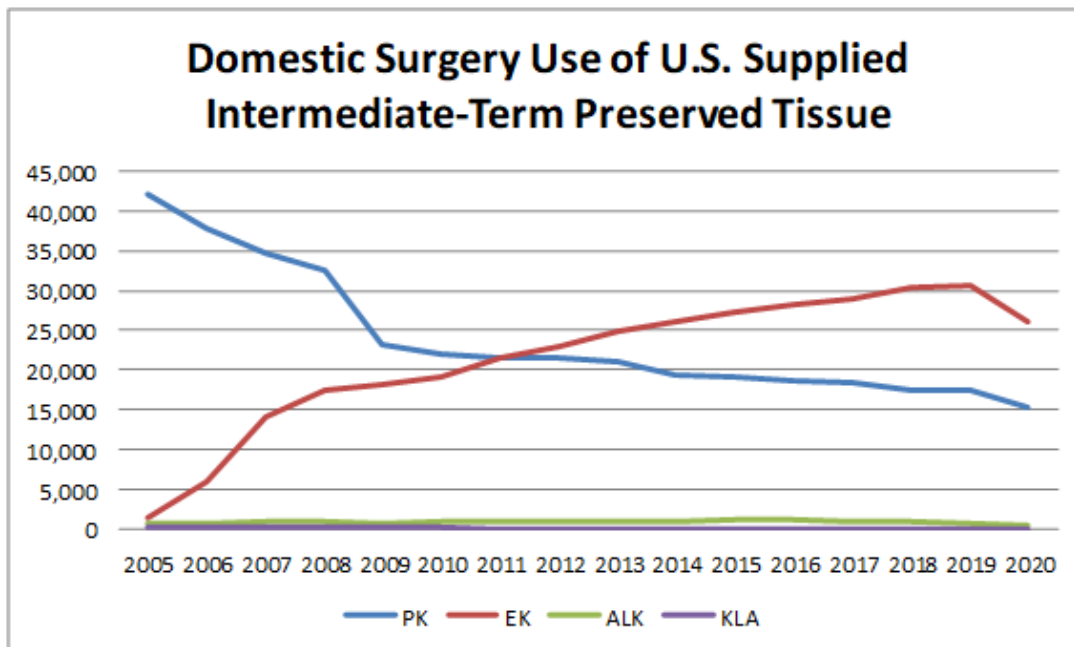


## 2020 Eye Banking Statistics Reported by U.S. Banks: Domestic Surgery Use of Intermediate-Term Preserved Tissue



## Eye Banking Statistics Reported by U.S. Banks: Domestic Use of Intermediate-Term Preserved Tissues Annual Comparison 2012 - 2020

Domestic Surgery Use	2012	2013	2014	2015	2016	2017	2018	2019	2020
Penetrating Keratoplasty	21,422	20,954	19,294	19,160	18,579	18,346	17,347	17,409	15,402
Endothelial Keratoplasty	23,049	24,987	25,965	27,208	28,327	28,993	30,336	30,650	26,095
Anterior Lamellar Keratoplasty	883	951	914	1,115	1,232	1,027	884	745	505
Keratolimbal Allograft	80	91	80	97	82	93	68	95	109
K-Pro	236	223	260	323	279	304	225	251	161





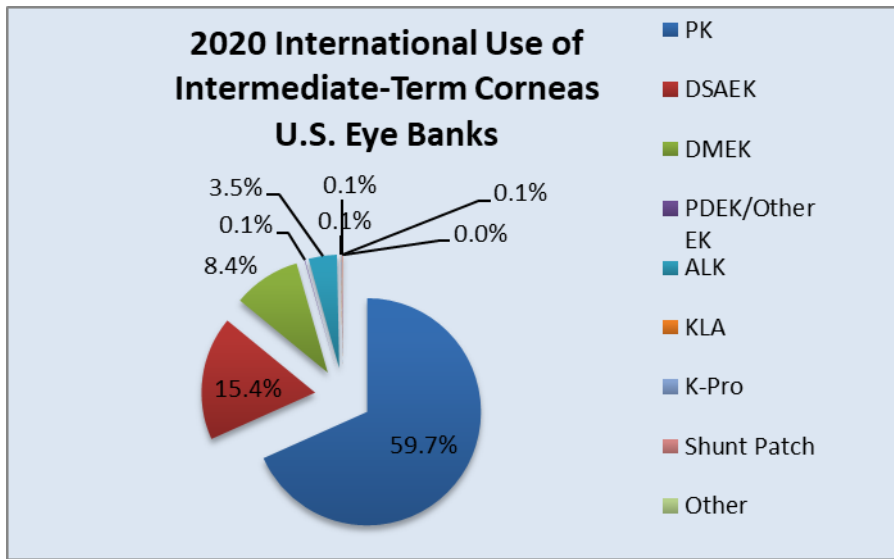
## 2020 Eye Banking Statistics Reported by U.S. Banks: Domestic Surgery Use of Intermediate-Term Preserved Tissue

Surgery Type (Domestically Distributed Corneas) - U.S. Eye Banks												
Month	PK	EK (DSEK)	EK (DMEK)	EK (Other)	ALK (DALK)	ALK (SALK)	ALK (Other)	KLA	K-Pro	Shunt Patch	Other	Unknown
Jan. 2020	34.9%	32.2%	26.6%	0.0%	0.9%	0.1%	0.3%	0.3%	0.4%	2.3%	0.0%	2.2%
Feb. 2020	33.9%	33.1%	28.2%	0.0%	0.8%	0.2%	0.1%	0.0%	0.3%	1.5%	0.0%	1.7%
Mar. 2020	41.9%	27.0%	23.4%	0.0%	0.8%	0.1%	0.3%	0.5%	0.7%	2.3%	0.0%	2.9%
Apr. 2020	49.4%	25.1%	11.8%	0.2%	0.7%	0.1%	0.2%	0.6%	0.6%	9.4%	0.1%	1.7%
May 2020	33.5%	31.3%	27.4%	0.0%	1.0%	0.1%	0.2%	0.4%	0.3%	4.0%	0.0%	1.6%
Jun. 2020	33.7%	34.3%	27.5%	0.0%	0.8%	0.1%	0.3%	0.2%	0.4%	1.4%	0.0%	1.2%
Jul. 2020	35.7%	34.1%	26.8%	0.2%	0.8%	0.0%	0.2%	0.3%	0.2%	0.9%	0.0%	0.8%
Aug. 2020	35.1%	34.4%	25.5%	0.1%	1.0%	0.0%	0.2%	0.4%	0.4%	1.7%	0.0%	1.4%
Sep. 2020	34.5%	33.7%	26.9%	0.0%	0.8%	0.0%	0.3%	0.0%	0.3%	1.4%	0.0%	2.0%
Oct. 2020	34.1%	33.2%	27.5%	0.0%	0.8%	0.0%	0.3%	0.2%	0.4%	1.8%	0.0%	1.7%
Nov. 2020	34.4%	30.8%	29.4%	0.0%	0.7%	0.0%	0.1%	0.4%	0.4%	1.5%	0.0%	2.2%
Dec. 2020	34.6%	33.3%	27.0%	0.0%	0.9%	0.0%	0.3%	0.3%	0.3%	1.9%	0.0%	1.3%
<b>2016 Avg.</b>	37.3%	43.9%	13.0%	N/A	2.2%	0.0%	0.2%	0.2%	0.6%	1.6%	0.1%	1.0%
<b>2017 Avg.</b>	36.5%	41.9%	15.0%	0.1%	1.1%	0.1%	0.8%	0.2%	0.6%	2.6%	0.4%	1.2%
<b>2018 Avg.</b>	36.2%	38.1%	21.0%	0.1%	1.1%	0.0%	0.6%	0.1%	0.4%	1.9%	0.1%	2.7%
<b>2019 Avg.</b>	36.2%	33.9%	25.7%	0.0%	1.1%	0.0%	0.3%	0.2%	0.5%	1.9%	0.1%	2.3%
<b>2020 Avg.</b>	35.1%	32.7%	26.8%	0.0%	0.8%	0.1%	0.2%	0.2%	0.4%	1.9%	0.0%	1.7%
<b>Std. Dev.</b>	4.7%	3.0%	4.6%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	2.3%	0.0%	0.6%

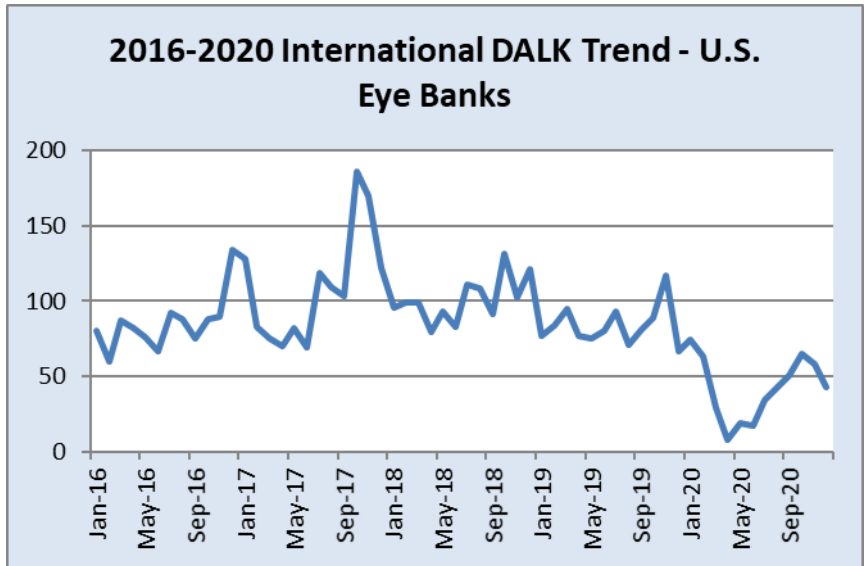
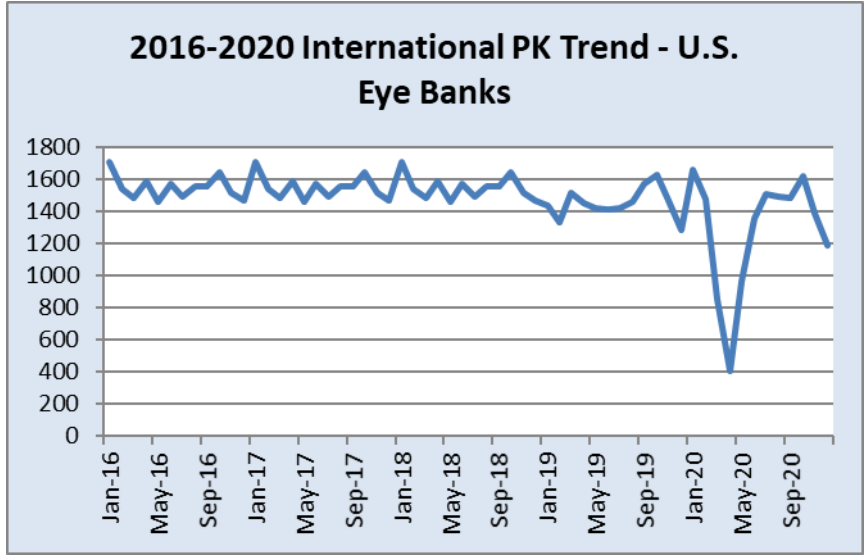
\*Percentages read from this table should be read as "of the tissue distributed for transplant use domestically"

## 2020 Eye Banking Statistics Reported by U.S. Banks: International Surgery Use of Intermediate-Term Preserved Tissue

International Use of Intermediate-Term Corneas – U.S. Eye Banks		
	2019	2020
Intermediate-term preserved corneas, corneal segments or whole eyes transplanted internationally for:	<b>28,402</b>	<b>16,123</b>
PK	<b>18,510</b>	<b>9,621</b>
EK	<b>4,905</b>	<b>3,852</b>
DSEK, DSAEK, DLEK	3,017	2,485
DMEK or DMAEK	1,884	1,355
PDEK	0	0
Other EK	4	12
ALK	<b>1,401</b>	<b>567</b>
DALK (Deep Anterior Lamellar Keratoplasty)	1,006	503
SALK (Superficial Anterior Lamellar Keratoplasty)	53	25
Other ALK (e.g. peripheral, eccentric, etc.)	342	39
KLA	15	10
Keratoprosthesis (K-Pro)	16	13
Glaucoma shunt patch or other non-keratoplasty use	47	19
Other Keratoplasty (e.g. experimental surgery type)	4	4
Unknown or Unspecified	3,504	2,037
<b>Total intermediate-term preserved corneas, corneal segments, and whole eyes used for KERATOPLASY</b>	<b>78,720</b>	<b>59,123</b>
<b>Total intermediate-term preserved corneas, corneal segments, and whole eyes used for TRANSPLANT</b>	<b>79,534</b>	<b>59,849</b>



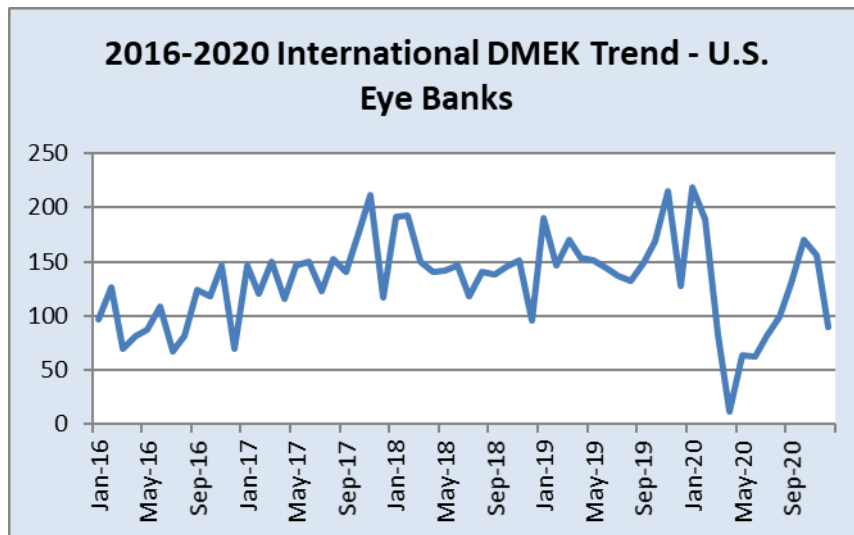
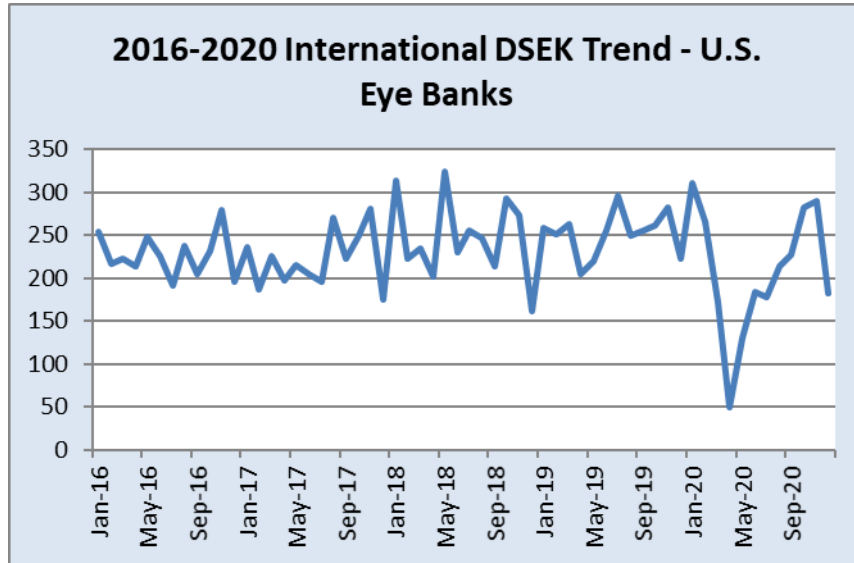
**2020 Eye Banking Statistics Reported by U.S. Banks:  
International Surgery Use of Intermediate-Term Preserved Tissue**



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## 2020 Eye Banking Statistics Reported by U.S. Banks: International Surgery Use of Intermediate-Term Preserved Tissue

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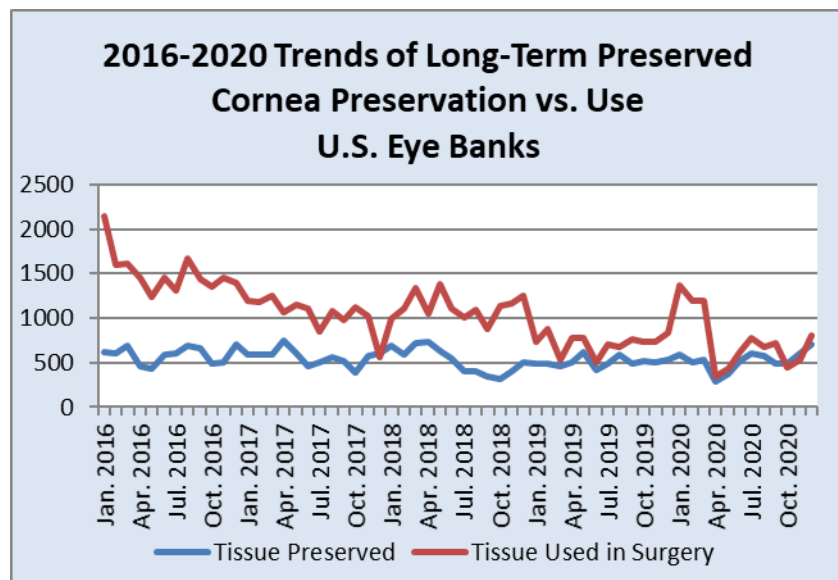
## 2020 Eye Banking Statistics Reported by U.S. Banks: International Surgery Use of Intermediate-Term Preserved Tissue

Surgery Type (Internationally Distributed Corneas) - U.S. Eye Banks												
Month	PK	EK (DSEK)	EK (DMEK)	EK (Other)	ALK (DALK)	ALK (SALK)	ALK (Other)	KLA	K-Pro	Shunt Patch	Other	Unknown
<b>Jan. 2020</b>	60.9%	12.3%	8.6%	0.2%	2.9%	0.3%	0.6%	0.1%	0.2%	0.2%	0.0%	13.8%
<b>Feb. 2020</b>	64.3%	11.4%	8.1%	0.2%	2.7%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	13.2%
<b>Mar. 2020</b>	64.6%	14.7%	7.1%	0.0%	2.5%	0.0%	0.0%	0.2%	0.0%	0.3%	0.0%	10.7%
<b>Apr. 2020</b>	59.1%	24.0%	5.8%	0.5%	3.8%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	6.3%
<b>May 2020</b>	50.5%	24.2%	11.9%	0.0%	3.5%	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	9.7%
<b>Jun. 2020</b>	52.4%	27.5%	9.3%	0.0%	2.5%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	8.1%
<b>Jul. 2020</b>	56.5%	20.9%	9.5%	0.0%	4.0%	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	8.7%
<b>Aug. 2020</b>	59.9%	17.3%	8.0%	0.0%	3.5%	0.0%	0.0%	0.1%	0.2%	0.3%	0.0%	10.6%
<b>Sep. 2020</b>	56.9%	15.8%	9.0%	0.1%	3.5%	0.0%	0.1%	0.0%	0.0%	0.0%	0.2%	14.3%
<b>Oct. 2020</b>	56.4%	16.2%	9.8%	0.1%	3.7%	0.3%	0.3%	0.0%	0.0%	0.2%	0.1%	13.0%
<b>Nov. 2020</b>	59.7%	16.1%	8.7%	0.0%	3.2%	0.2%	0.7%	0.0%	0.2%	0.0%	0.0%	11.3%
<b>Dec. 2020</b>	61.2%	11.3%	5.6%	0.0%	2.7%	0.4%	0.3%	0.1%	0.0%	0.1%	0.0%	18.4%
<b>2016 Avg.</b>	76.1%	10.4%	4.5%	N/A	3.9%	0.1%	0.5%	0.1%	0.1%	0.4%	0.0%	3.9%
<b>2017 Avg.</b>	74.4%	10.0%	6.6%	0.0%	4.9%	0.1%	0.7%	0.0%	0.2%	0.2%	0.0%	3.5%
<b>2018 Avg.</b>	71.1%	10.6%	6.3%	0.0%	4.3%	0.1%	0.8%	0.1%	0.1%	0.3%	0.0%	10.4%
<b>2019 Avg.</b>	65.2%	10.6%	6.6%	0.0%	3.5%	0.2%	1.2%	0.1%	0.1%	0.2%	0.0%	12.3%
<b>2020 Avg.</b>	59.7%	15.4%	8.4%	0.1%	3.1%	0.2%	0.2%	0.1%	0.1%	0.1%	0.0%	12.6%
<b>Std. Dev.</b>	4.3%	5.4%	1.7%	0.1%	0.5%	0.2%	0.2%	0.1%	0.1%	0.2%	0.1%	3.3%

\*Percentages read from this table should be read as "of the tissue distributed for transplant use internationally"

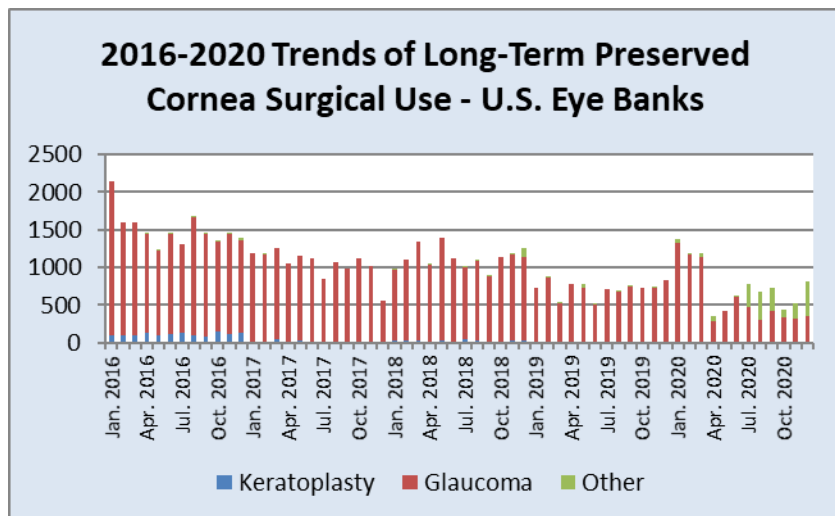
## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Long-Term Preserved Tissue Distribution

Long-Term Preserved Tissue Preservation and Distribution		
	2019	2020
Long-term preserved corneas or whole globes PRESERVED for transplant	6,067	6,282
Long-term preserved corneas, corneal segments, or whole globes DISTRIBUTED for:	8,614	9,093
Keratoplasty	126	125
Glaucoma Shunt patching	8,420	7,037
Other Surgical Uses	68	1,931
Long-term preserved corneas, corneal segments, or whole globes FORWARDED to another entity for final distribution	577	762
Sclera or sclera segments PRESERVED for transplantation	3,148	4,183
Sclera or sclera segments DISTRIBUTED for:	5,999	3,151
Prosthesis following enucleation	495	444
Glaucoma shunt patching	1,989	1,804
Other surgical uses	3,515	903
Sclera or sclera segments FORWARDED to another entity for final distribution	268	308

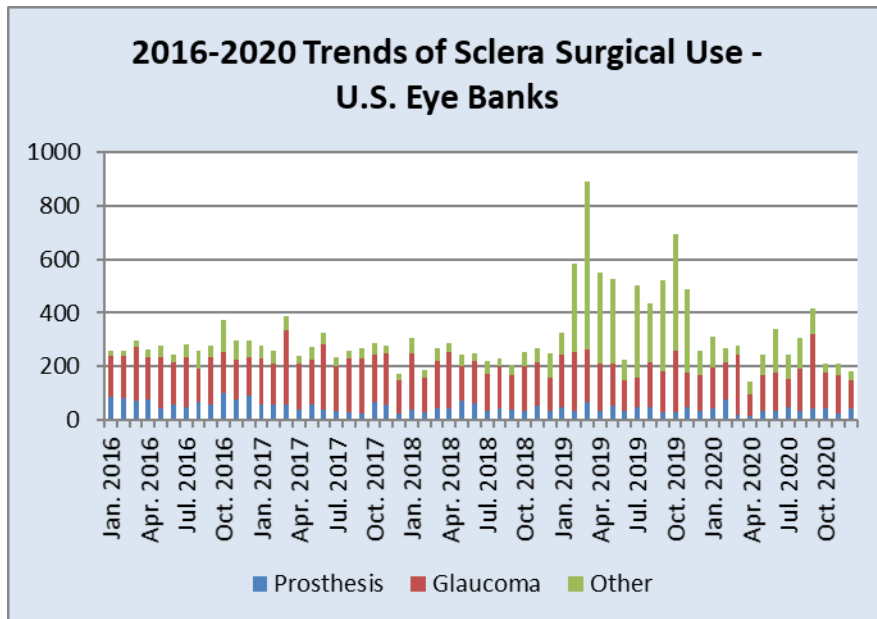
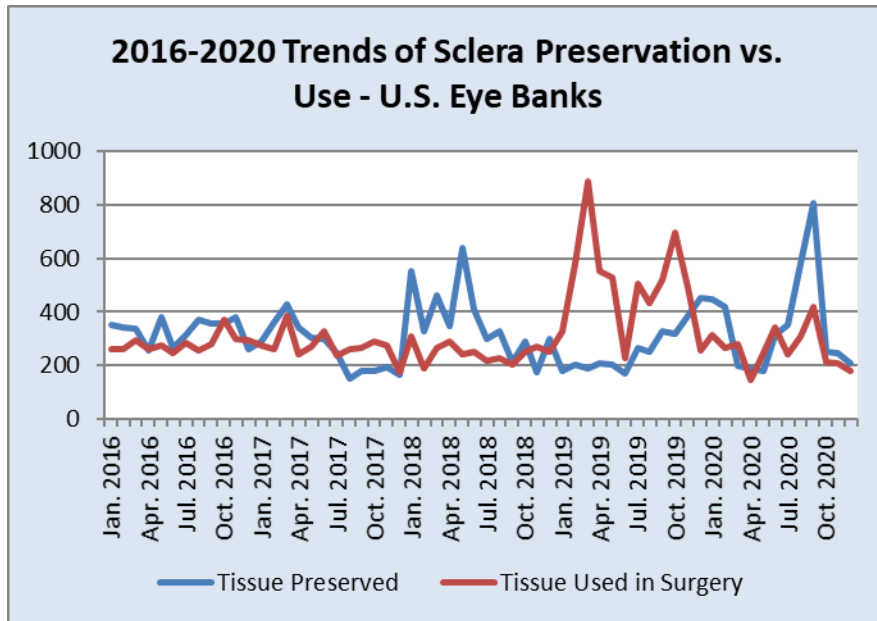


