The Change in Living Kidney Donation in Women and Men in the United States (2005–2015): A Population-Based Analysis

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ABSTRACT

The factors underlying the decline in living kidney donation in the United States since 2005 must be understood to inform strategies to ensure access to this option for future patients. Population-based estimates provide a better assessment of donation activity than do trends in the number of living donor transplants. Using data from the Scientific Registry of Transplant Recipients and the United States Census, we determined longitudinal changes in living kidney donation between 2005 and 2015, focusing on the effect of sex and income. We used multilevel Poisson models to adjust for differences in age, race, the incidence of ESRD, and geographic factors (including population density, urbanization, and daily commuting). During the study period, the unadjusted rate of donation was 30.1 and 19.3 per million population in women and men, respectively, and the adjusted incidence of donation was 44% higher in women (incidence rate ratio [IRR], 1.44; 95% confidence interval [95% CI], 1.39 to 1.49). The incidence of donation was stable in women (IRR, 0.95; 95% CI, 0.84 to 1.07) but declined in men (IRR, 0.75; 95% CI, 0.68 to 0.83). Income was associated with longitudinal changes in donation in both sexes, yet donation was stable in the highest two population income quartiles in women but only in the highest income quartile in men. In both sexes, living related donations declined, irrespective of income. In conclusion, living donation declined in men but remained stable in women between 2005 and 2015, and income appeared to have a greater effect on living donation in men.

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Living donor kidney transplantation is the preferred treatment for patients with ESRD.[1] The number of living donor transplantations in the United States has been decreasing since 2005,[2] for uncertain reasons,

Significance Statement

Living donor kidney transplantation is the preferred treatment for patients with ESRD, but the number of living donor transplantations in the United States has been decreasing since 2005, for uncertain reasons. Using data from the Scientific Registry of Transplant Recipients and the United States Census, we determined longitudinal changes in living donation between 2005 and 2015, focusing on the effect of sex and income. Living donation declined in men but remained stable in women; income appeared to have a greater effect on living donation in men. These findings suggest that strategies to remove financial barriers to living donation may reduce gender based disparities in donation.

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and studies are needed to better understand the factors contributing to this decline so that evidence-based strategies may be implemented to ensure patients with ESRD continue to benefit from this treatment in the future.[2]

Women comprise the majority of living kidney donors in the United States, and accounted for 63% of all living donors in 2016.[3] The reasons underlying the imbalance in living donation between women and men are also incompletely understood. It has been hypothesized that a higher incidence of kidney disease, heart disease, diabetes, and hypertension in men may limit their suitability for donation.[4–6] In addition, the financial implications of donating may pose a larger barrier for living donation in men compared with women because more men are likely to be the primary household earner.[7]

Simply reporting the number of living donor transplantations in national registries can provide an incomplete understanding of living donor activity because these analyses do not account for population-level differences in factors such as the prevalence of ESRD and income, which may affect the number of living donor transplantations. In contrast, population-based analyses that account for differences in factors that can affect the number of living donor transplantations provide a more direct assessment of living donor activity, allow for determination of longitudinal changes in living donation in a given country or region, and facilitate comparisons between countries or regions. For example, the lower number of living donor transplantations in black people[8,9] has led to presumption that they have a low level of support for living donation.[10,11] However, in a population-based analysis that accounted for race-related differences in ESRD and income, black people were shown to have a higher rate of living donation per million population compared with white people, even after accounting for differences in ESRD rates.[12]

To better understand the contemporary decline in living donation in the United States over the past decade, we undertook a population-level analysis of living kidney donation, focusing on longitudinal changes since 2005 and the effect of donor sex and income. Given our previous work showing the association of income with living donation,[13] we hypothesized a greater decline in living donation in men compared with women, and that sex-related differences in living donation would be greater in lower income groups.

RESULTS

Figure 1 outlines the cohort selection of living donors. After excluding *n*=490 living kidney donors who were not between the ages of 18 and 69 years and *n*=8531 donors for whom income could not be determined because of missing residential zip code data, *n*=52,690 living donors (85.4% of all living donors in the United States during the study period of 2005–2015) including *n*=31,958 women and *n*=20,732 men) were identified for study inclusion. The characteristics of the 8531 donors excluded because of missing zip code data were similar to those of the study cohort (data not shown).

