

Relevant Financial Relationship Disclosure Statement

*Measuring and Monitoring Equity in Access to Deceased
Donor Lung Transplants Among Lung Registrations
Rebecca R Goff, PhD*

I will not discuss off label use and/or investigational use of drugs/devices.

The following relevant financial relationships exist related to this presentation:

No relationships to disclose

Measuring and Monitoring Equity in Access to Deceased Donor Lung Transplants among Lung Registrations

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Background

- 2016: Organ Procurement and Transplantation Network (OPTN) developed novel method to monitor equity in access to deceased donor kidney transplants
- 2018: OPTN published this methodology as applied to kidney
- 2019: Applied this methodology to deceased donor liver and lung transplants



Lung Waiting List

Blood type AB
50 years old

When's my turn?



Blood type B
17 years old

Artwork by Andrew Swartz, UNOS

LAS=99



Research Question

After accounting for:

- Lung Allocation Score
- Pediatric Priority
- Blood Type Compatibility
- Other factors used in lung allocation policy

How is access to transplant impacted by:

- Age?
- Race/Ethnicity?
- Education?
- Blood type?
- Diagnosis Group?
- Insurance type?
- Donation Service Area?
- Other factors?

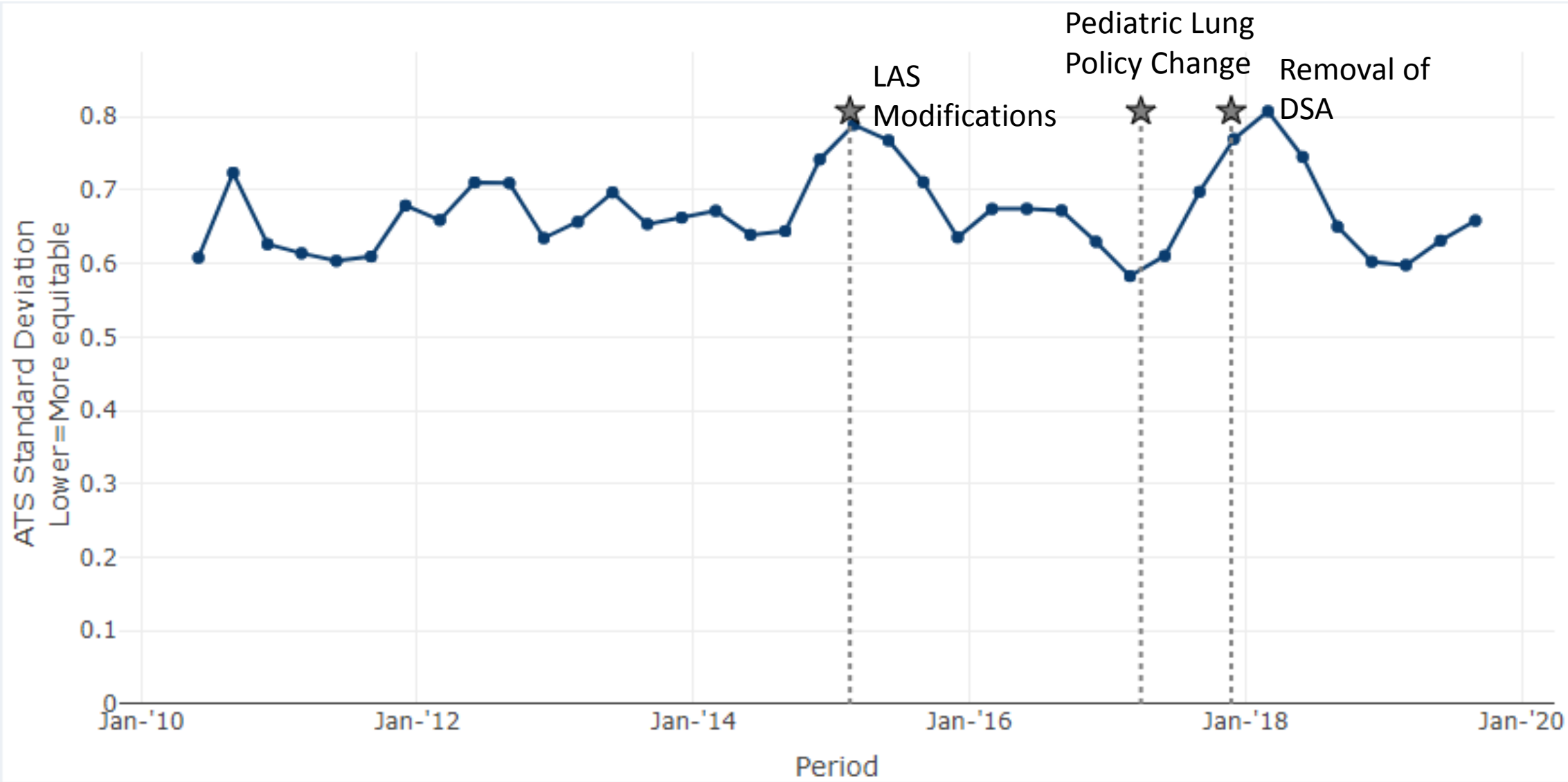


Methods

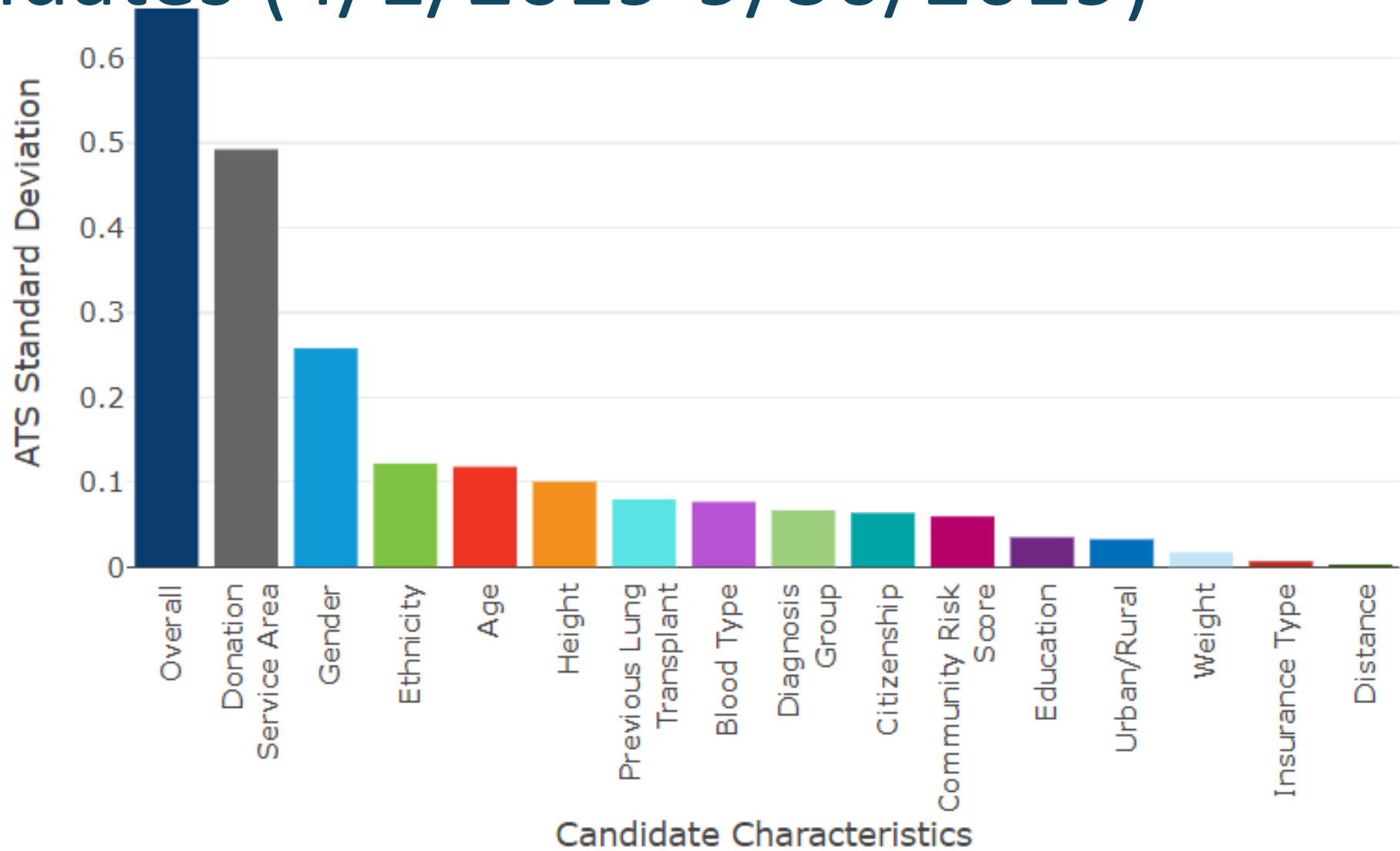
- Deceased donor transplant rate regression models tracked over time
- Restricted to listed lung candidates in the OPTN database
- Main value of interest is the log transplant rate, called the Access to Transplant Score (ATS)
 - Discounting for policy intended variation
- Updated quarterly, utilizing 6 month rolling time windows



