

ONLINE APPENDIXES

6

Outpatient dialysis services

ONLINE APPENDIX

6-A

Access to kidney transplantation

Because of improved clinical outcomes and quality of life, kidney transplantation is widely considered a better treatment option for end-stage renal disease (ESRD) than dialysis. (Eggers 1988, Kasiske et al. 2000, Laupacis et al. 1996, Ojo et al. 1994). Overall, demand for kidney transplantation has grown faster than supply. Between 2007 and 2011, demand—as measured by the number of ESRD individuals wait-listed for a kidney—increased on average by 5 percent per year, while supply—as measured by the number of kidney transplantations—increased on average by 0.2 percent per year (United States Renal Data System 2012, United States Renal Data System 2013). When no living kidney donor is available, patients with ESRD must rely on the limited supply of cadaveric donor organs.

From the patient’s perspective, the transplantation process involves a series of steps that include (1) being educated about transplantation, (2) being interested in transplantation and referred to a transplant center, (3) completing the transplant center’s workup and being placed on at least one kidney waiting list, and (4) moving up the waiting list and receiving a transplant.

Although the principle of equity is emphasized in the distribution of this limited resource, many studies document that kidney transplantation rates differ by patients’ racial and ethnic characteristics. For example, according to 2011 data from the United States Renal Data System, access to kidney transplantation and organ donation rates vary by race:

- White ESRD patients accounted for 60 percent of ESRD patients and 64 percent of transplant recipients.
- African Americans accounted for 32 percent of ESRD patients and 25 percent of transplant recipients.
- Asian Americans accounted for 8 percent of ESRD patients and 6 percent of transplant recipients.
- Native Americans accounted for 1 percent of ESRD patients and 2 percent of transplant recipients.
- Hispanics accounted for 16 percent of ESRD patients and 15 percent of transplant recipients.

Disparities also exist by gender and socioeconomic status. Compared with male, higher income, and employed individuals, female, lower income and unemployed individuals were less likely to complete the pretransplant workup (Alexander and Sehgal 1998).

Unequal transplantation rates reflect numerous factors, including:

- ***A kidney allocation, or matching, policy that considers immunologic factors to match kidneys to potential recipients***—Lower rates of renal transplantation, particularly among African Americans, partly reflect the immunologic (including blood type and antibodies in the blood) matching process of donors to recipients. Reducing the number of biological mismatches improves the outcomes of kidney transplantation; as a result, the matching process gives priority to candidates who have fewer mismatches.
- ***The rate of kidney transplants from living donors***—In 2012, about 35 percent of transplants were from live donors. Rates of live donation are unequal across racial and ethnic groups. Researchers have found that there are fewer living donors among African Americans, increasing the dependence of African American patients on cadaver organs (Young and Gaston 2000). According to some researchers, interventions that attempt to reduce transplant disparities should prioritize the improvement of live donation rates for African Americans (Hall et al. 2011).
- ***The rate of kidney transplants from cadaver donors***—Rates of cadaver donation are unequal across racial and ethnic groups (United Network for Organ Sharing 2011). In the United States, individuals must consent (“opt in”) to become a donor before their death. By contrast, other countries have adopted an “opt-out” process in which individuals are automatically part of the donor pool and must expressly opt out from becoming a donor. Different approaches have been used to increase awareness of organ donation. For example, in May 2012, Facebook organized an effort to increase the number of people who registered themselves as organ donors. Other approaches include those that are intended to increase donation awareness among specific racial and ethnic groups, such as peer-to-peer campaigns and using lay health advisers.
- ***Patients’ health literacy and their knowledge of the alternative ESRD treatment options through education and shared decision-making efforts***—Dialysis facilities and physicians who treat dialysis patients have an important role in educating

patients about renal treatment options, including transplantation and home dialysis, and referring patients to a transplant center. The literature on the relationship between the role of the dialysis facility and access to transplantation is mixed. Some researchers have found that patients treated at for-profit facilities are less likely to undergo transplantation, while other researchers have not reached this conclusion.

- ***Patients' attitudes and preferences toward transplantation and their clinical characteristics and socioeconomic status***—Some patients are hesitant to consider kidney transplantation because they are concerned about surgery and the adverse effects of medication, and are mistrustful of the medical system. In addition, some patients are not able to receive a transplant because of the presence of medical

contraindications, such as a recent history of substance abuse, cancer, a serious infection (including from dental disease), and significant cardiovascular disease.

