Title

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Journal

Transplantation, 108(3)

Authors

Motter, Jennifer
Hussain, Sarah
Brown, Diane
et al.

Publication Date

2024-03-01

DOI

10.1097/TP.0000000000004857

Peer reviewed

HHS Public Access

Author manuscript

Transplantation. Author manuscript; available in PMC 2024 April 23.

Published in final edited form as:

Transplantation. 2024 March 01; 108(3): 759–767. doi:10.1097/TP.0000000000004857.

Wait Time Advantage for Transplant Candidates With HIV Who Accept Kidneys From Donors With HIV Under the HOPE Act

Jennifer D. Motter, MHS[1], **Sarah Hussain, MBBS, MSHI**[2], **Diane M. Brown, MSN**[2], **Sander Florman, MD**[3], **Meenakshi M. Rana, MD**[3], **Rachel Friedman-Moraco, MD**[4], **Alexander J. Gilbert, MD**[5], **Peter Stock, MD, PhD**[6], **Shikha Mehta, MD**[7], **Sapna A. Mehta, MD**[8], **Valentina Stosor, MD**[9], **Nahel Elias, MD**[10], **Marcus R. Pereira, MD, MPH**[11], **Ghady Haidar, MD**[12], **Maricar Malinis, MD**[13], **Michele I. Morris, MD**[14], **Jonathan Hand, MD**[15], **Saima Aslam, MBBS MS**[16], **Joanna M. Schaenman, MD, PhD**[17], **John Baddley, MD**[18], **Catherine B. Small, MD**[19], **David Wojciechowski, DO**[20], **Carlos A.Q. Santos, MD**[21], **Emily A. Blumberg, MD**[22], **Jonah Odim, MD, PhD**[23], **Senu K. Apewokin, MD**[24], **Emmanouil Giorgakis, MD**[25], **Mary Grace Bowring, MPH**[26], **William A. Werbel, MD, PhD**[2], **Niraj M. Desai, MD**[26], **Aaron A.R. Tobian, MD, PhD**[2], **Dorry L. Segev, MD, PhD**[1,27,28], **Allan B. Massie, PhD**[1,27], **Christine M. Durand, MD**[2] **on behalf of the HOPE in Action Investigators**

[1]Department of Surgery, NYU Grossman School of Medicine, New York, NY.

[2]Department of Medicine, Johns Hopkins University School of Medicine, Baltimore, MD.

[3]Department of Medicine, Icahn School of Medicine at Mount Sinai, New York, NY.

[4]Department of Medicine, Emory University, Atlanta, GA.

[5]Department of Medicine, Medstar Georgetown, Washington, DC.

[6]Department of Medicine, University of California, San Francisco, San Francisco, CA.

[7]Department of Medicine, University of Alabama at Birmingham, Birmingham, AL.

[8]Department of Medicine, NYU Grossman School of Medicine, New York, NY.

[9]Divisions of Infectious Diseases and Organ Transplantation, Northwestern University Feinberg School of Medicine, Chicago, IL.

[10]Department of Surgery, Massachusetts General Hospital, Boston, MA.

[11]Department of Medicine, Columbia University Irving Medical Center, New York, NY.

[12]Department of Medicine, University of Pittsburgh, Pittsburgh, PA.

Correspondence: Christine M. Durand, MD, Department of Medicine, Johns Hopkins School of Medicine, 2000 E Monument St, Baltimore, MD 21205. (christinedurand@jhmi.edu).

A.B.M. and C.M.D. contributed equally to this article. J.D.M., J.O., A.A.R.T., D.L.S., A.B.M., and C.M.D. participated in the research design. J.D.M., S.H., and A.B.M. performed the statistical analysis. S.F., M.M.R., R.F., A.G., P.S., S.M., S.A.M., R.D., V.S., N.E., M.R.P., G.H., M.M., M.I.M., J.H., S.A., J.M.S., J.B., C.B.S., C.A.Q.S., E.F.H., and E.A.B. participated in implementing the HOPE in Action clinical trials and collected the data. J.D.M. and C.M.D. wrote the article. All authors reviewed and revised the article.

Clinical Trial Notation: HOPE in Action Prospective Multicenter, Clinical Trial of Deceased HIV D^+ Kidney Transplants for HIV^+ Recipients, ClinicalTrials.gov number NCT03500315.

Supplemental digital content (SDC) is available for this article. Direct URL citations appear in the printed text, and links to the digital files are provided in the HTML text of this article on the journal's Web site (www.transplantjournal.com).

[13]Department of Medicine, Yale School of Medicine, New Haven, CT.

[14]Department of Medicine, University of Miami Miller School of Medicine, Miami, FL.

[15]Department of Medicine, Ochsner Health, New Orleans, LA.

[16]Department of Medicine, University of California San Diego, La Jolla, CA.

[17]Department of Medicine, Division of Infectious Diseases, David Geffen School of Medicine at UCLA, Los Angeles, CA.

[18]Department of Medicine, University of Maryland School of Medicine, Baltimore, MD.

[19]Department of Medicine/Division of Infectious Diseases, Weill Cornell Medicine, New York, NY.

[20]Department of Medicine, UT Southwestern Medical Center, Dallas, TX.

[21]Department of Medicine, Rush University Medical Center, Chicago, IL.