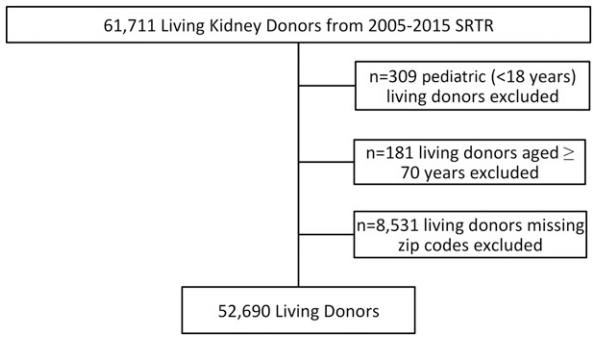

Figure 1. Cohort selection.

Table 1 outlines the characteristics of women and men who were living kidney donors in the United States between 2005 and 2015. Both women and men donated mostly to male recipients, with 63% of women and 59% of men donating to men. Compared with men, more women donated to spouses and fewer were living related donors. There were proportionately fewer women donors in the age group 18–34 years, whereas there were small but statistically significant differences in race between women and men (11% of women

Table 1. Characteristics of living kidney donors by sex in the United States between 2005 and 2015

Characteristics	Women *n*=31,958	Men *n*=20,732	*P* Value[a]
Age categories, %			<0.001
18–34	27	35	
35–49	44	41	
50–69	29	24	
Race, %			<0.001
Black	11	12	
White	71	70	
Other	18	18	
Donor relationship,[b] %			
Living related	53	60	
Living unrelated	31	32	<0.001
Spousal	16	9	
Median household income Quartiles (*N*), %			
Q1 (<$39,287)	15 (4793)	16 (3317)	0.21
Q2 ($39,287–$49,120)	20 (6392)	20 (4146)	
Q3 ($49,121–$61,902)	24 (7670)	24 (4976)	
Q4 (>$61,902)	41 (13,103)	40 (8393)	
RUCA, %			<0.001
>50,000	82	83	
10,000–50,000	9	9	
<10,000	9	8	
Recipient sex, %			
Women	37	41	<0.001
Men	63	59	

[a]Where not stated, missing values comprised <2% of all values.
[b]Donor income categories on the basis of data from the 2010 United States Census.

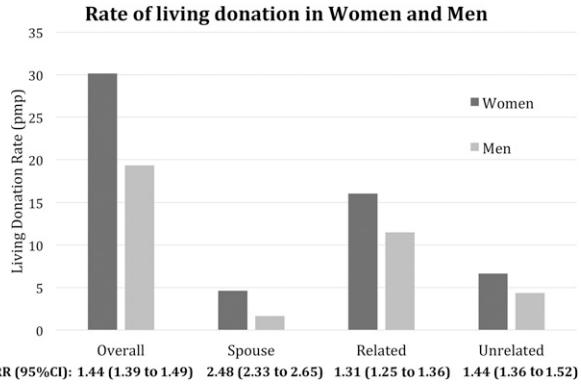

Figure 2. Unadjusted living donor rates per million population (pmp) in women and men, stratified by donor relation between 2005 and 2015 and adjusted IRRs of living donation in women compared with men.

were black compared with 12% of men) and minor differences in rural–urban commuting area (RUCA) distribution (82% of women versus 83% of men lived in metropolitan areas).

Supplemental Table 1 outlines the characteristics of women and men aged 18–69 years, as reported in the 2010 United States Census. Compared with men, women were slightly older and included a larger proportion of black people. Median household income was similar between women and men in the United States population and had minor statistically different RUCA distributions (81% of women versus 80% of men lived in metropolitan areas). The period prevalent rate of ESRD (calculated using US Renal Data System [USRDS] and 2010 United States Census data between 2000 and 2015) was significantly higher in men, at a rate of 394 men per million population compared with 253 per million population in women ($P<0.001$).

