

Addressing Racial and Ethnic Disparities in Live Donor Kidney Transplantation: Priorities for Research and Intervention

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Summary: One potential mechanism for reducing racial/ethnic disparities in the receipt of kidney transplants is to enhance minorities' pursuit of living donor kidney transplantation (LDKT). Pursuit of LDKT is influenced by patients' personal values, their extended social networks, the health care system, and the community at large. This review discusses research and interventions promoting LDKT, especially for minorities, including improving education for patients, donors, and providers, using LDKT kidneys more efficiently, and reducing surgical and financial barriers to transplant. Future directions to increase awareness of LDKT for more racial/ethnic minorities also are discussed including developing culturally tailored transplant education, clarifying transplant-eligibility practice guidelines, strengthening partnerships between community kidney providers and transplant centers, and conducting general media campaigns and community outreach.

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Kidney transplantation represents an optimal therapy for end-stage renal disease (ESRD), offering patients improved survival and quality of life at less cost than dialysis.^{1,2} However, racial/ethnic minorities with

ESRD trail behind Caucasians in their receipt of deceased donor kidney transplants.^{1,2} Research on racial/ethnic disparities in access to kidney transplant has shown that, compared with Caucasians, minorities are less likely to be referred and present for transplant evaluation,^{3,4} take longer to complete transplant evaluation,⁵ are less likely to be placed on the waiting list,⁶ wait longer for kidney transplantation,⁷ ascend up the waiting list more slowly,⁷ are less likely to undergo transplantation, and often suffer worse outcomes postoperatively.^{3,8,9}

One potential mechanism for reducing racial/ethnic disparities in the receipt of transplants is to enhance minorities' pursuit of living donor kidney transplantation (LDKT). LDKT, in which a living family member, friend, or another altruistic person donates their kidney to a patient with ESRD, yields better graft survival, lower rates of acute rejection, and improved patient survival¹⁰ compared with deceased donor transplantation. Because LDKT does not require potential recipients to be placed on a waiting list, it also bypasses many documented

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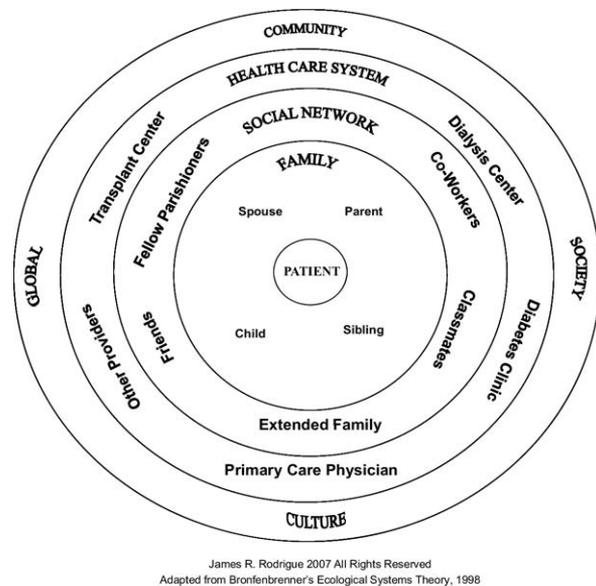


Figure 1. Socioecological transplant model. Reprinted with permission.⁷²

barriers to the receipt of deceased kidney transplants,^{3,11} including longer deceased donor transplant waiting times and higher rates of immunologic incompatibility.¹² LDKT also can occur before ESRD patients require dialysis, a treatment option called *preemptive live donor transplantation* (PLDT) that is associated with superior clinical outcomes.¹³⁻¹⁵ However, as of 2008, only 30% of living donors are racial/ethnic minorities, only 30% of LDKTs go to non-Caucasian recipients,¹⁶ and racial/ethnic minorities are significantly less likely to receive PLDTs than Caucasians.¹⁷

SOCIOECOLOGICAL THEORY DESCRIBING LDKT DECISION MAKING

The use of a socioecological model as a theoretical framework allows for examination of the influences of patients' personal values, core family, extended social network, the health care system at large, and their community or culture on LDKT decision making and behavior (Fig. 1). Table 1 outlines known barriers to LDKT for racial/ethnic minorities and promising interventions to overcome these barriers for each level of the socioecological model.