- ***The evaluation process and criteria used by transplant centers that determine placement on the kidney waiting list, such as physical health, mental health, social support, insurance status, and financial support***—In addition to the patient's physical health, transplant centers consider other factors, including the patient's mental health status, ability to carry out necessary post-transplant treatment plans, education, financial resources (including insurance covering the transplant procedure and the antirejection medicines needed after transplantation), and psychosocial barriers (including lack of or inadequate social support—no spouse, family, or friends). ■

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ONLINE APPENDIX

6-B

**Additional information on
dialysis outcomes**

**TABLE
6-B1**

Dialysis clinical indicators and outcomes continue to improve for some measures

Outcome measure	2007	2008	2009	2010	2011
Percent of in-center adult hemodialysis patients:					
Receiving adequate dialysis	94%	95%	95%	95%	97%
Anemia measures					
Mean hemoglobin 10–12 g/dL	49	57	62	68	74
Mean hemoglobin ≥ 12 g/dL*	45	37	32	25	12
Mean hemoglobin < 10	6	6	6	7	14
Dialyzed with an AV fistula	47	50	53	56	59
Nutritional status	34	35	35	39	42
Phosphorus and calcium management	46	45	46	47	48
Percent of adult peritoneal dialysis patients:					
Receiving adequate dialysis	89%	88%	89%	89%	91%
Anemia measures					
Mean hemoglobin 10–12 g/dL	48	52	57	58	61
Mean hemoglobin ≥ 12 g/dL*	45	39	33	31	21
Mean hemoglobin < 10	7	9	10	11	18
Nutritional status	20	19	18	20	21
Phosphorus and calcium management	46	45	47	47	47
Annual mortality rate per 100 dialysis patient years					
All*	20.8%	20.0%	19.5%	18.8%	18.4%
White*	22.5	21.7	21.2	20.5	20.2
African American*	18.3	17.5	17.0	16.2	15.6
Native American*	17.1	17.2	17.2	16.0	15.4
Asian American*	14.7	13.9	13.7	13.1	12.9
Other race*	17.3	17.5	17.2	16.2	14.9
45–64 years*	16.1	15.5	15.1	14.5	14.2
65–74 years*	26.4	25.6	25.1	24.3	23.7
75+ years*	41.9	40.4	39.4	38.0	37.4
Inpatient admission rate per dialysis patient:					
All*	1.9	1.9	1.9	1.9	1.8
White*	1.9	1.9	1.9	1.9	1.8
African American*	2.0	2.0	1.9	1.9	1.9
Native American*	1.7	1.7	1.8	1.8	1.7
Asian American*	1.4	1.4	1.3	1.4	1.3
45–64 years*	1.8	1.8	1.8	1.8	1.8
65–74 years*	1.9	1.9	1.8	1.9	1.8
75+ years*	2.0	2.1	2.0	2.0	1.9
Percent of discharges that were rehospitalized within 30 days					
All	35.8%	N/A	35.9%	33.4%	33.3%
Cardiovascular (index hospitalization)*	37.5	N/A	37.6	34.5	34.1
Infection (index hospitalization)*	33.7	N/A	33.8	31.0	30.6
Vascular access (index hospitalization)*	31.7	N/A	31.1	29.3	29.0
Percent of prevalent dialysis patients wait-listed for a kidney:					
All	16.8%	17.0%	17.3%	17.5%	17.4%
White	15.7	16.0	16.2	16.5	16.5
African American	17.3	17.5	17.7	17.9	17.7
Native American	15.1	15.5	14.9	15.0	14.9
Asian American	25.6	25.7	25.7	25.5	25.5
Renal transplant rate per 100 dialysis patient years:					
All	4.4	4.2	4.1	3.9	3.8
White	5.1	4.8	4.6	4.4	4.2
African American	3.0	2.9	2.9	2.9	2.7
Native American	4.1	4.1	4.6	4.1	4.2
Asian American	7.1	6.6	6.7	6.4	5.9

Note: g/dL (grams/deciliter), AV (arteriovenous), N/A (not available). "Other" includes Asian Americans and Native Americans. Data on dialysis adequacy, use of fistulas, and anemia management represent percent of patients meeting CMS's clinical performance measures. United States Renal Data System adjusts data by age, gender, race, and primary diagnosis of end-stage renal disease.
* Lower values indicate higher quality.

Source: Compiled by MedPAC from the 2010 and 2011 National Elab Reports, 2002–2009 Elab Trends Report, Fistula First 2012, and United States Renal Data System 2013.