[22]Department of Medicine, Hospital of the University of Pennsylvania, Philadelphia, PA.

[23]Division of Allergy, Immunology and Transplantation, National Institutes of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, MD.

[24]Department of Medicine, University of Cincinnati Medical Center, Cincinnati, OH.

[25]Department of Surgery, University of Arkansas for Medical Sciences, Little Rock, AR.

[26]Department of Surgery, Johns Hopkins University School of Medicine, Baltimore, MD.

[27]Department of Population Health, NYU Grossman School of Medicine, New York, NY.

[28]Scientific Registry of Transplant Recipients, Minneapolis, MN.

Abstract

Background.—Kidney transplant (KT) candidates with HIV face higher mortality on the waitlist compared with candidates without HIV. Because the HIV Organ Policy Equity (HOPE) Act has expanded the donor pool to allow donors with HIV (D^+), it is crucial to understand whether this has impacted transplant rates for this population.

Methods.—Using a linkage between the HOPE in Action trial (NCT03500315) and Scientific Registry of Transplant Recipients, we identified 324 candidates listed for D^+ kidneys (HOPE) compared with 46 025 candidates not listed for D^+ kidneys (non-HOPE) at the same centers between April 26, 2018, and May 24, 2022. We characterized KT rate, KT type (D^+, false-positive [FP; donor with false-positive HIV testing], D^- [donor without HIV], living donor [LD]) and quantified the association between HOPE enrollment and KT rate using multivariable Cox regression with center-level clustering; HOPE was a time-varying exposure.

Results.—HOPE candidates were more likely male individuals (79% versus 62%), Black (73% versus 35%), and publicly insured (71% versus 52%; $P < 0.001$). Within 4.5 y, 70% of HOPE candidates received a KT (41% D^+, 34% D^-, 20% FP, 4% LD) versus 43% of non-HOPE candidates (74% D^-, 26% LD). Conversely, 22% of HOPE candidates versus 39% of non-HOPE candidates died or were removed from the waitlist. Median KT wait time was 10.3 mo for HOPE versus 60.8 mo for non-HOPE candidates ($P < 0.001$). After adjustment, HOPE candidates had a

3.30-fold higher KT rate (adjusted hazard ratio = 3.30, 95% confidence interval, 2.14–5.10; $P < 0.001$).

Conclusions.—Listing for D^+ kidneys within HOPE trials was associated with a higher KT rate and shorter wait time, supporting the expansion of this practice for candidates with HIV.

NTRODUCTION

The prevalence of end-stage renal disease (ESRD) is increasing among persons with HIV (PWH) because of longer life expectancies afforded by effective antiretroviral therapy, as well as common comorbidities such as hypertension, diabetes, and cardiac disease.[1] Kidney transplantation (KT) is the definitive treatment for ESRD, conferring a substantial survival benefit, with excellent outcomes for PWH demonstrated in both clinical trials and real-world registry data.[2–4] Unfortunately, access to life-saving KT for PWH is inadequate, resulting in part from the nationwide organ shortage in the United States, and exacerbated by the higher mortality that PWH incur on dialysis compared with those living without HIV.[5]

A motivation for the HIV Organ Policy Equity (HOPE) Act was to improve access to transplant for PWH.[6] Signed into law in 2013 and implemented in 2015, the HOPE Act allows transplantation of organs from donors with HIV (D^+) to recipients with HIV (HIV D^+/R^+) within research protocols.[7] In addition, an unexpected benefit of the HOPE Act was the utilization of organs from donors with false-positive (FP) HIV testing for candidates enrolled in HOPE trials.[8] Early safety outcomes of HIV D^+/R^+ KT in trials have been encouraging; however, the number of D^+ in practice has been lower than predicted, with only 92 D^+ and FP donors in the first 4 y of HOPE compared with estimates ranging from 354 to 534 potential HOPE donors per year.[9–12] With fewer HOPE donors in practice, it is uncertain whether access to KT has substantially improved for PWH.

Understanding the impact of D^+ on KT rates for PWH cannot be achieved with national transplant registry data alone because (1) diagnosis of HIV is not collected for waitlist candidates, and (2) registry data do not adequately differentiate between D^+, donors without HIV (D^-), and donors with FP HIV testing.[13] As such, the objectives of this study were to characterize KT types (D^+, FP, D^-), and quantify the association between enrollment in HOPE trials and time to KT for candidates with HIV listed as willing to accept D^+ kidneys compared with candidates (with or without HIV) at the same center not listed for D^+ kidneys.

MATERIALS AND METHODS

Data Sources

This study used data from the HOPE in Action Multicenter Kidney U01 trial (U01AI134591, NCT03500315), which opened on April 26, 2018, and included 24 participating centers (see Table S1, SDC, http://links.lww.com/TP/C922). Candidates enrolled in these studies met standard clinical criteria for KT at their local center, as well as HIV-specific inclusion criteria: no active opportunistic infections, HIV RNA below the limit of detection, CD4 T-cell count ≥200 cells/μL, and kidney candidates as per the Department of Health and Human Services HOPE Act Safeguards and Research Criteria.[7]

Trial protocols were approved by each site's Institutional Review Board, and each site had an Open Variance approved by the United Network for Organ Sharing. All trial participants provided written informed consent.

