

At the California Transplant Donor Network, we allocate kidneys differently than almost everyone else in the United States. We think the way we do it works better than the way UNOS (United Network of Organ Sharing) does it.

The California Transplant Donor Network (CTDN) is an organ procurement organization (OPO) that services most of Northern and Central California and Northern Nevada. We work with four transplant centers and over 150 community hospitals. In 1993 CTDN received UNOS approval for a kidney allocation variance which enabled us to allocate kidneys within our service area according to a different system than the one UNOS uses. This article is an explanation of the different systems of allocations, a bit of their histories, and some hope for the future.

There are currently over 90,000 people on the waiting list for a cadaveric organ transplant in the United States. Of those, more than 67,000 of them are waiting for a kidney. Kidney transplantation has been proven to be a successful treatment for many forms of kidney disease, including hypertension and diabetes. Because of this, more and more people are being added to the list of waiting patients. Some people wait as long as ten years to receive a new kidney. The demand for transplantable organs far exceeds the supply.

In 1984, the National Organ Transplantation Act identified the need to have a national list of all patients needing organs and a system for matching available organs to potential recipients. UNOS facilitates the organ matching and allocation process and, with input from medical professionals and the donor/transplant community, continually develops national organ policy. UNOS must balance several objectives in determining policy in order to promote medical utility and equitable distribution among the tens of thousands of sick patients waiting for a transplant. They do this by focusing on:

- Maximizing the availability of transplantable organs
- Maximizing patient and graft survival
- Minimizing disparities in wait time

Often these goals can be conflicting. For example, pediatric patients have a higher instance of graft failure than adults. However, children waiting for a kidney suffer growth and development problems as a result of their renal disease that adults do not. How can we as an industry be as fair as possible while ensuring the best medical results? As transplant professionals, we are constantly evolving in order to serve a need that is ever-growing. An example of this evolution is the California Transplant Donor Network's Medical Variance for kidney allocation.

To understand the variance and the reasons for it, we must first examine the norm.

The UNOS kidney allocation system awards points in the following manner:

Time Waiting:

- 1 point for longest waiting patient in a blood group category
- Fraction of a point for relative position on the list

-1 additional point for each additional year of waiting time

Quality of HLA match:

- 7 points for zero B or DR mismatch
- 5 points for one B or DR mismatch
- 2 points for two B or DR mismatch

UNOS allocates kidneys by wait time and HLA match. Human Leukocyte Antigens (HLA) are located on the short arm of chromosome 6 and are central in the role of antigen recognition. In other words, HLA helps the human body recognize foreign tissue. HLA plays a key role in determining the likelihood of acute rejection in the recipient. A person has an A, B and DR antigen from each parent so in most organ matching cases, the donor's HLA typing shows six antigens. Data consistently show that a zero HLA mismatch between donor and recipient allows for greater graft survival rates. For this reason, 6-antigen match (zero mismatches) kidneys get priority on every kidney list in the country. Beyond those matches however, UNOS kidney allocation is based on the idea that a better match, or more HLA in common between the donor and recipient, allows for better graft survival. In other words, five antigens in common are better than four and so on. When a donor's statistics are entered into the UNOS database, potential recipients with similar HLA typing to the donor print out closer to the top of the list and therefore, have a better chance of being offered a kidney.

So, why did CTDN want to do things differently? By awarding points for HLA matches, the UNOS kidney allocation process inherently disadvantages non-Caucasian patients. The persons with the lowest number of antigenic matches are less likely to receive the transplant. Data show that the best HLA matches are derived when the donor and recipient are from the same racial group and that mismatches are more likely when the racial group are mismatched.¹ In the United States, the donor population is predominantly Caucasian while the kidney waiting list has a disproportionate amount of African American and Hispanic patients. For example, nationally African Americans constitute 12% of the total population, 8% of the donors but 34% of those with ESRD.² According to UNOS data, in 2004 70% of the deceased donors in the United States were Caucasian.

