

DONOR-DEPENDENT SCORING SCHEMES: SHAPING THE ALLOCATION OF CADAVER KIDNEYS IN A NEW ERA

Baris Ata, Kellogg School of Management, Northwestern University, Evanston, IL, USA, b-ata@kellogg.northwestern.edu

Yichuan Ding, Sauder School of Business, University of British Columbia, BC, Canada, daniel.ding@sauder.ubc.ca

Stefanos Zenios, Stanford Graduate School of Business, Stanford University, CA, USA stefzen@stanford.edu

In the United States, candidates on the cadaver kidney transplant waitlist are ranked using a scoring scheme that takes into account characteristics of the donor and the candidate. This paper undertakes a modeling based analysis of a general class of scoring systems. We consider scoring systems that are donor-dependent, but also donor-independent. We use a fluid model to approximate the transplant waitlist, and assume that patients make rational decisions based on the predictions that the fluid model makes. We show that at the equilibrium state, a donor-dependent ranking system increases the chance of survival-based matching between a recipient and a donor, and enables the acceptance of a larger range of kidneys when compared to a donor-independent ranking system. We use the simulation model developed by the Scientific Registry of Transplant Recipients (SRTR) to compare the current policy and our policy. The simulation results show that the donor-dependent policy we proposed improves the total life years from transplant by 12% and reduces the number of discarded kidneys by about 7%, as compared with the current policy, which is more close to a donor-independent policy.