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Patients prioritize waitlist over posttransplant outcomes when evaluating kidney transplant centers

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Abstract

Factors that patients value when choosing a transplant center have not been well studied. In order to guide the improvement of patient-facing materials, we conducted an anonymous electronic survey of patients that assessed the relative importance of patient experience, practical considerations, transplant center reputation, center experience, and waitlist when selecting a transplant center. A total of 409 respondents completed the survey, of whom 68% were kidney transplant recipients and 32% had chronic kidney disease or were on dialysis. Participants had mean age 56 ± 12 years and were predominantly female (61%), white (79%), and had an associate’s degree or higher (68%). Participants most often prioritized waitlist when selecting a transplant center (transplanted 26%, chronic kidney disease 40%), and waitlist was almost twice as likely as outcomes to be ranked most important (30% vs 17%). Education level and transplant status were significantly associated with factors used for center prioritization. Waitlisted respondents most commonly (48%) relied on physicians for information when selecting a center, while a minority cited transplant-specific organizations. In order to improve shared decision-making, materials outlining center-specific waitlist features should be prioritized. Novel patient-
oriented metrics for measuring transplant center quality that align with patient priorities must be explored.

Keywords
clinical research/practice; health services and outcomes research; kidney transplantation/nephrology; organ procurement organization; patient characteristics; quality of care/care delivery; Scientific Registry for Transplant Recipients (SRTR); social sciences

1 | INTRODUCTION

The growth in the number of kidney transplants performed in the United States over the past 3 decades has been accompanied by a significant increase in the number of domestic transplant centers. Nevertheless, the transplant center characteristics that potential transplant candidates prioritize when choosing between centers have not been well described. Practical considerations, such as geography and insurance coverage, presumably play a large role in determining patient access to individual kidney transplant centers. However, the vast majority of states have more than 1 active kidney transplant center, and patients with end-stage kidney disease are entitled to Medicare coverage after dialysis initiation or transplantation, suggesting that other factors must also contribute. Current program-specific report cards issued by the Scientific Registry of Transplant Recipients (SRTR) are used to evaluate and compare transplant center performance—and impact public funding for transplant centers—but focus largely on short-term posttransplant outcomes. Other factors that may be important to patients, including patient experiences, practical considerations (such as lodging and transportation), and waitlist factors are not emphasized in these reports.

Better understanding patient preferences and attitudes toward differences in transplant centers represents an important step toward improving shared decision-making between providers and potential transplant candidates and developing patient-oriented center comparisons. We therefore sought to assess patient priorities regarding transplant center characteristics in order to inform the development of improved center-specific informational materials and program-specific reports that include the current transplant center metrics.

2 | METHODS

2.1 | Study design and population

Potential study participants were all adult kidney transplant candidates, recipients, and their family members as well as others who were interested in kidney disease who signed up to receive emails from the National Kidney Foundation (NKF). All survey respondents were informed that completing the survey was voluntary and all survey respondents signed an electronic consent form before beginning the survey. All procedures performed were approved by and conducted in accordance with the ethical standards of Columbia University Medical Center’s Institutional Review Board.
2.2 | Survey content and administration

Patients were asked to self-report demographic data including age, sex, race/ethnicity, state of residence, education, insurance status, chronic kidney disease (CKD) status, dialysis status, and transplant status. Subsequent questions were aimed at determining patient preferences regarding transplant center characteristics. The survey asked participants to rate the importance of 33 center factors on a 5-point Likert scale with the heading: “When choosing a transplant center, how important is each of the following factors?” (Table 1).

Participants were then asked “What is the single most important category of factors you would consider when choosing a transplant center?” among the following options: Waitlist, Outcomes, Transplant center experience, Transplant center reputation, Patient experience, and Practical considerations. This survey was revised based on initial feedback from a panel of 30 active members of the NKF’s patient advocacy group who were given a preview of the survey and invited to provide feedback. Proposed edits from the field test were then incorporated into the survey design.

The survey was administered using a web-based survey interface using skip logic to limit the burden for respondents. All responses were recorded electronically. The survey was only available in English. It was distributed by the NKF to the 8500 individuals signed up for the information from the NKF on August 30, 2018, and survey responses were collected through September 18, 2018 (20-day response period).

