Lung Transplant Continuous Distribution

Opportunities for Continuous Improvement

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Disclosures

I have no financial relationships with any ACCME ineligible companies.

University of Nebraska Medical Center

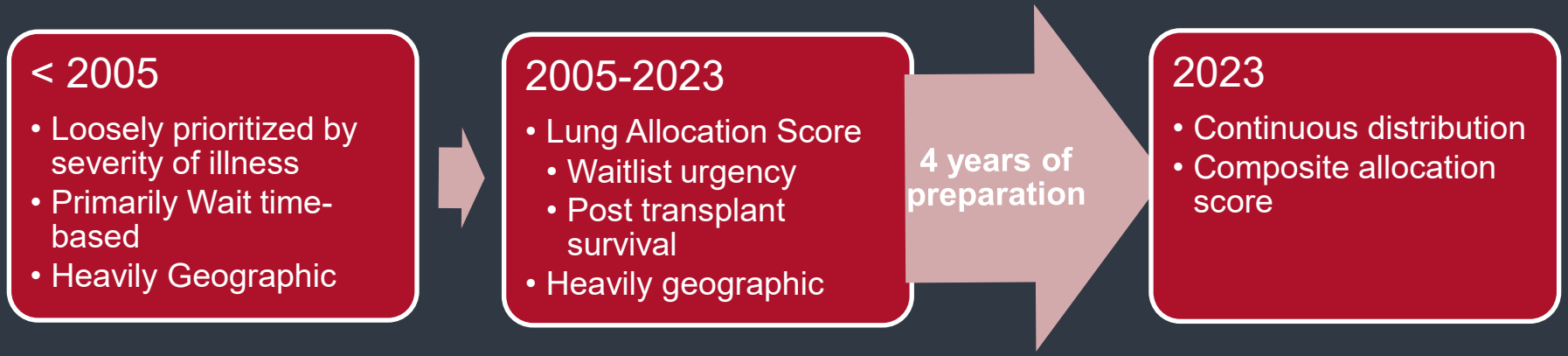
Objectives

- Compare the previous lung allocation score with current composite allocation score
- Dissect the current composite allocation score attributes
- Address the urgent ABO modification
- Explore opportunities for further optimization for biologically disadvantaged candidates

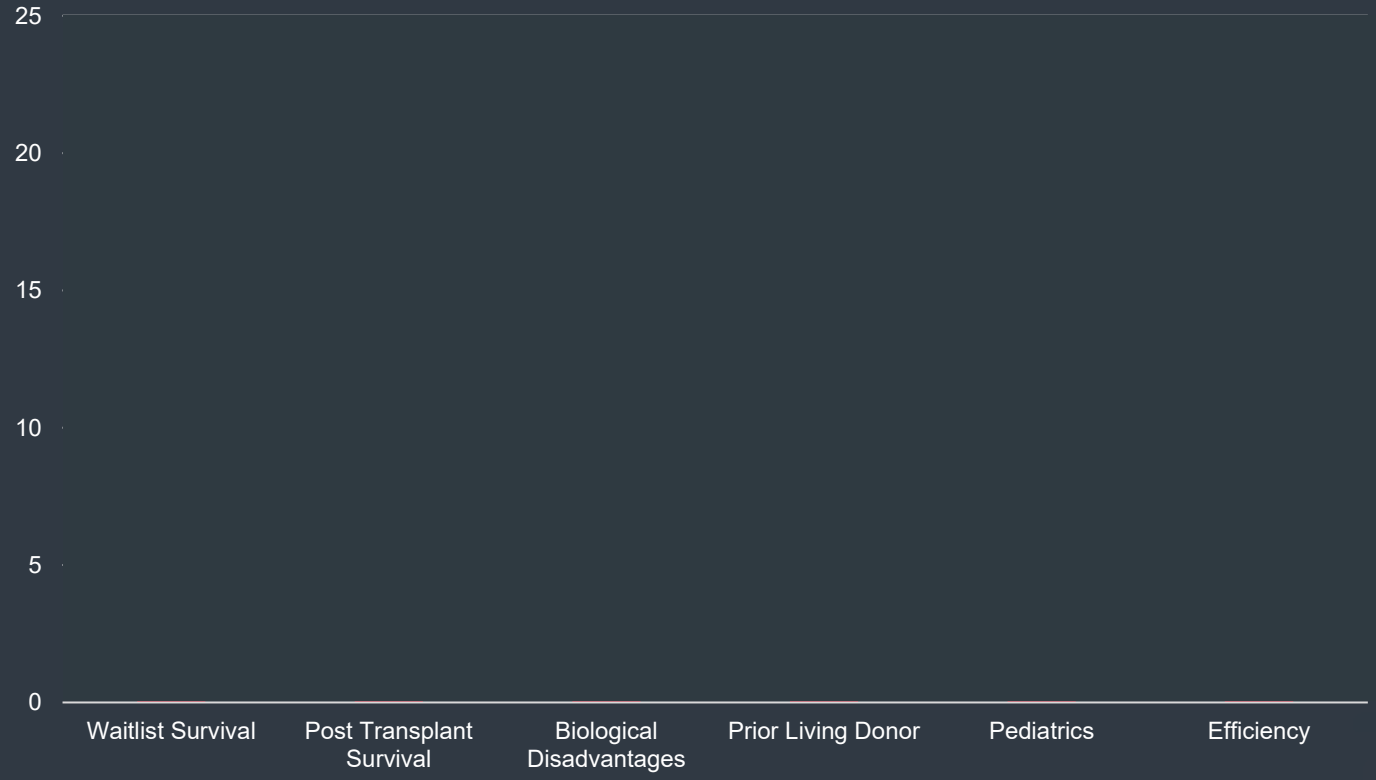
Lung Transplantation

- Surgical treatment for end-stage lung disease
  - Interstitial and fibrotic lung disease (~50% of lung transplants)
  - COPD
  - Pulmonary hypertension
  - All other lung diseases
  - Cystic Fibrosis
- Extend life and improve quality
- Lowest survival of any solid organ transplant
  - Waitlist
  - 1-year
  - Long-term

Evolution of Lung Allocation



Priorities of the Lung Community



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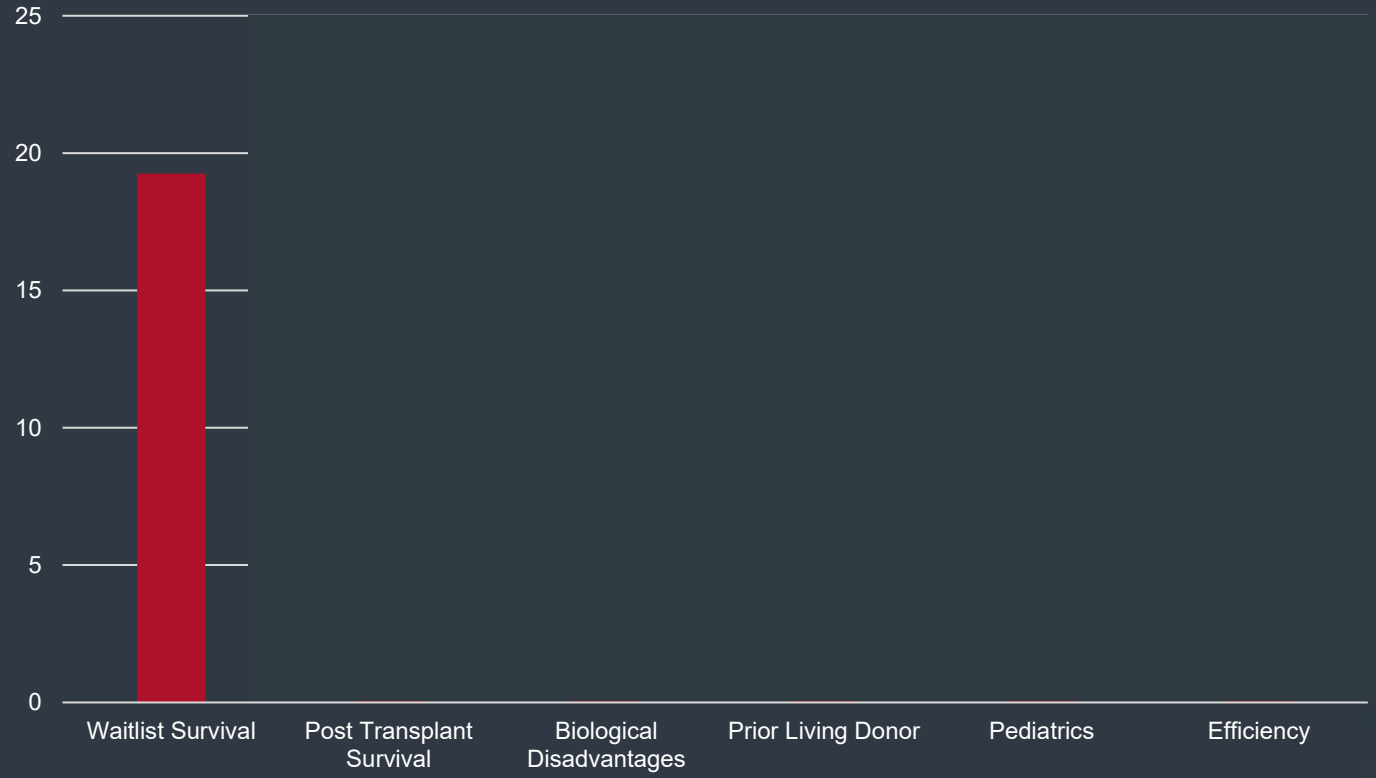

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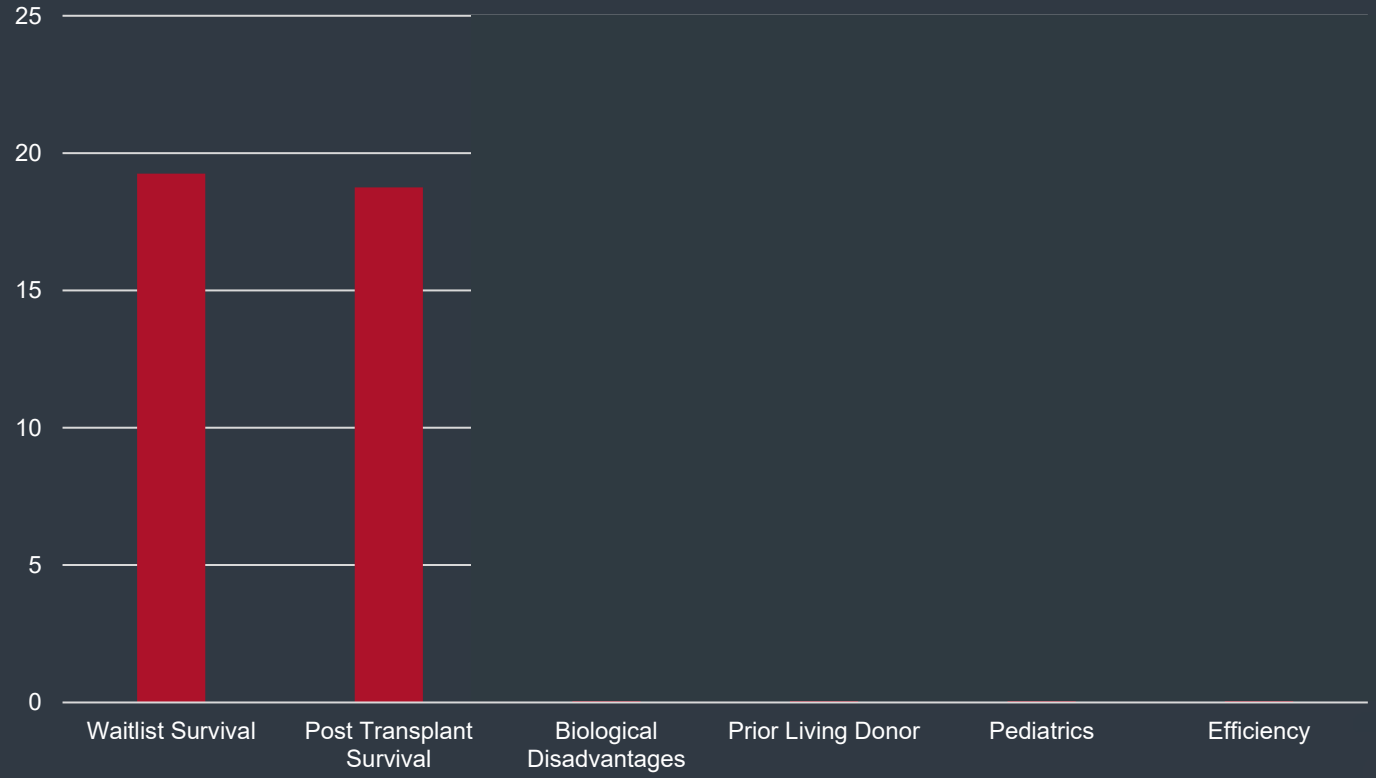

