



# Offer Acceptance Practices and Geographic Variability in Allocation MELD at Transplant

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## Introduction

Offer acceptance practices may cause geographic variability in allocation model for end-stage liver disease scores (aMELD) at transplant and could magnify the effect of donor supply and demand on variability in aMELD.

We investigated three dimensions of the relationship between offer acceptance practices and geographic variability in aMELD at transplant:

1. The association of offer acceptance with liver yield or local placement of recovered and eventually transplanted livers.
2. The association between donor supply and demand and offer acceptance practices. If donor supply and demand and offer acceptance practices are independent, then they likely independently contribute to variability in aMELD at transplant. That is, minimizing the variability in donor supply and demand will not address the impact of offer acceptance on variability in aMELD at transplant (and vice versa).
3. The association between offer acceptance practices and aMELD at transplant. The existence of this association would suggest that offer acceptance contributes to geographic variability in aMELD at transplant.

## Methods

### Offer Acceptance

Discrete-time survival models estimated the probability of acceptance of offers of eventually accepted livers for donors recovered between January 1, 2016, and December 31, 2016. The model was stratified by donor age and adjusted for donor quality, candidate health, donor-candidate interactions, and the number of previous offers.

Program- and donation service area (DSA)-level offer acceptance ratios were estimated separately from the offer acceptance models. A generalized linear mixed model with a logit-link estimated the ratios through a random intercept term, which accounted for candidate and donor factors by setting the offset to the linear predictors from the liver offer acceptance model.

### Donor Supply and Demand

The metric of donor supply and demand in a DSA was the number of recovered liver donors and the number of candidates waiting for a liver in the DSA (i.e., donor-to-candidate ratio). Several sensitivity analyses were considered for candidates with, for example, aMELD  $\geq 15$  and/or incident rather than prevalent listings.

### Geographic Variability in Access to Transplant

The median aMELD at transplant for recipients in a DSA was the metric of geographic disparity in access to liver transplant.

## Methods (Cont'd)

### Analyses

Liver yield was assessed for donors with a recovered organ, while local placement evaluated transplanted livers. A logistic regression adjusted for differential liver yield and local placement across donor characteristics. Pearson correlations estimated the associations among offer acceptance, aMELD at transplant, and donor supply and demand.

## Results

### Association of Offer Acceptance with Donor Yield and Local Placement

The odds ratios correspond to the increase in odds per doubling in the DSA-level offer acceptance ratio.

