

# Health Insurance Status of US Living Kidney Donors

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**Background and objectives:** Ensuring follow-up of living kidney donors (LKD) is essential to long-term preventive care. We sought information on health insurance status of US LKDs, with particular attention to age, gender, and ethnicity.

**Design, setting, participants, & measurements:** The United Network for Organ Sharing/Organ Procurement Transplantation Network database was queried for associations among age at donation, race, gender, and health insurance status. We studied all US LKDs between July 2004 and September 2006.

**Results:** A total of 10,021 LKDs with known health insurance status were studied, 1765 (18%) of whom lacked health insurance at donation. There were 4852 donors without health insurance information. Younger kidney donors had higher rates of being uninsured (age 18 to 34: 26.2%; age 35 to 49: 15.2%; age 50 to 64: 11.2%; age >65: 3.8%;  $P < 0.0001$ ), as did men (19.5% versus 16.3% for women;  $P < 0.0001$ ), and ethnic minorities (white 13.4%, black 21%, Hispanic 35.6%, Asian 26.7%;  $P < 0.0001$ ).

**Conclusions:** This study confirms that younger patients, ethnic minorities, and men are less likely to have health insurance when donating a kidney, which could negatively affect adherence to long-term follow-up.

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**K**idney transplantation is the preferred therapy for ESRD. Living kidney donation is an essential component of kidney transplantation programs in the United States and elsewhere (1,2). Emphasis has been placed on the relative safety of the procedure and the ability of donors to return to a healthy lifestyle soon after donation (3). Although serious complications are unusual, adverse outcomes such as kidney failure and death have been reported (4–7). Risks for hypertension, proteinuria, depression, and chronic pain are difficult to quantify but have also been described (8–10).

In previous studies of living kidney donors (LKDs) who developed kidney failure, we found that black donors, male donors, and those who donated before the age of 35 were overrepresented on the transplant waiting list when compared with their representation among all kidney donors (11). Similarly, those who developed kidney failure within 5 years of donating were overwhelmingly young and black, with few exceptions (12). These findings highlight a group of people—ethnic minorities and young donors, often male—who may be at higher risk for sequelae than previously appreciated. Conversely, long-term studies of living donors in predominantly white populations have established similar long-term risks for

death and lower rates of ESRD than in the general population (13).

In considering long-term care after nephrectomy, it seems logical that donors who lack health insurance could be expected to face significant financial barriers to preventive screening and monitoring of kidney function and BP, increasing the chance of sequelae. Lack of health insurance in the general population has been a contentious issue in the United States, with estimates of 40 to 50 million people uninsured. Young adults, men, and members of minority groups face increased risks for being uninsured (14,15).

In one survey (16), 15% of US transplant programs indicated that they would exclude donors without insurance, with 42% believing a lack of insurance was a relative contraindication to donation; however, data on insurance information for donors has been absent. Therefore, we sought information from the United Network for Organ Sharing/Organ Procurement Transplantation Network (UNOS/OPTN) regarding health insurance status of US LKDs. We hypothesized that young donors, male donors, and ethnic minorities would have the lowest rates of health insurance coverage and that a substantial portion of donors would be uninsured.

## Materials and Methods

We queried the UNOS/OPTN registry for information on health insurance status of all LKDs in the United States between July 2004 and September 2006. We considered whether there were associations between age, race, gender, and living donor health insurance status. We compared insurance status of so-called “medically complex” donors

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(hypertension, body mass index [BMI] >30, and estimated GFR [eGFR] <60 by the Modification of Diet in Renal Disease [MDRD] formula) with donors without these characteristics (17). Also, we examined for an association between donor insurance status and transplant center volume. Descriptive statistics were generated and frequencies were compared by means of  $\chi^2$  testing. Baseline characteristics of patients without a known health insurance status (excluded patients) were compared with study patients by means of  $\chi^2$  testing. We also compared state and UNOS regional data on uninsured donors with general population statistics in the same states and regions using population-weighted data from reference (14). Using multivariable logistic regression, we also studied whether insurance status affected likelihood of completing serum creatinine (SCr) testing within 1 year, after controlling for age, race, and gender. All statistical analyses were performed using SAS 9.1.3 (SAS Institute, Cary, NC). This study did not involve any unique patient identifiers or human subject research.

**Results**

A total of 4862 patients were excluded because of a lack of information on health insurance status. Comparison of the remaining 10,021 LKDs with excluded patients is presented in Table 1. Compared with those who were excluded, LKDs with known health insurance status were older and less likely to be black ( $P < 0.01$  for ethnicity and age).