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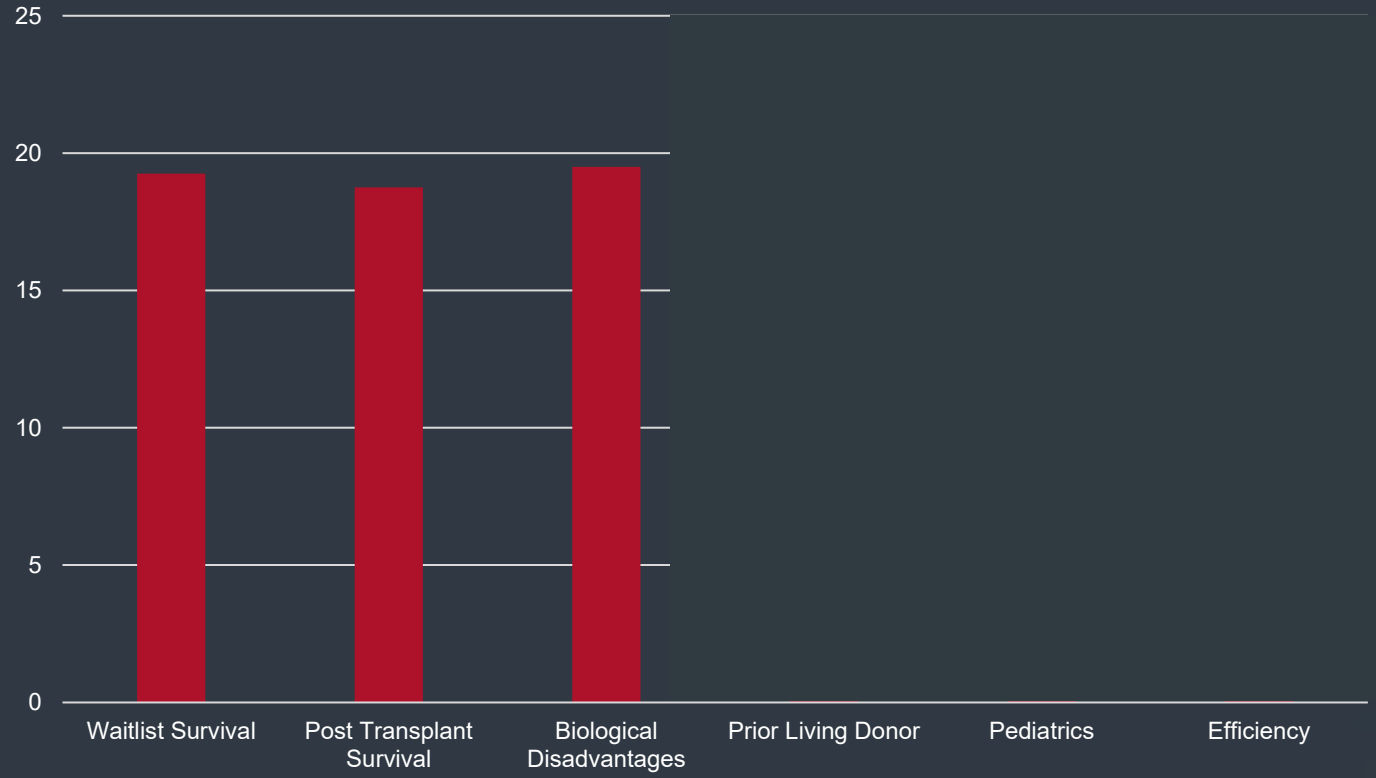

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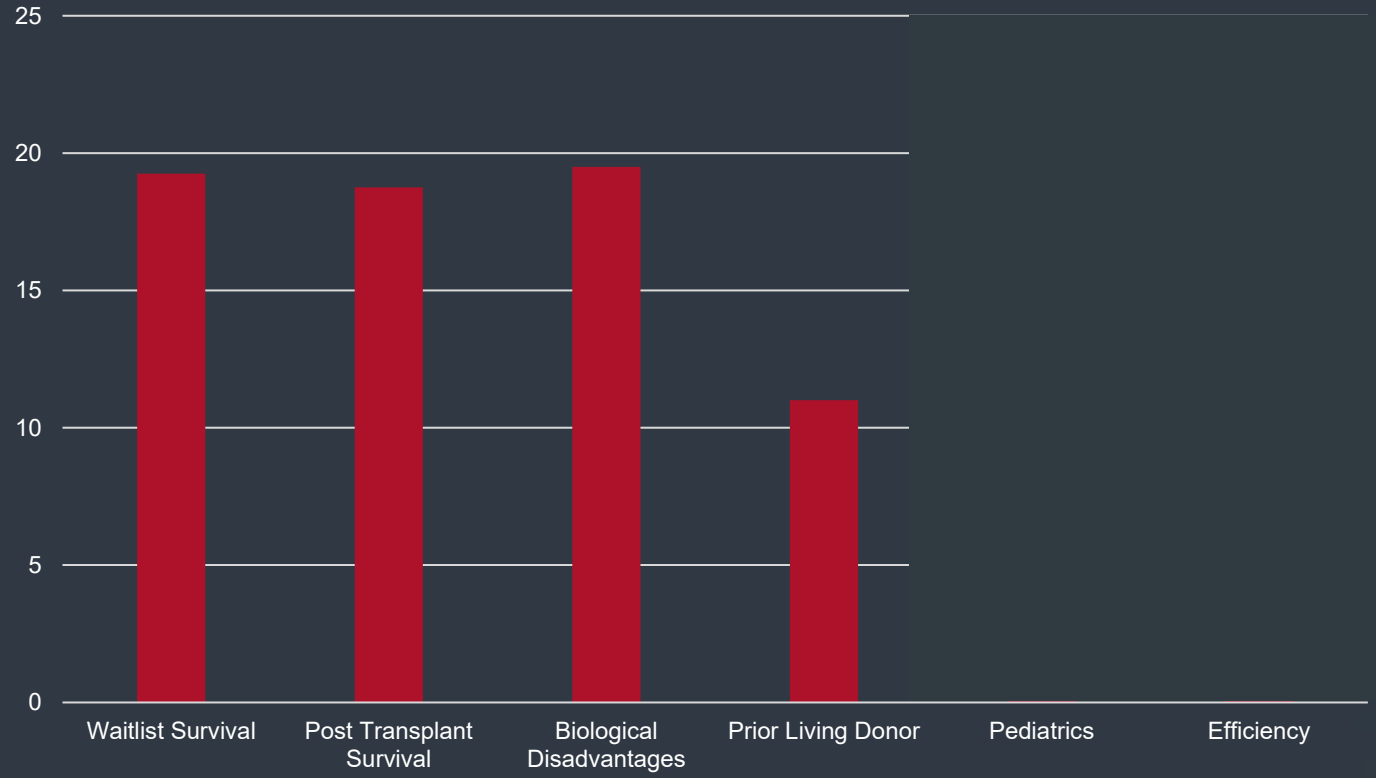

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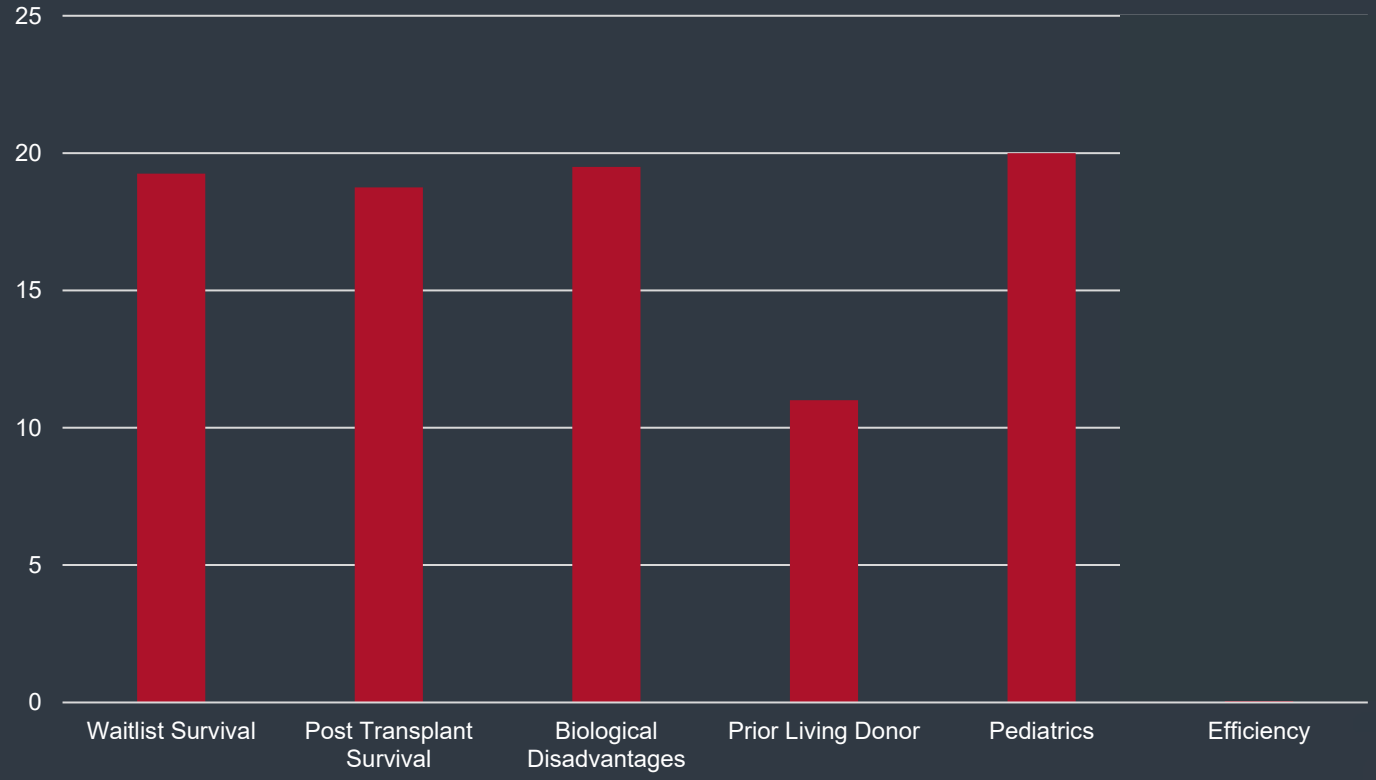

