Transplant Clinician Opinions on Use of Race in the Estimation of Glomerular Filtration Rate

Mona D. Doshi,1 Neeraj Singh,2 Benjamin E. Hippen,3 Kenneth J. Woodside,1 Prince Mohan,4 Hannah L. Byford,5 Matthew Cooper,6 Darshana M. Dadhania,7 Sruthi Ainapurapu,8 and Krista L. Lentine8

Abstract

Background and objectives Current race-based eGFR calculators assign a higher eGFR value to Black patients, which could affect the care of kidney transplant candidates and potential living donors.

Design, setting, participants, & measurements We conducted a survey of staff at adult kidney transplant centers in the United States (December 17, 2020 to February 28, 2021) to assess opinions on use of race-based eGFR equations for waitlisting and living donor candidate evaluation, availability of serum cystatin C testing and measured GFR, and related practices.

Results Respondents represented 57% (124 of 218) of adult kidney transplant programs, and the responding centers conducted 70% of recent kidney transplant volume. Most (93%) programs use serum creatinine-based eGFR for listing candidates. However, only 6% of respondents felt that current race-based eGFR calculators are appropriate, with desire for change grounded in concerns for promotion of health care disparities by current equations and inaccuracies in reporting of race. Most respondents (70%) believed that elimination of race would allow more preemptive waitlisting for Black patients, but a majority (79%) also raised concerns that such an approach could incur harms. More than one third of the responding programs lacked or were unsure of availability of testing for cystatin C or measured GFR. At this time, 40% of represented centers did not plan to remove race from eGFR calculators, 46% were planning to remove, and 15% had already done so. There was substantial variability in eGFR reporting and listing of multiracial patients with some Black ancestry. There was no difference in GFR acceptance thresholds for Black versus non-Black living donors.

Conclusions This national survey highlights a broad consensus that extant approaches to GFR estimation are unsatisfactory, but it also identified a range of current opinions.

CJASN 16: 1552–1559, 2021. doi: https://doi.org/10.2215/CJN.05490421

Introduction

GFR, a measure of kidney function, is used in clinical practice to diagnose, classify, and manage kidney disease, and it is used in public health to estimate the burden of kidney disease (1). Direct measurement of GFR using exogenous filtration markers, such as iothalamate or other compounds, is the gold standard and has been used for reference in clinical studies, but it is not widely available and is too expensive and laborious for routine clinical use. The alternative, 24-hour urine collection for creatinine clearance (CrCl), is less expensive and more readily available; however, it is cumbersome for the patients, and the accuracy of the test result is highly dependent on adequacy of collection. Hence, several equations have been developed to estimate GFR using demographic information and serum creatinine values to conveniently assess kidney function.

Two of these equations, the Modification of Diet in Renal Disease (MDRD) study equation developed in 1999 and the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation developed in 2009, use coefficients for age, sex, and race in addition to serum creatinine, purportedly providing more accurate estimation of GFR than serum creatinine alone (2), a premise that has recently come under scrutiny and criticism (3). Current race adjustment assigns a higher eGFR to Black patients (21% higher using the MDRD equation and 16% higher in the CKD-EPI equation). Both the MDRD and CKD-EPI equations have emerged as standards for eGFR over the past 2 decades. In 2017, nearly 90% of US laboratories were reporting eGFR along with serum creatinine results for adults (1). Because a patient’s race is often not available to laboratories, two eGFR values are reported, one for Black persons and another for non-Black persons, leaving providers to decide which value best represents their patient.

Critics have argued that use of race in clinical tools, although ostensibly in service to estimation precision, is a poor proxy for individual genetic differences, exacerbates inequities, and may propagate structural
Survey Administration

The target population was staff at US kidney transplant programs that were active during 2019-2020 (n=218), including nephrologists, surgeons, administrators, coordinators, and social workers. Potential participants were derived from the working group’s professional connections and emailed the survey through the Qualtrics Survey Software. Opportunity for self-elected participation through a Qualtrics link was also posted to professional society listservs (e.g., AST KPCOP, Living Donor Community of Practice [LDCOP], and AST e-News). COP postings were approved by COP leadership, and the AST e-News was approved by the AST Education Committee. Links to the survey were distributed between December 17, 2020 and February 28, 2021. Up to two reminders were provided. Surveys received from programs serving only pediatric patients were excluded from the study as they do not use the common race-based eGFR calculators developed for adults. This manuscript was approved by the AST Education Committee.