We then linked the HOPE in Action trial data to the Scientific Registry of Transplant Recipients (SRTR) to identify KT candidates at the same centers who were not listed to accept D^+ kidneys under the HOPE in Action trial. The SRTR data system includes data on all donor, waitlisted candidates, and transplant recipients in the United States, submitted by the members of the Organ Procurement and Transplantation Network (OPTN). The Health Resources and Services Administration, US Department of Health and Human Services provides oversight to the activities of the OPTN and SRTR contractors. The SRTR data set has previously been described elsewhere.[14]

Study Population

The study population consisted of adult (age 18 y or older), kidney-only active waitlist registrants at the 24 participating centers between the date the center joined the HOPE in Action trial (April 26, 2018–June 29, 2020) and administrative censorship (December 31, 2022). We excluded individuals who joined the waitlist before December 13, 2007, or after May 24, 2022, because these are the first and last dates that individuals enrolled in the HOPE trials joined the waitlist.

We compared candidates listed as willing to accept D^+ kidneys (HOPE) with candidates (with or without HIV) from the same center not listed as willing to accept D^+ kidneys (non-HOPE). Because the OPTN captures HIV status only for transplant recipients, we were unable to discern the HIV status of non-HOPE waitlist candidates before KT. However, among non-HOPE candidates who eventually received KT, 98.9% did not have HIV according to SRTR.

Ascertainment of Candidate Characteristics and Waitlist Outcomes

Data on clinical history and virologic and immunologic characteristics for all HOPE candidates and donors were obtained from the HOPE in Action trial database. Notably, this database also included information on whether donors for these candidates had confirmed HIV or FP HIV testing, because the OPTN does not collect this information.[8] FP donors were those who (1) had no history of HIV according to the medical record or next-of-kin interview, (2) were not on HIV medications, and (3) had discordant HIV screening tests (antibody, antigen/antibody, or nucleic acid test) with subsequent negative confirmatory testing for HIV, as previously described.[13] Data for all non-HOPE candidates and their corresponding donors were obtained from SRTR.

Waitlist outcomes were reported to the OPTN. Candidates enrolled in HOPE received organs from donors with (D^+) or without HIV (D^-) based on organ availability and standard allocation procedures, as previously described.[9] As per the HOPE Research Safeguards, D^+ could not have active opportunistic infections or cancer; there were no specific criteria for donor HIV RNA or CD4 count, although transplant center teams had to describe effective antiretroviral therapy for intended recipients. D^- were evaluated according to institutional criteria.

Waitlist Outcomes of HOPE and Non-HOPE Candidates

To characterize the outcomes of HOPE and non-HOPE candidates after placement on the waitlist, we used a competing risk framework to estimate the cumulative incidence of death (including removal due to deteriorating condition), removal (either from the waitlist or HOPE study), remaining waitlisted, receipt of a living donor (LD) KT, and deceased donor KT.[15] Candidates were followed until 54 mo (4.5 y) because this was the maximum length of follow-up time available since their date of entry into the study.

Association Between HOPE Listing and Time to KT

Receipt of a KT was assessed from candidates' most recent date of active waitlisting or the date that their transplant center became active as a HOPE trial site (herein referred to as date of entry) until the earliest date of transplant, death, removal from the HOPE in Action study, removal from the waitlist, or administrative censorship at end of follow-up. The last transplant on the HOPE in Action Multicenter Kidney U01 trial was September 6, 2021, after which this trial was closed to new transplants. Following that date, most centers chose to participate in a subsequent research protocol with the same eligibility criteria for D^+/R^+ KT (Table S1, SDC, http://links.lww.com/TP/C922). For candidates from these centers, the date of administrative censorship was December 31, 2022. For candidates from centers who did not participate in this subsequent research protocol, the date of administrative censorship was September 7, 2021.

Candidates who were on the waitlist before the date of entry were treated as late entries. For example, if a center became activated for HOPE on April 26, 2018, all person-time accrued before this date would be considered immortal person-time for both HOPE and non-HOPE candidates at that center, and only person-time from after April 26, 2018, would be included in analysis. We used Cox regression, rather than competing risks regression, to compare the KT rate in HOPE versus non-HOPE candidates. This choice was driven by our study question, which was etiologic rather than prognostic in nature.[16] HOPE status, which is being listed for a D^+ kidney, was treated as a time-varying exposure. Candidates who consented to the HOPE in Action trial after entry first contributed unexposed person-time until their date of HOPE consent, and then contributed exposed person-time thereafter. Candidates whose consent date was equivalent to their date of entry into the risk set contributed only exposed person-time. Model adjustment included candidate age, sex, diabetes, blood type, time on dialysis at the time of study entry, previous history of transplant, calculated panel reactive antibody (PRA) or PRA, willingness to accept a kidney from a donor with hepatitis C virus (HCV), and calendar year of listing. We incorporated a robust sandwich estimator to account for within-center clustering of outcomes. In a sensitivity analysis, we additionally adjusted for differences between HOPE and non-HOPE candidates, race, height, weight, serum albumin, peripheral vascular disease, primary diagnosis of ESRD, insurance type, and employment status. We did not adjust for these variables in our main model because this would have excluded 21 HOPE candidates (n = 6.5%). To determine whether our handling of late entries impacted inference, we conducted a sensitivity analysis including candidates whose first active date of listing was on or after April 26, 2018, the date the HOPE in Action trial began. Finally, to illustrate

differences in time to transplant, we produced Kaplan-Meier curves including only patients whose first active date was the beginning of the HOPE in Action trial.