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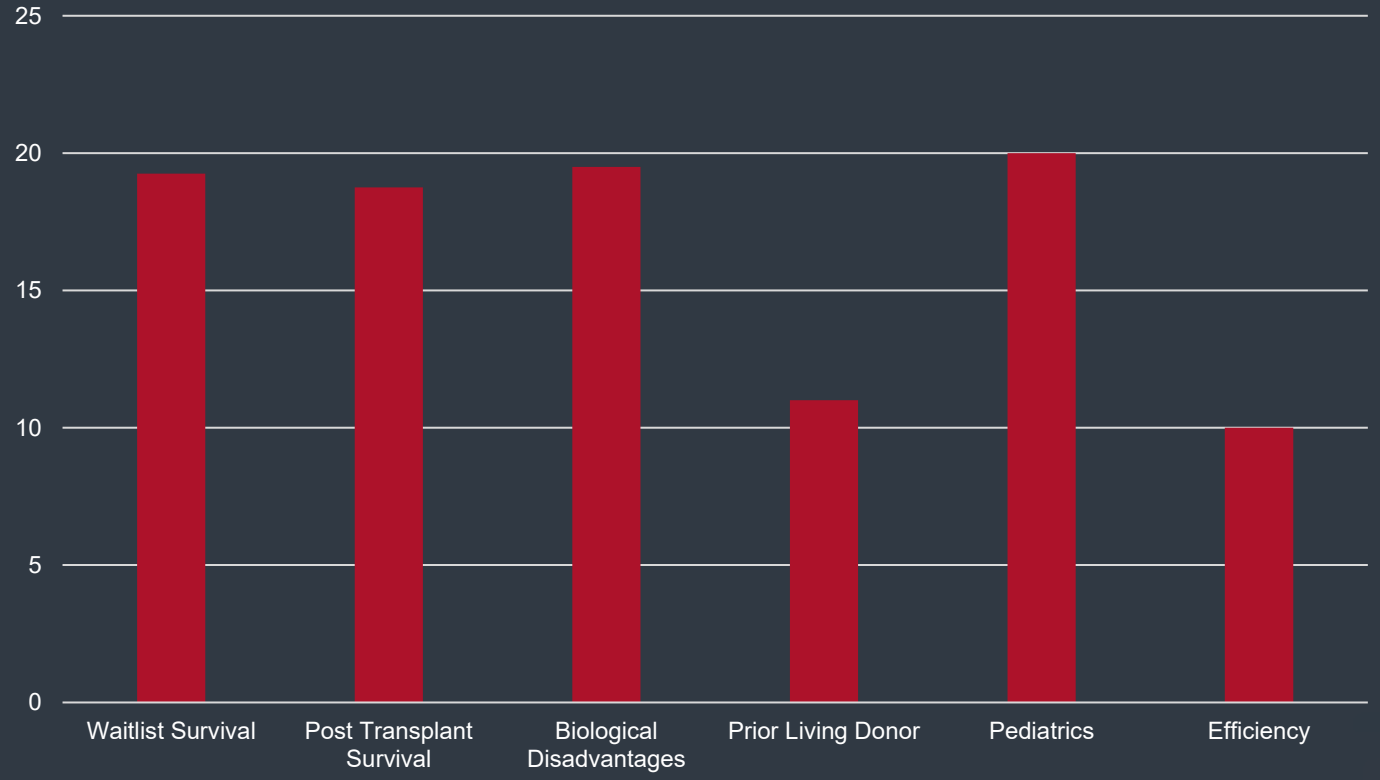

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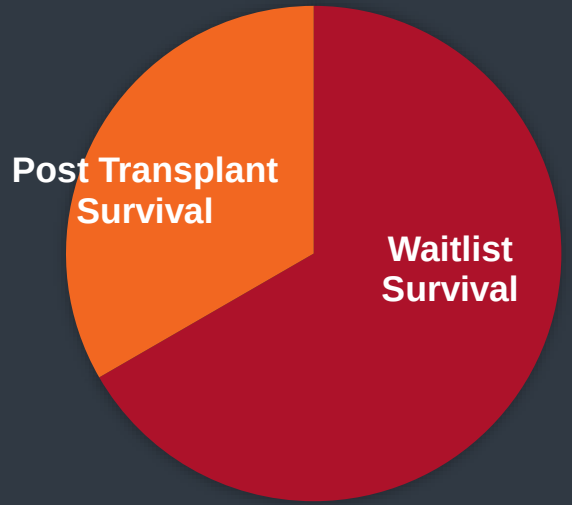
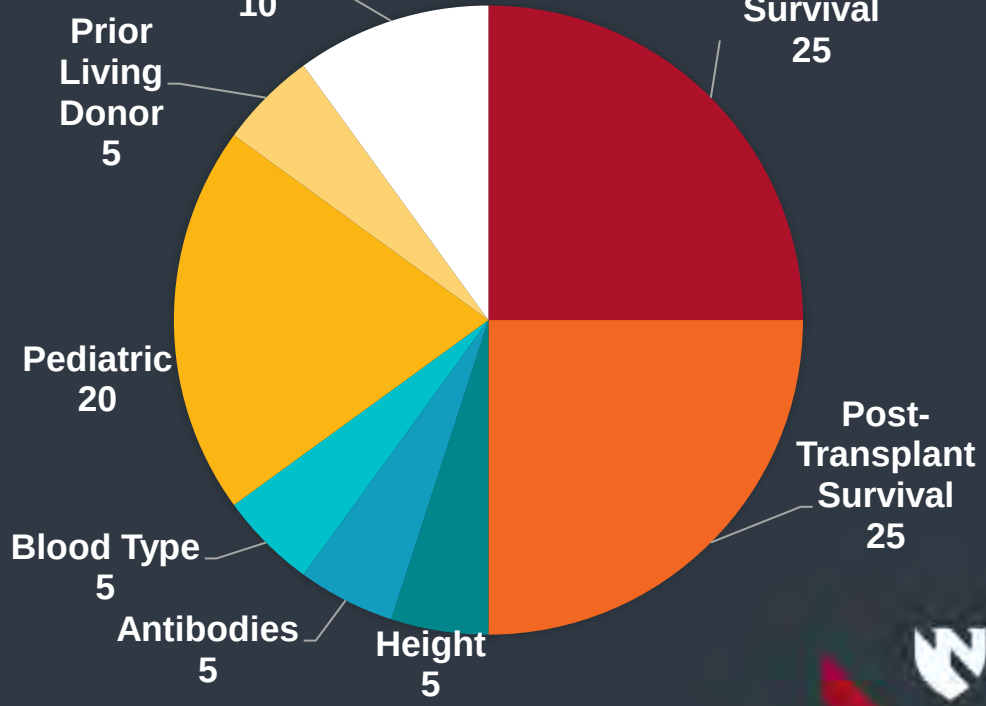
Comparison of Two Allocation Scores

LAS

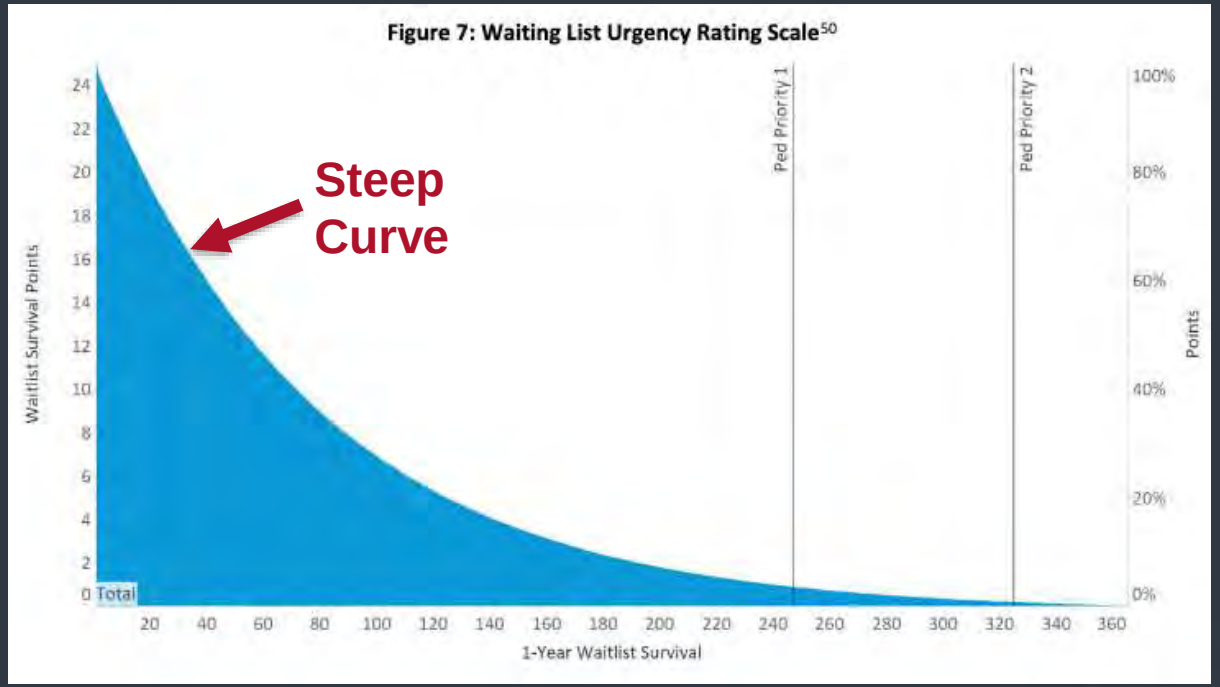


CAS



Waitlist Survival

- Age
- Bilirubin
- BMI
- Assisted Ventilation
- Creatinine
- Diagnosis group
- Functional status
- Oxygen need at rest
- pCO2
- pCO2 increase of at least 15%
- PA systolic pressure
- Six-minute walk distance



*Candidates at least 12 years old

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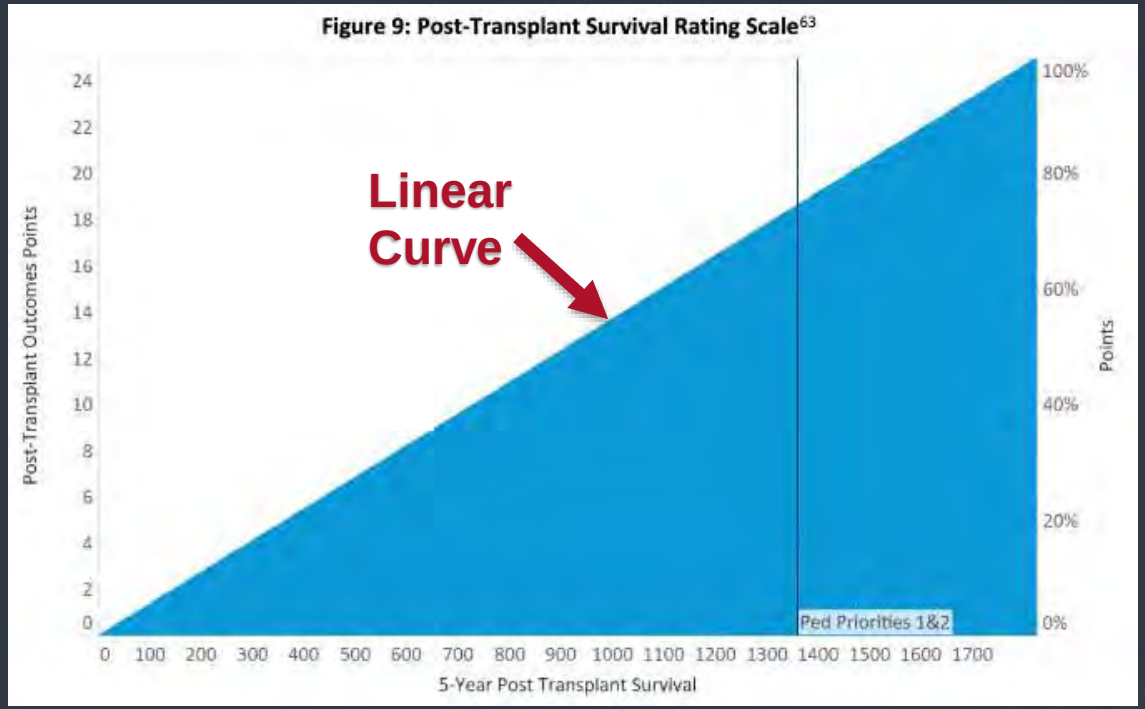
Post Transplant Survival

- Age
- Creatinine
- Cardiac Index
- Assisted ventilation
- Diagnosis group
- Functional status
- Six-minute walk distance



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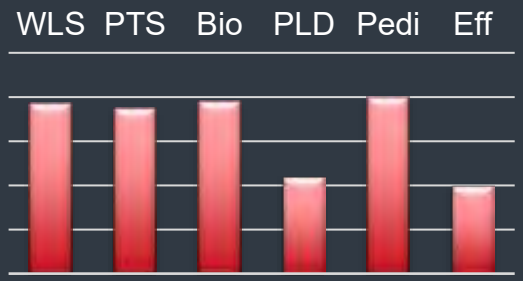
Scoring Simulations: Waitlist Urgency