Statistical Analyses

Each program was represented once in the primary analysis. For programs with multiple respondents, we selected one participant to represent the program using a hierarchical algorithm, prioritizing responses with the most complete information and sequentially prioritizing responses from nephrologists, surgeons, and other providers, similar to previous methods (18-21). For programs with more than one response after the above two steps, we retained the earliest submitted survey. All responses from staff at adult kidney transplant centers and responses limited to nephrologists were summarized in secondary analyses.

Responses to each survey question were described with percentages and frequencies. To obtain percentages, we divided the number of program responses (i.e., row totals) by the total number of programs that responded to the question, such that percentages reflect proportions of respondents, as per previous methods (21-25). For questions where participants were asked to “select all that apply,” the denominator for calculating percentages was the number of participants responding to that question. For these questions, column totals may exceed 100%. All analyses were performed using R for Windows version 1.2.5042 (RStudio Inc., Boston, MA).

Materials and Methods

Survey Design

The survey instrument was developed by the study investigators. Key topics of study interest were identified, and survey items were developed. The final survey instrument queries information on center (for response rate computation and aggregation), participant role at the center, and opinions on removal of race from GFR estimation equations (n=4); current hospital testing protocols and availability of cystatin C and measured GFR (n=4); interpretation/utilization of eGFR calculations (n=5); and GFR thresholds for acceptance of living donor candidates (n=1) (Supplemental Table 1). This survey study was approved by the Saint Louis University Institutional Review Board (Institutional Review Board protocol no. 31650).

Results

Survey Participants

We received 190 survey responses from US adult kidney transplant programs, of which 84 came from a program with only one survey respondent and 106 were from programs with more than one respondent. After limiting to unique program responses, 124 center responses were available for primary analyses (Supplemental Figure 1). Respondents represented 57% (124 of 218) of active adult kidney transplant centers, and responding transplant centers represented 70% of recent kidney transplant volume. Participants were most often transplant program nephrologists (80%), followed by transplant surgeons (15%) and other staff (5%) (Table 1). All United Network for Organ Sharing (UNOS) regions were represented.

Survey Participants

The survey instrument was developed by the study investigators. Key topics of study interest were identified, and survey items were developed. The final survey instrument queries information on center (for response rate computation and aggregation), participant role at the center, and opinions on removal of race from GFR estimation equations (n=4); current hospital testing protocols and availability of cystatin C and measured GFR (n=4); interpretation/utilization of eGFR calculations (n=5); and GFR thresholds for acceptance of living donor candidates (n=1) (Supplemental Table 1). This survey study was approved by the Saint Louis University Institutional Review Board (Institutional Review Board protocol no. 31650).

Results

Survey Participants

We received 190 survey responses from US adult kidney transplant programs, of which 84 came from a program with only one survey respondent and 106 were from programs with more than one respondent. After limiting to unique program responses, 124 center responses were available for primary analyses (Supplemental Figure 1). Respondents represented 57% (124 of 218) of active adult kidney transplant centers, and responding transplant centers represented 70% of recent kidney transplant volume. Participants were most often transplant program nephrologists (80%), followed by transplant surgeons (15%) and other staff (5%) (Table 1). All United Network for Organ Sharing (UNOS) regions were represented.

Materials and Methods

Survey Design

The survey instrument was developed by the study investigators. Key topics of study interest were identified, and survey items were developed. The final survey instrument queries information on center (for response rate computation and aggregation), participant role at the center, and opinions on removal of race from GFR estimation equations (n=4); current hospital testing protocols and availability of cystatin C and measured GFR (n=4); interpretation/utilization of eGFR calculations (n=5); and GFR thresholds for acceptance of living donor candidates (n=1) (Supplemental Table 1). This survey study was approved by the Saint Louis University Institutional Review Board (Institutional Review Board protocol no. 31650).