Statistical Analyses

To compare candidate and donor characteristics across groups, we used 2-sample *t* tests or Wilcoxon rank-sum tests for continuous variables and Pearson's χ^2 tests or Fisher exact tests for categorical variables. Column percentages in Tables 1 and 2 may be slightly <100% or >100% due to rounding; missing data were excluded. In our analyses, we used complete case analysis to handle missing data ranging from 0.06% to 5.5%. All tests were 2-sided with statistical significance set at $\alpha = 0.05$, with analyses performed using Stata version 17.0/MP for Linux (College Station, TX).

RESULTS

Study Population

We identified 324 HOPE and 46025 non-HOPE KT candidates across 24 HOPE in Action centers in the United States. Compared with non-HOPE candidates, HOPE candidates were more likely to be male individuals (79% versus 62%, $P < 0.001$) and Black (73% versus 35%, $P < 0.001$; Table 1). HOPE candidates were more likely to have glomerular diseases as their indication for ESRD (41% versus 21%, $P < 0.001$) and have >6 y of time on dialysis (16% versus 12%, $P < 0.001$) but less likely to have undergone a previous transplant (7% versus 12%, $P = 0.009$) compared with non-HOPE candidates. HOPE candidates were more likely to have public insurance (71% versus 52%, $P < 0.001$) and also less likely to be listed to accept a kidney from a donor with HCV (22% versus 29%, $P = 0.003$). Among HOPE candidates, willingness to accept a kidney from a donor with HCV increased from 16.7% in 2018 to 31.3% in 2021; 13% of HOPE candidates were seropositive for HCV. Ninety-nine percent of HOPE candidates had HIV RNA <200 copies/mL.

Waitlist Outcomes of HOPE and Non-HOPE Candidates

Within 4.5 y of consenting for HOPE, the cumulative incidence of KT for HOPE candidates was 70%, of whom 41% received D^+, 34% received D^-, 20% received FP, and 4% received LD among those transplanted (Figure 1A). Conversely, the cumulative incidence of death was 15%, removal from the waitlist or the HOPE study was 7%, and remaining waitlisted was 9%.

During the same period, the cumulative incidence of KT for non-HOPE candidates was 43%, of whom 74% received D^- and 26% received LD among those transplanted (Figure 1B). Conversely, the cumulative incidence of death was 20%, removal from the waitlist was 19%, and remaining waitlisted was 18%. Among non-HOPE candidates who received a KT, 181 (1.0%) were living with HIV, of whom 81% received a deceased donor KT, 7% received an LD KT, and 12% remained waitlisted at the end of the study.

Association Between HOPE Listing and Time to KT

Overall, the estimated median wait time (time at which the Kaplan-Meier survival estimate crossed 50%) for HOPE versus non-HOPE candidates was 10.3 and 60.8 mo, respectively

($P < 0.001$). The cumulative incidence of KT for HOPE candidates (versus non-HOPE) was 28% (versus 10%) at 3 mo, 38% (versus 15%) at 6 mo, 52% (versus 21%) at 12 mo, 68% (versus 29%) at 24 mo, 82% (versus 37%) at 36 mo, and 83% (versus 44%) at 48 mo ($P < 0.001$; Figure 2). After adjustment for candidate age, sex, diabetes, blood type, time on dialysis, prior transplant, calculated PRA or PRA, willingness to accept a kidney from a donor with HCV and calendar year of listing, this translated into 3.30-fold higher rate of KT (adjusted hazard ratio [aHR] = 3.30; 95% confidence interval [CI], 2.14–5.10; $P < 0.001$) for HOPE versus non-HOPE candidates. In a sensitivity analysis, after excluding candidates whose first active date of listing was before the HOPE in Action trial began, inferences were consistent with our main findings (aHR = 3.01; 95% CI, 2.03–4.48; $P < 0.001$). Similarly, inferences were consistent with our main findings after additional adjustment for candidate characteristics (aHR = 3.01; 95% CI, 2.01–4.49; $P < 0.001$) and excluding candidates whose first active date of listing was before the HOPE in Action trial began (aHR = 2.76; 95% CI, 1.92–3.96; $P < 0.001$).

Characteristics of Donors for HOPE and Non-HOPE Groups

During the study period, there were 166 donors who donated kidneys to HOPE candidates and 9660 donors who donated kidneys to non-HOPE candidates. Among donors for HOPE candidates, 39% were D^+ (median kidney donor profile index [KDPI]: 36%), 18% were FP (median KDPI: 38%), and 43% were D^- (median KDPI: 56%) (Table 2). Donors for the HOPE group were more likely to be Black (29% versus 16%, $P < 0.001$), were less likely to be hypertensive (23% versus 31%, $P = 0.04$), and had an overall lower KDPI (median: 41% versus 50%, $P = 0.02$) compared with donors for the non-HOPE group. Donors for HOPE candidates were also more likely to be seropositive for cytomegalovirus (76% versus 60%, $P < 0.001$) and more likely to be labeled increased infectious risk (49% versus 26%, $P < 0.001$) compared with donors for non-HOPE candidates.