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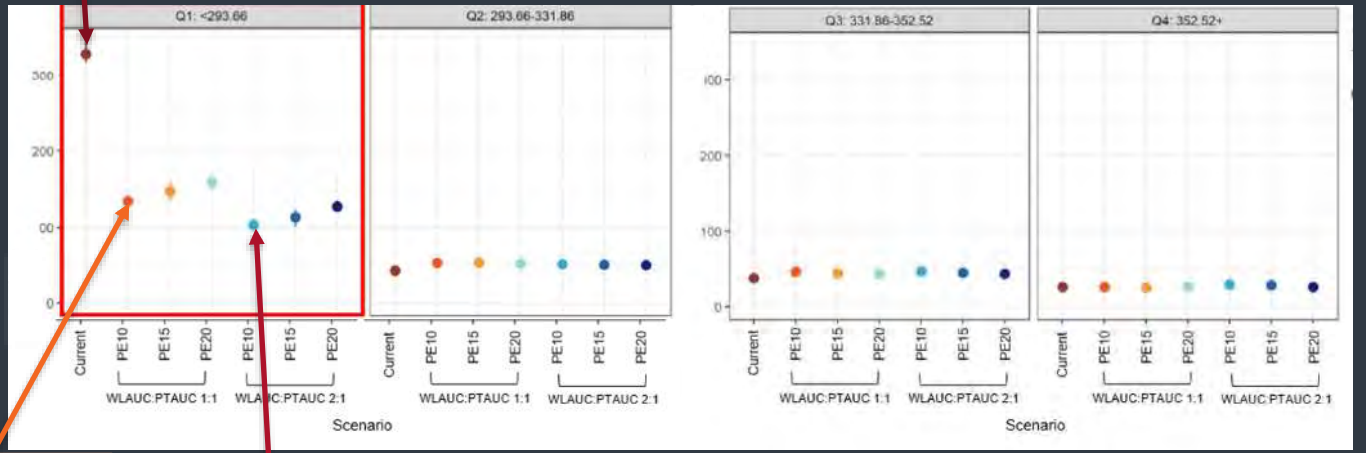
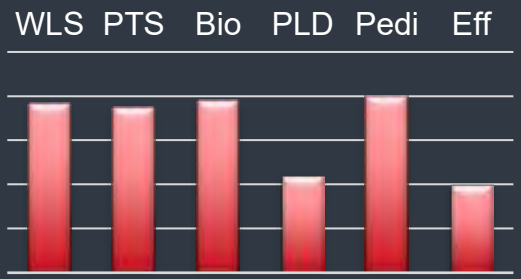


1:1 Waitlist survival: Post-transplant survival

2:1 Waitlist survival: Post-transplant survival

Valapour, M. et.al. AJT. 2022

Scoring simulations: Post-transplant Survival



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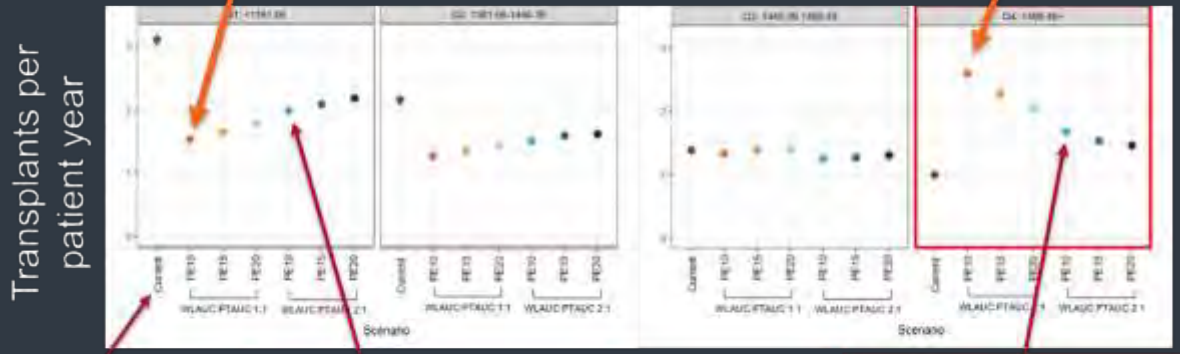

LAS

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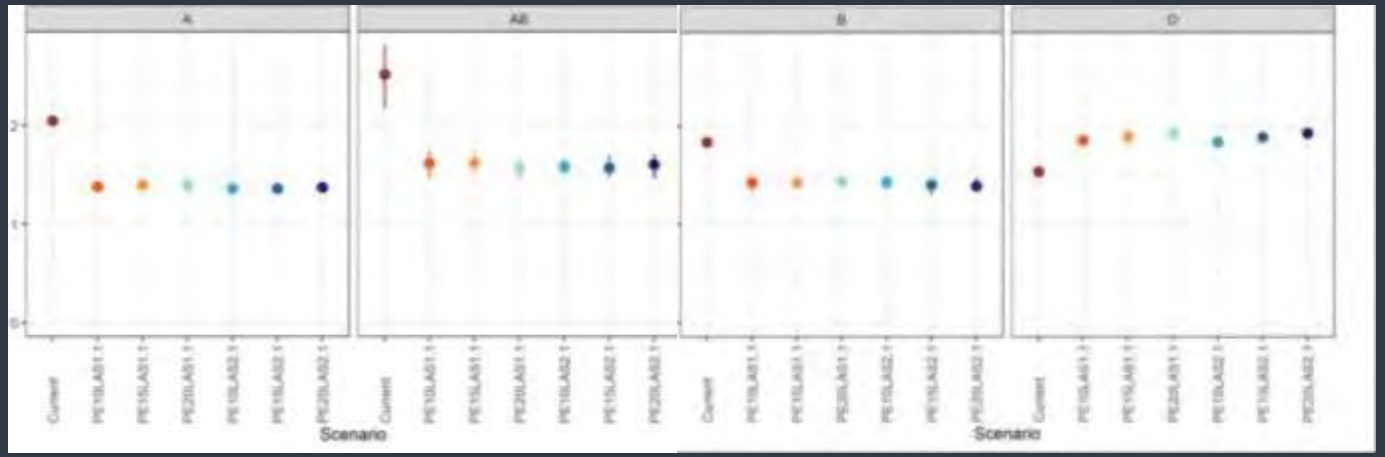
Valapour,M. et.al. *AJT.* 2022

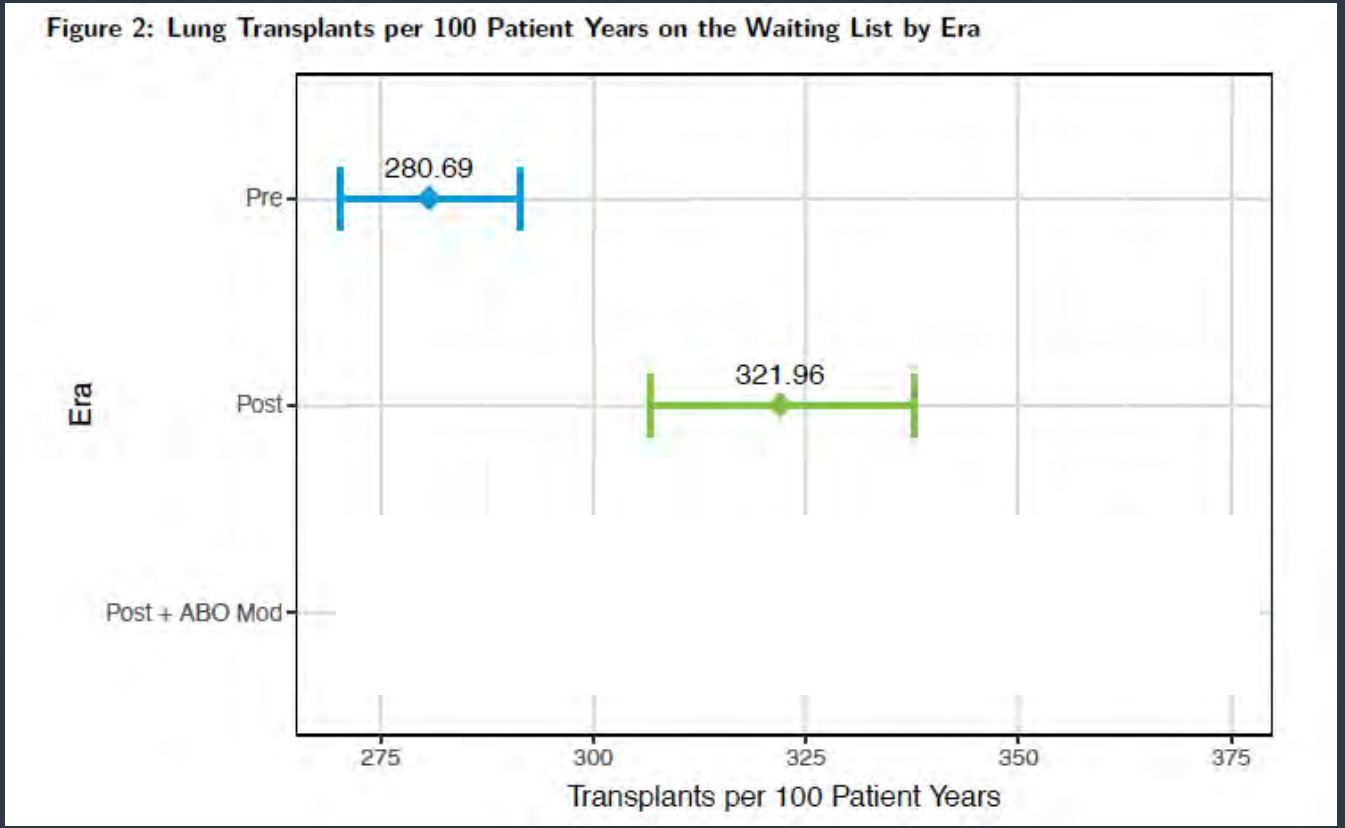
Aspirational transplant equity

Transplants per patient year



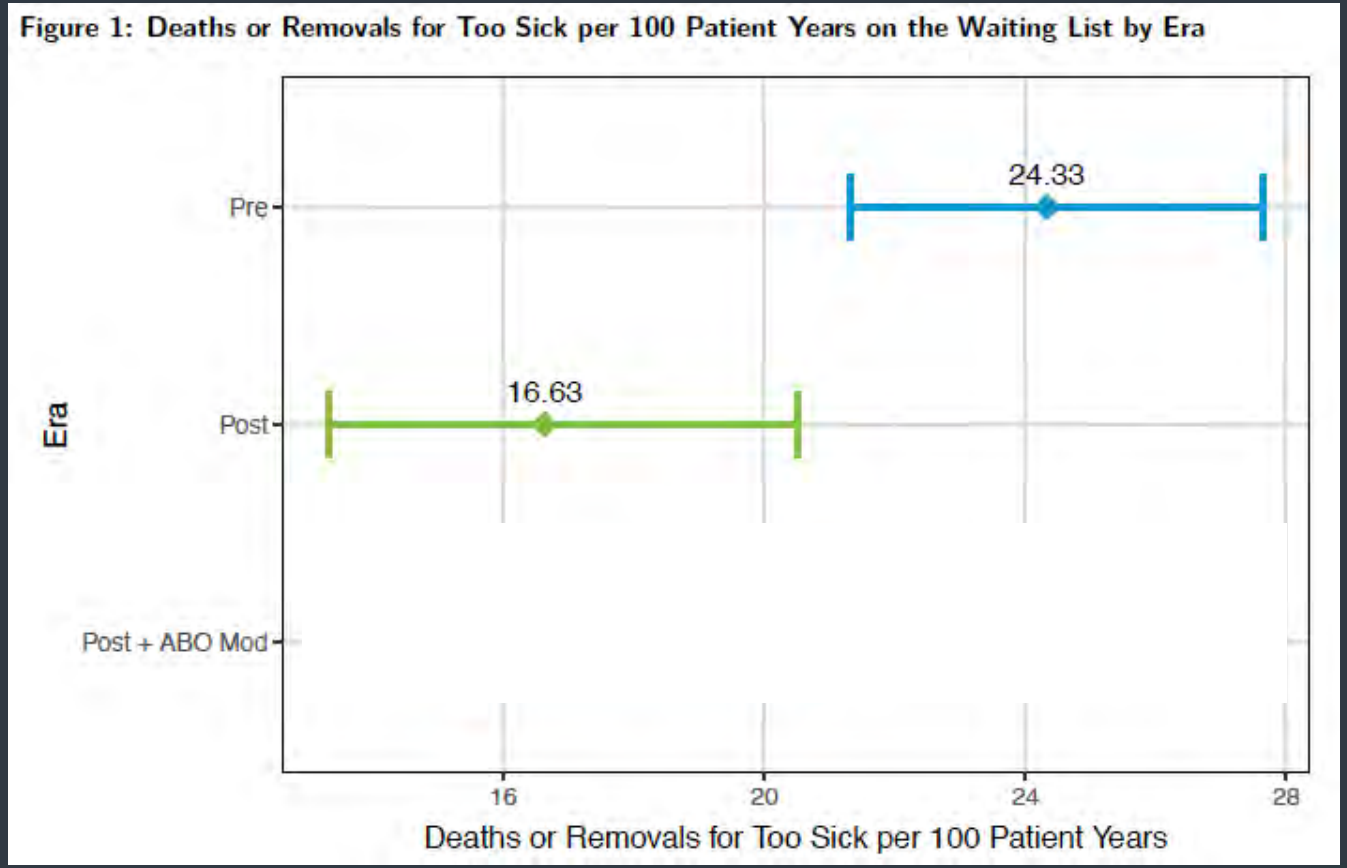
Swanner, K. Public Comment Proposal: Modify Lung Allocation by Blood Type. 2023.