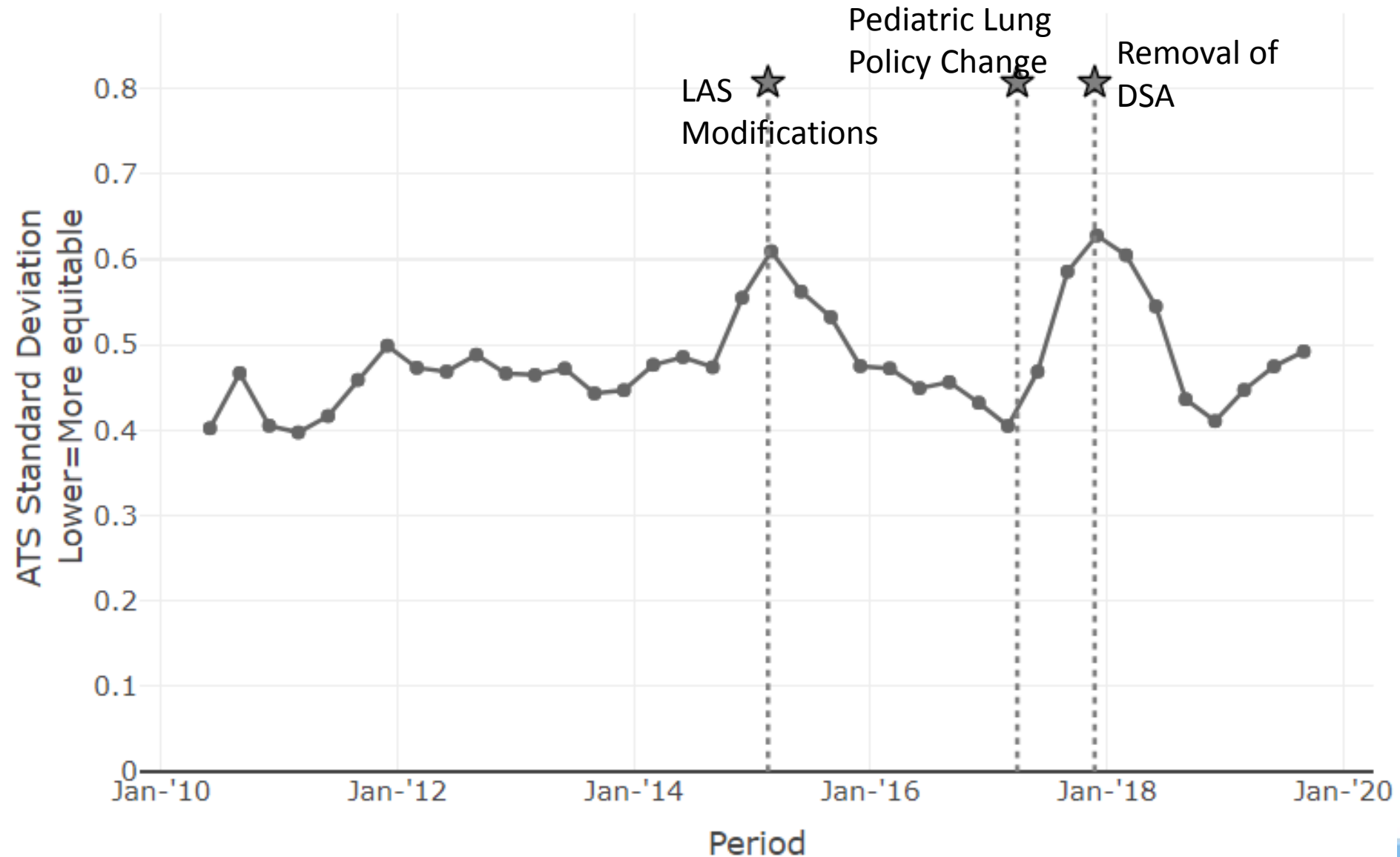
Overall Variability in ATS (1/1/2010-9/30/2019)