Among the 10,021 LKDs, 1765 (17.6%) lacked health insurance at the time of kidney donation. In univariable analysis, we found that age, gender, and race were significantly associated with health insurance status (Table 2). Compared with white LKDs (13.4%), black (21%), Hispanic (35.6), Asian (26.7%), and other ethnic groups all had a higher frequency of lacking coverage ( $P < 0.0001$  for comparison between groups). For age, there was a clear graded association, with the highest frequency of being uninsured in the youngest donors (age 18 to 34, 26.2%; age 35 to 49, 15.2%; age 50 to 64, 11.2%, age >65, 3.8%;  $P < 0.0001$  for trend). Male LKDs were more likely to be uninsured than female LKDs (19.5 versus 16.3%;  $P < 0.0001$ ; Table 2). These changes were similar but slightly less than the frequency of

being uninsured in the general population; among nonelderly adults in the United States, 14.4% of white, 25.7% of black, and 43.5% of Hispanic individuals were uninsured. Similarly, 22.7% of male and 18.1% of female individuals were uninsured, and the relationship of age to insurance status in the general population was similar but with even higher rates of uninsured. Thus, it did seem that LKDs had a slightly higher rate of having insurance when compared with the general population. LKDs with BMI >30, preexisting hypertension, and eGFR <60 by the MDRD equation had similar rates of being uninsured compared with donors without these characteristics. Similarly, transplant center volume by tertile (low-, medium-, and high-volume centers) had rates of uninsured of 17.5, 19.7, and 16.5%, showing no discernible pattern.

Examination of the groups by age, race, and gender demonstrated various demographic groups with high frequencies of being uninsured (Figures 1 and 2). We further considered the geographic patterns of donors with and without health insurance. Figure 3 displays health insurance status of donors and in the general population of nonelderly adults by UNOS region along with a map of UNOS regions (<http://www.unos.org/whowere/regions.asp>). Notable is the wide variation in health insurance status of donors, with regions 1 and 6 having only 5.9 and 5.5% of donors uninsured, respectively, and regions 4, 5, and 10 having 23, 27, and 37% uninsured, respectively. We also calculated population-weighted averages of uninsured individuals of the general population in the various UNOS regions using reference (14). In most regions, the general population had a higher rate of uninsured individuals, but regions 5, 9, and 10 did not follow this pattern.

Finally, we tested whether insurance status affected likelihood of completing SCr testing during the first year. Although there were minor differences in completing SCr testing (66% in those with insurance versus 62% in those without insurance;  $P < 0.001$ ), these associations were not present after adjustment

*Table 1.* Comparison of baseline characteristics between donors with and without information on their health insurance status

Characteristic	Status Known (n = 10,021)	Status Unknown (n = 4852)	P
Race			<0.01
white	7136 (71.0)	3189 (66.0)	
black	1217 (12.0)	776 (16.0)	
Hispanic	1259 (12.0)	643 (13.0)	
Asian	292 (2.9)	163 (3.0)	
Native American, Hawaiian, Pacific Islander	63 (0.6)	48 (0.9)	
multiracial	54 (0.5)	33 (0.7)	
Female gender	5948 (59.0)	2822 (58.0)	0.16
Age (years)			<0.01
18 to 34	3085 (31.0)	1707 (35.0)	
35 to 49	4701 (47.0)	2225 (46.0)	
50 to 64	2130 (21.0)	893 (18.0)	
≥65	105 (1.0)	27 (0.5)	

Data are n (%).

Table 2. Associations between age, gender, race, and health insurance status among US LKDs, July 2004 through September 2006

Parameter	Health Insurance? (n [%])		Total	P
	No	Yes		
Gender				<0.0001
male	794 (19.5)	3279 (80.5)	4073	
female	971 (16.3)	4977 (83.7)	5948	
Race				<0.0001
white	954 (13.4)	6182 (86.6)	7136	
black	255 (21.0)	962 (79.0)	1217	
Hispanic	448 (35.6)	811 (64.4)	1259	
Asian	78 (26.7)	214 (73.3)	292	
other <sup>a</sup>	30 (25.6)	87 (74.3)	117	
Age (years)				<0.0001
18 to 34	809 (26.2)	2276 (73.8)	3085	
35 to 49	714 (15.2)	3987 (84.8)	4701	
50 to 64	238 (11.2)	1892 (88.8)	2130	
≥65	4 (3.8)	101 (96.2)	105	

<sup>a</sup>Includes Hawaiian, Native American, Pacific Islander, and multiracial.