Rates of Living Donation in Women and Men during the Period 2005–2015

Figure 2 shows the unadjusted rates of living donation in women and men during the study period and the adjusted relative incidence of donation in women versus men (labeled incidence rate ratio [IRR] in the figure), stratified by the donor recipient relationship. The unadjusted rate of living donation in women was 1.5 times that of men, with a rate of 30.1 per million population in women compared with 19.3 per million population in men. After adjustment for age, race, median household income, rate of ESRD, and RUCA, women had a 44% higher incidence of donation compared with men (IRR, 1.44; 95% confidence interval [95% CI], 1.39 to 1.49). This difference was greatest for spousal donation, where women had a 148% higher adjusted incidence of donation compared with men (IRR, 2.48; 95% CI, 2.33 to 2.65), whereas women had a 31% higher adjusted incidence of living related donation (IRR, 1.31; 95% CI, 1.25 to 1.36) and a 44% higher adjusted incidence of unrelated donation (IRR, 1.44; 95% CI, 1.36 to 1.52).

Longitudinal Changes in Living Kidney Donation in Men and Women

Figure 3 shows the unadjusted rate of living donation per million population per year and the adjusted relative incidence of donation (IRR) during the period 2005–2015 in women and men, separately. The rate of living donation in women was stable during the 10-year study period, with no significant change in the adjusted incidence of living donation (IRR, 0.95; 95% CI, 0.84 to 1.07). In contrast, the unadjusted donation rate in men declined from 21.9 per million population in 2005 to 16.8 per million population in 2015, with a 25% decline in the incidence of donation after adjustment for age, race, ESRD rate, income, and RUCA (IRR, 0.75; 95% CI, 0.68 to 0.83). The change in living donation over time was statistically different in women compared with men (*P* value for interaction <0.001).

Figure 4 displays the unadjusted rate of living donation in women (A) and men (B), stratified by zip code level population quartiles of median household income. Among women (Figure 4A), the unadjusted rate of donation was greater in higher income populations and the decline in donation over time varied by median household income. Between 2005 and 2015, the unadjusted rate of living donation was stable in the two highest income quartiles (*i.e.*, quartiles 3 and 4) and declined in the two lowest income quartiles. Table 2 shows the adjusted relative incidence of living kidney donation between 2005 and 2015, stratified by zip code level median household income quartiles. Living donation declined by 27% among women in the lowest income quartile (Q1) and by 16% in the second lowest income quartile (Q2), but the adjusted relative incidence of donation was stable in the top two quartiles (Q3 and Q4) of median household income, resulting in an overall stable donation rate during the study period among women (IRR, 0.95; 95% CI, 0.84 to 1.07).

In contrast, men had a more marked decline in both the unadjusted and adjusted rate of living donation between 2005 and 2015 (Figure 4B, Table 2). The unadjusted rate of living donation remained stable only among men in the highest

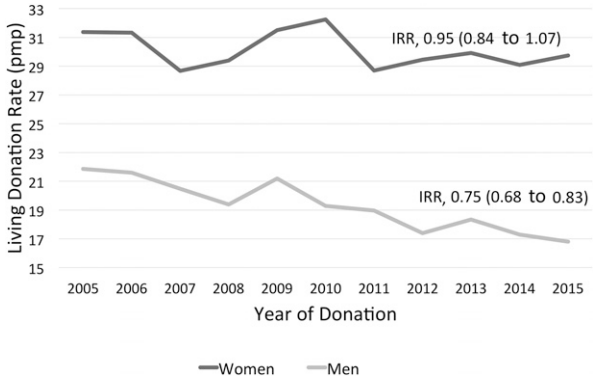

Figure 3. Living donor rates per million population per year (pmp/yr) between 2005 and 2015 in women and men.