Survey Administration

The target population was staff at US kidney transplant programs that were active during 2019-2020 (n=218), including nephrologists, surgeons, administrators, coordinators, and social workers. Potential participants were derived from the working group’s professional connections and emailed the survey through the Qualtrics Survey Software. Opportunity for self-elected participation through a Qualtrics link was also posted to professional society listservs (e.g., AST KPCOP, Living Donor Community of Practice [LDCOP], and AST e-News). COP postings were approved by COP leadership, and the AST e-News was approved by the AST Education Committee. Links to the survey were distributed between December 17, 2020 and February 28, 2021. Up to two reminders were provided. Surveys received from programs serving only pediatric patients were excluded from the study as they do not use the common race-based eGFR calculators developed for adults. This manuscript was approved by the AST Education Committee.

Statistical Analyses

Each program was represented once in the primary analysis. For programs with multiple respondents, we selected one participant to represent the program using a hierarchical algorithm, prioritizing responses with the most complete information and sequentially prioritizing responses from nephrologists, surgeons, and other providers, similar to previous methods (18-21). For programs with more than one response after the above two steps, we retained the earliest submitted survey. All responses from staff at adult kidney transplant centers and responses limited to nephrologists were summarized in secondary analyses.

Responses to each survey question were described with percentages and frequencies. To obtain percentages, we divided the number of program responses (i.e., row totals) by the total number of programs that responded to the question, such that percentages reflect proportions of respondents, as per previous methods (21-25). For questions where participants were asked to “select all that apply,” the denominator for calculating percentages was the number of participants responding to that question. For these questions, column totals may exceed 100%. All analyses were performed using R for Windows version 1.2.5042 (RStudio Inc., Boston, MA).

Materials and Methods

Survey Design

The survey instrument was developed by the study investigators. Key topics of study interest were identified, and survey items were developed. The final survey instrument queries information on center (for response rate computation and aggregation), participant role at the center, and opinions on removal of race from GFR estimation equations (n=4); current hospital testing protocols and availability of cystatin C and measured GFR (n=4); interpretation/utilization of eGFR calculations (n=5); and GFR thresholds for acceptance of living donor candidates (n=1) (Supplemental Table 1). This survey study was approved by the Saint Louis University Institutional Review Board (Institutional Review Board protocol no. 31650).
Opinions Regarding Use of Race in Glomerular Filtration Rate Estimating Equations

A majority (94%) of respondents indicated that the continued use of current race-based equations for calculating eGFR is inappropriate. However, there was a broad array of opinions regarding alternatives (Table 2). Forty percent felt that there were limitations with the use of current eGFR equations that include modifier for race but planned to wait for additional research and consensus data prior to adopting any change. Twenty-one percent believed that race should be “dropped” from eGFR calculations and that estimates should be reported as a range on the basis of age and sex, whereas 24% favored using cystatin C calculators instead of creatinine-based eGFR calculators, which do not use race. A smaller proportion (6%) wanted to utilize height and weight as part of the eGFR calculation to account for muscle mass.

Among participants who believed that use of race in estimating GFR is not appropriate, 69% had concerns for race as a socially constructed concept rather than an empirically substantiated measure of biologic differences; in addition, 67% were concerned that the use of the race modifier reinforced health care disparities (Table 2). Other common reasons for believing that current race parameters are inappropriate include potential inaccuracies in presuming, self-reporting, or self-interpreting race (69%) and uncertain application to multiracial persons (57%). Nearly 50% of the respondents believed that inclusion of race in GFR estimation yielded little to modest improvement in precision.

Effect of Removal of Race from Glomerular Filtration Rate Estimation on “Black” Patients

Seventy-one percent of respondents felt that excluding race from eGFR equations will result in earlier referral to nephrologists and improved CKD case, and 70% believed this change would improve access to preemptive kidney transplant listing (Table 2). Half of respondents believed this change would build trust with the Black community. Only 16% thought that dropping race from GFR estimation would have no beneficial effect on clinical care of Black individuals.