2.3 | Statistical analyses

Participants were included if they completed the entire survey (Figure S1). Study data were screened to detect erroneous data entries, missing data, and outliers to test normality. T tests were used to assess differences in demographic information between transplanted and nontransplanted respondents. Pearson $\chi^2$ tests of independence and Fisher exact tests were used where appropriate to examine demographic information and differences between groups for transplant factor rankings. Multivariable ordinal logistic regression was used to determine factors associated with prioritization of each factor. Analyses were performed using SAS 9.4 (SAS Institute Inc, Cary, NC). Statistical significance was identified by a $P < .05$.

3 | RESULTS

Of the 514 participants who responded to the survey, 94 (18%) did not complete the survey and 11 (2%) did not provide their education level, yielding a total of 409 participants who were included in the analysis (80% of survey respondents) (Figure S1). Included participants were similar to excluded participants on all characteristics except transplant status (Table S1). Of the participants included in this analysis, 278 (68%) were prior kidney transplant recipients, and the remaining 131 (32%) had either CKD or endstage kidney disease requiring renal replacement therapy (henceforth referred to together as CKD for brevity) at the time of survey completion (Table 2). The mean age of included participants was 56 years, and they were predominantly female (61%), white (79%), and had obtained at least a bachelor’s/associate’s degree or higher education (68%). About half of participants had private health insurance (49%). Compared to participants with CKD, transplanted patients
were less likely to be black (16% vs 9%, \( P = .044 \)), but there were no other significant differences among demographic characteristics.

Participants most commonly described almost all surveyed center characteristics as “extremely important” (Table S2). Waitlist was most often ranked as the most important factor when evaluating a transplant center by both transplanted participants (26%) and those with CKD (40%) (Figure 1). Furthermore, although the 2 patient groups differed overall on their prioritization of transplant center factors (Table 3), waitlist was listed as either the most important or second most important factor by 66% of participants overall (70% of CKD participants, 64% of transplant participants) (Table S3).

In addition, significant differences between groups were noted for prioritization of practical considerations, which were considered the most important factor by 16% of transplanted participants but only 9% of those with CKD (\( P = .045 \)). Notably, practical considerations were also most likely to be considered the least important factor by both groups (ranked last by 67% of respondents). In order to compare overall attitudes of transplanted participants vs CKD participants toward each factor, the aggregate scores for each transplant center factors were then organized into density plots. Significant differences were noted only for prioritization of waitlist and practical considerations (Figure 2).

We next examined whether demographic factors impacted the likelihood of prioritization of each transplant center factor using multivariable ordinal logistic regression (collapsing factor ranking into first most important factor vs second most important factors vs third to sixth most important factor) (Table 4). Education, insurance status, age, and transplant status had no significant impact on prioritization of practical considerations, transplant center reputation, transplant center experience, patient experience, or outcomes. Higher education attainment was associated with greater prioritization of waitlist factors (compared to participants with a high school degree or less), whereas prior transplant recipient status was associated with decreased prioritization of waitlist.

Given these results, we further assessed whether participant education status was associated with changes in prioritization of individual transplant center factors. Participants with different education levels did not differ in any demographic characteristic other than ethnicity (Table S4). Among all subfactors surveyed, higher level of education was significantly associated with lower likelihood of considering duration of hospitalization, continuity of care team, availability of affordable family housing, family support, and evaluation cost to be important factors (Table 5).

Finally, participants who reported that they were actively waitlisted for a kidney transplant were asked which resources they utilized when choosing a transplant center (multiple answers were allowed). Among these 62 participants, almost half (48%) cited their physician as a source of information about transplant centers, whereas a minority reported utilizing the SRTR (9.7%) (Figure 3).
More than 19,000 patients receive kidney transplants in the United States each year, and there are currently over 95,000 patients on the kidney transplant waitlist.\textsuperscript{5,6} While accessibility defined by distance plays a large role in dictating access to each of the 276 domestic kidney transplant centers for the majority of patients, little else is known about patient preferences when choosing transplant centers. Understanding the transplant center characteristics that patients value is the first step toward improving patient-facing program reports and developing patient-oriented metrics for evaluating transplant center performance.