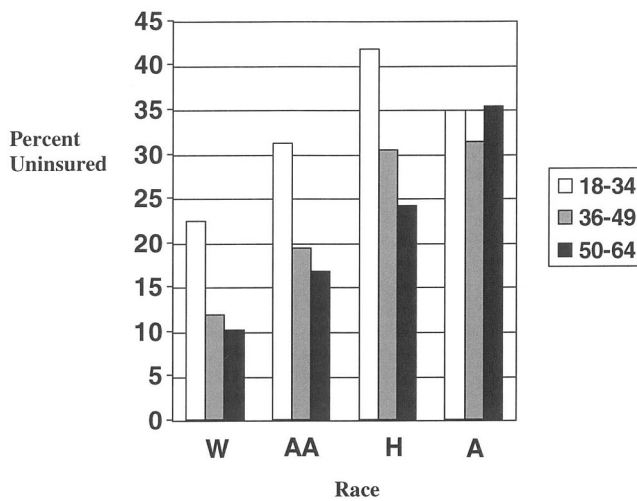


Figure 1. Uninsured US male LKDs according to race. W, white; AA, African American; H, Hispanic; A, Asian. 18 to 34: 18 to 34 yr old; 36 to 49: 36 to 49 yr old; 50 to 64: 50 to 64 yr old.

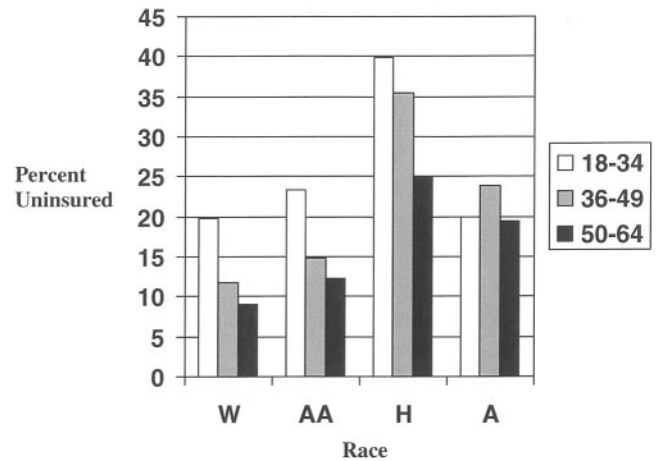


Figure 2. Uninsured US female LKDs according to race. W, white; AA, African American; H, Hispanic; A, Asian. 18 to 34: 18 to 34 yr old; 36 to 49: 36 to 49 yr old; 50 to 64: 50 to 64 yr old.

for age, gender, and race. Only age affected an LKD's likelihood of completing follow-up SCr.

**Discussion**

Our study demonstrated that a significant percentage of LKDs lack health insurance. Although it did seem that insurance patterns were similar to those of the general population and that LKDs were slightly more likely to have insurance coverage than the general population, any intentional or unintentional screening that occurred still left a substantial number of uninsured LKDs. Even LKDs with possibly elevated long-term risks as a result of hypertension, elevated BMI, and low predonation eGFR were uninsured at similar frequencies. The

finding of high rates of uninsured LKDs is troubling given that uninsured LKDs will face significant financial barriers to adhering to recommendations for ongoing health maintenance and preventive care after kidney donation. Furthermore, we noted that young LKDs, men, and members of ethnic minorities were particularly likely to be uninsured at the time of donation. We found that uninsured individuals were less likely to complete follow-up SCr testing, but this finding was not robust after adjustment for age, race, and gender; however, because follow-up in the first year is covered by Medicare, recipient insurance, or the transplant center, our data fail to uncover the potential problems that LKDs could have with long-term follow-up or management of new health conditions if they lack health insurance. It is also important to note that among both

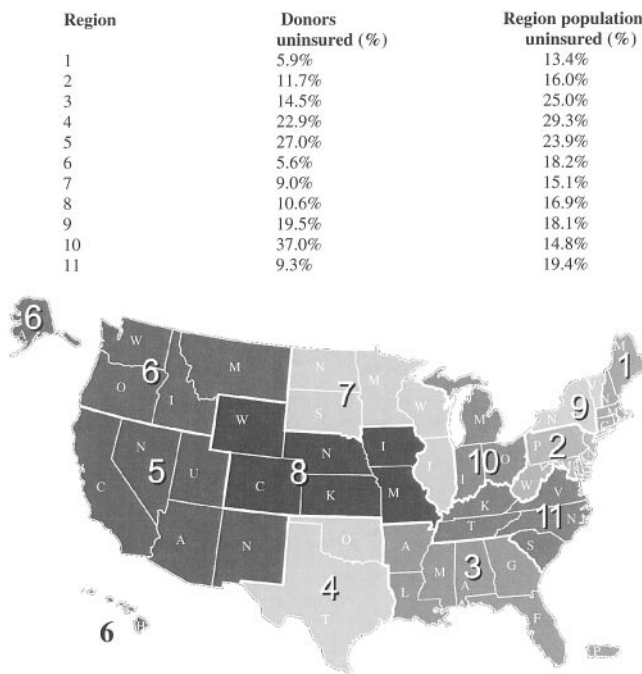


Figure 3. UNOS region and donor health insurance status.

the insured and uninsured, almost 40% did not complete follow-up SCr testing, demonstrating that follow-up is far less than ideal. We acknowledge that this could have been due to LKDs' failing to follow up or centers' failing to report data.