Increased transplant rate



Weiss and Hawkins. Lung Continuous Distribution 18-month Monitoring Report. 2024.

Reduced waitlist mortality



Weiss and Hawkins. Lung Continuous Distribution 18-month Monitoring Report. 2024.

Faster transplants for sickest patients

- Medical urgency curve demonstrates right-skewed distribution
- Candidates with medical urgency scores above the 95th percentile have median wait time less than a week.

Figure 5: Median Time to Transplant (Days) by Medical Urgency Points at Listing in the Post Policy Era

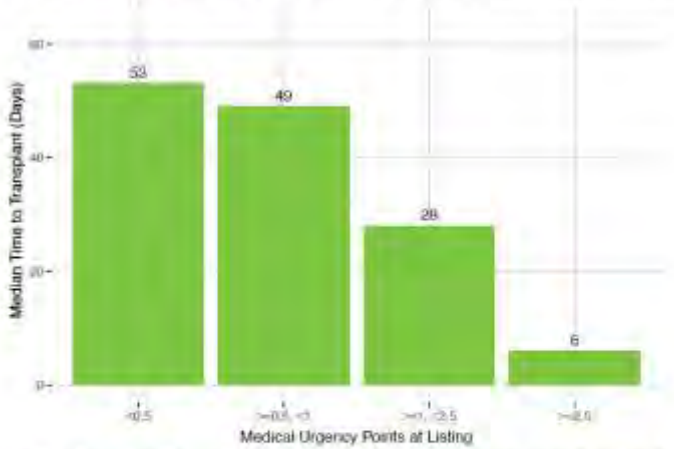


Table 5: Median Time to Transplant (Days) by Medical Urgency Points at Listing in the Post Policy Era

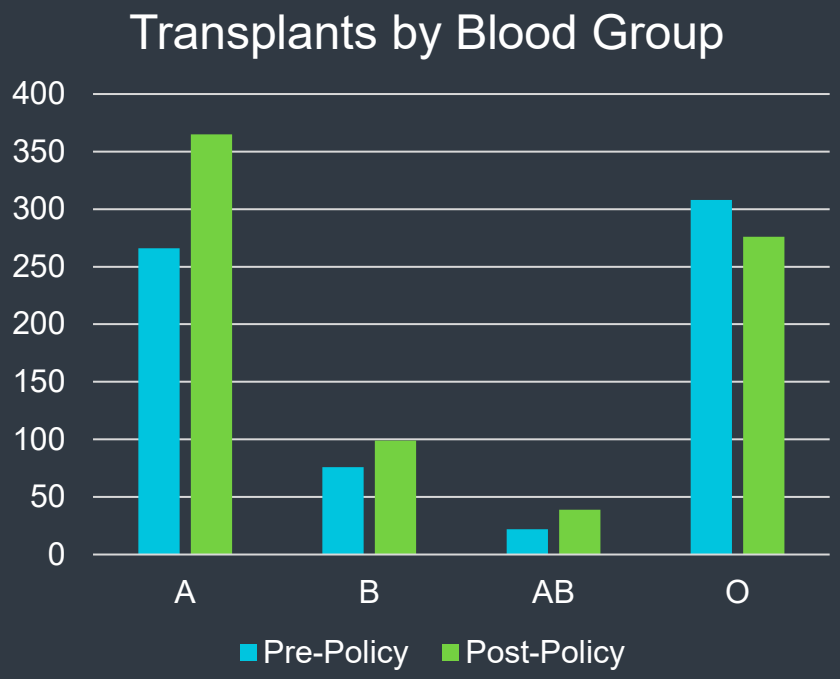
Medical Urgency Points at Listing	N Registrations	Median Time to Transplant (Days)
<0.5	1731	53
>=0.5, <1	835	49
>=1, <2.5	374	28
>=2.5	570	6

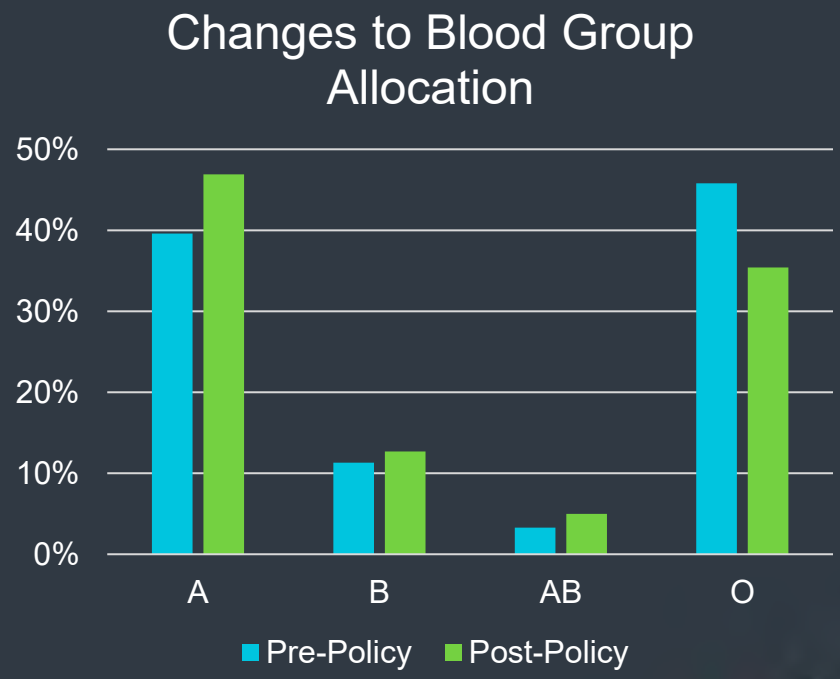
Summary of Medical Urgency Goal Points and Percentage of Goal

Medical Urgency	Number Waiting	25th percentile	Median	75th percentile	90th percentile	95th percentile	99th percentile
Number of Points	972	0.1275	0.3275	0.8950	1.4750	2.5700	18.9475
Percentage of Goal	972	0.5100%	1.3100%	2.7800%	5.9000%	10.2800%	75.7900%

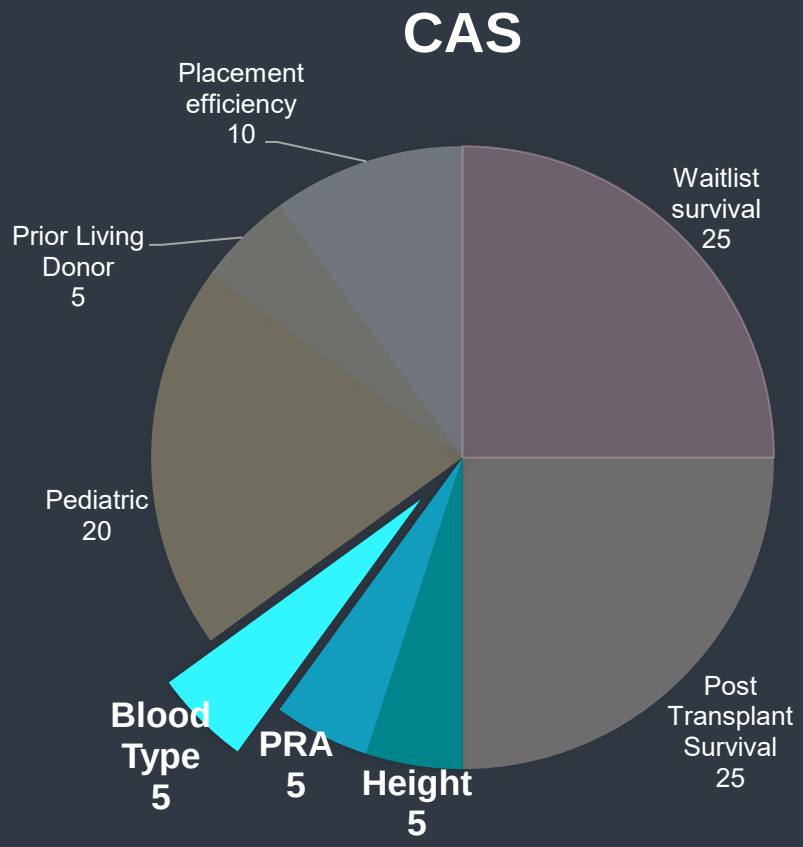
Weiss and Hawkins. Lung Continuous Distribution 18-month Monitoring Report. 2024.