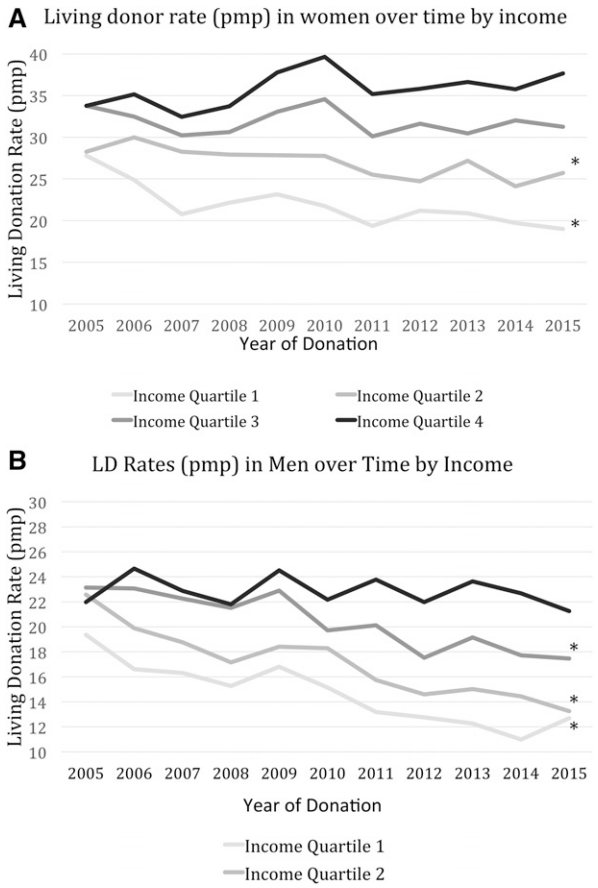

Figure 4. Living donor rates per million population per year (pmp/yr) between 2005 and 2015 in (A) women and (B) men, stratified by quartile of median household income. LD, living donor.

income quartile (Q4), and declined among men in the three lower income quartiles (Figure 4B). The adjusted relative incidence of living kidney donation in men declined by 25% overall between 2005 and 2015 (IRR, 0.75; 95% CI, 0.68 to 0.83), and declined by 41% in Q1, 40% in Q2, and 29% in Q3 between 2005 and 2015 (Table 2). There was no change in the adjusted relative incidence of living kidney donation during the study period among men in the highest income quartile (Q4). There was a significant interaction (P=0.05) between income and sex for the outcome of living donation during the study period.

Table 3 shows the adjusted relative incidence of donation during the study period in women and men, stratified by the donor and recipient relationship. Among women, only living related donations declined during the study period 2005–2015 (IRR, 0.68; 95% CI, 0.60 to 0.76). In contrast, among men the adjusted relative incidence of donation during the study period 2005–2015 declined in every donor recipient relationship subgroup: the largest decline (47%) was observed in living related donations, followed by spousal donations (22%), and unrelated donation (17%).

Given the large longitudinal decline in living related donation among both women and men, an analysis of the change in living related donation by income quartile was undertaken (Table 4). The adjusted relative incidence of living related donations dropped in all income quartiles in both men and women.

Analyses of longitudinal changes in spousal and unrelated donations by income quartile in men and women showed the same pattern as observed in the overall analysis: among women, the longitudinal decline in spousal and unrelated donations was confined to the lowest two income quartiles, whereas among men, spousal and unrelated donations declined in the three lowest income quartiles during the study period (data not shown).

Table 2. Longitudinal change in the adjusted relative incidence of living kidney donation 2005 and 2015 in women and men, stratified by median household income

Median Household Income	Women IRR (95% CI)	Men IRR (95% CI)
All	0.95 (0.84 to 1.07)	0.75 (0.68 to 0.83)[a]
Q1 (<$39,287)	0.73 (0.60 to 0.87)[a]	0.59 (0.52 to 0.68)[a]
Q2 ($39,287–$49,120)	0.84 (0.72 to 0.97)[a]	0.60 (0.53 to 0.68)[a]
Q3 ($49,121–$61,902)	0.95 (0.84 to 1.09)	0.71 (0.60 to 0.84)[a]
Q4 (>$61,902)	1.11 (0.96 to 1.28)	0.96 (0.86 to 1.07)

IRR refers to the relative incidence of living kidney donation in 2015 relative to 2005, on the basis of a multilevel Poisson regression model adjusted for donor- and population-level age, race, ESRD rate standardized for race and age, and RUCA, clustered by state of residence. For example, men in the lowest income quintile (Q1) had a 41% decline in living donation between 2005 and 2015, with an IRR of 0.59.
[a]P<0.05.