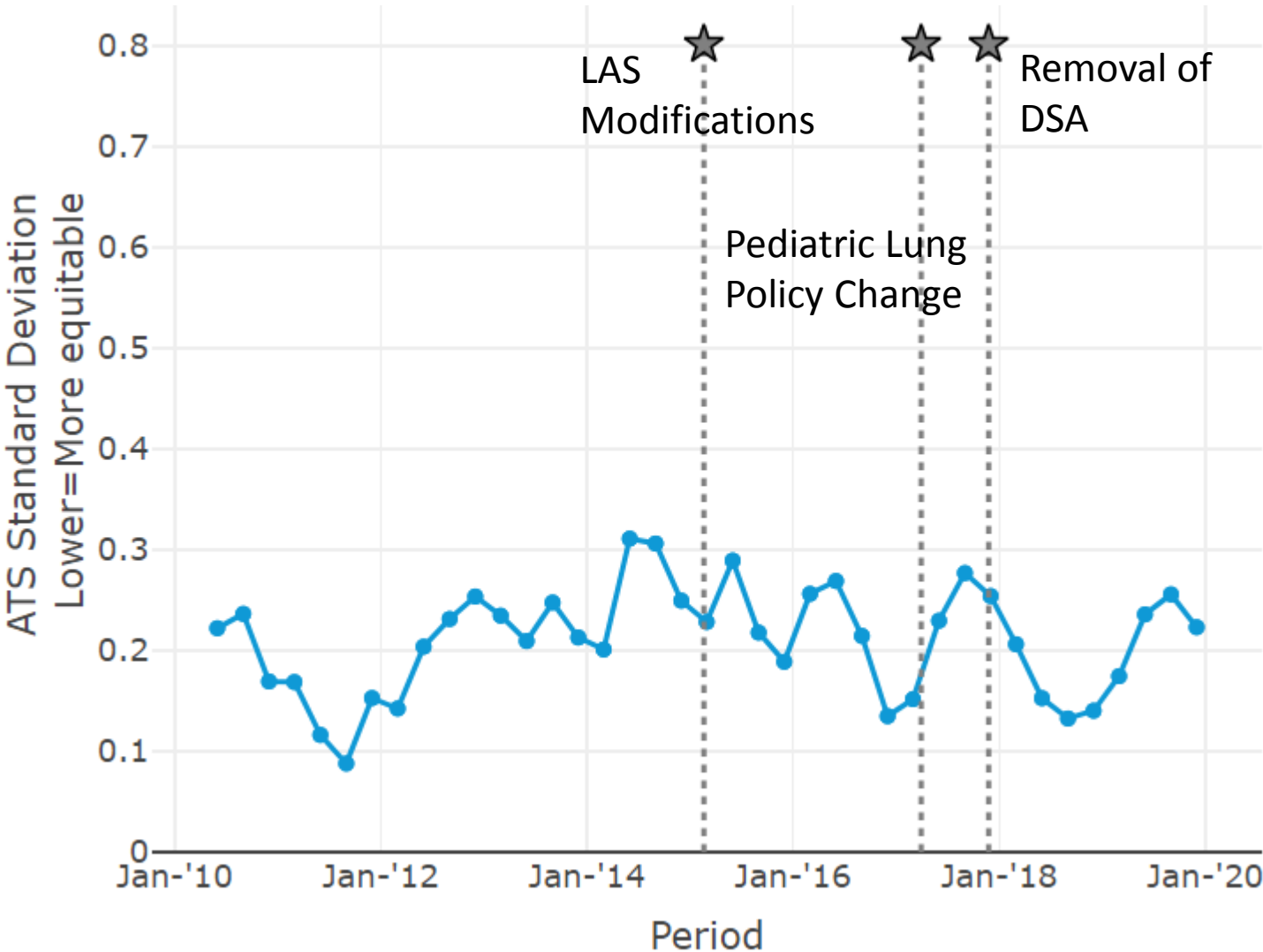
Variability in ATS Among Waitlisted Lung Candidates (4/1/2019-9/30/2019)



