

Working Together Toward a National Kidney Paired Donation Program

To the Editor:

Many researchers have addressed compatible pair participation in kidney paired donation (KPD) programs. The concept was first introduced by Woodle and Ross (1) and first implemented clinically by Montgomery et al. (2). Comprehensive inclusion of compatible pairs in clinical KPD programs would nonetheless be a new paradigm, as evidenced by ongoing contention in the transplant community about whether to pursue compatible paired donation.

In their 2006 discourses, Veatch (3) and Spital (4) each referred to the unknown probability that a compatible pair could benefit from KPD. The goal of our recent manuscript (5) was to estimate this controversial probability and how it might vary depending on the size and makeup of KPD programs and on the precise definition of benefit. These questions had never been answered. Roth et al. previously suggested that compatible pairs would increase matching opportunities in KPD (6). However, because of methodologic limitations, Roth et al. could not address the critical issue later identified by Veatch and Spital. The maximum cardinality-matching algorithm used by Roth et al. assumes that all matches are equally valuable, and as such cannot capture distinctions such as matching to a beneficial donor versus matching to a medically inferior one. The top-trading-cycles algorithm used by Roth et al. requires logistically impossible 26-way matches.

In their letter to which we respond, Roth et al. (7) describe one difference between our analysis and theirs (that their model considers only unrelated donors) but do not mention the more fundamental contrast and its implications. Rather than maximum cardinality matching, which seeks to maximize the number of transplants, we use maximum edge-weight matching that considers the quality of the matches. Although both algorithms were suggested by Edmonds, only maximum edge-weight matching can respect factors such as varying levels of medical benefit to a recipient who enters KPD with his compatible donor. Furthermore, only maximum edge-weight matching can prioritize local and regional matches. Minimizing travel was a central feature of the UNOS proposal for KPD, and the UNOS consensus statement acknowledged that such prioritization would require edge weighting. Moreover, we have recently shown that it is possible to design maximum edge-weight mod-

els so that they will also include the maximum number of transplants, if that is desired.

The purpose of our study was to demonstrate the high probability that a compatible pair entering a KPD pool would derive a benefit in terms of younger donor age and better matching, because that fact might encourage a widening of compatible pair participation. This is very different from previous simulation work by Roth et al. concerning compatible pairs in KPD pools, but we did not intend to overlook their contributions.

We applaud the interest of economists in the field of transplantation. Our interest has been in developing mathematical models that closely reflect actual medical practice. A national KPD program would yield the greatest benefit to the largest number of patients awaiting transplantation. It is our hope that the transplant community will unite behind the cause of making KPD available to all patients by supporting a national program administered through UNOS.

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