DISCUSSION

This study represents the first population-level analysis of living kidney donation in women and men in the United States in the current era, when overall living donation rates have declined and during an economically strained time in the United States, with increased rates of unemployment and decreased job security.[14] We found that women have a 44% higher incidence of living kidney donation compared with men, after

Table 3. Longitudinal change in the adjusted relative incidence of living kidney donation during the period 2005 and 2015 in women and men, stratified by donor relation

Donor Relation	Women IRR (95% CI)	Men IRR (95% CI)
All	0.95 (0.84 to 1.07)	0.75 (0.68 to 0.83)[a]
Spousal	0.91 (0.75 to 1.09)	0.78 (0.62 to 0.99)[a]
Related	0.68 (0.60 to 0.76)[a]	0.53 (0.48 to 0.59)[a]
Unrelated	1.02 (0.88 to 1.18)	0.83 (0.71 to 0.96)[a]

IRR refers to the relative incidence of living kidney donation in 2015 relative to 2005, on the basis of a multilevel Poisson regression model adjusted for donor- and population-level age, race, ESRD rate standardized for race and age, and RUCA, clustered by state of residence. Overall, men had a 25% decline in living donation between 2005 and 2015, with an IRR of 0.75.
[a]P<0.05.

Table 4. Longitudinal change in the adjusted relative incidence of living related kidney donation during the period 2005 and 2015 in women and men

Zip Code Level Income Quartiles	Women IRR (95% CI)	Men IRR (95% CI)
Q1 (<$39,287)	0.55 (0.45 to 0.68)[a]	0.44 (0.37 to 0.51)[a]
Q2 ($39,287–$49,120)	0.65 (0.56 to 0.76)[a]	0.43 (0.36 to 0.51)[a]
Q3 ($49,121–$61,902)	0.64 (0.57 to 0.73)[a]	0.49 (0.41 to 0.60)[a]
Q4 (>$61,902)	0.78 (0.67 to 0.90)[a]	0.69 (0.61 to 0.78)[a]

IRR refers to the relative incidence of living kidney donation in 2015 relative to 2005, on the basis of a multilevel Poisson regression model adjusted for donor- and population-level age, race, ESRD rate standardized for race and age, and RUCA, clustered by state of residence. For example, women in the lowest income quintile (Q1) had a 45% decline in living related donation between 2005 and 2015, with an IRR of 0.55.
[a]$P<0.05$.

adjustment for factors that have been previously hypothesized to explain this disparity, including sex-specific differences in ESRD. We also found that living donation in women has remained stable over the last decade, whereas there has been a marked decrease in living donation in men, resulting in a widening gap in donation between the sexes. We found that living donation rates varied by income in both women and men, but the decline in living donation was most marked in men from lower income groups. Finally, we found that living related donations declined in both women and men, in all income groups.

The last national population-based analysis examining sex differences in living donation was on the basis of transplantations performed during the years 1991–1993.[15] Our analysis is timely because it examines sex differences in donation during a period when living donation is declining. Although it is difficult to compare the results from the 1990s to our findings, the fact that we demonstrate a widening of the discrepancy in donation between women and men over the study period should renew interest in understanding the basis for this long-standing discrepancy. Importantly, the previous work did not include consideration of sex related differences in income or ESRD.[15] Our finding that sex-related differences in living donation persisted after adjustment for differences in ESRD between women and men suggests the importance of other factors including differences in the financial implications of donation, attitudes toward donation, or societal expectations of donation between women and men contribute to the sex-related difference in living donation.[5,15]

Our findings also draw further attention to financial barriers to living donation (see recommendations from the American Society of Transplantation Living Donor Community of Practice consensus conference[16] and other recent publications[17,18] for a comprehensive overview of this issue). The finding that income had a greater effect on donation from men should be interpreted with the knowledge that living donors and recipients are usually from the same socioeconomic background and, in many cases, the same household.[19] It is notable that the largest difference (IRR, 2.48) in donation between women and men was observed for spousal donations. Because a larger proportion of men are the primary household income earner in the United States[20] and are likely to earn higher wages compared with women,[7] it follows that the potential for lost wages may disproportionately affect donations from men. With the exception of selected private charities and paired exchange registries, most current expense reimbursement programs for living donors do not cover lost wages. The National Living Donor Assistance Center does not provide support for lost wages, but it is currently engaged in a randomized trial in which potential transplant recipients will be randomized to be offered or not offered wage reimbursement for their donor.[21]