Respondents also raised concerns of potential harms of removing a race modifier from GFR estimation, including overdiagnosis and overtreatment of CKD (43%), premature initiation of dialysis (31%), and premature diagnosis of allograft failure (27%) (Table 2). Twenty-seven percent of respondents were concerned that removing a race modifier from GFR estimation would not significantly improve access to transplantation, while 46% worried the change would underestimate kidney function among Black living donor candidates and deceased donors. Other concerns included errors in prescribing and dosing of medications (24%).

Institution-Level Changes in Estimated Glomerular Filtration Rate Reporting

A minority of respondents (15%) reported that their institution has dropped a race modifier from GFR estimation and reporting by the time of this survey, whereas 46% reported their institutions are contemplating dropping race from GFR estimation; 40% do not anticipate imminent change (Figure 1). Among institutions that have dropped or are planning to drop race, 37% plan to assign a single value to all individuals (assuming non-Black), 30% plan to report a range from computation with and without a race modifier, and 20% reported a planned transition to a cystatin C-based equation.

Availability of Alternative Methods for Estimated Glomerular Filtration Rate Calculators and Glomerular Filtration Rate Measurements

With regard to availability of testing modalities, 65% report that their institution has cystatin C testing available, whereas 24% reported lack of availability, and another 11% were unsure (Figure 1). Similar availability patterns were reported for access to measured GFR using exogenous filtration markers, such as iothalamate, urinary iohexol, or 99mTc-DTPA. Availability of these tests was not universal, with 62% of respondents reporting that their institution has capabilities for measuring GFR, whereas 31% did not have access to measured GFR testing, and 7% were unsure.

Glomerular Filtration Rate Estimation and Transplant Practices

Nearly all respondents (93%) routinely use eGFR for listing patients for kidney transplantation. Twenty-nine percent also used measured 24-hour CrCl in some cases, whereas only 7% reported using measured GFR in transplant listing practice (Table 3).

There was no clear consensus on how to avoid disadvantaging Black patients for preemptive transplant listing. Only 9% felt that current practice is appropriate. Eighteen percent endorsed routine use of measured GFR or measured CrCl, and 31% endorsed use of cystatin C-based formula; 42% felt there was a need to explore other ways to address access disparities. Regarding listing candidates of mixed race including African ancestry, 50% use race reported by the patient, and 20% use a Black race adjustment, whereas 19% use GFR estimated for non-Black persons. For those currently reporting or intending to report

---

**Table 1. Participant characteristics**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Role in transplant program, n=124</strong></td>
<td></td>
</tr>
<tr>
<td>Transplant nephrologist</td>
<td>99 (80)</td>
</tr>
<tr>
<td>Transplant surgeons</td>
<td>19 (15)</td>
</tr>
<tr>
<td>Administrator</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Coordinator</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Other</td>
<td>4 (3)</td>
</tr>
<tr>
<td><strong>UNOS region, n=124</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>9 (7)</td>
</tr>
<tr>
<td>2</td>
<td>22 (18)</td>
</tr>
<tr>
<td>3</td>
<td>10 (8)</td>
</tr>
<tr>
<td>4</td>
<td>11 (9)</td>
</tr>
<tr>
<td>5</td>
<td>14 (11)</td>
</tr>
<tr>
<td>6</td>
<td>2 (2)</td>
</tr>
<tr>
<td>7</td>
<td>10 (8)</td>
</tr>
<tr>
<td>8</td>
<td>10 (8)</td>
</tr>
<tr>
<td>9</td>
<td>9 (7)</td>
</tr>
<tr>
<td>10</td>
<td>14 (11)</td>
</tr>
<tr>
<td>11</td>
<td>13 (10)</td>
</tr>
</tbody>
</table>

UNOS, United Network for Organ Sharing.
If race is excluded from eGFR estimation, how do you think this may “benefit” Black patients?, N=122