The biological disadvantages miss

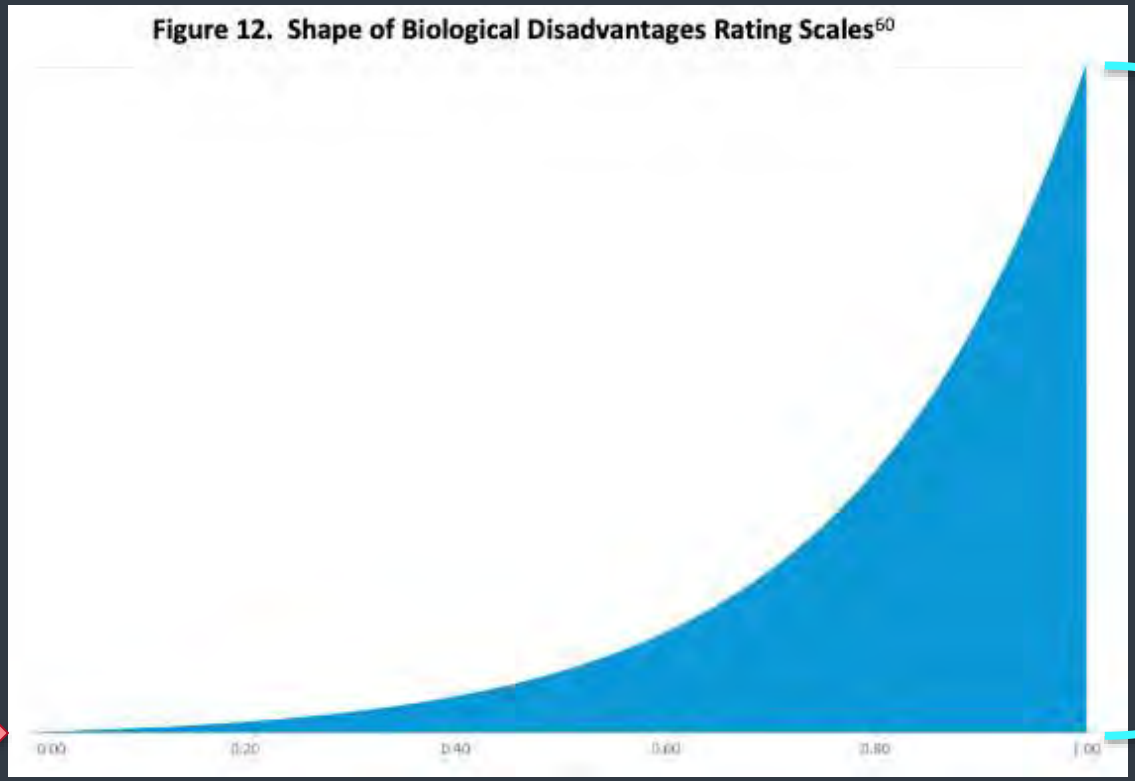




Composite Allocation Score



Why the miss? One Scale



Percentage of population incompatible

Percentage of GOAL

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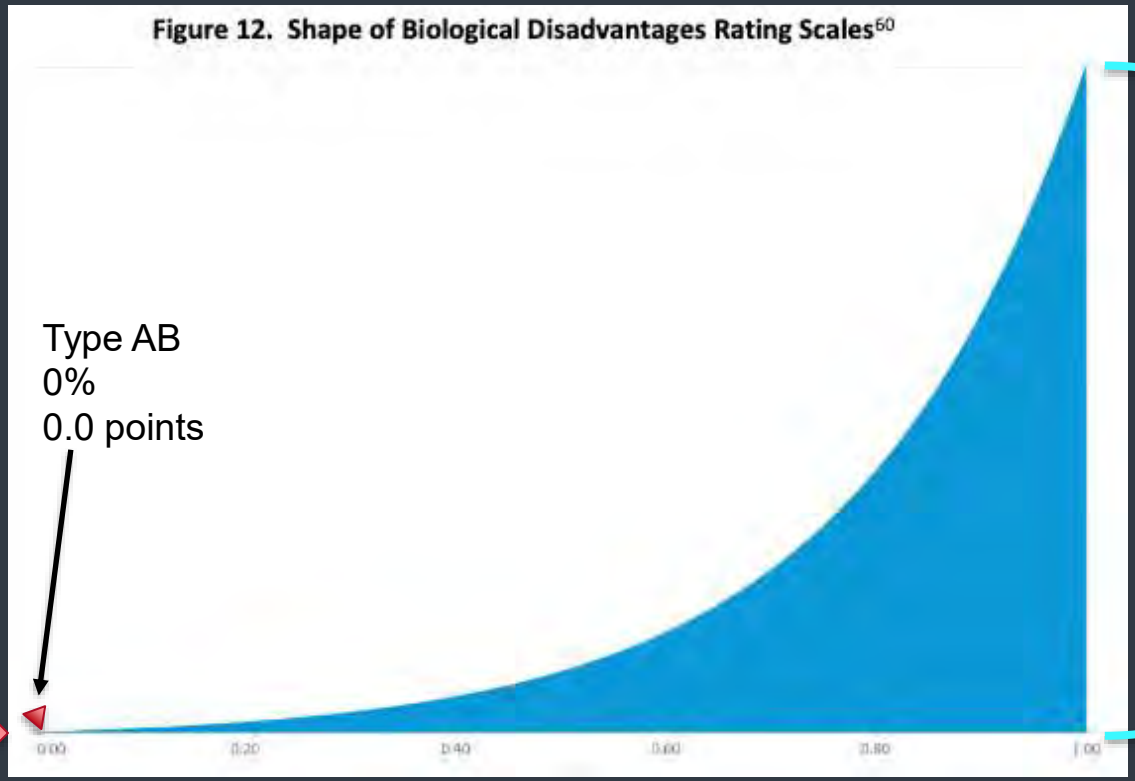

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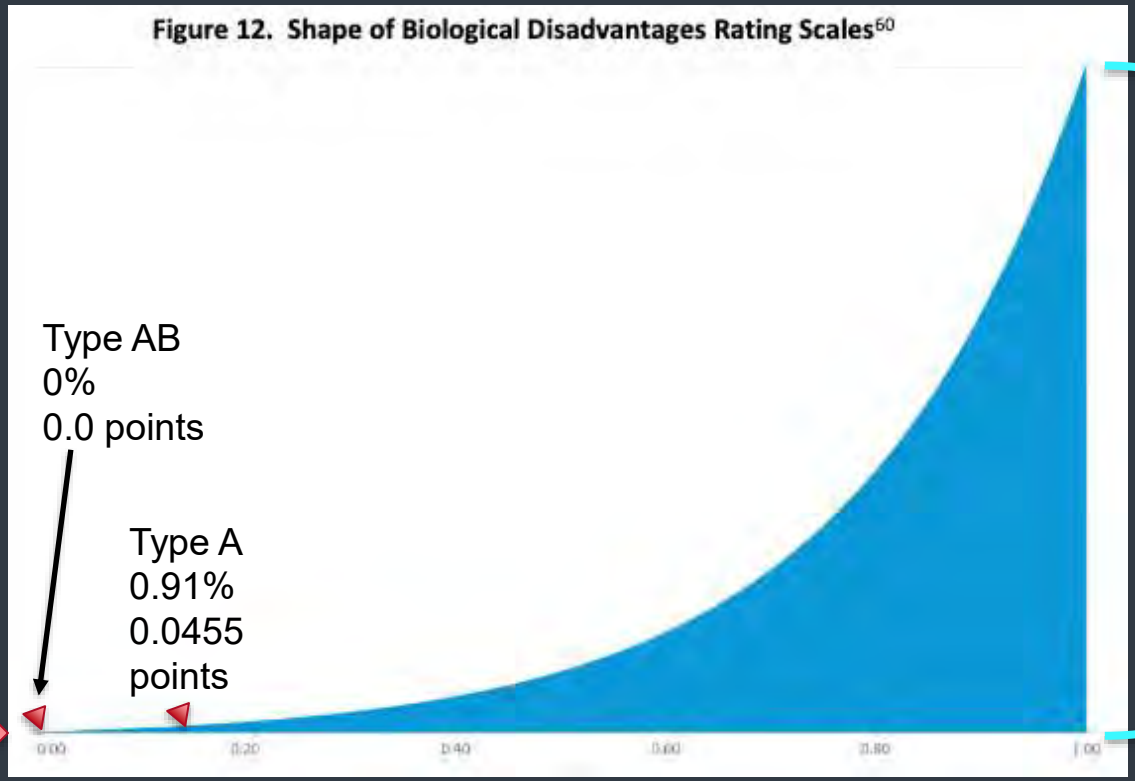

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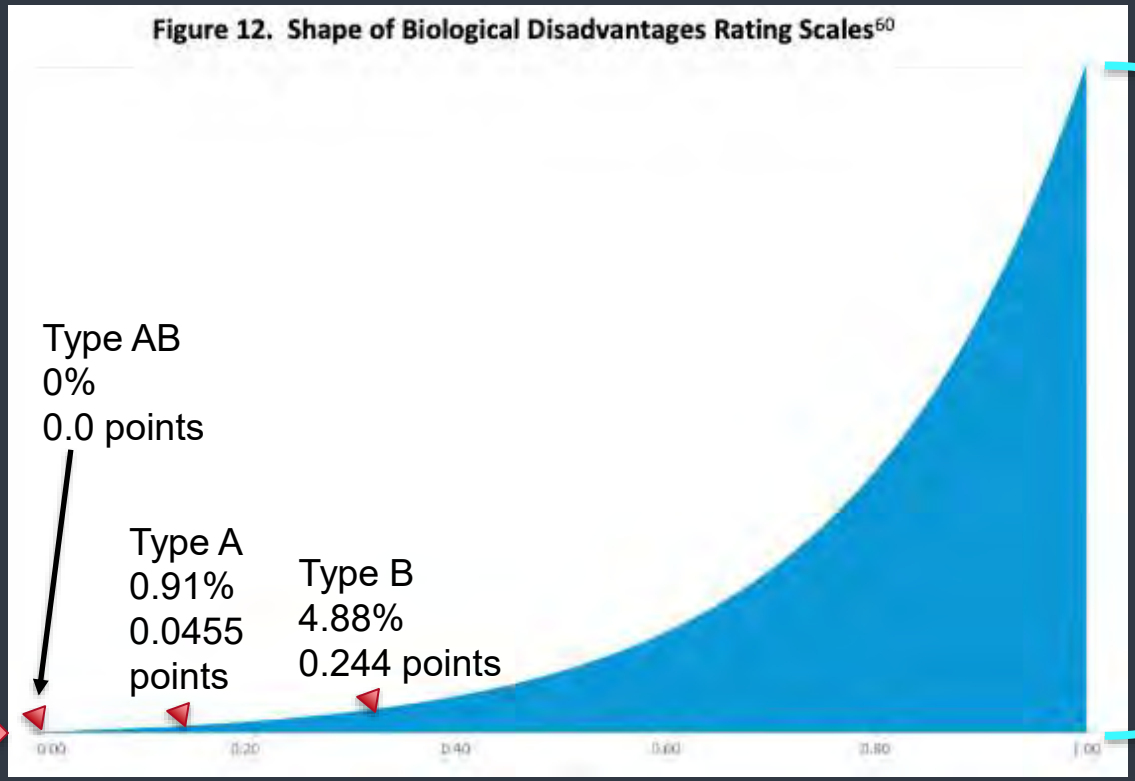

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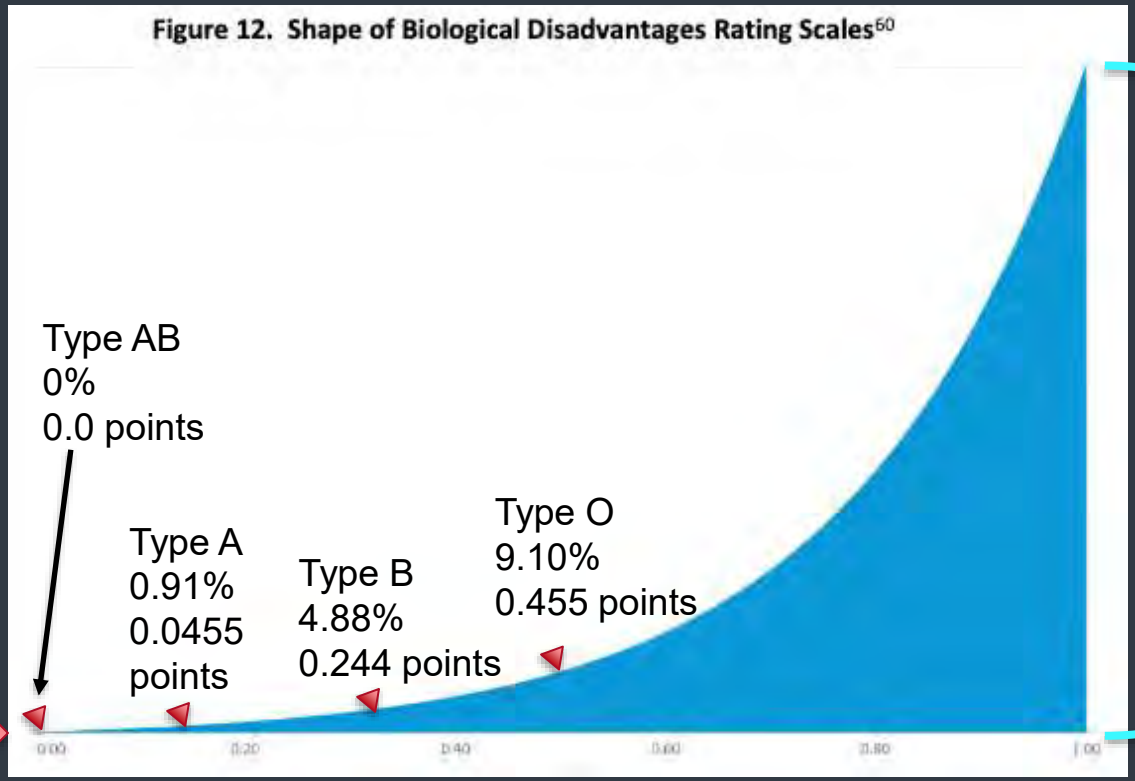