Kidneys for HOPE candidates were more likely to be shared nationally (54% versus 30%, $P < 0.001$) and have comparable cold ischemia time (median: 20 versus 20 h, $P = 0.09$) compared with those for non-HOPE candidates.

DISCUSSION

In this multicenter study, we sought to understand the impact of the HOPE Act on access to KT for PWH. We found that 70% of those enrolled in HOPE received a KT during the 4.5-y study period versus 43% of non-HOPE candidates at the same center. Most of these were from donors with HIV or FPs, transplants that were not possible before the HOPE Act. Those who received transplants in HOPE trials had shorter estimated wait times (median 10.3 versus 60.8 mo), and after adjusting for relevant allocation factors including time on dialysis, the KT rate was 3.30-fold higher for those in HOPE. These findings are highly encouraging and indicate that HIV D^+/R^+ transplantation can increase access to KT for PWH, potentially improving access for all waitlisted candidates.

We found that HOPE candidates were more likely to have >6 y on dialysis and less likely to undergo preemptive listing compared with non-HOPE candidates at the same center. This is consistent with prior studies that have shown that PWH have more time on dialysis than

their counterparts without HIV.[17] This difference may be related to the fact that PWH are less likely to be referred to KT.[18] Moreover, we found that the cumulative incidence of LD KT was 4% in the HOPE group, compared with 26% in the non-HOPE group. This is consistent with a prior study that showed that PWH on the KT waitlist had a 47% lower likelihood of LD transplantation.[17]

In our study, HOPE candidates had an estimated median wait time of 10.3 mo, substantially lower than that of 60.8 mo for contemporary non-HOPE candidates at their centers. The wait time for HOPE candidates is also lower than what has been reported for KT candidates with HIV before HOPE. A national study by Cohen et al[19] that identified KT candidates with HIV by linking SRTR and pharmacy claims data from 2001 to 2012, found that the median KT wait time for PWH was 39 mo. These shorter wait times might be considered an additional incentive for centers that are not yet participating in HOPE Act transplants. Furthermore, for international transplant programs that have not yet moved into this practice area, it is another clinical benefit to consider.

Our study has several limitations. First, our comparison group was individuals at the same center not enrolled in HOPE trials; these were primarily individuals without HIV infection (98.9%). An ideal counterfactual would have been KT candidates with HIV who were not enrolled in HOPE trials. However, because the OPTN does not capture HIV status on the waitlist, this comparison group was not possible. Instead, we treat a population of candidates without HIV primarily as the counterfactual for what the transplant rate for HOPE candidates would have been if HOPE had not been passed because organ allocation procedures are the same for candidates with and without HIV. A second limitation is that our group conducted a pilot trial of HIV D^+/R^+ KT at 14 centers that began before the study period, and thus, some individuals in our study population may have been eligible for D^+ transplants under this protocol. However, we excluded any person-time before center activation for the U01 trial. A third limitation is that HOPE participants were all selected to participate in a study, and thus, we cannot rule out a potential selection bias and/or Hawthorne effect. However, we believe these factors are unlikely to impact our results. The fact that virtually all transplant recipients in the non-HOPE group were patients without HIV suggests that very few patients with HIV were excluded from the HOPE study. Also, subtle selection biases are unlikely to substantially impact transplant rates; all patients in the study were active on the waitlist and needed to meet transplant criteria at their center. Finally, we adjusted for measured patient comorbidities and other differences in casemix.

The major strength of our study was our design, which leveraged our trial data for reliable ascertainment of candidate HIV status, which is unavailable in the national registry. Inclusion of these data allowed us to further differentiate between true positive and FP HOPE donors.[8,13] Furthermore, our study comprised 24 centers located throughout the United States, and these represent the majority (24 of 30) that have an OPTN variance to perform HIV D^+/R^+ KT.[20]

In conclusion, we found that KT candidates with HIV who participated in HOPE trials had lower wait times and significantly higher KT rates than non-HOPE candidates. This finding is very encouraging, given that PWH with ESRD have higher mortality than those without

HIV, making the need for KT even more urgent. In addition, the benefits of reduced wait time and increased KT rate under HOPE occurred, although the number of HOPE donors per year has been lower than expected. As this practice expands more broadly and may no longer be restricted to research, we anticipate further benefits in expanding the donor pool that may impact the entire waitlist.[21]