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Response, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earlier referral to a nephrologist, leading to improved CKD care</td>
<td>87 (71)</td>
</tr>
<tr>
<td>Improved access to preemptive kidney transplantation</td>
<td>86 (70)</td>
</tr>
<tr>
<td>Build trust with Black community</td>
<td>60 (49)</td>
</tr>
<tr>
<td>Other</td>
<td>6 (5)</td>
</tr>
<tr>
<td>No benefit</td>
<td>20 (16)</td>
</tr>
</tbody>
</table>

If race is excluded from GFR estimation, how do you think this may “harm” Black patients?, N=124

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Response, n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overdiagnosis and overtreatment of CKD</td>
<td>53 (43)</td>
</tr>
<tr>
<td>Premature dialysis initiation</td>
<td>39 (31)</td>
</tr>
<tr>
<td>Access to kidney transplantation may not improve significantly</td>
<td>34 (27)</td>
</tr>
<tr>
<td>Premature diagnosis of failing kidney transplant</td>
<td>33 (27)</td>
</tr>
<tr>
<td>Underestimation of kidney function among Black living donor candidates/deceased donors</td>
<td>57 (46)</td>
</tr>
<tr>
<td>Errors in medication dosing/prescribing</td>
<td>30 (24)</td>
</tr>
<tr>
<td>Other</td>
<td>4 (3)</td>
</tr>
<tr>
<td>No harm</td>
<td>26 (21)</td>
</tr>
</tbody>
</table>

$n$ indicates the item denominator on the basis of number of respondents and accounting for contingent responses.

Among the responding centers, 90% do not have a higher GFR threshold (on the basis of the measured GFR or measured CrCl required in policy) for acceptance of Black compared with non-Black living donor candidates.

Response patterns were similar when including all responses (including multiple respondents per centers and when limiting to nephrologists) (Supplemental Table 2).

**Discussion**

In this national survey of US adult kidney transplant programs, we found that most respondents believe that a modifier for race should be removed from GFR estimation equations; however, there is considerable controversy around appropriate alternatives with attendant unintended consequences. Forty percent of respondents prefer to await additional research and consensus guidance before adopting changes. Key reasons for believing current approaches to GFR estimation are not appropriate include concern for unjustifiably treating race as a biologic category rather than as a social construct and concern for perpetuating or extending extant health care disparities, including among multiracial individuals with some Black heritage. However, respondents also registered potential harms of dropping race from eGFR calculations, including overdiagnosis of CKD, premature dialysis initiation and diagnosis of allograft failure, and underestimation of kidney function in screening living donor candidates. To date, only 15% of responding centers have stopped using race in eGFR calculations. These centers are reporting eGFR in varied fashion, including using only nonmodified eGFR values or reporting a range, whereas some use cystatin C-based equations. eGFR is currently the dominant approach to measuring GFR for accrual of preemptive waiting time points, and there is uncertainty in the community regarding how to avoid disadvantaging multiracial patients with some Black ancestry for preemptive waitlisting. Measured GFR and CrCl, although free of race bias, are not routinely used for waitlisting, perhaps because of the cumbersome nature of these tests.

Our survey highlights the limited availability of commonly proposed alternatives to racefree determination of kidney function, such as cystatin C and measured GFR. Serum cystatin C is an alternative endogenous filtration marker that is less influenced by muscle and diet than creatinine (26,27). Although eGFR using cystatin C is not more accurate than creatinine-based eGFR, it does not include a modifier for race. The eGFR on the basis of using both markers is more precise than estimation based on either marker alone (28,29). Cystatin C is measured by using an ELISA method and, therefore, is not measured in a chemistry laboratory with the rest of the components of a kidney panel. The global adoption of the use of serum cystatin C has been limited by the availability at local institutions and turnaround time, as well as by associated costs (~$4 versus $0.50 US dollars for serum creatinine) (30). Cystatin C levels are affected by diabetes and inflammation and therefore may not be accurate in some patients (26,27). In this survey, only 65% of respondents reported access to cystatin C testing at their hospitals. Measurement of urinary or plasma clearance after administration of an exogenous filtration is
considered the “gold standard” for determining kidney function, with superior accuracy compared with measured CrCl or eGFR, but it requires specialized personnel and equipment and is more difficult, time consuming, and expensive (31). GFR measurement methods are not standardized across transplant centers, and measurement error is an important concern (32). However, measured GFR may provide value justifying the time and expense in some patients, particularly in multiracial patients with some Black ancestry. Only 62% of respondents had access to measured GFR.