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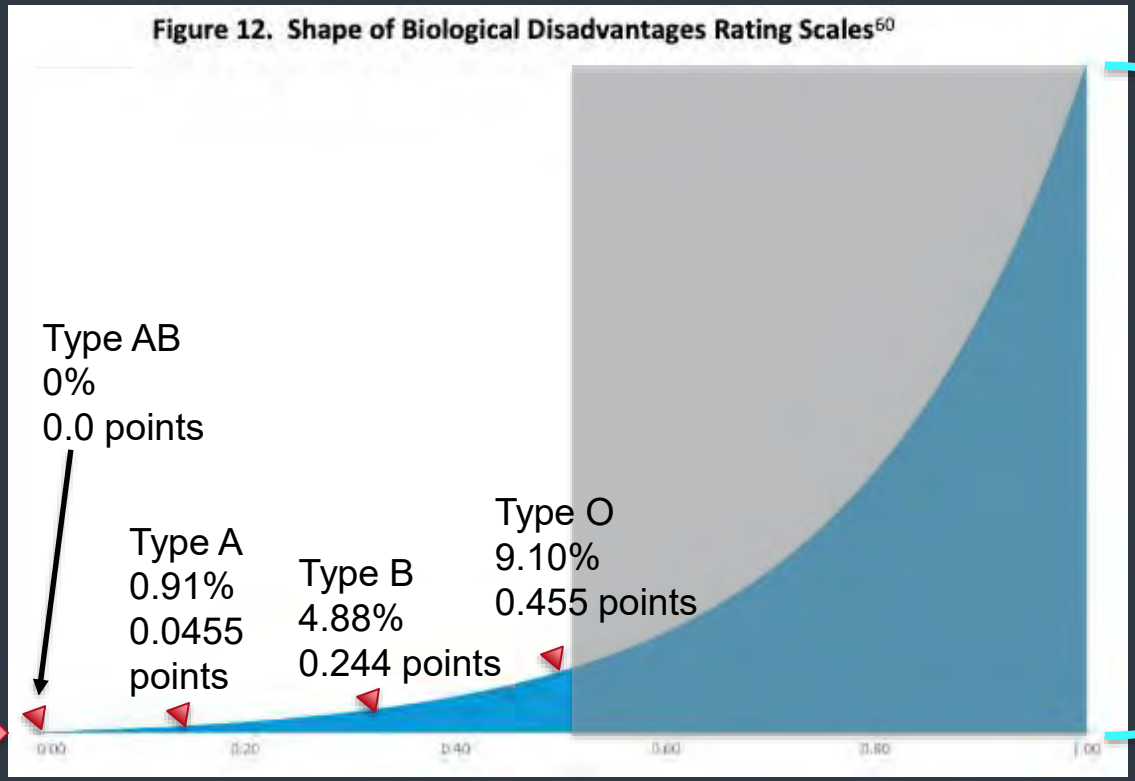

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Percentage of GOAL

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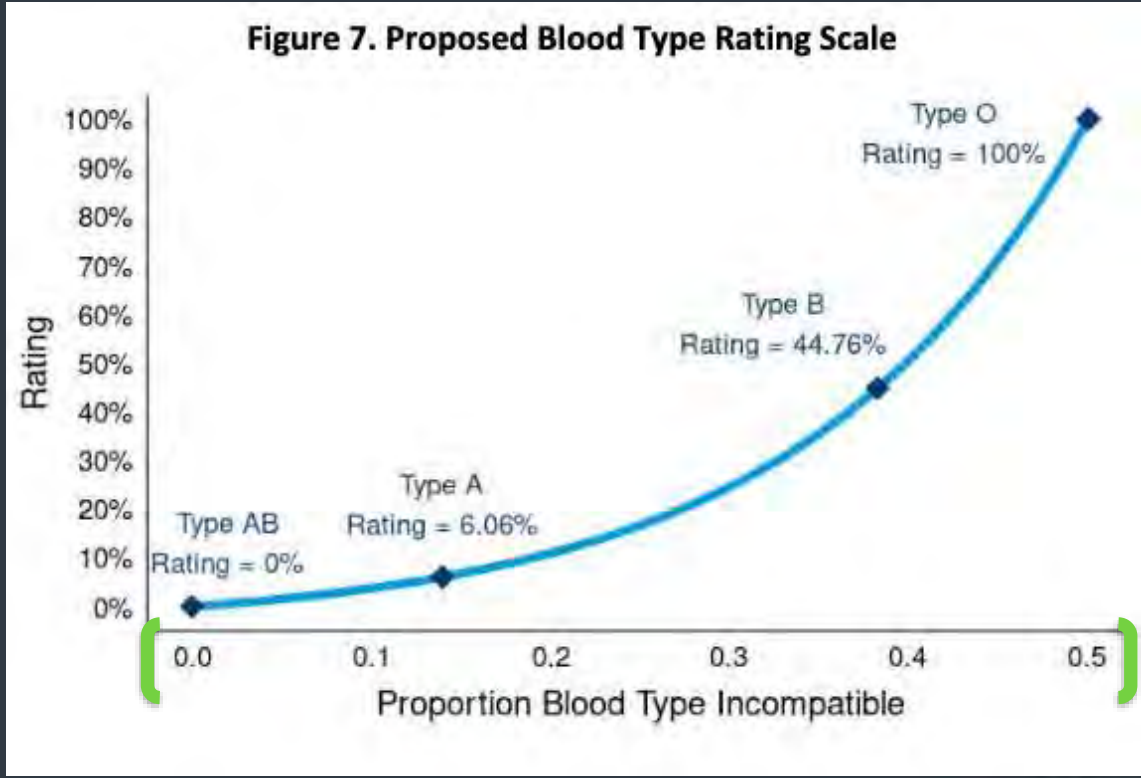
Why the Urgency?

- Type O medical urgency points = 1.2325 vs type B 0.6200
- Type O wait time increased
- Post-policy 21% increase in O donor allocation to non-O recipients



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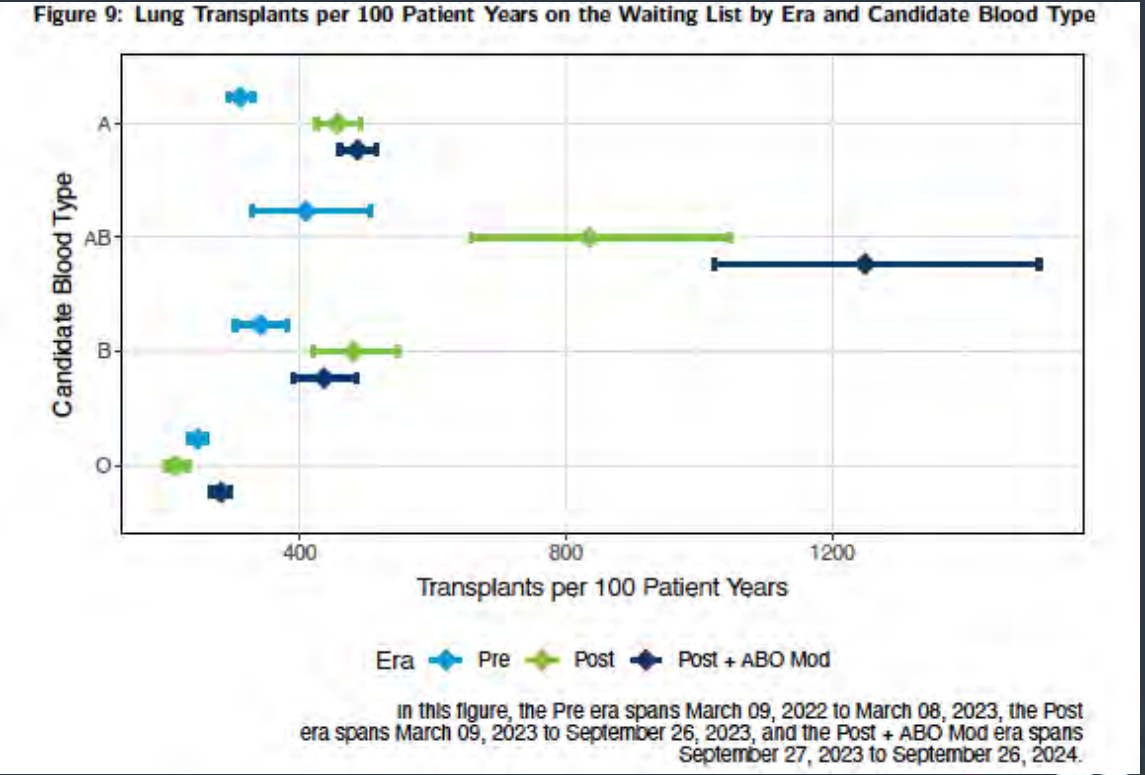
Persistent discrepancies

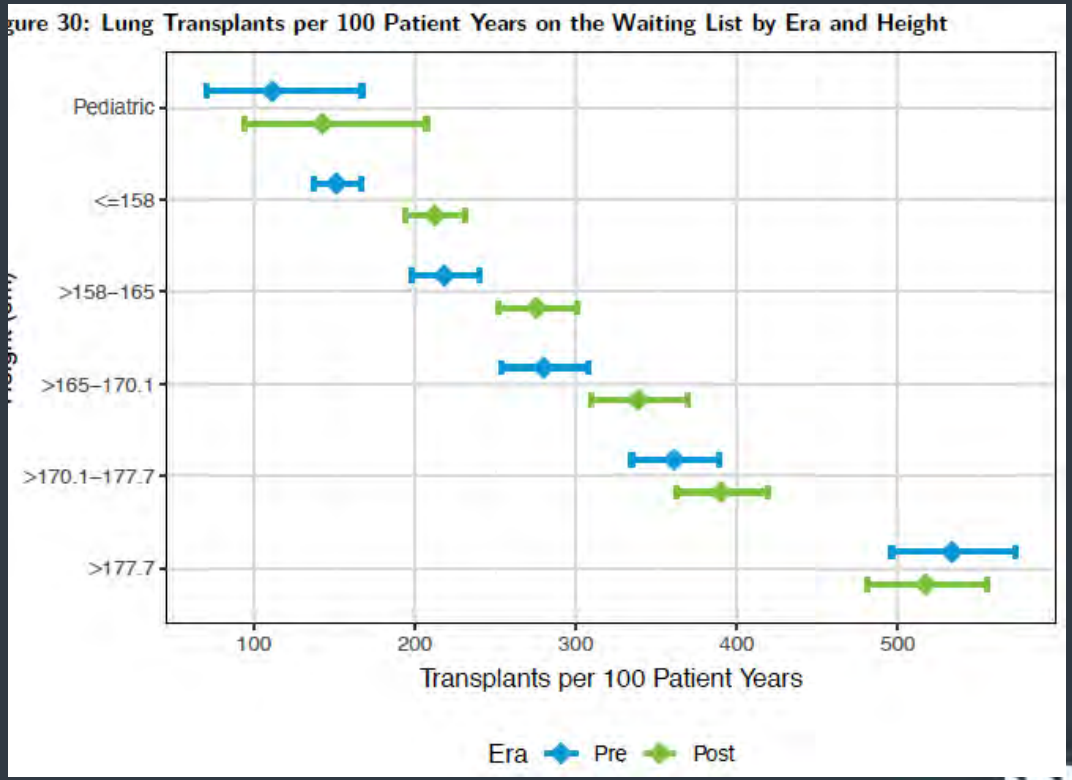
- What is the maximum transplant rate for blood group O candidates?



Weiss and Hawkins. Lung Continuous Distribution 18-month Monitoring Report. 2024.

Height disparities for the short

- Who is in our donor pool?



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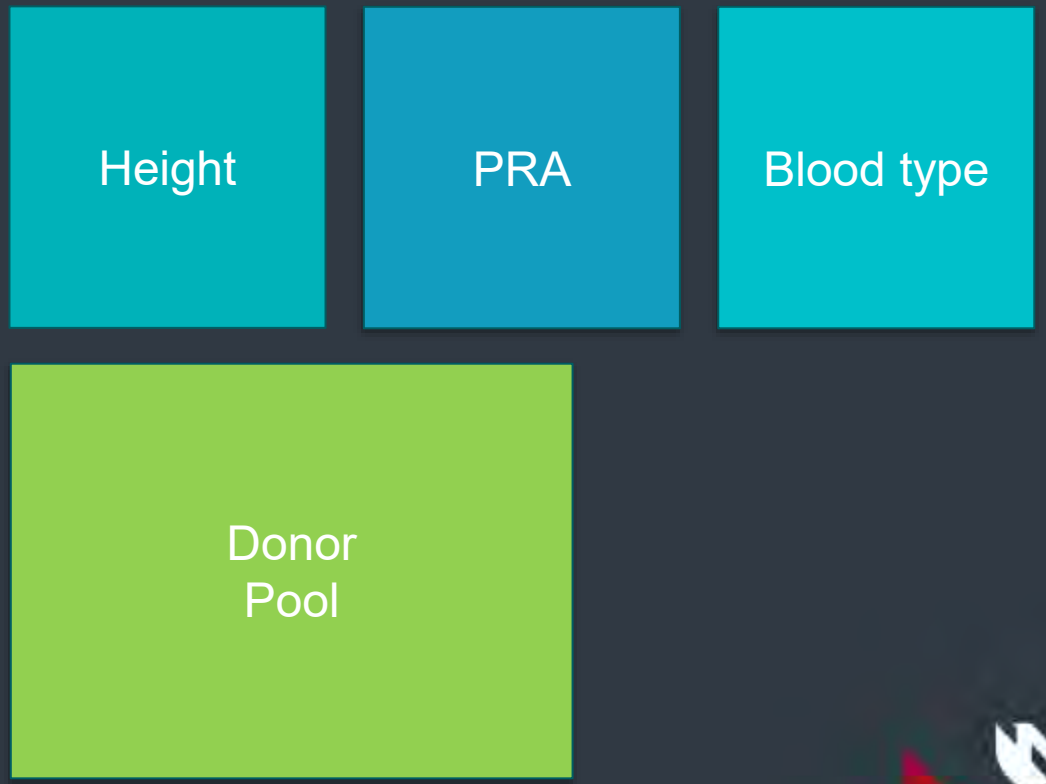
Biological Disadvantages