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

ACKNOWLEDGMENTS

From Johns Hopkins University School of Medicine/Johns Hopkins Hospital: Oyinkansola Kusemiju, MPH, RN, Brittany Barnaba, MS, RN, Michelle Prizzi, BA, Tao Liang, MSPH, Grace Link Barnes, BSN, MPH, Margaret Chahoud, BS, James Wiles, RN, BSN, Willa Cochran, MSN, CRNP, Michelle Morrison, RN, MSN, Kaitlyn Storm, BS, Anuj Apte BS, Linda Paredes, MS, BA, Bahati Kuffar, BA, Quinten Stearns, BA, Nadine Brown, BS, and Amy Chang, MD. From Icahn School of Medicine at Mount Sinai: Brandy M. Haydel, CCRC. From Emory University Transplant Center: Thomas Pearson, MD, Aneesh K. Mehta, MD, G. Marshall Lyon, MD, William Kitchens, MD, PhD, Jeryl Huckaby, MSCRA, CCRC, Rivka Elbein, RN, BSN, April Roberson, RN, and Elizabeth Ferry, RN. From MedStar Georgetown Transplant Institute: Margaret Coakley, RN, Aleya Akhran, RN, Joseph Timpone, MD, and Alyssa Stucke, BS. From University of California San Francisco: Rodney Rogers, BA and Ada Chao, BA. From University of Alabama at Birmingham: Darnell Mompoint-Williams, CRNP, DNP, and Jayme E. Locke, MD, MPH. From NYU Langone Transplant Institute: Elaina P. Weldon, MSN, Rebecca Dieter, PharmD, and Elizabeth Klein, BA. From Northwestern University: Leah Goudy, RN, BSN, Michelle Callegari, MS, and Lorenzo Gallon, MD. From University of Pittsburgh: Kailey Hughes, MPH, Diana Lynn Pakstis, RN, BSN, MBA, and Fernanda Silveira, MD, MS. From Yale School of Medicine: Ricarda Tomlin, BS, CCRP. From Ochsner Health: Angela Smith, MBA. From University of California San Diego: Mita Shah, MD, Kristin Mekeel, MD, Phirum Nguyen, BS, and Jeff Mills, BA. From David Geffen School of Medicine at UCLA: Suphamai Bunnapradist, MD, MS, H. Albin Gritsch, MD, Ardis A. Moe, MD, and Rosemary Silva, RN. From Institute of Human Virology at the University of Maryland School of Medicine: Ilise D. Marrazzo, RN, BSN, MPH. From Weill Cornell Medicine: Thangamani Muthukumar, MD. From Transplant/Oncology Infectious Diseases Clinical Research Unit, Division of Transplant Surgery Research Group: Amy Chang, MD. From UT Southwestern Medical Center: Ricardo La Hoz, MD, and Jarrett Hubbard, BASc. From Rush University Medical Center: Mark Mall, RN, and Carlos Santos, MD. From the Hospital of the University of Pennsylvania: Ty Dunn, MD, Deirdre Sawinski, MD, and Maryann Najdzinowicz, RN. From Indiana University: Jeanne M. Chen, BS, PharmD. From University of Virginia: Jamie Nagy, BA, MSN. From Virginia Commonwealth University: Nathaniel Brigle, CCRP.

D.L.S. receives honoraria for AstraZeneca, CareDx, Houston Methodist, Northwell Health, Optum Health Education, Sanofi, and WebMd, as well as consulting fees from AstraZeneca, CareDx, Moderna Therapeutics, Novavax, Regeneron, and Springer Publishing. C.M.D. received honoraria from Gilead Sciences for serving on a grant review committee. V.S. received research grant support from Eli Lilly and Company and consulting fees from DiaSorin SpA. M.P. received grant support from Merck, Hologic, Moderna, Shire/Takeda, and Pfizer, as well as provided consultation to/serves on the advisory board for Rebiotix, Takeda, and Union Therapeutics. C.B.S. has received grants paid to her institution from GlaxoSmithKline, ViiV, Abbott, Merck, Gilead, Chimerix, Shire/Takeda, Schering-Plough, Ablynx, Janssen, Ansun Biopharma, and Karyopharm Therapeutics. G.H. is a recipient of research grants from Allovir, Karius, and AstraZeneca. G.H. serves on the scientific advisory boards of Karius and AstraZeneca and has received honoraria from MDOutlook and MAD-ID/ID Connect. J.H. is a recipient of grants paid to his institution from Pfizer, Janssen, and Scynexis. The other authors declare no conflicts of interest.

This work was supported by grants U01AI134591 (C.M.D./D.L.S.), U01AI138897 (C.M.D./D.L.S.), and K24AI144954 (D.L.S.) from the National Institute of Allergy and Infectious Diseases. A.B.M. is supported by R01DK132395 from the Institute of Diabetes and Digestive and Kidney Diseases. S.K.A. is supported by K08CA237735 from the National Cancer Institute. J.M.S. receives funding from the OneLegacy Foundation.