## 2020 Eye Banking Statistics Reported by U.S. Banks: Long-Term Preserved Tissue Distribution

Long-Term Tissue Trends - U.S. Eye Banks								
Month	Long-Term Preserved Corneas	Long-Term Cornea Use - Keratoplasty	Long-Term Cornea Use - Glaucoma	Long-Term Cornea Use - Other	Scleral Segments Preserved	Sclera Use - Prosthesis	Sclera Use - Glaucoma	Sclera Use - Other
Jan. 2020	588	7	1,323	38	446	43	153	115
Feb. 2020	506	17	1,153	27	417	75	141	50
Mar. 2020	534	9	1,136	50	199	18	226	35
Apr. 2020	291	15	270	66	187	12	82	51
May 2020	376	9	416	0	178	34	134	76
Jun. 2020	520	17	588	8	311	34	143	163
Jul. 2020	605	3	473	298	352	48	103	91
Aug. 2020	571	8	297	375	579	35	155	116
Sep. 2020	489	4	410	306	807	42	276	100
Oct. 2020	485	16	328	95	251	41	134	35
Nov. 2020	607	15	302	207	248	21	148	40
Dec. 2020	710	5	341	461	208	41	109	31
<b>2016 Total</b>	7,068	1,335	16,683	115	3,990	852	1,944	584
<b>2017 Total</b>	6,718	197	12,345	1	3,139	523	2,266	464
<b>2018 Total</b>	6,263	298	13,066	157	4,332	515	1,900	544
<b>2019 Total</b>	6,067	126	8,420	68	3,148	495	1,989	3,515
<b>2020 Total</b>	6,282	125	7,037	1,931	4,183	444	1,804	903
<b>2020 Avg.</b>	524	10	586	161	349	37	150	75
<b>Std. Dev.</b>	110	5	385	161	190	16	53	42



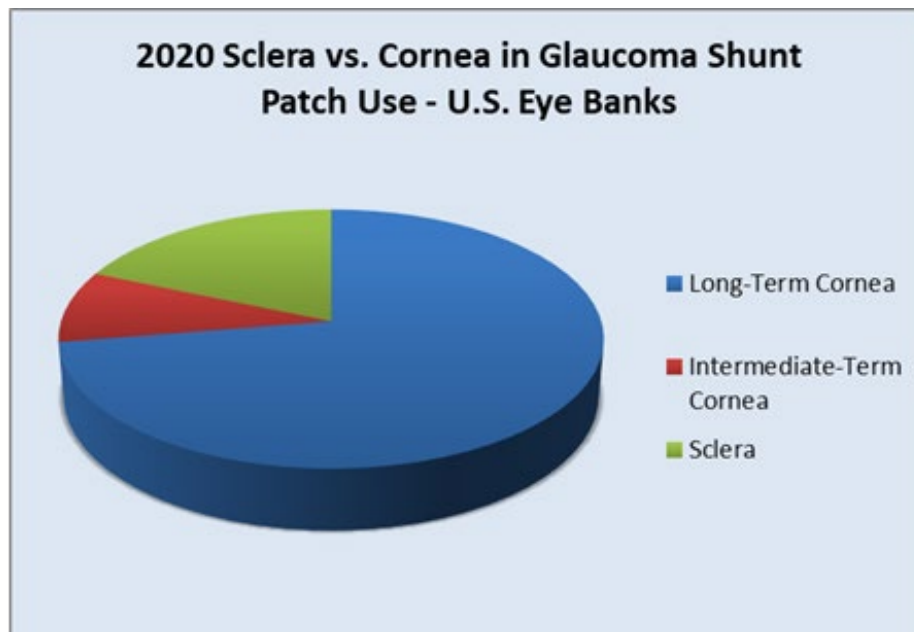
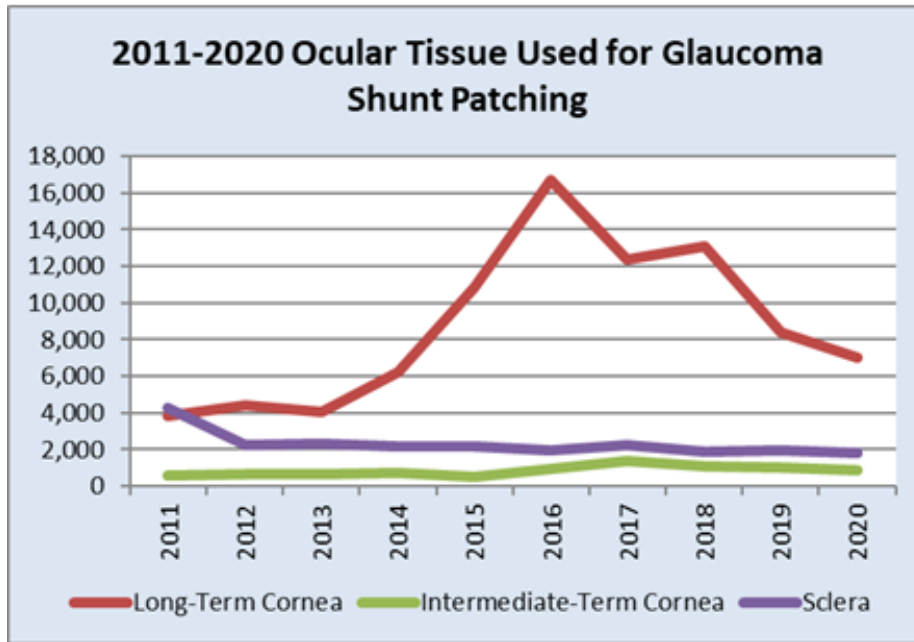
## 2020 Eye Banking Statistics Reported by U.S. Banks: Long-Term Preserved Tissue Distribution





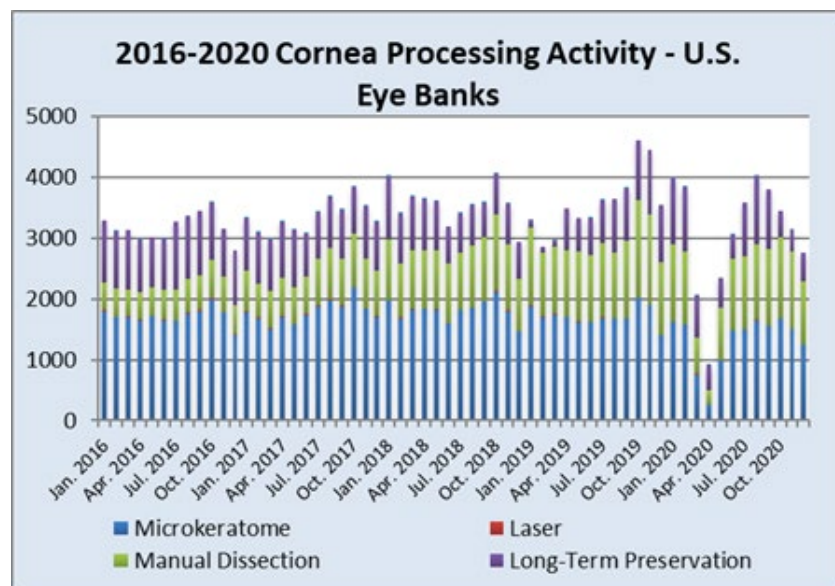
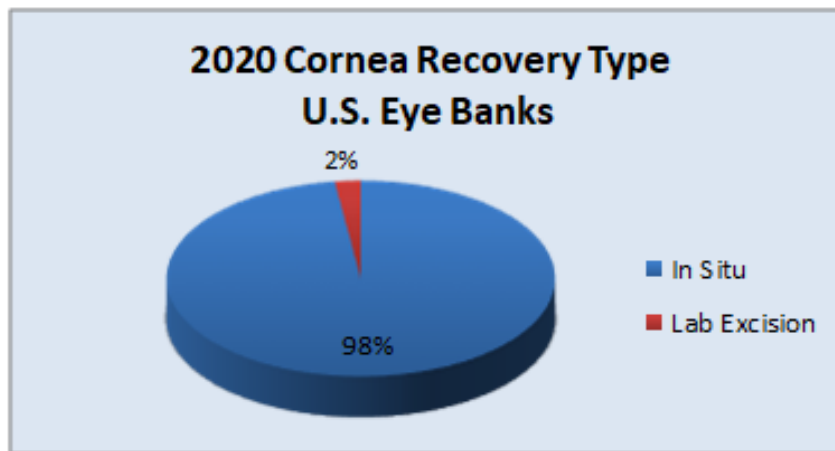
## 2020 Eye Banking Statistics Reported by U.S. Banks: Long-Term Preserved Tissue Distribution

Ocular Tissue Used for Glaucoma Shunt Patching - U.S. Eye Banks											
Ocular Tissue Used for Glaucoma Shunt Patching	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Long-Term Cornea	3,802	4,435	4,040	6,212	10,843	16,683	12,345	13,066	8,420	0	
Intermediate-Term Cornea	604	676	687	755	527	917	1,368	1,058	1,018	873	
Sclera	4,285	2,260	2,293	2,199	2,175	1,944	2,266	1,900	1,989	0	



## 2020 Eye Banking Statistics Reported by U.S. Banks: Tissue Processing for Transplant

Tissue Processing for Transplant		
	2019	2020
Eye Processing (does not include in situ excision)	<b>2,842</b>	<b>2,164</b>
Processed for corneal preservation only	1,115	170
Processed for sclera preservation	1,697	1,955
Processed for other ocular materials	30	39
Cornea Processing	<b>42,968</b>	<b>36,962</b>
Processed by microkeratome	20,594	15,797
Processed by laser	79	61
Processed by hand dissection	14,635	12,670
Processed by transfer into long-term preservation	7,634	8,393
Processed by other methods	26	41



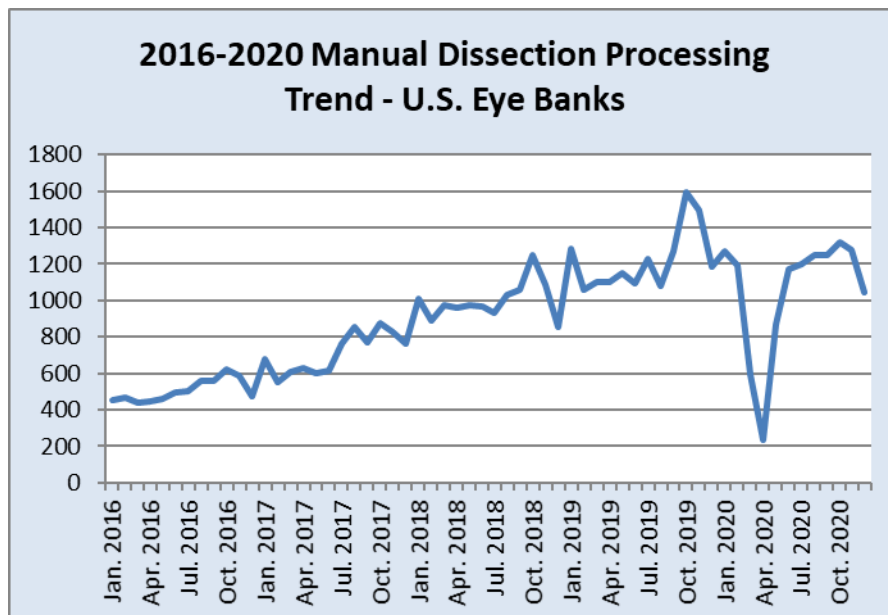
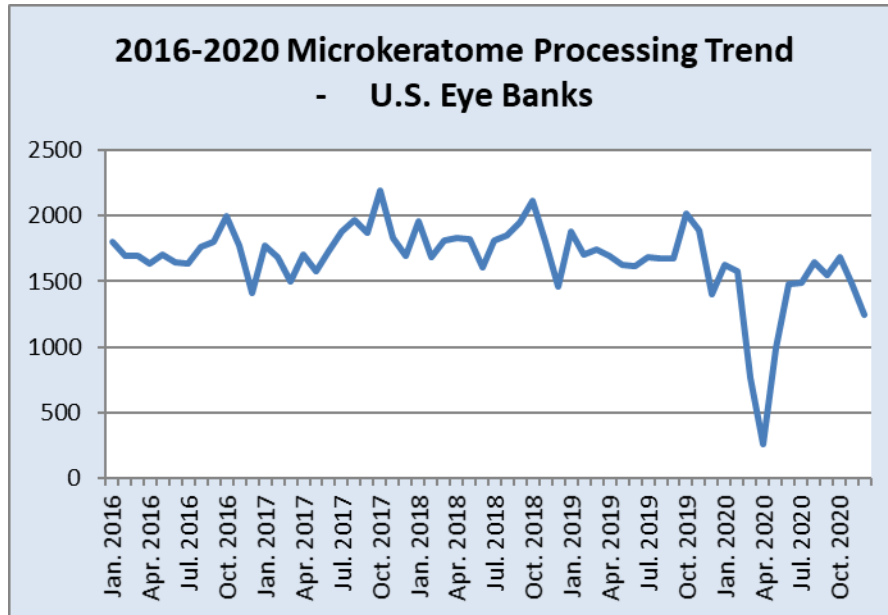
## 2020 Eye Banking Statistics Reported by U.S. Banks: Tissue Processing for Transplant

Cornea Processing - U.S. Eye Banks					
Month	Processing - Microkeratome	Processing - Laser	Processing - Manual	Processing - Long-Term Preservation	Processing - Other
Jan. 2020	1,624	3	1,268	1,075	7
Feb. 2020	1,577	3	1,195	1,070	13
Mar. 2020	763	3	597	689	16
Apr. 2020	260	5	233	416	1
May 2020	987	2	865	498	0
Jun. 2020	1,476	11	1,172	391	2
Jul. 2020	1,494	11	1,201	884	0
Aug. 2020	1,642	7	1,247	1,125	1
Sep. 2020	1,550	10	1,251	980	0
Oct. 2020	1,686	1	1,318	440	0
Nov. 2020	1,492	3	1,279	351	1
Dec. 2020	1,246	2	1,044	474	0
<b>2016 Total</b>	<b>20,604</b>	<b>154</b>	<b>6,071</b>	<b>11,346</b>	<b>5</b>
<b>2017 Total</b>	<b>21,409</b>	<b>151</b>	<b>8,528</b>	<b>10,019</b>	<b>60</b>
<b>2018 Total</b>	<b>21,683</b>	<b>124</b>	<b>11,994</b>	<b>8,803</b>	<b>46</b>
<b>2019 Total</b>	<b>20,594</b>	<b>79</b>	<b>14,635</b>	<b>7,634</b>	<b>26</b>
<b>2020 Total</b>	<b>15,797</b>	<b>61</b>	<b>12,670</b>	<b>8,393</b>	<b>41</b>
<b>2019 Avg.</b>	<b>1,316</b>	<b>5</b>	<b>1,056</b>	<b>699</b>	<b>3</b>
<b>Std. Dev.</b>	<b>435</b>	<b>4</b>	<b>333</b>	<b>306</b>	<b>6</b>

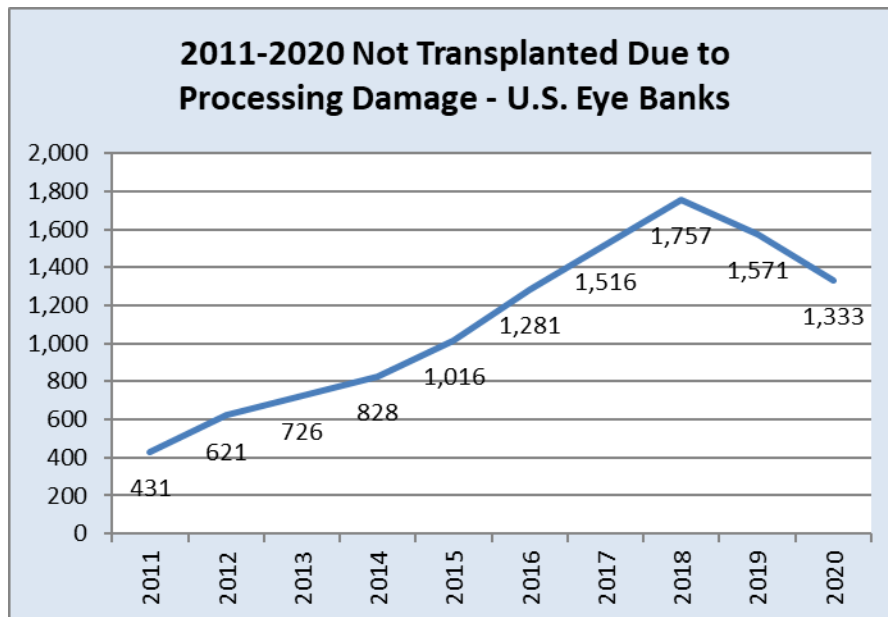
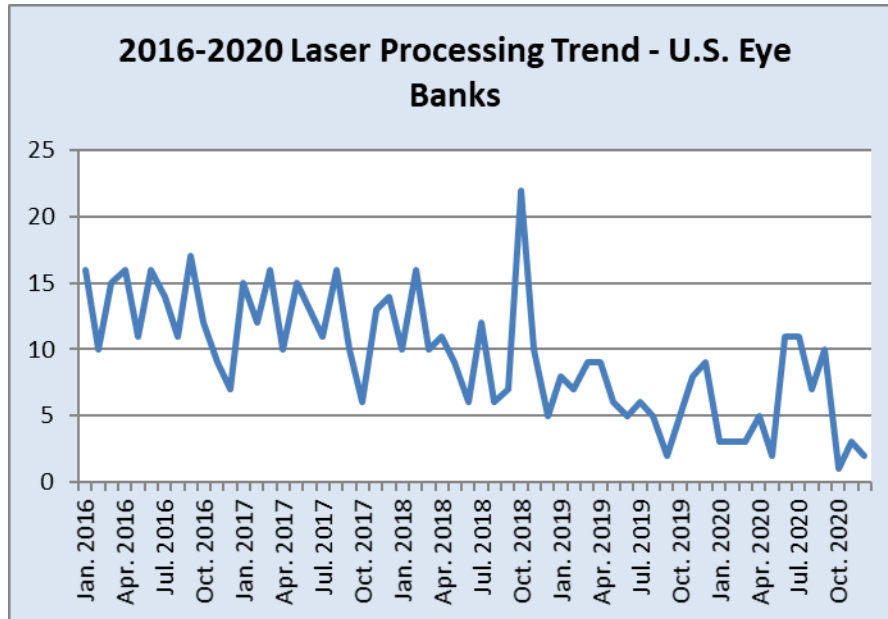
Cornea Processing Success Rates - U.S. Eye Banks											
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Processing Events	18,455	22,599	24,168	24,347	28,660	38,180	40,167	42,650	42,968	36,962	
Failed Processing	431	621	726	828	1,016	1,281	1,516	1,757	1,571	1,333	
Success Rate	97.7%	97.3%	97.0%	96.6%	96.5%	96.6%	96.2%	95.9%	96.3%	96.4%	

Cornea Recovery Methods - U.S. Eye Banks											
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
In Situ	96,847	98,512	106,710	113,163	117,250	121,971	120,861	121,001	122,001	98,568	
Lab Excision	4,686	5,262	3,655	2,908	2,437	2,678	2,855	2,221	2,842	2,164	

## 2020 Eye Banking Statistics Reported by U.S. Banks: Tissue Processing for Transplant



## 2020 Eye Banking Statistics Reported by U.S. Banks: Tissue Processing for Transplant



## 2020 Eye Banking Statistics Reported by EBAA Members: Countries of Destination

<b>NORTH AMERICA</b>				
<b>Country</b>	<b>US Member Eye Banks - Transplanted Corneas</b>	<b>Non-US Member Eye Banks - Transplanted Corneas</b>	<b>All EBAA Member Eye Banks - Transplanted Corneas</b>	<b>Change (2020 – 2019)</b>
Antigua and Barbuda	4	0	4	0
Barbados	11	0	11	(16)
Canada	403	2,570	2,973	(441)
Cayman Islands	1	0	1	1
Costa Rica	34	7	41	(42)
Dominican Republic	221	0	221	(228)
El Salvador	41	0	41	(31)
Guadeloupe	1	0	1	1
Guatemala	30	0	30	(64)
Haiti	6	0	6	(10)
Honduras	69	0	69	(106)
Jamaica	3	0	3	(36)
Mexico	490	0	490	(374)
Nicaragua	5	0	5	(3)
Saint Vincent	2	0	2	(4)
Trinidad and Tobago	24	0	24	(17)
United States	<b>43,873</b>	0	43,873	(7,464)
<b>TOTAL</b>	<b>45,218</b>	<b>2,577</b>	<b>47,795</b>	<b>(8,838) -15.4%</b>

<b>AUSTRALIA and OCEANIA</b>				
<b>Country</b>	<b>US Member Eye Banks - Transplanted Corneas</b>	<b>Non-US Member Eye Banks - Transplanted Corneas</b>	<b>All EBAA Member Eye Banks - Transplanted Corneas</b>	<b>Change (2020 – 2019)</b>
Cook Islands	1	0	1	1
New Zealand	19	0	19	(5)
<b>TOTAL</b>	<b>20</b>	<b>0</b>	<b>20</b>	<b>(4) -20.8%</b>

<b>SOUTH AMERICA</b>				
<b>Country</b>	<b>US Member Eye Banks - Transplanted Corneas</b>	<b>Non-US Member Eye Banks - Transplanted Corneas</b>	<b>All EBAA Member Eye Banks - Transplanted Corneas</b>	<b>Change (2020 – 2019)</b>
Argentina	133	0	133	(244)
Bolivia	24	0	24	(57)
Brazil	77	0	77	(133)
Chile	256	0	256	19
Colombia	3	0	3	1
Ecuador	56	0	56	(128)
Peru	73	0	73	(110)
Suriname	5	0	5	(23)
Uruguay	6	0	6	(18)
Venezuela	47	0	47	(98)
<b>TOTAL</b>	<b>680</b>	<b>0</b>	<b>680</b>	<b>(819)</b> <b>-54.6%</b>

<b>EUROPE</b>				
<b>Country</b>	<b>US Member Eye Banks - Transplanted Corneas</b>	<b>Non-US Member Eye Banks - Transplanted Corneas</b>	<b>All EBAA Member Eye Banks - Transplanted Corneas</b>	<b>Change (2020 – 2019)</b>
Albania	9	0	9	(5)
Austria	0	1	1	1
Bulgaria	4	0	4	1
Cyprus	2	0	2	(16)
Finland	4	0	4	4
Germany	942	34	976	(350)
Greece	166	0	166	(86)
Iceland	1	0	1	0
Italy	5	0	5	0
Latvia	14	0	14	5
Macedonia	18	0	18	(28)
Monaco	1	0	1	0
Netherlands	2	0	2	(11)
Norway	43	0	43	(2)
Serbia	18	0	18	(25)
Switzerland	37	0	37	(10)
United Kingdom	25	0	25	(32)
<b>TOTAL</b>	<b>1,291</b>	<b>36</b>	<b>1326</b>	<b>(599)</b> <b>-30.2%</b>

<b>AFRICA</b>				
<b>Country</b>	<b>US Member Eye Banks - Transplanted Corneas</b>	<b>Non-US Member Eye Banks- Transplanted Corneas</b>	<b>All EBAA Member Eye Banks - Transplanted Corneas</b>	<b>Change (2020 – 2019)</b>
Algeria	5	0	5	(508)
Cameroon	10	0	10	10
Cote d'Ivoire	2	0	2	(8)
Djibouti	870	0	870	(539)
Egypt	2980	0	2980	(2,955)
Ethiopia	2	0	2	2
Ghana	56	0	56	(3)
Kenya	157	0	157	(108)
Malawi	2	0	2	2
Mali	3	0	3	2
Morocco	213	0	213	(203)
Namibia	9	0	9	(4)
Nigeria	37	0	37	(105)
Rwanda	32	0	32	(53)
Senegal	3	0	3	2
South Africa	612	0	612	(239)
Sudan	21	0	21	(21)
Swaziland	11	0	11	(5)
Tanzania	7	0	7	(42)
Tunisia	257	0	257	(463)
Uganda	2	0	2	(38)
Zambia	8	0	8	(28)
Zimbabwe	1	0	1	(9)
<b>TOTAL</b>	<b>5,300</b>	<b>0</b>	<b>5,300</b>	<b>(5,421) -50.6%</b>