PATIENT-LEVEL FACTORS

At the core of the socioecological model are patient-level factors: how patients think, feel, and make decisions about their illness and LDKT. Patients not pursuing LDKT tend to lack knowledge about the benefits of living donation over remaining on dialysis,¹⁸ have concerns about involving and risking a living donor's health, or fear their own surgical pain and the possibility of the transplanted kidney failing.^{19,20} The effect of these factors on pursuit of LDKT among racial/ethnic minorities likely is exacerbated by minorities' lower socioeconomic status, greater levels of occupational insecurity, and more transient health care coverage compared with their Caucasian counterparts.^{21,22}

Support of LDKT at the patient level varies among racial/ethnic minorities of different cultural backgrounds. For instance, mistrust of health care providers is more common for African Americans than Caucasians,²³ which may affect their trust in physician's recommendations for LDKT and cause suspicion of LDKT.²³⁻²⁵ In contrast, Hispanics' strong sense of familial duty²⁶ may affect their willingness to volunteer to be LDKTs compared with other ethnic groups.²⁷

FAMILY- AND SOCIAL NETWORK-LEVEL FACTORS

At its core, LDKT involves the potential kidney patient and his or her living donor. In addition, family members and friends are involved in supporting these individuals through evaluation, surgery, and recovery. Studies have shown that many patients, especially non-Caucasians and patients without a college degree, feel very uncomfortable talking about LDKT.^{19,28,29} In the case of racial/ethnic minorities, discussion about LDKT also may need to occur with a larger pool of potential living donors because it may be difficult to find a clinically suitable donor without kidney disease risk factors. This is reinforced by research suggesting that precursors for ESRD may spread through social networks.³⁰ Also, research has shown that African American women with larger social support networks are more likely to complete pretrans-

Table 1. Possible Interventions to Overcome LDKT Barriers for Racial Minorities

	Barriers to Receipt of a LDKT, Particularly for Racial Minorities	Interventions That Have or Might Overcome These Barriers
Patient/family level		
Patient factors	Variation in mortality/morbidity on dialysis or clinical suitability for transplant Differing preferences for transplant Greater fears of transplant surgery or involving a LDKT Poorer LDKT knowledge Variation in willingness to ask others to be living donors Variation in religious views or spirituality about health, organ donation, and transplant Mistrust of the medical establishment Practical barriers to transplant: no transportation or ability to take off work for evaluation and recovery Transient health care coverage or lack of private insurance Not native English speakers or US citizens	Improved LDKT education in transplant and dialysis centers Improved preemptive living donor education through community organizations Interventions to improve patient's health literacy Interventions to reduce medical mistrust Community support groups for renal patients in early chronic kidney disease stages Education addressing how to ask others to be living donors
Family and social network factors	Lack of eligible living donors because of higher rates of diabetes, hypertension, and kidney disease in families of racial minorities Lack of awareness someone could be a LDKT Higher fears about being a LDKT Mistrust of the medical establishment Practical barriers: no transportation or ability to take off from work for LDKT evaluation and recovery Transient health care coverage or lack of private insurance Not native English speakers or US citizens Cultural differences in family decision making, communication, and support for LDKT	Increased availability of paired donation and nondirected donation programs Improved LDKT education reaching potential living donors on the web Financial assistance covering LDKT-related expenses Transplant education involving the family and prospective donors in multiple languages Media campaigns to educate community about LDKT
Provider factors		
Physician and/or health care provider factors	Lack of physicians and health care providers who are racial minorities Physician beliefs about racial differences in morbidity and mortality with transplant versus dialysis Perceptions of patients' suitability for transplant—subconscious stereotyping Insufficient training in transplant (for dialysis providers)	Establish a diverse and culturally competent health care workforce Establish practice guidelines for transplant eligibility and referral Train dialysis providers how to educate patients about LDKT
Physician-patient factors	Patient confusion about LDKT owing to inconsistent transplant education and referral across multiple providers Less established or quality patient-physician relationship Poor patient-physician communication regarding LDKT Cultural or language barriers between patients and physicians	Develop culturally competent education at appropriate literacy levels in multiple languages Increase the availability of interpreters Strengthen communication between transplant, dialysis, and community physicians
System level		
Health care organization factors	Insufficient time for potential donor and recipient education about LDKT Complex and inefficient transplant evaluation Lack of LDKT educational resources in multiple languages and for low health literacy patients Healthy potential living donors do not match their recipients	Streamline transplant and living donor evaluation and surgery Chronic Care Model or guided-care approach to help ensure patients complete transplant evaluation Establish standard LDKT educational programs using web, video, and print materials Establish national paired donation program
Community and societal level	Lack of health insurance results in delayed access to CKD care—minorities present to emergency rooms in ESRD Providers receive more reimbursement for dialysis care than transplant referral Costs of immunosuppressant drugs after 3 years stop minorities from pursuing LDKT	Universal access to health care Provide incentives for appropriate referrals (ie, pay for performance) Proposals to extend Medicare immunosuppressant drug coverage for the life of the transplant