Since 2017, nearly 90% of US laboratories are reporting eGFR along with serum creatinine results for adults (1). This uniform reporting allows for early recognition of kidney disease and consistency in access to care, such as medication use, and referral to nephrology consultations. Although only 15% of responding centers have dropped race from eGFR calculation, there is considerable variability in reporting and use for waitlisting. Such variability may further exacerbate disparities for listing on the basis of a patient’s choice of transplant center. We found that many centers are planning to change their practice regarding use of race-based eGFR—plans that may be affected or refined by final recommendations of the NKF-ASN Task Force (10).

Overall, the reasons for delayed access to kidney transplant are multifactorial, including referral patterns and barriers to completing the evaluation, and inaccuracy in GFR estimation may be a small contributor (33,34). Most respondents feel that the community needs to explore other ways to address disparities in preemptive listing for transplant. Reese et al. (35) recently summarized reasons for delayed access to the waiting list and pitfalls of current thresholds of GFR for preemptive listing. The Organ Procurement and Transplantation Network (OPTN) requires a single value of GFR of ≥20 ml/min and does not mandate evidence of a downward trajectory. There is no guidance on modalities for measurement or estimation of GFR, particularly for multiracial individuals with some Black ancestry. Lastly, there is no limit to the amount of preemptive wait time that can be accrued by an individual. This policy for preemptive kidney transplant was implemented in 1998, when a 24-hour urine CrCl and the Cockcroft–Gault equation were the only methods available for estimating kidney function, modalities that may overestimate GFR by 25%. Although it is important to remove racial bias from clinical algorithms, such as eGFR, it is equally important to re-examine preemptive waitlisting criteria with attention to improving equity in access to preemptive waitlisting and transplantation, particularly for Black patients and other

![Figure 1. | Reported health system practices related to use of race in GFR estimation.](image-url)
disadvantaged populations (36). We presented the survey findings and these considerations at an information-gathering session of the NKF-ASN Task Force on Reassessing the Inclusion of Race in Diagnosing Kidney Diseases on April 2, 2021.

In the context of living donor candidate evaluation, the use of current race-based eGFR equations may overestimate the true kidney reserve in Black potential donors. Although national OPTN/UNOS policy requires confirmatory measurements with measured GFR or measured CrCl (37), if eGFR is used in the decision-making process, there is potential for overestimation of kidney reserve with current race-based equations. In contrast, without careful application of race-neutral GFR estimation, otherwise acceptable Black living donor candidates could be inaccurately excluded from further donor evaluation on the basis of screening thresholds for minimal eGFR. For example, to streamline the donor evaluation, some programs exclude donor candidates with eGFR≤60 ml/min per 1.73 m² without proceeding to confirmatory measured CrCl or measured GFR (38). Such exclusions would be expected to happen in the population of candidates with eGFR within 5–10 ml/min of a clinically acceptable range and may exacerbate disparities in opportunities for living donation.

There are limitations to this study. Responses reflect views of the respondents in the center, which may not be in line with other clinicians in the same center. It is possible that our survey respondents include higher proportions of individuals who are especially engaged with the topic. The findings represent practices and experiences as they are reported; we cannot verify how accurately the reports represent actual experience at the center. Although not all programs are represented, the 57% center-level response rate is higher than many contemporary studies of transplant program practices (19–21,24,39,40) (where response rates in the 30% range are common), likely reflecting strong community interest in the topic. The survey was conducted and completed before the March 9, 2021 announcement of preliminary findings by the NKF-ASN joint Task Force, which recommended the elimination of race modifiers in eGFR equations (41).

In conclusion, in this national survey of US transplant centers, there was broad consensus among the respondents that extant approaches to eGFR calculations, which include a race modifier, were unsatisfactory, but there were also broad ranges of opinion on what should replace the status quo. Identifying and eliminating health care access disparities and dismantling structural racism are intertwined with avoiding unintended consequences from an alternative solution that may exchange some disparities for others. Other factors beyond the use of race-based eGFR affecting access to preemptive kidney transplant evaluation and waiting list urgent attention to promote equity in access to the gift of life for all patients, regardless of race (36).