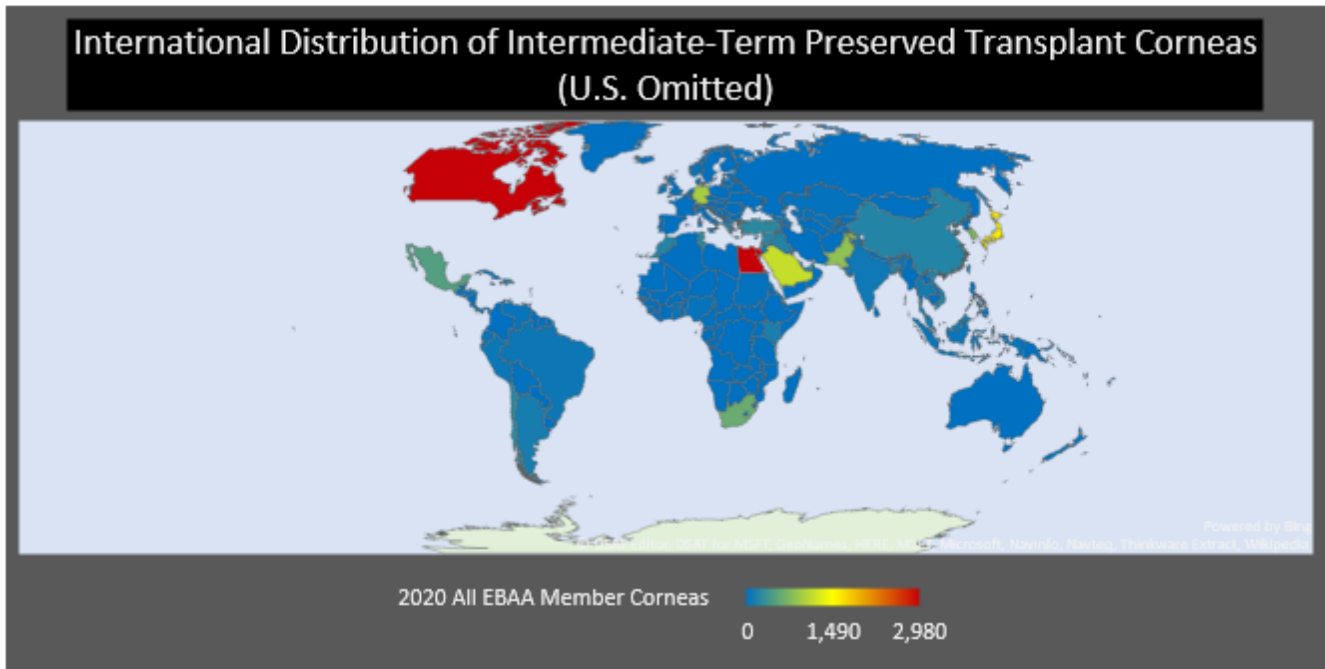


<b>ASIA</b>				
<b>Country</b>	<b>US Member Eye Banks - Transplanted Corneas</b>	<b>Non-US Member Eye Banks- Transplanted Corneas</b>	<b>All EBAA Member Eye Banks - Transplanted Corneas</b>	<b>Change (2020 – 2019)</b>
Afghanistan	8	0	8	(2)
Armenia	23	0	23	(89)
Azerbaijan	45	0	45	(25)
Bahrain	24	0	24	(32)
Bangladesh	229	0	229	(177)
Cambodia	1	0	1	0
China	211	0	211	(1115)
Georgia	49	0	49	8
Hong Kong	48	183	231	(93)
India	88	0	88	(205)
Indonesia	57	0	57	6
Iraq	200	0	200	(73)
Israel	306	24	330	(87)
Japan	1564	39	1603	(456)
Jordan	121	0	121	(119)
Kazakhstan	22	0	22	(11)
Korea, Republic of	767	0	767	56
Kuwait	18	0	18	(105)
Lebanon	141	0	141	(178)
Malaysia	125	0	125	(225)
Oman	16	0	16	(21)
Pakistan	841	3	844	(972)
Palestine	26	0	26	(14)
Philippines	8	0	8	8
Qatar	12	0	12	(11)
Saudi Arabia	1149	0	1149	(214)
Singapore	199	0	199	(170)
Syrian Arab Republic	234	0	234	(345)
Taiwan	137	0	137	(71)
Thailand	116	0	116	(36)
Turkey	255	0	255	(13)
United Arab Emirates	220	0	220	9
Uzbekistan	31	0	31	19
Vietnam	189	0	189	(91)
Yemen	7	0	7	5
<b>TOTAL</b>	<b>7,487</b>	<b>249</b>	<b>7,736</b>	<b>(4,916) -38.7%</b>

## 2020 Eye Banking Statistics Reported by EBAA Member Banks: Countries of Destination

EBAA Member Eye Bank Distribution by Continent (Transplanted Corneas Stored in Intermediate-Term Solution)			
Continent	U.S. EBAA Member Eye Bank	International EBAA Member Eye Bank	EBAA Member Total
Asia	7,487	249	7,736
Africa	5,300	0	5,300
North America	45,218	2,577	47,795
South America	680	0	680
Antarctica	0	0	0
Europe	1,291	35	1,326
Australia & Oceania	20	0	20
<b>TOTAL</b>	<b>59,996</b>	<b>2,861</b>	<b>62,857</b>

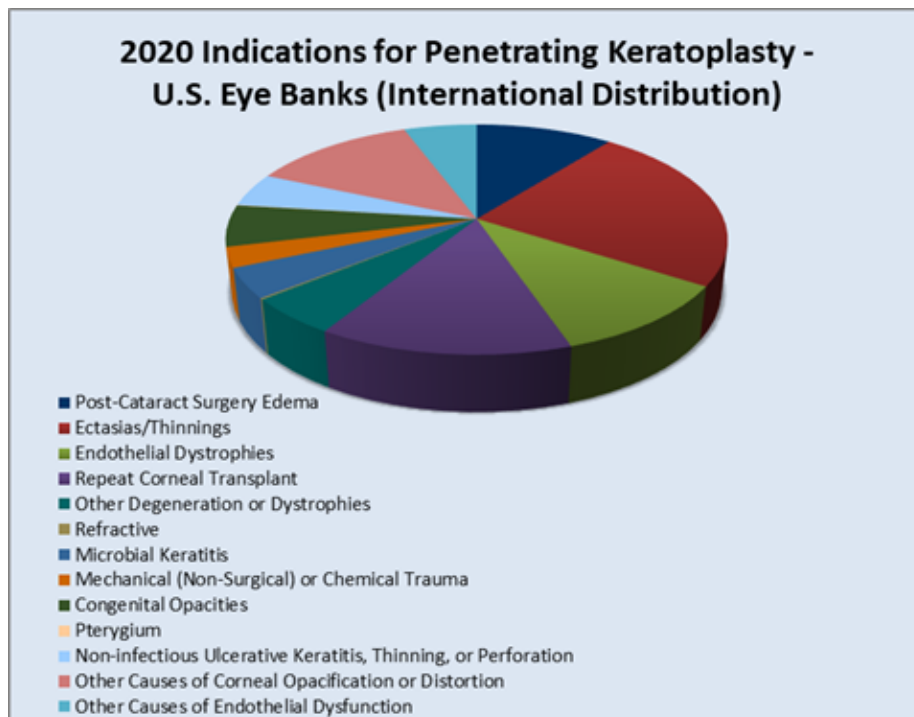
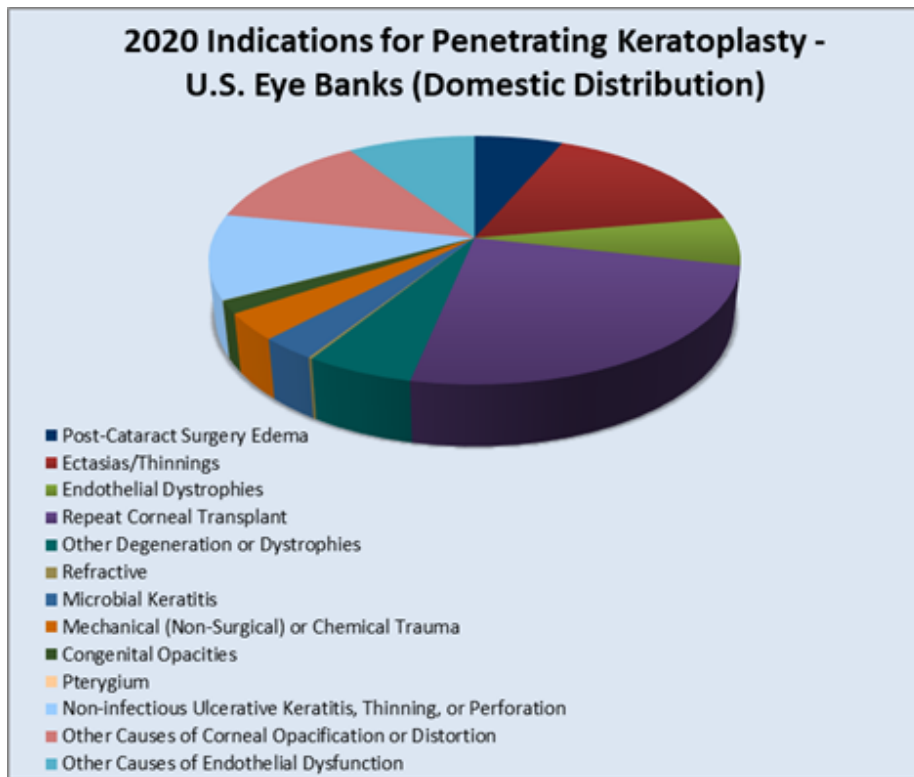
### International Distribution of Intermediate-Term Preserved Transplant Corneas (U.S. Omitted)



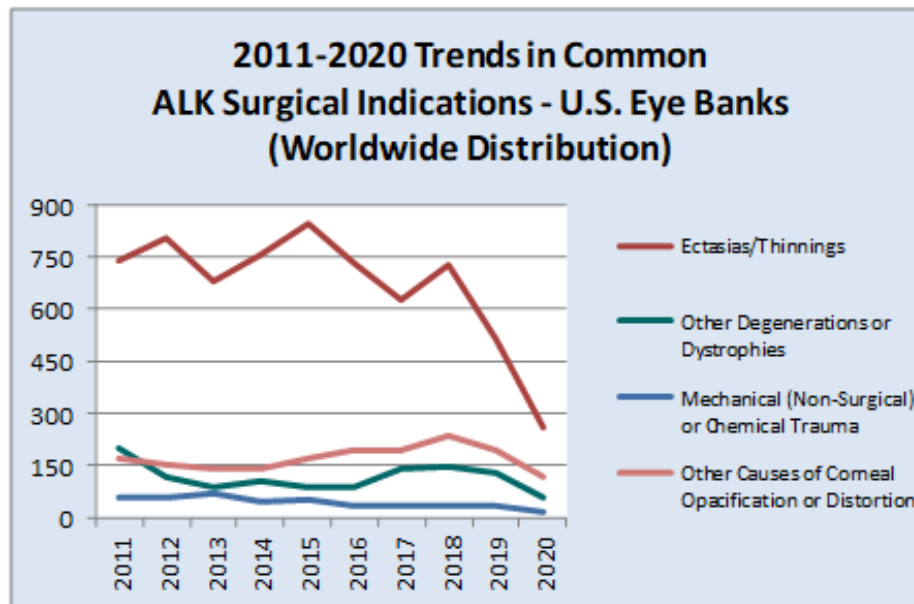
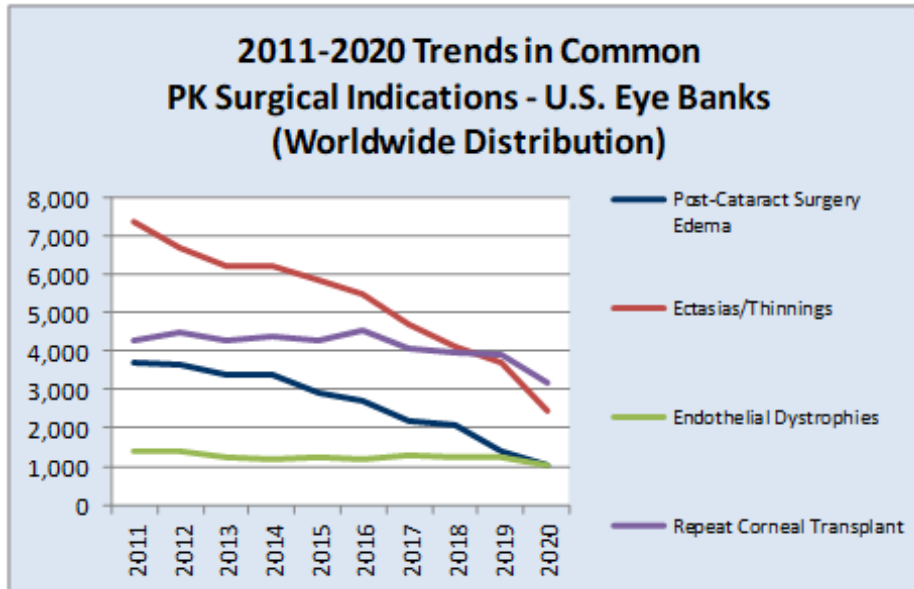
## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Indications for Corneal Transplant Reported by U.S. Banks

Indications for Penetrating Keratoplasty 2020	Domestic Use		International Use	
A. Post-cataract surgery edema	716	4.6%	308	3.2%
B. Ectasias/Thinnings	1,772	11.5%	697	7.2%
C. Endothelial Dystrophies	705	4.6%	312	3.2%
D. Repeat Corneal Transplant	2,756	17.9%	407	4.2%
E. Other degenerations or dystrophies	623	4.0%	153	1.6%
F. Refractive	22	0.1%	5	0.1%
G. Microbial keratitis	328	2.1%	123	1.3%
H. Mechanical or chemical trauma	385	2.5%	83	0.9%
I. Congenital opacities	187	1.2%	172	1.8%
J. Pterygium	3	0.0%	2	0.0%
K. Non-infectious ulcerative keratitis or perforation	1,233	8.0%	139	1.4%
L. Other causes of corneal dysfunction or distortion	1,410	9.2%	371	3.9%
M. Other causes of endothelial dysfunction	1,032	6.7%	164	1.7%
Z. Unknown, unreported, or unspecified	4,230	27.5%	6,685	69.5%
<b>Total Indications for Penetrating Keratoplasty</b>	<b>15,402</b>		<b>9,621</b>	
Indications for Anterior Lamellar Keratoplasty	Domestic use		International Use	
B. Ectasias/Thinnings	199	39.4%	61	10.8%
D. Repeat Corneal Transplant	18	3.6%	5	0.9%
E. Other degenerations or dystrophies	25	5.0%	35	6.2%
F. Refractive	1	0.2%	0	0.0%
G. Microbial keratitis	14	2.8%	2	0.4%
H. Mechanical or chemical trauma	17	3.3%	1	0.2%
I. Congenital opacities	13	2.6%	14	2.5%
J. Pterygium	0	0.0%	0	0.0%
K. Non-infectious ulcerative keratitis or perforation	49	9.7%	14	2.5%
L. Other causes of corneal dysfunction or distortion	82	16.2%	34	6.0%
Z. Unknown, unreported, or unspecified	87	17.2%	401	70.7%
<b>Total for Anterior Keratoplasty</b>	<b>505</b>		<b>567</b>	
Indications for Endothelial Keratoplasty	Domestic Use		International Use	
A. Post-Cataract Surgery Edema	2,771	10.6%	665	17.3%
C. Endothelial Dystrophy	13,325	51.1%	633	16.4%
D. Repeat Corneal Transplant	2,697	10.3%	235	6.1%
M. Other Causes of Endothelial Dysfunction	3,905	15.0%	684	17.8%
Z. Unknown, unreported, or unspecified	3,397	13.0%	1,635	42.4%
<b>Total for Endothelial Keratoplasty</b>	<b>26,095</b>		<b>3,852</b>	

## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Indications for Corneal Transplant Reported by U.S. Banks



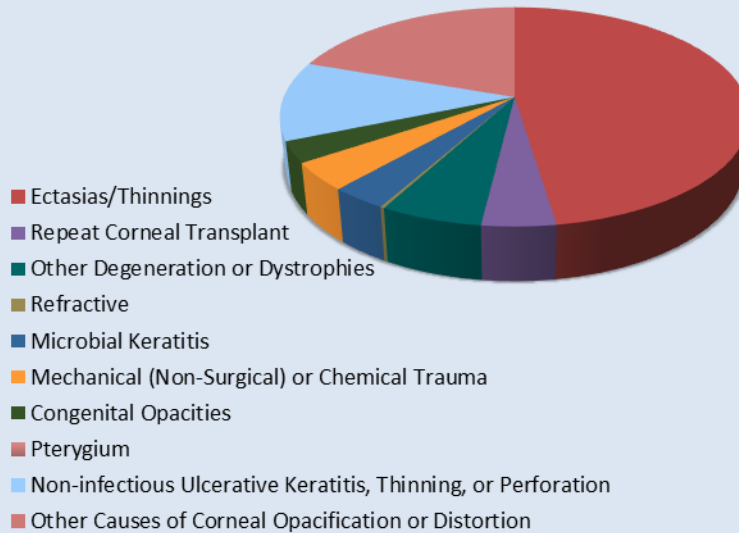
## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Indications for Corneal Transplant Reported by U.S. Banks



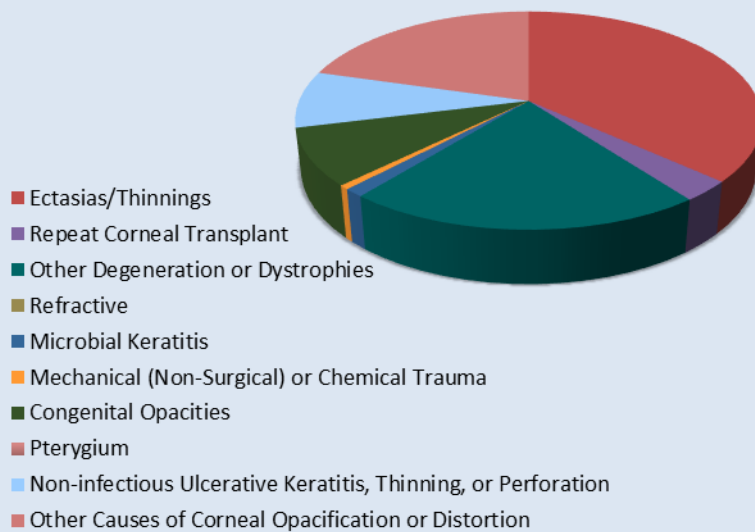
\*Worldwide Distribution = Combined Domestic and International Distribution

## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Indications for Corneal Transplant Reported by U.S. Banks

**2020 Indications for Anterior Lamellar Keratoplasty -  
U.S. Eye Banks (Domestic Distribution)**



**2020 Indications for Anterior Lamellar Keratoplasty -  
U.S. Eye Banks (International Distribution)**

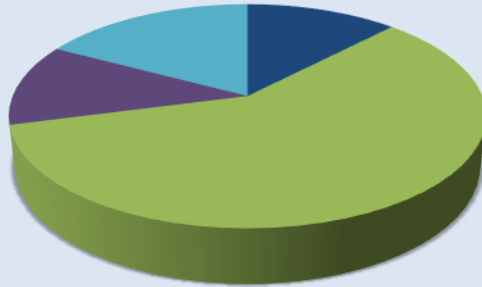


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## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Indications for Corneal Transplant Reported by U.S. Banks

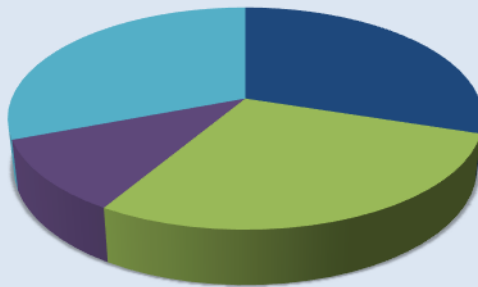
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**2020 Indications for Endothelial Keratoplasty  
- U.S. Eye Banks (Domestic Distribution)**



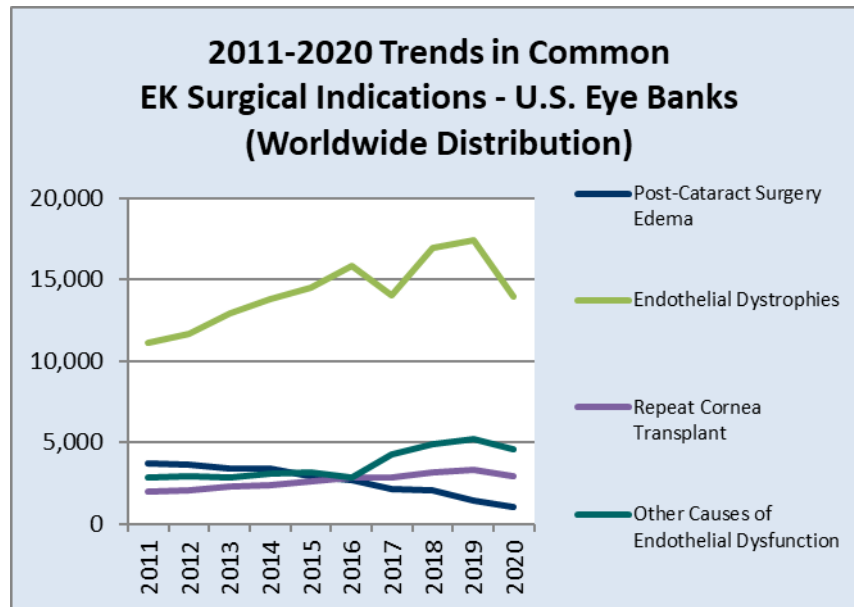
- Post-Cataract Surgery Edema
- Endothelial Dystrophies
- Repeat Corneal Transplant
- Other Causes of Endothelial Dysfunction

**2020 Indications for Endothelial Keratoplasty -  
U.S. Eye Banks (International Distribution)**



- Post-Cataract Surgery Edema
- Endothelial Dystrophies
- Repeat Corneal Transplant
- Other Causes of Endothelial Dysfunction

## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Indications for Corneal Transplant Reported by U.S. Banks



\*Worldwide Distribution = Combined Domestic and International Distribution



## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Indications for Corneal Transplant Reported by U.S. Banks

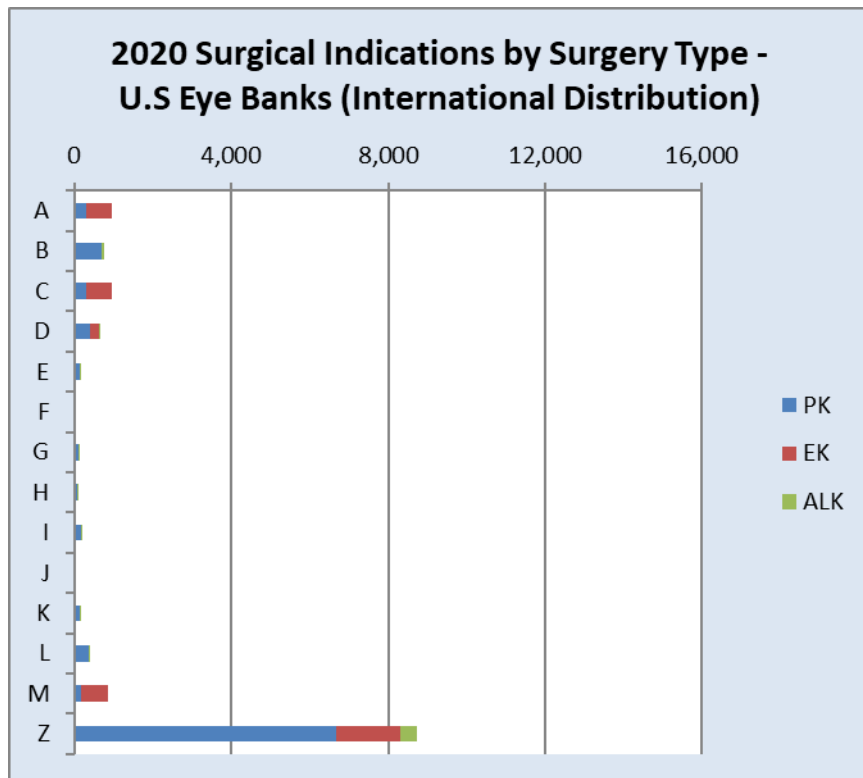
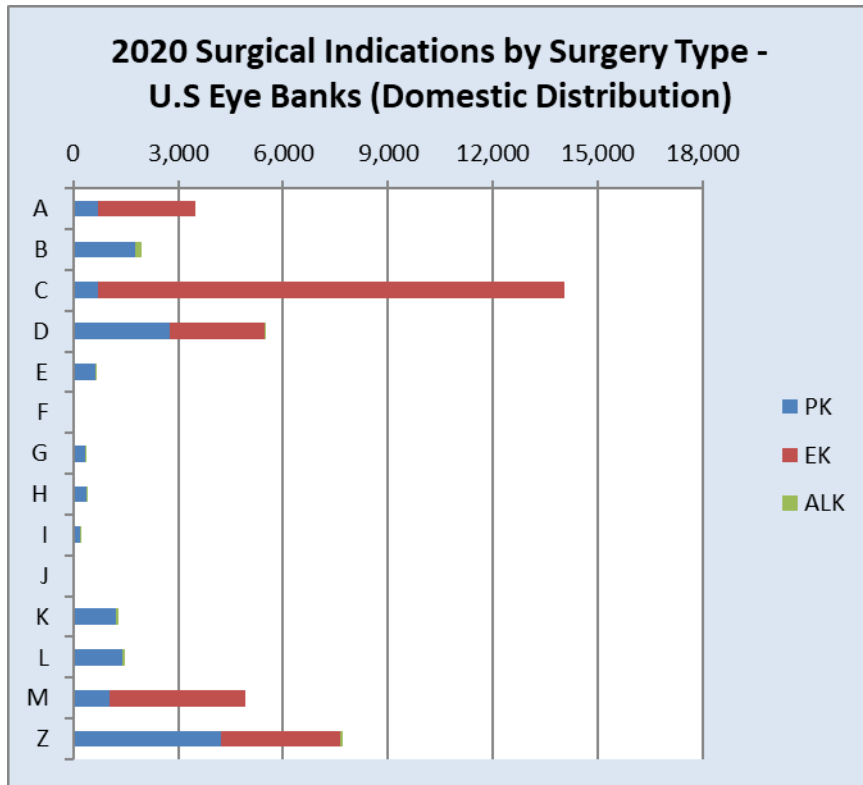
2020 (Domestically Distributed Corneas Only) - U.S. Eye Banks														
	A	B	C	D	E	F	G	H	I	J	K	L	M	Z
PK	716	1,772	705	2,756	623	22	328	385	187	3	1,233	1,410	1,032	4,230
EK	2,771		13,325	2,697									3,905	3,397
ALK		199		18	25	1	14	17	13	0	49	82		87

