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Early Hypertension and Diabetes after Living Kidney Donation: A National Cohort Study

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Abstract

Background: Living kidney donors have an increased risk of end-stage renal disease, with hypertension and diabetes as the predominant causes. In this study, we sought to better understand the timeline when these diseases occur, focusing on the early postdonation period.

Methods: We studied 41 260 living kidney donors in the US between 2008–2014 from the SRTR and modeled incidence rates and risk factors for hypertension and diabetes.

Results: At 6-months, 1-year, and 2-years postdonation, there were 74, 162, and 310 cases of hypertension per 10 000 donors. Donors who were older (per 10 years, aIRR 1.40, 95% CI 1.29–1.51), male (aIRR 1.31, 95% CI 1.14–1.50), had higher BMI (per 5 units, aIRR 1.29, 95% CI 1.17–1.43), and were related to their recipient (first degree relative, aIRR 1.28, 95% CI 1.08–1.52; spouse, aIRR 1.34, 95% CI 1.08–1.66) were more likely to develop hypertension, while donors who were Hispanic/Latino were less likely (aIRR 0.71, 95% CI 0.55–0.93). At 6-months, 1-year,

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DISCLOSURES

The authors declare no conflicts of interest. The results presented in this paper have not been published previously in whole or part, except in abstract format.

AUTHORSHIP

The individual contributions of each author are as follows:

- CMH designed the study, analyzed and interpreted data, drafted and revised the article, and had final approval of this version;
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- AT designed the study, analyzed and interpreted data, revised the article, and had final approval of this version;
- MH designed the study, revised the article, and had final approval of this version;
- CEH interpreted data, revised the article, and had final approval of this version;
- SD interpreted data, revised the article, and had final approval of this version;
- ADM designed the study, revised the article, and had final approval of this version;
- JGW designed the study, drafted and revised the article, and had final approval of this version;
- ABM designed the study, interpreted data, revised the article, and had final approval of this version;
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- DS designed the study, interpreted data, revised the article, and had final approval of this version.

and 2-years, there were 2, 6, and 15 cases of diabetes per 10 000 donors. Donors who were older (per 10 years, aIRR 1.42, 95% CI 1.11–1.82), had higher BMI (per 5 units, aIRR 1.52, 95% CI 1.04–2.21), and were Hispanic/Latino (aIRR 2.45, 95% CI 1.14–5.26) were more likely to develop diabetes.

Conclusions: In this national study, new-onset diabetes was rare, but 3% of donors developed hypertension within 2 years of nephrectomy. These findings reaffirm that disease pathways for kidney failure differ by donor phenotype and estimate the population most at-risk for later kidney failure.

INTRODUCTION

Living kidney donors have an increased risk of end-stage renal disease (ESRD) compared to their healthy nondonor counterparts, and this risk seems to be particularly high for some donor phenotypes.^{1–6} Specifically, men are at higher risk than women for ESRD, African Americans are at higher risk than non-African Americans, and first-degree biological relatives of their recipients are at higher risk than unrelated donors.⁵ Beyond understanding baseline demographic risk factors for ESRD, Anjum et al found that the proximal predominant causes of ESRD more than 10 years after kidney donation are hypertension and diabetes, while ESRD within 10 years of kidney donation is most frequently due to glomerulonephritis.⁷ Given that hypertension and diabetes can be medically managed in order to prevent subsequent kidney complications, it is critical to understand the timeline of development of the 2 most frequent causes of later ESRD in living kidney donors.

Although there have been studies of hypertension and diabetes in donors, they have been mainly limited to linked insurance claims data or single-center studies reporting cross-sectional prevalence.^{8–14} Importantly, although these cross-sectional studies are limited in providing a specific timeline of comorbidity incidence following donor nephrectomy, many of the same risk factors for ESRD are identified as risk factors for hypertension and diabetes. Men,¹³ African Americans,^{10,11,14} Hispanic donors,¹⁴ older donors,⁹ and donors with higher BMI^{9,13} have a higher risk of postdonation hypertension. Similarly, men,¹⁵ African Americans,¹⁴ Hispanic donors,¹⁴ and donors with higher BMI¹⁵ have a higher risk of postdonation diabetes. In other countries with more centralized transplant programs, there are better estimates of new incidence of comorbid diseases following living kidney donation. For example in Norway, where all living kidney donor nephrectomies are performed at a single center, 9.1% of donors developed hypertension within 1-year of donation, and 24.5% developed hypertension within 5-years of donation.¹⁶ A study of Egyptian living kidney donors with 5–30 years of follow-up reported that the 22.1% of donors who developed hypertension were diagnosed at an average of 6 years after donation, with a range of diagnosis of 1–16 years.⁸ Though not generalizable to a US population of living kidney donors, these international reports suggest that incident hypertension might be an early event postdonation for some living donors.

