EYE BANK ASSOCIATION OF AMERICA

Medical Advisory Board Meeting
November 2, 2022

I.	Welcome and Introductions	Winston Chamberlain, MD, PhD
II.	Approval of Minutes	Eric Meinecke
III.	Reports	
	Medical Review Subcommittee	Elmer Tu, MD
	Policy & Position Review Subcommittee	Asim Farooq, MD
	Accreditation Board	Lisa Brooks / Bennie Jeng, MD
	Certification Board	Adam Stockman
	Technician Education Committee	Ingrid Schunder
	Technical Procedures Manual	Vicki Adler
IV.	Old Business	
	Data Integrity Subcommittee Report	Brian Philippy
V.	New Business	
	L1.100 Tissue Report Form Matrix II	Andrew Officer
	6-Month Data Review	Jennifer DeMatteo
	Storage Solution Observations	Brian Philippy
VI.	Late Additions	
	HTLV I/II Antibody	Edwin Roberts
	B&L Viewing Chambers	Jennifer DeMatteo
VII.	For Information and Review	
	Regulation of HCT/Ps Small Entity Compliance Guide	
VIII.	Adjourn	

Approval of Minutes

Eye Bank Association of America
Medical Advisory Board Meeting Minutes
Hilton Baltimore Inner Harbor
June 3, 2022

Dr. Win Chamberlain called the meeting to order. The following Medical Advisory Board members were in attendance:

Winston Chamberlain, MD, PhD	MAB Chair
Shahzad Mian, MD	MAB Vice Chair
Marcy Dimond, CEBT	
Beverly Bliss, CTBS	AATB Liaison, Ex-Officio
Lisa Brooks, CEBT	Accreditation Board Vice Chair
Kevin Corcoran, CAE	EBAA, President & CEO
Jennifer DeMatteo, MCM, CIC	EBAA, Director of Regulations & Standards
Donna Drury, CEBT	
David Glasser, MD	
Mark Greiner, MD	
Brian Ha, CEBT	
Bennie Jeng, MD	
Sara Kerr, CEBT	Certification Board Chair
Chris Ketcherside, MD	
Jennifer Li, MD	EBAA, Chair Elect
Amy Lin, MD	
John Lohmeier, CEBT	
Kristin Mathes	
Kyle Mavin, CEBT	Accreditation Board Co-Chair
Kristen McCoy, CEBT	
Eric Meinecke, CEBT	MAB Secretary
Noel Mick	EBAA Chair, Ex-Officio
Brian Philippy, CEBT	
Graeme Pollock, PhD	
Jim Quirk, CEBT	
Michelle Rhee, MD	Accreditation Board Co-Chair
Edwin Roberts, CEBT	
Chris Stoeger, CEBT	
Michael Titus, CEBT	Tech Procedures Manual Subcommittee Chair
Michael Tramber, CEBT	
Woodford Van Meter, MD	
David Verdier, MD	
Troy Win'E, CEBT	Technician Education Committee Chair

A motion was made and seconded to approve the minutes from the November 11, 2021 meeting. The minutes were approved.

Medical Review Subcommittee Report

Jennifer DeMatteo presented the Medical Review Subcommittee Report.

-There were 76 Primary Graft Failures reported in 2021 (up from 70 in 2020): 16 PK, 32 DSAEK, and 28 DMEK
-There were 61 Early regrafts reported in 2021 (down from 78 in 2020): 6 PK, 17 DSAEK, and 38 DMEK
-There were 8 Endophthalmitis cases reported in 2021 (down from 13 in 2020): 4 PK, 1 DSAEK, and 3 DMEK
-There were 17 Infectious keratitis cases reported in 2021 (up from 6 in 2020): 7 PK, 2 ALK, 2 DSAEK, 5 DMEK, and 1 K-Pro

We had 1 donor corneal dystrophy reported for 2021.

The Systemic Infection reports [1 in 2018 and 2 in 2019] were CJD cases in corneal recipients which upon CDC investigation was determined to NOT be tissue related.

Other: 2020 was non-inflammatory corneal necrosis; 2021 was an interface infection; 2022 there was a significant adverse event – Hepatitis B Core AB positive exposure.

Mated Cases – The OARRS Report Summary contains a Mated Cases row, which is consistently zero. We have checked the programming for the Summary Report and do not see any logic for calculating it. This is a separate item than the line for concurrent positive cultures which maps to the Do Cultures Match on the report under Endophthalmitis and Keratitis. The Medical Review Subcommittee will need to decide whether to remove this line item or build in logic for when this is yes. This will require minor programming and education for eye bank reporting.

Preoperative Diagnosis – The listing does not mirror the verbiage in the Stat report, so OARRS lists C as Fuchs' dystrophy instead of Endothelial Dystrophies and reporters are reclassifying these cases.

Pathogen List – We have several "Other" pathogens which should be added to the pathogen dropdown menu. For example, we had several Saccharomyces spp. and Cryptococcus spp. cases this year. The MRS will need to determine which pathogens to add and then Jennifer will need to manually edit old reports to clean up the OARRS database.

OARRS User Guide – We have an OARRS Guidance for investigating adverse reaction reports, but do not have a guide for entering these reports into the OARRS database. A few eye bankers from the MRS and QA Committee could develop a how-to video for entering these cases, so that the data is consistent.

Dr. Elmer Tu is the incoming chair of the MRS.

Policy and Position Review Subcommittee

Dr. Jennifer Li directed MAB members to the agenda package to view the Updated Guidance and COVID-19 Screening Recommendations (March 14, 2022). The Policy and Position Review Subcommittee (PPRS) will be meeting again soon, and Dr. Li reported that despite 18 corneas being distributed and transplanted from COVID positive donors, no transmission of the virus has been reported. Dr. Chamberlain and Dr. Mian reminded the MAB that the PPRS is always seeking feedback on the guidance. If there are any questions or suggestions, Dr. Asim Farooq is the incoming chair of the PPRS.

Accreditation Board

Kyle Mavin presented the Accreditation Board report. Eleven eye banks were eligible for inspection and reaccreditation during the Spring 2022 cycle. One bank declined to be inspected and ten were inspected. Of the ten banks inspected, nine received a 3-year accreditation and one bank received a 1-year accreditation.

Certification Board

Sara Kerr presented the Certification Board report. The Certification Board met January 13th and approved to allow remote observations for the competency verification reviews that are a part of the CEBT Exam application process. The new guideline encourages in person observations but states that if a remote observation is conducted, it must be live and there must be a third person controlling the camera. The Fall CEBT Exam took place October 9 - 23 in the US and Canada. A total of 15 candidates took the exam, and 13 passed (86.7% passing rate). A special congratulations to Marguerite Delvecchio from Kentucky Lions Eye Bank for earning the highest score during the fall exam cycle. The Spring CEBT exam took place April 9 - 23, and 22 candidates took the exam in the US and Canada. Out of the 22 people who took the exam, 19 people passed and 3 people failed, which means that for this exam period there was an 86.4% passing rate. Congratulation to Elizabeth Hacker from ConnectLife who had the highest score in the Spring Cycle. Sara congratulating everyone who passed the exam this year and are now Certified Eye Bank Technicians. The next exam takes place October 8 - 22, early bird rates end August 17, and the deadline to apply is September 7. Sara concluded the report by thanking the Exam Committee. The committee worked hard to write new questions for the CEBT exam.

Technician Education Committee

Troy Win'E presented the Technician Education Committee report. The Technician Education Seminar took place January 21 - March 18. With the help of many dedicated volunteers, we were able to successfully host this seminar as a virtual course for the second time. The 8-week interactive virtual course featured 27 on-demand presentations and 5 live workshops delivered by 20 experienced faculty members. The program welcomed 59 attendees and was streamed in the US, Canada, Saudi Arabia, Morocco, and Chile. The live sessions were interactive workshops that provided attendees the opportunity to ask questions, review the on-demand content, watch live demonstrations, participate in lively discussions, test their knowledge, interact with the faculty during breakouts and case study discussions, participate in activities and much more. Highlights of the live sessions included: personal accounts about the gift of sight, interactive slit lamp microscopy evaluations and discussion, a thorough discussion on physical exam, demonstrations for proper and improper aseptic technique and a live in situ cornea excision. Since this was the second year facilitating the course virtually, the Technician Education Committee was able to build off last year's course and continue to grow and strengthen the program. Troy thanked all of the faculty members who contributed to this year's course. A special thanks to the individuals who participated in the live sessions.

These individuals lent their time and expertise:

Troy Win'E
Ingrid Schunder
Paul Graves
Kristen McCoy
Chris Conwell
Saira Quraishy
Matthew Arnett
Alex Cummings

Joshua Galloway
Darrell Lee
Brendan Luckett
Brian Philippy
Anthony Vizzerra
Dr. Joshua Hou
Dr. Jennifer Li
Dr. Mark Mannis
Jennifer DeMatteo
Stacey Gardner
Genevieve Magnuson

The TES was able to use Dr. George Rosenwasser's recordings for another year. If any physicians are interested in helping with some recorded sessions for the TES, please contact Stacey Gardner.

The Committee has been busy creating resources for the membership, including training videos for eyeLEARN.

Troy thanked the following individuals for creating some great videos:

Sharlene Rupp
Anthony Vizzerra
Chris Conwell
Brendan Luckett
Paul Graves
Darrell Lee

The committee has been planning many of the sessions that have presented at the 2022 Annual Meeting, including several with live demos or interactive components. The committee planned the Technical Skills Workshop as well as the following sessions:

Corneal Tissue Processing for DMEK with live Demo
The Competency Assessment: Observing Technicians Performing Procurement Procedures
Photographing Donors for Medical Examiners

The committee has posted several polls and questions to the Lens to begin conversations or find out how members are handling specific issues. Troy concluded his report by thanking the Technician Education Committee for all their hard work these past two years. Due to the pandemic, the committee had to rethink various educational trainings and components, and the committee was ready and willing to assist.

Data Integrity Subcommittee

Brian Philippy presented the Data Integrity Subcommittee report. The charge of the Data Integrity Subcommittee was to determine how eye banks can improve the rate of known surgical indications reported to EBAA. Ultimately, the subcommittee identified two major courses of action that could assist in this process:

1. Replace the EBAA Surgical Indications List document with a new version that crosswalks to the respective ICD-10 codes. ICD-10 codes are used by medical coders at the surgery center, hospital, or clinic, to submit for insurance reimbursements. ICD-10 codes are often available in place of the recognized verbiage that would warrant accurate EBAA coding. Therefore, cross walking ICD-10 codes to EBAA codes provides both the eye bank side and the surgeon side of the process with a powerful tool for coding. (It is suggested that eye banks

put this one-page tool on the back side of their Recipient Information Form and their Tissue Request Forms.

2. Standardize an EBAA Recipient Information Form and require eye banks to use a standardized form in place of their existing, homegrown forms. This second course of action creates a bit of hesitance to act, since the action would have ripple effects on databases and carry real costs. Therefore, it would be appropriate for the MAB, not the subcommittee to determine if this course of action is warranted. As a result of the indeterminate nature of this potential action, the subcommittee did not develop a draft version of a standardized EBAA Recipient Information Form. The subcommittee has developed a crosswalk tool that is poised to replace the previous EBAA Surgical Indications List. The tool reconciles ICD-10 coding to EBAA surgical indication categories. The subcommittee intends to submit a version that has been reviewed and edited by coding experts ahead of the November EBAA meeting – hopefully in time for MAB Agenda publication.

There was significant discussion on the topic. Dr. Van Meter and Dr. Glasser both contributed significantly to the discussion. The MAB discussed the complex topic at length.

Medical Standard J1.000

Kristin Mathes presented a request to amend Medical Standard J1.000 Labeling to allow for the application of the Standard European Code (SEC) in place of ISBT 128 identifiers to final labels for tissue distributed to regions that require SEC, like the member states of the European Economic Area (EEA) and United Kingdom (UK). A motion was made and seconded to revise J1.000. After significant discussion, the motion did not pass.

Comparison of Graft Outcome Reusing Original Storage Solution for Entire Corneal Donor Storage Period with Fresh Storage Solution following Donor Preparation in the CPTS

Michael Titus presented to the MAB that the use of the original solution throughout storage period versus use of fresh solution at DSAEK prep did not emerge as a factor in multivariable analysis. The continued use of the original storage solution did not reduce the 3-year graft success rate or increase endothelial cell loss compared to fresh solution exchange. The donor rim culture positivity rate for the two groups were statistically comparable, and infection rates were similar to what has been reported in the literature. Although DSAEK was the EK procedure in the CPTS, it is likely that these results would apply to DMEK as well, even though DMEK, involves a different technique for lenticule preparation and differing injector systems. Michael stated that this data should encourage eye banks that currently perform storage solutions exchanges (e.g., during tissue processing) to not exchange solution. Using the original storage solution throughout storage and processing events would conserve storage solution. Michael concluded that EBAA could consider collecting this data prospectively for the Annual Statistical Report and correlate with OARRS findings.

Referral Coding Workgroup

Brian Philippy briefly discussed some recent work that was done by a Referral Coding Workgroup. He encouraged anyone with questions or a desire to get involved, to contact him.

After hearing no further questions or new topics for the MAB to discuss, Dr. Win Chamberlain adjourned the meeting.

Medical Review Subcommittee

EYE BANK ASSOCIATION OF AMERICA

OARRS
The Online Adverse Reaction Reporting System

Adverse Reactions Reasonably Likely/ Proven to be Due to Donor Tissue

Report generated 12 Oct 2022 8:34am EDT

	2017	2018	2019	2020	2021	2022	Mean
Primary Graft Failure	**56**	**89**	**100**	**70**	**87**	**21**	**70.5**
Recipient's Age (mean)	64.71	68.95	69.41	67.18	66.37	63.69	67.47
Donor's Age (mean)	57.02	57.25	59.56	55.12	58.47	59.47	57.72
Donor Cause of Death							
Heart disease	13 (23%)	28 (31%)	26 (26%)	16 (23%)	22 (25%)	2 (10%)	17.83 (25%)
Cancer	18 (32%)	14 (16%)	29 (29%)	19 (27%)	18 (21%)	5 (24%)	17.17 (24%)
Cerebrovascular accident	3 (5%)	10 (11%)	7 (7%)	12 (17%)	13 (15%)	4 (19%)	8.17 (12%)
Respiratory disease	6 (11%)	6 (7%)	6 (6%)	4 (6%)	9 (10%)	1 (5%)	5.33 (8%)
Trauma	5 (9%)	6 (7%)	7 (7%)	6 (9%)	4 (5%)	3 (14%)	5.17 (7%)
Toxic / Accident	2 (4%)	0 (0%)	1 (1%)	0 (0%)	0 (0%)	1 (5%)	0.67 (1%)
Other	9 (16%)	25 (28%)	24 (24%)	13 (19%)	21 (24%)	5 (24%)	16.17 (23%)
Mated Cases	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Procedure Type							
Penetrating keratoplasty (includes LAK/IEK)	12 (21%)	10 (11%)	15 (15%)	13 (19%)	18 (21%)	8 (38%)	12.67 (18%)
Anterior lamellar keratoplasty (includes ALK, DALK)	0 (0%)	0 (0%)	0 (0%)	1 (1%)	0 (0%)	0 (0%)	0.17 (0%)
Endothelial keratoplasty: DSEK, DSAEK, DLEK	34 (61%)	57 (64%)	50 (50%)	32 (46%)	41 (47%)	7 (33%)	36.83 (52%)
Endothelial keratoplasty: DMEK or DMAEK	10 (18%)	22 (25%)	35 (35%)	24 (34%)	28 (32%)	6 (29%)	20.83 (30%)
Source of Lamellar Cut							
N/A	0 (0%)	1 (1%)	13 (13%)	14 (20%)	17 (20%)	8 (38%)	8.83 (13%)
Surgeon	2 (5%)	5 (6%)	13 (13%)	2 (3%)	2 (2%)	0 (0%)	4 (6%)
Processing establishment - source eye bank	31 (70%)	45 (56%)	53 (54%)	31 (44%)	38 (44%)	6 (29%)	34 (51%)
Other processing establishment	11 (25%)	29 (36%)	20 (20%)	23 (33%)	30 (34%)	7 (33%)	20 (30%)
Type of Lamellar Cut							
N/A	0 (0%)	1 (1%)	21 (21%)	15 (21%)	19 (22%)	8 (38%)	10.67 (16%)
Microkeratome	35 (80%)	61 (76%)	49 (49%)	31 (44%)	40 (46%)	6 (29%)	37 (55%)
Laser	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)	0 (0%)	0.17 (0%)
Manual Dissection	9 (20%)	18 (23%)	29 (29%)	24 (34%)	27 (31%)	7 (33%)	19 (28%)
Tissue Preloaded							
Yes	0 (0%)	6 (7%)	24 (24%)	19 (27%)	21 (24%)	6 (29%)	12.67 (18%)
No	48 (100%)	83 (93%)	76 (76%)	51 (73%)	66 (76%)	15 (71%)	56.5 (82%)
Location of Tissue Transplant							
United States	37 (66%)	70 (79%)	64 (64%)	48 (69%)	70 (80%)	16 (76%)	50.83 (72%)
International	19 (34%)	19 (21%)	36 (36%)	22 (31%)	17 (20%)	5 (24%)	19.67 (28%)
Preoperative Diagnosis							
A. Post-cataract surgery edema	7 (13%)	13 (15%)	13 (13%)	13 (19%)	16 (18%)	2 (10%)	10.67 (15%)
B. Keratoconus	8 (14%)	2 (2%)	2 (2%)	3 (4%)	1 (1%)	3 (14%)	3.17 (4%)
C. Fuchs' dystrophy	26 (46%)	44 (49%)	43 (43%)	23 (33%)	33 (38%)	8 (38%)	29.5 (42%)
D. Repeat corneal transplant	5 (9%)	6 (7%)	9 (9%)	9 (13%)	11 (13%)	0 (0%)	6.67 (9%)
E. Other degenerations or dystrophies	4 (7%)	9 (10%)	7 (7%)	5 (7%)	1 (1%)	0 (0%)	4.33 (6%)
G. Microbial changes	0 (0%)	0 (0%)	1 (1%)	0 (0%)	0 (0%)	0 (0%)	0.17 (0%)
H. Mechanical or chemical trauma	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)	1 (5%)	0.33 (0%)
I. Congenital opacities	1 (2%)	0 (0%)	0 (0%)	0 (0%)	1 (1%)	0 (0%)	0.33 (0%)
K. Non-infectious ulcerative keratitis or perforation	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (2%)	1 (5%)	0.5 (1%)
L. Other causes of corneal dysfunction or distortion (non-endothelial)	1 (2%)	3 (3%)	2 (2%)	3 (4%)	1 (1%)	0 (0%)	1.67 (2%)
M. Other causes of endothelial dysfunction	2 (4%)	9 (10%)	16 (16%)	12 (17%)	17 (20%)	4 (19%)	10 (14%)

	2017	2018	2019	2020	2021	2022	Mean
Z. Unknown, unreported, or unspecified	2 (4%)	3 (3%)	7 (7%)	2 (3%)	3 (3%)	2 (10%)	3.17 (4%)
Endothelial Density (mean)	2859.73	2906.35	2839.89	2873.9	2850.99	2885.24	2866.61
Death to Cooling (mean hrs)	4.53	4.91	4.82	3.86	4.35	3.21	4.49
Range	0–20.62	0–21	0–20.6	0–15	0–19	1–6	0–21
Death to Preservation (mean hrs)	11.16	12.14	45.56	11.23	13.07	10.86	19.92
Range	2–24	3–24	3.8–1810	3–23	3–24	5–21	2–1810
Death to Surgery (mean days)	7.32	6.4	6.39	6.61	6.45	6.86	6.59
Range	3–14	2–14	2–15	3–13	2–10.6	5–11	2–15
Preservation Method							
Optisol-GS	54 (96%)	77 (87%)	87 (87%)	63 (90%)	66 (76%)	13 (62%)	60 (85%)
Life4C	1 (2%)	9 (10%)	13 (13%)	7 (10%)	21 (24%)	4 (19%)	9.17 (13%)
Eusol-C	1 (2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (14%)	0.67 (1%)
Cornea Cold®	0 (0%)	1 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.17 (0%)
Other	0 (0%)	2 (2%)	0 (0%)	0 (0%)	0 (0%)	1 (5%)	0.5 (1%)
Was storage solution changed after processing?							
No	20 (42%)	27 (30%)	33 (33%)	22 (31%)	31 (36%)	10 (48%)	23.83 (34%)
Yes	28 (58%)	62 (70%)	67 (67%)	48 (69%)	56 (64%)	11 (52%)	45.33 (66%)
Post-Processing Preservation Method							
Optisol-GS	24 (80%)	37 (59%)	61 (91%)	40 (83%)	45 (80%)	8 (73%)	35.83 (78%)
Life4C	6 (20%)	7 (11%)	4 (6%)	6 (13%)	8 (14%)	2 (18%)	5.5 (12%)
Cornea Cold®	0 (0%)	9 (14%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1.5 (3%)
Other	0 (0%)	10 (16%)	2 (3%)	2 (4%)	3 (5%)	1 (9%)	3 (7%)
Antifungal Supplementation?							
No	29 (100%)	61 (97%)	79 (87%)	55 (79%)	67 (77%)	16 (76%)	51.17 (85%)
Yes	0 (0%)	2 (3%)	12 (13%)	15 (21%)	20 (23%)	5 (24%)	9 (15%)
Recovery Procedure							
In-situ corneal excision	56 (100%)	88 (99%)	97 (97%)	67 (96%)	85 (98%)	21 (100%)	69 (98%)
In-laboratory corneal and/or scleral excision after enucleation	0 (0%)	1 (1%)	3 (3%)	3 (4%)	2 (2%)	0 (0%)	1.5 (2%)
Donor Site Facility							
Hospital	35 (63%)	45 (51%)	65 (65%)	48 (69%)	50 (57%)	11 (52%)	42.33 (60%)
Medical examiner	3 (5%)	7 (8%)	7 (7%)	4 (6%)	5 (6%)	1 (5%)	4.5 (6%)
Funeral home or mortuary	5 (9%)	12 (13%)	11 (11%)	5 (7%)	8 (9%)	0 (0%)	6.83 (10%)
Other	13 (23%)	25 (28%)	17 (17%)	13 (19%)	24 (28%)	9 (43%)	16.83 (24%)
Early Regraft	**43**	**52**	**82**	**78**	**64**	**47**	**61**
Recipient's Age (mean)	68.37	66.63	66.98	66.22	67.67	68.89	67.28
Donor's Age (mean)	59.84	58.85	62.35	59.31	58.4	59.67	59.9
Donor Cause of Death							
Heart disease	18 (42%)	13 (25%)	21 (26%)	20 (26%)	20 (31%)	15 (32%)	17.83 (29%)
Cancer	4 (9%)	8 (15%)	36 (44%)	20 (26%)	13 (20%)	7 (15%)	14.67 (24%)
Cerebrovascular accident	6 (14%)	10 (19%)	5 (6%)	9 (12%)	7 (11%)	3 (6%)	6.67 (11%)
Respiratory disease	3 (7%)	4 (8%)	6 (7%)	3 (4%)	7 (11%)	7 (15%)	5 (8%)
Trauma	0 (0%)	6 (12%)	4 (5%)	5 (6%)	6 (9%)	4 (9%)	4.17 (7%)
Toxic / Accident	0 (0%)	1 (2%)	0 (0%)	1 (1%)	1 (2%)	0 (0%)	0.5 (1%)
Other	12 (28%)	10 (19%)	10 (12%)	20 (26%)	10 (16%)	11 (23%)	12.17 (20%)
Mated Cases	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Procedure Type							
Penetrating keratoplasty (includes LAK/IEK)	2 (5%)	5 (10%)	2 (2%)	13 (17%)	6 (9%)	5 (11%)	5.5 (9%)
Endothelial keratoplasty: DSEK, DSAEK, DLEK	22 (51%)	25 (48%)	19 (23%)	25 (32%)	19 (30%)	10 (21%)	20 (33%)
Endothelial keratoplasty: DMEK or DMAEK	19 (44%)	22 (42%)	61 (74%)	40 (51%)	39 (61%)	32 (68%)	35.5 (58%)
Source of Lamellar Cut							
N/A	0 (0%)	0 (0%)	2 (2%)	9 (12%)	9 (14%)	6 (13%)	4.33 (7%)
Surgeon	4 (10%)	2 (4%)	4 (5%)	5 (6%)	1 (2%)	3 (6%)	3.17 (5%)