2020 (Internationally Distributed Corneas Only) - U.S. Eye Banks														
	A	B	C	D	E	F	G	H	I	J	K	L	M	Z
PK	308	697	312	407	153	5	123	83	172	2	139	371	164	6,685
EK	665		633	235									684	1,635
ALK		61		5	35	0	2	1	14	0	14	34		401

2020 (Combined Domestic & International Distributed Corneas) - U.S. Eye Banks														
	A	B	C	D	E	F	G	H	I	J	K	L	M	Z
PK	1,024	2,469	1,017	3,163	776	27	451	468	359	5	1,372	1,781	1,196	10,915
EK	3,436		13,958	2,932									4,589	5,032
ALK		260		23	60	1	16	18	27	0	63	116		488

- A - Post-Cataract Surgery Edema
- B - Ectasias/Thinnings
- C - Endothelial Dystrophies
- D - Repeat Corneal Transplant
- E - Other Degeneration or Dystrophies
- F - Refractive
- G - Microbial Keratitis
- H - Mechanical (Non-Surgical) or Chemical Trauma
- I - Congenital Opacities
- J - Pterygium
- K - Non-infectious Ulcerative Keratitis, Thinning, or Perforation
- L - Other Causes of Corneal Opacification or Distortion
- M - Other Causes of Endothelial Dysfunction
- Z - Unknown or Unreported

## 2020 U.S. Eye Banking Statistics Reported by U.S. Banks: Indications for Corneal Transplant Reported by U.S. Banks

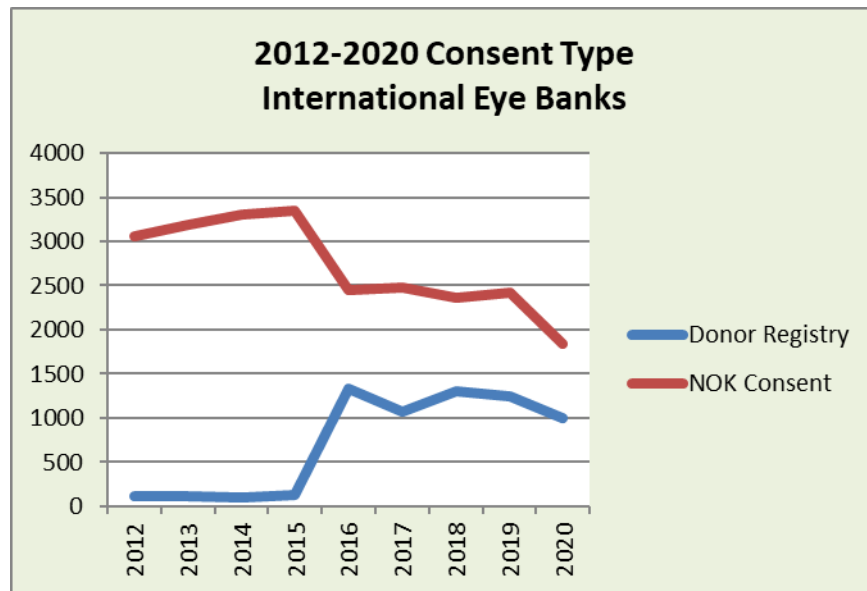


**2020**  
**Eye Banking Statistics**  
**From EBAA**  
**International Members**

## 2020 International Eye Banking Statistics Donations and Tissue Recoveries

Donations	2016	2017	2018	2019	2020
Number of Eye Banks Reporting	11	11	11	11	11
Total Whole Eyes and Corneas Donated	7,520	7,061	7,291	7,271	5,622
Total Number of Donors	3,776	3,547	3,677	3,669	2,827

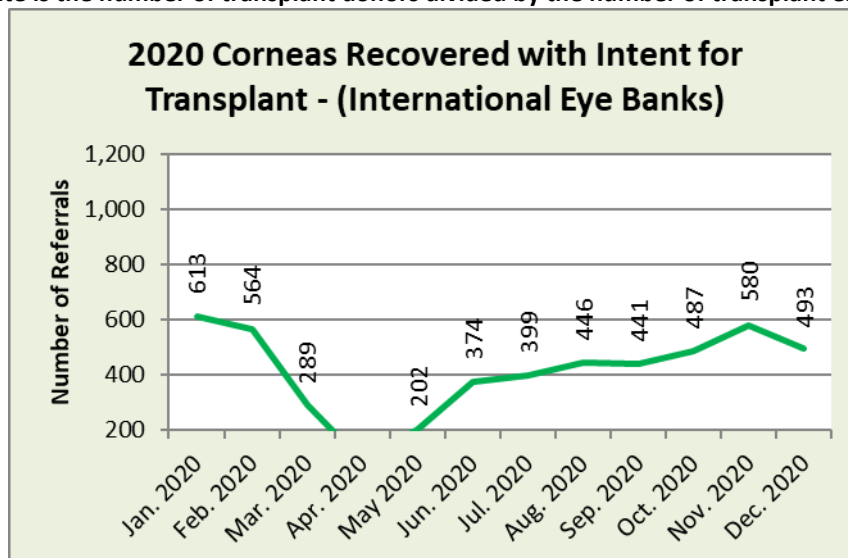
Death Referrals	2018	2019	2020
Total Death Referrals	62,270	63,512	56,200
Death referrals Determined Eligible	11,993	11,728	9,967
Tissue Recoveries			
Total Donors	3,677	3,669	2,827
Donors recovered not found on donor registry or known to have first person consent	2,367	2,421	1,836
Donors recovered found on donor registry or known to have first person consent	1,310	1,248	991
Eyes or Corneas Recovered with Intent for Surgical Use	6,559	6,551	4,972
Eyes or Corneas Recovered for Other Uses	732	720	650



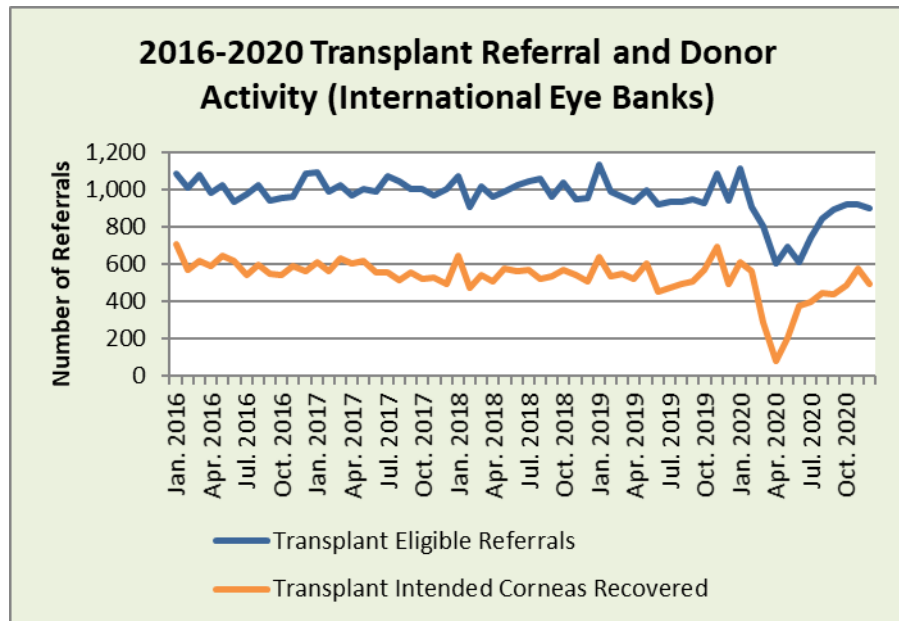
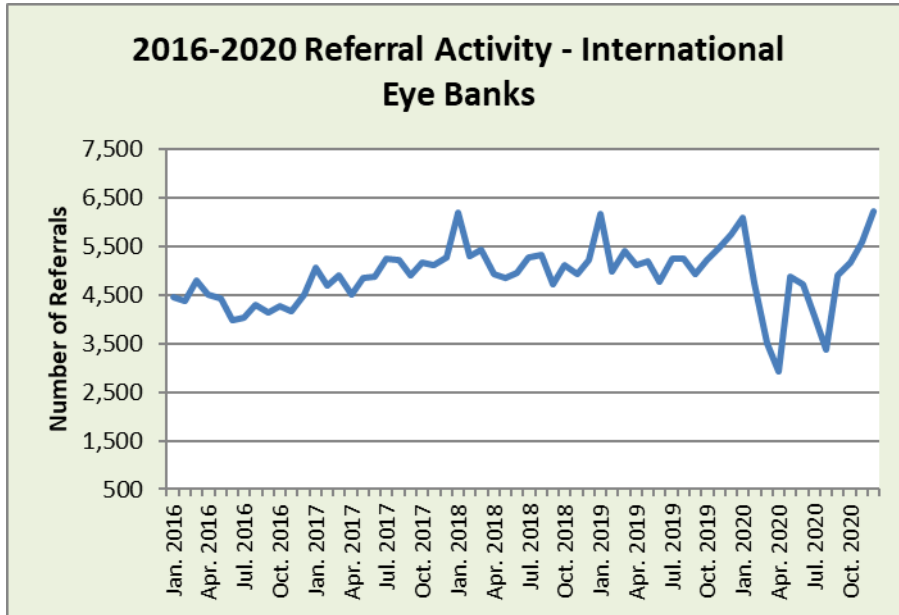
## 2020 International Eye Banking Statistics Referral Trends, Transplant and Conversion Rates

Transplant & Conversion Rates - International Eye Banks					
Month	Transplant Rate	Conversion Rate	Death Referrals	Transplant Eligible Referrals	Transplant Intended Corneas Recovered
Jan. 2020	63.0%	27.6%	6,082	1,117	613
Feb. 2020	59.9%	31.4%	4,752	905	564
Mar. 2020	45.7%	18.0%	3,517	807	289
Apr. 2020	82.1%	7.0%	2,921	604	84
May 2020	66.3%	14.7%	4,888	694	202
Jun. 2020	68.4%	30.9%	4,726	611	374
Jul. 2020	57.4%	27.0%	4,055	743	399
Aug. 2020	59.9%	26.5%	3,374	844	446
Sep. 2020	71.9%	24.9%	4,911	894	441
Oct. 2020	71.9%	26.4%	5,162	922	487
Nov. 2020	65.2%	31.5%	5,592	923	580
Dec. 2020	57.8%	27.6%	6,220	903	493
<b>2016 Total</b>	56.1%	29.9%	51,946	12,333	7,333
<b>2017 Total</b>	54.5%	27.9%	59,833	12,169	6,753
<b>2018 Total</b>	57.4%	27.6%	62,270	11,993	6,559
<b>2019 Total</b>	59.3%	28.2%	63,512	11,728	6,551
<b>2020 Total</b>	63.2%	25.1%	56,200	9,967	4,972
<b>2020 Avg.</b>	N/A	N/A	4,683	831	414
<b>Std. Dev.</b>	9.2%	7.5%	1047	148	158

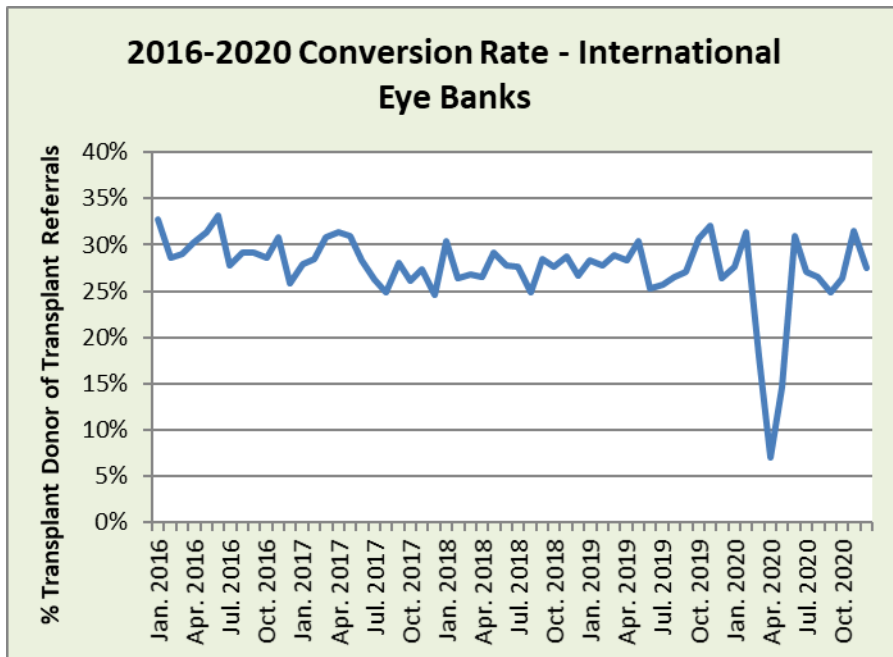
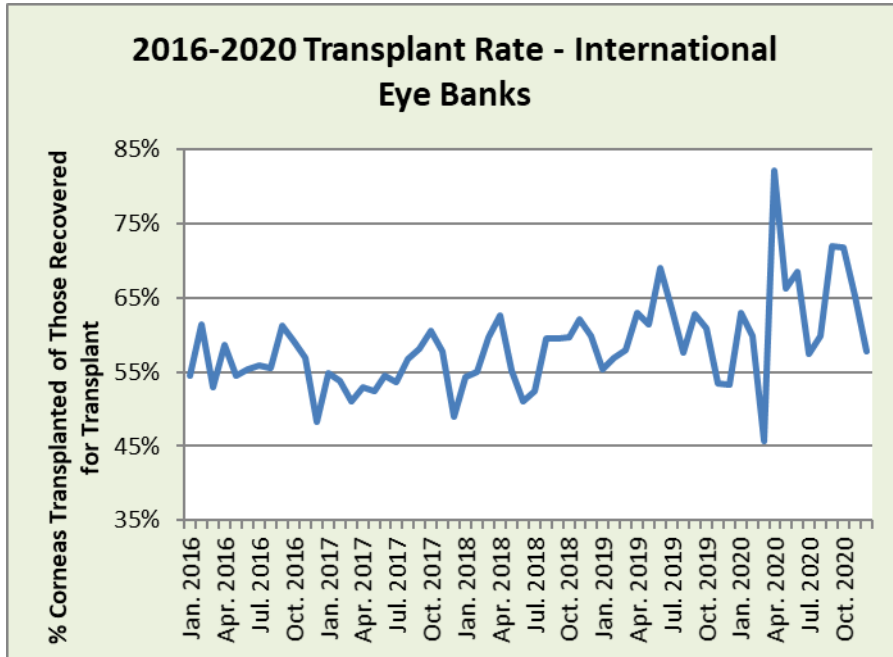
\*Transplant rate is the number of corneas used for transplant divided by the number recovered for transplant.  
Conversion rate is the number of transplant donors divided by the number of transplant eligible referrals.



## 2020 International Eye Banking Statistics Referral Trends, Transplant and Conversion Rates



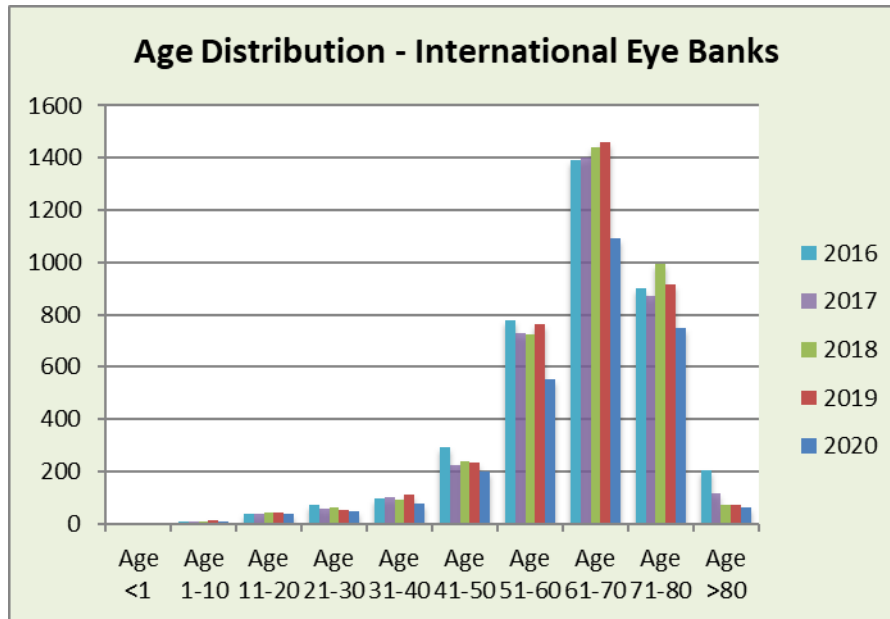
## 2020 International Eye Banking Statistics Transplant and Conversion Rates



Transplant rate is the number of corneas used for transplant divided by the number recovered for transplant.  
 Conversion rate is the number of transplant donors divided by the number of transplant eligible referrals.

## 2020 International Eye Banking Statistics Donor Profiles: Age

Age Demographics - International Eye Banks										
Year	Age <1	Age 1-10	Age 11-20	Age 21-30	Age 31-40	Age 41-50	Age 51-60	Age 61-70	Age 71-80	Age >80
2016	0	7	35	71	94	291	778	1,393	901	206
2017	0	8	35	58	101	222	731	1,403	873	116
2018	0	9	40	64	93	240	722	1,439	995	73
2019	0	15	40	51	112	236	765	1,460	916	74
2020	0	10	36	46	75	200	552	1,094	750	64
<b>Monthly Avg.</b>	0	1	3	4	6	17	46	91	63	5
<b>Std. Dev.</b>	0.0	0.7	1.3	1.9	3.7	6.8	17.9	36.6	28.4	3.6



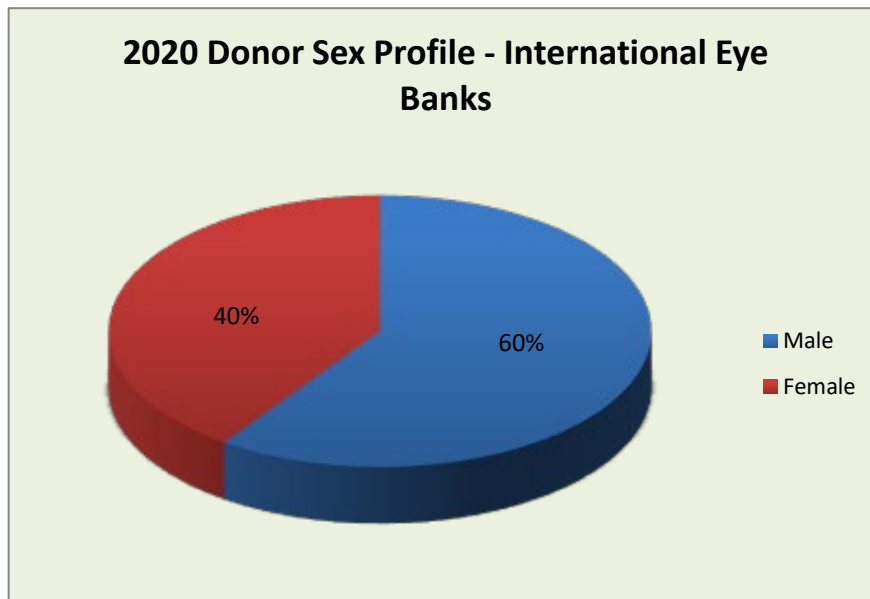


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## 2020 International Eye Banking Statistics Donor Profiles: Gender and Cause of Death

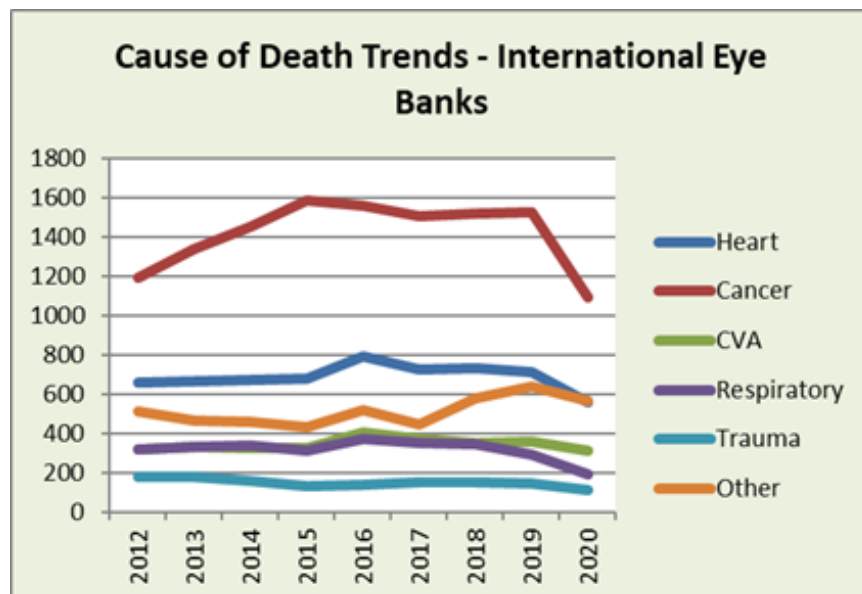
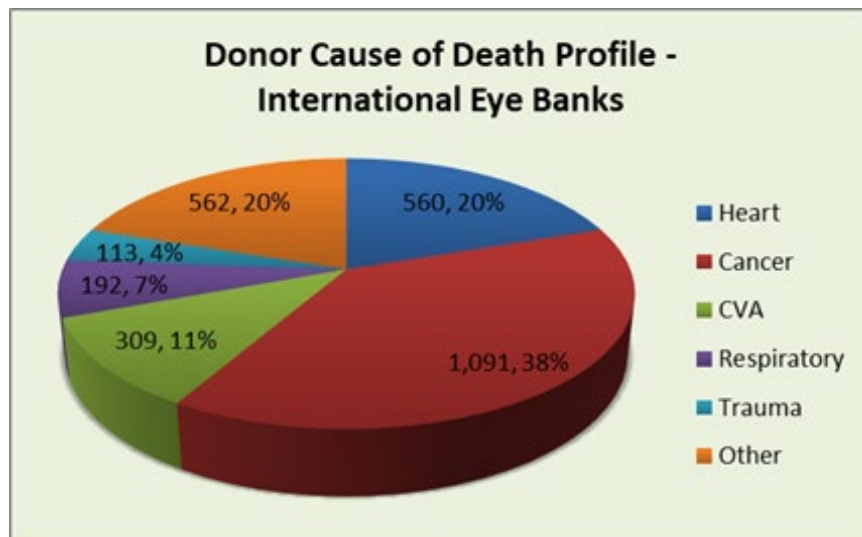
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Sex Demographics – International Eye Banks		
Year	Male	Female
2016	2,252	1,524
2017	2,077	1,470
2018	2,182	1,495
2019	2,151	1,518
2020	1,688	1,139
<b>Monthly Avg.</b>		
	141	95
<b>Std. Dev.</b>		
	52.7	37.2



## 2020 International Eye Banking Statistics Donor Profiles: Cause of Death









Cause of Death Demographics - International Eye Banks						
2016 Total	793	1,557	403	371	134	518
2017 Total	722	1,507	370	351	153	444
2018 Total	735	1,518	350	343	151	580
2019 Total	711	1,525	360	291	145	637
2020 Total	560	1,091	309	192	113	562
Monthly Avg.	47	91	26	16	9	47
Std. Dev.	17.0	38.5	9.1	10.4	4.1	17.0