DSA Variability in ATS (1/1/2010-9/30/2019)



Gender Variability in ATS (1/1/2010-9/30/2019)



Center-level Variation is the Top Factor Associated with Unintended Disparities in Access to Lung Transplants among WL Candidates

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Background

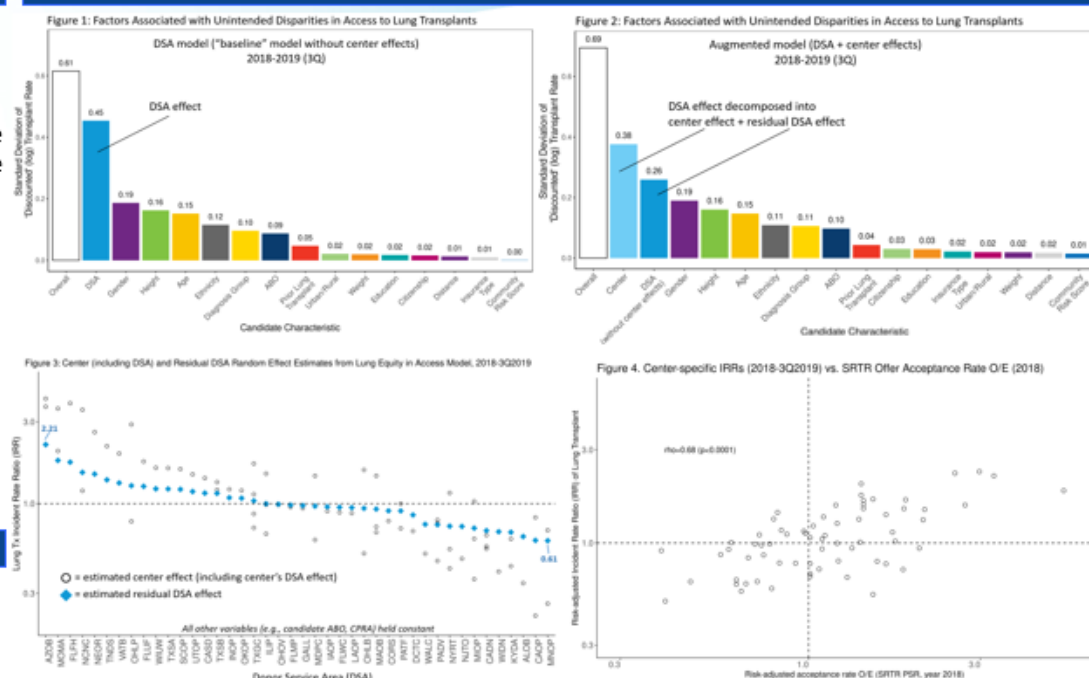
The OPTN developed a novel methodology in 2016 to monitor equity in access to deceased donor kidney transplants (Tx) among waitlisted (WL) candidates. The methodology has been extended to liver and lung transplantation. For all organs, the methodology has consistently shown donor service area (DSA) of listing to be the factor most independently associated with disparities. To better reflect disparities faced by WL candidates, the methodology is being refined to parse out center- from DSA-level variation. We present results from lung equity in access modeling incorporating both center and DSA effects to highlight factors associated with unintended disparities in access to lung transplantation among WL candidates. Results are post-November 2017, when DSA-based priority was removed from lung allocation policy.