plant evaluation than African American women with less support.³¹

HEALTH CARE SYSTEM–LEVEL FACTORS

Patients interested in LDKT also encounter barriers at every stage of the clinical pathway, including being aware of their medical eligibility, completing transplant evaluation, finding a matching living donor, completing donor and recipient evaluations, and receiving transplants. System-level barriers for racial/ethnic minorities include disproportionate access to the option of LDKT, poor LDKT education, and inefficient clinical evaluations and care. Possibly because of variation in their training or subconscious patient stereotyping, health care providers may overemphasize racial/ethnic minority patients' reluctance to receive transplants or hold biases that racial/ethnic minorities do better on dialysis than nonminorities.^{8,32,33} Their rates of transplant referral may vary because of beliefs that minorities or individuals of low socioeconomic status may be more likely to drop out of evaluation or have less successful transplants.^{34,35} Also, some providers have insufficient time to educate patients about LDKT or work in environments with inadequate educational resources.^{4,36} One study found that 78% of surveyed dialysis patients reported no or incomplete knowledge about LDKT.³⁷ Cultural or language barriers also may limit providers from being able to truly understand patients' LDKT preferences.³⁸

COMMUNITY- AND SOCIETY-LEVEL FACTORS

Community- and society-level factors affecting transplant decision making include availability of health insurance, government regulations regarding transplantation and organ donation, and cultural values and customs. Persons of low socioeconomic status and without private insurance are less likely to be listed for transplant and less likely to undergo PLDT.³⁹ Research has shown that more than 80% of the general public is supportive of financial incentives such as reimbursement for medical costs and paid leave for LDKT, with African Americans reporting more support for financial incentives than Cau-

casians.⁴⁰ Over the past 10 years, state and national legislation has been enacted to reduce the financial burden of LDKT through tax incentives, the provision of paid and unpaid leave, and the reimbursement of direct costs. However, such legislation is not yet associated with any increase in LDKT rates.⁴¹

INTERVENTIONS

ADDRESSING BARRIERS TO LDKT

To provide insight for stakeholders seeking to address and overcome racial/ethnic disparities in LDKT, we discuss known LDKT interventions at every level of the socioecological model. This review discusses research and interventions promoting LDKT, especially for minorities, including improving education for patients, donors, and providers, using LDKT kidneys more efficiently, and reducing surgical and financial barriers to transplant.

PATIENT-LEVEL INTERVENTIONS

Improved Dialysis Education About LDKT

Minority and low-income populations are less knowledgeable and receive less education about transplants than other groups.⁴² At least two group randomized controlled trials have studied whether improved dialysis center LDKT education increases pursuit of transplant and LDKT. Transplant-eligible patients in these studies watched videos sharing recipient and living donor stories, received educational brochures, and had LDKT conversations. In one study, compared with their baseline attitudes, African Americans, younger patients, and patients who spent less time on dialysis were shown to be significantly more willing to pursue LDKT after receiving education compared with patients in control dialysis centers.⁴³ In a second study, patients in dialysis centers receiving LDKT education were significantly more likely to share education with their support network, make a list of potential living donors, and discuss LDKT with others compared with patients in control dialysis centers. Also, in a subgroup analysis, African American patients receiving LDKT education were significantly more likely than their

Caucasian counterparts to make a list of potential donors and to discuss LDKT with others.⁴⁴

Improved Education about Preemptive Transplantation

Although educating patients about PLDT also could enable more patients to bypass dialysis entirely,⁴⁵ it is difficult to locate eligible patients before they reach ESRD. Minority patients generally access health care services less than non-minorities and are more likely to present to nephrologists or the emergency room in full kidney failure.^{46,47} Although currently there is a paucity of data about promoting PLDT, two randomized controlled trials partnering with community nephrologists and patient advocacy organizations are being conducted to assess the effectiveness of patient educational initiatives on increasing rates of PLDT for minorities. Methods for improving PLDT awareness outside of the clinical setting also should be explored further.

