

# The Long Road to Kidney Transplantation

## Does Center Distance Impact Transplant Referral and Evaluation?

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Kidney transplantation is the optimal treatment therapy for eligible patients with kidney failure, offering longer life expectancy and better quality of life compared with patients receiving long-term dialysis treatment (1). However, despite decades of recognition and efforts to improve equity in transplantation, pervasive disparities in access to kidney transplantation persist (1). Recent reports conclude that some transplant disparities have actually become worse over the last two decades (1,2). Patient characteristics, including ethnicity, race, age, frailty/cognitive status, health insurance status, educational status, health literacy, language, and geography, have all been implicated as important determinants of access to kidney transplantation (2–7).

Similarly, prior studies suggest that disparities in transplant access for historically disadvantaged patient populations may be attributable to health care system barriers encountered at multiple steps along the path to successful kidney transplantation, including the timing and quality of nephrology specialist care, decision support tools, and access to timely referral (6–8). Dialysis facilities, where most patients with kidney failure receive their nephrology care, play an important role in the timing and quality of kidney transplant education, assessment of eligibility for kidney transplantation, and referral to a transplant center. Previously, Johansen *et al.* (6) reported that patient race and insurance status influenced their likelihood of receiving timely assessment for transplant eligibility. In a prior study to identify patient- and dialysis facility-level factors associated with kidney transplant referral, Patzer *et al.* (7) also noted that patient race, age, and for-profit status of dialysis centers were associated with patients' referral to a transplant center in Georgia within 1 year of starting dialysis treatment.

In this issue of *CJASN*, McPherson *et al.* (9) evaluate the effect of the distance that patients with kidney failure must travel to a transplant center on their receipt of a transplant referral and initiation of the evaluation process. The authors sought to test whether their quantitative data supported prior qualitative studies that identified geographic distance as a barrier to referral for kidney transplantation. This work leveraged novel patient-level data collected through the Southeastern Kidney Transplant Coalition to test the extent to which center distance was a barrier to transplant referral and initiation of evaluation, two

important early stages of access to kidney transplantation that are often hard to study. In this editorial, we summarize the key findings from this study, highlight the importance of empirically testing commonly held beliefs about access to kidney transplantation, and address the clinical and public health implications of this study.

McPherson *et al.* (9) identified 27,250 adults initiating treatment for kidney failure in the southeastern United States as documented within the US Renal Data System, and they estimated the distance from each patient's residential zip code to the nearest transplant center using a direct route approximation method. Importantly, this study not only accounted for important patient- and dialysis facility-level characteristics but also, accounted for neighborhood-level sociodemographic and socioeconomic characteristics. In the univariate analyses, 38% of patients who lived the closest to a transplant center (<15 miles) were referred for kidney transplantation, whereas 33% of those who lived >90 miles away were referred. Similarly, there was a lower proportion of referred patients who initiated the transplant evaluation process when comparing patients who lived >90 miles from a center (51%) with those who lived <15 miles away (62%). However, after adjustment, center distance was not associated with (1) patient referral within 1 year of starting dialysis or (2) initiation of the evaluation process after referral.

Furthermore, McPherson *et al.* (9) explored important patient subgroups that may be most vulnerable to having to travel far distances to a transplant center. However, they found that there was still no significant association between distance and early access to kidney transplantation by patient race/ethnicity, socioeconomic status, neighborhood poverty, or urban/rural location. These findings further confirmed the limited role of transplant center distance to disparities in access to kidney transplantation among many vulnerable patients. Although these null findings did not support the previous qualitative research that suggested that distance affected referral, the authors performed a number of sensitivity analyses to fully explore the quantitative association. Their inference that distance to a transplant center did not play a major role in access to kidney transplantation during the early stages was robust to their study assumptions and how they defined their population.

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This study is unique and leveraged novel data from the Southeastern Kidney Transplant Coalition that allowed the authors to examine disparities in the early steps of the transplant process; however, by design, it is limited to the southeastern United States. Naturally, readers may question the generalizability and geographic transportability of this study. The thorough evaluation of patient subgroups and robust analyses to confirm their findings suggest that these results may have important implications for other regions in the United States with similar patient populations. In addition, their findings that there were no substantial associations between distance to a transplant center and access to kidney transplant referral and evaluation by race/ethnicity are likely applicable to other United States regions.

However, there could certainly be unique location-specific barriers that influence associations between geography and access to kidney transplantation. In a prior quantitative study of national Organ Procurement and Transplantation Network (OPTN) data, Axelrod *et al.* (8) reported that variations across individual OPTN regions greatly influenced observed differences in access and outcomes on the basis of geography. The study authors further reported that patients living farthest from transplant centers had reduced access to deceased donor kidney transplantation but improved access to living donor kidney transplantation. The recent findings by McPherson *et al.* (9) further demonstrate the complexities of studies to elucidate the contribution of geography to documented disparities in kidney transplantation. Further studies are needed to better understand location-based barriers beyond transplant center distance that may influence geographic disparities in kidney transplantation. For instance, additional geography-based factors that were not evaluated in this study may include key social determinants of health (10), such as lack of public transportation or lack of appropriate infrastructure to facilitate driving during poor weather conditions. These nuanced factors may greatly influence patients' abilities to obtain timely kidney transplant referral and completion of the evaluation process.

In summary, McPherson *et al.* (9) provide important quantitative evidence suggesting that transplant center distance may not affect early access to kidney transplantation for some patient groups. These findings are likely to apply nationally across the United States, but they should be confirmed in other geographic regions and in international settings. Finally, these findings suggest that researchers may need to focus on addressing other documented barriers to kidney transplantation to effectively advance equity in access to transplantation.

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See related Patient Voice, “Distance from a Transplant Center and Getting Listed for a Transplant,” and article, Distance to Kidney Transplant Center and Access to Early Steps in the Kidney Transplantation Process in the Southeastern United States,” on pages 439–440 and 539–549, respectively.