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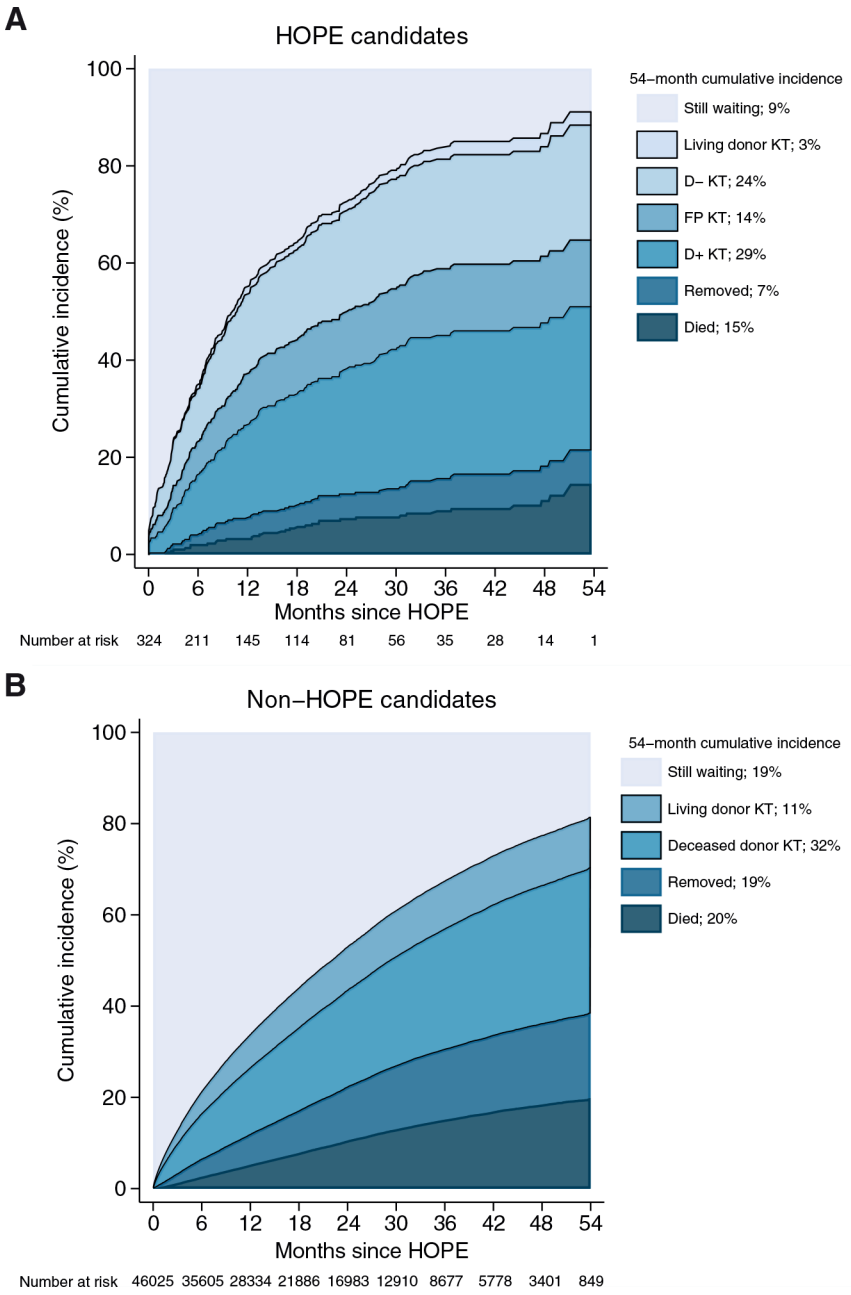

FIGURE 1.

Waitlist outcomes of HOPE and non-HOPE candidates. Fifty-four-month (4.5 y) cumulative incidence of death, waitlist removal, remaining waitlisted, receipt of living donor kidney transplant and deceased donor kidney transplant for HOPE (A) and non-HOPE candidates (B). Estimates were obtained using a competing risk framework (see Materials and Methods), with solid black lines representing candidates who were eventually transplanted. Estimates may go >100% due to rounding. Reasons for removal include refused transplant, transferred to another center*, candidate condition improved, transplant at another center, candidate removed in error, candidate changed to kidney pancreas*, transplanted at another center*, unable to contact candidate, and other reasons for removal among HOPE

candidates. D^+, donor with HIV; D^-, donor without HIV; FP, donor with false-positive HIV test; HOPE, HIV Organ Policy Equity; KT, kidney transplant.

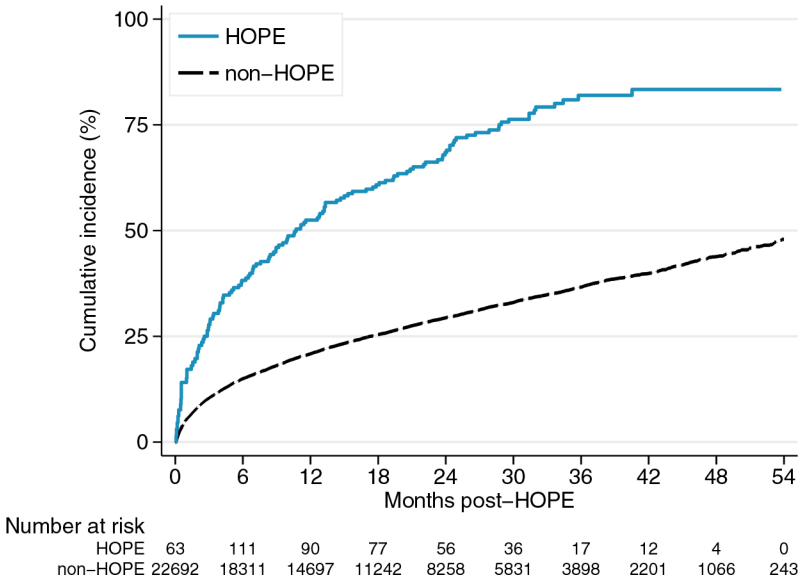

FIGURE 2.

Cumulative incidence of time to kidney transplant for HOPE and non-HOPE candidates. Fifty-four-month (4.5 y) cumulative incidence of time to kidney transplant for HOPE and non-HOPE candidates. HOPE, HIV Organ Policy Equity.

TABLE 1.