FAMILY AND SOCIAL NETWORK INTERVENTIONS

Home-Based Education for Patients and Families

Patients pursuing LDKT want detailed information about the evaluation, surgery, and medical tests required for recipients and donors.⁴⁸ Several transplant centers have increased LDKT rates by offering formal family education programs and targeting African Americans.⁴⁹ However, traditional clinic education about LDKT often is brief, presented early in the patients' decision-making process, and only to those who attend medical appointments. Rodrigue et al^{50,51} conducted a randomized controlled trial of an educational program in which health professionals discussed LDKT with prospective recipients and their support network either in the clinic or their homes. Compared with traditional clinic-based education, significantly more patients in the home-based condition, particularly African Americans, had living donor inquiries, evaluations, and LDKTs. This program allowed more patients and their support networks to learn about LDKT without taking time off from work to go to the transplant center and enabled interested

potential living donors to volunteer without requiring kidney recipients to ask directly.

HEALTH CARE SYSTEM-LEVEL INTERVENTIONS

Improving Dialysis Provider Education About LDKT

The Medicare Improvements for Patients and Providers Act of 2008 mandates that patients with advanced kidney dysfunction receive education about all ESRD treatment options, tailored to the specific needs of individual patients and populations. However, dialysis providers may not have received enough education about LDKT themselves to accomplish this task. One study of dialysis providers representing 254 centers in four states revealed that only 41% felt knowledgeable enough to answer patients' transplant questions, with only 29% of these centers having a formal transplant education program.⁵² An ongoing trial educating dialysis providers on how to discuss LDKT with their patients is occurring in partnership with the Centers for Medicare and Medicaid Services Network 12. The goal of this intervention is to standardize provider knowledge about transplants and to increase the availability of patient education for all transplant-eligible dialysis patients. As one of its main outcomes, this study will assess the effect of provider education on reducing racial/ethnic disparities in the receipt of LDKT.

Paired Donation and Nondirected Donation Programs

One third of willing living donors are ruled out because of blood type or antibody incompatibility with their intended recipients.⁵³ Paired donation programs (where an incompatible donor donates to another recipient so that his/ her intended recipient can receive a kidney from another living donor or the deceased donor pool), and nondirected donation programs (where charitable individuals anonymously donate living donor kidneys to patients on the waiting list) have been developed to efficiently use available living donors without matching recipients.⁵⁴ To date, 398 paired donations, 207

list paired donations, and more than 500 non-directed donations have occurred.¹⁷

In 2008, a national Kidney Paired Donation pilot program was approved by the United Network for Organ Sharing to increase living donor access to this option nationally. Although these programs allow more recipients to receive the health benefits of living donor kidneys,⁵⁵⁻⁵⁷ concerning trends are being reported in which Caucasians and patients of higher socioeconomic status are more likely to participate than other racial groups, possibly creating, rather than reducing, LDKT disparities.⁵⁸

Systematizing Living Donor Care in Transplant Centers

Interventions to standardize education and simplify care for living donors also may help to increase LDKT rates. To reduce confusion, the Living Donor Consensus Group has developed a set of recommendations standardizing what information should be communicated to living donors at transplant centers.^{59,60} Growing use of laparoscopic and mininephrectomy surgical techniques, which reduce donors' incisions and shorten recovery times, has been shown to increase LDKT rates.⁶¹⁻⁶³

COMMUNITY AND SOCIETY LDKT INTERVENTIONS

Reimbursement of Living Donation Expenses for Eligible Donors

In 2007, the National Living Donor Assistance Center (NLDAC) was established to assist individuals with out-of-pocket expenses associated with living donation. For potential living donors who meet specific financial eligibility criteria, the NLDAC provides up to \$6,000 in reimbursement for the costs of donor evaluation, surgery, and follow-up evaluation, including hotel, travel, and meal expenses. Currently, more than 100 transplant centers have filed NLDAC applications, with more than 200 potential living donors receiving funds (NLDAC communication, Katrina Crist, October 1, 2008). With 40% of applicants reporting that they would be unable to afford to donate without NLDAC financial support, this is an important initiative for overcoming financial disincentives to living

donation. The effect of the NLDAC program on LDKT rates for racial/ethnic minorities has not yet been assessed.