	2017	2018	2019	2020	2021	2022	Mean
Processing establishment - source eye bank	21 (51%)	28 (60%)	53 (65%)	47 (60%)	28 (44%)	25 (53%)	33.67 (56%)
Other processing establishment	16 (39%)	17 (36%)	23 (28%)	17 (22%)	26 (41%)	13 (28%)	18.67 (31%)
Type of Lamellar Cut							
N/A	0 (0%)	0 (0%)	3 (4%)	13 (17%)	9 (14%)	6 (13%)	5.17 (9%)
Microkeratome	22 (56%)	26 (55%)	20 (24%)	25 (32%)	19 (30%)	7 (15%)	19.83 (33%)
Laser	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (4%)	0.33 (1%)
Manual Dissection	17 (44%)	21 (45%)	59 (72%)	40 (51%)	36 (56%)	32 (68%)	34.17 (57%)
Tissue Preloaded							
Yes	2 (7%)	14 (27%)	44 (54%)	28 (36%)	35 (55%)	26 (55%)	24.83 (42%)
No	27 (93%)	38 (73%)	38 (46%)	50 (64%)	29 (45%)	21 (45%)	33.83 (58%)
Location of Tissue Transplant							
United States	39 (91%)	51 (98%)	74 (90%)	64 (82%)	56 (88%)	42 (89%)	54.33 (89%)
International	4 (9%)	1 (2%)	8 (10%)	14 (18%)	8 (13%)	5 (11%)	6.67 (11%)
Preoperative Diagnosis							
A. Post-cataract surgery edema	4 (9%)	6 (12%)	3 (4%)	3 (4%)	4 (6%)	1 (2%)	3.5 (6%)
B. Keratoconus	1 (2%)	3 (6%)	0 (0%)	4 (5%)	0 (0%)	2 (4%)	1.67 (3%)
C. Fuchs' dystrophy	24 (56%)	30 (58%)	59 (72%)	39 (50%)	36 (56%)	33 (70%)	36.83 (60%)
D. Repeat corneal transplant	3 (7%)	4 (8%)	3 (4%)	12 (15%)	2 (3%)	2 (4%)	4.33 (7%)
E. Other degenerations or dystrophies	5 (12%)	5 (10%)	10 (12%)	9 (12%)	5 (8%)	2 (4%)	6 (10%)
H. Mechanical or chemical trauma	0 (0%)	0 (0%)	0 (0%)	1 (1%)	1 (2%)	1 (2%)	0.5 (1%)
L. Other causes of corneal dysfunction or distortion (non-endothelial)	0 (0%)	1 (2%)	1 (1%)	2 (3%)	2 (3%)	0 (0%)	1 (2%)
M. Other causes of endothelial dysfunction	6 (14%)	3 (6%)	4 (5%)	5 (6%)	11 (17%)	3 (6%)	5.33 (9%)
Z. Unknown, unreported, or unspecified	0 (0%)	0 (0%)	2 (2%)	3 (4%)	3 (5%)	3 (6%)	1.83 (3%)
Endothelial Density (mean)	2922.26	2857.19	2795.9	2783.15	2818.61	2800.74	2821.39
Death to Cooling (mean hrs)	4.32	3.86	3.89	3.31	3.6	3.95	3.76
Range	0.58–17	0–13.4	0–13.6	0–10	0–11	0–12	0–17
Death to Preservation (mean hrs)	10.98	56.91	11.65	11.53	12.59	11.04	18.06
Range	2.18–24	1–2356	1–23	3.2–23	3.1–24	3.75–23	1–2356
Death to Surgery (mean days)	6.05	5.79	5.83	6.22	6.5	6.14	6.09
Range	1–17	2–13	2–13	1–12	3–10	2–9	1–17
Preservation Method							
Optisol-GS	43 (100%)	45 (87%)	72 (88%)	68 (87%)	48 (75%)	31 (66%)	51.17 (84%)
Life4C	0 (0%)	7 (13%)	10 (12%)	10 (13%)	16 (25%)	10 (21%)	8.83 (14%)
Eusol-C	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	6 (13%)	1 (2%)
Was storage solution changed after processing?							
No	6 (21%)	14 (27%)	13 (16%)	18 (23%)	13 (20%)	14 (30%)	13 (22%)
Yes	23 (79%)	38 (73%)	69 (84%)	60 (77%)	51 (80%)	33 (70%)	45.67 (78%)
Post-Processing Preservation Method							
Optisol-GS	18 (78%)	23 (61%)	63 (91%)	50 (83%)	35 (69%)	23 (70%)	35.33 (77%)
Life4C	5 (22%)	8 (21%)	6 (9%)	8 (13%)	10 (20%)	6 (18%)	7.17 (16%)
Eusol-C	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (3%)	0.17 (0%)
Cornea Cold®	0 (0%)	2 (5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.33 (1%)
Other	0 (0%)	5 (13%)	0 (0%)	2 (3%)	6 (12%)	3 (9%)	2.67 (6%)
Antifungal Supplementation?							
No	23 (100%)	37 (97%)	58 (74%)	58 (74%)	44 (69%)	33 (70%)	42.17 (77%)
Yes	0 (0%)	1 (3%)	20 (26%)	20 (26%)	20 (31%)	14 (30%)	12.5 (23%)
Recovery Procedure							
In-situ corneal excision	41 (95%)	52 (100%)	82 (100%)	78 (100%)	61 (95%)	45 (96%)	59.83 (98%)
In-laboratory corneal and/or scleral excision after enucleation	2 (5%)	0 (0%)	0 (0%)	0 (0%)	3 (5%)	2 (4%)	1.17 (2%)
Donor Site Facility							
Hospital	24 (56%)	33 (63%)	47 (57%)	55 (71%)	36 (56%)	24 (51%)	36.5 (60%)
Medical examiner	4 (9%)	5 (10%)	7 (9%)	6 (8%)	8 (13%)	3 (6%)	5.5 (9%)

	2017	2018	2019	2020	2021	2022	Mean
Funeral home or mortuary	6 (14%)	4 (8%)	16 (20%)	4 (5%)	5 (8%)	3 (6%)	6.33 (10%)
Other	9 (21%)	10 (19%)	12 (15%)	13 (17%)	15 (23%)	17 (36%)	12.67 (21%)
Endophthalmitis	**21**	**13**	**10**	**13**	**8**	**3**	**11.33**
Recipient's Age (mean)	65.57	71.17	69.6	58.54	62.63	53	64.9
Donor's Age (mean)	58.1	58	63.3	61.69	47	41.67	57.5
Donor Cause of Death							
Heart disease	8 (38%)	4 (31%)	4 (40%)	3 (23%)	1 (13%)	0 (0%)	3.33 (29%)
Cancer	1 (5%)	3 (23%)	3 (30%)	4 (31%)	1 (13%)	0 (0%)	2 (18%)
Cerebrovascular accident	1 (5%)	2 (15%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.5 (4%)
Respiratory disease	1 (5%)	1 (8%)	0 (0%)	4 (31%)	1 (13%)	0 (0%)	1.17 (10%)
Trauma	3 (14%)	1 (8%)	0 (0%)	0 (0%)	0 (0%)	1 (33%)	0.83 (7%)
Toxic / Accident	1 (5%)	0 (0%)	0 (0%)	1 (8%)	0 (0%)	0 (0%)	0.33 (3%)
Other	6 (29%)	2 (15%)	3 (30%)	1 (8%)	5 (63%)	2 (67%)	3.17 (28%)
Mated Cases	1 (5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.17 (1%)
Procedure Type							
Penetrating keratoplasty (includes LAK/IEK)	2 (10%)	4 (31%)	2 (20%)	3 (23%)	4 (50%)	1 (33%)	2.67 (24%)
Anterior lamellar keratoplasty (includes ALK, DALK)	1 (5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.17 (1%)
Endothelial keratoplasty: DSEK, DSAEK, DLEK	15 (71%)	7 (54%)	3 (30%)	4 (31%)	1 (13%)	1 (33%)	5.17 (46%)
Endothelial keratoplasty: DMEK or DMAEK	3 (14%)	2 (15%)	5 (50%)	5 (38%)	3 (38%)	1 (33%)	3.17 (28%)
Keratoprosthesis (K-Pro)	0 (0%)	0 (0%)	0 (0%)	1 (8%)	0 (0%)	0 (0%)	0.17 (1%)
Source of Lamellar Cut							
N/A	0 (0%)	0 (0%)	2 (20%)	4 (31%)	4 (50%)	1 (33%)	1.83 (18%)
Surgeon	3 (16%)	0 (0%)	0 (0%)	2 (15%)	0 (0%)	0 (0%)	0.83 (8%)
Processing establishment - source eye bank	11 (58%)	5 (56%)	4 (40%)	4 (31%)	4 (50%)	1 (33%)	4.83 (47%)
Other processing establishment	5 (26%)	4 (44%)	4 (40%)	3 (23%)	0 (0%)	1 (33%)	2.83 (27%)
Type of Lamellar Cut							
N/A	0 (0%)	0 (0%)	2 (20%)	4 (31%)	4 (50%)	1 (33%)	1.83 (18%)
Microkeratome	15 (79%)	7 (78%)	3 (30%)	4 (31%)	1 (13%)	1 (33%)	5.17 (50%)
Manual Dissection	4 (21%)	2 (22%)	5 (50%)	5 (38%)	3 (38%)	1 (33%)	3.33 (32%)
Tissue Preloaded							
Yes	1 (8%)	1 (8%)	3 (30%)	4 (31%)	2 (25%)	2 (67%)	2.17 (22%)
No	11 (92%)	12 (92%)	7 (70%)	9 (69%)	6 (75%)	1 (33%)	7.67 (78%)
Location of Tissue Transplant							
United States	18 (86%)	10 (77%)	9 (90%)	12 (92%)	7 (88%)	2 (67%)	9.67 (85%)
International	3 (14%)	3 (23%)	1 (10%)	1 (8%)	1 (13%)	1 (33%)	1.67 (15%)
Concordant Positive Cultures	5 (24%)	5 (38%)	5 (50%)	1 (8%)	1 (13%)	0 (0%)	2.83 (25%)
Recipient Culture Results							
Candida albicans	1 (5%)	1 (9%)	1 (9%)	1 (8%)	1 (14%)	0 (0%)	0.83 (7%)
Candida glabrata	6 (27%)	1 (9%)	6 (55%)	3 (23%)	1 (14%)	0 (0%)	2.83 (25%)
Candida other	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (25%)	0.17 (1%)
Candida parapsilosis	0 (0%)	1 (9%)	0 (0%)	1 (8%)	1 (14%)	0 (0%)	0.5 (4%)
Candida tropicalis	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (25%)	0.17 (1%)
Candida unspecified	2 (9%)	0 (0%)	0 (0%)	1 (8%)	0 (0%)	0 (0%)	0.5 (4%)
Clostridium perfringens	0 (0%)	0 (0%)	1 (9%)	0 (0%)	0 (0%)	0 (0%)	0.17 (1%)
Enterobacter spp.	0 (0%)	0 (0%)	0 (0%)	1 (8%)	0 (0%)	0 (0%)	0.17 (1%)
Enterococcus faecalis	1 (5%)	1 (9%)	2 (18%)	1 (8%)	0 (0%)	1 (25%)	1 (9%)
Enterococcus unspecified	1 (5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.17 (1%)
Pseudomonas aeruginosa	1 (5%)	1 (9%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.33 (3%)
Staphylococcus aureus	2 (9%)	0 (0%)	0 (0%)	0 (0%)	1 (14%)	0 (0%)	0.5 (4%)
Viridans streptococci (alpha hemolytic)	0 (0%)	1 (9%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.17 (1%)
Yeast - non-specified	2 (9%)	1 (9%)	0 (0%)	1 (8%)	0 (0%)	1 (25%)	0.83 (7%)
Other Organism	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (14%)	0 (0%)	0.17 (1%)

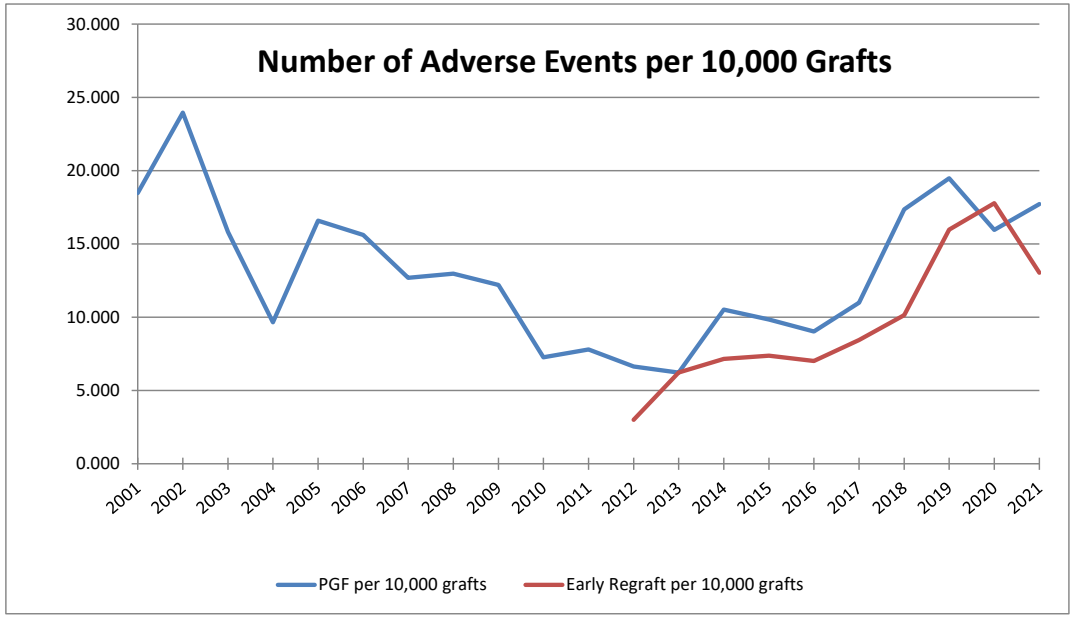
	2017	2018	2019	2020	2021	2022	Mean
Not done	5 (23%)	4 (36%)	1 (9%)	2 (15%)	1 (14%)	0 (0%)	2.17 (19%)
No growth	1 (5%)	0 (0%)	0 (0%)	2 (15%)	1 (14%)	0 (0%)	0.67 (6%)
Death to Cooling (mean hrs)	5.49	3.6	4.3	4.42	4.81	4	4.62
Range	1.5–17	1.5–10.5	1–8	1.5–15	1.5–11	2–7	1–17
Death to Preservation (mean hrs)	13.23	10.93	10.32	14.34	11.98	15.5	12.53
Range	5.75–24	4–23.83	6.8–17	5–20	6–23	12–20	4–24
Death to Surgery (mean days)	5.76	7.08	5.9	5.77	6.38	7	6.16
Range	3–13	2–13	3–8	4–10	3–10	5–9	2–13
Preservation Method							
Optisol-GS	19 (90%)	13 (100%)	7 (70%)	8 (62%)	4 (50%)	2 (67%)	8.83 (78%)
Life4C	2 (10%)	0 (0%)	3 (30%)	5 (38%)	4 (50%)	1 (33%)	2.5 (22%)
Was storage solution changed after processing?							
No	6 (50%)	7 (54%)	4 (40%)	4 (31%)	4 (50%)	2 (67%)	4.5 (46%)
Yes	6 (50%)	6 (46%)	6 (60%)	9 (69%)	4 (50%)	1 (33%)	5.33 (54%)
Post-Processing Preservation Method							
Optisol-GS	6 (86%)	5 (83%)	5 (83%)	7 (78%)	3 (75%)	1 (100%)	4.5 (82%)
Life4C	1 (14%)	0 (0%)	0 (0%)	2 (22%)	1 (25%)	0 (0%)	0.67 (12%)
Other	0 (0%)	1 (17%)	1 (17%)	0 (0%)	0 (0%)	0 (0%)	0.33 (6%)
Antifungal Supplementation?							
No	7 (100%)	5 (83%)	7 (88%)	13 (100%)	8 (100%)	3 (100%)	7.17 (96%)
Yes	0 (0%)	1 (17%)	1 (13%)	0 (0%)	0 (0%)	0 (0%)	0.33 (4%)
Recovery Procedure							
In-situ corneal excision	21 (100%)	13 (100%)	10 (100%)	13 (100%)	8 (100%)	3 (100%)	11.33 (100%)
Donor Site Facility							
Hospital	10 (48%)	9 (69%)	6 (60%)	6 (46%)	7 (88%)	1 (33%)	6.5 (57%)
Medical examiner	3 (14%)	0 (0%)	1 (10%)	3 (23%)	0 (0%)	1 (33%)	1.33 (12%)
Funeral home or mortuary	3 (14%)	1 (8%)	0 (0%)	0 (0%)	1 (13%)	0 (0%)	0.83 (7%)
Other	5 (24%)	3 (23%)	3 (30%)	4 (31%)	0 (0%)	1 (33%)	2.67 (24%)
Infectious Keratitis	**21**	**14**	**6**	**8**	**19**	**8**	**12.67**
Recipient's Age (mean)	64.95	70.69	62.33	43.57	61.25	66.25	62.99
Donor's Age (mean)	54.29	59.14	49.83	47.71	54.94	53	54.23
Donor Cause of Death							
Heart disease	6 (29%)	7 (50%)	1 (17%)	2 (25%)	4 (21%)	2 (25%)	3.67 (29%)
Cancer	2 (10%)	0 (0%)	1 (17%)	0 (0%)	1 (5%)	0 (0%)	0.67 (5%)
Cerebrovascular accident	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (5%)	0 (0%)	0.17 (1%)
Respiratory disease	2 (10%)	1 (7%)	1 (17%)	1 (13%)	5 (26%)	1 (13%)	1.83 (14%)
Trauma	1 (5%)	0 (0%)	0 (0%)	2 (25%)	2 (11%)	2 (25%)	1.17 (9%)
Toxic / Accident	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (5%)	0 (0%)	0.17 (1%)
Other	10 (48%)	6 (43%)	3 (50%)	3 (38%)	5 (26%)	3 (38%)	5 (39%)
Mated Cases	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (5%)	0 (0%)	0.17 (1%)
Procedure Type							
Penetrating keratoplasty (includes LAK/IEK)	2 (10%)	3 (21%)	2 (33%)	2 (25%)	7 (37%)	1 (13%)	2.83 (22%)
Anterior lamellar keratoplasty (includes ALK, DALK)	1 (5%)	0 (0%)	0 (0%)	0 (0%)	2 (11%)	0 (0%)	0.5 (4%)
Endothelial keratoplasty: DSEK, DSAEK, DLEK	12 (57%)	9 (64%)	0 (0%)	6 (75%)	4 (21%)	5 (63%)	6 (47%)
Endothelial keratoplasty: DMEK or DMAEK	6 (29%)	2 (14%)	4 (67%)	0 (0%)	5 (26%)	2 (25%)	3.17 (25%)
Keratoprosthesis (K-Pro)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (5%)	0 (0%)	0.17 (1%)
Source of Lamellar Cut							
N/A	0 (0%)	0 (0%)	2 (33%)	2 (25%)	9 (47%)	1 (13%)	2.33 (20%)
Surgeon	4 (21%)	0 (0%)	1 (17%)	0 (0%)	0 (0%)	0 (0%)	0.83 (7%)
Processing establishment - source eye bank	8 (42%)	8 (73%)	2 (33%)	5 (63%)	6 (32%)	6 (75%)	5.83 (49%)
Other processing establishment	7 (37%)	3 (27%)	1 (17%)	1 (13%)	4 (21%)	1 (13%)	2.83 (24%)
Type of Lamellar Cut							

	2017	2018	2019	2020	2021	2022	Mean
N/A	0 (0%)	0 (0%)	2 (33%)	2 (25%)	9 (47%)	1 (13%)	2.33 (20%)
Microkeratome	12 (71%)	9 (82%)	0 (0%)	6 (75%)	5 (26%)	4 (50%)	6 (52%)
Manual Dissection	5 (29%)	2 (18%)	4 (67%)	0 (0%)	5 (26%)	3 (38%)	3.17 (28%)
Tissue Preloaded							
Yes	0 (0%)	1 (7%)	2 (33%)	0 (0%)	5 (26%)	2 (25%)	1.67 (15%)
No	13 (100%)	13 (93%)	4 (67%)	8 (100%)	14 (74%)	6 (75%)	9.67 (85%)
Location of Tissue Transplant							
United States	17 (81%)	10 (71%)	6 (100%)	5 (63%)	17 (89%)	8 (100%)	10.5 (83%)
International	4 (19%)	4 (29%)	0 (0%)	3 (38%)	2 (11%)	0 (0%)	2.17 (17%)
Concordant Positive Cultures	4 (19%)	1 (7%)	2 (33%)	1 (13%)	5 (26%)	0 (0%)	2.17 (17%)
Recipient Culture Results							
Candida albicans	5 (23%)	2 (17%)	0 (0%)	2 (25%)	3 (16%)	3 (38%)	2.5 (20%)
Candida glabrata	2 (9%)	2 (17%)	1 (17%)	0 (0%)	3 (16%)	0 (0%)	1.33 (11%)
Candida other	1 (5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.17 (1%)
Candida parapsilosis	1 (5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.17 (1%)
Candida unspecified	1 (5%)	1 (8%)	0 (0%)	0 (0%)	3 (16%)	0 (0%)	0.83 (7%)
Enterococcus faecalis	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (13%)	0.17 (1%)
Fusarium spp.	1 (5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.17 (1%)
Herpes simplex	0 (0%)	0 (0%)	1 (17%)	0 (0%)	0 (0%)	0 (0%)	0.17 (1%)
Propionibacterium spp.	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (5%)	0 (0%)	0.17 (1%)
Staphylococcus epidermidis / coagulase negative	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (5%)	0 (0%)	0.17 (1%)
Streptococcus agalactiae (Group B Strep)	1 (5%)	0 (0%)	1 (17%)	0 (0%)	0 (0%)	0 (0%)	0.33 (3%)
Streptococcus unspecified	0 (0%)	0 (0%)	0 (0%)	1 (13%)	0 (0%)	0 (0%)	0.17 (1%)
Viridans streptococci (alpha hemolytic)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (5%)	0 (0%)	0.17 (1%)
Yeast - non-specified	1 (5%)	0 (0%)	1 (17%)	0 (0%)	0 (0%)	0 (0%)	0.33 (3%)
Other Organism	0 (0%)	0 (0%)	0 (0%)	2 (25%)	1 (5%)	1 (13%)	0.67 (5%)
Not done	8 (36%)	7 (58%)	0 (0%)	2 (25%)	2 (11%)	1 (13%)	3.33 (27%)
No growth	1 (5%)	0 (0%)	2 (33%)	1 (13%)	4 (21%)	2 (25%)	1.67 (13%)
Death to Cooling (mean hrs)	4.99	4.53	3.25	6.94	4.41	3.13	4.67
Range	1–11	2–13	2–6	2–11.51	1–13	1.9–5	1–13
Death to Preservation (mean hrs)	11.23	11.89	13.24	17.39	14.02	14.18	13.16
Range	4.68–16.12	5–23.83	6.57–23.85	10.75–23	5–21	10–22.5	4.68–23.85
Death to Surgery (mean days)	5.76	6.64	4.83	7.81	7	5.5	6.35
Range	2–11	2–12	2–7	2–14	2–13.5	2–8	2–14
Preservation Method							
Optisol-GS	19 (90%)	12 (86%)	5 (83%)	6 (75%)	12 (63%)	3 (38%)	9.5 (75%)
Life4C	0 (0%)	2 (14%)	1 (17%)	2 (25%)	7 (37%)	5 (63%)	2.83 (22%)
Other	2 (10%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.33 (3%)
Was storage solution changed after processing?							
No	4 (31%)	6 (43%)	3 (50%)	6 (75%)	9 (47%)	1 (13%)	4.83 (43%)
Yes	9 (69%)	8 (57%)	3 (50%)	2 (25%)	10 (53%)	7 (88%)	6.5 (57%)
Post-Processing Preservation Method							
Optisol-GS	6 (67%)	5 (63%)	3 (100%)	2 (100%)	7 (70%)	4 (57%)	4.5 (69%)
Life4C	3 (33%)	0 (0%)	0 (0%)	0 (0%)	3 (30%)	3 (43%)	1.5 (23%)
Other	0 (0%)	3 (38%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.5 (8%)
Antifungal Supplementation?							
No	9 (100%)	8 (100%)	4 (80%)	8 (100%)	15 (79%)	7 (88%)	8.5 (89%)
Yes	0 (0%)	0 (0%)	1 (20%)	0 (0%)	4 (21%)	1 (13%)	1 (11%)
Recovery Procedure							
In-situ corneal excision	21 (100%)	14 (100%)	6 (100%)	8 (100%)	19 (100%)	8 (100%)	12.67 (100%)
Donor Site Facility							
Hospital	18 (86%)	9 (64%)	3 (50%)	2 (25%)	9 (47%)	4 (50%)	7.5 (59%)

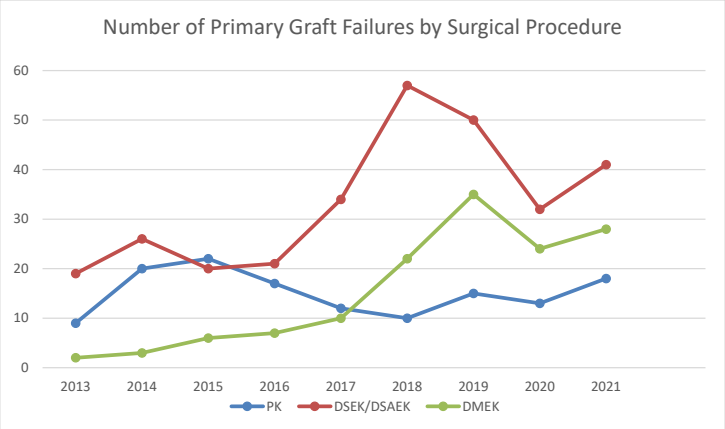
	2017	2018	2019	2020	2021	2022	Mean
Medical examiner	1 (5%)	0 (0%)	0 (0%)	1 (13%)	3 (16%)	3 (38%)	1.33 (11%)
Funeral home or mortuary	0 (0%)	1 (7%)	0 (0%)	3 (38%)	1 (5%)	0 (0%)	0.83 (7%)
Other	2 (10%)	4 (29%)	3 (50%)	2 (25%)	6 (32%)	1 (13%)	3 (24%)
Scleral Graft Infection							
Donor Corneal Dystrophy or Degeneration	**0**	**1**	**0**	**0**	**1**	**0**	**0.33**
Mated Cases	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Donor Corneal Refractive Surgery	**2**	**0**	**0**	**0**	**0**	**0**	**0.33**
Donor-to-host Transmission of Systemic Infection	**2**	**1**	**2**	**1**	**0**	**0**	**1**
Malignancy							
Other (or Multiple)	**0**	**1**	**0**	**1**	**0**	**1**	**0.5**

Questions? Contact Jennifer DeMatteo at jennifer@restoresight.org or 202-775-4999 ext. 117.