## 2020 International Eye Banking Statistics Reasons Tissue Intended for Surgery Was Not Suitable For Transplant

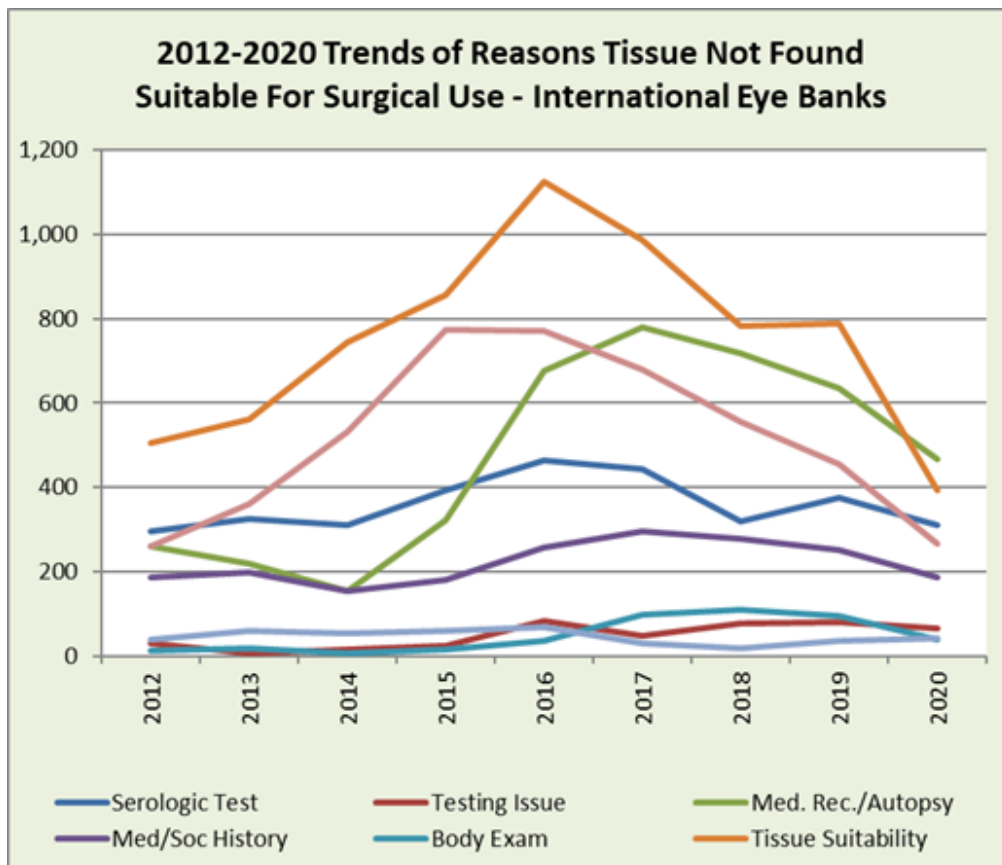
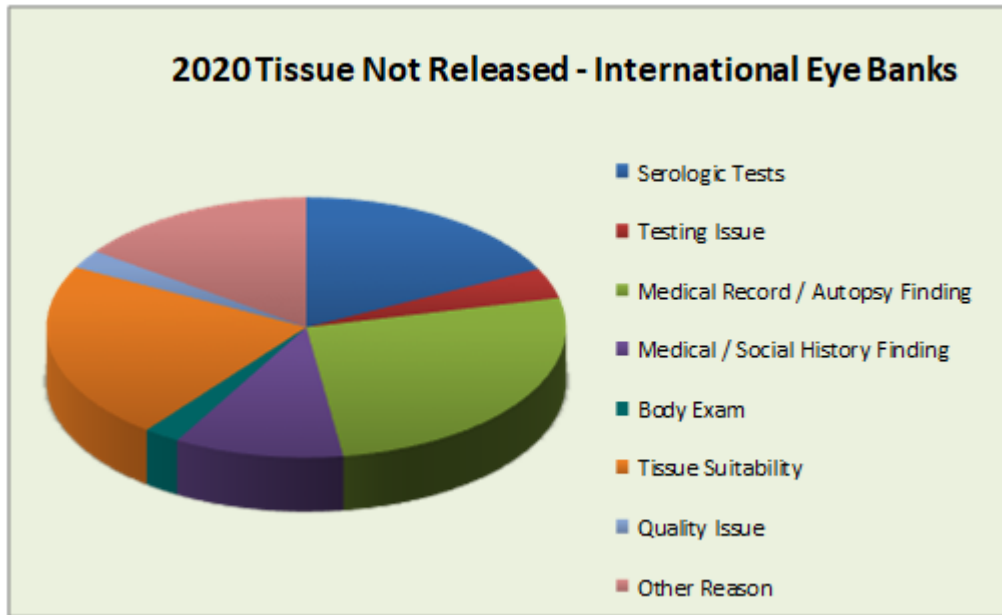
Contraindications for Transplant <sup>1</sup>	2019		2020	
<b>Donor Eligibility</b>	<b>1,434</b>	<b>59.9%</b>	<b>1,073</b>	<b>68.2%</b>
Positive or reactive test for communicable disease agent or disease	374	15.6%	312	19.8%
Other communicable disease testing issue	80	3.3%	67	4.3%
Medical record or autopsy findings	635	26.5%	467	29.7%
Medical/social history interview	251	10.5%	187	11.9%
Body Exam	94	3.9%	40	2.5%
<b>Tissue Suitability</b>	<b>790</b>	<b>33.0%</b>	<b>392</b>	<b>24.9%</b>
<b>Quality Issue</b>	<b>36</b>	<b>1.5%</b>	<b>41</b>	<b>2.6%</b>
<b>Other reason prior to tissue release</b>	<b>454</b>	<b>19.0%</b>	<b>267</b>	<b>17.0%</b>
<b>Total eyes/corneas intended for transplant but not released for transplant</b>	<b>2,392</b>		<b>1,573</b>	

\*Percentages read from this table should be read as "of the tissue not released for transplant."

Reasons Corneas Recovered for Transplant Were Not Released - International Eye Banks										
Reasons Not Released	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
<b>Serology Tests</b>	296	326	310	394	464	442	318	374	312	
<b>Testing Issue</b>	31	8	16	24	83	47	77	80	67	
<b>Med. Rec./Autopsy Finding</b>	260	219	155	323	675	780	718	635	467	
<b>Med Soc Hx Finding</b>	186	197	154	182	258	297	278	251	187	
<b>Body Exam</b>	12	18	8	16	37	98	110	94	40	
<b>Tissue Suitability</b>	506	561	743	856	1,125	987	783	790	392	
<b>Quality Issue</b>	38	61	55	60	70	29	18	36	41	
<b>Other Reason</b>	260	360	531	775	770	678	554	454	267	

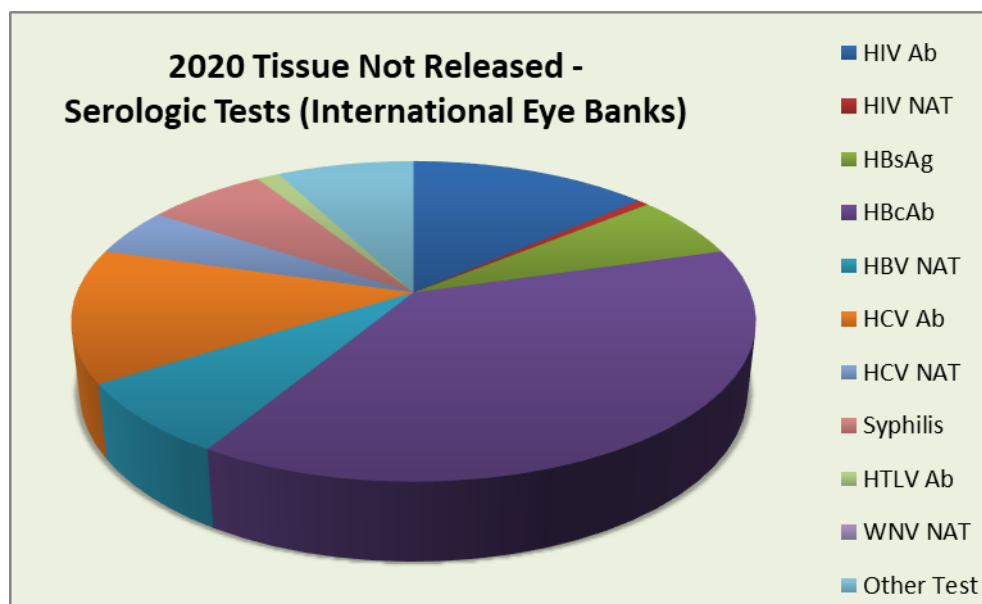
<sup>1</sup> Some tissues had multiple contraindications.

## 2020 International Eye Banking Statistics Reasons Tissue Intended for Surgery Was Not Released

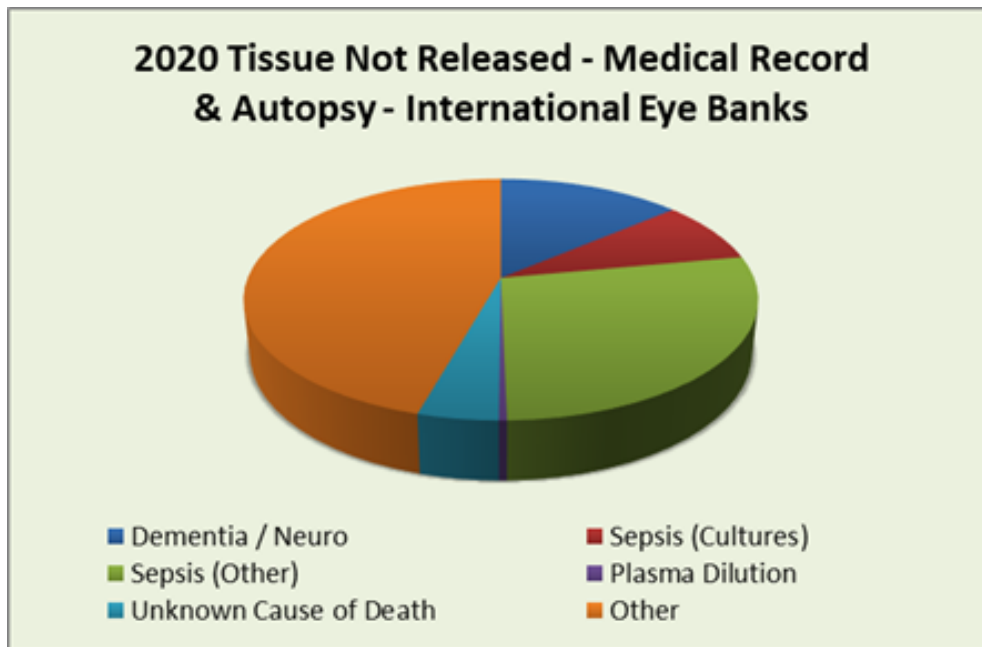
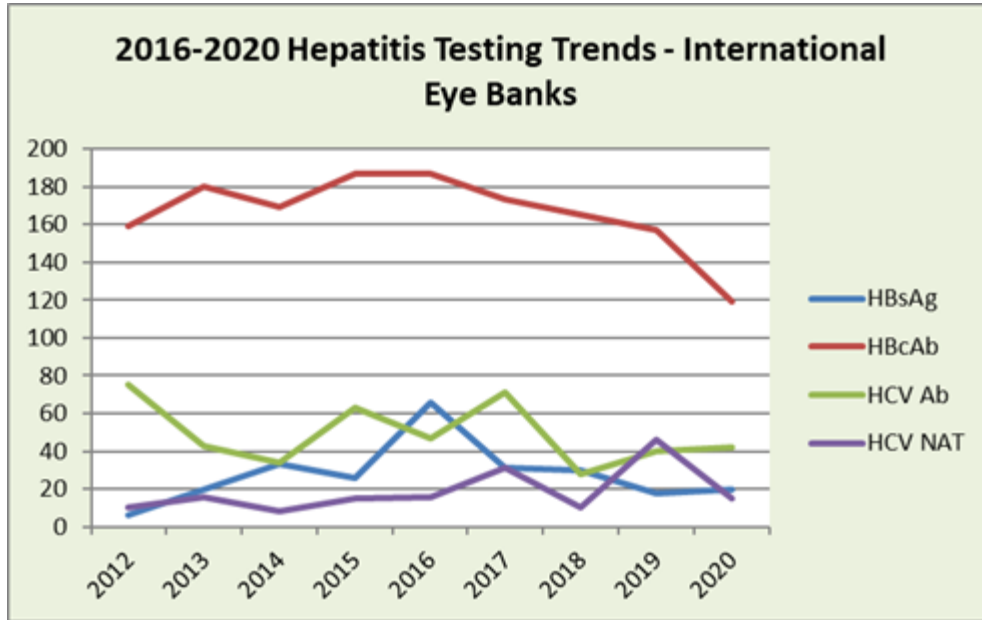


## 2020 International Eye Banking Statistics Reasons Tissue Intended for Surgery Was Not Released

Corneas Not Released for Transplant (Serologic Testing) - International Eye Banks										
Not Released - Serology	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trend
<b>HIV</b>	10	18	22	37	30	34	22	27	44	
HIV I/II Ab	8	6	20	37	30	32	22	25	42	
HIV NAT	2	12	2	0	0	2	0	2	2	
<b>HBV</b>	165	200	203	213	263	209	219	203	162	
HBsAg	6	20	33	26	66	31	30	18	20	
HBcAb	159	180	169	187	187	173	165	157	119	
HBV NAT	0	0	1	0	10	5	24	28	23	
<b>HCV</b>	85	59	42	78	63	102	38	86	57	
HCV Ab	75	43	34	63	47	71	28	40	42	
HCV NAT	10	16	8	15	16	31	10	46	15	
<b>Syphilis</b>	6	16	22	41	64	59	15	37	21	
<b>HTLV</b>	12	11	14	5	20	12	6	4	4	
<b>WNV</b>	0	0	4	0	0	2	0	0	0	
<b>Other</b>	18	22	3	20	24	24	18	17	24	

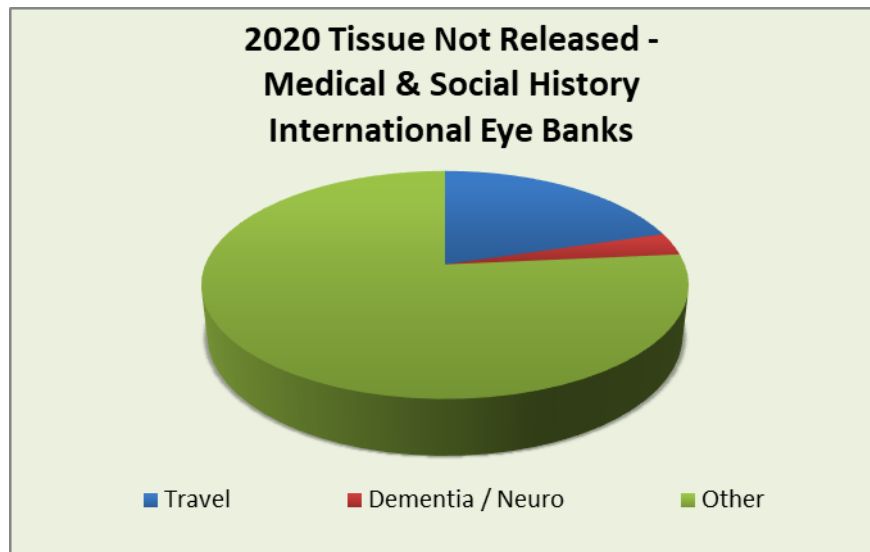


## 2020 International Eye Banking Statistics Reasons Tissue Intended for Surgery Was Not Released



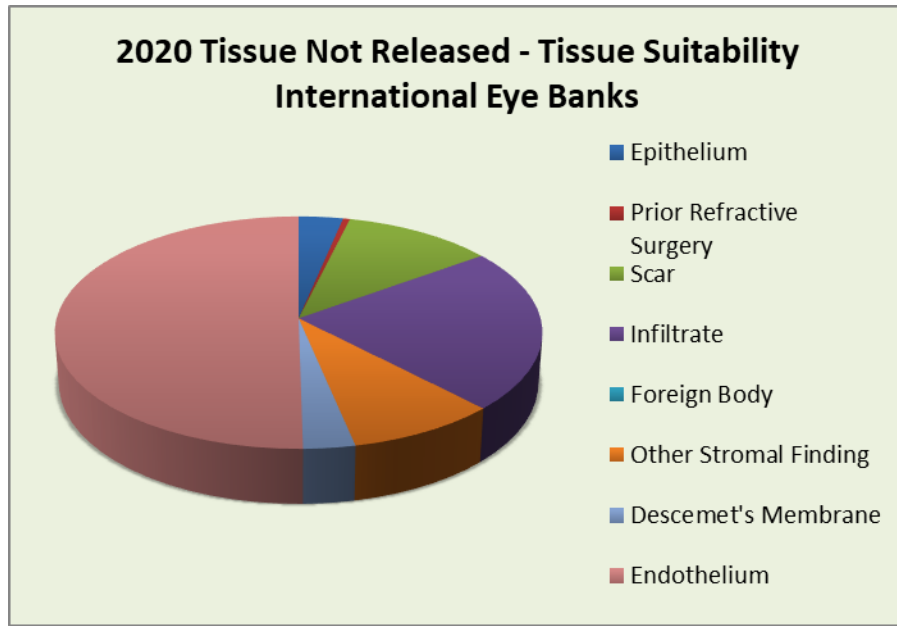
## 2020 International Eye Banking Statistics Reasons Tissue Intended for Surgery Was Not Suitable

Corneas Not Released for Transplant (Medical Records) - International Eye Banks										
Not Released - Med Rec / Autopsy	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Dementia/Neuro	16	20	20	48	171	161	191	101	64	
Sepsis (Cultures)	68	39	23	26	50	46	80	40	39	
Sepsis (Other)	79	80	50	111	140	145	114	146	129	
Plasma Dilution	10	6	6	4	10	10	6	9	2	
Unknown COD	35	26	22	28	24	12	10	30	20	
Other	52	48	34	106	280	406	317	309	213	



Corneas Not Released for Transplant (Med Soc Hx) - International Eye Banks										
Not Released - Med Soc	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Travel	36	36	30	16	24	38	24	40	38	
Dementia/Neuro	2	24	30	40	19	24	43	20	6	
Other	136	137	94	126	215	235	211	191	143	

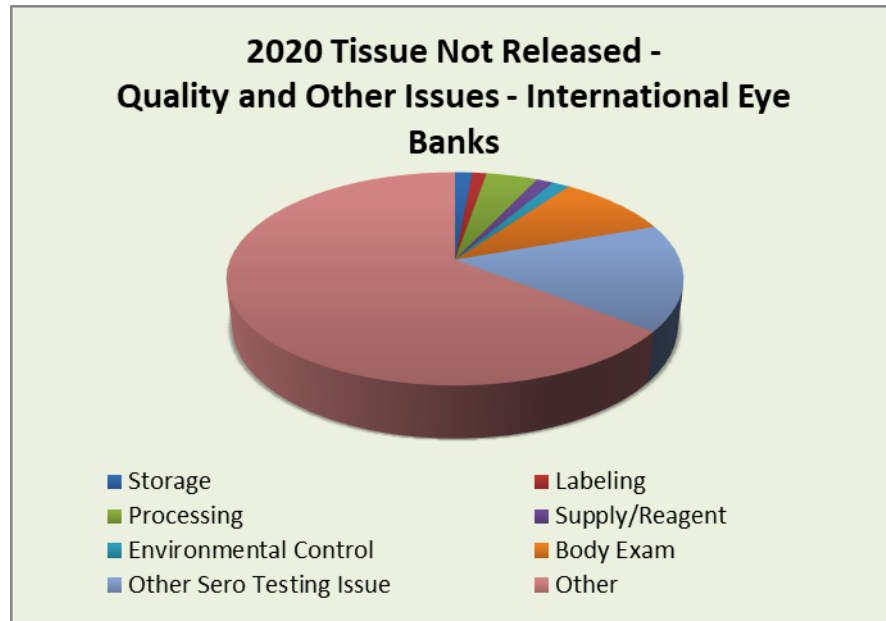
## 2020 International Eye Banking Statistics Tissue Suitability Reasons Tissue Was Not Released



Corneas Not Released for Transplant (Tissue Suitability) - International Eye Banks										
Not Released - Tissue Suitability	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Epithelium	31	55	65	45	54	37	10	18	13	
Prior Refractive Surgery	4	9	33	33	40	21	9	12	2	
Scar	68	93	142	238	282	328	156	124	44	
Infiltrate	76	81	107	106	164	85	106	96	89	
Foreign Body	7	3	28	21	25	23	6	2	0	
Other Stromal Finding	59	40	34	77	77	119	48	43	35	
Descemet's Membrane	4	3	34	16	35	10	23	19	12	
Endothelium	257	277	300	320	448	364	425	476	197	



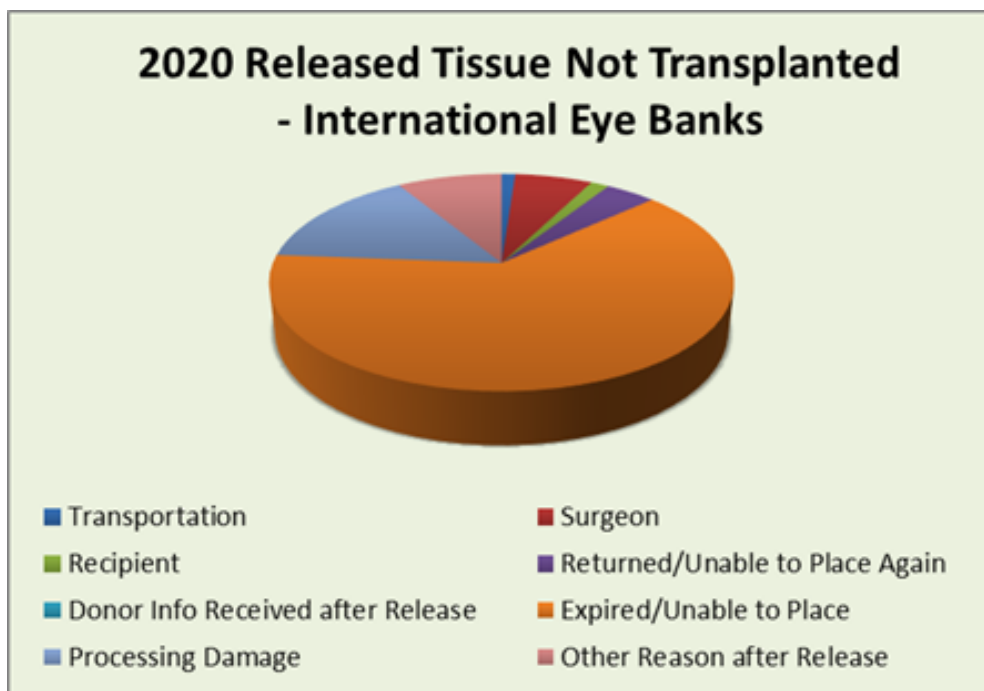
## 2020 International Eye Banking Statistics Quality Reasons Tissue Intended for Surgery Was Not Released



Corneas Not Released for Transplant (Quality) - International Eye Banks										
Not Released - Quality Issues / Other	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Storage Issue	13	22	16	23	13	4	3	10	6	
Labeling Issue	0	5	11	9	10	0	0	0	5	
Processing Issue (not released)	21	14	10	8	11	8	8	19	18	
Supply / Reagent Issue	2	14	8	5	5	6	3	7	6	
Environmental Control Issue	2	6	10	15	31	11	4	0	6	
Body Exam	12	18	8	16	37	98	110	94	40	
Other Sero Testing Issue	31	8	16	24	83	47	77	80	67	
Other Issue	260	360	531	775	770	678	554	454	267	

## 2020 International Eye Banking Statistics Reasons Released Tissues Were Not Transplanted

Reasons Released Tissues Were Not Transplanted	2019		2020	
	Count	Percentage	Count	Percentage
Transportation Issue	2	0.7%	3	1.2%
Surgeon Issue	52	18.6%	17	6.5%
Recipient Issue	9	3.2%	4	1.5%
Returned and Unable to Place Again	41	14.7%	11	4.2%
Donor Information Not Available at the Time of Tissue Release	0	0.0%	0	0.0%
Expired or Unable to Place Tissue	112	40.1%	167	64.2%
Tissue Damaged During Processing	46	16.5%	40	15.4%
Other Reason After Release of Tissue	42	15.1%	23	8.8%
<b>Total eyes/corneas released for transplant, but not used for transplant</b>	<b>279</b>		<b>260</b>	



Corneas Released but Not Transplanted - International Eye Banks										
Released But Not Transplanted	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Transport Issue	10	0	26	2	8	1	2	2	3	
Surgeon Issue	23	11	20	53	24	46	38	52	17	
Recipient Issue	5	3	5	6	6	6	5	9	4	
Returned, Unable to Place Again	55	53	56	24	32	35	26	41	11	
Donor Info Received After Release	0	0	0	2	7	2	0	0	0	
Expired, Unable to Place	246	198	316	234	215	219	156	112	167	
Processing Damage After Release	32	41	54	41	55	47	52	46	40	
Other Reason After Release	12	9	10	24	42	44	48	42	23	