FUTURE DIRECTIONS TO OVERCOME RACIAL/ETHNIC DISPARITIES IN LDKT

In addition to the intervention approaches discussed, there are many other strategies for reducing racial/ethnic disparities in LDKT that need additional study. Hispanics (41%), African Americans (25%), and Asian/Pacific Islanders (13%) have suboptimal levels of health literacy compared with Caucasians (9%). Therefore, culturally tailored transplant education approaches must be made available at appropriate reading/literacy levels and in other languages, with the use of live interpreters when appropriate.^{64,65} Since many potential living donors first learn about LDKT online,⁶⁶ information must be made easily available through common search engines. Finally, an exploration of the effectiveness of different strategies for involving patients' families and social networks in learning about LDKT and locating potential living donors still is needed.

Interventions aimed at the health care system or provider levels, where patients most often receive information, ultimately may reach more racial/ethnic minorities. Strengthening partnerships between community nephrologists and transplant centers may enable more transplant-eligible patients to be identified, educated, and referred. Broad dissemination of clinical practice guidelines outlining which patients are transplant-eligible and when referral for PLDT should occur may help resolve provider uncertainty. Since greater continuity of care is associated with higher levels of patient trust,⁶⁷ interventions that establish strong and consistent physician-patient relationships also may contribute to higher LDKT rates for minorities.

At the community level, media campaigns and community outreach targeting racial/ethnic minorities may enhance awareness of the need for LDKT.⁶⁸ Interventions encouraging donor registration through the Registry of Motor Vehicles may have important spill-over effects for LDKT, especially by increasing discussion about the possibility of organ donation within families.

In closing, multiple forums on reducing racial/ethnic disparities recommend linking system improvements to reducing racial disparities, incentivizing reduction of disparities, establishing a diverse health care workforce and culturally competent providers, and expanding access to health services and insurance coverage.⁶⁹⁻⁷¹ It is likely that these approaches would impact LDKT rates for racial/ethnic minorities. However, there is also a significant lack of information about how LDKT decisions are made, especially for racial/ethnic minorities. Research that enhances knowledge about the key determinants of decision making for minority recipients and potential donors and that addresses system- and community-level LDKT barriers still is needed to understand the optimal mechanisms through which LDKT disparities can be ameliorated.