In the current analysis, we present the first study evaluating and comparing pre- and posttransplant prioritization of transplant center factors by patients and their caregivers. Notably, participants most commonly listed waitlist factors (including ease of getting onto the waitlist and waitlist time) as their top priority—particularly pretransplant CKD patients, who were almost 3 times more likely to list waitlist factors over transplant outcomes as the most important factor to consider when choosing a transplant center. This preference may represent a surrogate for prioritization of overall likelihood of transplantation, which is a reasonable point of emphasis for patients given the quality of life advantage of transplant over dialysis, as well as the high mortality on maintenance dialysis compared to the generally good posttransplant outcomes overall.\textsuperscript{2,7,8} These findings are consistent with a prior report by SRTR investigators showing that waitlist-related inquiries were the most common data-related (“Average or median wait or shortest wait”) and general information (“How to get on the waiting list”) requests to the SRTR by patients.\textsuperscript{9} Not surprisingly, we also found that participants were mostly likely to use their primary providers as their primary source of information when evaluating transplant centers. These data supplement studies outside of transplantation, demonstrating that providers are patients’ preferred source of health information, but is concerning given known deficiencies in transplant-related counseling for patients with end-stage renal disease (ESRD).\textsuperscript{10–12}

Accordingly, earnest discussions between patients and providers regarding differences in waitlist practices and expected waitlist times between centers should be part of transplant-related shared decision-making.\textsuperscript{4} Such discussions should recognize regional differences in organ availability for patients who may be able to take advantage of waitlisting in multiple United Network of Organ Sharing regions, as well as within-region center-level differences in waitlist outcomes that arise from differences in practice patterns with regard to organ offer acceptance and the use of suboptimal kidneys (especially since these center characteristics can confer overall survival advantages to waitlisted candidates).\textsuperscript{13,14} Further investigation is also warranted to assess the effect of waitlist time prioritization on patients’ willingness to accept organs with unfavorable characteristics, such as high Kidney Donor Profile Index kidneys, dual kidney offers, or public health service increased risk organs. Interestingly, our findings somewhat differ from previous work suggesting dialysis patients may underestimate their mortality on dialysis.\textsuperscript{15} We suspect that these differences are due to both differences in the questions that were asked (asking specifically about waitlist outcome prioritization vs about mortality on dialysis) as well as demographic differences between study participants, since that study focused on patients with high expected 1-year mortality.
Differences between pre- and posttransplant patients are also worth noting, in particular regarding patient experience and practical considerations. While patients in our study largely considered practical considerations (including geographic proximity, cost, and lodging) to be the least important factor when choosing a transplant center, transplanted patients were 1.8 times more likely to list this as the most or second-most important factor. This finding suggests that logistical hurdles significantly impact the quality of the posttransplant course for a subset of patients, and greater efforts should be made to predict and address these potential problems at the time of waitlisting.

Finally, participants with no more than a high school education were significantly more likely to prioritize individual practical considerations (such as cost and length of stay) and deprioritize waitlist time compared to participants with at least an associate’s degree, despite clear evidence of the association between dialysis vintage and higher posttransplant mortality.16,17 This difference in preferences may represent a failure of the transplant community to provide adequate, effective education about the association of dialysis duration with inferior posttransplant outcomes and thus encourage patients to be more proactive in shortening time to transplantation, such as by either seeking out a living donor or a center with relatively shorter waiting time. Indeed, prior studies have shown that limited health literacy is common among patients with CKD and is associated with inferior outcomes including decreased likelihood of undergoing kidney transplantation.18–20 Alternatively, it may be reflective of the residual role of peritransplant financial hardship as a barrier to receiving the long-term benefits of transplantation for some patients.21–23 Regardless, this group-level heterogeneity in participant responses demonstrates that the development of effective, comprehensive informational materials requires the input of all segments of the diverse CKD/ESRD population (including, perhaps, those who were denied the opportunity to be transplanted). This is especially true given that we found that patients most often turned to their physicians for information when choosing centers, but prior studies have shown that healthcare providers have limited awareness of the allocation system or of disparities in kidney transplantation.24,25 Disparities in patient education about transplant have direct effects on access to transplantation, and prior studies have found that patient education has the ability to reduce racial and socioeconomic disparities in completion of transplant evaluation.11,26 Furthermore, prior studies have found that patients with lower education attainment were more likely to report psychosocial concerns regarding pursuing transplantation, and less likely to believe transplantation would be advantageous.27