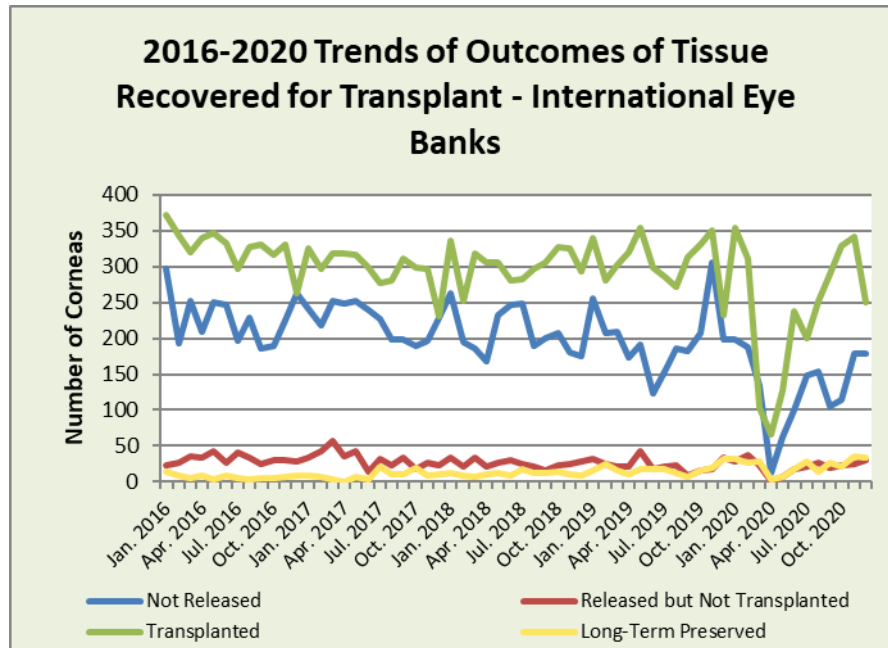
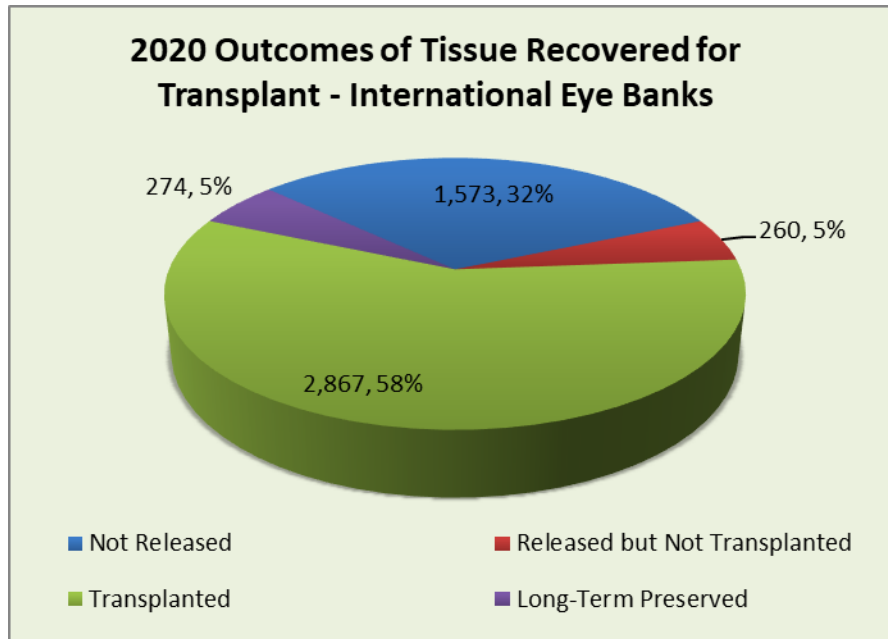
## 2020 International Eye Banking Statistics Outcomes of Tissue Recovered for Transplant

Donations	2019	2020	% Change
Eye Banks Reported	11	11	0.0%
Total Whole Eyes and Corneas Donated	7,271	5,622	(-22.7%)
Total Number of Donors	3,669	2,827	(-22.9%)
Distribution	2019	2020	
Intermediate-Term Preserved Corneas	3,682	2,867	(-22.1%)
Sclera	1,420	1,332	(-6.2%)
Long-Term Preserved Corneas	191	235	23.0%
Research	124	86	(-30.6)
Training	1,958	1,431	(-26.9%)

Outcomes of Corneas Recovered for Transplant Use - International Eye Banks											
Month	Corneas Recovered for Transplant	Corneas Segmented	Corneal Segments Produced	Not Released		Released but Not Transplanted		Whole Corneas and Segments Transplanted		Preserved Long-Term	
Jan. 2020	613	0	0	199	32.5%	28	4.6%	355	57.9%	31	5.1%
Feb. 2020	564	0	0	188	33.3%	38	6.7%	312	55.3%	26	4.6%
Mar. 2020	289	0	0	134	46.4%	23	8.0%	104	36.0%	28	9.7%
Apr. 2020	84	0	0	13	15.5%	2	2.4%	65	77.4%	4	4.8%
May 2020	202	0	0	62	30.7%	6	3.0%	127	62.9%	7	3.5%
Jun. 2020	374	0	0	100	26.7%	18	4.8%	238	63.6%	18	4.8%
Jul. 2020	399	0	0	148	37.1%	22	5.5%	201	50.4%	28	7.0%
Aug. 2020	446	1	2	154	34.5%	26	5.8%	253	56.6%	14	3.1%
Sep. 2020	441	1	2	105	23.8%	20	4.5%	290	65.6%	27	6.1%
Oct. 2020	487	0	0	114	23.4%	23	4.7%	329	67.6%	21	4.3%
Nov. 2020	580	1	1	178	30.7%	24	4.1%	342	59.0%	36	6.2%
Dec. 2020	493	1	1	178	36.1%	30	6.1%	251	50.9%	34	6.9%
<b>2016 Total</b>	7,333	0	0	2,838	38.7%	379	5.2%	4,035	55.0%	81	1.1%
<b>2017 Total</b>	6,753	1	1	2,692	39.9%	380	5.6%	3,570	52.9%	111	1.6%
<b>2018 Total</b>	6,559	4	7	2,492	38.0%	304	4.6%	3,631	55.3%	135	2.1%
<b>2019 Total</b>	6,551	4	8	2,392	36.5%	279	4.3%	3,682	56.2%	202	3.1%
<b>2020 Total</b>	4,972	4	6	1,573	31.6%	260	5.2%	2,867	57.6%	274	5.5%
<b>2020 Avg.</b>	414	0	1	131	N/A	22	N/A	239	N/A	23	N/A
<b>Std. Dev.</b>	158	0.49	0.8	55	7.9%	10	1.5%	97	10.4%	10	1.8%

\*Percentages read from this table should be read as "of the tissue recovered with transplant intent"

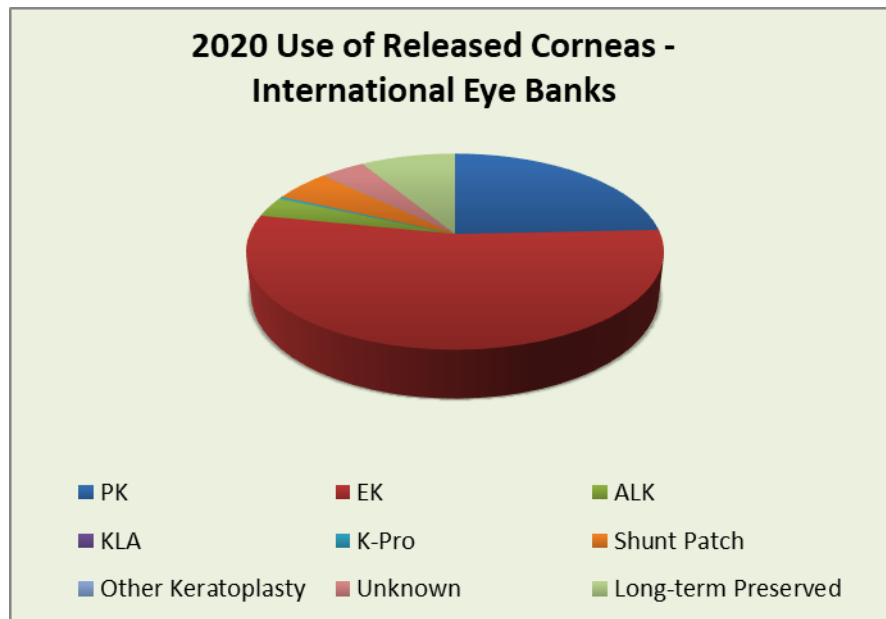
## 2020 International Eye Banking Statistics Outcomes of Tissues Recovered for Transplant



General Outcomes of Corneas Recovered for Transplant Use - International Eye Banks										
Outcome	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trend
Not Released	1,394	1,588	1,443	2,217	2,838	2,692	2,492	2,392	1,573	
Released but Not Transplanted	394	324	459	380	379	380	304	279	260	
Transplanted	3,270	3,415	3,718	3,500	4,035	3,570	3,631	3,682	2,867	
Long-Term Preserved	137	100	110	307	81	111	135	202	274	

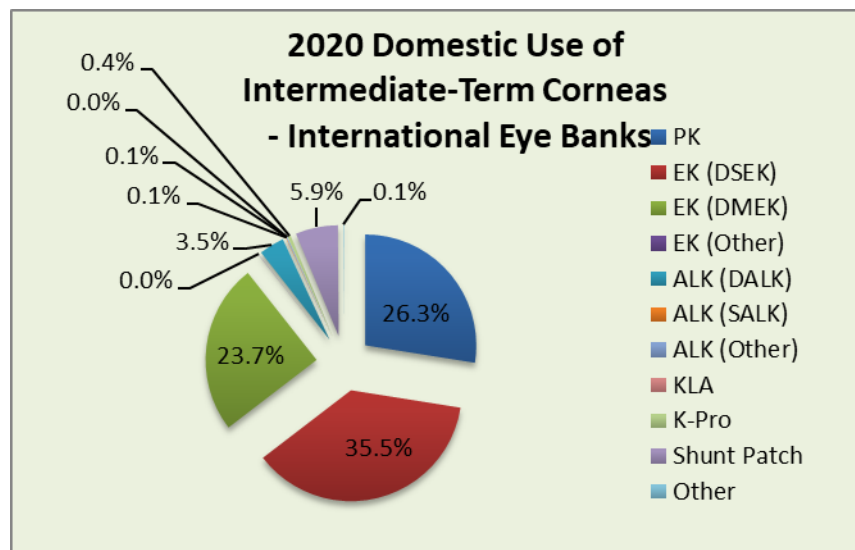
## 2020 International Eye Banking Statistics Use of Donated Tissues

Use of Donated Tissue	2016	2017	2018	2019	2020
Corneal Grafts Total	4,116	3,681	3,628	3,880	3,141
Penetrating Keratoplasty	1,399	1,248	1,055	1,001	763
Anterior Lamellar Keratoplasty	142	174	182	181	105
Endothelial Keratoplasty	1,890	1,736	1,865	1,991	1,693
Keratolimbal Allograft	4	6	3	3	0
Keratoprosthesis (K-Pro)	24	10	11	18	12
Glaucoma Shunt Patch or other non-keratoplasty use	313	229	245	239	167
Other keratoplasty (experimental surgery)	3	3	8	1	3
Unknown or Unspecified	260	164	262	248	124
Sclera	1,077	995	1,193	1,420	1,332
Long-Term Preserved Corneas	92	93	88	191	235
Keratoplasty	2	6	3	13	4
Glaucoma Shunt Patching	89	62	62	126	166
Other Surgical Uses	1	25	23	52	65
Research	300	200	310	124	86
Training	1663	1,992	1,997	1,958	1,431



## 2020 International Eye Banking Statistics Intermediate-Term Tissue Distribution

Intermediate-Term Tissue Distribution of Source Eye Bank Corneas for Domestic Use		
	2019	2020
Intermediate-term preserved corneas, corneal segments or whole eyes transplanted <b>domestically</b> for:	<b>3,546</b>	<b>2,832</b>
PK	<b>912</b>	<b>745</b>
EK	<b>1,948</b>	<b>1,676</b>
DSEK, DSAEK, DLEK	1,117	1,004
DMEK or DMAEK	831	671
PDEK	0	0
Other EK	0	1
ALK	<b>177</b>	<b>105</b>
DALK (Deep Anterior Lamellar Keratoplasty)	152	99
SALK (Superficial Anterior Lamellar Keratoplasty)	15	2
Other ALK (e.g., peripheral, eccentric, etc.)	10	4
KLA	3	0
Keratoprosthesis (K-Pro)	18	12
Glaucoma shunt patch or other non-keratoplasty use	239	167
Other Keratoplasty (e.g., experimental surgery type)	1	3
Unknown or Unspecified	248	124
<b>Total intermediate-term preserved corneas, corneal segments, and whole eyes used for KERATOPLASTY</b>	<b>3,439</b>	<b>2,700</b>
<b>Total intermediate-term preserved corneas, corneal segments, and whole eyes used for TRANSPLANT</b>	<b>3,678</b>	<b>2,865</b>



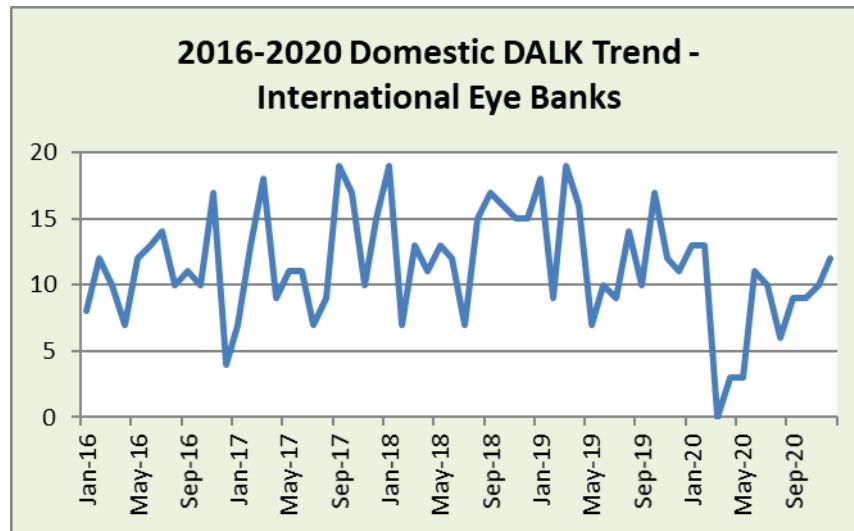
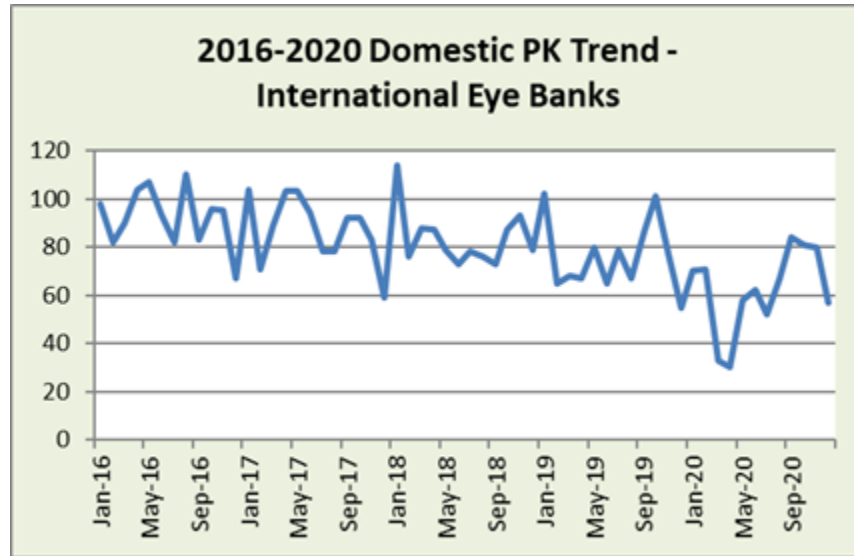
## 2020 International Eye Banking Statistics

### Domestic Surgery Use of Intermediate-Term Preserved Tissue

Surgery Type (Domestically Distributed Corneas) - International Eye Banks												
Month	PK	EK (DSEK)	EK (DMEK)	EK (Other)	ALK (DALK)	ALK (SALK)	ALK (Other)	KLA	K-Pro	Shunt Patch	Other	Unknown
Jan. 2020	20.7%	33.4%	28.4%	0.3%	3.8%	0.0%	0.0%	0.0%	1.2%	7.4%	0.0%	4.7%
Feb. 2020	23.0%	34.3%	28.2%	0.0%	4.2%	0.0%	0.0%	0.0%	0.6%	4.9%	0.0%	4.9%
Mar. 2020	32.4%	25.5%	31.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.9%	0.0%	7.8%
Apr. 2020	46.2%	21.5%	10.8%	0.0%	4.6%	0.0%	0.0%	0.0%	0.0%	9.2%	0.0%	7.7%
May 2020	45.7%	29.9%	18.1%	0.0%	2.4%	0.0%	0.8%	0.0%	0.0%	2.4%	0.8%	0.0%
Jun. 2020	26.2%	40.1%	18.6%	0.0%	4.6%	0.0%	0.0%	0.0%	0.0%	6.3%	0.0%	4.2%
Jul. 2020	25.9%	37.3%	22.9%	0.0%	5.0%	0.5%	1.5%	0.0%	0.5%	4.0%	0.5%	2.0%
Aug. 2020	26.5%	41.5%	20.2%	0.0%	2.4%	0.0%	0.0%	0.0%	0.4%	6.3%	0.4%	2.4%
Sep. 2020	29.0%	35.9%	23.4%	0.0%	3.1%	0.0%	0.0%	0.0%	0.3%	5.5%	0.0%	2.8%
Oct. 2020	24.6%	37.4%	25.2%	0.0%	2.7%	0.0%	0.0%	0.0%	0.3%	5.2%	0.0%	4.6%
Nov. 2020	23.7%	34.9%	23.1%	0.0%	3.0%	0.0%	0.0%	0.0%	0.3%	8.9%	0.0%	6.2%
Dec. 2020	23.5%	35.8%	23.0%	0.0%	4.9%	0.4%	0.0%	0.0%	0.4%	5.3%	0.0%	6.6%
<b>2016 Avg.</b>	30.1%	33.7%	16.1%	N/A	3.5%	0.0%	0.2%	0.1%	0.7%	8.5%	0.1%	7.1%
<b>2017 Avg.</b>	31.8%	32.0%	18.7%	0.1%	4.4%	0.3%	0.3%	0.2%	0.3%	6.9%	0.1%	5.0%
<b>2018 Avg.</b>	28.4%	30.5%	21.0%	0.1%	4.5%	0.3%	0.3%	0.1%	0.3%	6.9%	0.2%	7.4%
<b>2019 Avg.</b>	25.7%	31.5%	23.4%	0.0%	4.3%	0.4%	0.3%	0.1%	0.5%	6.7%	0.0%	7.0%
<b>2020 Avg.</b>	26.3%	35.5%	23.7%	0.0%	3.5%	0.1%	0.1%	0.0%	0.4%	5.9%	0.1%	4.4%
<b>Std. Dev.</b>	8.5%	5.8%	5.5%	0.1%	1.5%	0.2%	0.5%	0.0%	0.3%	2.1%	0.3%	2.4%

\*Percentages read from this table should be read as "of the tissue distributed for transplant use domestically"

## 2020 International Eye Banking Statistics Trends of Domestic Use

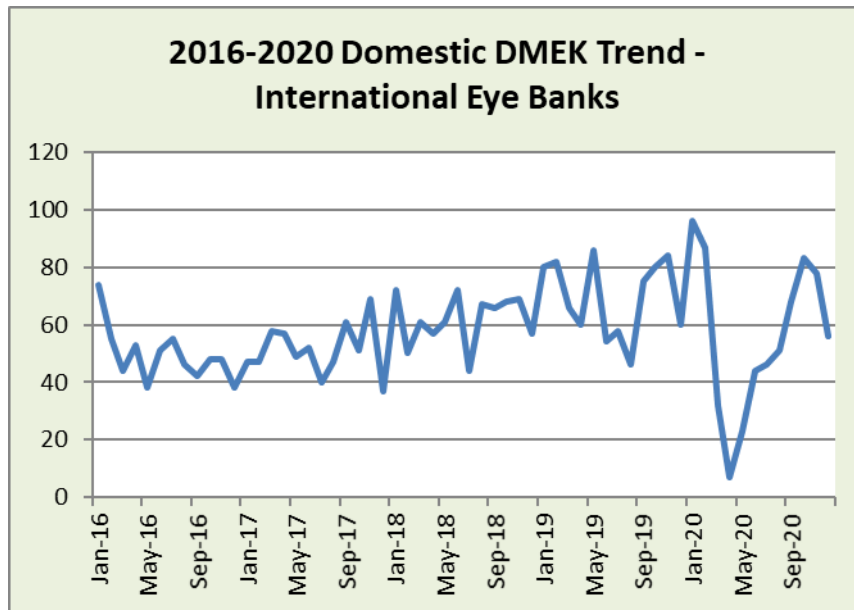
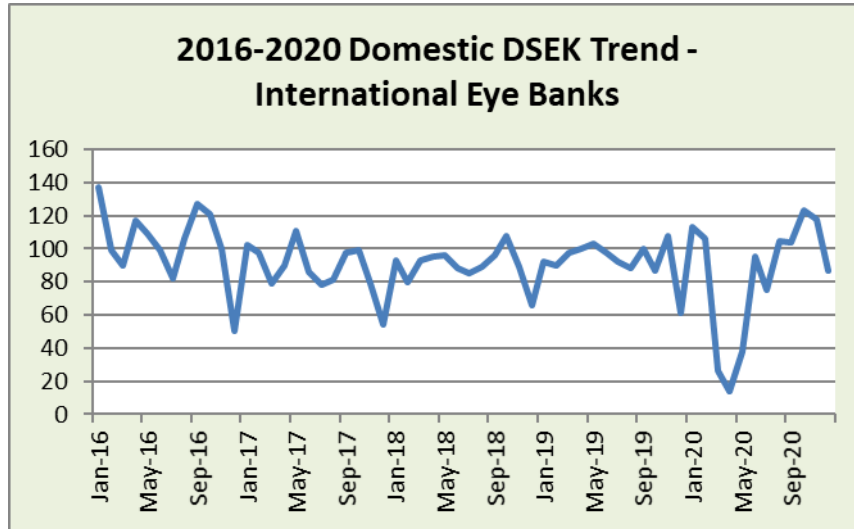




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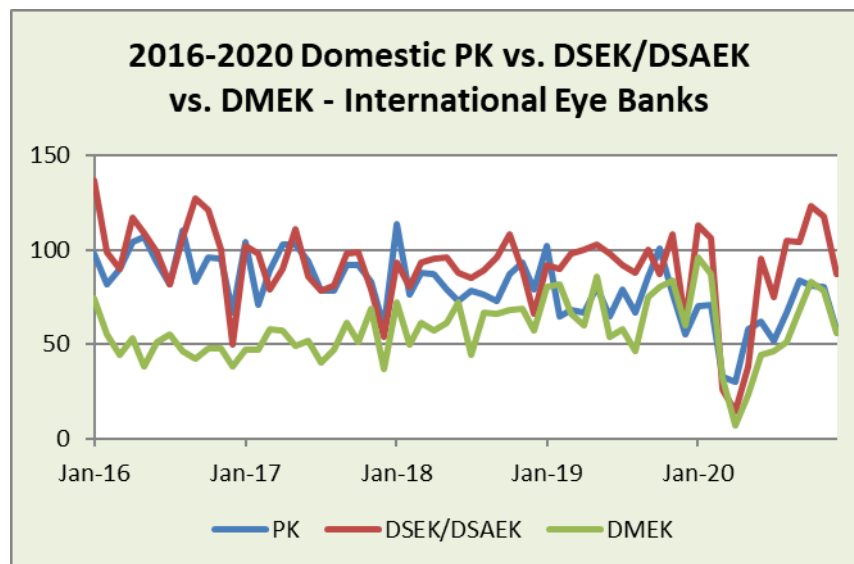
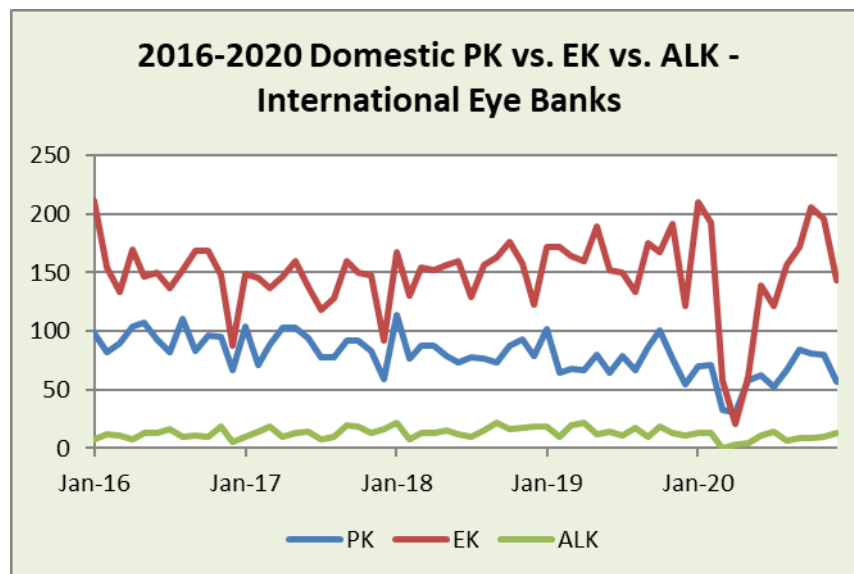
## 2020 International Eye Banking Statistics Trends of Domestic Use

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## 2020 International Eye Banking Statistics

