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Early Trends in Access to Lung Transplant by Candidate Biology After the ABO Score Modification

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Introduction

- Continuous distribution of lungs was implemented by the Organ Procurement and Transplantation Network (OPTN) on March 9, 2023.
- On September 27, 2023, the points for blood type were modified to increase access for candidates with blood type O. The score also assigns points for candidate height and calculated panel-reactive antibody (cPRA) value.
- In 2024, the OPTN Lung Committee requested an inferential analysis to answer this question:
Do equally sick adult lung candidates have equal access to transplant by candidate biology, including blood type, height, and cPRA?

Methods

- N=2,393 adult first-time lung-alone candidates from the Scientific Registry of Transplant Recipients database
- Waiting on any day from September 27, 2023, through March 27, 2024
- Two outcomes:
 - Transplant rate
 - Waitlist mortality
- Transplant rate was modeled by a cause-specific Cox proportional hazards model.
- Waitlist mortality incidence was modeled by a Fine-Gray subdistribution hazards model, with bootstrap confidence intervals (CIs) for the adjusted cumulative incidence.
- Blood type AB candidates excluded due to no waitlist mortalities
- Models adjusted for:
 - Blood type, height, cPRA, waitlist urgency score, posttransplant survival score

Results

- Summary of waitlist outcomes**
 - Lung transplant: 1,465
 - Waitlist mortality: 72 (41 for death, 31 for deteriorated condition)
- Transplant rate model results**
 - Significant differences by blood type, height, and cPRA value (all $P < .001$)
 - Type-O candidates had a 36% (95% CI: 29%, 43%) lower transplant rate than type-A, who had similar access to type-B candidates.
 - Candidates at the 25th percentile of height (160 cm) had a 38% (95% CI: 29%, 46%) lower transplant rate than candidates at the 75th percentile (175 cm).
 - Candidates with 50% cPRA had a 27% (95% CI: 11%, 40%) lower transplant rate than candidates with no unacceptable antigens reported.
- Effect modification analysis**
 - The effect of height on transplant rate somewhat varied by diagnosis group ($P = .057$; Figure 1). For group A (obstructive lung diseases), transplant rate increased with height for candidates taller than 175 cm. For group D (restrictive lung diseases), transplant rate increased with height from 160 cm to 175 cm.
- Waitlist mortality model results**
 - No statistically significant differences in waitlist mortality by candidate biological characteristics
 - Mortality was slightly higher for type-O and shorter candidates, but absolute risk was low within the 6-month study period (Figures 2-3).

Figure 1: Adjusted transplant rate ratio by height and diagnosis group (A – Obstructive, D – Restrictive)