Disclosures

H.L. Byford reports serving as a scientific advisor or member of the AST Transplant Administration and Quality Management Community of Practice Executive Committee and serving as a volunteer for NKF. M. Cooper reports consultancy agreements with CareDx and Specialist Direct; receiving honoraria from CareDx; and serving as a scientific advisor or member of the American Foundation for Donation and Transplant, Angion Pharmaceuticals, Donate Life America, the International Pancreas and Islet Cell Transplant Association, NKF, the National Kidney Registry, Quark Pharmaceuticals, Transplant Genomics, and UNOS. D.M. Dadhania reports consultancy agreements with the advisory boards of AlloVir Inc., CareDx, and Veloxis Pharmaceuticals; receiving research funding from the National Institutes of Health and CSL Behring; and serving as section editor of Nephrology Dialysis Transplantation, as an associate editor of Transplantation, and as a member of the LiveOnNY Medical Advisory Board. B.E. Hippen reports consulting services to Fresenius Medical Care on transplant-related matters, ownership interest in OmniLife.ai, and serving on the board of directors of InterWell Health. K.L. Lentine reports

---

Table 3. Transplant-specific eGFR practices with a focus on patients with some Black ancestry

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which modality(ies) does your institution use most commonly to quantify the GFR value for registering a patient on the transplant waiting list?, n=124</td>
<td></td>
</tr>
<tr>
<td>eGFR</td>
<td>116 (93)</td>
</tr>
<tr>
<td>Measured 24-h CrCl</td>
<td>36 (29)</td>
</tr>
<tr>
<td>Measured GFR</td>
<td>9 (7)</td>
</tr>
<tr>
<td>If you are currently reporting or intend to report eGFR as a range, how do you plan to select the value for waiting list registration?, n=18</td>
<td></td>
</tr>
<tr>
<td>Use midpoint of reported eGFR range</td>
<td>6 (33)</td>
</tr>
<tr>
<td>Use a single value of eGFR (for non-Blacks)</td>
<td>4 (22)</td>
</tr>
<tr>
<td>Other</td>
<td>4 (22)</td>
</tr>
<tr>
<td>Which of the following approaches do you think may be most helpful to avoid disadvantaging Black patients for preemptive listing?, n=123</td>
<td></td>
</tr>
<tr>
<td>Use measured GFR or measured CrCl to identify GFR&lt;20 ml/min per 1.73 m²</td>
<td>22 (18)</td>
</tr>
<tr>
<td>Use cystatin C–based GFR estimation formulas</td>
<td>38 (31)</td>
</tr>
<tr>
<td>Need to explore other ways to address disparities in access to transplant current practice is appropriate</td>
<td>52 (42)</td>
</tr>
<tr>
<td>What eGFR do you use to list a candidate of mixed race with some African ancestry?, n=122</td>
<td></td>
</tr>
<tr>
<td>Use eGFR on the basis of the race reported by the patients</td>
<td>61 (50)</td>
</tr>
<tr>
<td>Use eGFR adjusted for Black race</td>
<td>25 (20)</td>
</tr>
<tr>
<td>Use eGFR adjusted for non-Black race</td>
<td>23 (19)</td>
</tr>
<tr>
<td>Use measured CrCl or measured GFR rather than eGFR</td>
<td>13 (11)</td>
</tr>
<tr>
<td>Do you use a higher GFR (measured GFR or measured CrCl) threshold for acceptance of Black versus non-Black living kidney donor candidates?, n=123</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12 (10)</td>
</tr>
<tr>
<td>No</td>
<td>111 (90)</td>
</tr>
</tbody>
</table>