According to current UNOS data, the breakdown in California is as follows:

Deceased Donors in California Recovered through 8/05

Caucasian:	263	(approx. 49%)
Hispanic:	176	(approx. 33%)
African Am:	46	(approx. 1%)
Asian:	38	(approx. 1%)
Other:	13	

¹ Lazda VA. The impact of HLA frequency differences in races on access to optimally HLA -matched cadaver renal transplants. The Medical Advisory Committee. Transplantation 1992;53(2):352-7

² Gaston RS, Ayres I, Dooley LG, Diethelm AG. Racial Equity in Renal Transplantation. The Journal of American Medical Association 1993;270(11):1352-6

Total: 536

Kidney Waiting List in California as of November 2005

Caucasian: 4,359 (approx. 29%)
Hispanic: 4,999 (approx. 34%)
African Am.: 2,514 (approx. 17%)
Asian: 2,822 (approx. 19%)
Other: 518
Total: 14,728

Back in 1993 the disparities were even more pronounced. The California Transplant Donor Network, with huge input from our local transplant centers, recognized the fact that our geographical area was very racially diverse and that, in order to fairly distribute the available organs, we needed to try something new. We suggested a variance that selected recipients on the basis of wait time only, with no additional points awarded for HLA match. The goal of this system was to address the racial inequity in the national kidney allocation program while maintaining excellent patient survival rates. And it worked!

Examination of data done by the California Pacific Medical Center (one of our local centers) showed that long-term graft survivals were the same despite not using HLA matching. Analysis of graft survival for all cadaveric transplants done at CPMC between 1988-1996 compared to UNOS graft survival data for the same time period are shown below. The number of transplants examined is 958 for CPMC and 66,069 for UNOS. Long term graft survivals were the same despite not using HLA matching.

Graft Survival	CPMC	UNOS*
3yr	72%	71%
5yr	62.9%	60.5%
8yr	45%	45.6%
10yr	35.7%	36.6%

*Based on OPTN Data as of April 5 2002

Studies have also shown that patients who receive transplants, regardless of HLA match, have a lower mortality rate than similar patients on the waiting list who remain on dialysis. ³Allocating according to wait time rather than HLA match very likely saves lives by preventing deaths on the waiting list.

With this variance, CTDN has also greatly minimized the disparity in wait time across ethnic groups in our service area. The data below shows CTDN wait time by ethnicity for the period of 1995-1999 compared to patients across the country during that same period.

³ Wolfe RA, Ashby VB, Milford EL, et al. Comparison of mortality in all patients on dialysis, patients on dialysis awaiting transplantation, and recipients of a first cadaveric transplant. New England Journal of Medicine 1999;341:1725-1730

If we look at Caucasian wait time as a normalized value of 1 then we see comparably sick African Americans nationally waiting 1.8 times longer for a kidney. The third column reflects how much longer non-Caucasian patients wait according to the UNOS system as measured in days. The difference is remarkable.

Wait Time by Ethnicity CTDN vs. National

	CTDN Wait Time	National Wait Time	Wait Time Difference In days
Caucasians	1.0	1.0	
African Americans	1.17	1.8	+600 days
Hispanics	1.1	1.6	+550 days
Asians	1.26	1.6	+550 days

*Caucasian wait time = 1.0

We at the California Transplant Donor Network believe that our variance clearly supports the stated goals of UNOS and the transplant community by offering the best balance between social justice and medical utility. It is also our belief that fairness on the recipient side will help increase the donation rates in non-Caucasian communities. Although there is no data to support the correlation, in the twelve years of using this variance our consent rates in the African American, Hispanic and Asian communities have all increased dramatically. Those results are very likely due to several factors including community outreach and education but we hope that increased faith in a fair allocation system has something to do with it as well.

In addition to providing a more equitable distribution of organs, the California Transplant Donor Network sees this variance as part of a long-term global goal. We hope that helping to provide more equal access to transplants is a bold step in addressing similar racial disparities in other areas of healthcare.

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