

## A New System for Kidney Allocation: The Devil Is in the Details

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Most nephrologists agree that kidney transplantation is the treatment of choice for end-stage renal disease (ESRD). Transplant extends life, compared with patients on the waiting list undergoing dialysis, and gives a superior quality of life for most individuals (1). The major limitation to kidney transplantation in the United States is the lack of organ availability. Over the past two decades, intensified public education of the use of living donors and exchange options for patients with acceptable but incompatible donors have been implemented. Despite these efforts, deceased donor rates remain inadequate to meet the needs of waitlisted patients.

The kidney allocation system currently in place at the Organ Procurement and Transplant Network (OPTN) is based primarily on the length of time from the time of listing. In addition, there are marked geographical discrepancies in waiting times. In addition to the size of the population, where one resides determines how quickly one will receive a transplant. In our donor service area, for example, the average waiting time for a blood type O kidney is 18 to 24 months, whereas 300 miles to the north and 600 miles to the south, waiting times are between 5 and 10 years.

In an attempt to improve the current system, the kidney transplantation committee of the United Network for Organ Sharing (UNOS) has put forth a proposal based primarily on the quality of the donor organ and age matching between donor and recipient (2). Currently kidneys from extended criteria donors (ECD), defined by a kidney that has a failure risk of 70%, *versus* a standard criteria donor, are used for elderly recipients with major comorbidities who have a mortality benefit compared with those remaining on dialysis. If these organs are utilized for younger recipients, they may result in a premature return to dialysis and/or the requirement for a second transplant. Conversely, and somewhat more troubling, is the use of standard donor kidneys with an expected long-term survival for recipients with many comorbidities that shorten their life and result in death with a functioning kidney. Thus, the aim of the new system is to reduce discarded organs, reduce the mismatch between recipient and donor organ longevity (*i.e.*, death with a functioning graft), and to correct large variabilities in wait time.

The OPTN/UNOS Kidney Transplant Committee

has proposed an allocation system based mainly on donor organ quality as measured by a kidney donor profile index (KDPI). This index will incorporate the risk of any kidney's risk of graft failure by using a variety of defined parameters based on data from Rao *et al.* (3). Some of these factors are easily obtained from the deceased donor, such as age, race, height, weight, and whether the donor dies after cardiac death. However, major criteria in KDPI include diabetes, serum creatinine, cerebrovascular cause of death, and hypertension. It is not clear how these data would be obtained in the real life situation of deceased donor procurement since all of the information on which the index is based came from Scientific Registry of Transplant Recipients (SRTR) data. For example, is BP obtained at the time of traumatic event the BP that determine whether or not hypertension is present, or would an elevated BP under the stress of various clinical situations lead to a diagnosis of hypertension? It is not clear how diabetes would be defined. Hyperglycemia can occur in a number of clinical situations in which true type 1 or type 2 diabetes is not present. Probably the most troublesome aspect will be the determination of serum creatinine as an index of donor kidney function. In the setting of shock, trauma, rhabdomyolysis, or other clinical circumstances, it is not clear which creatinine will be used since prior measurements are likely to be unavailable for most donors at the time of procurement. About one third of the 92,000 patients were excluded, including those with repeat transplants, which were 14% of the total. Repeat transplant patients, who make up a growing number of recipients, would be subject to the same KDPI formula (3).

After the score is calculated, the best kidneys would be offered to the local recipients who have the longest estimated survival. When the donor score is higher, these kidneys would be first offered to recipients who are between 15 years older and 15 years younger than the recipient before being offered to other candidates. Using this system, the lifespan benefit computer is modeled to increase the kidney lifespan benefit from 4.9 to 5.4 years per transplant. This should also avoid wastage of kidneys from high KDPI donors that are now being declined for younger recipients in better health. In addition to better age matching, the proposed revision to the allocation system explicitly aims

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to eliminate variances, which should reduce variability in access to transplantation by recipient blood group or geographic location. There are no obvious features in the proposal that accomplish this.

Allocating the highest quality kidneys to candidates with the highest estimated post transplant survival would make better use of these excellent organs. Such kidneys, however, only account for 20% of the available kidneys at this time. The remaining kidneys making up the other 80% should be better age-matched with the recipient than is now possible. This presumes that length of life, rather than quality of life, is most important to potential recipients and that all donors of the same age have equivalent quality. Recent research on the aging kidney from live kidney donors challenges this assumption (4,5). Interestingly, no pathologic parameters are used in the KDPI formula.

Any system of resource allocation that is not sufficiently available for the entire population will disadvantage someone. Currently, transplant programs explicitly ration organs to those who are deemed medically acceptable for transplantation. Criteria for acceptance vary between centers based on comorbidities, age, and, sometimes, psychosocial factors. This is probably necessary but may also distort outcome data between different centers. In our own Pacific Northwest region, the percentage of diabetic patients, for example, at the various centers ranges from 20% to 50%. Current criteria often ignore other factors important in making a decision about whether a transplant is worthwhile for an individual patient, such as the ability to achieve life goals (*i.e.*, watching a grandchild graduate from college). The premise that death with a functioning graft is a failure is open to debate. This, then, begs the question of the role of the individual nephrologist dealing with his or her individual patient in relation to a transplant center with variable criteria. The precept of medicine that most patients expect, and on which most nephrologists were raised with, is to do the best thing medically for the individual patient. This does not mean unnecessary care, which has never been good medicine, but categorizing individuals by race, age, gender, or other group characteristics, which is arbitrary and often wrong. The individual should partner with the physician in decisions about whether or not a medical treatment is beneficial. The daily life of a transplant nephrologist who deals with these ethical issues necessarily involves arbitrary decisions. Di-

versity of patient motivations and values for their own lives may not simply fit into models based on registry data whose collection is variable and incomplete.

Thus, at the current time, it would appear that there is a need to fix the current system to eliminate discrepancies. To do this, a realistic look at individual patients, their desires, and the availability of resources will be necessary. Allocation of kidneys based on donor quality is reasonable, but the ascertainment of the factors making up the kidney donor profile index will need to be carefully defined and standardized in order for the system to work. Outcomes from such a new system of organ distribution will need to be carefully monitored for unintended consequences, like delaying transplantation for the relatively healthy elderly or patients with later-onset ESRD, such as those with autosomal dominant polycystic kidney disease. The current use of kidneys for special groups, such as extrarenal organ recipients, pediatric recipients, and repeat transplants, will need to be reevaluated in light of the utilitarian approach proposed.

#### Disclosures

None.

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