The findings that patients value waitlist factors above others are also important to view in the context of existing resources available to patients when choosing between transplant centers. The SRTR currently provides standardized information about each transplant center in an effort to help patients compare centers to national and regional benchmarks. Included information in the center overview includes quantitative assessments of annual transplant volume and transplant rate (per 100 people per year), as well as a summative outcomes assessment (ie “better than expected,” “as expected,” “worse than expected”).1 Additional available information in the >60-page program-specific reports includes raw data regarding waitlist and transplant activities, waitlist mortality, short-term patient and allograft survival, and results stratified by demographic/medical characteristics. However, patients often find this information difficult to digest.9 Furthermore, it should be noted that although waitlist
factors are valued most by patient before and after transplantation, current metrics used by regulators and payers to evaluate transplant center performance (including the SRTR’s summary “5-tier assessment”) do not take this patient priority into account. Rather, they focus on 1-year (ie, short-term) graft and patient survival despite the fact that with advances in the field of transplantation, the primary contributor to mortality for transplant patients has increasingly become death while waiting for a transplant. These short-term posttransplant outcomes are the only metrics used to set standards for programs and trigger program reviews, and are the only metrics highlighted in the program search feature (both by default sort order and by summative, highlighted, tiered assessment). This discordance may further explain why we found that few patients reported use of SRTR reports to evaluate transplant centers. Patient-oriented reports and metrics that focus on waitlist outcomes rather than short-term outcomes alone may better align with both patient values and overall outcomes, in contrast to the risk aversion encouraged by current metrics.

Interestingly, participants most commonly described all but 5 individual factors as “very important” or “extremely important.” This likely represents patients’ desires to optimize as many aspects of the transplant process as possible, and reinforces that while additional emphasis on waitlist information is needed in existing reports, this should not be done by excluding data on other steps in the transplant process including outcomes. Patient-facing documents that reflect patient preferences for information about transplant centers are likely going to need to be separated out from measures that are provided to transplant center professionals in order to be able to satisfy the needs of both communities. While some of the data being proposed are not currently available, novel data capture strategies that are less burdensome, such as the use of common data models, may be the innovative solution that is needed in the field.

Importantly, public reports about transplant centers are largely standardized across organ types, despite the fact that patients with different disease processes may have different priorities and needs. While our analysis focuses on the needs of patients with end-stage kidney disease, the needs of other patient groups should be studied and organ-specific tailoring of patient-facing center information should be considered. In addition, the heterogeneity of responses overall is worth highlighting. Even though waitlist was most likely to be prioritized, each of the other factors was ranked as “most important” by >10% of participants. As a result, while more information on the pretransplant phase is desirable, it should not be provided at the expense of the outcomes measures to ensure that the diverse needs of ESRD patients are being met.

Recommendations from the 2012 Consensus Conference on Transplant Program Quality and Surveillance include that “PSRs should be better suited to the needs of all users, particularly patients” and to “Enhance reporting of access to transplant and pretransplant outcomes.” In response to these recommendations, on May 14, 2018 (after the completion of this survey and its analysis), the SRTR released an updated beta site (beta.srtr.org) that sought to improve the program-specific reports. Changes included adding 5-tier assessments for waitlist mortality and transplant rate. Importantly, the beta site now acknowledges the importance of actually receiving a deceased donor transplant quickly for patients (“For kidney transplant candidates, this measure has the largest impact on survival after listing.”).
While the proposed changes are not yet final and are subject to revisions following a comment period, they appear to be an important initial step towards making the publicly available information about transplant centers more consistent with the kind of information that patients are seeking.

While this study highlights patient preferences regarding transplant centers, several limitations should be considered. As with most survey-based studies, not all potential participants completed the survey. Although demographic data or CKD status on the nonresponders is not available to us, it is therefore possible that a response bias reduces the generalizability of our results. Similarly, there are notable differences between the survey respondents and the ESRD population in the United States in regard to sex (ESRD population is predominantly male), race (our study had a low proportion of black participants), age, and education. Patients with demographics that were underrepresented in our study population compared to the overall ESRD population (including economically disadvantaged patients, non-English speakers, and racial minorities) face different barriers to transplantation and therefore may have different information preferences when selecting centers. These issues potentially limit the generalizability of our study, suggesting the need to repeat these analyses in other groups, in particular those with lower socioeconomic status and limited health literacy. Additional investigation is warranted to determine the effect of these demographic factors in shaping patient preferences when selecting transplant centers. It is also important to note that the choice of terms used in survey questions can influence participant responses. For example, it is possible that patients may prioritize concepts of mortality outcomes differently from survival outcomes posttransplantation. This will need to be explored in future studies and should inform how center performance is shared with patients. Furthermore, our format did not allow direct ranking of individual items from the first section of the survey. Additional studies comparing individual metrics rather than grouped categories may provide a more nuanced understanding of patient preferences, especially as they pertain to the development of specific metrics that will be used to guide program evaluation and accreditation.

In conclusion, we found that both kidney transplant recipients and pretransplant patients with CKD prioritized waitlist factors when evaluating potential transplant centers. Public-facing informational materials and transplant center report cards that emphasize short-term outcomes should be updated to include clear comparisons of waitlist-related factors in order to facilitate shared decision-making and align with patient preferences.