CrCl, creatinine clearance. n indicates the item denominator on the basis of number of respondents and accounting for contingent responses.
consultancy agreements with CareDx, Inc.; speakers bureau honora-
ria from Sanofi; and serving as LDCOP Chair, an associate editor of the American Journal of Transplantation, and a section editor of Current Transplantation Reports. P. Mohan reports consultancy agreements with CareDx, Natera, and Veloxis; receiving research funding from CareDx and Natera; receiving honoraria from CareDx, Natera, and Veloxis; serving as a scientific advisor or member of Natera; and speakers bureau for CareDx, Natera, and Veloxis. N. Singh reports consultancy agreements with CareDx, Mallinckrodt, Natera, Transplant Genomics, and Veloxis Pharmaceuticals; receiving research funding from CareDx and Transplant Genomics; receiving honoraria from CareDx, Mallinckrodt, Natera, Transplant Genomics, and Veloxis Pharmaceuticals; serving as AST KPCOP Cochair; and speakers bureau for CareDx, Mallinckrodt, Natera, Transplant Genomics, and Veloxis Pharmaceuticals. K.J. Woodside reports consultancy agreements with Lamine, ownership interest in Nephrodite, receiving research funding from Lami-
ne, and serving as a scientific advisor or member of the Gift of Life Michigan Organ Committee. S. Ainapurapu has nothing to disclose. All authors are volunteer members of the AST KPCOP.

Funding
K.L. Lentine is supported by the Mid-America Transplant/Jane A. Beckman Endowed Chair in Transplantation and National Institute of Diabetes and Digestive and Kidney Disease grant R01DK120551.

Acknowledgments
We thank survey respondents, including members of AST KPCOP and Living Donor COP listservs, and the AST Education Committee for review of the survey and manuscript. We also thank Saint Louis University biostatistician Huiling Xiao, MS, for assistance quantifying response reporting on the basis of national registry linkage.

Dr. M.D. Doshi and Dr. K.L. Lentine presented the survey find-
ings by invitation to the NKF-ASN Task Force on Reassessing the Inclusion of Race in Diagnosing Kidney Diseases at a virtual information-gathering session on April 2, 2021.

Data Sharing Statement
Data availability is limited to aggregate summaries as reported on the basis of institutional review board requirements.

Supplemental Material
This article contains the following supplemental material online at http://cjasn.asnjournals.org/lookup/suppl/doi:10.2215/CJN.05490421/-/DCSupplemental.

Supplemental Figure 1. Sampling scheme.
Supplemental Table 1. Survey instrument.
Supplemental Table 2. Comparison of selected survey responses with all responses (including multiple respondents at a given cen-
ter) and with nephrologist responses.

References
1. Miller WG, Jones GRD: Estimated glomerular filtration rate; laboratory implementation and current global status. Adv Chronic Kidney Dis 25; 7–13, 2018
tion—Clinically appropriate or due to underuse or over-
9. Diao JA, Wu GJ, Taylor HA, Tucker JK, Powe NR, Kohane IS, Manrai AK: Clinical implications of removing race from esti-
10. Delgado G, Baweja M, Burrows NR, Crews DC, Eneanya ND, Gadegebeku CA, Inker LA, Mendu ML, Miller WG, Moxey-Mims MM, Roberts GV, St Peter WL, Warfield C, Powe NR: Reassessing the inclusion of race in diagnosing kidney dis-
12. Levey AS, Tighiouart H, Titan SM, Inker LA: Estimation of glo-
merular filtration rate with vs without including patient race. JAMA Intern Med 180: 793–795, 2020
15. Parasuraman R, Venkat KK: Utility of estimated glomerular filtra-
17. Kuppachi S, Norman SP, Lentine KL, Axelrod DA: Using race to estimate glomerular filtration and its impact in kidney trans-
er M, Hays R, Dunbar-Forrest M, Nishio-Lucar A, Mandelbrot DA: Care of international living kidney donor candidates in the U.S.: A survey of contemporary experience, practice & chal-
enges. Clin Transplant 34: e11064, 2020
19. Lentine KL, Peipert JD, Alhamad T, Caliskan Y, Batista M, Con-


Received: April 21, 2021 Accepted: August 13, 2021

M.D.D. and N.S. contributed equally to this work.

Published online ahead of print. Publication date available at www.cjasn.org.