YEAR	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
PGF	61	78	51	31	53	53	50	54	52	31	36	31	30	50	48	45	56	89	100	70	87
Early Regraft												14	30	34	36	35	43	52	82	78	64
No. Corneal Grafts performed in U.S.	33035	32559	32240	32106	31952	33962	39391	41652	42606	42642	46196	46,684	48,229	47,530	48,792	49,869	50,934	51,294	51,336	43,873	49,110
PGF per 10,000 grafts	18.465	23.957	15.819	9.656	16.587	15.606	12.693	12.965	12.205	7.270	7.793	6.640	6.220	10.520	9.838	9.024	10.995	17.351	19.480	15.955	17.715
Early Regraft per 10,000 grafts												2.999	6.220	7.153	7.378	7.018	8.442	10.138	15.973	17.779	13.032

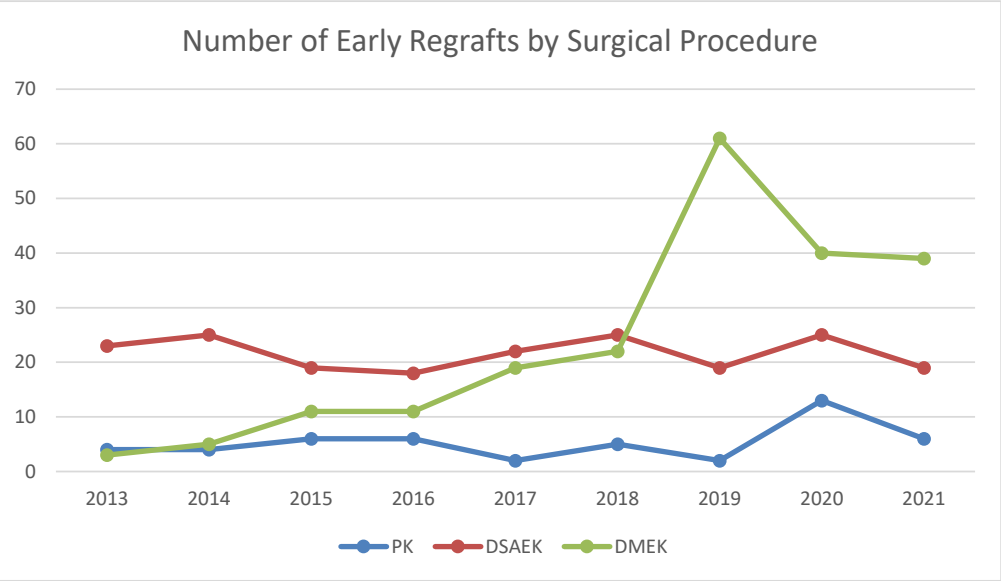


Year	2013	2014	2015	2016	2017	2018	2019	2020	2021
PK	9	20	22	17	12	10	15	13	18
DSAEK	19	26	20	21	34	57	50	32	41
DMEK	2	3	6	7	10	22	35	24	28
TOTAL	**30**	**50**	**48**	**45**	**56**	**89**	**100**	**69**	**87**

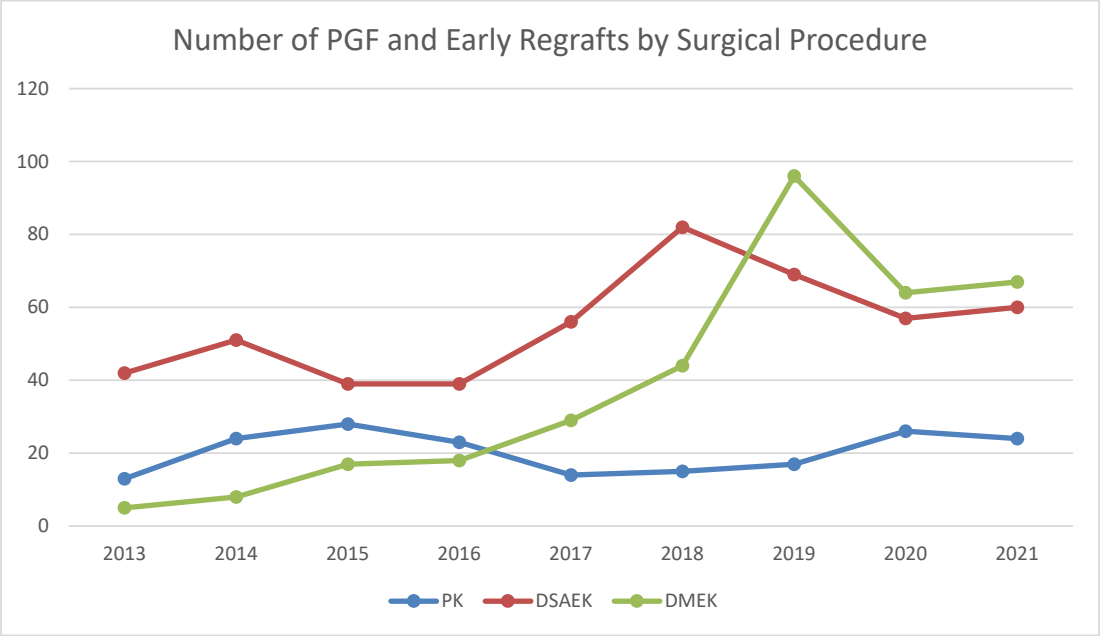


Early Regrafts

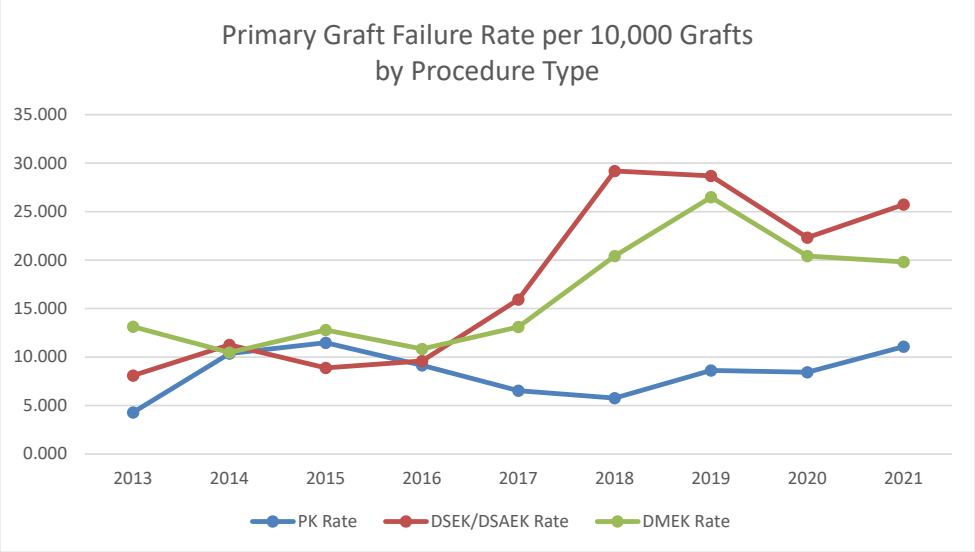
Year	2013	2014	2015	2016	2017	2018	2019	2020	2021
PK	4	4	6	6	2	5	2	13	6
DSAEK	23	25	19	18	22	25	19	25	19
DMEK	3	5	11	11	19	22	61	40	39
TOTAL	**30**	**34**	**36**	**35**	**43**	**52**	**82**	**78**	**64**



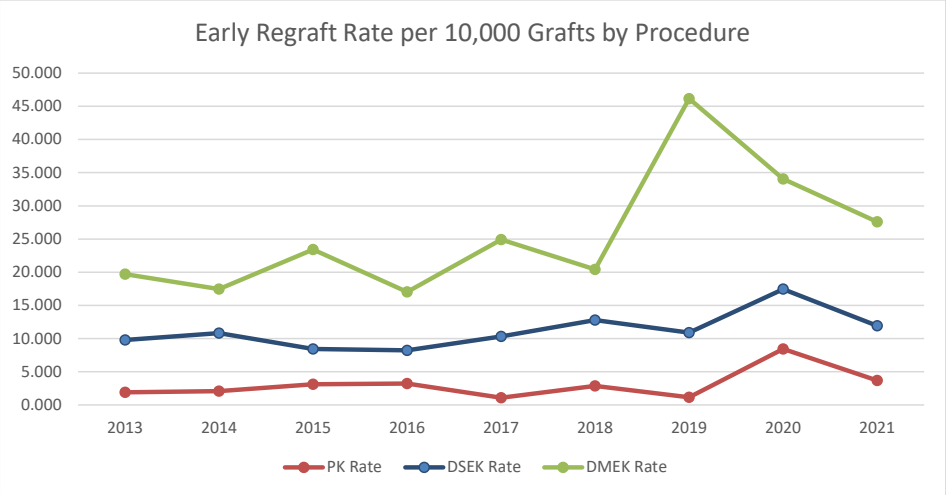
	PGF + Early Regrafts								
Year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
PK	13	24	28	23	14	15	17	26	24
DSAEK	42	51	39	39	56	82	69	57	60
DMEK	5	8	17	18	29	44	96	64	67
TOTAL	**60**	**83**	**84**	**80**	**99**	**141**	**182**	**147**	**151**



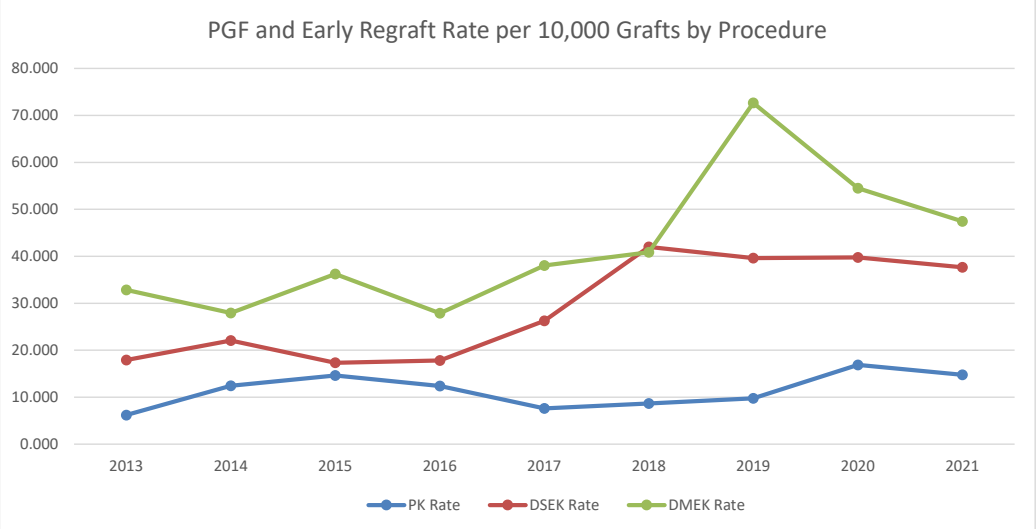
Year	2013	2014	2015	2016	2017	2018	2019	2020	2021
PGF following PK	9	20	22	17	12	10	15	13	18
PK Procedures	20,954	19,294	19,160	18,579	18,346	17,347	17,409	15,402	16,269
PGF rate per 10,000 PK	**4.295**	**10.366**	**11.482**	**9.150**	**6.541**	**5.765**	**8.616**	**8.440**	**11.064**
PGF following DSEK	19	26	20	21	34	57	50	32	41
DSEK Procedures	23465	23100	22514	21868	21337	19526	17,428	14,331	15,935
PGF rate per 10,000 DSEK	**8.097**	**11.255**	**8.883**	**9.603**	**15.935**	**29.192**	**28.689**	**22.329**	**25.730**
PGF following DMEK	2	3	6	7	10	22	35	24	28
DMEK Procedures	1522	2865	4694	6459	7628	10773	13,215	11,749	14,128
PGF rate per 10,000 DMEK	**13.141**	**10.471**	**12.782**	**10.838**	**13.110**	**20.421**	**26.485**	**20.427**	**19.819**



Year	2013	2014	2015	2016	2017	2018	2019	2020	2021
Early Regraft following PK	4	4	6	6	2	5	2	13	6
PK Procedures	20,954	19,294	19,160	18,579	18,346	17,347	17,409	15,402	16,269
Early regraft rate per 10,000 PK	**1.909**	**2.073**	**3.132**	**3.229**	**1.090**	**2.882**	**1.149**	**8.440**	**3.688**
Early Regraft following DSEK	23	25	19	18	22	25	19	25	19
DSEK Procedures	23465	23100	22514	21868	21337	19526	17,428	14,331	15,935
Early Regraft rate per 10,000 DSEK	**9.802**	**10.823**	**8.439**	**8.231**	**10.311**	**12.803**	**10.902**	**17.445**	**11.923**
Early regraft following DMEK	3	5	11	11	19	22	61	40	39
DMEK Procedures	1522	2865	4694	6459	7628	10773	13,215	11,749	14,128
Early regraft rate per 10,000 DMEK	**19.711**	**17.452**	**23.434**	**17.031**	**24.908**	**20.421**	**46.160**	**34.045**	**27.605**

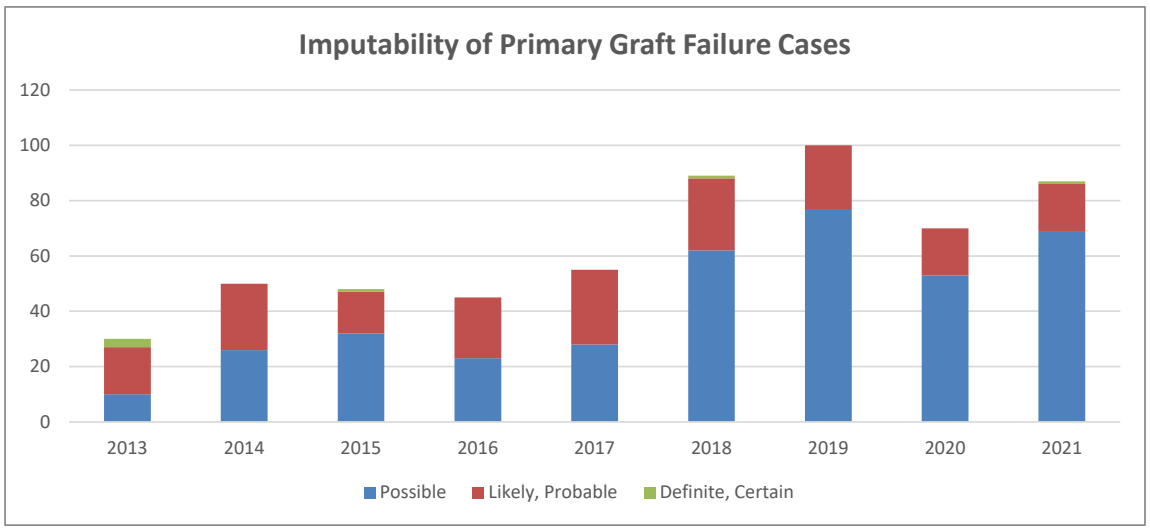


Year	2013	2014	2015	2016	2017	2018	2019	2020	2021
PGF + Early Regaft following PK	13	24	28	23	14	15	17	26	24
PK Procedures	20,954	19,294	19,160	18,579	18,346	17,347	17,409	15,402	16,269
PGF + Early Regraft Rate per 10,000 PK	**6.204**	**12.439**	**14.614**	**12.380**	**7.631**	**8.647**	**9.765**	**16.881**	**14.752**
PGF+ Early Regraft following DSEK	42	51	39	39	56	82	69	57	60
DSEK Procedures	23465	23100	22514	21868	21337	19526	17,428	14,331	15,935
PGF+ Early Regraft Rate per 10,000 DSEK	**17.899**	**22.078**	**17.323**	**17.834**	**26.245**	**41.995**	**39.591**	**39.774**	**37.653**
PGF+ Early Regraft following DMEK	5	8	17	18	29	44	96	64	67
DMEK Procedures	1522	2865	4694	6459	7628	10773	13,215	11,749	14,128
PGF+ Early Regraft Rate per 10,000 DMEK	**32.852**	**27.923**	**36.216**	**27.868**	**38.018**	**40.843**	**72.645**	**54.473**	**47.424**



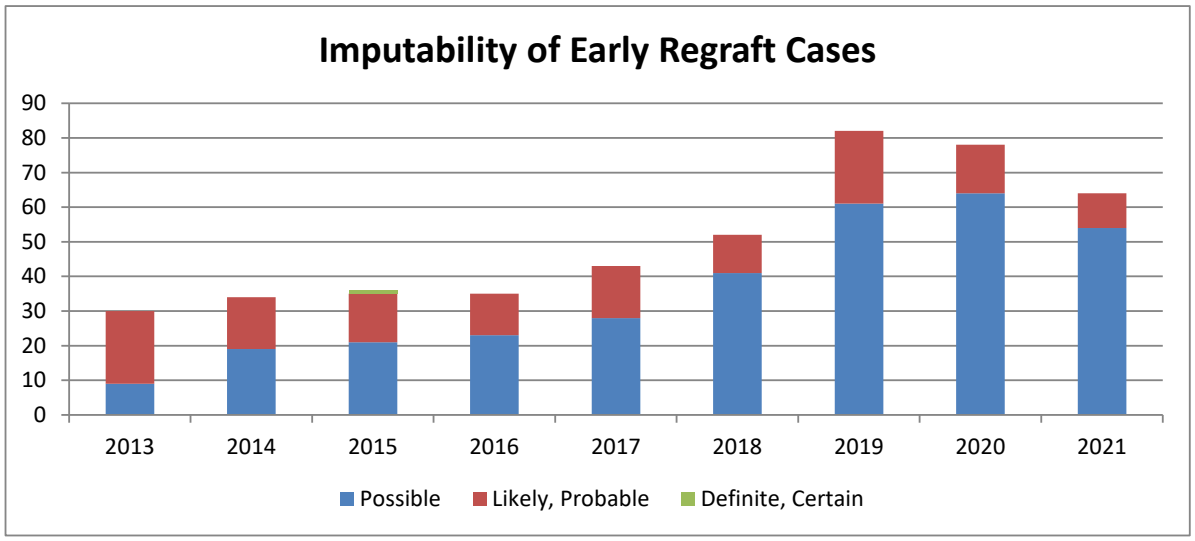
Imputability of PGF

PGF	2013	2014	2015	2016	2017	2018	2019	2020	2021
Possible	10	26	32	23	28	62	77	53	69
Likely, Probable	17	24	15	22	27	26	23	17	17
Definite, Certain	3	0	1	0	0	1	0	0	1
Total Reported	**30**	**50**	**48**	**45**	**56**	**89**	**100**	**70**	**87**

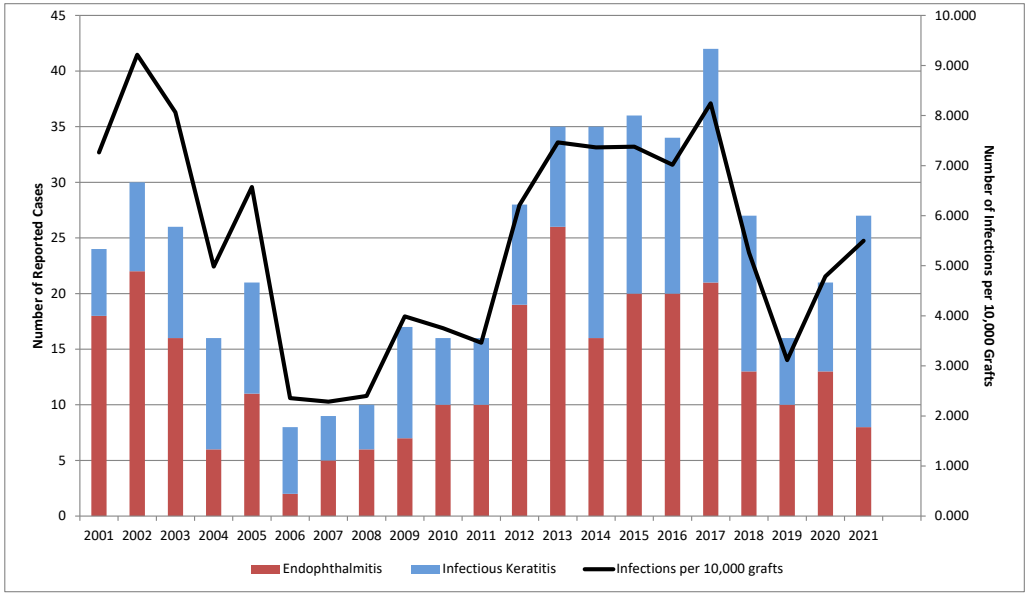


Imputability of Early Regraft

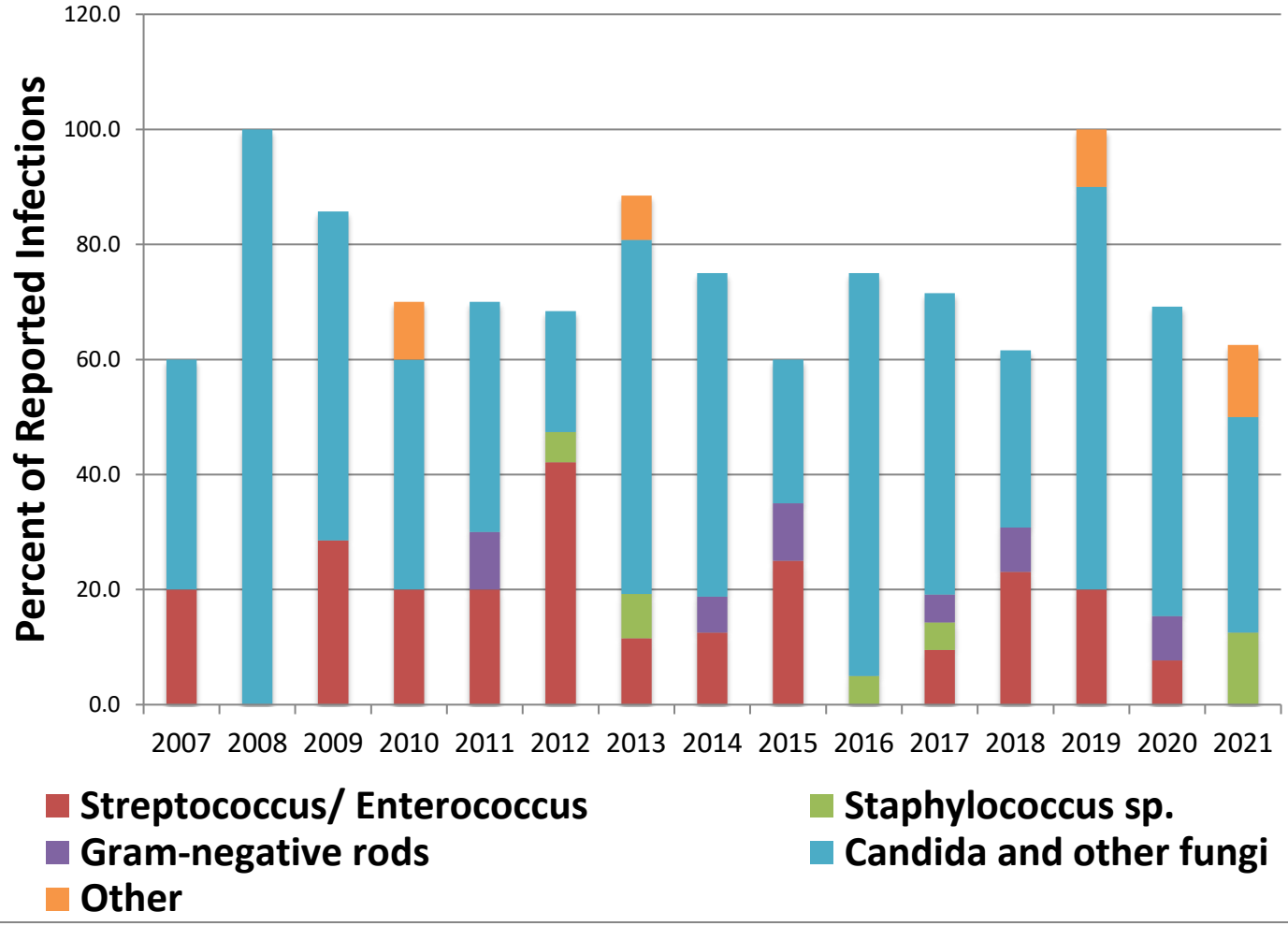
Early Regraft	2013	2014	2015	2016	2017	2018	2019	2020	2021
Possible	9	19	21	23	28	41	61	64	54
Likely, Probable	21	15	14	12	15	11	21	14	10
Definite, Certain	0	0	1	0	0	0	0	0	0
Total Reported	**30**	**34**	**36**	**35**	**43**	**52**	**82**	**78**	**64**