**Supplementary Material**

Refer to Web version on PubMed Central for supplementary material.

**ACKNOWLEDGMENTS**

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American Society of Transplantation; National Institute of Diabetes and Digestive and Kidney Diseases, Grant/ Award Number: R01-DK114893–01 and U01-DK116066–01; Laura and John Arnold Foundation

Abbreviations:

CKD chronic kidney disease
NKF National Kidney Foundation
SRTR Scientific Registry of Transplant Recipients

REFERENCES


FIGURE 1.
Highest ranked transplant factor stratified by transplant group. Both transplanted and CKD participants most often ranked waitlist factors as most important when evaluating transplant centers. Center experience was the second most often prioritized factor for CKD patients, whereas transplant outcomes was the second most often prioritized factor for transplanted patients. CKD, chronic kidney disease [Color figure can be viewed at wileyonlinelibrary.com]
FIGURE 2.
Density plot of waitlist (A) and practical considerations (B) composite scores stratified by transplant status. For waitlist (A), the mean composite score for CKD respondents was 78.5, while the mean composite score for transplanted patients was 77.6. For practical considerations (B), the mean composite score for CKD respondents was 78.1, while the mean composite score for transplanted patients was 72.3. CKD, chronic kidney disease
[Color figure can be viewed at wileyonlinelibrary.com]
FIGURE 3.
Resource utilization when choosing a transplant center, of respondents who are currently waitlisted (n = 62). Physician/nephrologist was the most commonly listed resource (48% of participants), whereas the SRTR was least commonly listed (<10%). NKF, National Kidney Foundation; SRTR, Scientific Registry of Transplant Recipients; UNOS, United Network of Organ Sharing [Color figure can be viewed at wileyonlinelibrary.com]
### TABLE 1

#### Transplant center characteristics by category

**Waitlist**
- Ease of getting onto transplant waitlist compared to other centers
- Center accepts patients in my age group
- Center accepts patients with my health condition/status
- Average time on waitlist before receiving a kidney compared to other centers
- Percent of patients on the waitlist who never receive a kidney transplant

**Outcomes**
- Percent of patients with complications after transplant surgery
- Average length of hospital stay after transplant surgery
- Hospital readmission rate after transplant
- Patient outcomes compared to those of other nearby transplant centers

**Transplant Center Experience**
- How many years the center has been performing transplants
- Transplant center performs large number of transplants per year
- Overall experience level of doctors at transplant center
- Transplant center’s experience treating patients like me
- Transplant center’s experience treating complex cases
- Transplant center is at an academic medical center (affiliated with a medical school/university)
- Transplant center’s willingness to use kidneys that other centers have turned down

**Transplant Center Reputation**
- Recommendation by my kidney doctor
- Reputation of transplant program
- Reputation of transplant physicians
- Overall reputation of hospital
- Transplant center is affiliated with my dialysis center

**Patient Experience**
- The transplant center is at a hospital that I use for other medical services
- Other patients at my dialysis center have been transplanted at the transplant center
- Other patients at my dialysis center report a positive experience at the transplant center
- Other transplant center patients report satisfaction with transplant experience
- I will work with the same doctors throughout the entire transplant process
- Ease of access to post-op follow-up care at the transplant center

**Practical Considerations**
- Distance of program from my home
- Availability of affordable lodging for my family near the hospital
- Access to support programs/resources for my family
- Program accepts my insurance
- Expected cost of pretransplant evaluation after insurance
- Expected cost of transplantation after insurance
**TABLE 2**

Kidney transplantation survey respondent characteristics and demographics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Total</th>
<th>CKD</th>
<th>Transplanted</th>
<th>P value</th>
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<tr>
<td>N (%)</td>
<td>409</td>
<td>131 (32)</td>
<td>278 (68)</td>
<td></td>
</tr>
<tr>
<td>Mean ± SD or Col %</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondent characteristics</td>
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</tr>
<tr>
<td>Age (y)</td>
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<td>56 ± 12</td>
<td>55 ± 13</td>
<td>.65</td>
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<td>18–25</td>
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<td>1%</td>
<td>2%</td>
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<td>26–45</td>
<td>17%</td>
<td>15%</td>
<td>18%</td>
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<td>46–65</td>
<td>60%</td>
<td>63%</td>
<td>59%</td>
<td></td>
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<td>21%</td>
<td>21%</td>
<td>21%</td>
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<td>Other/None</td>
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<td>Education Level</td>
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<td>32%</td>
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<tr>
<td>Bachelor’s or Associates</td>
<td>44%</td>
<td>48%</td>
<td>42%</td>
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<tr>
<td>Master’s or Doctoral</td>
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<td>20%</td>
<td>26%</td>
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<tr>
<td>Currently on Dialysis</td>
<td>–</td>
<td>47%</td>
<td>–</td>
<td>–</td>
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<tr>
<td>Currently Waitlisted for Transplant</td>
<td>15%</td>
<td>44%</td>
<td>1%</td>
<td></td>
</tr>
</tbody>
</table>