It is important to note that financial barriers to donation are not limited to out of pocket expenses and lost wages. Concerns about financial, employment, or insurance consequences of donation may have been particularly relevant in our analysis, as it was conducted during the period of economic downturn in the United States. The potential for an interruption in employment or loss of employment may pose a greater concern for loss of work-related benefits, including health insurance, in men. Ensuring adequate medical follow-up for living donors postdonation is increasingly recognized a priority for transplantation programs,[22,23] and therefore lack of health insurance may be a significant barrier to donation. Because a larger proportion of women in the United States have their health insurance benefits covered as a dependent,[24] the threat of job loss may not necessarily affect their ability to access health care in the future. Conversely, the prospect of a male donor losing his job may more frequently result in loss of health insurance for him and his dependents. The proposed Living Donor Protection Act[25] would entitle a covered employee to medical leave in the event of living kidney donation. The bill would also prohibit discrimination on the basis of an individual's status as a living organ donor in "the offering, issuance, cancellation, coverage, price, or any other condition of a life insurance policy, disability insurance policy, or long-term care insurance policy." Our findings suggest that the passage of this bill into law may indirectly help increase living donation in the future, particularly from men.

Although our study emphasizes the importance of income as a barrier to donation in men, it is important to highlight that income was associated with lower donation rates in both women and men. We previously reported that the retraction in living donation since 2005 was restricted to lower income populations.[13] Together, these findings highlight the need for broad based policies to ensure donation is financially neutral for living donors.[26,27] This includes reimbursement for out of pocket expenses at the time of donation, and for long-term health insurance coverage for donation related complications, as well as for health care required to preserve postdonation kidney function.[28]

Our findings also highlight the role of additional factors beyond financial considerations in the decline in living donation over the past decade. We found that living related donation declined by 42% in women and 47% in men between 2005 and 2015. Of note, this decline did not vary by median household

income. Parent to child living donations have declined, in part, because of changes in deceased donor organ allocation that prioritize pediatric recipients,[29] but this only constitutes a minority of living related donations. Studies about the long-term health outcomes of living donors were published in 2013[30] and 2014,[31] and may have had some limited effect on the use of living related donations in the latter years of our analysis, but were unlikely to contribute to the decline in donation that preceded these studies. It is important to understand that other than the potential role of APOL-1 gene variants,[32–36] the basis for an increased risk of kidney failure in living related donors remains uncertain. Importantly, lifestyle factors that are shared among family members may lead to conditions such as diabetes and hypertension, which appear to be important antecedents of CKD in previous living donors.[37,38] The importance of these recent observations is that much of the apparent familial risk in related living donors may be modifiable with appropriate postdonation care.

The strengths of this analysis are that it includes all living donors in the United States with a valid zip code and directly examined prevalent and longitudinal changes in living donor transplantation in women and men, after adjustment for differences in age, race, geography, and ESRD. Our population-level analysis may not be applicable to individual donors. The use of zip codes to determine median household income is frequent in the medical literature and assumes the same income for individuals living in a given zip code. This assumption may be incorrect, especially in metropolitan areas. Median household income is only one indicator of socioeconomic status and may not directly relate to the financial status of an individual. However, when we examined other metrics at the zip code level, such as education, we found that these were colinear with median household income. Because we examined median household income as a categorical variable rather than a continuous variable, we were unable to account for the variability in income within each income quintile and how this relates to living donation. Data from the 2010 United States Census were used to assign median household income and determine population figures. It is important to note that the lack of individual level data limit our ability to account for changes in median household income over time, particularly during periods of economic stress. We adjusted for the age and race standardized prevalence of ESRD, but are not able to directly adjust for the incidence of other health conditions (*i.e.*, diabetes, heart disease) that may affect living donation. The effect of such conditions would only be accounted for to the extent that they are correlated with the prevalence of ESRD in our study. We have previously reported on the equivalent rate of living donation in black and white Americans in the United States, and therefore we did not specifically examine three-way interactions of ancestry, income, and sex on living donation in this study as these analyses are difficult to interpret and we have shown that black ancestry is not an independent determinant of living donation after accounting for differences in income and ESRD. Specific to black people, recent survey work has shown that United States transplant centers do not routinely currently use APOL-1 testing in their evaluation of living donors,[32] and therefore we do not believe the evolving information regarding APOL-1 risk alleles and the risk of CKD affected the use of living related donation in black people in this study. The trends in this analysis may not be applicable for small selected subgroups of donors, such as nondirected anonymous donors. Kumar *et al.*[39] recently reported on nondirected donation in the United States and showed that only 44% of these donors were men. Although we did not separately examine trends in living donation by sex and income among nondirected anonymous donors in this analysis because of the small numbers of such donors, it is unlikely that these donors were key drivers of the overall trends in donation in women and men, given their small numbers.