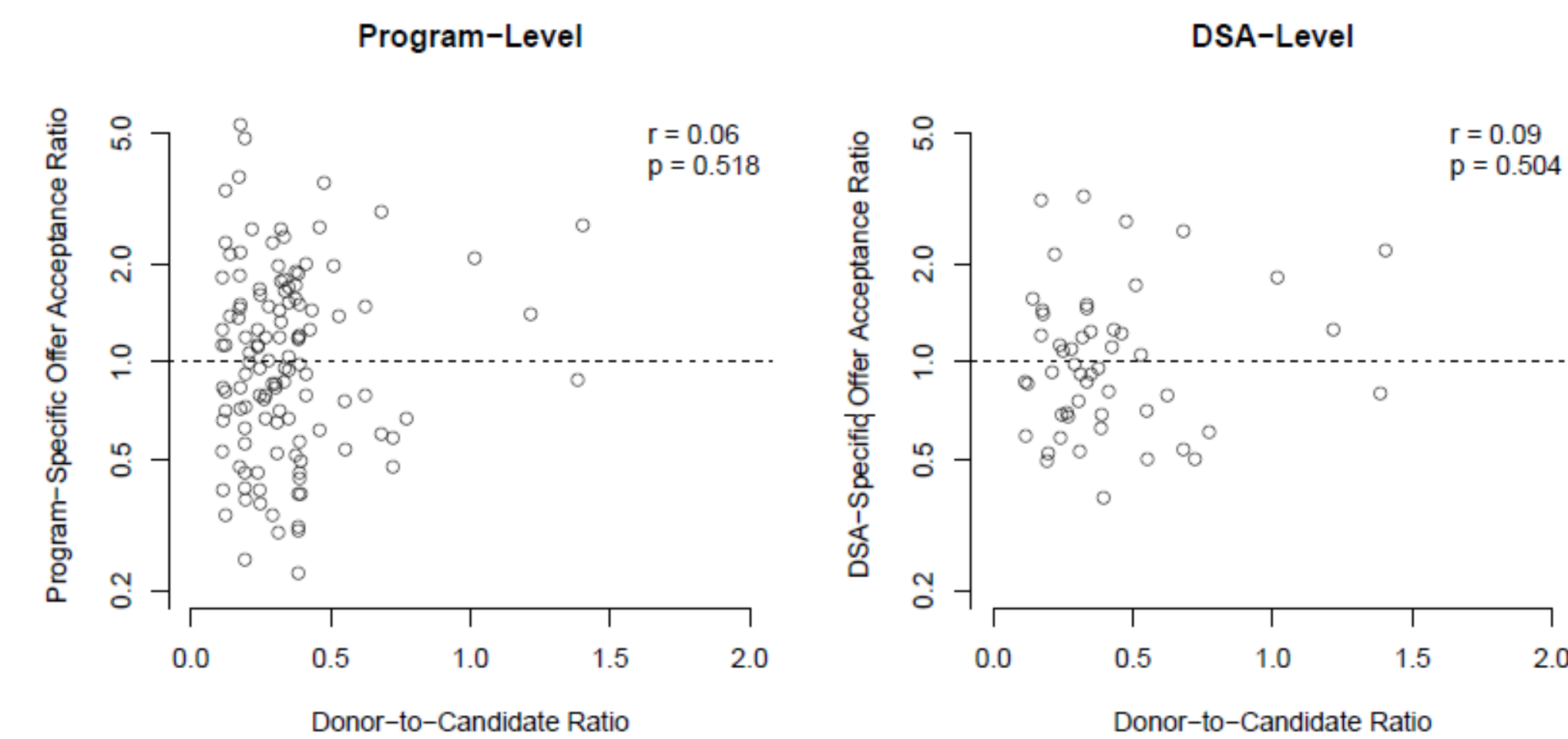
Metric	Odds Ratio
Liver yield	1.32 (1.21-1.44)
Local placement	1.34 (1.24-1.45)