### Domestic Surgery Use of Intermediate-Term Preserved Tissue

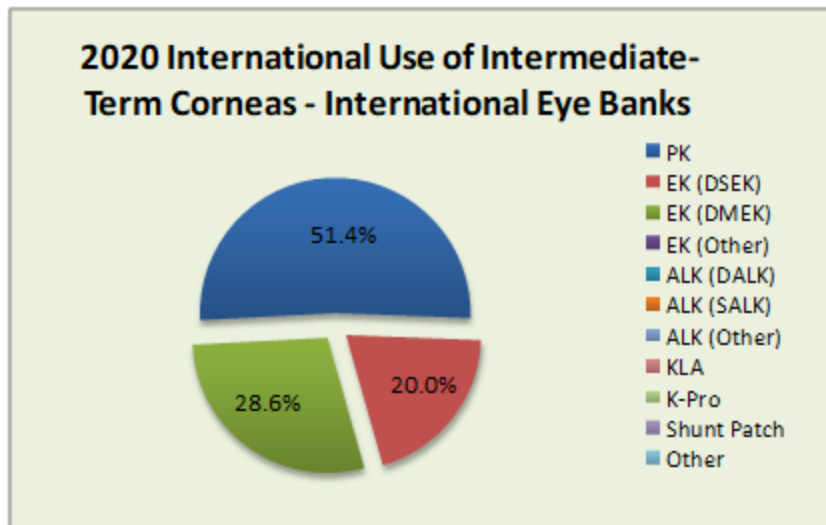


Surgical Outcomes of Corneas Recovered for Transplant Use - International Eye Banks										
Surgery Type	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trend
PK	1,246	1,356	1,539	1,403	1,399	1,248	1,055	1,001	763	
EK	1,271	1,491	1,669	1,523	1,890	1,736	1,865	1,991	1,693	
ALK	122	160	150	192	142	174	182	181	105	
KLA	0	0	0	8	4	6	3	3	0	
K-Pro	18	14	20	15	24	10	11	18	12	
Shunt Patch	169	227	304	240	313	229	245	239	167	
Other Keratoplasty	1	0	0	1	3	3	8	1	3	
Unknown	306	167	36	118	260	164	262	248	124	
Long-term Preserved	137	100	110	307	81	111	135	202	274	

## 2020 International Eye Banking Statistics

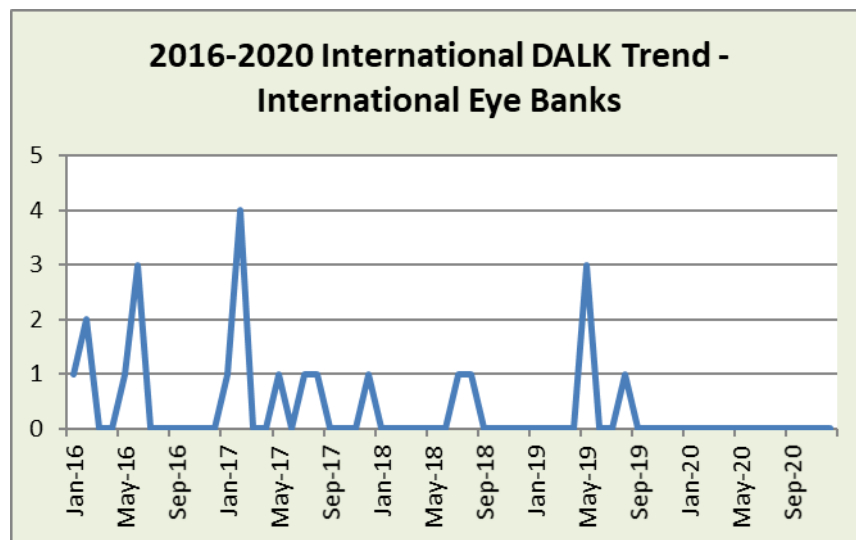
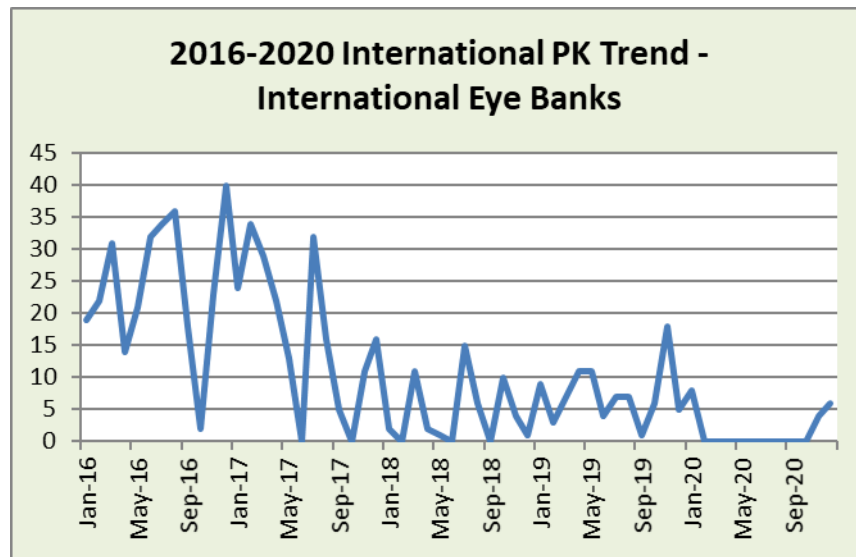
### International Surgery Use of Intermediate-Term Preserved Tissue

International Use of Intermediate-Term Corneas – International Eye Banks		
	2019	2020
Intermediate-term preserved corneas, corneal segments or whole eyes transplanted for:	<b>136</b>	<b>35</b>
PK	<b>89</b>	<b>18</b>
EK	<b>43</b>	<b>17</b>
DSEK, DSAEK, DLEK	16	7
DMEK or DMAEK	27	10
PDEK	0	0
Other EK	0	0
ALK	<b>4</b>	<b>0</b>
DALK (Deep Anterior Lamellar Keratoplasty)	4	0
SALK (Superficial Anterior Lamellar Keratoplasty)	0	0
Other ALK (e.g., peripheral, eccentric, etc.)	0	0
KLA	0	0
Keratoprosthesis (K-Pro)	0	0
Glaucoma shunt patch or other non-keratoplasty use	0	0
Other Keratoplasty (e.g., experimental surgery type)	0	0
Unknown or Unspecified	0	0
<b>Total intermediate-term preserved corneas, corneal segments, and whole eyes used for KERATOPLASTY</b>	<b>3,439</b>	<b>2,700</b>
<b>Total intermediate-term preserved corneas, corneal segments, and whole eyes used for TRANSPLANT</b>	<b>3,678</b>	<b>2,865</b>

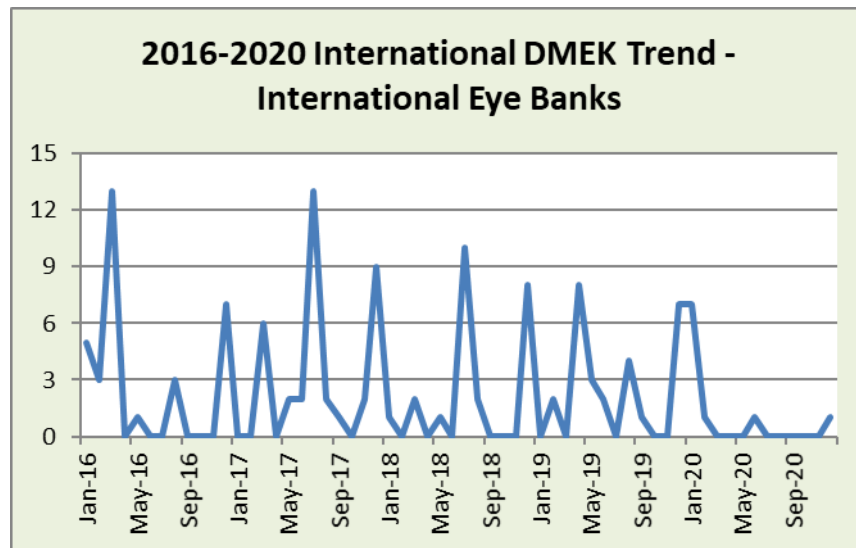
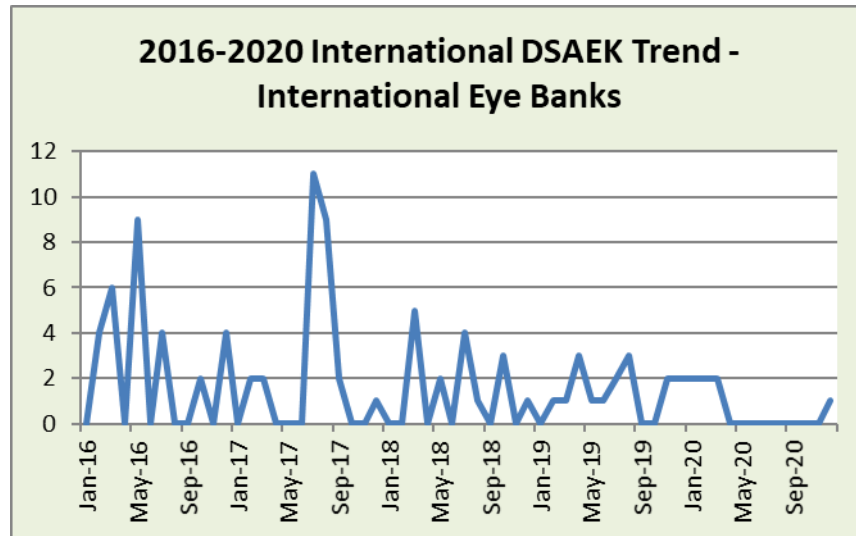


## 2020 International Eye Banking Statistics International Surgery Use of Intermediate-Term Preserved Tissue

Surgery Type (Internationally Distributed Corneas) - International Eye Banks												
Year	PK	EK (DSEK)	EK (DMEK)	EK (Other)	ALK (DALK)	ALK (SALK)	ALK (Other)	KLA	K-Pro	Shunt Patch	Other	Unknown
2016	292	29	32	0	7	0	0	0	0	2	1	0
2017	202	27	37	0	9	0	0	0	0	1	0	0
2018	52	16	24	0	2	0	0	0	0	2	0	0
2019	89	16	27	0	4	0	0	0	0	0	0	0
2020	18	7	10	0	0	0	0	0	0	0	0	0

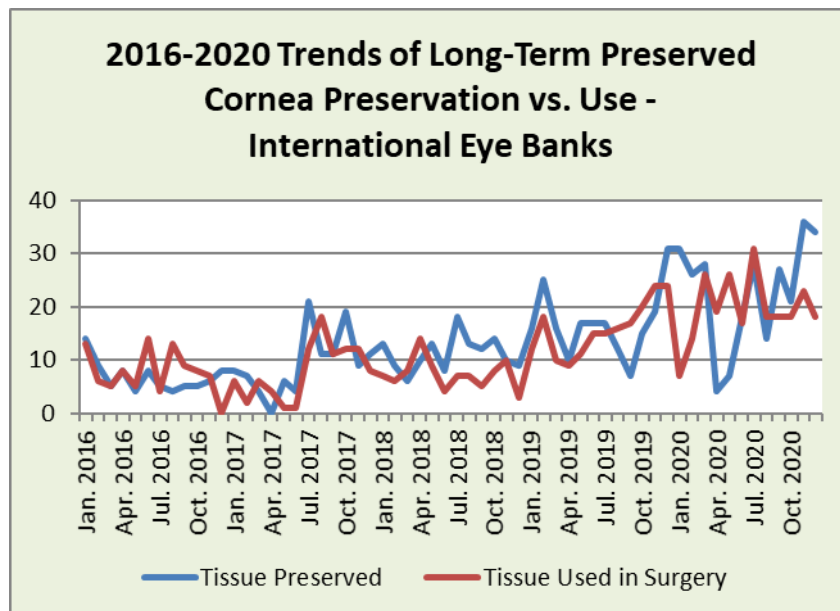


## 2020 International Eye Banking Statistics Trends of International Use






## 2020 International Eye Banking Statistics Long-Term Tissue Distribution

Long-Term Preserved Tissue Preservation and Distribution		
	2019	2020
Long-term preserved corneas or whole globes PRESERVED for transplant	202	274
Long-term preserved corneas, corneal segments, or whole globes DISTRIBUTED for:	191	235
Keratoplasty	13	4
Glaucoma Shunt patching	126	166
Other Surgical Uses	52	65
Long-term preserved corneas, corneal segments, or whole globes FORWARDED to another entity for final distribution	62	62
Sclera or sclera segments PRESERVED for transplantation	1,879	1,616
Sclera or sclera segments DISTRIBUTED for:	1,420	1,332
Prosthesis following enucleation	33	43
Glaucoma shunt patching	1,246	1,171
Other surgical uses	141	118
Sclera or sclera segments FORWARDED to another entity for final distribution	2	17

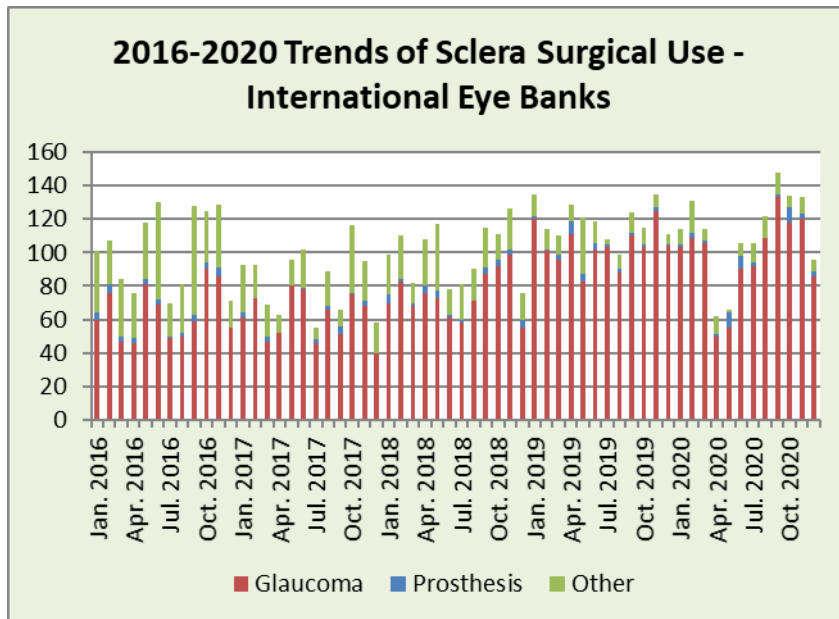
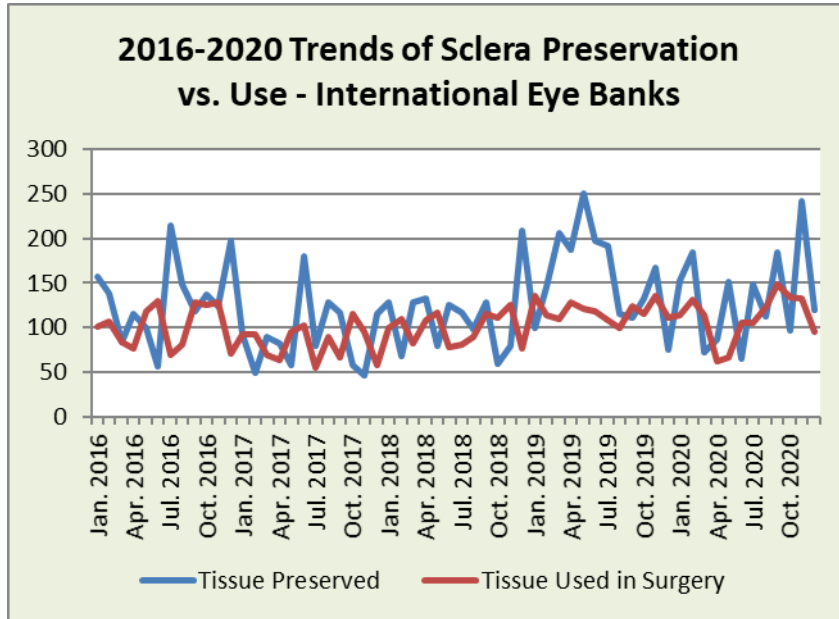


## 2020 International Eye Banking Statistics Long-Term Tissue Trends

Ocular Tissue Used for Glaucoma Shunt Patching - International Eye Banks										
Ocular Tissue Used for Glaucoma Shunt Patching	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Long-Term Cornea	119	110	101	102	89	62	62	126	0	
Intermediate-Term Cornea	169	227	304	240	313	229	245	239	167	
Sclera	609	597	679	611	773	737	893	1246	0	

Long-Term Tissue Trends - International Eye Banks								
Month	Long-Term Preserved Corneas	Long-Term Cornea Use - Keratoplasty	Long-Term Cornea Use - Glaucoma	Long-Term Cornea Use - Other	Scleral Segments Preserved	Sclera Use - Prosthesis	Sclera Use - Glaucoma	Sclera Use - Other
Jan. 2020	31	0	4	3	153	2	103	9
Feb. 2020	26	1	10	3	185	3	109	19
Mar. 2020	28	0	19	7	72	1	106	7
Apr. 2020	4	1	14	4	86	1	50	11
May 2020	7	0	20	6	151	9	55	2
Jun. 2020	18	0	7	10	65	8	90	8
Jul. 2020	28	1	19	11	148	2	92	12
Aug. 2020	14	1	12	5	113	0	109	13
Sep. 2020	27	0	14	4	184	2	133	13
Oct. 2020	21	0	13	5	97	9	118	7
Nov. 2020	36	0	19	4	242	3	120	10
Dec. 2020	34	0	15	3	120	3	86	7
<b>2016 Total</b>	<b>81</b>	<b>2</b>	<b>89</b>	<b>1</b>	<b>1,398</b>	<b>39</b>	<b>773</b>	<b>265</b>
<b>2017 Total</b>	<b>111</b>	<b>6</b>	<b>62</b>	<b>25</b>	<b>1,097</b>	<b>20</b>	<b>737</b>	<b>238</b>
<b>2018 Total</b>	<b>135</b>	<b>3</b>	<b>62</b>	<b>23</b>	<b>1,352</b>	<b>36</b>	<b>893</b>	<b>264</b>
<b>2019 Total</b>	<b>202</b>	<b>13</b>	<b>126</b>	<b>52</b>	<b>1,879</b>	<b>33</b>	<b>1246</b>	<b>141</b>
<b>2020 Total</b>	<b>274</b>	<b>4</b>	<b>166</b>	<b>65</b>	<b>1,616</b>	<b>43</b>	<b>1171</b>	<b>118</b>
<b>2020 Avg.</b>	<b>23</b>	<b>0</b>	<b>14</b>	<b>5</b>	<b>135</b>	<b>4</b>	<b>98</b>	<b>10</b>
<b>Std. Dev.</b>	<b>10</b>	<b>0</b>	<b>5</b>	<b>3</b>	<b>53</b>	<b>3</b>	<b>25</b>	<b>4</b>

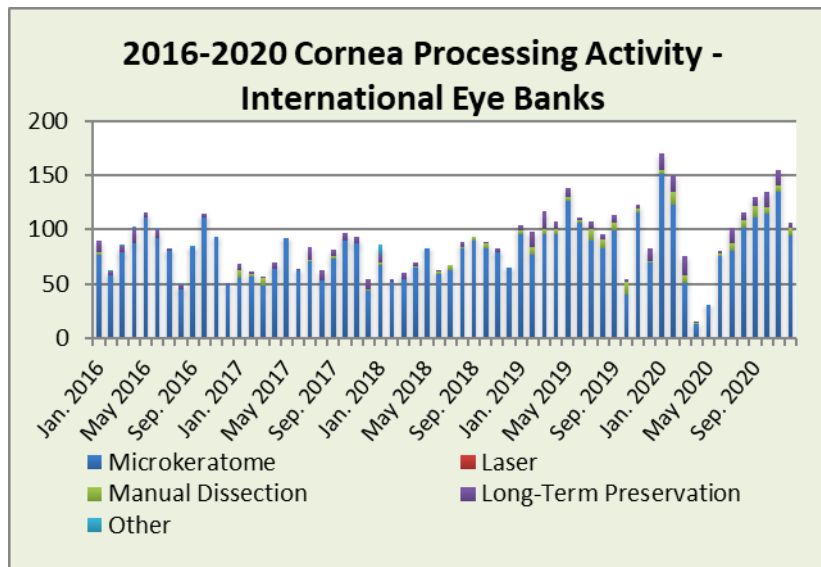
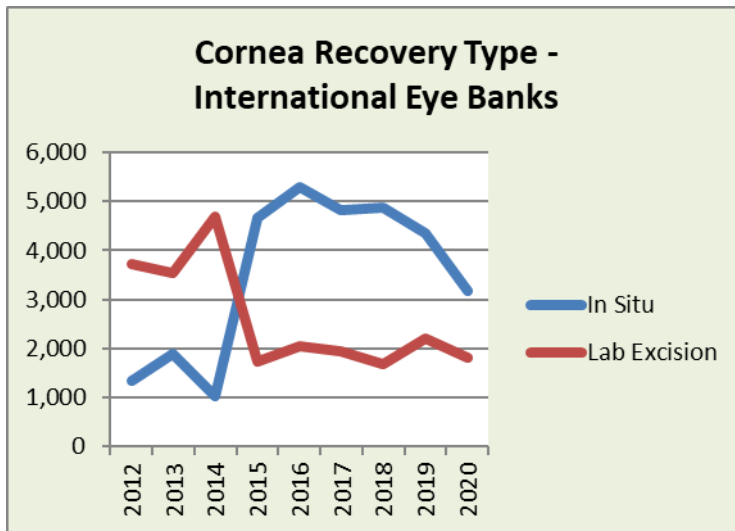
## 2020 International Eye Banking Statistics Long-Term Tissue Trends





## 2020 International Eye Banking Statistics Tissue Processing

Tissue Processing for Transplant – International Eye Banks		
	2019	2020
Eye Processing (does not include in situ excision)	<b>2,191</b>	<b>1,806</b>
Processed for corneal preservation only	1,422	1,179
Processed for sclera preservation	727	578
Processed for other ocular materials	42	49
Cornea Processing	<b>1,250</b>	<b>1,265</b>
Processed by microkeratome	1,093	1,081
Processed by laser	0	0
Processed by hand dissection	67	66
Processed by transfer into long-term preservation	90	118
Processed by other methods	0	0



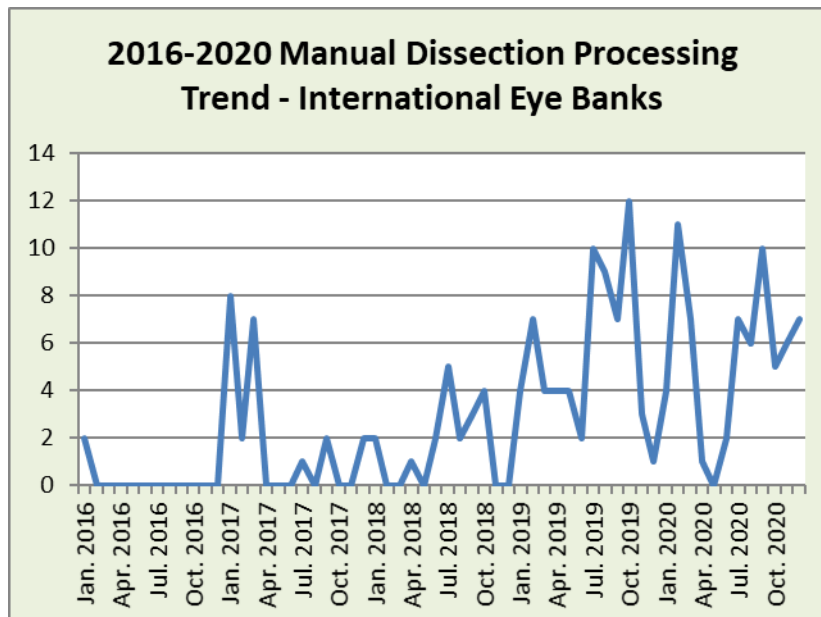
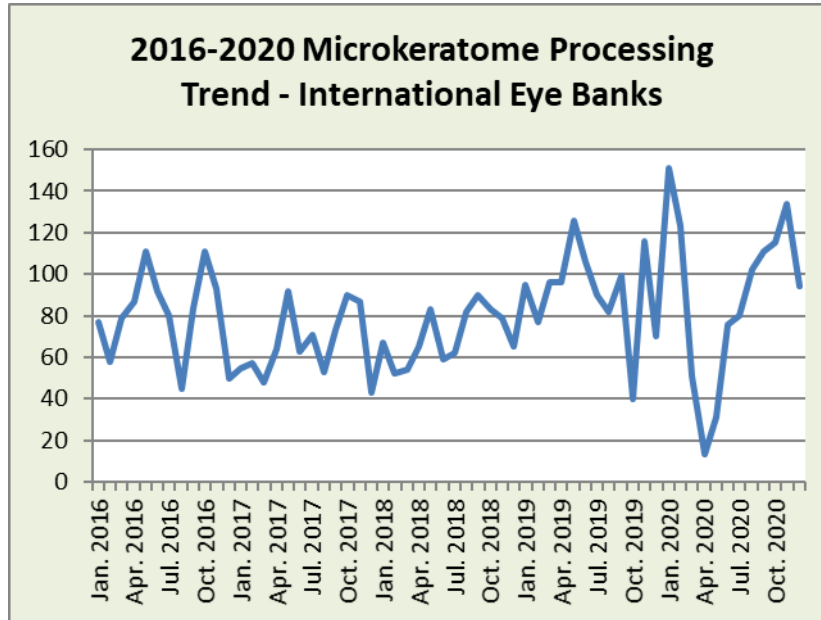
## 2020 International Eye Banking Statistics Tissue Processing

Cornea Processing - International Eye Banks					
Month	Processing - Microkeratome	Processing - Laser	Processing - Manual	Processing - Long-Term Preservation	Processing - Other
Jan. 2020	151	0	4	15	0
Feb. 2020	123	0	11	16	0
Mar. 2020	51	0	7	17	0
Apr. 2020	13	0	1	1	0
May 2020	31	0	0	0	0
Jun. 2020	76	0	2	2	0
Jul. 2020	80	0	7	15	0
Aug. 2020	102	0	6	8	0
Sep. 2020	111	0	10	9	0
Oct. 2020	115	0	5	15	0
Nov. 2020	134	0	6	15	0
Dec. 2020	94	0	7	5	0
<b>2016 Total</b>	864	0	2	57	6
<b>2017 Total</b>	796	0	22	64	0
<b>2018 Total</b>	841	0	19	31	9
<b>2019 Total</b>	1093	0	67	90	0
<b>2020 Total</b>	1081	0	66	118	0
<b>2020 Avg.</b>	90	0	6	10	0
<b>Std. Dev.</b>	42	0	3	6	0