With recent Organ Procurement and Transplantation Network (OPTN) mandates of 6-month, 1-year, and 2-year donor follow-up, prospectively collected national data are becoming available, and we now have an opportunity to study the early postdonation comorbidity

timeline.¹⁷ Using national registry data, we sought to estimate the early incidence of hypertension and diabetes following donor nephrectomy and to identify the risk factors associated with these early postdonation diagnoses.

METHODS

Data source

This study used data from the Scientific Registry of Transplant Recipients (SRTR). The SRTR data system includes data on all donor, wait-listed candidates, and transplant recipients in the US, submitted by the members of the Organ Procurement and Transplantation Network (OPTN), and has been described elsewhere.¹⁸ The Health Resources and Services Administration (HRSA), U.S. Department of Health and Human Services provides oversight to the activities of the OPTN and SRTR contractors. This study was acknowledged as exempt nonhuman subjects research by the Johns Hopkins Medicine Institutional Review Board.

Study population

We studied living donor registration and living donor follow-up reports from 41 260 donors who donated between January 1, 2008 and December 31, 2014. Donors with baseline hypertension (n=1313, 3.2%) or diabetes (n=21, 0.05%) at the time of donor nephrectomy were excluded from models of postdonation hypertension and diabetes, respectively, as the purpose of this study was to estimate incident disease. A follow-up report was considered to reflect 6-month clinical status if it occurred between 3 and 9 months postnephrectomy, 1-year status if it occurred between 9 and 18 months postnephrectomy, and 2-year status if it occurred between 18 and 36 months postnephrectomy. For those donors with more than 1 follow-up report during a time period, the visit reported as the 6-month, 1-year, or 2-year encounter by the reporting transplant center was considered to reflect follow-up status for that time period.

Outcome definition

We studied center-reported pos-donation hypertension and diabetes based on the OPTN living donor follow-up (LDF) form data. Outcomes were reported as “yes,” “no,” or “unknown” in response to questions “Donor developed hypertension requiring medication” and “Diabetes.” Development of hypertension and diabetes were considered absorptive states; in other words, once a donor developed postdonation hypertension, they were considered to have developed postdonation hypertension for all time thereafter. As such, reports of a diagnosis of postdonation hypertension or diabetes were carried forward to the next time period; that is, if a donor developed postdonation hypertension on the 6-month follow-up report, they were considered to have developed postdonation hypertension for the purposes of the 1-year and 2-year time points as well.

Missing and unknown outcomes

The questions regarding hypertension and diabetes required responses in order to submit an LDF report, but did allow a response of “unknown” in addition to “yes” and “no.” Thus for each follow-up report, subjects could have “yes,” “no,” “unknown,” or be missing a

response, indicating that a follow-up report was not submitted for that time period. For the purpose of estimating incidence rates, responses of “unknown” were considered missing.

Incidence estimates

Incidence rates were estimated using 3 methods—complete case analysis, inverse probability weighting to account for missing outcomes, and multiple imputation by chained equations to impute missing outcomes—to examine potential bias introduced by missing follow-up reports. Poisson regression was used to model the incidence rates of hypertension and diabetes at 6-months, 1-year, and 2-years postdonation, using robust variance to account for variance overestimation.¹⁹ As a sensitivity complete case analysis, the study period was limited to subjects who donated during 2013–2014, a time period with the least missing outcome data. There was no difference in complete case incidence rate estimates between the full study period and the 2013–2014 time period so only the full study period complete case estimates are reported.

To compare to complete case analyses, inverse probability weighted estimates were modeled using logistic regression to create probability weights for having missed each follow-up report (6-months, 1-year, and 2-years). Covariates used for the inverse probability weighted estimates were transplant center of donation, calendar year of donation, donor age, sex, race, weight, height, relationship with recipient, marital status, education, and baseline diabetes, hypertension, and proteinuria. Covariate balance was checked for age, gender, race, and body mass index (BMI) between the full study population and the inverse probability weighted pseudo-population.