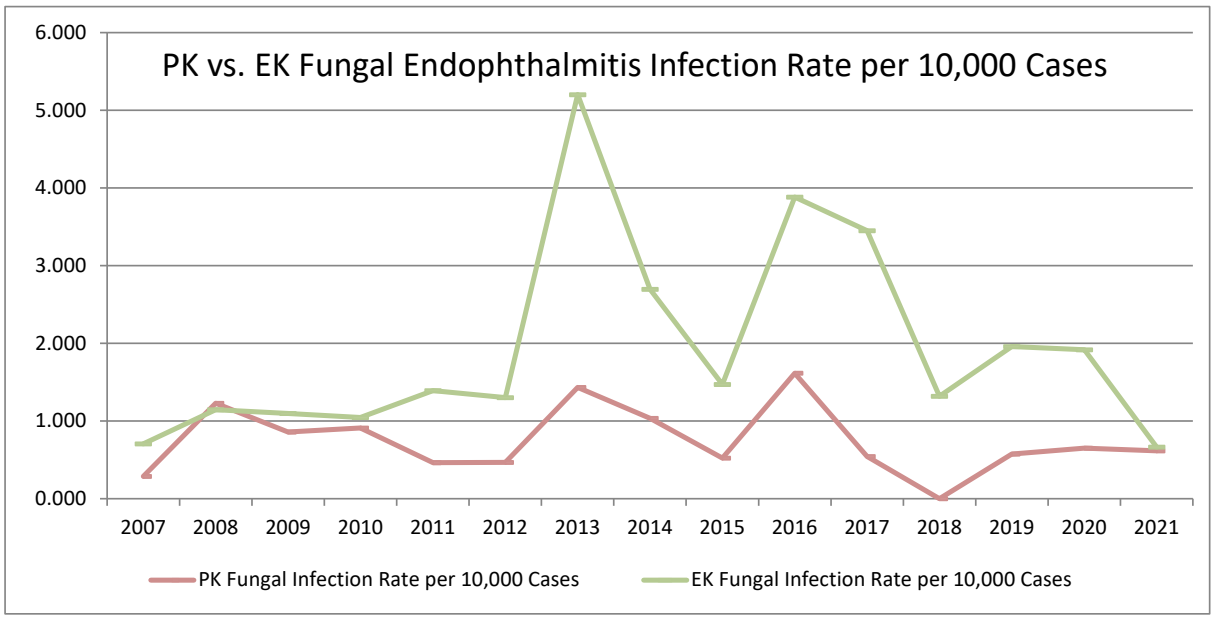
YEAR	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Endophthalmitis	18	22	16	6	11	2	5	6	7	10	10	19	26	16	20	20	21	13	10	13	8
Infectious Keratitis	6	8	10	10	10	6	4	4	10	6	6	9	9	19	16	14	21	14	6	8	19
Total Infections*	24	30	26	16	21	8	9	10	17	16	16	29	36	35	36	35	42	27	16	21	27
No. Corneal Grafts performed in U.S.	33035	32559	32240	32106	31952	33962	39391	41652	42606	42642	46196	46,684	48,229	47,530	48792	49,869	50,934	51,294	51,336	43,873	49,110
Infections per 10,000 grafts	7.265	9.214	8.065	4.983	6.572	2.356	2.285	2.401	3.990	3.752	3.464	6.212	7.464	7.364	7.378	7.018	8.246	5.264	3.117	4.787	5.498



Endophthalmitis Pathogens 2007- 2021



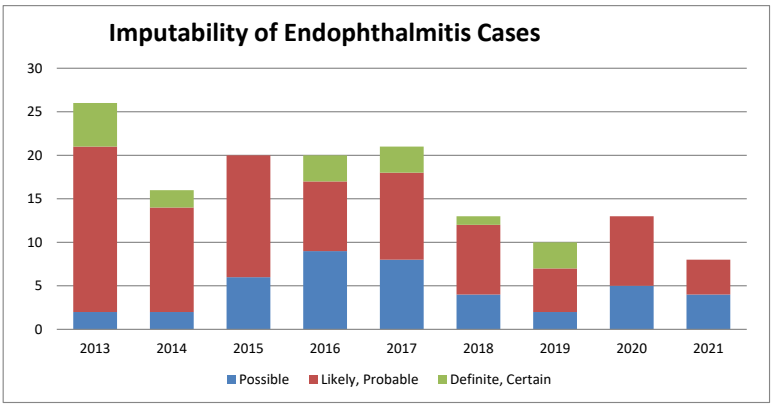
Year	Total Endophthalmitis Cases	Fungal Endophthalmitis Cases	PK Fungal Cases	EK Fungal Cases	Total Domestic PK Procedures	Total Domestic EK Procedures	PK Fungal Infection Rate per 10,000 Cases	EK Fungal Infection Rate per 10,000 Cases
2007	5	2	1	1	34806	14159	0.287	0.706
2008	6	6	4	2	32524	17468	1.230	1.145
2009	7	4	2	2	23269	18221	0.860	1.098
2010	10	4	2	2	21970	19159	0.910	1.044
2011	10	4	1	3	21620	21555	0.463	1.392
2012	19	4	1	3	21422	23049	0.467	1.302
2013	26	16	3	13	20954	24987	1.432	5.203
2014	16	9	2	7	19294	25965	1.037	2.696
2015	20	5	1	4	19160	27208	0.522	1.470
2016	20	14	3	11	18579	28327	1.615	3.883
2017	21	11	1	10	18346	28993	0.545	3.449
2018	13	4	0	4	17347	30336	0.000	1.319
2019	10	7	1	6	17409	30,650	0.574	1.958
2020	13	7	1	5	15402	26,095	0.649	1.916
2021	8	3	1	2	16269	30,098	0.615	0.664

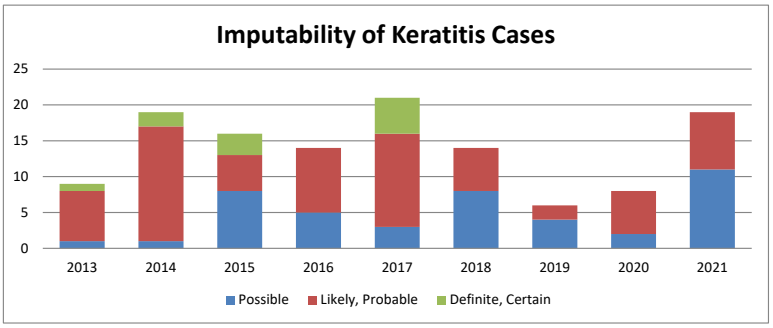


Imputability of Endophthalmitis and Infectious Keratitis

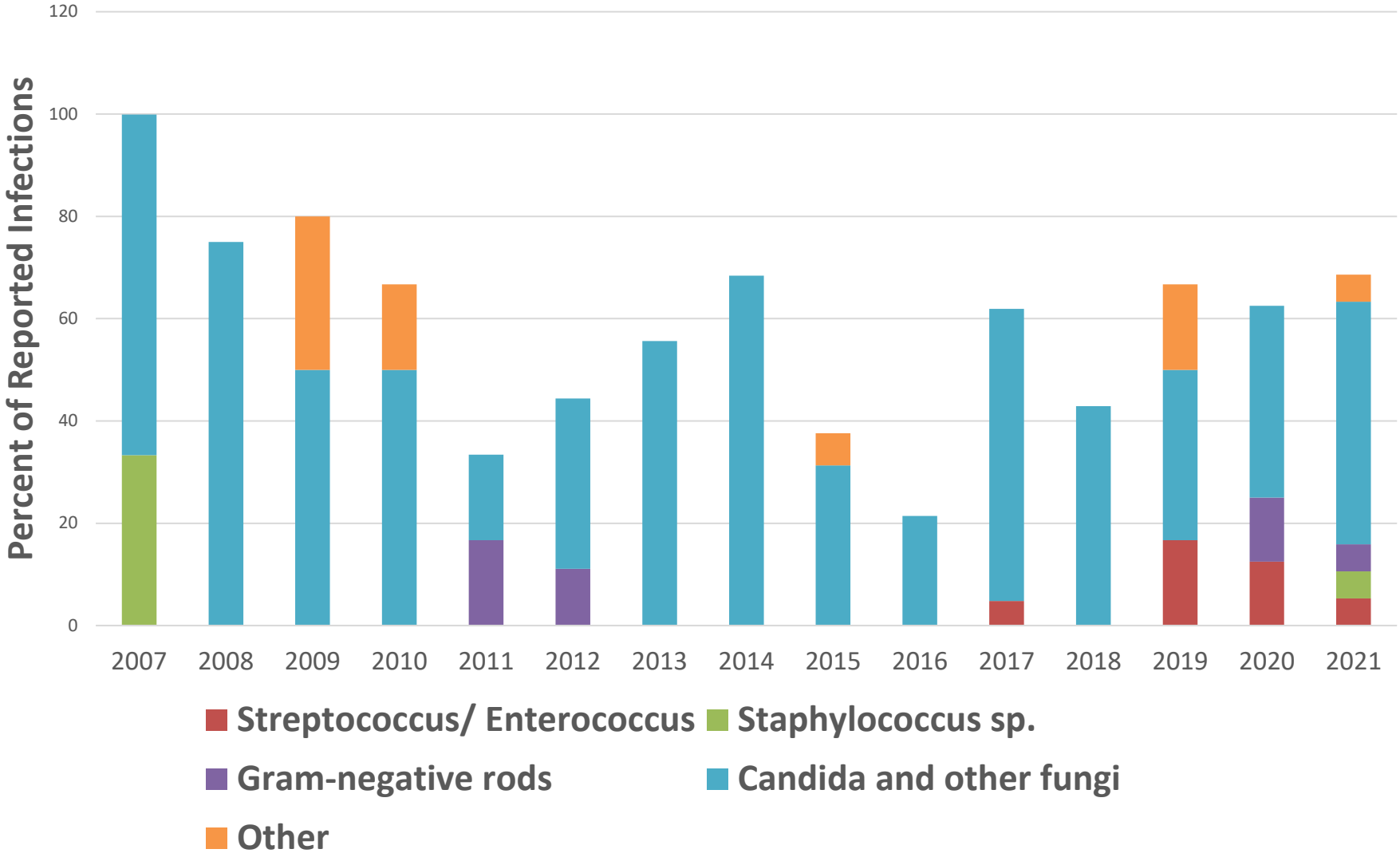
Endophthalmitis	2013	2014	2015	2016	2017	2018	2019	2020	2021
Possible	2	2	6	9	8	4	2	5	4
Likely, Probable	19	12	14	8	10	8	5	8	4
Definite, Certain	5	2	0	3	3	1	3	0	0
Total Reported	**26**	**16**	**20**	**20**	**21**	**13**	**10**	**13**	**8**

Keratitis	2013	2014	2015	2016	2017	2018	2019	2020	2021
Possible	1	1	8	5	3	8	4	2	11
Likely, Probable	7	16	5	9	13	6	2	6	8
Definite, Certain	1	2	3	0	5	0	0	0	0
Total Reported	**9**	**19**	**16**	**14**	**21**	**14**	**6**	**8**	**19**

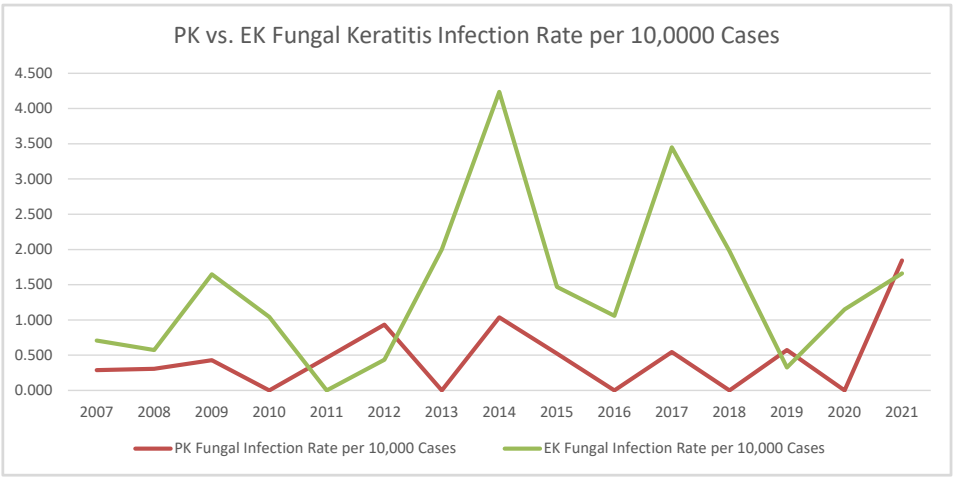




Infectious Keratitis Pathogens
2007 - 2021



Year	Total Keratitis Cases	Fungal Keratitis Cases	PK Fungal Cases	EK Fungal Cases	Total Domestic PK Procedures	Total Domestic EK Procedures	PK Fungal Infection Rate per 10,000 Cases	EK Fungal Infection Rate per 10,000 Cases	
2007	3	2	1	1	34806	14159	0.287	0.706	
2008	4	3	1	1	32524	17468	0.307	0.572	
2009	10	5	1	3	23269	18221	0.430	1.646	
2010	6	3	0	2	21970	19159	0.000	1.044	
2011	6	1	1	0	21620	21555	0.463	0.000	
2012	9	3	2	1	21422	23049	0.934	0.434	
2013	9	5	0	5	20954	24987	0.000	2.001	
2014	19	13	2	11	19294	25965	1.037	4.236	
2015	16	5	1	4	19160	27208	0.522	1.470	
2016	14	3	0	3	18579	28327	0.000	1.059	
2017	21	12	1	10	18346	28993	0.545	3.449	Includes 1 fungal ALK case
2018	14	6	0	6	17347	30336	0.000	1.978	
2019	6	2	1	1	17409	30,650	0.574	0.326	
2020	8	3	0	3	15402	26,095	0.000	1.150	
2021	19	9	3	5	16269	30,098	1.844	1.661	



YEAR	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Primary Graft Failure	61	78	51	31	53	53	50	54	52	31	36	31	30	50	48	45	56	89	100	70	87
Early Regraft												14	30	34	36	35	43	52	82	78	64
Endophthalmitis	18	22	16	6	11	2	5	6	7	10	10	19	26	16	20	20	21	13	10	13	8
Infectious Keratitis	6	8	10	10	10	6	4	4	10	6	6	9	9	19	16	14	21	14	6	8	19
Total Infections*	24	30	26	16	21	8	9	10	17	16	16	29	36	35	36	35	42	27	16	19	27
No. Corneal Grafts performed in U.S.	33035	32559	32240	32106	31952	33962	39391	41652	42606	42642	46196	46,684	48,229	47,530	48,792	49,869	50,934	51,294	51,336	43,873	49,110
Percent Infections	0.073	0.092	0.081	0.050	0.066	0.024	0.023	0.024	0.040	0.038	0.035	0.062	0.075	0.074	0.074	0.070	0.082	0.053	0.031	0.043	0.055
Infections per 10,000 grafts	7.265	9.214	8.064	4.983	6.572	2.356	2.285	2.401	3.990	3.752	3.464	6.212	7.464	7.364	7.378	7.018	8.246	5.264	3.117	4.331	5.498
PGF per 10,000 grafts	18.465	23.957	15.819	9.656	16.587	15.606	12.693	12.965	12.205	7.270	7.793	6.640	6.220	10.520	9.838	9.024	10.995	17.351	19.480	15.955	17.715
Early Regraft per 10,000 grafts												2.999	6.220	7.153	7.378	7.018	8.442	10.138	15.973	17.779	13.032

Endophthalmitis Pathogens	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Streptococcus/ Enterococcus	30.0	48.0	31.0	33.0	36.0	100.0	20.0	0.0	28.6	20.0	20.0	42.1	11.5	12.5	25.0	0.0	9.5	23.1	20.0	7.7	0.0
Staphylococcus sp.	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3	7.7	0.0	0.0	5.0	4.8	0.0	0.0	0.0	12.5
Gram-negative rods	0.0	5.0	12.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	6.3	10.0	0.0	4.8	7.7	0.0	7.7	0.0
Candida and other fungi	14.0	32.0	22.0	50.0	27.0	0.0	40.0	100.0	57.1	40.0	40.0	21.1	61.5	56.3	25.0	70.0	52.4	30.8	70.0	53.8	37.5
Other	0.0	0.0	13.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	0.0	0.0	7.7	0.0	0.0	0.0	0.0	0.0	10.0	0.0	12.5
No growth	28.0	5.0	22.0	0.0	9.0	0.0	0.0	0.0	0.0	20.0	10.0	15.8	7.7	12.5	20.0	10.0	0.0	0.0	0.0	15.4	12.5
Not done	28.0	5.0	0.0	17.0	18.0	0.0	40.0	0.0	0.0	10.0	20.0	21.1	3.9	12.5	20.0	15.0	23.8	38.5	10.0	15.4	25.0

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Fungal	14.0	32.0	22.0	50.0	27.0	0.0	40.0	100.0	57.1	40.0	40.0	21.1	61.5	56.3	25.0	70.0	52.4	30.8	70.0	53.8	37.5
Bacterial	30.0	58.0	56.0	33.0	45.0	100.0	20.0	0.0	28.6	30.0	30.0	47.4	26.9	18.8	35.0	5.0	23.8	30.8	30.0	15.4	25.0

* Note - Includes 1 Iritis case in 2012; 1 scleral graft infection in 2013; and 1 anterior chamber reaction in 2016

Infectious Keratitis	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Streptococcus/ Enterococcus							0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	16.7	12.5	5.3
Staphylococcus sp.							33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.3
Gram-negative rods							0.0	0.0	10. 0	0.0	16.7	11.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.5	5.3
Candida and other fungi							66.6	75.0	50.0	50.0	16.7	33.3	55.6	68.4	31.3	21.4	57.1	42.9	33.3	37.5	47.4
Other							0.0	0.0	30.0	16.7	0.0	0.0	0.0	0.0	6.3	0.0	0.0	0.0	16.7	0.0	5.3
No growth							0.0	25.0	10.0	16.7	33.3	11.1	11.1	10.5	25.0	7.1	4.8	0.0	33.3	12.5	21.1
Not done							0.0	0.0	0.0	16.7	33.3	44.4	33.3	21.1	37.5	64.3	38.1	50.0	0.0	25.0	15.8

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Fungal							66.6	75.0	50.0	50.0	16.7	33.3	55.6	68.4	31.3	21.4	57.1	42.9	33.3	37.5	47.4
Bacterial							33.3	0.0	20.0	0.0	16.7	11.1	0.0	0.0	0.0	0.0	4.8	0.0	16.7	25.0	15.8

Policy & Position Review Subcommittee

INFORMATIONAL ALERT:

Monkeypox and Eye Tissue Donation

September 26, 2022

EBAA continues to closely monitor the outbreak of monkeypox in the United States. The Policy and Position Review Subcommittee (PPRS) of the EBAA Medical Advisory Board has reassessed what is currently known about the risk of transmission of the monkeypox virus, including the potential for human-to-human transmission and disseminated infection from donated ocular tissues. This update provides insight into the current issues potentially impacting ocular tissue safety.

Key Points about Monkeypox

1. The risk to recipients of donated ocular tissues in the United States is considered low at present, given the low domestic prevalence of monkeypox.
2. Monkeypox virus causes a rash characterized by deep and well-circumscribed lesions, typically with central umbilication, with progression through sequential stages (i.e., macules, papules, vesicles, pustules, and scabs). The rash can resemble that caused by more commonly encountered conditions including syphilis, herpes simplex, and herpes zoster.
3. Close contact* (including skin-to-skin contact with a person infected with monkeypox – see below for expanded definition) or contact with contaminated fomites (such as shared linens) are risk factors for human-to-human transmission.
4. Individuals of any gender identity or sexual orientation can develop and spread monkeypox infection. Men who have sex with men (MSM) are considered an at-risk population in the present outbreak in the United States.
5. According to the World Health Organization, the incubation period of monkeypox virus can range from 5 to 21 days.
6. There is no evidence at present that monkeypox can be transmitted by blood transfusion or tissue/cell transplantation and therefore the following screening recommendations are precautionary.

Monkeypox Screening Recommendations for EBAA Member Eye Banks

The EBAA recommends that eye banks exclude/defer (rule out) potential ocular tissue donors who in the last 21 days before death met one or more of the following criteria:

- were diagnosed with or were suspected of having a monkeypox infection;
- had close contact* with a person or an animal diagnosed with or suspected of having monkeypox infection regardless of the donor's vaccination status; or
- developed a rash or other symptoms suggestive of monkeypox infection.

Disclaimer: the selection of risk mitigation criteria pertaining to monkeypox, which includes symptomology, exposure, close contact, infection status and testing for monkeypox is at the sole discretion of the medical director and eye bank responsible for donor eligibility determination as long as the intent of relevant standards, e.g., D.1.110, D1.120, Appendix II is met.

The following donor risk assessment questions were developed by the American Association of Tissue Banks (AATB) and may be used to obtain information specific to screening for risk of monkeypox infection:

- Was she/he told by a healthcare professional she/he was diagnosed with monkeypox, suspected of having monkeypox, or treated for monkeypox in the past 21 days? If yes:
    - When was she/he diagnosed?
    - Was testing performed? If yes, what were the results?
    - Have all scabs from the rash fallen off?
- Was she/he told that she/he could have been exposed* to human and/or animal monkeypox virus in the past 21 days? If yes,
    - Who told her/him?
    - When did the exposure occur?
- Has she/he been vaccinated with monkeypox or smallpox vaccine in the past 6 months? If yes,
    - When?
    - Which vaccine?
    - Why were they vaccinated?

These recommendations will be in effect until further notice or additional criteria are added.

*Close contact/exposure in the context of human-to-human spread of monkeypox virus includes direct contact with skin lesions, prolonged face-to-face exposure to respiratory secretions, contact with contaminated fomites (i.e., objects/fabrics/surfaces), and/or intimate physical contact. The virus also may be transmitted in utero or as a result of direct contact during or after childbirth. More information about the spread of monkeypox can be found at:

https://www.cdc.gov/poxvirus/monkeypox/if-sick/transmission.html

Accreditation Board

The AB voted to recommend the following changes to C2.000 at its meeting on October 18, 2022:

C2.000 Training, Certification and Competency Reviews of Personnel Performing Tasks Overseen and/or Regulated by the EBAA, FDA, and Other State and Federal Agencies.