Cornea Processing Success Rates - International Eye Banks										
	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
Processing Events	556	451	664	719	929	882	900	1,250	1,265	
Failed Processing	53	55	64	49	66	55	60	65	58	
Failure Rate	90.5%	87.8%	90.4%	93.2%	92.9%	93.8%	93.3%	94.8%	95.4%	

Cornea Recovery Methods - International Eye Banks										
	2012	2013	2014	2015	2016	2017	2018	2019	2020	Trends
In Situ	1,327	1,897	1,024	4,667	5,283	4,813	4,872	4,360	3,166	
Lab Excision	3,731	3,530	4,702	1,736	2,050	1,940	1,687	2,191	1,806	

## 2020 International Eye Banking Statistics Tissue Processing



## 2020 International Eye Banking Statistics Indications for Corneal Transplant

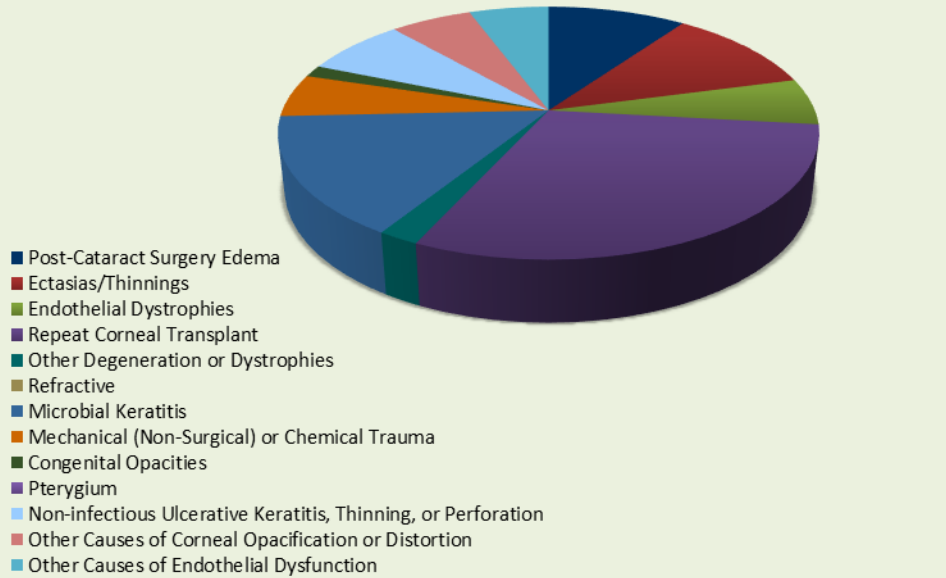
Indications for Penetrating Keratoplasty 2020	Domestic Use		International Use	
A. Post-cataract surgery edema	66	8.9%	3	16.7%
B. Ectasias/Thinnings	74	9.9%	3	16.7%
C. Endothelial Dystrophies	40	5.4%	0	0.0%
D. Repeat Corneal Transplant	202	27.1%	0	0.0%
E. Other degenerations or dystrophies	14	1.9%	0	0.0%
F. Refractive	0	0.0%	0	0.0%
G. Microbial keratitis	103	13.8%	1	9.1%
H. Mechanical or chemical trauma	37	5.0%	0	0.0%
I. Congenital opacities	10	1.3%	0	0.0%
J. Pterygium	0	0.0%	0	0.0%
K. Non-infectious ulcerative keratitis or perforation	49	6.6%	0	0.0%
L. Other causes of corneal dysfunction or distortion (non-endothelial)	39	5.2%	0	0.0%
M. Other causes of endothelial dysfunction	38	5.1%	0	0.0%
Z. Unknown, unreported, or unspecified	73	9.8%	11	61.1%
<b>Total Indications for Penetrating Keratoplasty</b>	<b>745</b>		<b>18</b>	

Indications for Anterior Lamellar Keratoplasty	Domestic Use		International Use	
B. Ectasias/Thinnings	43	41.0%	0	0.0%
D. Repeat Corneal Transplant	3	2.9%	0	0.0%
E. Other degenerations or dystrophies	13	12.4%	0	0.0%
F. Refractive	0	0.0%	0	0.0%
G. Microbial keratitis	9	8.6%	0	0.0%
H. Mechanical or chemical trauma	9	8.6%	0	0.0%
I. Congenital opacities	1	1.0%	0	0.0%
J. Pterygium	2	1.9%	0	0.0%
K. Non-infectious ulcerative keratitis or perforation	3	2.9%	0	0.0%
L. Other causes of corneal dysfunction or distortion	11	10.5%	0	0.0%
Z. Unknown, unreported, or unspecified	11	10.5%	0	0.0%
<b>Total for Anterior Keratoplasty</b>	<b>105</b>		<b>0</b>	

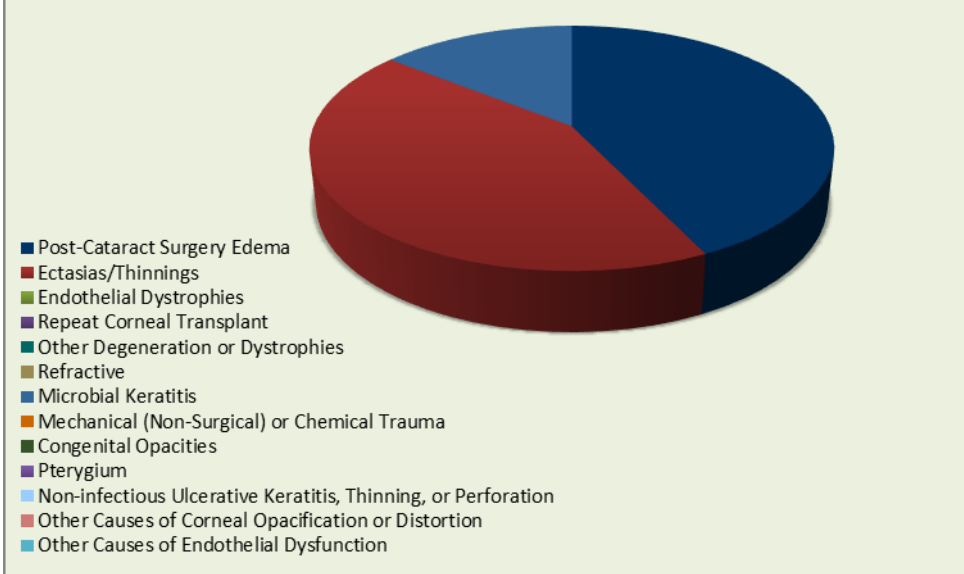
Indications for Endothelial Keratoplasty	Domestic Use		International Use	
A. Post-Cataract Surgery Edema	277	16.5%	4	23.5%
C. Endothelial Dystrophies	586	35.0%	2	11.8%
D. Repeat Corneal Transplant	178	10.6%	1	5.9%
M. Other Causes of Endothelial Dysfunction	65	3.9%	0	0.0%
Z. Unknown, unreported, or unspecified	570	34.0%	10	58.8%
<b>Total for Endothelial Keratoplasty</b>	<b>1,676</b>		<b>17</b>	

## 2020 International Eye Banking Statistics Indications for Corneal Transplant

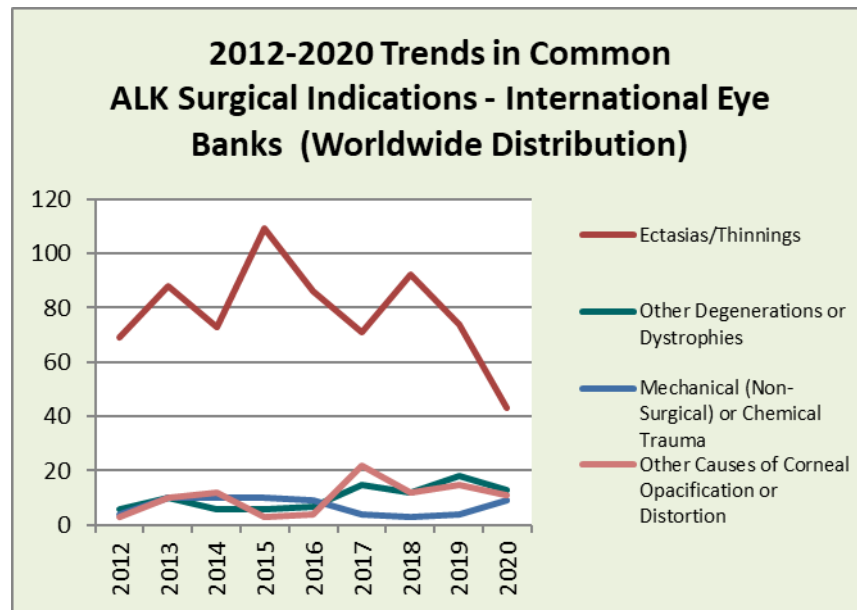
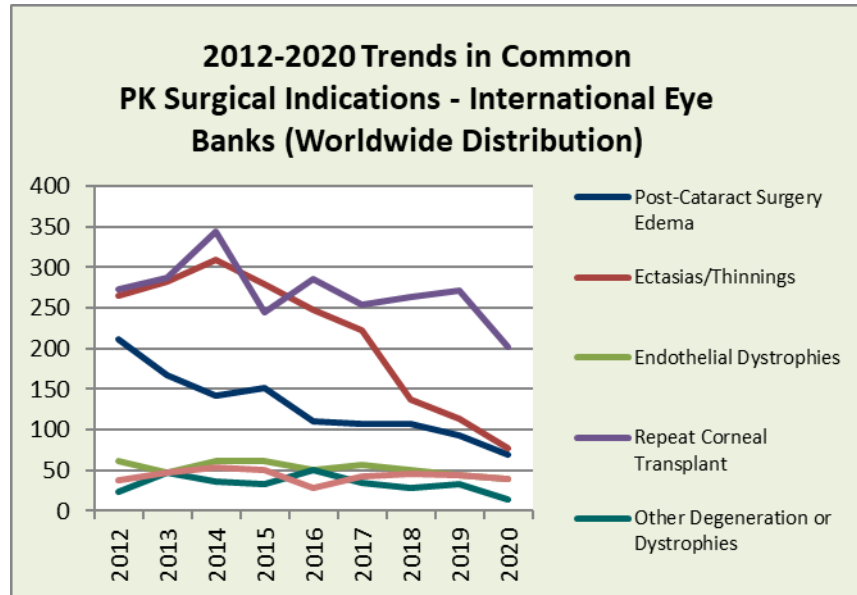
**2020 Indications for Penetrating Keratoplasty -  
International Eye Banks (Domestic Distribution)**



**2020 Indications for Penetrating Keratoplasty -  
International Eye Banks (International Distribution)**

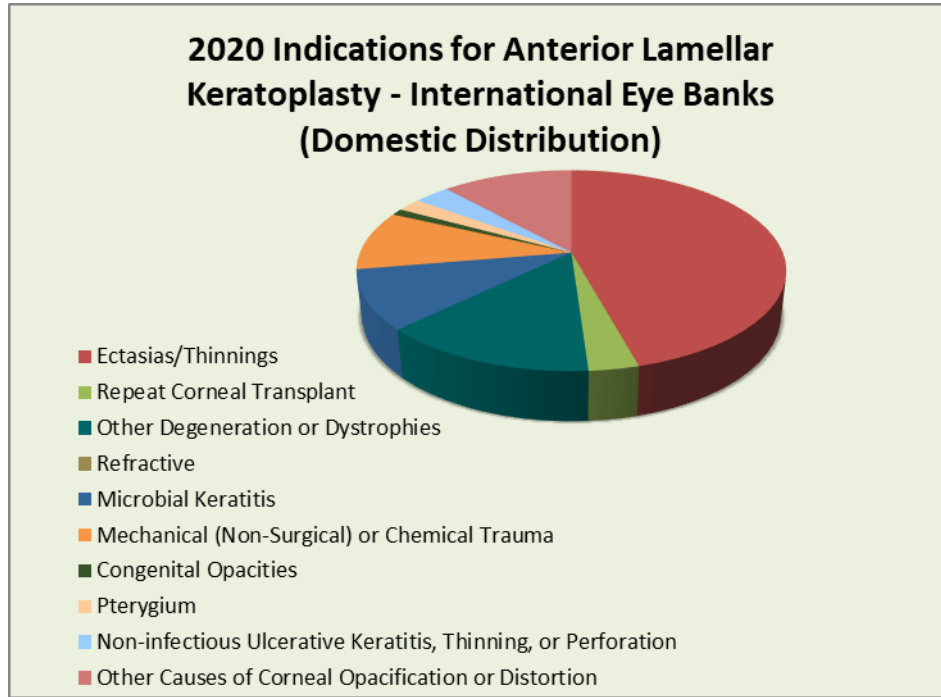


## 2020 International Eye Banking Statistics Indications for Corneal Transplant

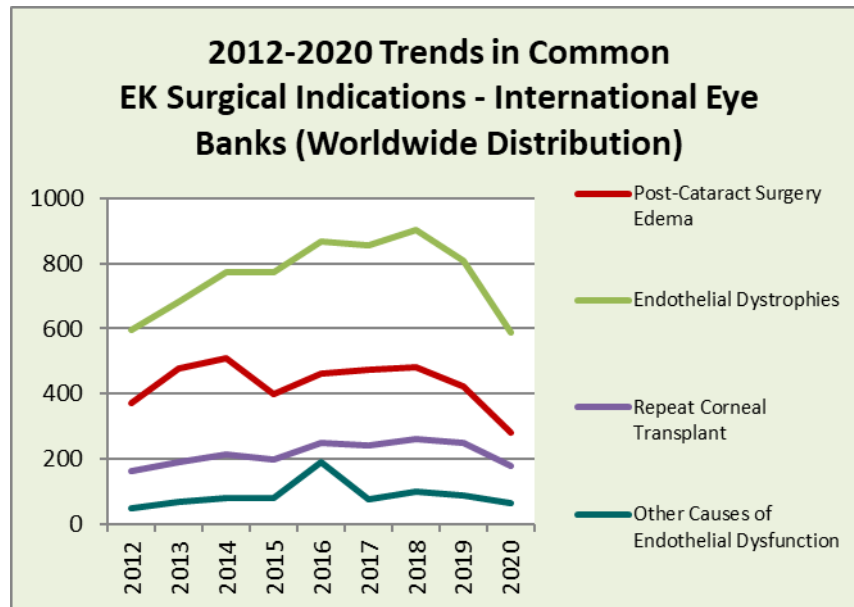


\*Worldwide Distribution = Combined Domestic and International Distribution

## 2020 International Eye Banking Statistics Indications for Corneal Transplant



Note: There was no international ALK use of international eye bank tissue in 2020.



\*Worldwide Distribution = Combined Domestic and International Distribution

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## 2020 International Eye Banking Statistics Indications for Corneal Transplant

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**2020 Indications for Endothelial Keratoplasty -  
International Eye Banks (Domestic Distribution)**



- Post-Cataract Surgery Edema
- Endothelial Dystrophies
- Repeat Corneal Transplant
- Other Causes of Endothelial Dysfunction

**2020 Indications for Endothelial Keratoplasty -  
International Eye Banks (International  
Distribution)**



- Post-Cataract Surgery Edema
- Endothelial Dystrophies
- Repeat Corneal Transplant
- Other Causes of Endothelial Dysfunction



## 2020 International Eye Banking Statistics Indications for Corneal Transplant

2020 (Domestically Distributed Corneas Only) - International Eye Banks														
	A	B	C	D	E	F	G	H	I	J	K	L	M	Z
PK	66	74	40	202	14	0	103	37	10	0	49	39	38	73
EK	277		586	178									65	570
ALK		43		3	13	0	9	9	1	2	3	104		11

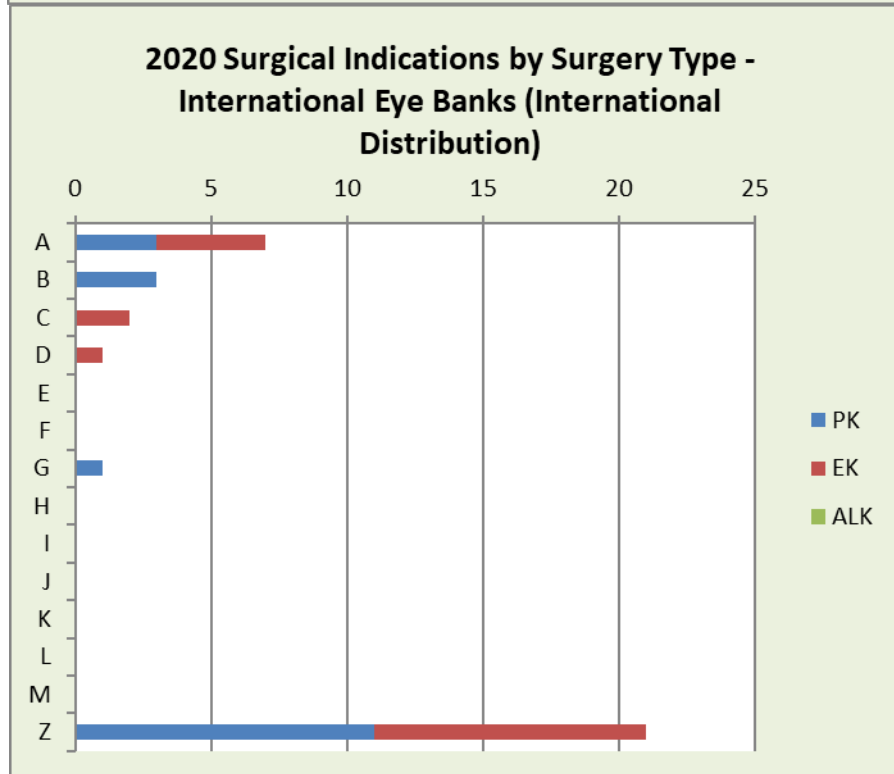
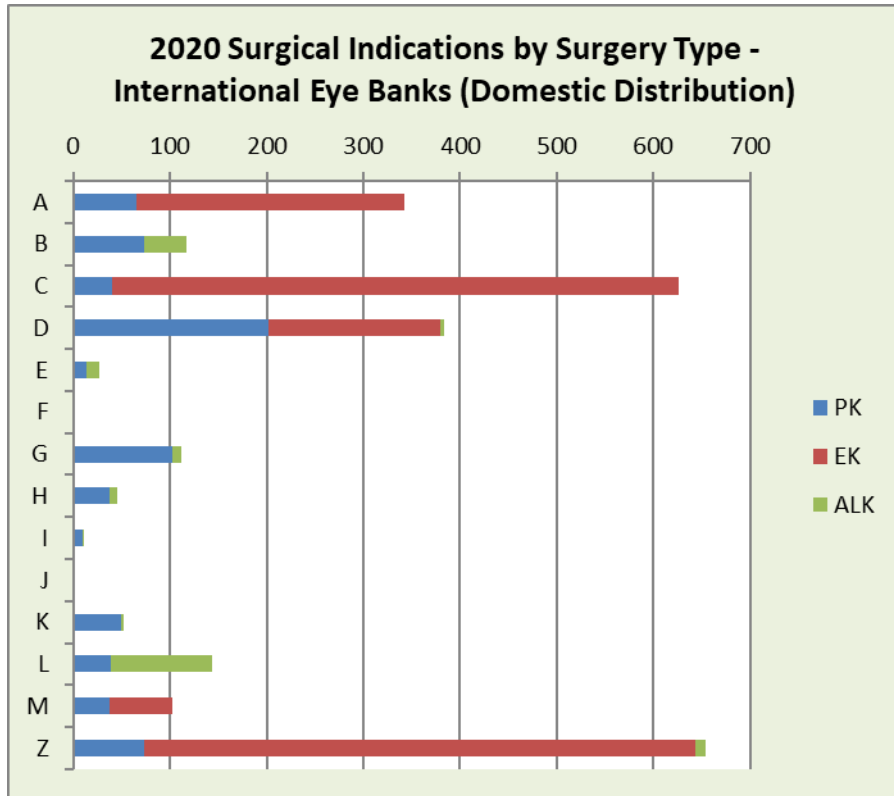
2020 (Internationally Distributed Corneas Only) - International Eye Banks														
	A	B	C	D	E	F	G	H	I	J	K	L	M	Z
PK	3	3	0	0	0	0	1	0	0	0	0	0	0	11
EK	4		2	1									0	10
ALK		0		0	0	0	0	0	0	0	0	0		0

2020 (Combined Domestic & International Distributed Corneas) - International Eye Banks														
	A	B	C	D	E	F	G	H	I	J	K	L	M	Z
PK	69	77	40	202	14	0	104	37	10	0	49	39	38	84
EK	281		588	179									65	580
ALK		43		3	13	0	9	9	1	2	3	11		11

\*Worldwide Distribution = Combined Domestic and International Distribution

- A - Post-Cataract Surgery Edema
- B - Ectasias/Thinning
- C - Endothelial Dystrophies
- D - Repeat Corneal Transplant
- E - Other Degeneration or Dystrophies
- F - Refractive
- G - Microbial Keratitis
- H - Mechanical (Non-Surgical) or Chemical Trauma
- I - Congenital Opacities
- J - Pterygium
- K - Non-infectious Ulcerative Keratitis, Thinning, or Perforation
- L - Other Causes of Corneal Opacification or Distortion
- M - Other Causes of Endothelial Dysfunction
- Z - Unknown or Unreported

## 2020 International Eye Banking Statistics Indications for Corneal Transplant



## Eye Banks Submitting Data for the 2020 Eye Banking Statistical Report

STATE	EYE BANK NAME	CITY
AL	Advancing Sight Network	Birmingham
AR	Arkansas Lions Eye Bank & Laboratory	Little Rock
AZ	Donor Network of Arizona	Tempe
CA	One Legacy	Los Angeles
	San Diego Eye Bank	San Diego
	Sierra Donor Services Eye Bank	West Sacramento
CO	Rocky Mountain Lions Eye Bank	Aurora
FL	Florida Lions Eye Bank	Miami
	Lions Eye Institute for Transplantation and Research	Tampa
GA	Georgia Eye Bank	Atlanta
HI	Lions Eye Bank of Hawaii	Honolulu
IA	Iowa Lions Eye Bank	Coralville
ID	Envision	Boise
IN	VisionFirst	Carmel
KS	Kansas Eye Bank & Cornea Research Center	Wichita
KY	Kentucky Lions Eye Bank	Louisville
LA	Baton Rouge Regional Eye Bank	Baton Rouge
	Southern Eye Bank	Metairie
MI	Eversight	Ann Arbor
MN	Lions Gift of Sight	Minneapolis
MO	Mid-America Transplant	St. Louis
	Saving Sight	Kansas City
MS	Mississippi Lions Eye Bank	Flowood
NC	LifeShare Carolinas	Charlotte
	Miracles in Sight.	Winston-Salem
NE	Lions Eye Bank of Nebraska	Omaha
NM	New Mexico Lions Eye Bank	Albuquerque
NV	Nevada Donor Network	Las Vegas
NY	Sight Society of Northeastern New York	Albany
	The Lions Eye Bank for Long Island	Valley Stream
	The Eye-Bank for Sight Restoration	New York
	ConnectLife	Williamsville
OH	Central Ohio Lions Eye Bank	Columbus
	Cincinnati Eye Bank	Cincinnati
	Lions Eye Bank of West Central Ohio	Dayton
OK	Oklahoma Lions Eye Bank	Oklahoma City
OR	Lions VisionGift	Portland

STATE	EYE BANK NAME	CITY
PA	Center for Organ Recovery & Education (CORE)	Pittsburgh
	Gift of Life Donor Program Eye Bank	Hershey
	Lions Eye Bank of Delaware Valley	Philadelphia
	Lions Eye Bank of NW PA	Erie
PR	Lions Eye Bank of Puerto Rico	San Juan
SD	Dakota Lions Sight and Health	Sioux Falls
TN	East Tennessee Lions Eye Bank	Knoxville
	Mid-South Eye Bank	Memphis
TX	Great Plains Lions Eye Bank	Lubbock
	Lions Eye Bank of Texas at Baylor College of Medicine	Houston
	Miracles in Sight - Lone Star Division	Manor
	Transplant Services Center, UT Southwestern Medical Center	Dallas
	Western Texas Lions Eye Bank Alliance	San Angelo
	San Antonio Eye Bank	San Antonio
UT	Utah Lions Eye Bank	Murray
VA	Lions Medical Eye Bank & Research Center of Eastern VA	Norfolk
	Old Dominion Eye Foundation	Richmond
WA	SightLife Corporate	Seattle
	CorneaGen	Seattle
WI	Lions Eye Bank of Wisconsin	Madison
WV	Medical Eye Bank of West Virginia	Charleston

COUNTRY	EYE BANK NAME	CITY
Canada	Lions Eye Bank	Calgary, AB
	Eye Bank of British Columbia	Vancouver, BC
	Tissue Bank Manitoba Shared Health	Winnipeg, MB
	New Brunswick Organ and Tissue Program- Ocular Division	Saint John, NB
	Regional Tissue Bank	Halifax, NS
	Eye Bank of Canada, Ontario Division	Toronto, ON
	Eye Bank of Saskatchewan	Saskatoon, SK
China	Daqing Eye Bank	Daqing
Germany	Hornhautbank Muenchen gGmbH	Munich
Hong Kong	Hospital Authority Eye Bank	Kowloon
Japan	Cornea Center & Eye Bank	Ichikawa City