Methods

Poisson Tx rate regression with 17 candidate factors, including random DSA and nested center effects, was applied to a period-prevalent cohort (2018-Sep 2019) of active lung WL registrations using OPTN data. Overall disparity was quantified as the Winsorized standard deviation (SD_w) of $\log(\text{Tx rate})$ among registrations, after “discounting” for policy-intended variation (e.g., lung allocation score (LAS), pediatric priority) by holding such factors constant. To isolate each factor's association with disparities, factor-specific SD_w's were obtained after holding all other factors constant. Random DSA and center Empirical Bayes (“shrunk”) estimates were expressed as Tx incidence rate ratios (IRRs).

OPTN ORGAN PROCUREMENT AND TRANSPLANTATION NETWORK

Results



Using the baseline model with random DSA effects but without transplant center effects, the overall disparity metric (SD_w) was 0.61, with DSA clearly the factor most associated with disparities (SD_w = 0.45; **Figure 1**). Adding center effects increased the overall disparity metric 13% (SD_w 0.61 → 0.69). Tx center was found to be the factor most associated with unintended disparities in access (SD_w=0.38). However, after accounting for center effects, substantial DSA effects remained (SD_w=0.26; **Figure 2**).

The open circles in **Figure 3** result from combining each center's effect with their DSA-specific effect (“net IRR”). Centers in DSAs with above average IRR tended to have above average net IRR. After parsing out center effects, DSA IRRs ranged from 0.61 to 2.21, a 3.6-fold difference. However, substantial heterogeneity in center-level IRRs was found even within the same DSA. For example, a 2.8-fold difference in IRR was found among the three lung programs in MIOP; similarly, a 3.8-fold difference was found among the three CAOP programs. Center effects are highly associated (correlation=0.68, $p<0.0001$) with risk-adjusted offer acceptance rates (**Figure 4**).

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Conclusions

Among waitlisted lung candidates, transplant center was found to be the top driver of lung access disparities. But even after extracting center effects, disparities associated with candidates' listing DSA remain. This could be at least partially explained by the fact that more lung transplants are staying within a 250 nautical mile radius after policy implementation (77%, based on one year monitoring report) compared to previously (65%).