An eye bank or other establishment performing eye banking functions must provide a formal orientation program for each new employee and the employee's participation must be documented.

An eye bank or other establishment performing eye banking functions, must also establish a comprehensive and well-defined training program outlining specific job-related tasks that each employee is being trained to perform. ~~This training program shall contain documentation indicating when each employee is released to perform their job-related tasks independently.~~ This comprehensive training program shall include the implementation and documentation of annual competency reviews of the skills and job- related knowledge of all eye bank employees performing eye banking functions. The person responsible for ~~these competency reviews~~ this training program must be a CEBT or an individual who has been qualified by a CEBT who is part of the organization's comprehensive quality program. Determination of competency for eye banking functions is the responsibility of the Medical Director or trainer(s) designated and determined competent by the Medical Director. This training program shall contain documentation indicating when each employee is released to perform their job-related tasks independently.

Eye bank technicians seeking to receive EBAA certification or become re-certified must meet the criteria set forth in the EBAA document Criteria for Certification and Recertification of Eye Bank Technicians.

All EBAA accredited eye banks must have one CEBT attend an EBAA sponsored skills workshop once every three years.

The Pre-Inspection Questionnaire Instructions would also be revised should the MAB approve the changes:

2-C. Provide documentation that the person (or persons) conducting annual competency reviews is ~~a CEBT or is an individual who has been qualified by a CEBT who is part of the organization's quality program.~~ the Medical Director or trainer(s) designated and determined competent by the Medical Director.

Certification Board

Technician Education Committee

Technical Procedures Manual Subcommittee

Old Business

Data Integrity Subcommittee Report

Data Integrity Subcommittee Report
Fall 2022

Members:

Amber Benbow	Dr. Holly Hindman
Natalie Buckman	Ellen Kerns
Jennifer DeMatteo (EBAA)	Dr. Marian Macsai
Kristin Mathes	Dr. Shahzad Mian
Brian Philippy	Dr. Woody Van Meter

The Data Integrity Subcommittee has followed up on the suggestions from the previous Medical Advisory Board meeting with significant assistance from Dr. David Glasser. We appreciate the immense work that Dr. Glasser put into the task of "crosswalking" ICD-10 codes to EBAA codes, as well as assisting with the suggested revisions to the EBAA coding system.

Goals:

- Improve the rate of known vs. unknown diagnoses reported
- Improve the quality of the data reported

Problems Identified (not an all-inclusive list):

1. Categories in EBAA diagnosis list include the word "other", causing interpretive coding errors
2. "Corneal edema" is often an indication reported, but that phasing is not detailed enough to code to a root cause
3. "Corneal ulcer" is often an indication reported, but that phasing is not detailed enough to code to a root cause
4. "Other causes of endothelial dysfunction" for EK use is on the rise, but greater specificity is needed by those interested in the data use
5. Eye banks providing tissue in bulk to other eye banks do not face scrutiny or penalty for not following up to get tissue-specific details
6. The problem with ICD-10 coding is that it's designed to justify procedures performed for billing purposes and offers an array of general and non-specific codes. This renders this data set alone not useful for academic, public health, or eye bank use.
7. The problem with "crosswalking" ICD-10 to the EBAA codes is that there are too many general ICD-10 codes that could apply to multiple EBAA codes. This renders the idea of developing a concrete tool matching one set to the other as too confusing to manage. However, elements thereof may be useful in a guidance.

Solutions:

- Regarding problems 1-4 and other similar coding issues, a revised EBAA Indications List has been carefully drafted
- Regarding problems 6-7, as well as the more complicated nuances of problems 1-4, a guidance document will accompany a revised list, written for eye bankers and clinicians as the audience.

- Regarding problem 5, a proposed addition to M1.600 to set a maximum acceptable threshold for reported domestic unknown indications would set clear expectations against which the Accreditation Board could determine citation mechanism and weight.

Summary of Voting Actions:

Item 1 Implement the proposed revision to the EBAA Indications List, to be supplemented with a robust guidance document

(Category titles listed in the table below with added items indicated with yellow highlight and removed items indicated with strikethrough. Category M is eliminated. Categories D, G, H, I, K, and Z are unchanged. A full list of categories and subcategories follows at the end of this document.)

A. Endothelial Dysfunction, Corneal Edema Due To Prior Ophthalmic Surgery ~~A. Post Cataract Surgery Edema~~	B. Ectasias, Thinnings (primary)	C. Heritable Endothelial Dystrophies	D. Repeat Corneal Transplant
E. Anterior and Stromal Non-Ectatic Degenerations and Dystrophies ~~E. Other Degenerations or Dystrophies~~	F. Complications of Prior Refractive Surgery	G. Microbial Keratitis	H. Mechanical (non-surgical) or Chemical Trauma
I. Congenital Opacities	J. Post-Surgical Non-Edematous Corneal Opacification or Distortion (other than due to prior refractive surgery or keratoplasty) ~~J. Pterygium~~	K. Noninfectious Ulcerative Keratitis, Thinning, or Perforation	L. Secondary Endothelial Dysfunction (other than dystrophy or surgical/nonsurgical trauma) ~~L. Other Causes of Corneal Opacification or Distortion~~
~~M. Other Causes of Endothelial Dysfunction~~	Z. Unknown, Unreported, or Unspecified		

Item 2 **Proposal to amend Medical Standard M1.600 to set an acceptable reporting threshold for domestic surgical indications aimed at empowering the Accreditation Board to cite non-compliant banks**

(added content subject to vote is highlighted in yellow below)

M1.600 Statistical Reporting
Each eye bank shall report data to the EBAA for statistical reporting.

Each source eye bank shall report information on surgical technique, indications for surgery, and destination country. No more than 10% of indications for surgery applying to corneas used for surgery domestically may be reported as unknown indication.

EBAA shall maintain an electronic reporting system through which member eye banks must submit their statistical data. Eye banks shall fully submit their operational data no later than 30 days following the end of March, June, September, and December. Data to be submitted will be defined by the EBAA Statistical Ledger and the reporting system.

Data for decision making on this vote follows.

		7 banks	29 banks	21 banks
		Large (over 4k recovered)	Medium (1k to 4k recovered)	Small (under 1k recovered)
Over 10%	23	4	15	4
Over 15%	15	2	10	3
Over 20%	11	1	8	2
Over 25%	8	1	6	1
Over 30%	8	1	6	1
Over 40%	7	0	6	1

Percent Domestic Unknown (PK + DSAEK + DMEK + DALK + SALK + Other ALK)

33 banks: 0.0% 0.0% 0.0% 0.0% 0.2% 0.5% 0.8% 1.0% 1.2% 1.3% 1.6% 1.6% 1.7% 1.9% 2.0% 2.4% 2.8% 3.0% 3.1% 3.2% 3.8% 3.8% 4.5% 4.8% 4.9% 5.4% 6.1% 6.4% 7.5% 8.1% 8.3% 8.5% 8.8%

8 banks: 11.8% 11.9% 12.0% 12.5% 12.7% 13.2% 13.6% 13.7%

4 banks: 17.1% 17.2% 18.1% 19.5%

3 banks: 20.4% 22.2% 23.2%

1 bank: 37.4%

7 banks: 44.9% 45.0% 45.7% 47.5% 49.7% 66.8% 77.2%

A. Endothelial Dysfunction, Corneal Edema Due To Prior Ophthalmic Surgery	B. Ectasias, Thinnings (primary)	C. Heritable Endothelial Dystrophies	D. Repeat Corneal Transplant	E. Anterior and Stromal Non-Ectatic Degenerations and Dystrophies	F.Complications of Prior Refractive Surgery
Corneal edema after cataract removal (with or without IOL insertion)	Keratoconus or keratoglobus	Fuchs dystrophy	Regraft following PK, EK, or ALK	Stromal and anterior corneal dystrophies (e.g. granular, lattice, macular, Reis-Bucklers)	Post refractive surgery without ectasia (e.g. RK, HK, automated lamellar keratoplaty, PRK, LASIK, LASEK, etc.)
Corneal edema after IOL repositioning or exchange or secondary IOL insertion	Pellucid or Terrien marginal degeneration	Posterior polymorphous dystrophy	Regraft following K-Pro, KLA, or other keratoplasty or limbal stem cell procedure	Non-ectatic corneal degenerations (e.g. calcific band keratopathy, amyloid degeneration)	Post refractive surgery with ectasia (e.g. RK, HK, automated lamellar keratoplaty, PRK, LASIK, LASEK, etc.
Corneal edema after penetrating glaucoma surgery with a bleb (e.g. trabeculectomy, tube shunt, full-thickness stent with or without reservoir)		Congenital hereditary endothelial dystrophy			
Corneal edema after non-penetrating glaucoma surgery (e.g. MIGS, goniotomy, canaloplasty, other ab interno angle procedures)					
Corneal edema after iris or cyclodialysis repair					
Corneal edema after vitrectromy					
Corneal edema due to epithelial downgrowth or stromal ingrowth					
Corneal edema after strabismus surgery					
Corneal edema after ophthalmic surgery not listed above					

G. Microbial Keratitis	H. Mechanical (non-surgical) or Chemical Trauma	I. Congenital Opacities	J. Post-Surgical Non-Edematous Corneal Opacification or Distortion (other than due to prior refractive surgery or keratoplasty)	K. Noninfectious Ulcerative Keratitis, Thinning, or Perforation	L. Secondary Endothelial Dysfunction (other than dystrophy or surgical/nonsurgical trauma)	Z. Unknown, Unreported, or Unspecified
Bacterial, viral, or fungal	Traumatic scarring, traumatic perforation, or traumatic corneal edema	Peters anomaly, sclerocornea, aniridia	Post-Pterygium Surgery	Dry eye, keratoconjunctivitis sicca, Sjogren syndrome, pemphigoid	Endothelial dysfunction due to uveitis (not microbial)	
Spirochete (syphilitic interstitial keratitis)	Thermal injury	Glaucoma (congenital), buphthalmos	Post-Keratectomy (other than pterygium)	Immune, collagen-vascular disease, systemic vasculitides (e.g. rheumatoid, Mooren ulcer, polyarteritis nodosa)	Endothelial dysfunction due to glaucoma (not congenital)	
Chlamydial (trachoma)	Chemical injuries (e.g. alkali, acid, petroleium, etc.)		Post-surgical limbal stem cell deficiency	Neurotrophic or exposure keratopathy	Endothelial dysfunction due to contact lens wear	
Parasitic (e.g. acanthamoeba, onchocerciasis, trypanosomiasis, etc.)	Limbal stem cell deficieny due to chronic medication (drug), toxin exposure, contact lens wear, or other medical devices interaction		Non-edematous corneal opacification or distortion after ophthalmic surgery not listed above.	Stevens Johnson syndrome, toxic epidermal necrolysis		
Iridocorneal endothelial syndromes (e.g. Chandler, iris-nevus, essential iris atrophy)						

New Business

L1.100 Tissue Report Form
Matrix II – Reporting Requirements

From:	Andrew Officer
To:	chamberw@ohsu.edu; Eric Meinecke
Subject:	MAB Agenda Item
Date:	Tuesday, September 20, 2022 2:05:10 PM
Attachments:	Andrew Officer Email Signature (400 × 200 px).png Matrix II Update.pdf

Hello Dr. Chamberlain and Eric,

I have a proposed MAB agenda item to present to the MAB at the upcoming fall meeting. This is in regards to Matrix II: Reporting Requirements on page 32 of the Medical Standard. My proposed change is to add a footnote that will apply to the box at the intersection of 'Specular microscope observations' and 'Intermediate-Term Storage." I would propose this footnote to be written with the verbiage as it appears in Matrix I: Tissue Evaluation Requirements which is, "In lieu of specular microscopy, a validated method for assessment of endothelium after processing meets this requirement."

This will make the medical standard consistent from a point of tissue evaluation requirements to also what we are then required to report. The medical standard is currently contradictory on this method of reporting and evaluation. I have attached an example of how this change could look with the updates in red text.

Andrew Officer, MS, CEBT
Technical Director
937-396-1000 Office
937-750-2773 Cell
Donatesight.org

Matrix II: Reporting Requirements			
Content on Tissue Report Form	**Unprocessed Tissue**	**Processed Tissue**	
	Short or Intermediate-Term Storage	**Intermediate-Term Storage***	**Long-Term Storage****
Donor age	Required	Required	Not Required
Donor cause of death	Required	Required	Not Required
Donor death date and time	Required	Required	Not Required
Preservation date and time	Required	Required	Not Required
Additional processing date and time		Required	Not Required
Date and time that cooling of ocular tissues or body refrigeration began	Required	Required	Not Required
Name/identifier of technician who recovered tissue	Required	Required	Not Required
Name/identifier of technician who initially preserved (stored) tissue	Required	Required	Not Required
Name/identifier of technician(s) who evaluated tissue	Required	Required	Not Required
Name/identifier of technician who processed tissue		Required	Not Required
Morphology and dimensions of processed tissue		Required	Required
Diameter of processed graft		Required	Not Required
Pachymetry (graft thickness)	Not Required	Required	Not Required
Slit lamp observations	Required	Required	Required (other visual exam acceptable)
Specular microscope observations (including endothelial cell density)	Required (unless whole eye, anterior or tectonic use only)	Required (unless [1] anterior or tectonic use only)	Not Required
Suitability for indicated surgical uses	Required	Required	Required

* Intermediate-Term Storage - For example: manual, microkeratome, or laser-processed cornea for penetrating, endothelial (e.g., DSAEK, DSEK, DMEK, DMAEK), or anterior lamellar keratoplasty.

** Long-term storage - For example: frozen whole globe, cornea in glycerin, irradiated cornea, sclera.

[1] In lieu of specular microscopy, a validated method for assessment of endothelium after processing meets this requirement

6-month Data Review

EBAA Statistical Report Ledger for Calendar Year 2022

	Jan - Jun 2022	Jan - Jun 2021	Jan - Jun 2020
I. Death Referrals			
A. Total death referrals received by eye bank or entity on behalf of eye bank	456,753	455,542	374,047
B. Death referrals determined eligible to donate for transplant intent	95,932	91,738	76,187
II. Tissue Recoveries			
A. Total donors	30,200	32,183	24,543
1. Donors recovered not found on a donor registry, nor known to have first-person consent documentation	11,384	12,396	9,982
2. Donors recovered found on a donor registry or known to have first-person consent documentation	18,816	19,787	14,561
B. Eyes and/or corneas recovered with intent for surgical use	55,124	59,066	45,273
C. Eyes and/or corneas recovered for other uses	4,847	4,613	3,337
CALCULATION A: Total eyes and/or corneas recovered	59,971	63,679	48,610
Validation A: This cell should be less than or equal to 2.	1.99	1.98	1.98
D. Recovery by			
1. Eyes and/or corneas recovered by this reporting eye bank	54,540	58,574	
2. Eyes and/or corneas recovered by an EBAA-accredited partner agency	2,084	2,049	
3. Eyes and/or corneas recovered by a partner agency, not accredited by EBAA	3,347	3,056	
Validation A2: This value should be equal to zero.	0	0	-48610
III. Donor Profiles			
A. Age Profile			
1. Donors aged under one year	1	1	1
2. Donors aged 1 to 10	110	132	108
3. Donors aged 11 to 20	532	732	563
4. Donors aged 21 to 30	1169	1366	1145
5. Donors aged 31 to 40	1963	2134	1541
6. Donors aged 41 to 50	3270	3619	2864
7. Donors aged 51 to 60	6811	7216	5820
8. Donors aged 61 to 70	10752	11186	8464
9. Donors aged 71 to 80	4987	5207	3627
10. Donors aged over 80	605	590	410
CALCULATION B: Total donors by age	30,200	32,183	24,543
Validation B: This value should equal zero.	0	0	0
B. Sex Profile			
1. Male	18,600	19,783	14,675
2. Female	11,600	12,400	9,868
CALCULATION C: Total donors by sex	30,200	32,183	24,543
Validation C: This number should be zero.	0	0	0
C. Cause of Death Profile			
1. Heart Disease	9,967	10,817	8,021
2. Cancer	4,648	4,846	3,891
3. Cerebral Vascular Accident	2,794	3,000	2,202
4. Respiratory Disease	3,226	2,706	2,327
5. Trauma	2,749	3,247	2,374
6. Other	6,816	7,567	5,728
CALCULATION D: Total donors by primary cause of death	30,200	32,183	24,543
Validation D: This value should be zero.	0	0	0
IV. Eligibility and suitability for tissues recovered with intent for surgical use			
A. Reasons tissues were not released (more than one reason per tissue may apply):			
1. Donor eligibility:			
a. Positive or reactive test for communicable disease agent or disease (Tests run by donation agency)	5,083	5,757	4,308
i. HIV Antibody (HIV I/II Ab)	224	140	90
ii. HIV Nucleic Acid Test (HIV NAT)	41	38	73
iii. Hepatitis B Surface Antigen (HBsAg)	1,085	1,249	591
iv. Hepatitis B Core Antibody (HBcAb)	1,889	2,006	1,872
v. Hepatitis B Nucleic Acid Test (HBV NAT)	323	267	284
vi. Hepatitis C Antibody (HCV Ab)	759	799	722
vii. Hepatitis C Nucleic Acid Test (HCV NAT)	297	337	319
viii. Syphilis (RPR, VDRL, FTA, etc.)	151	137	114
ix. HTLV Antibody (HTLV I/II Ab)	68	34	58
x. West Nile Virus Nucleic Acid Test (WNV NAT)	2	4	0
xi. Other positive or reactive test for communicable disease	244	746	185
b. Other communicable disease testing issue	277	294	125
c. Medical record or autopsy findings	3,167	3,598	2,886
i. Dementia/Neurological Issues	265	365	265
ii. Sepsis (determined by positive blood cultures)	689	680	437
iii. Sepsis (determined by other indicators)	779	841	595
iv. Plasma dilution	99	103	73
v. Unknown cause of death	41	68	50

EBAA Statistical Report Ledger for Calendar Year 2022

	Jan - Jun 2022	Jan - Jun 2021	Jan - Jun 2020
vi. Other	1,294	1,541	1,466
d. Medical/social history interview:	879	1,054	981
i. Travel	138	193	160
ii. Dementia/Neurological Issues	68	68	77
iii. Other	673	793	744
e. Body Exam	106	111	87
2. Tissue suitability	5,475	6,836	5,336
a. Epithelium	70	65	48
b. Stroma	3,373	3,620	2,802
i. Prior refractive surgery	131	293	237
ii. Scar	434	480	396
iii. Infiltrate	1,669	1,714	1,409
iv. Foreign body	46	59	36
v. Other	1,093	1,074	724
c. Descemet's membrane	63	155	122
d. Endothelium	1,969	2,996	2,364
3. Quality issue	385	218	139
a. Storage	136	76	51
b. Labeling	8	8	2
c. Processing	165	72	52
d. Supply or reagent	36	29	20
e. Environmental control	40	33	14
4. Other reason prior to tissue release	620	663	704
B. Total eyes and/or corneas intended for transplant but not released for transplant	13,284	15,679	12,475
CALCULATION E: Total eyes and/or corneas released for transplant	41,840	43,387	32,798
Validation E1: This cell should read, "Valid." The value is valid when the number of reasons for not releasing tissue is greater than or equal to the number of corneas not released for transplant.	Valid	Valid	Valid
C. Reasons released tissues were not transplanted (more than one reason per tissue may apply):			
1. Transportation issue	131	228	50
2. Surgeon issue	42	45	44
3. Recipient issue	19	22	18
4. Returned and unable to place again	213	317	268
5. Donor information not available at time of tissue release	8	45	8
6. Expired or unable to place tissue	1,532	1,810	2,488
7. Tissue damaged during processing (tissue was released for transplant prior to cut)	760	790	502
8. Other reason after release of tissue	1,456	532	435
D. Total eyes and/or corneas released for transplant but not used for transplant	3,087	3,293	3,751
Validation E2: This cell should read, "Valid." The value is valid when the number of reasons for released tissue is not transplanted is greater than or equal to the number of corneas released but not transplanted.	Valid	Valid	Valid
V. Intermediate-Term Tissue Distribution of Source Eye Bank Corneas			
A. Intermediate-term preserved corneas processed into corneal segments (into separate containers for use in multiple recipients)	107	89	88
B. Number of corneal segments produced from whole, intermediate-term preserved corneas processed into segments (into separate containers for use in multiple recipients)	213	173	170
C. Intermediate-term preserved corneas, cornea segments or whole eyes, transplanted domestically for:	24010	24708	18868
1. PK	7891	8258	6717
2. EK	14827	14984	10967
a. DSEK, DSAEK, DLEK	7575	8097	6007
b. DMEK or DMAEK	7233	6863	4957
c. PDEK	0	0	1
d. Other EK	19	24	2
3. ALK	232	314	233
a. DALK (Deep Anterior Lamellar Keratoplasty)	161	232	163
b. SALK (Superficial Anterior Lamellar Keratoplasty)	7	11	24
c. Other ALK (e.g. peripheral, eccentric, etc.)	64	71	46
4. KLA	39	66	47
5. Keratoprosthesis (K-Pro)	52	83	79
6. Glaucoma shunt patch or other non-keratoplasty use	424	431	473
7. Other Keratoplasty (e.g. experimental surgery type)	7	3	3
8. Unknown or Unspecified	538	569	349
D. Intermediate-term preserved corneas, cornea segments or whole eyes, transplanted internationally for:	10985	11444	7446
1. PK	6525	6873	4539
2. EK	2551	2624	1751
a. DSEK, DSAEK, DLEK	1695	1710	1113

EBAA Statistical Report Ledger for Calendar Year 2022	Jan - Jun 2022	Jan - Jun 2021	Jan - Jun 2020
b. DMEK or DMAEK	833	895	629
c. PDEK	1	1	0
d. Other EK	22	18	9
3. ALK	401	379	232
a. DALK (Deep Anterior Lamellar Keratoplasty)	374	342	210
b. SALK (Superficial Anterior Lamellar Keratoplasty)	4	16	8
c. Other ALK (e.g. peripheral, eccentric, etc.)	23	21	14
4. KLA	7	7	6
5. Keratoprosthesis (K-Pro)	8	5	7
6. Glaucoma shunt patch or other non-keratoplasty use	22	13	11
7. Other Keratoplasty (e.g. experimental surgery type)	10	1	0
8. Unknown or Unspecified	1,461	1,542	900
CALCULATION K: Total intermediate-term preserved corneas, cornea segments, and whole eyes used for KERATOPLASTY	34,549	35,708	25,830
CALCULATION L: Total intermediate-term preserved eyes and/or corneas used for TRANSPLANT	34,889	36,068	26,232
VI. Long-Term Preserved Tissue Preservation and Distribution of Source Eye Bank Tissue			
A. Long-term preserved corneas or whole eyes PRESERVED for transplant	3,864	4,026	2,815
B. Long-term preserved corneas, cornea segments, or whole eyes DISTRIBUTED for:	2,133	7,049	5,152
1. Keratoplasty	84	55	74
2. Glaucoma shunt patching	2,047	4,749	4,889
3. Other surgical uses	2	2,245	189
C. Long-term preserved corneas, cornea segments, or whole eyes FORWARDED to another entity for final distribution	289	191	638
D. Sclera or sclera segments PRESERVED for transplantation	3,118	3,655	1,738
E. Sclera or sclera segments DISTRIBUTED for:	1,190	2,629	1,585
1. Prosthesis following enucleation	116	141	216
2. Glaucoma shunt patching	800	2,089	879
3. Other surgical uses	274	399	490
F. Sclera or sclera segments FORWARDED to another entity for final distribution	104	87	202
CALCULATION M: Total eyes and/or corneas transplanted and long-term preserved for transplant	38,753	40,094	29,047
Validation M: This cell should be zero.	0	0	0
VII. Tissue Provided for Non-Surgical Uses			
A. Tissues provided for research (all tissue types)	6,932	7,097	4,970
B. Tissues provided for physician or technician training (all tissue types)	3,077	3,601	3,174
VIII. Tissue Processing for Transplant by My Eye Bank			
A. Eye Processing (does not include in situ excision)	2,417	4,556	986
1. Processed for cornea preservation (corneas only)	1,335	461	87
2. Processed for sclera preservation (incl. cornea/sclera preservation, sclera preservation from poles removed after in situ excision, etc.)	1,018	1,181	892
3. Processed for other ocular materials (regardless of cornea or sclera preservation)	64	2,914	7
B. Cornea Processing	19,391	25,360	16,222
1. Processed by microkeratome	9,017	10,845	6,687
a. Preloaded into a device following processing by microkeratome	446	251	
2. Processed by laser	20	72	27
3. Processed by manual dissection (e.g. DMEK, DMAEK, cornea dissection)	7,176	8,975	5,330
a. Preloaded into a device following processing by manual dissection	6,006	5,052	
4. Processed by transfer into long-term preservation (incl. sectioned tissue only once)	2,927	5,390	4,139
5. Processed by other methods	251	78	39
IX. Countries of Destination			
Country: United States	24,010	24,708	18,868
Country: Afghanistan	2		
Country: Aland Islands			
Country: Albania	7	1	
Country: Algeria	47	9	
Country: Andorra			
Country: Angola			
Country: Antigua and Barbuda			
Country: Argentina	251	176	
Country: Armenia	36	9	
Country: Aruba			
Country: Australia			
Country: Austria			
Country: Azerbaijan	25	14	
Country: Bahamas	1		
Country: Bahrain	28	8	
Country: Bangladesh	124	103	