Kidney candidate characteristics according to HOPE enrollment

Characteristics	Non-HOPE (n = 46 025)	HOPE (n = 324)	*P*
Age at study entry, y, mean (SD)	54 (13)	52 (11)	0.05
Male, %	62	79	<0.001
Race/ethnicity, %			<0.001
American Indian/Alaska Native	0.3	0	
Asian	12	2	
Black	35	73	
Hispanic/Latino	19	13	
Multiracial	0.7	0.3	
Pacific Islander/Native Hawaiian	0.6	0.3	
White	32	12	
Cause of ESRD, %			<0.001
Glomerular diseases	21	41	
Diabetes	35	20	
Hypertension	23	27	
Polycystic kidney disease	7	2	
Other	14	10	
Peripheral vascular disease, %	9	8	0.8
Height, cm, median (IQR)	170 (163–178)	173 (168–180)	<0.001
Weight, kg, median (IQR)	82 (69–96)	80 (70–93)	0.2
BMI, kg/m^2, median (IQR)	28 (25–33)	27 (24–30)	<0.001
Blood type, %			0.8
O	50	52	
A	29	27	
B	17	18	
AB	3	3	
Serum albumin, mg/dL, mean (SD)	4 (1)	4 (1)	0.5
Previous transplant, %	12	7	0.009
c/PRA ≥80%, %	11	8	0.08

Characteristics	Non-HOPE (n = 46 025)	HOPE (n = 324)	*P*
Years on dialysis at study entry, %			<0.001
Preemptive	26	17	
0–1 y	15	12	
1–3 y	25	24	
3–6 y	21	29	
>6 y	12	18	
Willing to accept an HCV D^+ kidney, %	29	22	0.003
Insurance, %			<0.001
Private	48	29	
Public	52	71	
Other	0.4	0.3	
≤High school education, %	57	65	0.002
Working for income, %	39	36	0.2
Infection characteristics			
HIV RNA <200 copies/mL,[b] %	NA	99	–
HBV core IgG positive,[b] %	ND	39	–
HBV sAg positive,[b] %	ND	7	–
HCV Ab positive,[b] %	ND	13	–
HCV NAT positive,[b] %	ND	3	–

[a]Not mutually exclusive categories.

[b]Only available for 3% candidates who received deceased donor KT. Two candidates had a viral load >200 copies/mL (38 679 and 463).

Ab, antibody; BMI, body mass index; c/PRA, calculated and panel-reactive antibody; ESRD, end-stage renal disease; HBV, hepatitis B virus; HCV, hepatitis C virus; HOPE, HIV Organ Policy Equity; IQR, interquartile range; KT, kidney transplant; NA, not applicable; NAT, nucleic acid testing; ND, no data, not collected by Scientific Registry of Transplant Recipients; sAg, surface antigen.

TABLE 2.

Characteristics of deceased donors for HOPE and non-HOPE recipients

Characteristics	Donors for non-HOPE (n = 9660)	Donors for HOPE (n = 166)	*P*
Age, y, mean (SD)	40 (15)	38 (13)	0.06
Male sex, %	63	69	0.1
Race/ethnicity, %			<0.001
American Indian/Alaska Native	0.5	0	
Asian	3	0.6	
Black	16	29	
Hispanic/Latino	16	15	
Multiracial	0.5	0.6	
Pacific Islander/Native Hawaiian	0.2	0.6	
White	64	54	
BMI, kg/m^2, median (IQR)	28 (24–33)	27 (24–31)	0.06
Diabetes, %	9	7	0.3
Hypertension, %	31	23	0.04
Blood type, %			0.4
O	48	51	
A	36	35	
B	12	13	
AB	4	1	
Donation after circulatory death, %	27	23	0.3
Cause of death, %			0.8
Anoxia	51	47	
Cerebrovascular/stroke	22	23	
Head trauma	24	27	
Other	3	3	
KDPI, %, median (IQR)	50 (28–71)	41 (27–61)	0.02
KDPI: HIV positive, median (IQR)	NA	36 (25–52)	–
KDPI: HIV false positive, median (IQR)	NA	38 (18–57)	–
KDPI: HIV negative, median (IQR)	50 (28–71)	56 (34–72)	0.2

Characteristics	Donors for non-HOPE (n = 9660)	Donors for HOPE (n = 166)	*P*
Infectious characteristics			
Donor type, %			–
HIV positive	NA	39	
HIV false positive	NA	18	
HIV negative	100	43	
HIV Ab positive, %	NA	53	–
HIV NAT positive, %	NA	30	–
HBV core Ab positive, %	6	8	0.2
HBV NAT positive, %	1	1	0.3
HCV Ab positive, %	12	7	0.06
HCV NAT positive, %	8	6	0.4
CMV IgG positive, %	60	76	<0.001
EBV IgG positive, %	91	89	0.3
Increased infectious risk, %	26	49	<0.001

[a]Deceased donors who donated a kidney to both HOPE and non-HOPE recipients (n = 27) were counted once in each column.

Ab, antibody; BMI, body mass index; CMV, cytomegalovirus; HBV, hepatitis B virus; HCV, hepatitis C virus; HOPE, HIV Organ Policy Equity; IQR, interquartile range; KDPI, kidney donor profile index; NA, not applicable; NAT, nucleic acid testing.