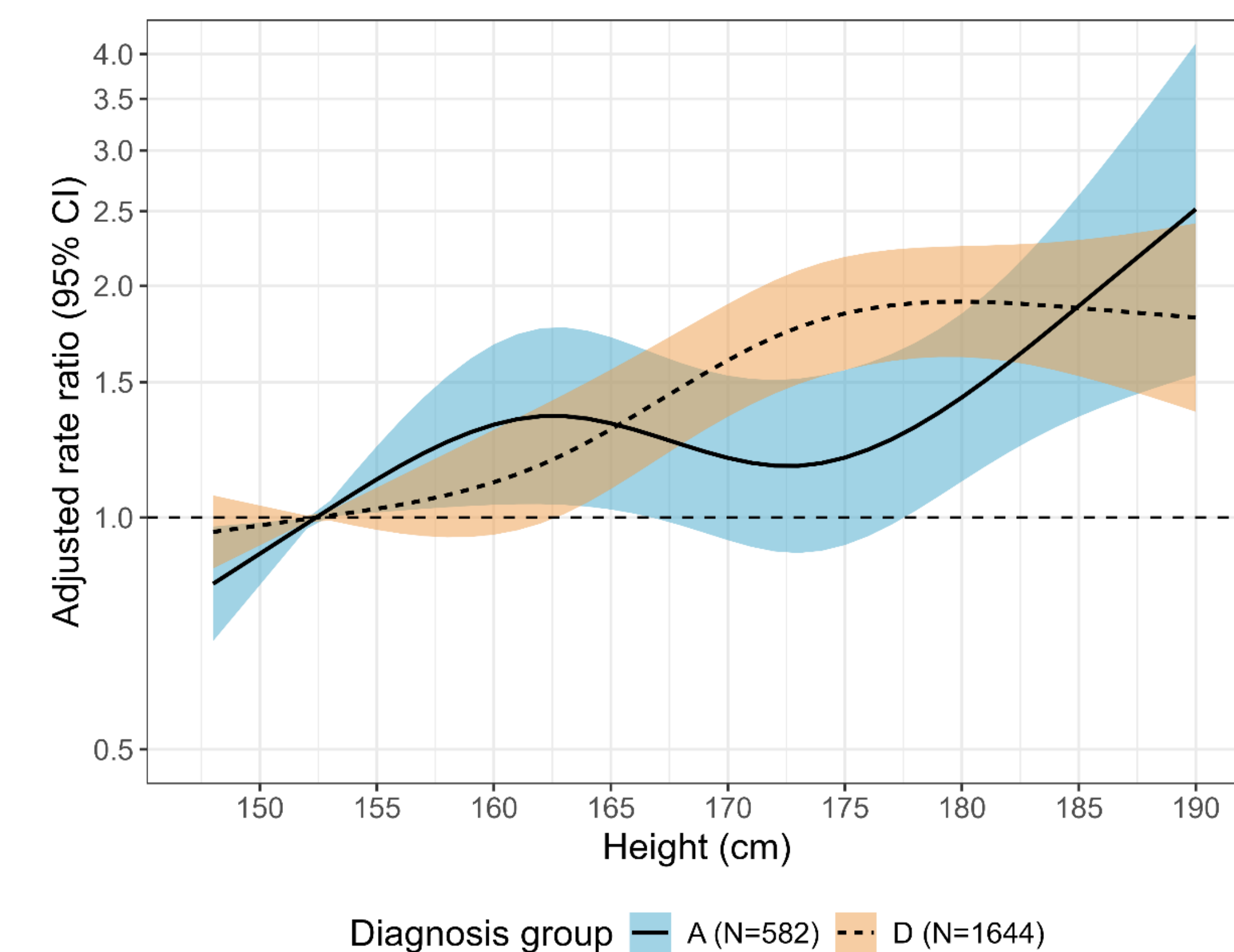


Figure 2: Waitlist mortality by blood type

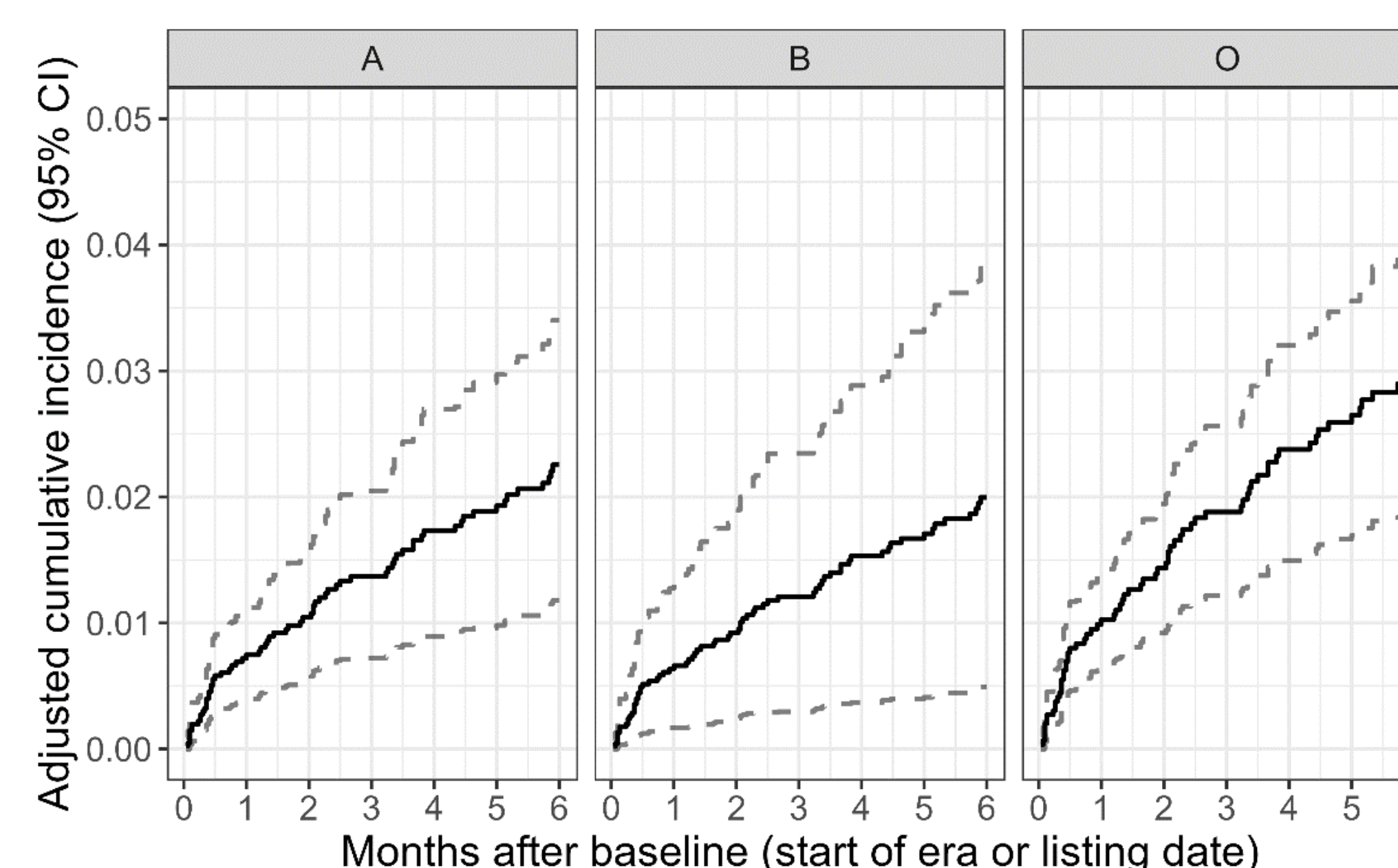
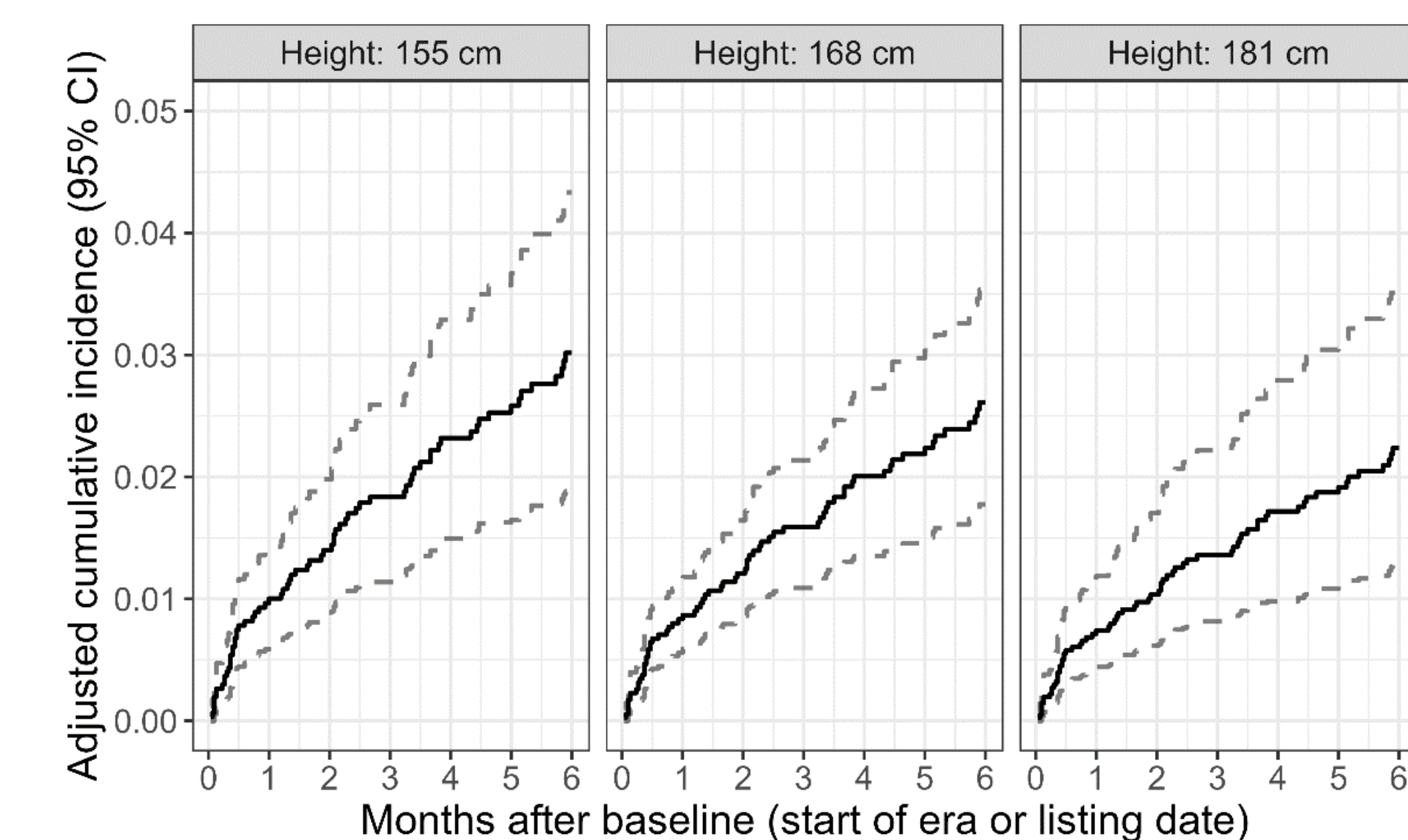


Figure 3: Waitlist mortality by height



Conclusions

- Equally urgent lung candidates with differing biology had significantly different transplant rates, with longer waiting times in type-O, shorter, and sensitized candidates.
- This did not translate to significant differences in waitlist mortality, possibly due to low overall incidence of waitlist mortality in 6 months.
- Policy rating scales should be further refined to promote equity, although achieving equal access may be unattainable due to inherent biological constraints within the donor pool.