REFERENCES

1. Ichikawa Y, Fujisawa M, Hirose E, et al. Quality of life in kidney transplant patients. *Transplant Proc.* 2000; 32:1815-6.
2. Whiting JF, Kiberd B, Kalo Z, Keown P, Roels L, Kjerulf M. Cost-effectiveness of organ donation: evaluating investment into donor action and other donor initiatives. *Am J Transplant.* 2004;4:569-73.
3. Alexander GC, Sehgal AR. Barriers to cadaveric renal transplantation among blacks, women, and the poor. *JAMA.* 1998;280:1148-52.
4. Garg PP, Frick KD, Diener-West M, Powe NR. Effect of the ownership of dialysis facilities on patients' survival and referral for transplantation. *N Engl J Med.* 1999;341:1653-60.
5. Weng FL, Joffe MM, Feldman HI, Mange KC. Rates of completion of the medical evaluation for renal transplantation. *Am J Kidney Dis.* 2005;46:734-45.
6. Sequist TD, Narva AS, Stiles SK, Karp SK, Cass A, Ayanian JZ. Access to renal transplantation among American Indians and Hispanics. *Am J Kidney Dis.* 2004;44:344-52.
7. Sanfilippo FP, Vaughn WK, Peters TG, et al. Factors affecting the waiting time of cadaveric kidney transplant candidates in the United States. *JAMA.* 1992; 267:247-52.
8. Held PJ, Pauly MV, Bovbjerg RR, Newmann J, Salvatierra O Jr. Access to kidney transplantation. Has the United States eliminated income and racial differences? *Arch Intern Med.* 1988;148:2594-600.
9. Eggers PW. Racial differences in access to kidney transplantation. *Health Care Financ Rev.* 1995;17:89-103.
10. United Network for Organ Sharing. Living donation: an overview. 2001. Available from: www.unos.org [accessed 2004 July 20].
11. Gaston RS, Ayres I, Dooley LG, Diethelm AG. Racial equity in renal transplantation. The disparate impact of HLA-based allocation. *JAMA.* 1993;270:1352-6.
12. Young CJ, Gaston RS. Renal transplantation in black Americans. *N Engl J Med.* 2000;343:1545-52.
13. Abecassis M, Bartlett ST, Collins AJ, et al. Kidney transplantation as primary therapy for end-stage renal disease: a National Kidney Foundation/Kidney Disease Outcomes Quality Initiative (NKF/KDOQIM) conference. *Clin J Am Soc Nephrol.* 2008;3:471-80.
14. Abou Ayache R, Bridoux F, Pessione F, et al. Preemptive renal transplantation in adults. *Transplant Proc.* 2005;37:2817-8.
15. Grochowicki T, Szmidt J, Galazka Z, et al. Comparison of 1-year patient and graft survival rates between preemptive and dialysed simultaneous pancreas and kidney transplant recipients. *Transplant Proc.* 2006; 38:261-2.
16. United Network for Organ Sharing. Online data reports. Available from www.unos.org. [accessed 2009 January 16].
17. Butkus DE, Dottes AL, Meydrech EF, Barber WH. Effect of poverty and other socioeconomic variables on renal allograft survival. *Transplantation.* 2001;72: 261-6.
18. Waterman AD, Stanley SL, Barrett AC, et al. Knowledge and attitudinal barriers to transplantation for dialysis patients. Chicago, IL: National Kidney Foundation; 2006.
19. Waterman AD, Stanley SL, Covelli T, Hazel E, Hong BA, Brennan DC. Living donation decision making: recipients' concerns and educational needs. *Prog Transplant.* 2006;16:17-23.
20. Pradel FG, Limcangco MR, Mullins CD, Bartlett ST. Patients' attitudes about living donor transplantation and living donor nephrectomy. *Am J Kidney Dis.* 2003;41:849-58.
21. Eckhoff DE, Young CJ, Gaston RS, et al. Racial disparities in renal allograft survival: a public health issue? *J Am Coll Surg.* 2007;204:894-902.
22. Navaneethan SD, Singh S. A systematic review of barriers in access to renal transplantation among African Americans in the United States. *Clin Transplant.* 2006;20:769-75.
23. Boulware LE, Cooper LA, Ratner LE, LaVeist TA, Powe NR. Race and trust in the health care system. *Public Health Rep.* 2003;118:358-65.
24. Callender CO, Miles PV. Obstacles to organ donation in ethnic minorities. *Pediatr Transplant.* 2001;5:383-5.
25. Boulware LE, Ratner LE, Cooper LA, Sosa JA, LaVeist TA, Powe NR. Understanding disparities in donor behavior: race and gender differences in willingness to donate blood and cadaveric organs. *Med Care.* 2002;40:85-95.
26. Warda MR. Mexican Americans' perceptions of culturally competent care. *West J Nurs Res.* 2000;22: 203-24.
27. Dominguez JM, Gonzalez ZA, Morales Otero LA, Torres A, Santiago-Delpin EA. Knowledge and atti-