As another sensitivity analysis, multiple imputation by chained equations was used to impute missing covariates and outcomes,²⁰ and Poisson regression with robust variance was used to estimate incidence rates and 95% confidence intervals from the imputed dataset. Variables with no missing data that were used in the multiple imputation model were age, sex, race, preoperative blood pressure, preoperative creatinine, BMI, smoking history, and calendar year of donation.

Risk factor analysis

A modified Poisson regression model¹⁹ was used to examine demographic risk factors for hypertension and diabetes within 2-years postdonation, with all missing data multiply imputed by chained equations. Demographic risk factors included age at donation, sex, preoperative BMI, preoperative systolic blood pressure, African American race, Hispanic/Latino ethnicity, relationship with recipient, postoperative eGFR within 6 weeks of donation, smoking history, education level, and employment status. All analyses were adjusted for calendar year of donation. Additionally, limiting to donors who were related to their recipients, we used logistic regression to examine how recipient diabetes or diabetes-caused ESRD was associated with donor incident diabetes within 2-years post-donation. All risk factors were obtained from living donor registration forms. These forms are reported to the OPTN/UNOS for every living kidney donor by the transplant program performing a donor nephrectomy.

Statistical analysis

Confidence intervals are reported as per the method of Louis and Zeger.²¹ A p value of 0.05 was considered significant. All analyses were performed using Stata 14.2/SE for Windows (College Station, Texas).

RESULTS

Study population

Among 41 260 donors, 38% were male; 84% were Caucasian, 12% were African American, 4% were Asian, and 1% reported other race; 14% reported Hispanic/Latino ethnicity; 53% were biologically related to their recipient, 13% were the spouse or partner of their recipient, and 34% were not related to their recipient. Median (interquartile range [IQR]) age at donation was 42 (32–51) years, BMI was 26.6 (23.8–29.7), and preoperative systolic blood pressure (SBP) was 120mmHg (111–129 mmHg). There were 1313 (3%) reported to have hypertension at the time of donation and 21 (0.05%) reported to have diabetes at the time of donation (Table 1).

Follow-up reporting over time

Both missing reports and reports of “unknown” decreased over the study period for 6-month, 1-year, and 2-year outcomes (Figure 1). For the outcome of hypertension, for donors from 2008, 46.2% had missing or unknown 6-month reports, 32.0% had missing or unknown 1-year reports, and 51.7% had missing or unknown 2-year reports. By 2014, hypertension missingness decreased to 11.8%, 13.5%, and 21.3% with missing or unknown 6-month, 1-year, and 2-year reports. For the outcome of diabetes, for donors from 2008, 44.2% had missing or unknown 6-month reports, 28.8% had missing or unknown 1-year reports, and 50.4% had missing or unknown 2-year reports. By 2014, diabetes missingness decreased to 11.1%, 12.2%, and 20.8% with missing or unknown 6-month, 1-year, and 2-year reports. However, most donors were seen at some point: in 2008, 92.1% of donors were seen at least once in follow-up, and in 2014, 99.3% of donors were seen at least once.

New-onset Hypertension

The incidence of new-onset hypertension was 64 74 84, 149 162 177, and 290 310 332 cases per 10 000 people at 6-months, 1-year, and 2-years postdonation (Figure 2), with clinically similar estimates from sensitivity analyses by inverse probability weighting and multiple imputation by chained equations (Table 2). Donors who were older at donation (per 10 years of age, adjusted incidence rate ratio [aIRR] 1.29 1.40 1.51, $p<0.001$), male (aIRR 1.14 1.31 1.50, $p<0.001$), had higher preoperative BMI (per 5 units, aIRR 1.17 1.29 1.43, $p<0.001$), had higher preoperative SBP (per 10 mmHg, aIRR 1.36 1.42 1.49, $p<0.001$), and who were the first degree relative (aIRR 1.08 1.28 1.52, $p=0.006$) or spouse/partner of their recipient (1.08 1.34 1.66, $p=0.007$) were more likely to develop hypertension within 2-years of donation (Table 3). Donors who were Hispanic or Latino (aIRR 0.55 0.71 0.93, $p=0.02$) were less likely to develop new-onset hypertension (Table 3).