EBAA Statistical Report Ledger for Calendar Year 2022

	Jan - Jun 2022	Jan - Jun 2021	Jan - Jun 2020
Country: Barbados	14	4	
Country: Belarus			
Country: Belgium			
Country: Belize			
Country: Benin			
Country: Bhutan			
Country: Bolivia	40	30	
Country: Bosnia and Herzegovina			
Country: Botswana			
Country: Brazil	15	51	
Country: Brunei			
Country: Bulgaria	8	2	
Country: Burkina Faso			
Country: Burundi			
Country: Cabo Verde			
Country: Cambodia			
Country: Cameroon			
Country: Canada	230	199	
Country: Cayman Islands	2		
Country: Central African Republic			
Country: Chad			
Country: Chile	297	248	
Country: China	62	95	
Country: Christmas Island	1		
Country: Colombia	2		
Country: Comoros			
Country: Congo			
Country: Costa Rica	33	38	
Country: Cote d'Ivoire	15	2	
Country: Croatia			
Country: Cuba		2	
Country: Curacao			
Country: Cyprus	37	26	
Country: Czechia			
Country: Denmark			
Country: Djibouti	622	682	
Country: Dominica			
Country: Dominican Republic	226	226	
Country: Ecuador	108	108	
Country: Egypt	1,921	2,581	
Country: El Salvador	56	74	
Country: Equitorial Guinea			
Country: Eritrea			
Country: Estonia			
Country: Eswatini			
Country: Ethiopia			
Country: Fiji			
Country: Finland			
Country: France			
Country: French Guiana			
Country: Gabon			
Country: Gambia			
Country: Georgia	19	19	
Country: Germany	416	537	
Country: Ghana	32	21	
Country: Greece	123	115	
Country: Greenland			
Country: Guam			
Country: Guatemala	10	13	
Country: Guinea			
Country: Guinea-Bissau		1	
Country: Guyana	4	3	
Country: Haiti			
Country: Honduras	60	47	
Country: Hong Kong	16	14	
Country: Hungary			
Country: Iceland	1	6	

EBAA Statistical Report Ledger for Calendar Year 2022

	Jan - Jun 2022	Jan - Jun 2021	Jan - Jun 2020
Country: India			
Country: Indonesia	31	27	
Country: Iran			
Country: Iraq	341	189	
Country: Ireland			
Country: Israel	186	166	
Country: Italy	25	4	
Country: Jamaica	8	5	
Country: Japan	1,070	1,114	
Country: Jordan	70	103	
Country: Kazakhstan			
Country: Kenya	120	93	
Country: Kiribati			
Country: Korea, North			
Country: Korea, South	397	429	
Country: Kosovo			
Country: Kuwait	54	57	
Country: Kyrgyzstan		6	
Country: Laos			
Country: Latvia	1	3	
Country: Lebanon	64	155	
Country: Lesotho			
Country: Liberia			
Country: Libya	13		
Country: Lichtenstein			
Country: Lithuania			
Country: Luxembourg			
Country: Macedonia		12	
Country: Madagascar			
Country: Malawi			
Country: Malaysia	62	50	
Country: Maldives			
Country: Mali			
Country: Malta			
Country: Marshall Islands			
Country: Mauritania			
Country: Mauritius	8		
Country: Mexico	482	512	
Country: Micronesia			
Country: Moldova			
Country: Monaco			
Country: Mongolia	6		
Country: Montenegro			
Country: Morocco	123	156	
Country: Mozambique		5	
Country: Myanmar			
Country: Namibia	13	11	
Country: Nauru			
Country: Nepal			
Country: Netherlands			
Country: New Zealand	2	9	
Country: Nicaragua			
Country: Niger			
Country: Nigeria	39	37	
Country: Norway	93	31	
Country: Oman	6	7	
Country: Pakistan	448	468	
Country: Palau			
Country: Palestine	5	17	
Country: Panama	6	1	
Country: Papau New Guinea			
Country: Paraguay	3	1	
Country: Peru	103	71	
Country: Philippines			
Country: Poland			
Country: Portugal			
Country: Qatar	19	10	

EBAA Statistical Report Ledger for Calendar Year 2022

	Jan - Jun 2022	Jan - Jun 2021	Jan - Jun 2020
Country: Republic of Congo			
Country: Romania	6		
Country: Russia			
Country: Rwanda	3	30	
Country: Saint Kitts and Nevis			
Country: Saint Lucia			
Country: Saint Vincent	4		
Country: Samao			
Country: San Marino			
Country: Sao Tome and Principe			
Country: Saudi Arabia	591	558	
Country: Senegal			
Country: Serbia	20	6	
Country: Seychelles			
Country: Sierra Leone	20		
Country: Singapore	210	170	
Country: Slovakia			
Country: Slovenia			
Country: Solomon Islands			
Country: Somalia		1	
Country: South Africa	360	411	
Country: South Sudan			
Country: Spain		1	
Country: Sri Lanka			
Country: Sudan		1	
Country: Suriname	2	10	
Country: Swaziland	3		
Country: Sweden			
Country: Switzerland	36	33	
Country: Syrian Arab Republic	105	122	
Country: Taiwan	62	76	
Country: Tajikistan			
Country: Tanzania	3	43	
Country: Thailand	56	47	
Country: Timor-Leste			
Country: Togo			
Country: Tonga			
Country: Trinidad and Tobago	16	15	
Country: Tunisia	261	150	
Country: Turkey	253	251	
Country: Turkmenistan			
Country: Tuvalu			
Country: Uganda		11	
Country: Ukraine			
Country: United Arab Emirates	132	143	
Country: United Kingdom	39	18	
Country: Uruguay	7	1	
Country: Uzbekistan	39	27	
Country: Vanuatu		3	
Country: Vatican City			
Country: Venezuela	54	56	
Country: Viet Nam	12	28	
Country: Western Sahara			
Country: Yemen			
Country: Zambia		18	
Country: Zimbabwe	2	1	
Country: International			7,446
Validation X (Domestic count): This cell should be zero.	0	0	0
Validation Y (International count): This cell should be zero.	0	0	0
X. Indications for Penetrating Keratoplasty			
A. Post-cataract surgery edema	592	601	466
1. Domestic - Post-cataract surgery edema	382	403	301
2. International - Post-cataract surgery edema	210	198	165
B. Ectasias/Thinnings	1,448	1,682	1,143
1. Domestic - Ectasias/Thinnings	1,001	1,128	763
2. International - Ectasias/Thinnings	447	554	380

EBAA Statistical Report Ledger for Calendar Year 2022

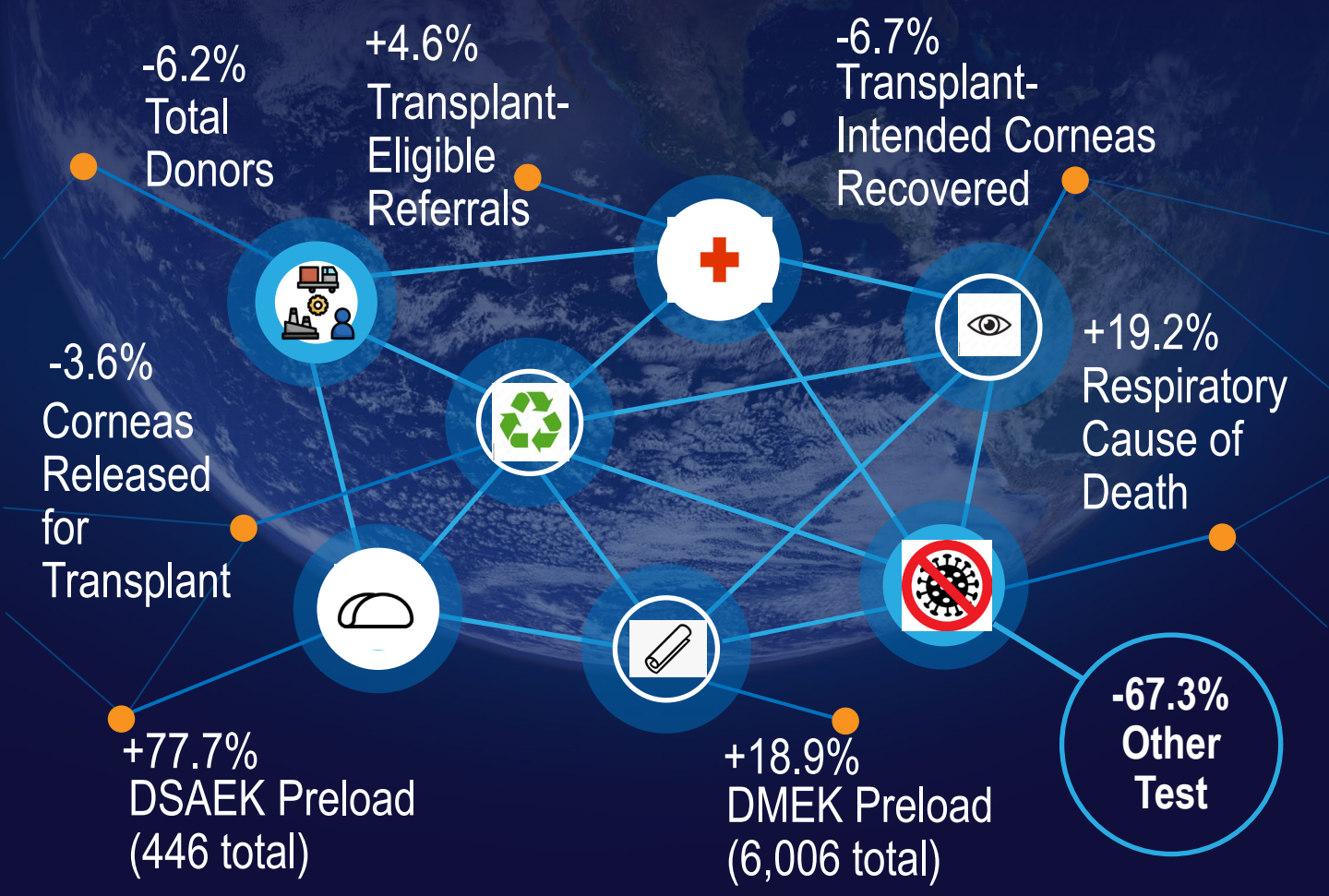
	Jan - Jun 2022	Jan - Jun 2021	Jan - Jun 2020
C. Endothelial Dystrophies	749	631	424
1. Domestic - Endothelial Dystrophies	471	439	293
2. International - Endothelial Dystrophies	278	192	131
D. Repeat corneal transplant	1,802	1,951	1,359
1. Domestic - Repeat corneal transplant	1,492	1,646	1,158
2. International - Repeat corneal transplant	310	305	201
E. Other degenerations or dystrophies	536	508	391
1. Domestic - Other degenerations or dystrophies	386	406	297
2. International - Other degenerations or dystrophies	150	102	94
F. Refractive	35	47	9
1. Domestic - Refractive	23	41	6
2. International - Refractive	12	6	3
G. Microbial keratitis	232	259	238
1. Domestic - Microbial keratitis	161	177	169
2. International - Microbial keratitis	71	82	69
H. Mechanical (non-surgical) or chemical trauma	268	264	199
1. Domestic - Mechanical (non-surgical) or chemical trauma	223	210	158
2. International - Mechanical (non-surgical) or chemical trauma	45	54	41
I. Congenital opacities	254	260	144
1. Domestic - Congenital opacities	150	123	72
2. International - Congenital opacities	104	137	72
J. Pterygium	8	2	3
1. Domestic - Pterygium	5	2	2
2. International - Pterygium	3	0	1
K. Non-infectious ulcerative keratitis, thinning, or perforation	685	670	655
1. Domestic - Non-infectious ulcerative keratitis, thinning, or perforation	627	577	581
2. International - Non-infectious ulcerative keratitis, thinning, or perforation	58	93	74
L. Other causes of corneal opacification or distortion	879	1,126	855
1. Domestic - Other causes of corneal opacification or distortion	675	881	648
2. International - Other causes of corneal opacification or distortion	204	245	207
M. Other causes of endothelial dysfunction	648	622	554
1. Domestic - Other causes of endothelial dysfunction	522	509	472
2. International - Other causes of endothelial dysfunction	126	113	82
Z. Unknown, unreported, or unspecified	6,280	6,508	4,816
1. Domestic - Unknown, unreported, or unspecified	1,773	1,716	1,797
2. International - Unknown, unreported, or unspecified	4,507	4,792	3,019
CALCULATION N: Total indications for penetrating keratoplasty	14,416	15,131	11,256
Validation N1 (Domestic indications): This value should be zero.	0	0	0
Validation N2 (International indications): This value should be zero.	0	0	0
XI. Indications for Anterior Lamellar Keratoplasty			
B. Ectasias/Thinnings	129	149	147
1. Domestic - Ectasias/Thinnings	83	114	107
2. International - Ectasias/Thinnings	46	35	40
D. Repeat corneal transplant	17	15	11
1. Domestic - Repeat corneal transplant	12	14	7
2. International - Repeat corneal transplant	5	1	4
E. Other degenerations or dystrophies	33	46	30
1. Domestic - Other degenerations or dystrophies	19	22	12
2. International - Other degenerations or dystrophies	14	24	18
F. Refractive	0	0	0
1. Domestic - Refractive	0	0	0
2. International - Refractive	0	0	0
G. Microbial keratitis	12	20	9
1. Domestic - Microbial keratitis	8	14	7
2. International - Microbial keratitis	4	6	2
H. Mechanical (non-surgical) or chemical trauma	3	7	12
1. Domestic - Mechanical (non-surgical) or chemical trauma	2	6	12
2. International - Mechanical (non-surgical) or chemical trauma	1	1	0
I. Congenital opacities	15	11	14
1. Domestic - Congenital opacities	8	5	6
2. International - Congenital opacities	7	6	8
J. Pterygium	0	0	0
1. Domestic - Pterygium	0	0	0
2. International - Pterygium	0	0	0
K. Non-infectious ulcerative keratitis, thinning, or perforation	24	27	35
1. Domestic - Non-infectious ulcerative keratitis, thinning, or perforation	19	23	25

EBAA Statistical Report Ledger for Calendar Year 2022	Jan - Jun 2022	Jan - Jun 2021	Jan - Jun 2020
2. International - Non-infectious ulcerative keratitis, thinning, or perforation	5	4	10
L. Other causes of corneal opacification or distortion	58	67	62
1. Domestic - Other causes of corneal opacification or distortion	40	54	35
2. International - Other causes of corneal opacification or distortion	18	13	27
Z. Unknown, unreported, or unspecified	342	351	145
1. Domestic - Unknown, unreported, or unspecified	41	62	22
2. International - Unknown, unreported, or unspecified	301	289	123
CALCULATION O: Total indications for anterior lamellar keratoplasty	633	693	465
Validation O (Domestic Indications): This value should be zero.	0	0	0
Validation O (International Indications): This value should be zero.	0	0	0
XII. Indications for Endothelial Keratoplasty			
A. Post-cataract surgery edema	2,021	2,046	1,505
1. Domestic - Post-cataract surgery edema	1,590	1,650	1,179
2. International - Post-cataract surgery edema	431	396	326
C. Endothelial Dystrophies	8,476	8,304	6,218
1. Domestic - Endothelial Dystrophies	8,168	7,943	5,874
2. International - Endothelial Dystrophies	308	361	344
D. Repeat corneal transplant	1,752	1,831	1,230
1. Domestic - Repeat corneal transplant	1,590	1,678	1,126
2. International - Repeat corneal transplant	162	153	104
M. Other causes of endothelial dysfunction	2,610	2,799	1,910
1. Domestic - Other causes of endothelial dysfunction	2,106	2,279	1,603
2. International - Other causes of endothelial dysfunction	504	520	307
Z. Unknown, unreported, or unspecified	2,519	2,628	1,855
1. Domestic - Unknown, unreported, or unspecified	1,373	1,434	1,185
2. International - Unknown, unreported, or unspecified	1,146	1,194	670
CALCULATION P: Total indications for endothelial keratoplasty	17,378	17,608	12,718
Validation P (Domestic Indications): This value should be zero.	0	0	0
Validation P (International Indications): This value should be zero.	0	0	0
XIII. Preservation Time			
A. Preservation Time for domestic PK Surgeries			
1. 1-7 days	6,800	7,289	
2. 8-11 days	1,017	913	
3. 12-14 days	74	56	
CALCULATION Q: Total Domestic PK Surgeries	7,891	8,258	0
Validation Q: This value should be zero.	0	0	-6,717
B. Preservation Time for Domestic DSEK, DSAEK, DLEK Surgeries			
1. 1-7 days	6,791	7,278	
2. 8-11 days	753	792	
3. 12-14 days	31	27	
CALCULATION R: Total Domestic DSEK, DSAEK, DLEK Surgeries	7,575	8,097	0
Validation R: This value should be zero.	0	0	-6,007
C. Preservation Time for Domestic DMEK or DMAEK Surgeries			
1. 1-7 days	6,312	6,227	
2. 8-11 days	912	617	
3. 12-14 days	9	19	
CALCULATION S: Total Domestic DMEK, DMAEK Surgeries	7,233	6,863	0
Validation S: This value should be zero.	0	0	-4,957

Transplant Rate	**70.3%**	**67.9%**	**64.2%**
Conversion Rate	**28.9%**	**32.5%**	**30.0%**

EYE BANK ASSOCIATION OF AMERICA

6-Month 2022 vs. 2021 Snapshot



COVID-19 Effect

The impact of COVID-19 on the donor tissue supply has decreased. One data point makes evident that death referrals in the first half of 2022 were determined ineligible less frequently than in 2021. Prior to pandemic, the "Transplant-Eligible Referrals" data point was steady. The variance between 2022 and 2021 is highly likely to be relative to decreased incidence of SARS-CoV-2 encounters during the screening of death referrals. Additionally, there has been a marked decrease in "Other Positive Testing" as a reason for determining tissue recovered for transplant to be ineligible. This suggests that either there are fewer tests performed or a lower rate of positive tests or both. Regardless, the data shows COVID-19 to have a diminishing impact on donor intake and release.

Storage Solution Supply Crisis

While the EBAA does not measure any data point related to supplies, the EBAA has been monitoring the issue since mid-March. Many eye banks reported changing intake criteria as a result of limited supply of reagents necessary to preserve tissue. The manner in which some eye banks categorize the referrals impacted by selection bias related to limited supply has a depressive effect on the data point "Transplant Eligible Referrals". This crisis is largely responsible for the decreased intake of donor tissue during this period.

Transplant Activity

-2.8% Domestic (-4.4% PK, -6.4% DSAEK, +5.4% DMEK, -26.1% ALK)

-4.0% International (-5.1% PK, -0.9% DSAEK, -6.9% DMEK, +5.8% ALK)

-69.7%
Long-Term Corneas Transplanted

-54.7%
Transplant Sclera Distribution

+9.5%
Tissues Recovered by a Non-Accredited Partner Agency

+5.1%
Tissues Recovered for Research/Medical Education/Training

Eric Meinecke

From: Brian Philippy <brianp@lionseyebank.org>
Sent: Tuesday, October 25, 2022 9:57 AM
To: Winston Chamberlain; Eric Meinecke
Cc: Jennifer DeMatteo
Subject: MAB Late Addition (A call for volunteer action)
Attachments: Storage Solution Observations - Final.xlsx

Dear esteemed peers,

Below is a copy of a post on the Lens that seeks volunteers to collect data to study storage solutions. Faced with a challenge, we have the opportunity to combine our observations and data on storage solution to gain answers that we will sorely need going into the future. Please take a moment to consider participating on a volunteer basis to collect info.

Thank you for considering this late addition.

Sincerely,
Brian Philippy

Hello all. We've tread into unfamiliar territory with storage solutions and we have a bunch of questions in our community. The good folks of Eversight, LGS, LMEB, and LVG have worked together to create a spreadsheet (that won't upload/attach to this for some reason). This spreadsheet contains a standardized series of data points we can all measure when processing tissue for EK to compare performance of storage solutions and prepare us for a future when we have options.

Key Questions We'd Like to Answer (regarding corneas in different storage solutions):

- Is there an observed difference in pachymetry?
- Is there an observed difference in maintenance of cell density?
- Is there an observed difference in peel success or performance (DMEK)?
- Is there an observed difference in any variables if antifungals are used in solution?

What this project entails:

- Observation of corneas in Optisol GS, Life4ºC, Eusol-C, Kerasave, and Cornisol
- *Volunteer participation by (DMEK and/or DSAEK) processing eye banks*
- Documenting information in spreadsheet
- Submitting spreadsheet to me for masking and grouping
- Use of a Statistician to process multi-variate data

Goal is to have N = 500. More eye banks = faster results (and ability to expand sample sizes per pool DMEK v DSAEK). If there is great interest, we can exceed our goals in little time.

Eye banks participating will have early access to analytic data. The rest will have to wait for scientific article publication. If your eye bank is interested, please contact Brian Philippy by email at brianp@lionseyebank.org.

Developed by:

- Brian Philippy, Lions Medical Eye Bank & Research Center of Eastern Virginia
- Onkar Sawant, Eversight
- Khoa Tran, Lions VisionGift
- Ching Yuan, Lions Gift of Sight

Storage Solution Observations

(overtype eye bank name here)

Race: Use single letter. A for Asian, B for Black, C for Caucasian, H for Hispanic, N for Native/Islander, O for Other, U for Unknown)
EBAA Cause of Death Categories: Cancer, CVA, Heart, Respiratory, Trauma, Other
Storage Solution: Cornsiol (C), Eusol-C (E), Kerasave (K), Life4ºC (L), or Optisol GS (O). Type either whole solution name or use a letter, but be consistent please.
Technician Skill Level: Use DEKS scale. 0-50 = Level 1. 51-100 = Level 2. 101-150 = Level 3. >150 = Level 4.
Corneal Thickness: Measurements may be taken with epi, without, or both (useful for validating varied methods). Columns K/L are intended for spec/OCT pachymetry from initial cornea evaluation, while R/S are intended for pachymeter/OCT "in processing" measurements.
Tissues subject to this study: Corneas processed for DSAEK and DMEK are included in this study, regardless of storage solution used.

	Donor/Whole Cornea Information												DMEK/DSAEK Processing Common Information					DSAEK Specific Processing Information					DMEK Specific Processing Information			
Tissue ID/Identifier #	**Age**	**Gender**	**Race**	**Date of Death**	**Cause of Death**	**Date of Recovery**	**Death to Preservation**	**Storage Solution**	**Antifungal Tab Used**	**Pachymetry of whole cornea (epi to endo)**	**Pachymetry of whole cornea* (Bowman's to endo)**	**Date of whole cornea pachy measurment**	**Date of Processing**	**Cell Density Before Processing**	**Cell Density After Processing (if performed)**	**Technician Skill Level**	**Transplanted?**	**Pachy Before Cut (epi to endo)**	**Pachy Before Cut (Bowman's to endo)**	**Graft Thickness (target)**	**Graft Thickness (actual)**	**Cut Observation**	**Diabetes**	**Peeling Successful?**	**Tissue Tear or bite?**	**Peel Observation**
(ISBT 128 Code)	(Years)	(M/F)	(A/B/C/ D/H/N/ O/U)	(MM/DD/ YY)	EBAA Category	(MM/DD /YY)	(HH:MM)	(C, E, K, L, or O)	(Y/N)	Cornea thickness use one column or both (µ)		(MM/DD/YY)	(MM/DD/YY)	(cells/mm^2)	(cells/mm^2)	(1 to 4)	(Y/N)	Cornea thickness use one column or both (µ)		(µ)	(µ)	(free text)	(Y/N; or DM score)	(Y/N)	(Y/N)	(free text)

Late Additions

From:	Edwin H Roberts
To:	chamberw@ohsu.edu
Cc:	Fout-Caraza, Elizabeth; Jennifer DeMatteo; Kevin Corcoran
Subject:	Question for the EBAA Medical Advisory Board
Date:	Monday, October 31, 2022 6:43:39 PM
Attachments:	Review-of-HTLV-1-and-HTLV-2-Serologic-Testing.pdf
Importance:	High

Dear Medical Advisor Board,

I apologize for this late item for the Medical Advisory Board Agenda, but would very much appreciate the MAB's perspective on the question of HTLV-1/2 test results. The Medical Standards is fairly silent on the issue of positive HTLV-1/2 test results. Where does this leave the medical director who is left to decide whether or not this tissue is suitable for transplantation? Medical Standards only list HTLV-1/2 in the appendix. However, the Procedures Manual states that a positive test result must be acted on by the medical director.

