

BACKGROUND AND OBJECTIVES

- A rise in incidence of post-keratoplasty keratitis was noted between 2007 and 2014, particularly following endothelial versus penetrating keratoplasty.¹
- However, among the keratoplasty procedures performed in the U.S., only a small proportion of keratitis cases were reported to the Eye Bank Association of America.
- Our objective was to compare the risk of fungal keratitis following endothelial, penetrating, or anterior lamellar keratoplasty among patients in the Sentinel Distributed Database (SDD).

METHODS

Data

- In this retrospective cohort study, we utilized data from the SDD, a curated database composed of medical encounter data and outpatient pharmacy dispensing records, contributed by 16 Data Partners of national and regional health insurers and integrated health care delivery networks in the U.S.

Analysis

This analysis was designed on Sentinel Query Request Package (QRP) version 8.1.0, with ad hoc programming.

Study population (Figure 1)

- We identified patients who had undergone endothelial, penetrating, or anterior lamellar keratoplasty (based on Current Procedural Terminology, Fourth Edition [CPT-4] codes), during the period from January 1, 2008, through February 29, 2020.
- Patients were required to have continuous health plan enrollment in the 90 days prior to keratoplasty procedure.
- Patients were excluded if they had fungal keratitis ICD-9/10-CM diagnosis codes in the 90 days prior to keratoplasty procedure.