New-onset Diabetes

The incidence of new-onset diabetes was 1 2 5, 4 6 9, and 11 15 20 cases per 10 000 people at 6-months, 1-year, and 2-years postdonation (Figure 2), with clinically similar estimates from sensitivity analyses by inverse probability weighting and multiple imputation by chained equations (Table 2). Donors who were older at donation (per 10 years of age, aIRR 1.11 1.42 1.82, $p=0.006$), had higher preoperative BMI (per 5 units, aIRR 1.04 1.52 2.21, $p=0.03$), and were Hispanic or Latino (aIRR 1.14 2.45 5.26, $p=0.02$) were more likely to develop new-onset diabetes within 2-years of donation (Table 3). Limiting to donors related to their recipients, there was no statistically significant association between recipient diabetes (OR 0.64 1.52 3.59, $p=0.3$); this inference is limited by our sample size and event rate.

DISCUSSION

In this national study of incident hypertension and diabetes early after living kidney donation, we estimated the incidence rate of hypertension is 310 per 10 000 donors within 2-years of donation, and the incidence rate of diabetes is 15 per 10 000 donors within 2-years. Older donors, male donors, those related to or partner with their recipient, and those with higher preoperative BMI and systolic blood pressure were more likely to develop hypertension within 2-years of donation. Older donors, Hispanic or Latino donors, and those with higher preoperative BMI were more likely to develop diabetes within 2-years of donation.

Our estimates of 74 per 10 000 donors with incident hypertension at 6-months postdonation, 162 per 10 000 at 1-year postdonation, and 310 per 10 000 donors with incident hypertension within 2-years post-donation illustrate the timeline of early postdonation incident hypertension with precision not previously reported. Prior cross-sectional studies reported prevalence of hypertension ranging between 18–42% with mean follow-up time 5–17 years.^{9,10,22–26} Our estimate of 1-year postdonation hypertension is lower than the 1-year incident hypertension rate of 9.1% in the Norwegian cohort, which may be partly due to the older age of the Norwegian donors with a mean age at donation of 48 years.¹⁶ Our findings confirmed other studies which found higher risk of hypertension in men,¹³ older donors,⁹ and donors with higher BMI.^{9,13} Interestingly, we did not find that African American donors were at higher risk of hypertension within 2-years of donation. Prior studies reporting an association of African American race with hypertension had a follow-up time greater than 5 years.^{10,12,23} This suggests African Americans are at risk for later development of hypertension. Importantly, even after diagnosis of hypertension, African Americans are less likely to have their hypertension controlled, and thus may be at higher risk for renal complications after hypertension diagnosis.²⁷ Additionally we found that donors who were the spouse or partner or biologically related to their recipients were at higher risk for incident hypertension within 2-years postdonation. This may be due to shared genetic, socioeconomic, and environmental risk factors, and in particular, the higher risk in spouses may be attributable to shared diet and sodium intake.²⁸ In the same vein, Reed et al found that living kidney donation was less frequent in areas with a higher burden of comorbid disease, and suggested that there are shared area socioeconomic factors involved in local rates of living kidney donation.²⁹

Our estimates of 2 per 10 000 donors with incident diabetes at 6-months postdonation, 6 per 10 000 at 1-year postdonation, and 15 per 10 000 donors with incident diabetes at 2-years postdonation are markedly lower than later cross-sectional estimates of prevalence of diabetes in donors, ranging from 3–18% at 5–18 years after donation.^{8,9,11,15,26,30} Chandran et al studied a cohort of living kidney donors with predonation impaired fasting glucose, the group most at-risk for development of postdonation diabetes, and found that although 15.6% had developed diabetes at a mean follow-up of 10 years, 57.8% had reverted to a normal fasting glucose.³¹ After controlling for BMI, we found that Hispanic or Latino donors were more likely to have developed diabetes within 2-years of donation, which is consistent with prior reports based on insurance claims.^{11,14} Diabetic donors are more likely to develop hypertension and proteinuria,¹⁵ and a recent study from Ibrahim et al found that diabetic donors experienced a renal function decline in excess of nondiabetic donors when they had concomitant hypertension and proteinuria.³⁰ In the context of increasing prevalence of obese donors in the US,^{32–34} the association of higher BMI with higher risk of hypertension and diabetes by 2-years postdonation reaffirm the current Kidney Disease: Improving Global Outcomes (KDIGO) recommendations that support for healthy lifestyle practices including exercise and diet.³⁵