Eye banks are not required to test for HTLV-1/2, however, when there is a shared organ and/or tissue donor, this test result may be provided to the eye bank. The FDA currently requires HTLV-1/2 testing of donors of leukocyte-rich tissues only and does not consider HTLV-1/2 one of the relevant communicable disease agents and diseases (RCDAD) for corneas. The EBAA Statistics Jan - Jun 2022 indicates that 68 tissues were disposed due to positive HTLV-1/2 results. This compares to the same time period in 2021 and 2020 with 34 and 58 cornea disposed, respectively.

Does the conclusion made by the Policy, Position and Research Subcommittee and approved by the MAB on June 4, 2010 still hold (see below)?

CONCLUSION
This comprehensive evaluation of all key data on the epidemiology and virology of HTLV infection and disease, relevant clinical issues and pathogenesis, and HTLV testing, with references to peer-reviewed literature, infers that screening or testing ocular tissue donors for HTLV infection is not necessary and is not pertinent to the enhancement of safety among persons who receive ocular tissue. Viable leukocytes, which are required for HTLV transmission to occur, are effectively not present, or are present in insufficient numbers, in ocular tissue released for transplantation. Routine HTLV screening and testing would decrease the supply of donor ocular tissue, serve only to increase labor time and costs and would not improve patient safety . If an ocular donor tests positive for anti-HTLV-I or anti-HTLV-II, ***the result is not clinically relevant and the donor may still be considered eligible.***

Thank you for your consideration.

_____
	Edwin H. Roberts	Associate Director
	The Eye-Bank for Sight Restoration, Inc.	120 Wall Street	New York, N. Y. 10005
	Main: 212-742-9000	Email: ehroberts@ebsr.org

EYE BANK ASSOCIATION of AMERICA

EBAA…restoring sight worldwide since 1961

Policy, Position, & Research Subcommittee

Review of HTLV-1 & HTLV-2 Serologic Testing

HTLV Review Subcommittee:

Scott A. Brubaker, Ad Hoc Subcommittee Leader
Michael W Belin, MD
Alan Sugar, MD
Joel Sugar, MD

PPR Committee:

Michael W. Belin, MD, Chair
H. Dwight Cavanagh, PhD, MD
Donna Drury
Chris Hanna
Ginger Miller
Roswell Pfister, MD
George Rosenwasser, MD
Alan Sugar, MD
Joes Sugar, MD
John Sutphin, MD
Mark Terry, MD

This document provides information to assist the Medical Advisory Board of the Eye Bank Association of American (EBAA) in re-evaluating the clinical utility of serologic testing for human T-lymphotropic viruses type I and type II (HTLV-I and HTLV-II) and to assist in the determination of whether or not HTLV testing is applicable and indicated for selection of donors of ocular tissue.

INTRODUCTION

The EBAA Medical Standards contain extensive requirements for donor screening and donor testing to ensure patient and Eye Bank staff safety and to avoid disease transmission. Current knowledge about HTLV infection, disease, and pathogenesis is vast compared with what was known just a decade ago. Current evidence-based,

scientific data suggest that routine cornea (eye) donor screening for HTLV disease and testing cornea (eye) donors for HTLV antibodies are unnecessary steps for donors of ocular tissue. Additionally, a donor who tests positive or repeat reactive for anti-HTLV-I or anti-HTLV-II is deemed not to be a risk for transmitting HTLV disease to a recipient of their ocular tissue.

SUPPORTIVE STUDIES & SCIENTIFIC RATIONALE

HTLV is a retrovirus that primarily affects T lymphocytes (through integration of its genome with that of the host T lymphocyte. More specifically, HTLV-1 has an affinity predominantly for CD4 lymphocytes, while HTLV-2 predominantly affects CD8 lymphocytes.[1] Viable leukocytes are the host cells with which the HTLV viral particles integrate, and these cells enable the virus to proliferate. Thus, if transplantable ocular tissues do not contain viable lymphocytes, then HTLV-associated disease becomes an irrelevant issue since the virus is unlikely to be present or activated.

Studies of HTLV virus transmission following blood transfusion have found that a sufficient number of viable leukocytes must be present in the blood to successfully transmit the disease.[7] The number is in the range of 10 to the 8th power.[3] This is where the term, "*rich in viable leukocytes*," is derived, which is used by the Food and Drug Administration (FDA) to describe a tissue type that would be relevant for HTLV transmission risk (e.g. whole blood, semen, pancreatic islet cells). Ocular human tissues (corneas, sclera) distributed for transplantation do not contain sufficient blood or viable leukocytes and are not designated by FDA as a cell or tissue type that is relevant for HTLV disease.

This rationale is supported by experience with human plasma. Studies have demonstrated that plasma has not transmitted the infection, even though donor red cells derived simultaneously from the same donors (via whole blood donation) have transmitted HTLV-I infection.[4] Human plasma for transfusion does not contain viable

leukocytes and has not been shown to transmit HTLV. HTLV transmission does not occur from transfusion of non-cellular components of blood.[5] Results of a retrospective investigation showed that in transfusion recipients of units of blood and/or platelets (*donor products considered rich in viable leukocytes*) from donors who subsequently tested positive for HTLV Ab, only 30% became infected with HTLV.[6] The infectivity rate for HTLV disease transmission is low.

Clinical expression of infectivity and the pathogenicity of HTLV infection are rare when immunocompetent individuals have received blood products contaminated with HTLV.[7] Allograft recipients do not require systemic immunosuppression after receipt of most ocular grafts. Candidates are considered healthy to undergo reparative eye surgery for tissue that has been affected by a disease process or due to trauma. Although it is not tracked, recipients of allograft tissue are not typically immuno-incompetent.

In the United States, the prevalence of HTLV infection is low, and the country is not considered an endemic area.[8] While there is an increased incidence in certain subgroups (e.g. IV drug users, sex workers), these individuals/groups are not eligible for ocular tissue donation by current EBAA screening regulations.[8]

REGULATIONS: HTLV SCREENING & TESTNG OF OCULAR DONORS

Regulations promulgated by the FDA for donors of human cells, tissues, and cellular and tissue-based products (HCT/Ps) do not require ocular donors be tested or screened for HTLV disease.[9,10] HTLV testing is also not required by Health Canada[11,12,13] or by the Official Compilation of Codes, Rules and Regulations of the State of New York.[14]
The FDA regulations additionally do not determine an ocular donor to be ineligible if the result for HTLV-I/II antibody testing is positive or repeat reactive, or if a history for HTLV disease risk is identified.

TEST KIT HISTORY

Routine testing for anti-HTLV-I was introduced for blood, organ, and tissue donors in the late 1980's and early 1990's. Testing for anti-HTLV-II was added about a decade later and combination test kits (anti-HTLV-I/II) became available and were commonly used. Currently, three test kits are licensed by the Food and Drug Administration (FDA), but only one remains in production.

http://www.fda.gov/BiologicsBloodVaccines/SafetyAvailability/TissueSafety/ucm095440.htm#approved

The table of licensed assays for Human T-Lymphotrophic Virus Types I & II lists three test kits with these trade names (and testing formats):

- Abbott HTLV-I/HTLV-II EIA (EIA);
- Abbott PRISM HTLV-I/HTLV-II Assay (ChLIA); and
- Vionostika* HTLV-I/II Microelisa System (EIA).

**EIA/ELISA Ezyme Immunoassay / enzyme-linked immunosorbent assay*
**ChLIA chemiluminescent immunoassay*

Today, the Vionostika HTLV Ab kit is no longer commercially available. Additionally, per a notice supplied by Abbott in February 2009, the last ship date of the Abbott HTLV-I/HTLV-II EIA kit was December 31, 2009. The expiration date of this kit was April 18, 2010. Only one test kit is now available to screen donors for HTLV I/II antibodies. Moreover, that test kit, the Abbott PRISM HTLV-I/HTLV-II Assay (ChLIA), is licensed for testing only blood samples from "living" donors (see the FDA website link cited above.) This test kit has not been approved for testing blood specimens from cadaveric donors and recent communications with testing laboratories have revealed testing errors in over 2/3 of the cadaveric specimens evaluated. Moreover, these errors were not resolved on repeat testing.

SUMMARY

- In the United States, the prevalence of HTLV infection is relatively low, and the country is not considered endemic for the virus.
- For HTLV transmission to occur via transplantation, implantation, injection or ransfusion, there must be sufficient viable, infected lymphocytes present in the product.

- In the United States, preserved ocular tissue does not contain leukocytes or viable leukocytes in high numbers

- There is only one test kit available for HTLV testing; that test kit is not licensed for testing cadaveric blood specimens

- Screening and testing ocular donors for risks associated with HTLV is not relevant or warranted and would not increase safety for recipients

CONCLUSION

This comprehensive evaluation of all key data on the epidemiology and virology of HTLV infection and disease, relevant clinical issues and pathogenesis, and HTLV testing, with references to peer-reviewed literature, infers that screening or testing ocular tissue donors for HTLV infection is not necessary and is not pertinent to the enhancement of safety among persons who receive ocular tissue. Viable leukocytes, which are required for HTLV transmission to occur, are effectively not present, or are present in insufficient numbers, in ocular tissue released for transplantation. Routine HTLV screening and testing would decrease the supply of donor ocular tissue, serve only to increase labor time and costs and and would not improve patient safety . If an ocular donor tests positive for anti-HTLV-I or anti-HTLV-II, the result is not clinically relevant and the donor may still be considered eligible.

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[7] Gout O, Baulac M, Gessain A, et al. Rapid development of myelopathy after HTLV-I infection acquired by transfusion during cardiac transplantation. N Engl J Med. 1990; 322:383-38.

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[9] Final Rule, Eligibility Determination for Donors of Human Cells, Tissues, and Cellular and Tissue-Based Products, dated May 25, 2004 (effective May 25, 2005). See Sections 1271.3©(1)(ii), 1271.75(b), and 1271.85(b).

[10] Final Guidance for Industry, Eligibility Determination for Donors of Human Cells, Tissues, and Cellular and Tissue-Based Products (HCT/Ps), dated August 2007

(effective August 28, 2007). See III. THE DONOR-ELIGIBILITY DETERMINATION (§ 1271.50) at C. What are "relevant communicable disease agents or diseases (RCDADs)"?, 1.b.; and at IV. DONOR SCREENING (§ 1271.75) at A. For what diseases or conditions must I screen cell and tissue donors?; at F. What clinical evidence do I look for when screening a donor? 7.; and at VI. DONOR TESTING: SPECIFIC REQUIREMENTS (§ 1271.85) at B. For what additional diseases must I test donors of viable, leukocyte-rich cells or tissue and what tests should I use? 1.a. and 2.

[11] Health Canada, Safety of Human Cells, Tissues and Organs for Transplantation Regulations, June 27, 2008, Canada Gazette, Part II; see 18.b. and 20.

[12] Guidance Document: Safety of Human Cells, Tissues and Organs for Transplantation, April 6, 2009, http://www.hc-sc.gc.ca/dhp-mps/brgtherap/reg-init/cell/cto_gd_ld-eng.php

[13] Canadian Standards Association, General Standard CAN/CSA Z900 series, Cells, Tissues, and Organs for Transplantation and Assisted Reproduction, 2003 with update 2007. General Requirements; see Sections 13.1.2 ©, 13.2.2 (d), 13.1.3 (e), 14.2.6 (a), 14.2.6.3 (d), 17.2.2 (d)

[14] Title 10 (Health) of the Official Compilation of Codes, Rules and Regulations of the State of New York, Subpart 52-7, Eye Banks

Approved by the Medical Advisory Board of the Eye Bank Association of America (EBAA) on June 4, 2010

Approved by the Eye Bank Association of America (EBAA) Board of Directors on June 4, 2010

Regulation of Human Cells, Tissues, and Cellular and Tissue-Based Products (HCT/Ps)

Small Entity Compliance Guide

Guidance for Industry

This guidance is for immediate implementation.

FDA is issuing this guidance for immediate implementation in accordance with 21 CFR 10.115(g)(4)(i). Submit one set of either electronic or written comments on this guidance at any time. Submit electronic comments to https://www.regulations.gov/. Submit written comments to the Dockets Management Staff (HFA-305), Food and Drug Administration, 5630 Fishers Lane, Rm. 1061, Rockville, MD 20852. You should identify all comments with docket number Docket No. FDA-2022-D-0563

Additional copies of this guidance are available from the Office of Communication, Outreach and Development (OCOD), 10903 New Hampshire Ave., Bldg. 71, Rm. 3128, Silver Spring, MD 20993-0002, or by calling 1-800-835-4709 or 240-402-8010, or email ocod@fda.hhs.gov, or from the Internet at https://www.fda.gov/vaccines-blood-biologics/guidance-compliance-regulatory-information-biologics.

For questions on the content of this guidance, contact OCOD at the phone numbers or email address listed above.

U.S. Department of Health and Human Services
Food and Drug Administration
Center for Biologics Evaluation and Research
November 2022

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Contains Nonbinding Recommendations

Regulation of Human Cells, Tissues, and Cellular and Tissue-Based Products (HCT/Ps)

Small Entity Compliance Guide

Guidance for Industry

This guidance represents the current thinking of the Food and Drug Administration (FDA or Agency) on this topic. It does not establish any rights for any person and is not binding on FDA or the public. You can use an alternative approach if it satisfies the requirements of the applicable statutes and regulations. To discuss an alternative approach, contact the FDA staff responsible for this guidance as listed on the title page.

I. INTRODUCTION

The Food and Drug Administration (FDA) has prepared this guidance in accordance with section 212 of the Small Business Regulatory Enforcement Fairness Act (Public Law 104-121). It is intended to help small entity establishments that manufacture[1] human cells, tissues, or cellular or tissue-based products (HCT/Ps) better understand the comprehensive regulatory framework for HCT/Ps, set forth in Title 21 of the Code of Federal Regulations, part 1271 (21 CFR 1271).[2] Section 21 CFR 1271.3 provides definitions for important terms used in 21 CFR 1271.

This guidance document supersedes the guidance of the same title dated August 2007.

In general, FDA's guidance documents do not establish legally enforceable responsibilities. Instead, guidances describe the Agency's current thinking on a topic and should be viewed only as recommendations, unless specific regulatory or statutory requirements are cited. The use of the word should in Agency guidances means that something is suggested or recommended, but not required.

[1] "Manufacture" means, but is not limited to, any or all steps in the recovery, processing, storage, labeling, packaging, or distribution of any human cell or tissue, and the screening or testing of the cell or tissue donor (21 CFR 1271.3(e)).

[2] *See* "Human Cells, Tissues, and Cellular and Tissue-Based Products; Establishment Registration and Listing;" Final Rule, 66 FR 5447 (January 19, 2001); "Eligibility Determination for Donors of Human Cells, Tissues, and Cellular and Tissue-Based Products;" Final Rule, 69 FR 29786 (May 25, 2004); "Current Good Tissue Practice for Human Cell, Tissue, and Cellular and Tissue-Based Product Establishments; Inspection and Enforcement;" Final Rule, 69 FR 68612 (November 24, 2004).

II. QUESTIONS AND ANSWERS

A. GENERAL

1. Where can an establishment find the criteria to determine how their HCT/Ps will be regulated?

21 CFR 1271.10(a) sets out the criteria that form the foundation of FDA's tiered, risk-based approach to regulating HCT/Ps. HCT/Ps that meet all of the criteria in 21 CFR 1271.10(a) are subject only to regulation under section 361 of the Public Health Service Act (PHS Act) and the regulations in 21 CFR part 1271. An HCT/P that falls into this category is sometimes referred to as a "361 HCT/P" and no premarket authorization is required.

If an HCT/P does not meet all the criteria set out in 21 CFR 1271.10(a), and the establishment that manufactures the HCT/P does not qualify for any of the exceptions listed in 21 CFR 1271.15, the HCT/P will be regulated as a drug, device, and/or biological product under section 351 of the PHS Act and/or the Federal Food, Drug, and Cosmetic Act (FD&C Act), and applicable regulations, including 21 CFR part 1271, and premarket review will generally be required.

Please note, the regulatory status of products identified as not being HCT/Ps (see 21 CFR part 1271.3(d)(1)-(8)) is beyond the scope of this guidance.

2. How can HCT/P manufacturers get more information about the appropriate regulatory considerations for their HCT/P?

To further assist HCT/P manufacturers, FDA issued the Guidance for Industry, "Regulatory Considerations for Human Cells, Tissues, and Cellular and Tissue-Based Products: Minimal Manipulation and Homologous Use", dated November 2017 and updated July 2020 (Ref.1). This guidance is intended to improve stakeholders' understanding of the definitions of minimal manipulation in 21 CFR 1271.3(f) and homologous use in 21 CFR 1271.3(c). This guidance is also intended to facilitate stakeholders' understanding of how the regulatory criteria in 21 CFR 1271.10(a)(1) and (2) apply to their HCT/Ps.

In addition, FDA published the Guidance for Industry, "Same Surgical Procedure Exception under 21 CFR 1271.15(b): Questions and Answers Regarding the Scope of the Exception", dated November 2017 (SSPE Guidance) (Ref. 2). This guidance is intended to provide stakeholders with the FDA's current thinking on the scope of the exception set forth in 21 CFR 1271.15(b). If the exception in 21 CFR 1271.15(b) applies, the establishment is not required to comply with the requirements of 21 CFR part 1271.

FDA provides two mechanisms through which a manufacturer may obtain a recommendation or decision regarding the classification of an HCT/P:

1) The Tissue Reference Group (TRG), which includes representatives from CBER and CDRH, provides product sponsors with an informal process through which they may obtain an Agency recommendation regarding the application of the criteria in 21 CFR 1271.10(a) to their HCT/Ps for a given indication. Information about this process as well as what you may want to include to facilitate review of your request can be found at: https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products/tissue-reference-group.

2) A Request for Designation (RFD) may be submitted to the Office of Combination Products (OCP) to obtain a formal Agency decision regarding the regulatory identity or classification of an HCT/P (21 CFR part 3). A description of that process and information on how to submit an RFD can be found at: https://www.fda.gov/combination-products/rfd-process. Additional information may be found in FDA's Guidance for Industry, "How to Write a Request for Designation," dated April 2011, https://www.fda.gov/regulatory-information/search-fda-guidance-documents/how-write-request-designation-rfd. You may also submit a Pre-RFD to OCP to obtain preliminary, feedback on the classification for your HCT/P. A description of the Pre-RFD process as well as assistance on how to prepare a Pre-RFD may be found in FDA's Guidance for Industry, "How to Prepare a Pre-Request for Designation (Pre-RFD)," https://www.fda.gov/regulatory-information/search-fda-guidance-documents/how-prepare-pre-request-designation-pre-rfd.

3. Which subparts of 21 CFR part 1271 apply to HCT/Ps[3] regulated solely under section 361 of the PHS Act?

For HCT/Ps regulated solely under section 361 of the PHS act, the subparts of 21 CFR part 1271 apply as follows:

- subparts A through C apply to all 361 HCT/Ps;
- subpart D applies only to non-reproductive 361 HCT/Ps, with the exception of 21 CFR 1271.150(c) and 1271.155, which apply to all 361 HCT/Ps;
- subpart E applies only to non-reproductive 361 HCT/Ps; and,
- subpart F applies to all 361 HCT/Ps.

4. Which subparts of 21 CFR part 1271 apply to HCT/Ps regulated as drugs, devices, and/or biological products?

For HCT/Ps regulated as drugs, devices, and/or biological products, the subparts of 21 CFR part 1271 apply as follows:

[3] Subparts C through F of 21 CFR part 1271 do not apply to HCT/Ps recovered before May 25, 2005.

- subparts A, C, and D apply to all these HCT/Ps; and,
- subparts B, E, and F do not apply.

5. For an establishment that manufactures an HCT/P regulated as a drug, device, and/or biological product, what must the establishment do if a requirement in 21 CFR part 1271 conflicts with a requirement in 21 CFR parts 210, 211, or 820?

In addition to current good tissue practice (CGTP) requirements in 21 CFR part 1271, subpart D, current good manufacturing practice (CGMP) requirements in 21 CFR parts 210 and 211 for drugs and biological products, or quality system (QS) regulation requirements in 21 CFR part 820 for devices apply to an HCT/P regulated as a drug, device, and/or biological product, as appropriate. In the event that a regulation in 21 CFR part 1271 is in conflict with a requirement in 21 CFR parts 210, 211, or 820, the establishment must follow the requirements that are more specifically applicable to the product, rather than the more general requirements (21 CFR 1271.150(d)).

For additional information about the CGTP requirements that would not be partly or completely covered by a corresponding CGMP regulation or QS regulation requiring the same practice, see the Guidance for Industry: "Current Good Tissue Practice (CGTP) and Additional Requirements for Manufacturers of Human Cells, Tissues, and Cellular and Tissue-Based Products (HCT/Ps)" dated December 2011 (CGTP Guidance) (Ref. 3).

B. REGISTRATION AND LISTING

1. Which establishments are required to register and list their HCT/Ps?

All establishments that manufacture 361 HCT/Ps (361 HCT/P establishments) must register and list their HCT/Ps with FDA (see 21 CFR 1271.1(b)(1), 1271.10(b), and 1271.21). Manufacturers of HCT/Ps that are regulated as drugs, devices, and/or biological products under section 351 of the PHS Act and/or the FD&C Act and applicable regulations, must register and list their products in accordance with 21 CFR part 207[4] or 807[5], as applicable, rather than 21 CFR part 1271 (21 CFR 1271.1(b)(2)).[6]

[4] See FDA's Drug Registration and Listing webpage (available at https://www.fda.gov/drugs/guidance-compliance-regulatory-information/drug-registration-and-listing-system-drls-and-edrls) for more information.
[5] See FDA's Device Registration and Listing webpage (available at https://www.fda.gov/medical-devices/how-study-and-market-your-device/device-registration-and-listing) for more information.
[6] In 2016, FDA revised 21 CFR 1271.1(b)(2) and 1271.20 to require establishments that manufacture HCT/Ps regulated as drugs and/or biological products to register and list following the procedures in 21 CFR part 207 and establishments that manufacture HCT/Ps regulated as devices to register and list following the procedures in 21 CFR part 807. (see 81 FR 60169, 60223, August 31, 2016). However, the agency inadvertently omitted a conforming amendment to 21 CFR 807.20(d) to reflect those changes. The agency intends to update its regulations to correct the error.

FDA does not require establishments that manufacture HCT/Ps regulated as drugs, devices, and/or biological products that are only for use in research under an investigational new drug application (IND) (21 CFR part 312) or an investigational device exemption (IDE) (21 CFR part 812) to register and list those HCT/Ps in accordance with 21 CFR part 207 or 807 if they do not engage in other activities that would require them to register (21 CFR 207.13(e), 807.65(f) and 812.1).

2. Must foreign establishments that manufacture HCT/Ps imported for distribution in the United States register and list their HCT/Ps?

Yes. All foreign establishments manufacturing 361 HCT/Ps that are imported or offered for import into the United States (U.S.) must register and list their 361 HCT/Ps with FDA (see 21 CFR 1271.1(b)(1), 1271.10(b), and 1271.21). It is a requirement for such foreign establishments to submit certain information described in 21 CFR 1271.25(a)(5)-(6), including the name, address, phone number, and email address of the U.S. agent(s) (someone located in the United States as a contact for inspection and other purposes) and of each importer that is known to the establishment at the time of initial registration or when submitting the annual registration update. If the HCT/Ps being imported or offered for import into the U.S. are regulated as drugs, devices, and/or biological products under section 351 of the PHS Act and/or the FD&C Act, the foreign establishment must register and list in accordance with 21 CFR part 207 or part 807, as applicable (see 21 CFR 1271.1(b)(2)).

3. Which establishments are excepted from HCT/P registration and listing?

If an establishment qualifies for any of the exceptions listed in 21 CFR 1271.15, the establishment does not have to register and list their HCT/Ps. For HCT/Ps regulated as drugs, devices, and/or biological products under section 351 of the PHS Act and/or the FD&C Act, exemptions from registration and listing requirements are set forth in section 510(g) of the FD&C Act, 21 CFR 207.13, and 21 CFR 807.65, as applicable.

4. How does a 361 HCT/P establishment submit their tissue establishment registration, and where can an establishment find more information on how to register and list HCT/Ps?