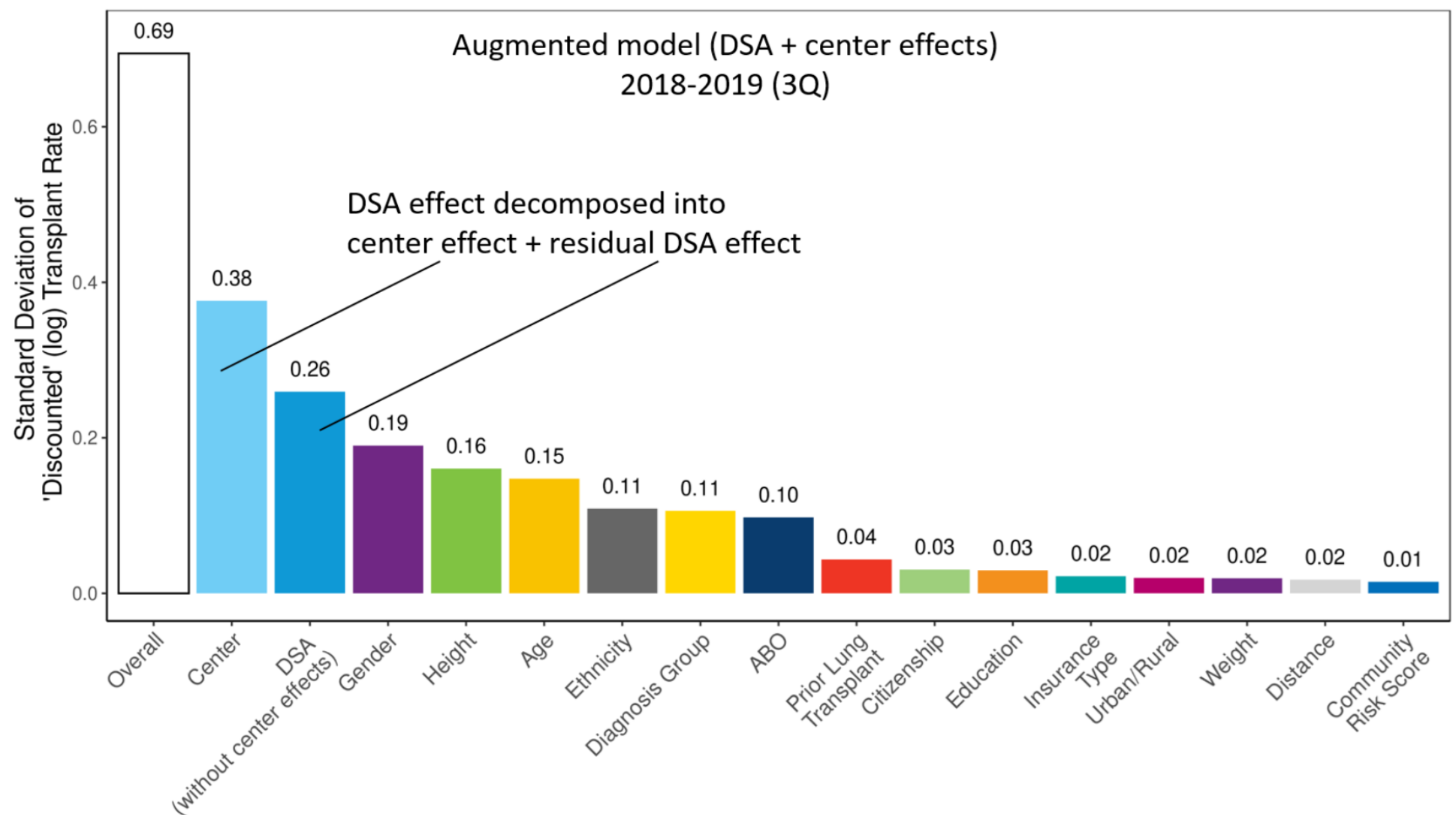
Further work is needed to better understand the root of these residual DSA-level disparities (which may relate to geographic variation in lung donor supply to demand), to identify policies and practices that may reduce access disparities.

Not surprisingly, center-level disparities in lung Tx rates are highly associated with lung offer acceptance rates, suggesting variation in acceptance practices is a significant contributor driving the factor found to be most associated with lung Tx access disparities: transplant center. The OPTN's plan of adapting lung allocation policy to a continuous distribution framework aims to efficiently allocate lungs to patients most in need by removing rigid policy boundaries, but reducing center-level disparities in access may require other interventions.

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The authors have no conflict of interest related to this abstract.

Variability in ATS, Including Center Effects



Future Work

- Extend methodology to heart transplant
- Update model to include CPRA

Online Application

<https://insights.unos.org/equity-in-access/>

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