There are limitations of our study that merit consideration. First, we do not use a nondonor comparison cohort as a control group. It is well-established that donors have a higher risk for ESRD than matched healthy nondonors² and that hypertension and diabetes are the most frequent causes of ESRD at more than 10 years after donation.⁷ Therefore, we believe it is critical to understand the early incidence rate of hypertension and diabetes in donors specifically (absolute risk). While a nondonor control group would allow estimation of the extra risk of donation (attributable risk), we sought to describe the absolute risk of the 2 most frequent causes of later ESRD and the risk factors for those donors at highest risk for later ESRD. Additionally, although there has been gradual improvement in compliance with donor follow-up visit reporting since mandated in 2013, there were still missing outcomes as described.^{17,36} To address this, we compared our inferences to inverse probability weighted incidence rate estimates as well as estimates through multiply imputing missing data, and found clinically similar estimates, suggesting that there is probably not substantial bias introduced by this missingness. We additionally examined a shorter time period using complete case analysis, limiting to the 2 years with the lowest rate of missing outcomes (<1.5% missing all 3 LDF forms), and found no difference in incidence rate estimates. Another limitation is the dichotomous definition of hypertension and diabetes and our consideration of these as absorptive states. Our main reason for considering both diagnoses as absorptive was 2-fold: first, regardless of whether they resolve, they are still concerning for long-term risk for the donor. Second, if someone developed hypertension and was treated, it was possible that the center might have marked them as not having hypertension. We are limited in defining these disease outcomes in that we did not have hemoglobin A1C or any medications reported.

The main strength of this study is that it reports on the entire national cohort of donors, a sample size and unbiasedness not previously used for donor follow-up studies, with clinical data available in the early postdonation period, a time period previously not studied in US donors and a precision and granularity not available until now. Perspectives of risk among

living donors include descriptions of event frequencies after donation, within-donor comparisons across donor subgroups, comparisons of outcomes among donors versus the general population, and for attributable risk estimation, comparisons to healthy nondonors.⁴ The current study provides important information on the first 2 perspectives. An important additional perspective to consider is that of donors: Manera et al recently reported findings from focus groups of living kidney donors regarding follow-up care, and found that some donors felt they needed longer follow-up.³⁷ This must be weighed against the cost of ongoing follow-up care for this healthy population; Habbous et al found that 1 year of follow-up care cost \$1011.³⁸

In this national study, new-onset diabetes was rare, but approximately 3% of donors developed new-onset hypertension within 2 years of donor nephrectomy. Our findings illustrate the timeline of development of comorbid disease in the early postdonation period, and reaffirm that disease pathways for kidney failure differ by donor phenotype. Early postdonation care for donors should emphasize healthy lifestyle practices, management of modifiable risk factors such as obesity, and early detection and management of new-onset comorbidities.

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ABBREVIATIONS

aIRR	adjusted incidence rate ratio
BMI	body mass index
CI	confidence interval
ESRD	end-stage renal disease
IQR	interquartile range
LDF	living donor follow-up

HRSA	Health Resources and Services Administration
OPTN	Organ Procurement and Transplantation Network
SBP	systolic blood pressure
SRTR	Scientific Registry of Transplant Recipients
US	United States

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Figure 1. Follow-up reports at 6-months, 1-year, and 2-years postdonation by year of donation. Because the outcomes of hypertension and diabetes were required questions on the living kidney donor follow-up report, the option of checking “unknown” was given in addition to “yes” and “no” for each disease. Thus, missing reports were those that were not submitted, while unknown outcomes were taken from reports that were submitted. Both missing and unknown outcomes decreased over the study period.

Figure 2. Incidence rates of hypertension and diabetes at 6-months, 1-year and 2-years after living kidney donation.
Incidence rates shown as cases per 10 000 donors with 95% confidence intervals displayed.

Table 1.