HCT/P establishments that manufacture 361 HCT/Ps must register and list electronically under 21 CFR part 1271 using the electronic Human Cell and Tissue Establishment Registration System (eHCTERS)[7] to meet the requirement for electronic submission of establishment registration and product listing (21 CFR 1271.22). Establishments may request a waiver from the electronic

[7] eHCTERS and instructions for use accessible at https://www.fda.gov/vaccines-blood-biologics/biologics-establishment-registration/tissue-establishment-registration.

submission requirement as described in 21 CFR 1271.23. HCT/P establishments may also submit questions about registration to TissueReg@fda.hhs.gov.

5. When must new 361 HCT/P establishments register and list their HCT/Ps?

New establishments must register and submit a list of their 361 HCT/Ps within 5 days after beginning operations (21 CFR 1271.21(a)). The establishment should also appoint a Reporting Official who will be responsible for registration and listing updates and/or changes and who will serve as the contact for all registration-related communication.

6. How will a 361 HCT/P establishment know when it is officially registered with FDA?

FDA considers the establishment to be registered as soon as FDA receives the registration information submitted in eHCTERS. After FDA processes the establishment's registration, FDA will send to the Reporting Official the Registration Summary Report, which includes the FDA Establishment Identifier (FEI) number. If an establishment already registered under separate requirements in 21 CFR parts 207, 607[8], and/or 807, the establishment will generally retain the same FEI number.

When the establishment has submitted their HCT/P manufacturing registration information to the FDA, the registration status is identified as "Pre-registered" in eHCTERS until the FEI number is assigned. The establishment may contact FDA at TissueReg@fda.hhs.gov or access the Public Query Application to determine the status of their registration.[9] The establishment's status will change to "registered" after the FEI number has been assigned. An establishment may also use the Public Query Application to access a list of other 361 HCT/P establishments that are registered with the FDA.

7. Does registration mean an establishment is in compliance?

No. FDA acceptance of an establishment registration and HCT/P listing form does not constitute a determination that an establishment is in compliance with applicable rules and regulations or that the HCT/P is licensed or approved by FDA (21 CFR 1271.27(b)).

[8] Establishments that manufacture human blood and blood products and licensed devices must register and list under 21 CFR part 607.

[9] Public Query Application accessible at: https://www.fda.gov/vaccines-blood-biologics/biologics-establishment-registration/human-cell-and-tissue-establishment-registration-hcters-public-query-application.

8. What else will 361 HCT/P establishments have to do after the initial registration?

Establishments must update their registration annually in December and submit changes in their HCT/P listing at the time of change or each June or December, whichever month occurs first after the change (21 CFR 1271.21). Even if there are no changes or updates to an establishment's HCT/P listing, the establishment must still register annually. The establishment's FEI number and last registration receipt date are needed to access their registration in eHCTERS. Establishments can find this information in their most recent Registration Summary Report. FDA currently sends in November a reminder via email to the Reporting Official regarding annual registration. If the ownership or location of the establishment changes or if there is a change in the United States agent's name, address, telephone number, or email address, the establishment must submit an amendment to the registration within 30 calendar days of the change (21 CFR 1271.26).

9. What would happen if an establishment required to register under 21 CFR part 207, 807, or 1271 does not register or forgets to submit the annual registration?

The establishment would be in violation of the applicable registration regulations.

10. Must an individual or company register if it only obtains blood specimens from HCT/P donors and sends the specimens to a registered establishment (e.g., a testing laboratory or a recovery establishment) for testing?

No. If an individual or company is simply obtaining a blood specimen from an HCT/P donor and sending the blood specimen to a registered testing laboratory or to a registered recovery establishment for testing, then the individual or company is not required to register. Obtaining a blood specimen is not considered part of manufacturing.

11. Must an establishment (laboratory) register if it only performs speciation of microorganisms already detected in a culture specimen from a 361 HCT/P?

Yes. By definition, the term "manufacture" includes processing, and processing includes testing for microorganisms (21 CFR 1271.3(e) and (ff)). Testing for microorganisms generally includes sampling, culturing, and identifying the microorganisms present in the sample (speciation). FDA is aware that HCT/P manufacturers use this information in a number of ways, including determining whether an HCT/P may be further processed and/or distributed. If an establishment (laboratory) only performs speciation of microorganisms, the establishment must register because it is performing a processing step (21 CFR 1271.1(b)).

12. What is the process to inactivate registration if the establishment no longer manufactures 361 HCT/Ps or has gone out of business?

The Reporting Official of the establishment may inactivate the establishment registration using eHCTERS.

13. Must a hospital have multiple registrations if it manufactures more than one type of 361 HCT/P (e.g., hematopoietic stem/progenitor cells, reproductive cells) or if it performs different manufacturing functions (e.g., recovery, processing, donor testing)?

Each establishment will generally have only one registration number (FEI number) for any combination of HCT/P types manufactured and/or manufacturing functions. An establishment means a place of business under one management, at one general physical location, that engages in the manufacture of HCT/Ps (21 CFR 1271.3(b)). One general physical location could be reasonably construed to include separate buildings within close proximity provided that the activities in them are closely related to the same business enterprise, under the supervision of the same local management, and capable of being inspected at the same time. For example, a hospital administrator could facilitate one registration of multiple laboratories under the same management. However, FDA requires separate registrations for two or more business enterprises that manufacture 361 HCT/Ps and are separate legal entities with different management even if both use the same facility or the same address (see 21 CFR 1271.3(b), 1271.10(b), and 1271.21).

14. Must a hospital be registered if the only functions performed there with respect to HCT/Ps are surgical removal and temporary storage of autologous HCT/Ps prior to their implantation?

An establishment that only removes HCT/Ps from an individual and implants such HCT/Ps into the same individual during the same surgical procedure is not required to comply with the requirements of 21 CFR part 1271, including registration and listing (21 CFR 1271.15(b)). For additional information on FDA's current thinking on the scope of the exception set forth in 21 CFR 1271.15(b), including the types of procedures that may be considered the same surgical procedure, see the SSPE Guidance (Ref. 2).

15. Must a hospital register and list with respect to 361 HCT/Ps that it receives, stores, and routinely shares with other hospitals?

Yes. Hospitals that receive 361 HCT/Ps and make them available for distribution to other establishments (e.g., hospitals) are performing the manufacturing steps of storage and distribution and therefore must register and list those 361 HCT/Ps (21 CFR 1271.3(e), 1271.10(b), and 1271.21). An establishment is not required to

comply with the requirements of 21 CFR part 1271 if the establishment does not recover, screen, test, process, label, package, or distribute, but only receives or stores HCT/Ps solely for implantation, transplantation, infusion, or transfer within its facility (21 CFR 1271.15(d)).

16. Must an establishment be registered if it recovers HCT/Ps for teaching and nonclinical research purposes only?

No. According to 21 CFR 1271.15(a), if your establishment only recovers HCT/Ps that are used solely for nonclinical scientific or educational purposes, you are not required to comply with the requirements of 21 CFR part 1271, including registration and listing.

C. DONOR ELIGIBILITY

1. What are the donor eligibility (DE) requirements for HCT/Ps?

The DE requirements are outlined in title 21 CFR part 1271, subpart C. A DE determination is required for all donors of cells or tissue used in HCT/Ps, recovered on or after May 25, 2005,[10] except as provided under 21 CFR 1271.90 and must be based on donor screening and testing for relevant communicable disease agents and diseases (RCDADs) (21 CFR 1271.45(b)). An HCT/P must not be implanted, transplanted, infused, or transferred until the donor has been determined to be eligible, except as provided under 21 CFR 1271.60(d), 1271.65(b), and 1271.90 (21 CFR 1271.45(c)). A DE determination is a determination of whether a donor is eligible based on the results of donor screening in accordance with 21 CFR 1271.75 and donor testing in accordance with 21 CFR 1271.80 and 1271.85 (21 CFR 1271.50(a)).

2. Where can an establishment find more information on donor eligibility?

An establishment can find more comprehensive information on DE by accessing FDA's "Guidance for Industry: Eligibility Determination for Donors of Human Cells, Tissues, and Cellular and Tissue-Based Products (HCT/Ps)," dated August 2007 (2007 DE Guidance) (Ref. 4) and "Guidance for Industry: Certain Human Cells, Tissues, and Cellular and Tissue-Based Products (HCT/Ps) Recovered From Donors Who Were Tested For Communicable Diseases Using Pooled Specimens or Diagnostic Tests," dated April 2008 (Ref. 5).

[10] 69 FR 29786 (May 25, 2004).

FDA has issued guidance documents[11] that notified establishments of a new RCDAD and/or recommended specific donor screening and testing measures, which serve to supplement recommendations in certain sections of the 2007 DE Guidance.

D. CURRENT GOOD TISSUE PRACTICE

1. What are current good tissue practice (CGTP) requirements?

CGTP requirements are the requirements in 21 CFR part 1271, subpart C and subpart D, that govern the methods used in, and the facilities and controls used for, the manufacture of HCT/Ps, including but not limited to all steps in recovery, donor screening, donor testing, processing, storage, labeling, packaging, and distribution (21 CFR 1271.150(a)). The CGTP Guidance (Ref. 3) provides HCT/P establishments with recommendations for complying with CGTP requirements under 21 CFR part 1271, subpart D and additional requirements under subpart E. For additional information on subpart C, refer to the 2007 DE Guidance (Ref. 4).

2. What is the purpose of the CGTP requirements?

The CGTP requirements aim to prevent the introduction, transmission, or spread of communicable diseases by HCT/Ps by reducing the risk that the HCT/Ps contain communicable disease agents (e.g., viruses, bacteria, fungi, parasites, and transmissible spongiform encephalopathy agents), and by preventing contamination during manufacturing.

3. Who must comply with the CGTP requirements if one establishment engages another establishment (e.g., a contract establishment) to perform certain steps in manufacture of HCT/Ps, under a contract, agreement, or other arrangement?

The contract establishment must comply with those CGTP requirements applicable to the manufacturing step(s) that it performs under a contract, agreement, or other arrangement (21 CFR 1271.150(c)(1)(ii)). The establishment that is contracting for outside manufacturing work must ensure that the contract establishment complies with applicable CGTP requirements before entering into the contract, agreement, or arrangement (21 CFR 1271.150(c)(1)(iii)). For further information, see "Guidance for Industry: Compliance with 21 CFR part 1271.150(c)(1) – Manufacturing Arrangements", dated September 2006 (Ref. 6).

[11] All FDA guidance documents related to DE requirements for HCT/Ps may be found at: https://www.fda.gov/vaccines-blood-biologics/biologics-guidances/tissue-guidances.

4. How does an HCT/P establishment request an exemption or an alternative to a requirement?

Under 21 CFR 1271.155, an establishment may request an exemption from or alternative to any requirement in subpart C (Donor Eligibility) or subpart D (Current Good Tissue Practice) of 21 CFR part 1271. Note that on June 22, 2016, FDA published a final rule, entitled "Revisions to Exceptions Applicable to Certain Human Cells, Tissues, and Cellular and Tissue-Based Products" (81 FR 40512, June 22, 2016), which revised 21 CFR part 1271 to clarify that if an embryo was originally intended for reproductive use for a specific individual or couple, its subsequent directed or anonymous donation for reproductive use would not be prohibited under 21 CFR 1271.45(c), even when the applicable donor eligibility requirements under part 1271, subpart C, are not met (see 21 CFR 1271.90(b)).

You must ordinarily request an exemption or alternative under 21 CFR 1271.155(d) in writing (hardcopy or electronically). However, you may request an exemption orally if circumstances make it difficult (e.g., there is inadequate time) to submit your request in writing. You must follow an oral request with an immediate written request (21 CFR 1271.155(d)). Requests for exemptions or alternative methods must be submitted to the appropriate Center (21 CFR 1271.155(b)).

As stated in 21 CFR 1271.155(b), the request must be accompanied by supporting documentation, including all relevant valid scientific data. More information on the criteria for granting exemptions and alternatives and the supporting documentation required may be found at: https://www.fda.gov/vaccines-blood-biologics/tissue-tissue-products/exemptions-and-alternatives.

If the HCT/P is regulated solely under section 361 of the PHS Act and regulations in part 1271, or as a biological product or medical device regulated by CBER, requests should be sent to:

Director, Office of Tissues and Advanced Therapies
Center for Biologics Evaluation and Research
Food and Drug Administration
10903 New Hampshire Ave
Document Control Center
WO71-G112
Silver Spring, MD 20993-0002

If you have questions concerning these requests, need to orally request an exemption or alternative, or wish to submit a request electronically, please refer to the Exemptions and Alternatives website above.

If the HCT/P is regulated as a medical device by CDRH, the request should be sent to:

Combination Product Jurisdiction Officer
Center for Devices and Radiological Health
Food and Drug Administration
10903 New Hampshire Ave
Document Control Center
WO66-G609
Silver Spring, MD 20993-0002

If you have questions concerning these requests or need to orally request an exemption or alternative, please refer to the Exemptions and Alternatives website above.

5. Is an HCT/P establishment required to investigate and report adverse reactions related to 361 HCT/Ps?

Establishments that make nonreproductive 361 HCT/Ps available for distribution are required to investigate adverse reactions involving a communicable disease related to those 361 HCT/Ps (21 CFR 1271.350(a)(1)). In addition, the establishments must report to FDA such adverse reactions that meet any of the criteria under 21 CFR 1271.350(a)(1)(i)-(iv). FDA issued a guidance entitled "Investigating and Reporting Adverse Reactions Related to Human Cells, Tissues, and Cellular and Tissue-Based Products (HCT/Ps) Regulated Solely under section 361 of the Public Health Service Act and 21 CFR part 1271", dated March 2016 (Ref. 7) with recommendations for complying with the requirements under 21 CFR part 1271, subparts D and E, for investigating and reporting of complaints of adverse reactions involving communicable disease in recipients of 361 HCT/Ps. That guidance provides updated information specific to reporting adverse reactions related to HCT/Ps, to supplement the general instructions accompanying the MedWatch mandatory reporting form, Form FDA 3500A, and supplements section XXII of the CGTP Guidance (Ref. 3).

6. Is an HCT/P establishment required to investigate and report deviations for 361 HCT/Ps?

Establishments that manufacture nonreproductive 361 HCT/Ps are required to investigate all HCT/P deviations related to distributed 361 HCT/Ps for which they performed a manufacturing step (21 CFR 1271.350(b)(1)). Under 21 CFR 1271.350(b)(2), the establishment must report to FDA any such HCT/P deviation relating to the core CGTP requirements defined in 21 CFR 1271.150(b), if the HCT/P deviation occurred in its facility or in a facility that performed a manufacturing step for the establishment under contract, agreement, or other arrangement. FDA issued the guidance, "Deviation Reporting for Human Cells, Tissues, and Cellular and Tissue-Based Products Regulated Solely Under Section

361 of the Public Health Service Act and 21 CFR Part 1271" dated September 2017 (Ref. 8) to provide establishments that manufacture non-reproductive 361 HCT/Ps, with recommendations and relevant examples for complying with the requirements under 21 CFR 1271.350(b) to investigate and report HCT/P deviations.

The guidance also supplements sections V. and XXII. of the CGTP Guidance (Ref. 3), by providing additional recommendations specific to an establishment's responsibilities to investigate HCT/P deviations concerning 361 HCT/Ps under 21 CFR 1271.160(b)(6) and 1271.350(b).

E. FDA INSPECTION AND ENFORCEMENT OF ESTABLISHMENTS DESCRIBED IN 21 CFR 1271.10

1. What does an FDA inspection involve?

An FDA inspection of an establishment that manufactures 361 HCT/Ps will be conducted as necessary in the judgment of FDA to determine compliance with the applicable provisions in 21 CFR part 1271 (21 CFR 1271.400(a)). The FDA inspection may include, but is not limited to, an assessment of the establishment's facilities, equipment, finished and unfinished materials, containers, processes, HCT/Ps, procedures, labeling, records, files, papers and controls required to be maintained under 21 CFR part 1271 (21 CFR 1271.400(a)).

FDA will call upon the most responsible person available at the time of the inspection of the establishment and may question the personnel as necessary to determine compliance with the provisions of 21 CFR part 1271 (21 CFR 1271.400(c)). FDA representatives may take samples, may review and copy any records required to be kept under 21 CFR part 1271, and may use other appropriate means to record evidence of observations during inspections (21 CFR 1271.400(d)).

For reproductive establishments, inspections will be limited to determining compliance with applicable provisions contained in 21 CFR part 1271, subparts A, B, and C; and 21 CFR 1271.150(c)(1) and 1271.155 of subpart D (see 21 CFR 1271.150(c)(3) and 1271.330).

As of May 15, 2017, as part of the broader agency Program Alignment initiative, FDA's Office of Regulatory Affairs (ORA) implemented a program-based management structure that aligns staff, including inspection staff, by FDA-regulated product. This organizational approach replaced a management structure based on geographic regions. The goal is to improve our public health response in a way that keeps pace with the acceleration of scientific innovation, global expansion of markets, and modern legal authorities.[12]

[12] See FDA's Program Alignment and ORA webpage at https://www.fda.gov/about-fda/office-regulatory-affairs/program-alignment-and-ora for more details.

2. When will an FDA inspection be performed?

An FDA inspection of an establishment that manufactures 361 HCT/Ps will ordinarily be performed during regular business hours and may be made with or without prior notification (21 CFR 1271.400(a)). The frequency of inspection will be at FDA's discretion (21 CFR 1271.400(b)).

3. What compliance or enforcement actions can FDA take to prevent the introduction, transmission, or spread of communicable diseases for 361 HCT/Ps?

For 361 HCT/Ps, advisory, administrative and judicial actions that FDA may take in response to violations of 21 CFR part 1271 include an Untitled Letter; Warning Letter; Orders of Retention, Recall, Destruction, and/or Cessation of Manufacturing; and prosecution.

A Warning Letter is a correspondence that notifies regulated industry about violations that FDA has identified during its inspections or other investigations to provide an opportunity to take prompt, voluntary corrective action. Typically, a Warning Letter notifies a responsible individual or establishment that FDA considers one or more products, practices, processes, or other activities to be in violation of statutes or their implementing regulations. Warning Letters are only issued for violations of regulatory significance (i.e., those that may lead to an enforcement action if the documented violations are not promptly and adequately corrected). An Untitled Letter is a correspondence with regulated industry that cites violations that do not meet the threshold of regulatory significance for a Warning Letter.

Under 21 CFR 1271.440, FDA may issue orders for retention, recall, destruction, and/or cessation of manufacturing. FDA may take one or more of these actions upon an agency finding that there are reasonable grounds to believe the following: (a) an HCT/P is a violative HCT/P because it was manufactured in violation of the regulations in 21 CFR part 1271 and, therefore, the conditions of manufacture of the HCT/P do not provide adequate protections against risks of communicable disease transmission; or (b) the HCT/P is infected or contaminated so as to be a source of dangerous infection to humans; or (c) an establishment is in violation of the regulations in 21 CFR part 1271 and, therefore, does not provide adequate protections against the risks of communicable disease transmission.

FDA may pursue prosecution in certain circumstances, such as when there are gross, flagrant or intentional violations, fraud, danger to health, or a continued or repeated course of violative conduct. Because 21 CFR part 1271 was promulgated pursuant to section 361 of the PHS Act (42 U.S.C. 264), there are criminal penalties found in 42 U.S.C. 271(a) that may apply: "Any person who violates any regulation prescribed under [42 U.S.C. 264] . . . shall be punished by a fine of not more than $1,000 or by imprisonment for not more than one year, or

both." However, Title 18 of the United States Code (U.S.C.) contains superseding penalties provisions for federal crimes. Under 18 U.S.C. 3551, "a defendant who has been found guilty of an offense described in any Federal statute" is governed by the sentencing provisions of 18 U.S.C. Chapter 227 (18 USC 3551-3586). Under 18 U.S.C. 3559(a)(6), any federal criminal offense which carries a possible maximum sentence of one year or less, but more than six months, is a Class A misdemeanor. The statutory fines for Class A misdemeanor federal offenses are, for individuals, for a violation resulting in death, not more than $250,000; otherwise; not more than $100,000 (18 U.S.C. 3571(b)(4) and (5)). For organizations, including corporations, for a violation resulting in death, not more than $500,000; otherwise, not more than $200,000 (18 U.S.C. 3571(c)(4) and (5)).

4. When would an FDA order for cessation of manufacturing go into immediate effect?

An FDA order for cessation of manufacturing will go into immediate effect only when FDA determines that there are reasonable grounds to believe that there is a danger to health if the establishment continues to manufacture (see 21 CFR 1271.440(a)(3)).

5. Are there any exceptions to the enforcement provisions in 21 CFR part 1271, subpart F?

Yes. As described in 21 CFR 1271.440(f), FDA will not issue an order for the destruction of reproductive tissue, nor will it carry out such destruction itself.

6. What are the requirements for 361 HCT/Ps offered for import?

Under 21 CFR 1271.420(a), when an HCT/P (except for certain reproductive HCT/Ps and peripheral blood stem/progenitor cells as described in 21 CFR 1271(c) and(d)) is offered for import, the importer of record must notify the FDA Director (or designee) of the district that covers the port of entry before or at the time of importation and provide sufficient information for FDA to make an admissibility decision. HCT/Ps offered for import must be held intact by the importer of record or consignee, under conditions necessary to prevent transmission of communicable disease, until an admissibility decision is made by FDA (21 CFR 1271.420(b)). Due to the perishable nature of most HCT/Ps, an HCT/P may be transported under quarantine to the consignee while FDA is determining admissibility of the HCT/P (21 CFR 1271.420(b)).

The "FDA Investigations Operations Manual 2021 (IOM)" (Ref. 9) is the primary operational reference for FDA employees who perform field investigational activities in support of the agency's public health mission and has more information on inspectional and import activities.

7. What are the exceptions for 361 HCT/Ps offered for import?

The import provisions in 21 CFR 1271.420 do not apply to reproductive HCT/Ps regulated solely under section 361 of the PHS Act and the regulations in 21 CFR part 1271, and donated by a sexually intimate partner of the recipient for reproductive use (21 CFR 1271.420(c)). In addition, such import provisions do not apply to peripheral blood stem/progenitor cells regulated solely under section 361 of the PHS Act and the regulations in 21 CFR part 1271, except when circumstances occur under which such imported peripheral blood stem/progenitor cells may present an unreasonable risk of communicable disease transmission indicating the need to review the information referenced in 21 CFR 1271.420(a). In such circumstances, 21 CFR 1271.420(a) and (b) apply (21 CFR 1271.420(d)).

III. REFERENCES

1. Guidance for Industry and Food and Drug Administration Staff: Regulatory Considerations for Human Cells, Tissues, and Cellular and Tissue-Based Products: Minimal Manipulation and Homologous Use, November 2017 and Corrected July 2020, available at: https://www.fda.gov/media/109176/download

2. Guidance for Industry: Same Surgical Procedure Exception under 21 CFR 1271.15(b): Questions and Answers Regarding the Scope of the Exception, November 2017, available at: https://www.fda.gov/media/89920/download

3. Guidance for Industry: Current Good Tissue Practice (CGTP) and Additional Requirements for Manufacturers of Human Cells, Tissues, and Cellular and Tissue-Based Products (HCT/Ps), December 2011, available at: https://www.fda.gov/media/82724/download

4. Guidance for Industry: Eligibility Determination for Donors of Human Cells, Tissues, and Cellular and Tissue-Based Products (HCT/Ps), August 2007, available at: https://www.fda.gov/media/73072/download

5. Guidance for Industry: Certain Human Cells, Tissues, and Cellular and Tissue-Based Products (HCT/Ps) Recovered From Donors Who Were Tested For Communicable Diseases Using Pooled Specimens or Diagnostic Tests, April 2008, available at https://www.fda.gov/media/70696/download

6. Guidance for Industry: Compliance with 21 CFR Part 1271.150(c)(1) – Manufacturing Arrangements", September 2006, available at: https://www.fda.gov/media/70696/download

7. FDA Guidance: Investigating and Reporting Adverse Reactions Related to Human Cells, Tissues, and Cellular and Tissue-Based Products (HCT/Ps) Regulated Solely under Section 361 of the Public Health Service Act and 21 CFR Part 1271, March 2016, available at: https://www.fda.gov/media/91082/download

8. FDA Guidance: Deviation Reporting for Human Cells, Tissues, and Cellular and Tissue-Based Products Regulated Solely Under Section 361 of the Public Health Service Act and 21 CFR Part 1271, September 2017, available at: https://www.fda.gov/media/107703/download

9. **FDA Investigations Operations Manual, 2021**, available at: **https://www.fda.gov/inspections-compliance-enforcement-and-criminal-investigations/inspection-references/investigations-operations-manual**