Bold indicates statistical significance.

CKD, chronic kidney disease; Col, column percentage; SD, standard deviation.
### TABLE 3

Factor ranked most important when considering transplant facility, stratified by transplant status (n = 409 Total, 131 CKD/Waitlist, 278 Transplanted) ($X^2 = 11.4, P = .044$)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Total (%)</th>
<th>CKD (%)</th>
<th>Transplanted (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waitlist</td>
<td>30.1</td>
<td>39.8</td>
<td>26.1</td>
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<tr>
<td>Transplant Outcomes</td>
<td>16.7</td>
<td>14.4</td>
<td>17.7</td>
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<td>Center Experience</td>
<td>12.5</td>
<td>15.3</td>
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<td>Patient Experience</td>
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<td>Practical Considerations</td>
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<td>9.3</td>
<td>16.3</td>
</tr>
<tr>
<td></td>
<td>Waitlist</td>
<td></td>
<td>Outcomes</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>----------</td>
<td>----------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Age</td>
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<td>0.99–1.03</td>
<td>1.01</td>
</tr>
<tr>
<td>Kidney transplant recipient</td>
<td><strong>0.59</strong></td>
<td><strong>0.40–0.88</strong></td>
<td>0.90</td>
</tr>
<tr>
<td>Education (ref. = HS deg. or less)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s/Associate’s Degree</td>
<td><strong>1.61</strong></td>
<td><strong>1.05–2.46</strong></td>
<td>1.19</td>
</tr>
<tr>
<td>Master’s/Doctoral Degree</td>
<td>1.32</td>
<td>0.81–2.17</td>
<td>1.25</td>
</tr>
<tr>
<td>Health Insurance (ref. = Medicare)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private insurance</td>
<td>1.37</td>
<td>0.90–2.07</td>
<td>0.73</td>
</tr>
<tr>
<td>Medicaid</td>
<td>0.52</td>
<td>0.08–3.52</td>
<td>0.58</td>
</tr>
<tr>
<td>Other/None</td>
<td>0.77</td>
<td>0.43–1.37</td>
<td>0.74</td>
</tr>
</tbody>
</table>

Bold indicates statistical significance.

CI, confidence interval; CKD, chronic kidney disease; HS deg., high school degree; OR, odds ratio; ref, reference group.
### TABLE 5

Multivariable logistic regression examining the effect of education on whether respondents deemed certain transplant program characteristics as important (vs not important). Model is adjusted for age, insurance, and transplant status.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Parameter</th>
<th>Bachelor’s/associate’s OR (95% CI)</th>
<th>Master’s/doctoral OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranking factor as important (vs not important)</td>
<td>High school or less Reference</td>
<td>0.77 (0.48, 1.25)</td>
<td>0.46 (0.27, 0.81)</td>
</tr>
<tr>
<td>Length of hospital stay</td>
<td></td>
<td>0.49 (0.29, 0.86)</td>
<td>0.55 (0.29, 1.04)</td>
</tr>
<tr>
<td>Other transplant pts. positive</td>
<td></td>
<td>0.37 (0.18, 0.77)</td>
<td>0.40 (0.18, 0.91)</td>
</tr>
<tr>
<td>Same doctors throughout transplant</td>
<td></td>
<td>0.45 (0.27, 0.76)</td>
<td>0.32 (0.17, 0.58)</td>
</tr>
<tr>
<td>Affordable family housing</td>
<td></td>
<td>0.45 (0.27, 0.75)</td>
<td>0.40 (0.22, 0.71)</td>
</tr>
<tr>
<td>Family support program</td>
<td></td>
<td>0.68 (0.36, 1.28)</td>
<td>0.35 (0.18, 0.68)</td>
</tr>
</tbody>
</table>

Bold indicates statistical significance.

CI, confidence interval; OR, odds ratio.