The Potential Use of Artificial Intelligence in Heart Transplantation Decision-Making and Allocation: A Nationwide Survey of Transplant Directors

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BACKGROUND

- The 2018 adult heart transplantation (HT) allocation policy has mixed opinions on whether changes have improved outcomes.
- This study aims to assess factors influencing decision making in donor allocation, limitations to current practice, and the use of artificial intelligence (AI) in HT.

METHOD

- United States transplant centers performing ≥ 10 HT per year were identified using the Scientific Registry of Transplant Recipients database.
- A 15-item survey was administered to surgical and medical HT directors at these institutions.
- Likert scales ranged from 1 to 5 (least/worst to most/best).
- There were 60 (34.3%) surveys completed of 175 invitations.

RESULTS

- Quality of the current data interface for donors was rated as 3.20 ± 0.89.
- A minority use predictive analytic tools in donor evaluation (33.3%; n=20), and of those that use it, only half (n=10) use it on all patients.
- Responders rated potential impact of future, real-time predictive analytic tools as moderate-high (3.75 ± 1.13).
- Important features to be included in such tools were predicted post-transplant survival, risk of primary graft dysfunction, PHM calculation, and waitlist survival.
- Quality and effectiveness of the current policy is rated as low-moderate (2.80 ± 0.93).
- Shortcomings of the current system included disadvantaging durable left ventricular assist device patients, gaming the system for temporary devices, and high number of exceptions.
- Experts rated trust in an AI-guided heart allocation system as 3.31 ± 1.14.

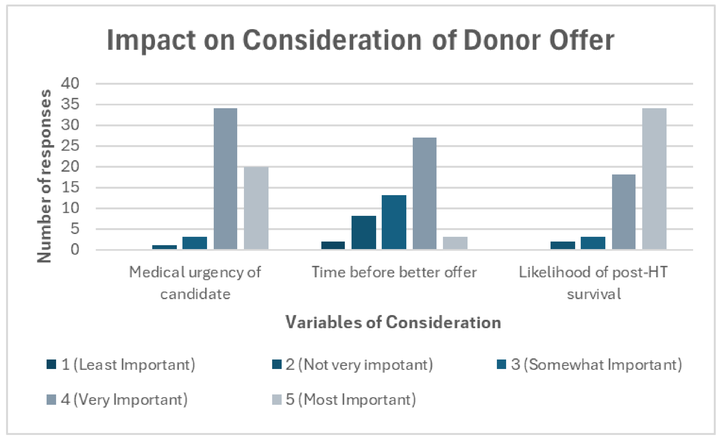

Figure 1. Level of impact on consideration of heart transplant donor offer

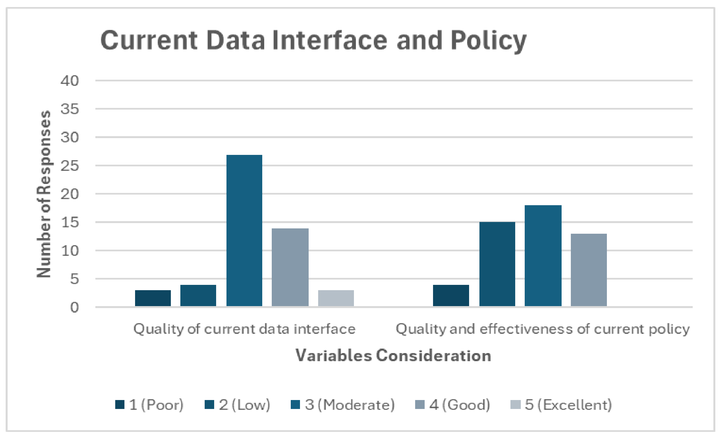

Figure 3: Rating of the quality of current donor evaluation interface and current allocation policy

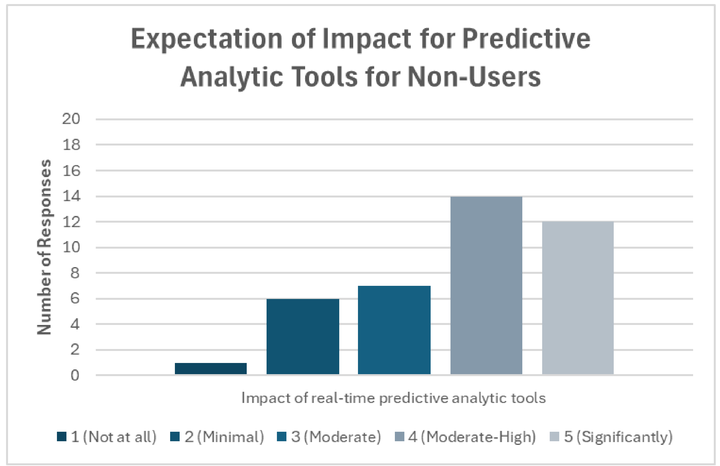

Figure 2. Rating of the expectation of impact of real-time predictive analytic tools for directors who currently do not use any predictive tools

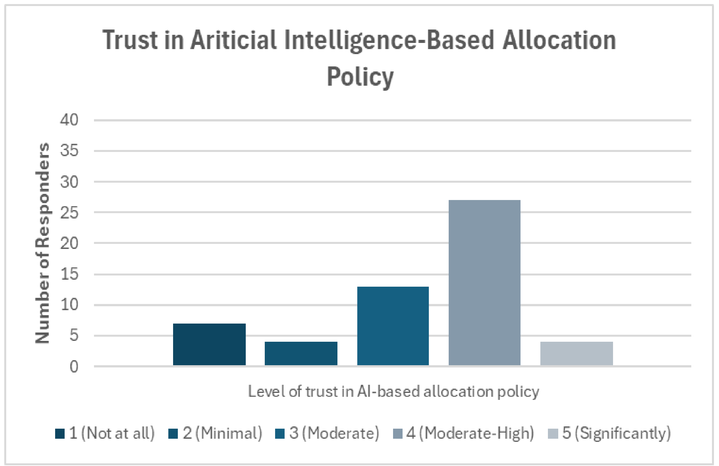

Figure 4: Level of trust in use of potential future artificial intelligence-based organ allocation policy

DISCUSSION

- Based on the results of this survey, experts rate the current allocation policy with low-moderate favorability.
- The acceptance behind the concept of an AI-based allocation is rated higher than the current allocation policy (3.31 ± 1.13 vs 2.8 ± 0.93)
- The limitations of this study include the small cohort and the broad nature of responses, and the low survey response rate of 34.4%.

CONCLUSION

- These findings underscore critiques of current HT allocation policy, unveiling a desire for improvements in data-driven tools and potentially support for an AI-guided allocation system.

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