One important limitation of the study is a lack of health insurance information on a substantial number of LKDs; however, because patients without health insurance information were younger and more likely to be black, it is likely that our study underestimates the percentage of uninsured donors, because black and young LKDs were less likely to be insured. Another weakness is the inability to track changes in insurance (loss or gain) with time, because health insurance is a dynamic variable in the United States. The UNOS data did not track changes in insurance status with time, so only predonation data were available; however, the basic finding that a large number of LKDs lacked health insurance remains unchanged. Also, our study should be balanced against that knowledge that long-term risks of kidney donation have established risks for cardiovascular disease, death, and ESRD that are similar or improved compared with general population risks, with perhaps slightly higher risks for diagnosed hypertension, perhaps related to more frequent health care visits (13,18). Although these and other, similar studies have captured homogeneous populations of white individuals, they still provide reassurance regarding the safety of living donation. Finally, there are no data suggesting that lack of follow-up in LKDs is associated with adverse outcomes, so any effect of health insurance on donor outcomes is speculative.

As living kidney donation has evolved, suitability of donors has become a critical issue, with many programs widening the criteria for live donors to include those with treated hypertension, obesity, advanced age, and stone formation. These "high-risk donors"

have received much attention (19,20); however, we believe that our study identifies another population of LKDs who merit attention: The young and healthy potential donor who lacks health insurance. These donors may have previously received less attention because the risks that they face may seem "invisible" at the time of evaluation. Although a physician who evaluates a young, healthy person may rightfully estimate that risks of donor surgery seem low, it is incumbent on the transplant community to think also in terms of long-term risk. Furthermore, this group, by nature of the living donation, often consists of first-degree relatives of someone with kidney failure.

In many ways, the issue of uninsured LKDs simply reflects broader patterns within the US population. Recent estimates of uninsured individuals in the United States are approximately 46 million, including 20.4% of adults (14,15). In the broader US population, frequencies of being uninsured are highest in young adults and decline with age; are higher in men than women; and are highest in Hispanic individuals, followed by black and other ethnic groups, with the lowest rates of uninsured being in white adults (14.4%). Predictably, income is highly associated with likelihood of having health insurance (14). Although this problem is indeed endemic in the United States, it is incumbent on transplant programs to consider the broader implications of organ donation and long-term follow-up because they are using these individuals as donors. It is interesting to note that many programs believe that being uninsured is a relative or absolute contraindication to living donation (16), which may indicate that *prospective* kidney donors have even lower rates of health insurance than *actual* kidney donors.

What could be a proactive response to this problem? Short of changes in governmental policy that make health care universally affordable or available, the transplant community could offer solutions at an institutional, a societal, or a legislative level. There are precedents for this sort of work, such as offering life and disability coverage to donors with the costs of insurance being absorbed by the transplant center (21). Others have advocated making donors Medicare-eligible but may have underestimated the frequency of uninsured donors, especially in selected populations (22). Currently, direct donation-related complications are covered indefinitely by Medicare and (theoretically) private payers, but health maintenance issues are not covered. Although offering "free" lifetime health insurance to donors could be costly or even potentially coercive given the value in our society, the transplant community might explore options that would grant at least short-term affordable coverage (Medicare or other) to living donors that cover health maintenance issues. If this were not permanent, then elimination of preexisting condition clauses would need to be considered for donors.

Finding and implementing a tenable solution to the problem of uninsured donors is important, because excluding these donors for insurance reasons is also problematic. Barriers to receiving living donor transplants are already especially formidable for many recipient candidates (23). Excluding another pool of potential living donors is likely to disadvantage further many who are in great need of living donors.

## Conclusions

A total of 17.6% of US LKDs between July 2004 and September 2006 had no health insurance coverage. Men, younger donors, and ethnic minorities were significantly more likely to lack health insurance. Previous reports have demonstrated that these subgroups may be at increased risk for ESRD after living kidney donation (11,12). We advocate policy-based initiatives that would provide health insurance for LKDs in the years after donation. Transplant programs should consider health insurance as a factor in a donor's overall risk evaluation.

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## Disclosures

None.

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