- Single Donor Pool



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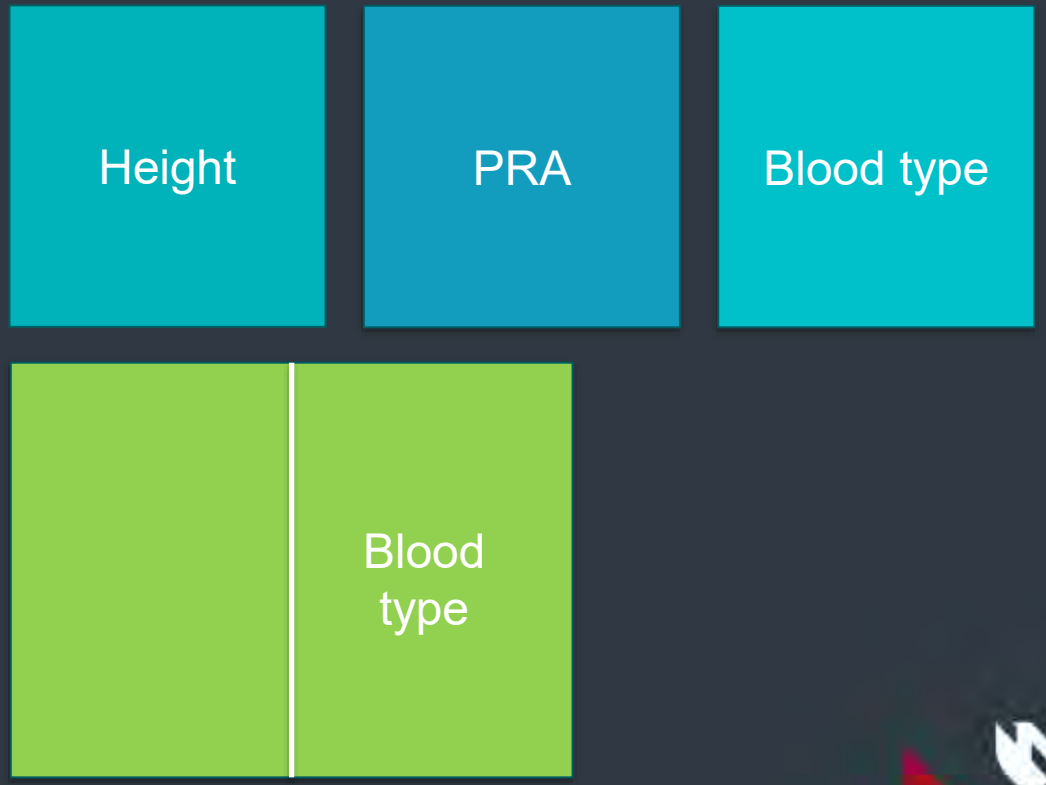

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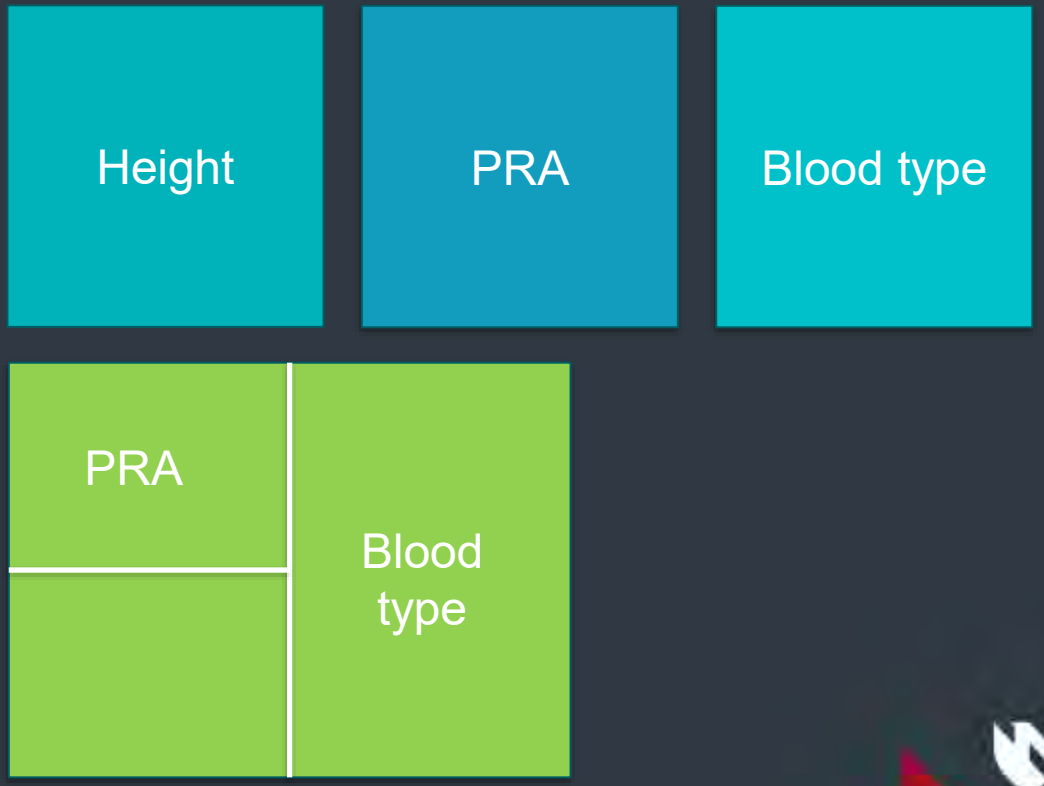

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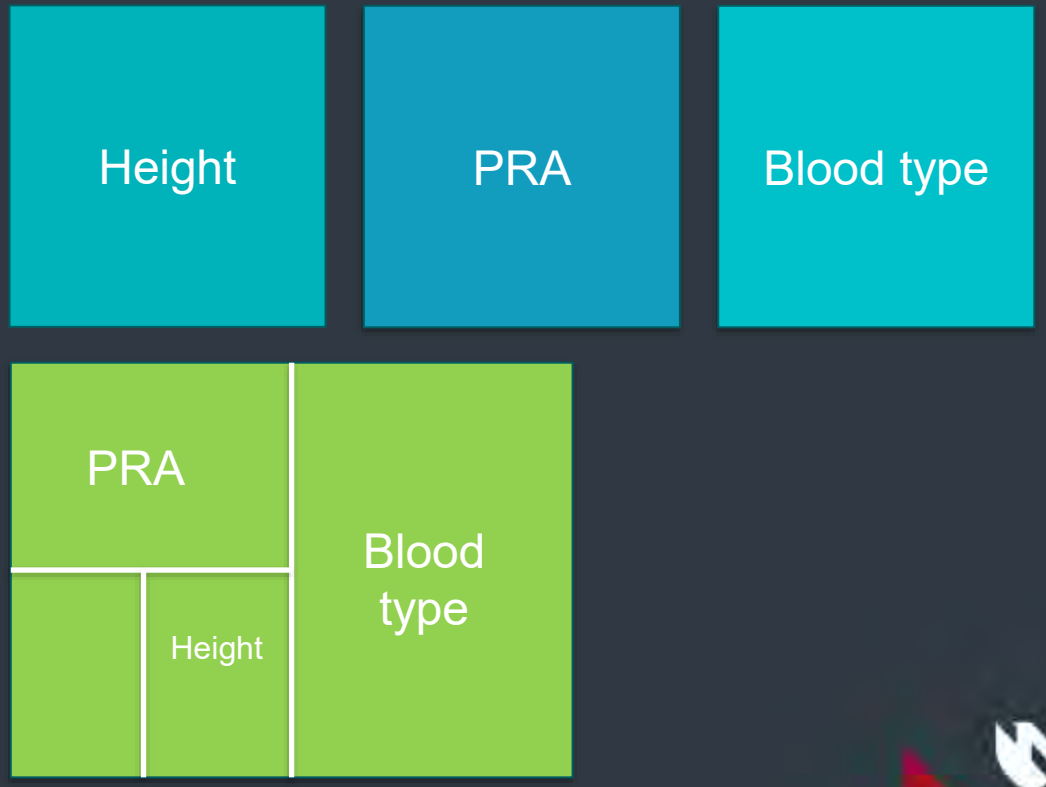
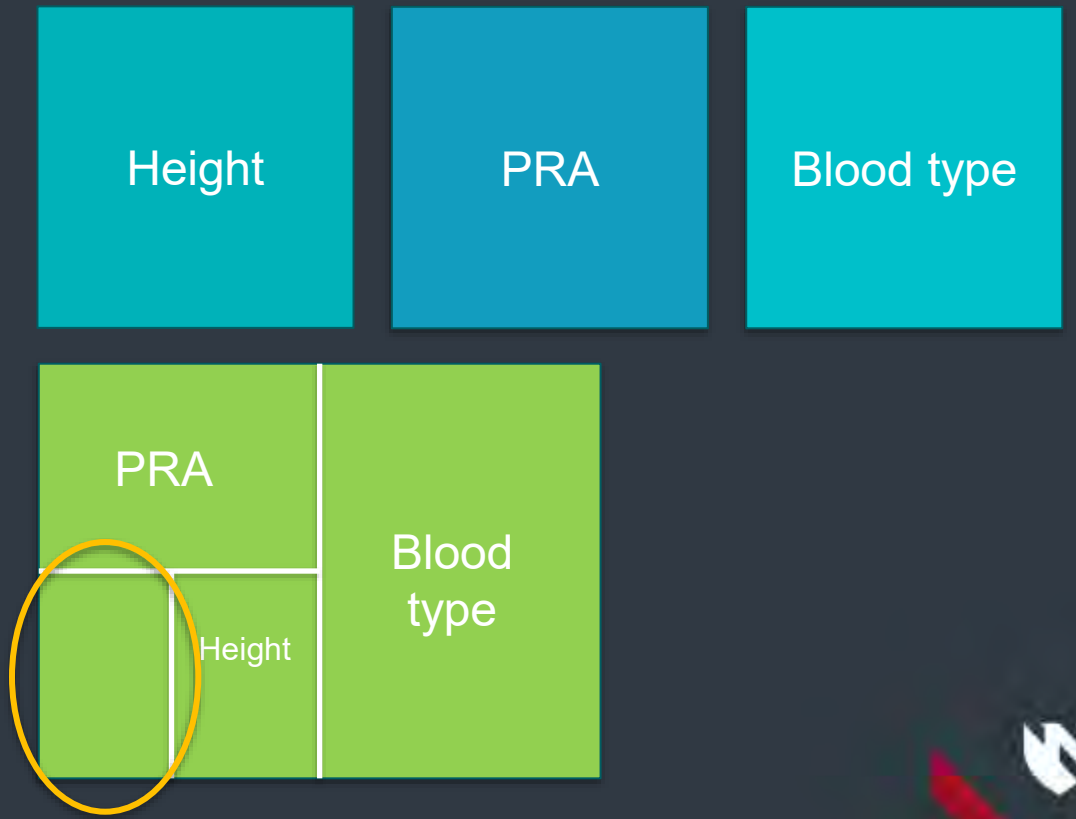


Future directions

- Better define the donor pool to determine the appropriate distribution of biological disadvantages points



Conclusion

- Continuous distribution has improved waitlist mortality and transplant rates for lung transplant candidates in the US
- Disparities for the biologically disadvantaged persist and more knowledge is needed to optimize the allocation system to eliminate disparities
- Additional downstream effects, like increases in out-of-sequence allocation, require in-depth exploration to understand the complex drivers behind OPO and transplant program behaviors while still meeting the needs of both recipients and donor families

Acknowledgements

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