In summary, we found that changes in living donation in the past decade varied by sex, resulting in a widened gap in donation between women and men and that income may be an important factor contributing to this discrepancy. These findings suggest that strategies to remove financial barriers to living donation as may be important to maintain living donation in the future. The reasons for the decline in living related donation require further study.

CONCISE METHODS

Definitions

Living related donations included all donations from a biologic relative including donations between sibling, parent to child donations, and donations from adult offspring to a parent. Living unrelated donations included all nonspousal, nonbiologically related donors.

Data Source and Study Population

Data from the Scientific Registry of Transplant Recipients (SRTR) were used to identify all living kidney donors aged 18–69 years of age in the United States between 2005 and 2015. The SRTR data system includes data on all donor, waitlist candidates, and transplant recipients in the United States, submitted by the members of the Organ Procurement and Transplant Network (OPTN). The Health Resources and Services Administration, US Department of Health and Human Services provides oversight to the activities of the OPTN and SRTR contractors.

Individuals aged 70 and older were excluded because they represent a very small proportion of living donors and estimates of donation may not be robust in these groups. Data from the 2010 United States Census were used to determine zip code level median household income. Zip codes were then grouped into quartiles on the basis of median household income.

The characteristics of women and men in the United States population in the 2010 United States Census and in living donors between 2005 and 2015 were examined. Continuous variables were reported as mean±SD, or medians (25th, 75th percentile), whereas categorical variables were described using proportions. Group differences were determined using *t* tests, ANOVA, or the chi-squared test as appropriate.

Adjusted Relative Incidence of Living Donation in Women Compared with Men

The overall rate of living kidney donation per million population was determined in women and men during the study period and was stratified by donor relation (spousal, related, and unrelated). Multivariable Poisson regression models were used to determine the adjusted relative incidence of living donation in women versus men during the study period, and was further stratified by donor relation. The models were adjusted for donor- and population-level differences in age, race, and median household income. To account for the possibility that differences in ESRD in women and men may affect living donation, we also adjusted for age and race standardized rate of ESRD in women and men. Zip code level period prevalent ESRD rates were determined using data from USRDS and the 2010 United States Census, using methods we have used in prior analyses.[13] Finally, to account for geographical factors that may affect the likelihood of living donation, all analyses were clustered by state of residence and adjusted for population density within each zip code using RUCA code.[40,41] RUCA codes were classified into the following groups: metropolitan (cities with population of >50,000 and their associated suburban areas; RUCA, 1.0–3.9), micropolitan (towns or cities with population 10,000–50,000; RUCA, 4.0–6.0), and rural (towns with a population <10,000; RUCA>6.0).

Longitudinal Changes in Living Donation in Women and Men

To examine sex-specific changes in donation over time, living kidney donation rates per year were determined separately for women and men between 2005 and 2015. The sex-specific adjusted relative incidence of living donation per year between 2005 and 2015 was determined using multivariable Poisson regression models. These models were adjusted for age, race, median household income, and race and age standardized ESRD rates in women and men. All analyses were clustered by state of residence and adjusted for population density within each zip code using RUCA codes.[40,41] In addition, the interaction between sex and time for the outcome of donation was formally tested.

Data from the 2010 United States Census were used to define zip code quartiles on the basis of median household income. Adjusted sex-specific changes in living donation between 2005 and 2015 were then determined within each income quartile, using the same methods outlined above. These analyses were repeated for subgroups of donation: living related, spousal, and living unrelated donation. To further examine the effect of income on the difference in donation rates between women and men during the study period, the interaction of sex and income for the outcome of donation was formally tested.

This study was conducted with the approval of our local hospital research ethics board. All analyses were performed using SAS v9.4 (SAS Institute, Cary, NC).

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The interpretation and reporting of these data are the responsibility of the author(s) and in no way should be seen as an official policy of or interpretation by the Organ Procurement and Transplant Network/SRTR or the US Government.

DISCLOSURES

None.

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