- tude about organ donation in a Hispanic population. *Transplant Proc.* 1991;23:1804-6.
28. Lunsford SL, Simpson KS, Chavin KD, et al. Racial differences in coping with the need for kidney transplantation and willingness to ask for live organ donation. *Am J Kidney Dis.* 2006;47:324-31.
 29. Rodrigue JR, Cornell DL, Kaplan B, Howard RJ. Patients' willingness to talk to others about living kidney donation. *Prog Transplant.* 2008;18:25-31.
 30. Christakis NA, Fowler JH. The spread of obesity in a large social network over 32 years. *N Engl J Med.* 2007;357:370-9.
 31. Clark CR, Hicks LS, Keogh JH, Epstein AM, Ayanian JZ. Promoting access to renal transplantation: the role of social support networks in completing pre-transplant evaluations. *J Gen Intern Med.* 2008;23:1187-93.
 32. Wolfe RA, Ashby VB, Milford EL, et al. Comparison of mortality in all patients on dialysis, patients on dialysis awaiting transplantation, and recipients of a first cadaveric transplant. *N Engl J Med.* 1999;341:1725-30.
 33. Ayanian JZ, Cleary PD, Keogh JH, Noonan SJ, David-Kasdan JA, Epstein AM. Physicians' beliefs about racial differences in referral for renal transplantation. *Am J Kidney Dis.* 2004;43:350-7.
 34. Miskulin D. Case-mix factors explain the survival advantage of Hispanic and racial minority patients on hemodialysis. *Nat Clin Pract Nephrol.* 2007;3:192-3.
 35. Robinson BM, Joffe MM, Pisoni RL, Port FK, Feldman HI. Revisiting survival differences by race and ethnicity among hemodialysis patients: the Dialysis Outcomes and Practice Patterns Study. *J Am Soc Nephrol.* 2006;17:2910-8.
 36. Beasley CL, Hull AR, Rosenthal JT. Living kidney donation: a survey of professional attitudes and practices. *Am J Kidney Dis.* 1997;30:549-57.
 37. Vianello A, Palminteri G, Brunello A, Calconi G, Maresca MC. Attitudes and knowledge about transplantation in dialyzed patients requesting a cadaveric kidney graft. *Clin Nephrol.* 2000;53 Suppl:64-6.
 38. Cooper-Patrick L, Gallo JJ, Gonzales JJ, et al. Race, gender, and partnership in the patient-physician relationship. *JAMA.* 1999;282:583-9.
 39. Kasiske BL, Snyder JJ, Matas AJ, Ellison MD, Gill JS, Kausz AT. Preemptive kidney transplantation: the advantage and the advantaged. *J Am Soc Nephrol.* 2002;13:1358-64.
 40. Boulware LE, Troll MU, Wang NY, Powe NR. Public attitudes toward incentives for organ donation: a national study of different racial/ethnic and income groups. *Am J Transplant.* 2006;640:2774-85.
 41. Boulware LE, Troll MU, Plantinga LC, Powe NR. The association of state and national legislation with living kidney donation rates in the United States: a national study. *Am J Transplant.* 2008;8:1451-70.
 42. van Ryn M, Fu SS. Paved with good intentions: do public health and human service providers contribute to racial/ethnic disparities in health? *Am J Public Health.* 2003;93:248-55.
 43. Pradel F, Suwannaprom P, Mullins C, Sadler J, Bartlett S. Short-term impact of an educational program promoting live donor kidney transplantation in dialysis centers. *Prog Transplant.* 2008;14:263-72.
 44. Waterman A, Hyland S, Stanley SL, Barrett AC, Millinger R. Improving education increases dialysis patients' pursuit of transplant: explore transplant RCT findings. Paper presented at: American Transplant Conference; 2009 May 30-June 3; Boston, MA.
 45. Hayes R, Waterman AD. Improving preemptive transplant education to increase living donation rates: reaching patients earlier in their disease adjustment process. *Prog Transplant.* 2008;14:251-6.
 46. Ismail N, Neyra R, Hakim R. The medical and economical advantages of early referral of chronic renal failure patients to renal specialists. *Nephrol Dial Transplant.* 1998;13:246-50.
 47. Cunningham WE, Mosen DM, Morales LS, Andersen RM, Shapiro MF, Hays RD. Ethnic and racial differences in long-term survival from hospitalization for HIV infection. *J Health Care Poor Underserved.* 2000;11:163-78.
 48. Waterman AD, Barrett AC, Stanley SL. Optimal transplant education for recipients to increase pursuit of living donation. *Prog Transplant.* 2008;18:55-62.
 49. Foster CE 3rd, Philosophe B, Schweitzer EJ, et al. A decade of experience with renal transplantation in African-Americans. *Ann Surg.* 2002;236:794-805.
 50. Rodrigue JR, Cornell DL, Lin JK, Kaplan B, Howard RJ. Increasing live donor kidney transplantation: a randomized controlled trial of a home-based educational intervention. *Am J Transplant.* 2007;7:394-401.
 51. Rodrigue JR, Cornell DL, Kaplan B, Howard RJ. A randomized trial of a home-based educational approach to increase live donor kidney transplantation: effects in blacks and whites. *Am J Kidney Dis.* 2008;51:663-70.
 52. Waterman A, Goalby C, Hyland S. Dialysis providers ability to educate patients about transplant: good education partners? Paper presented at: American Transplant Conference; 2009 May 30-June 3; Boston, MA.
 53. Segev DL, Gentry SE, Warren DS, Reeb B, Montgomery RA. Kidney paired donation and optimizing the use of live donor organs. *JAMA.* 2005;293:1883-90.
 54. Gentry SE, Segev DL, Montgomery RA. A comparison of populations served by kidney paired donation and list paired donation. *Am J Transplant.* 2005;5:1914-21.
 55. Spital A. Evolution of attitudes at U.S. transplant centers toward kidney donation by friends and altruistic strangers. *Transplantation.* 2000;69:1728-31.
 56. Jacobs CL, Roman D, Garvey C, Kahn J, Matas AJ. Twenty-two nondirected kidney donors: an update on a single center's experience. *Am J Transplant.* 2004;4:1110-6.
 57. Ross LF, Woodle ES. Ethical issues in increasing living kidney donations by expanding kidney paired exchange programs. *Transplantation.* 2000;69:1539-43.
 58. Segev DL, Montgomery RA. Regional and racial dis-