Characteristics of living kidney donors at the time of donation, 2008–2014.

n=41 260	
Age, median years (IQR)	42 (32–51)
Preoperative BMI, median (IQR)	26.6 (23.8–29.7)
Preoperative SBP, median mmHg (IQR)	120 (111–129)
Male sex, n (%)	15 797 (38%)
Race, n (%)	
Caucasian	34 528 (84%)
African American	4728 (12%)
Asian	1507 (4%)
Other	497 (1%)
Hispanic/Latino ethnicity, n (%)	5800 (14%)
Baseline hypertension, n (%)	1313 (3%)
Baseline diabetes, n (%)	21 (0.05%)
Postoperative eGFR, n (%)	
<60 mL/min/1.73m ²	18 497 (45%)
60–90 mL/min/1.73m ²	17 933 (44%)
>90 mL/min/1.73m ²	4830 (12%)
Relationship with recipient, n (%)	
Twin	68 (0.2%)
Full sibling	8340 (20%)
Parent	3551 (9%)
Child	6472 (16%)
Half sibling	424 (1%)
Other biological relative	3056 (7%)
Spouse/partner	5223 (13%)
Other nonrelated donor	14 126 (34%)
Current or former smoker, n (%)	10 479 (25%)
Some college education or higher, n (%)	
Yes	26 413 (64%)
No	11 173 (27%)
Unknown	3674 (9%)
Working for income, n (%)	
Yes	33 166 (80%)
No	6902 (17%)
Unknown	1192 (3%)
Insured, n (%)	
Yes	30 140 (73%)
No	5507 (13%)
Unknown	5613 (14%)

* Donors with baseline hypertension or diabetes were excluded from models of incident hypertension and diabetes, respectively.

Table 2.
Cases of hypertension and diabetes at 6-months, 1-year, and 2-years after kidney donation
per 10 000 living kidney donors.

Incidence rate estimates are displayed with 95% confidence intervals.

	Complete case estimate	Estimate by inverse probability weighting	Estimate by multiple imputation
New-onset hypertension			
6-months postdonation	64 74 84	87 98 110	68 78 89
1-year postdonation	149 162 177	185 200 216	152 164 178
2-years postdonation	290 310 332	340 362 384	297 319 342
New-onset diabetes			
6-months postdonation	1 2 5	1 2 5	2 4 10
1-year postdonation	4 6 9	4 6 9	4 6 9
2-years postdonation	11 15 20	11 15 21	11 15 21

Table 3.
Risk factors for new-onset hypertension and diabetes within 2-years postdonation.

Incidence rate ratios shown are adjusted for all risk factors in the table and bolded incidence rate ratios are significant at the $p < 0.05$ level.

	Hypertension	Diabetes
Age (per 10 years)	1.29 1.40 1.51, $p < 0.001$	1.11 1.42 1.82, $p = 0.006$
Male sex	1.14 1.31 1.50, $p < 0.001$	0.39 0.76 1.48, $p = 0.4$
Preoperative BMI (per 5 units)	1.17 1.29 1.43, $p < 0.001$	1.04 1.52 2.21, $p = 0.03$
Preoperative SBP (per 10 mmHg)	1.36 1.42 1.49, $p < 0.001$	0.75 0.94 1.18, $p = 0.6$
African American race*	0.79 1.06 1.43, $p = 0.7$	0.54 1.54 4.40, $p = 0.4$
Hispanic/Latino ethnicity*	0.55 0.71 0.93, $p = 0.02$	1.14 2.45 5.26, $p = 0.02$
Relationship with recipient		
Other	Reference	Reference
First degree relative	1.08 1.28 1.52, $p = 0.006$	0.47 0.88 1.67, $p = 0.7$
Spouse or partner	1.08 1.34 1.66, $p = 0.007$	0.17 0.52 1.58, $p = 0.2$
Postoperative eGFR		
>90 mL/min/1.73m ²	Reference	Reference
60–90 mL/min/1.73m ²	0.76 1.01 1.36, $p = 0.9$	0.36 0.98 2.67, $p = 1$
<60 mL/min/1.73m ²	0.75 0.98 1.28, $p = 0.9$	0.32 0.93 2.73, $p = 0.9$
Current or former smoker	0.98 1.12 1.28, $p = 0.09$	0.93 1.75 3.30, $p = 0.08$
Some college education or higher	0.82 0.98 1.16, $p = 0.8$	0.48 0.88 1.62, $p = 0.7$
Working for income	0.83 1.02 1.25, $p = 0.8$	0.54 1.12 2.33, $p = 0.8$
Year of donation (per calendar year)	0.94 0.97 1.01, $p = 0.1$	0.88 1.06 1.28, $p = 0.5$

* Reference: non-African American, non-Hispanic/Latino, respectively.