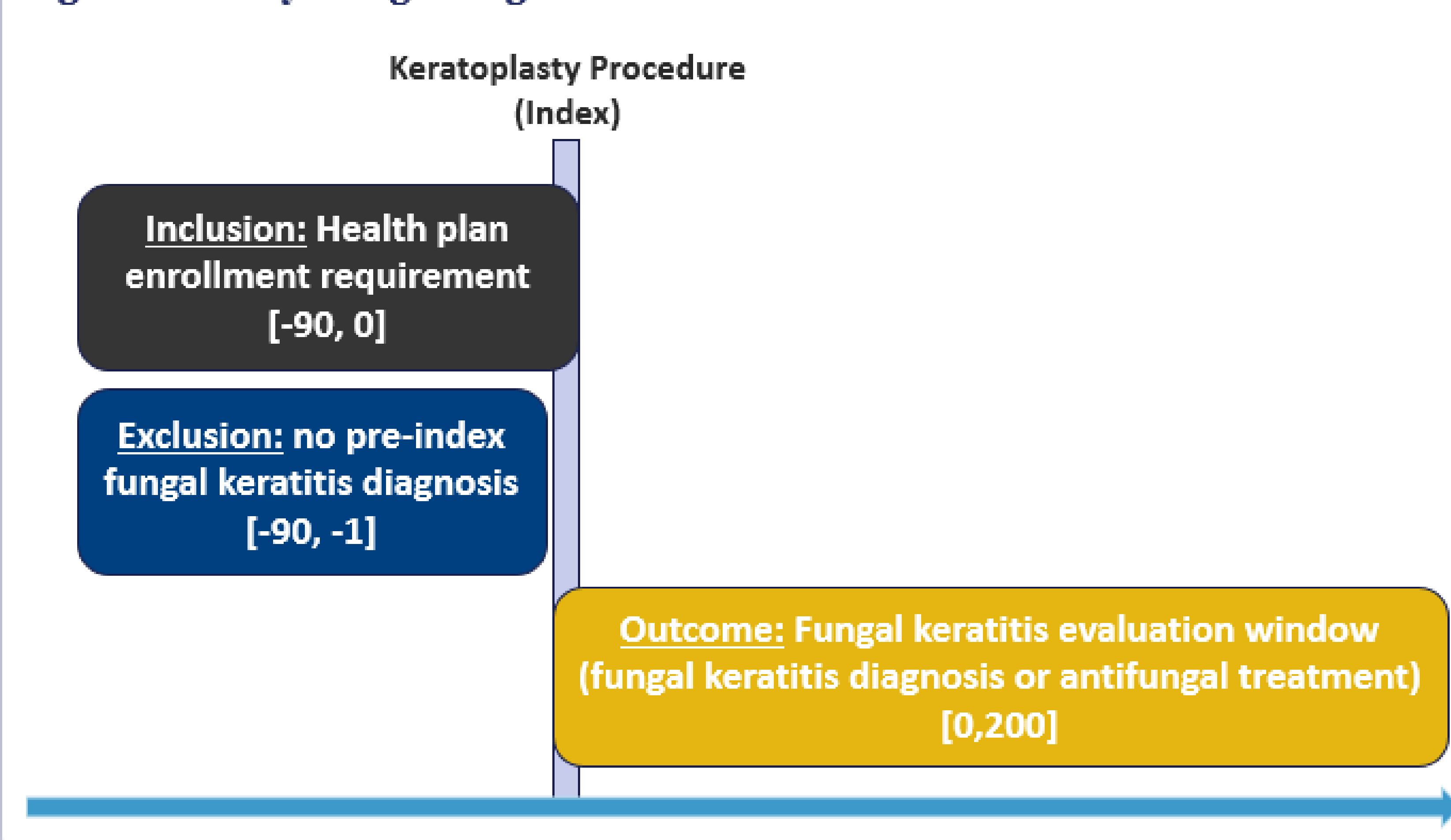
Outcome definition

- We followed patients for 200 days post-keratoplasty, unless a subsequent keratoplasty occurred, to evaluate evidence of fungal keratitis either as:
 - An ICD-9/10-CM diagnosis code for fungal keratitis, or
 - Dispensing of antifungal treatment of ≥ 15 days

Effect estimates

- We assessed the prevalence of fungal keratitis across the three keratoplasty types, overall and by calendar year, and calculated the relative risk of fungal keratitis across keratoplasty types, with endothelial keratoplasty as the referent.

Figure 1. Study design diagram.



REFERENCES

- Edelstein SL, DeMatteo J, Stoeger CG, Macsai MS, Wang C-H. Report of the Eye Bank Association of America Medical Review Subcommittee on Adverse Reactions Reported From 2007 to 2014. *Cornea*. 2016;35(7):917-926.

ACKNOWLEDGEMENTS/DISCLOSURES

- The views expressed in this presentation represent those of the presenters and do not necessarily represent the official views of the U.S. FDA.
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- Many thanks are due to Data Partners who provided data used in the analysis.
- The authors have no conflicts of interest to disclose.