- parities in the use of live non-directed kidney donors. *Am J Transplant*. 2008;8:1051-5.
59. Abecassis M, Adams M, Adams P, et al. Consensus statement on the live organ donor. *JAMA*. 2000;284:2919-26.
 60. McQuarrie B, Gordon D. Separate, dedicated care teams for living organ donors. *Prog Transplant*. 2003;13:90-3.
 61. Schweitzer EJ, Wilson J, Jacobs S, et al. Increased rates of donation with laparoscopic donor nephrectomy. *Ann Surg*. 2000;232:392-400.
 62. Shenoy S, Lowell JA, Ramachandran V, Jendrisak M. The ideal living donor nephrectomy "mini-nephrectomy" through a posterior transcostal approach. *J Am Coll Surg*. 2002;194:240-6.
 63. Andersen MH, Mathisen L, Oyen O, et al. Postoperative pain and convalescence in living kidney donors: laparoscopic versus open donor nephrectomy: a randomized study. *Am J Transplant*. 2006;6:1438-43.
 64. Siegel JT, Alvaro EM, Lac A, Crano WD, Dominick A. Intentions of becoming a living organ donor among Hispanics: a theory-based approach exploring differences between living and nonliving organ donation. *J Health Commun*. 2008;13:80-99.
 65. Jain N. Kidney Research UK's: a better life through education and empowerment. *Br J Community Nurs*. 2008;13:166-70.
 66. Seto E, Cafazzo JA, Rizo C, Bonert M, Fong E, Chan CT. Internet use by end-stage renal disease patients. *Hemodial Int*. 2007;11:328-32.
 67. Mainous AG 3rd, Baker R, Love MM, Gray DP, Gill JM. Continuity of care and trust in one's physician: evidence from primary care in the United States and the United Kingdom. *Fam Med*. 2001;33:22-7.
 68. Callender CO, Hall MB, Branch D. An assessment of the effectiveness of the Motte model for increasing donation rates and preventing the need for transplantation—adult findings: program years 1998 and 1999. *Semin Nephrol*. 2001;21:419-28.
 69. Kennedy EM. The role of the federal government in eliminating health disparities. *Health Aff (Millwood)*. 2005;24:452-8.
 70. Randhawa G. The challenge of kidney transplantation among minority ethnic groups in the UK. *EDTNA ERCA J*. 2004;30:182-7.
 71. King RK, Green AR, Tan-McGrory A, Donahue EJ, Kimbrough-Sugick J, Betancourt JR. A plan for action: key perspectives from the racial/ethnic disparities strategy forum. *Milbank Q*. 2008;86:241-72.
 72. Bronfenbrenner U, Morris PA. The ecology of developmental processes. In: Denton W, Lerner RM, editors. *Handbook of child psychology: Vol 1*. 5th ed. New York: Wiley; 1998.