

Improving broader sharing to address geographic inequity in liver transplantation

April 21 2023



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In the United States, an average of three people die every day waiting for a liver transplant, which resulted in nearly 1,200 lives lost in 2021. Liver allocation policy has undergone major modifications in the last 10 years.

In a new study, researchers examined these policies, finding that despite the changes, geographic inequity persists. The authors recommend a more efficient and equitable way to allocate livers.

The study, by researchers at Carnegie Mellon University (CMU) and the University of Maryland (UMD), has been published in *Manufacturing & Service Operations Management*.

"We suggest policymakers move away from the 'one-size-fits-all' approach of current policy and focus on matching supply and demand to develop organ allocation policies that score well in terms of efficiency and geographic equity," says Shubham Akshat, Assistant Professor of Operations Management at CMU's Tepper School of Business, who led the study.

The U.S. government created the Organ Procurement and Transplantation Network (OPTN) in 1984 to coordinate a nationwide transplant system and optimize the use of limited donor organs for transplants. Since 1986, the United Network for Organ Sharing, a nonprofit private organization, has overseen the operations of OPTN. A key regulatory framework guiding [organ transplantation](#) is the Final Rule, which was adopted in 1998 by the U.S. Department of Health and Human Services and states that policies shall not be based on the candidate's place of residence. However, disparities in organ access have been a serious issue for more than two decades. In 2012, OPTN's board adopted a strategic plan that included reducing geographic disparities in accessing transplantation.

For the purposes of organ allocation, the United States is divided into 11 [geographic regions](#), consisting of 58 Donation Service Areas (DSAs). A DSA-based allocation policy was in place for 30 years, from 1989 to February 2020, when it was replaced by the Acuity Circles policy, which provides a one-size-fits-all variant of broader sharing.

In the transplant community, broader organ sharing is believed to mitigate geographic inequity (e.g., inter-geographical variation in the transplant rates, patient survival rates, waiting times, offers) when considering access to organs. In this study, researchers developed a model based on about 40 medical characteristics of patients and donors to analyze allocation policies that differ from current and proposed policies, and to determine whether a better alternative exists.

The model accurately predicts the change in a patient's organ-offer acceptance probability due to a change in policy. They used data from the Scientific Registry of Transplant Recipients, which includes information on all donors, wait-listed candidates as well as U.S. [transplant](#) recipients.

Based on their model's predictions, the researchers conclude that broader sharing in its current form (i.e., as part of Acuity Circles) may not be the best strategy to balance geographic equity and efficiency. Instead, they suggest that a policy that equalizes the ratio of deceased donors to waiting list patients across geographic regions would work better in achieving geographic equity at the lowest tradeoff in efficiency.

"Recent policies are moving toward broader sharing in principle, but the current Acuity Circles policy leads to even lower efficiency," explains S. Raghavan, Professor of Management Science and Operations Management at UMD, who coauthored the study. "A customized approach involving equalizing the supply-to-demand ratios across the geographic regions of the country is a better option."

"Our model can be used to provide more accurate policy evaluations to [decision makers](#)," says Liye Ma, Associate Professor of Marketing at UMD, who coauthored the study.

More information: Shubham Akshat et al, Improving Broader Sharing

to Address Geographic Inequity in Liver Transplantation, *Manufacturing & Service Operations Management* (2023). [DOI: 10.1287/msom.2023.1211](#)

Provided by Tepper School of Business, Carnegie Mellon University

Citation: Improving broader sharing to address geographic inequity in liver transplantation (2023, April 21) retrieved 26 June 2024 from <https://medicalxpress.com/news/2023-04-broader-geographic-inequity-liver-transplantation.html>

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