

Transplant surgeons already account for inaccuracies in the Kidney Donor Profile Index (KDPI) calculation

The Kidney Donor Profile Index (KDPI) is used in deceased donor kidney allocation to summarize the quality of a deceased donor kidney relative to other recovered kidneys.¹ The KDPI is derived from the Kidney Donor Risk Index (KDRI), which was calibrated on deceased donor kidney transplants from 1995–2005.²

Hepatitis C virus (HCV) and Black donor race are currently used in the KDRI and the KDPI calculations due to their historical association with increased risk of graft failure. However, as direct-acting antiviral treatment for HCV has become more widely available, recent work by Sutcliffe et al. has shown that 5-year mean graft survival has not been statistically different between recipients of kidneys from HCV+ donors and HCV– donors and suggested that donor HCV status should no longer be included in the KDRI.³ Similarly, recent work by Miller et al. has come to similar conclusions, asserting that the Black race variable should be removed from the KDRI.⁴ As such, the Organ Procurement and Transplantation Network (OPTN) has created a public comment proposal to refit the KDRI without donor race and HCV status.⁵

To understand how transplant surgeons use these variables in decisions to transplant these organs, we assessed the outcomes of kidneys from 88,705 deceased donors (4,692 HCV+, 13,006 Black) with

Nucleic Acid Amplification Testing results between March 31, 2015, and March 31, 2023. We analyzed the proportion of kidneys not utilized by HCV status and Black race by the current KDPI allocation bins of 0–20, 21–34, 35–85, and 86–100. The analysis of HCV status was stratified before and after January 1, 2018, because 2018 was the first year when most HCV+ kidneys went to HCV– recipients.

Among KDPI 21–85 donors between 2018 and 2023, kidneys from an HCV+ donor were significantly more likely to be utilized than kidneys from an HCV– donor (Table 1). For example, among donors with KDPI 21–34, 4.3% of HCV+ versus 7.2% of HCV– kidneys were not utilized. The comparison was not significant among donors with KDPI 0–20 due to the low number of HCV+ donors. From donors with KDPI 86–100, HCV+ kidneys were not utilized at higher rates than HCV– kidneys. Across all KDPI bins from 2015–2023, kidneys from Black donors were more likely to be utilized compared to kidneys from non-Black donors.

Recently, multiple groups have advocated for removing the variables of donor race and HCV status from the KDRI and hence the KDPI because they no longer affect post-transplant survival outcomes. We studied 8 years of kidney placement to understand how transplant

TABLE 1 Utilization of kidneys by donor HCV status and Black race by KDPI, March 31, 2015–March 31, 2023.

KDPI	HCV–		HCV+				p-Value*
	2015–2017	2018–2023	2015–2017		2018–2023		
	Not utilized (%)	Not utilized (%)	Recovered	Not utilized (%)	Recovered	Not utilized (%)	
0–20	363 (2.8%)	790 (3.0%)	114	23 (20.2%)	104	2 (1.9%)	.2603
21–34	427 (5.9%)	1256 (7.2%)	454	132 (29.1%)	948	41 (4.3%)	.0004
35–85	4826 (21.6%)	13677 (23.3%)	1117	511 (45.7%)	5073	1040 (20.5%)	<10 ^{–5}
86–100	3205 (64.3%)	11412 (66.5%)	91	74 (81.3%)	1416	986 (69.6%)	.0089
KDPI	Non-Black donors		Black donors		p-Value**		
	Recovered	Not utilized (%)	Recovered	Not utilized (%)			
0–20	37043	1149 (3.1%)	2479	29 (1.2%)	<10 ^{–5}		
21–34	22009	1663 (7.6%)	4018	193 (4.8%)	<10 ^{–5}		
35–85	74472	17744 (23.8%)	12844	2310 (18.0%)	<10 ^{–5}		
86–100	17085	11754 (68.8%)	6556	3923 (59.8%)	<10 ^{–5}		

Abbreviations: HCV, Hepatitis C virus; KDPI, Kidney Donor Profile Index.

*p-Value from two-proportion one-sided t-tests between the nonuse % of HCV–, 2018–2023 and the nonuse % of HCV+, 2018–2023 (columns 3 and 7).

**p-Value from two-proportion one-sided t-tests between the nonuse % of non-Black donors and the nonuse % of Black donors (columns 3 and 5).

physicians are presently taking these variables into account when considering organs for transplant. Because the nonuse of an organ results from the collective decisions made by numerous transplant physicians, our analysis suggests that some transplant physicians are already minimizing the importance of certain variables within the KDPI. Across all KDPI bins, kidneys from Black donors were more likely to be utilized compared to kidneys from non-Black donors, and since 2018, kidneys from KDPI 21-85, HCV+ donors were more likely to be utilized compared to kidneys from HCV– donors.

The KDPI is intended to be a quality index, but transplant surgeons are already accounting for its inaccuracies by utilizing more organs at the same KDPI from Black and HCV+ donors compared to non-Black and HCV– donors respectively. It is encouraging that transplant decisions are aligned with the true risk of the donor (i.e., kidneys from Black and HCV+ donors have inflated KDPIs but may not necessarily lead to greater risk of graft failure). This is in line with the growing recognition that donor HCV status and Black race should be removed from the KDPI.

Revising the KDPI, however, requires caution. As stated in previous literature, removing Black donor race and HCV status from the KDPI will cause the KDPI of non-Black and HCV– donors to increase due to the zero-sum nature of the statistic.^{4,5} Moreover, as the KDPI is normalized yearly to the most recent years' donors, it is difficult to objectively compare KDPIs across years. While a percentile index is appropriate for national allocation policy, the decision to accept an organ should be based on absolute information because the zero-sum nature of the KDPI and ambiguity of interpreting the metric between years would cause kidneys previously considered suitable to appear less so.

CONFLICT OF INTEREST STATEMENT

The authors of this manuscript have no conflicts of interest to disclose.


DATA AVAILABILITY STATEMENT

The data is available upon request from the OPTN: <https://optn.transplant.hrsa.gov/data/>.

DISCLAIMER

The data reported here have been supplied by the United Network for Organ Sharing (UNOS) as the contractor for the OPTN. The interpreta-

tion and reporting of these data are the responsibility of the author(s) and in no way should be seen as an official policy of or interpretation by the OPTN or the US Government. This work is based on OPTN data as of March 31, 2023. Approval for this study was obtained from the Stanford Institutional Review Board (IRB) (Protocol 68925).

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