### Association between DSA-level Donor-to-Candidate Ratios and Recipient-Level aMELD at Transplant

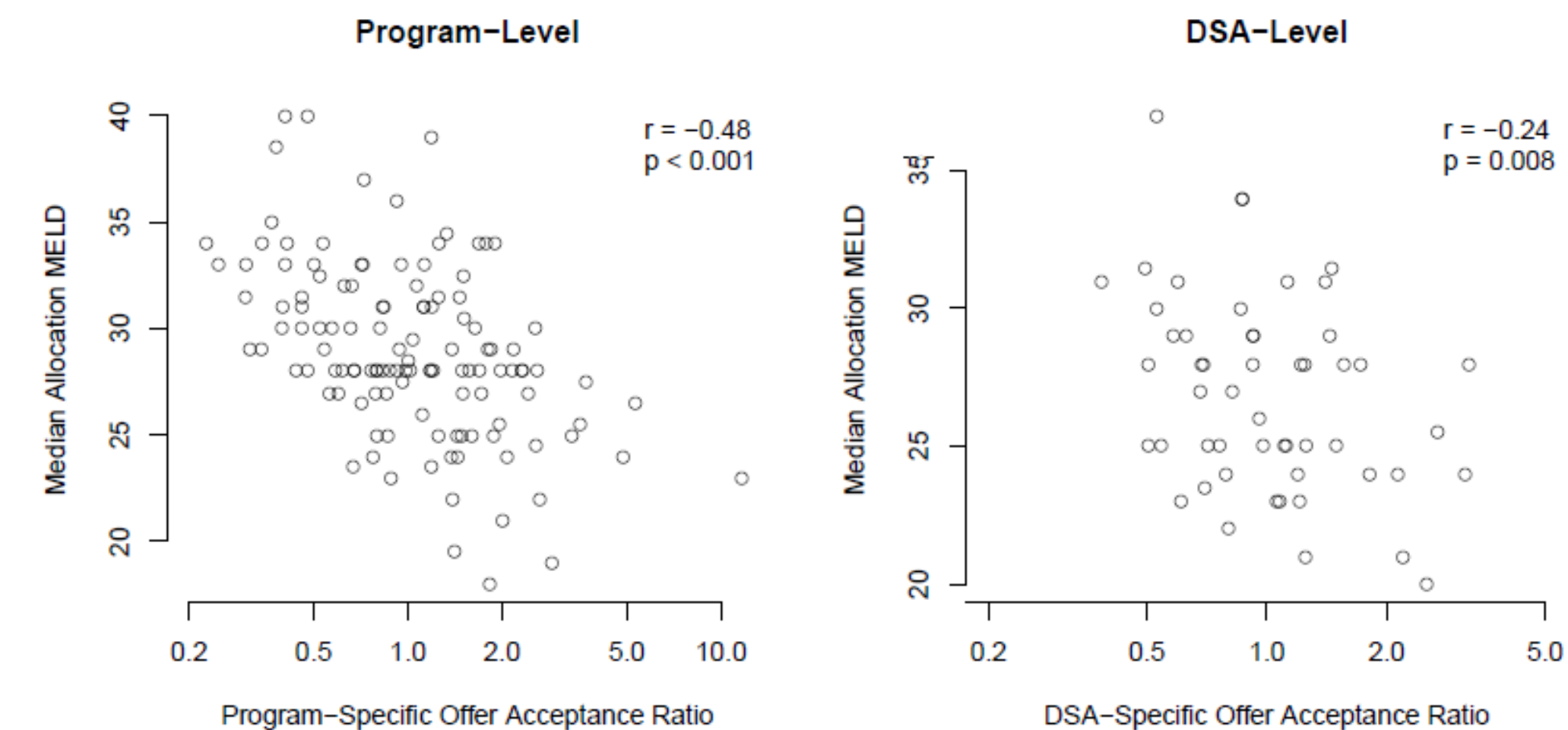
The difference in aMELD per doubling in the DSA-level donor-to-candidate ratio; unadjusted and adjusted for program-level offer acceptance ratios.

Offer Acceptance Adjustment	Difference in aMELD
Unadjusted	-1.58 (-2.16,-1.00)
Adjusted	-1.57 (-2.15,-0.99)

Association between Offer Acceptance and Donor-to-Candidate Ratios



Association between Offer Acceptance and Allocation MELD at Transplant



## Conclusions

Liver offer acceptance was associated with geographic variability in aMELD at transplant but independently contributed to variability in donor supply and demand. Thus, geographic variability in aMELD cannot be explained only by offer acceptance or only by donor supply and demand.

The association between offer acceptance and liver yield suggests that improving offer acceptance could increase the number of liver transplants. The Scientific Registry of Transplant Recipients integrated offer acceptance practices into the program-specific reports to help programs benchmark offer acceptance practices relative to the nation. Separately, monthly offer acceptance CUSUM reports are also provided for monitoring more recent offer acceptance practices.

## References

Wey A, Pyke J, Schladt DP, Gentry SE, Weaver T, Salkowski N, Kasiske BL, Israni AK, Snyder JJ. Offer acceptance practices and geographic variability in allocation model for end-stage liver disease at transplant. *Liver Transpl.* 2018;24:478-487.