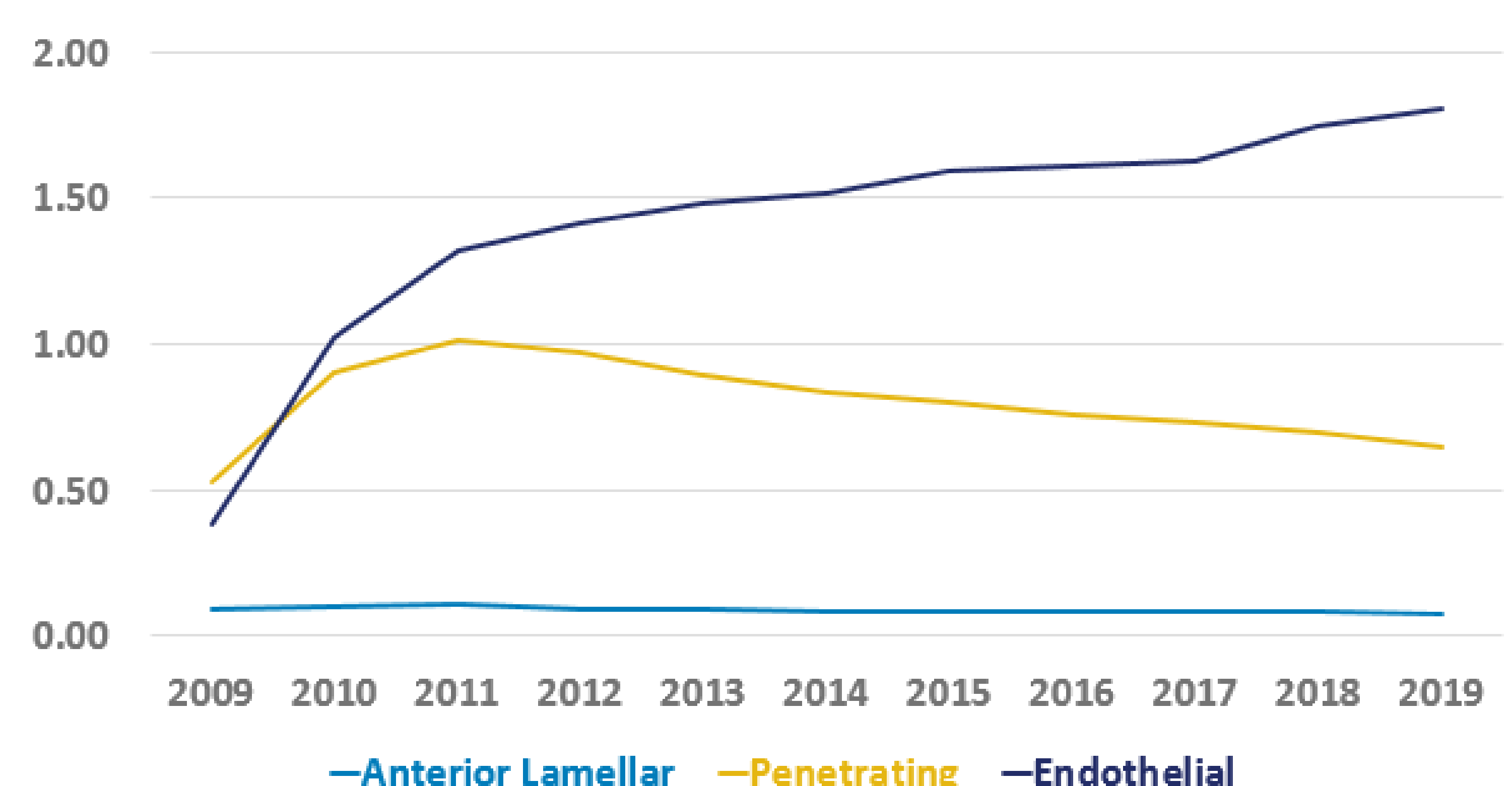
RESULTS

- We identified 83,781 endothelial (mean age \pm SD: 75 \pm 9 years; 62% female), 52,773 penetrating (mean age \pm SD: 66 \pm 16 years; 53% female), and 6,455 anterior lamellar (mean age \pm SD: 62 \pm 17 years; 53% female) keratoplasty patients between January 1, 2008 and February 29, 2020 (Table 1).
- Among the keratoplasty cohorts (endothelial, penetrating, or anterior lamellar), 795 had endothelial and anterior lamellar keratoplasty procedures, 4,217 had endothelial and penetrating keratoplasty procedures, and 1,298 had penetrating and anterior lamellar keratoplasty procedures, occurring on the same day (Table 1).
- There was a steady increase in endothelial keratoplasty use from 2009 to 2019 (from 0.38 to 1.81 procedures / 10,000 eligible persons). Use of penetrating and anterior lamellar keratoplasty procedures declined during the same period. We do not report results from 2008 and 2020 because incomplete data from these years led to extreme keratoplasty prevalence estimates (Figure 2).
- We observed 2.7, 16.1, and 10.6 fungal keratitis infections following endothelial, penetrating, and anterior lamellar keratoplasty, per 1,000 keratoplasty procedures, respectively.
- Compared to patients with an endothelial keratoplasty, without adjustment for potential confounding, patients with a penetrating keratoplasty had 5.9 (95% CI: 5.2 to 6.6) times the risk of fungal keratitis and patients with an anterior lamellar keratoplasty had 3.9 (95% CI: 3.0 to 5.0) times the risk of fungal keratitis.

Table 1. Characteristics of patients with keratoplasty procedure between January 1, 2008 and February 29, 2020 and prevalence of observed fungal keratitis outcomes.

	Endothelial Keratoplasty n = 83,781	Penetrating Keratoplasty n = 52,773	Anterior Lamellar Keratoplasty n = 6,455
PATIENT CHARACTERISTICS			
Mean age \pm SD	74.5 \pm 9.2	66.2 \pm 15.6	62.0 \pm 17.1
Female	51,771 (61.8%)	27,889 (52.8%)	3,447 (53.4%)
Concurrent keratoplasty on index procedure date:			
Anterior Lamellar	795 (0.7%)	1,298 (1.9%)	---
Penetrating	4,217 (3.7%)	---	1,298 (17.9%)
Endothelial	---	4,217 (6.3%)	795 (11.0%)
FUNGAL KERATITIS OUTCOMES			
Fungal keratitis outcomes per 1,000 keratoplasty procedures	2.74	16.08	10.64
Risk ratio (95% CI) of fungal keratitis prevalence	Referent	5.9 (5.2; 6.6)	3.9 (3.0; 5.0)

Figure 2. Count of keratoplasty procedures over time per 10,000 health plan members in the Sentinel Distributed Database.



NOTE: We did not report visualized results from 2008 and 2020 due to incomplete data from these years. We observed Anterior Lamellar Keratoplasty among 598 patients in 2008, and <11 in 2020; Penetrating Keratoplasty among 467 in 2008, and 73 in 2020; and Endothelial Keratoplasty among <11 in 2008, and 167 in 2020.

CONCLUSION

We observed an **increase in use of endothelial keratoplasty** over time, and a **lower unadjusted risk of post-keratoplasty fungal keratitis following this procedure** compared to penetrating or anterior lamellar keratoplasty procedures.