

## RESEARCH LETTERS

## Associations of Lack of Insurance and Other Sociodemographic Traits With Follow-up After Living Kidney Donation



To the Editor:

Clinical and laboratory follow-up for living kidney donors (LKD) may quantify risk, prompt early intervention, and inform donor candidates and donors.<sup>1</sup> In 1999, the Organ Procurement and Transplantation Network (OPTN) requested that US transplant centers submit LKD follow-up forms 6 and 12 months after donation.<sup>2</sup> Additional elements such as insurance status were added in 2004, with follow-up extended to 24 months in 2008. Noting poor performance, in 2013, the OPTN defined minimum transplant center follow-up thresholds, targeted to  $\geq 80\%$  and  $\geq 70\%$  for clinical and laboratory data, respectively.<sup>3</sup>

Postdonation follow-up poses financial and logistical challenges for both donors and transplant programs. Currently, no mechanism exists for reimbursing donors or programs for mandate-related costs. Previous studies have reported lower postdonation follow-up in uninsured living donors,<sup>4,5</sup> but this has not been examined in contemporary practice.

Hypothesizing that lack of insurance may pose a barrier to follow-up care after donation, the American Society of Transplantation Living Donor Community of Practice Finance Workgroup examined contemporary trends in national registry data.

We conducted a retrospective cohort study of LKDs in the United States using Scientific Registry of Transplant Recipients (SRTR) data. This study of de-identified, publicly available data was deemed human subjects exempt by the Institutional Review Board of Saint Louis University, which includes waiver of individual informed consent for data analysis.

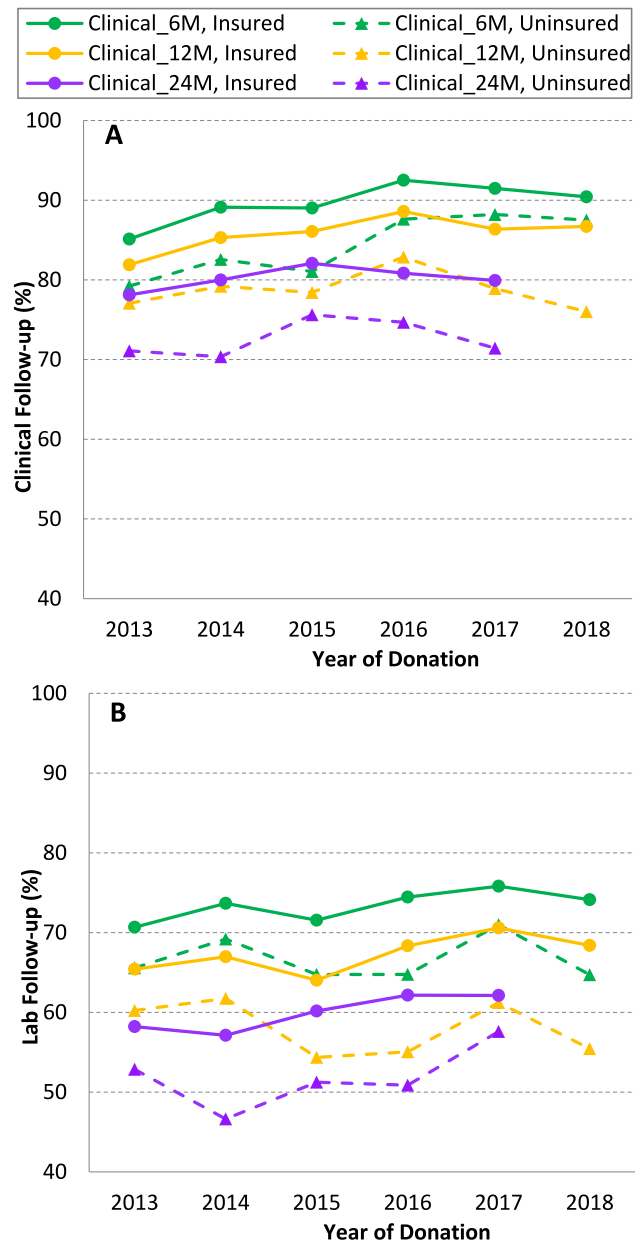
We examined associations of LKD insurance status for donations from the start of the OPTN follow-up mandate in February 2013 to December 2018, with postdonation follow-up. Donors were categorized as insured or uninsured at the time of donation. The primary dual outcomes were complete clinical and laboratory follow-up at 6, 12, and 24 months postdonation, based on the OPTN requirements (Table S1).<sup>3</sup> Follow-up records were examined through February 29, 2020 (before the COVID-19 pandemic).

Multivariable regression modeling, including adjustment for donation year and baseline demographic characteristics captured in the registry (Table S2), was used to examine the association of insurance status and the outcomes of clinical and laboratory follow-up (given as adjusted odds ratio [AOR] with 95% confidence limits [CL]). Data management and analyses were performed with SAS for Windows, version 9.4 (SAS Institute Inc).

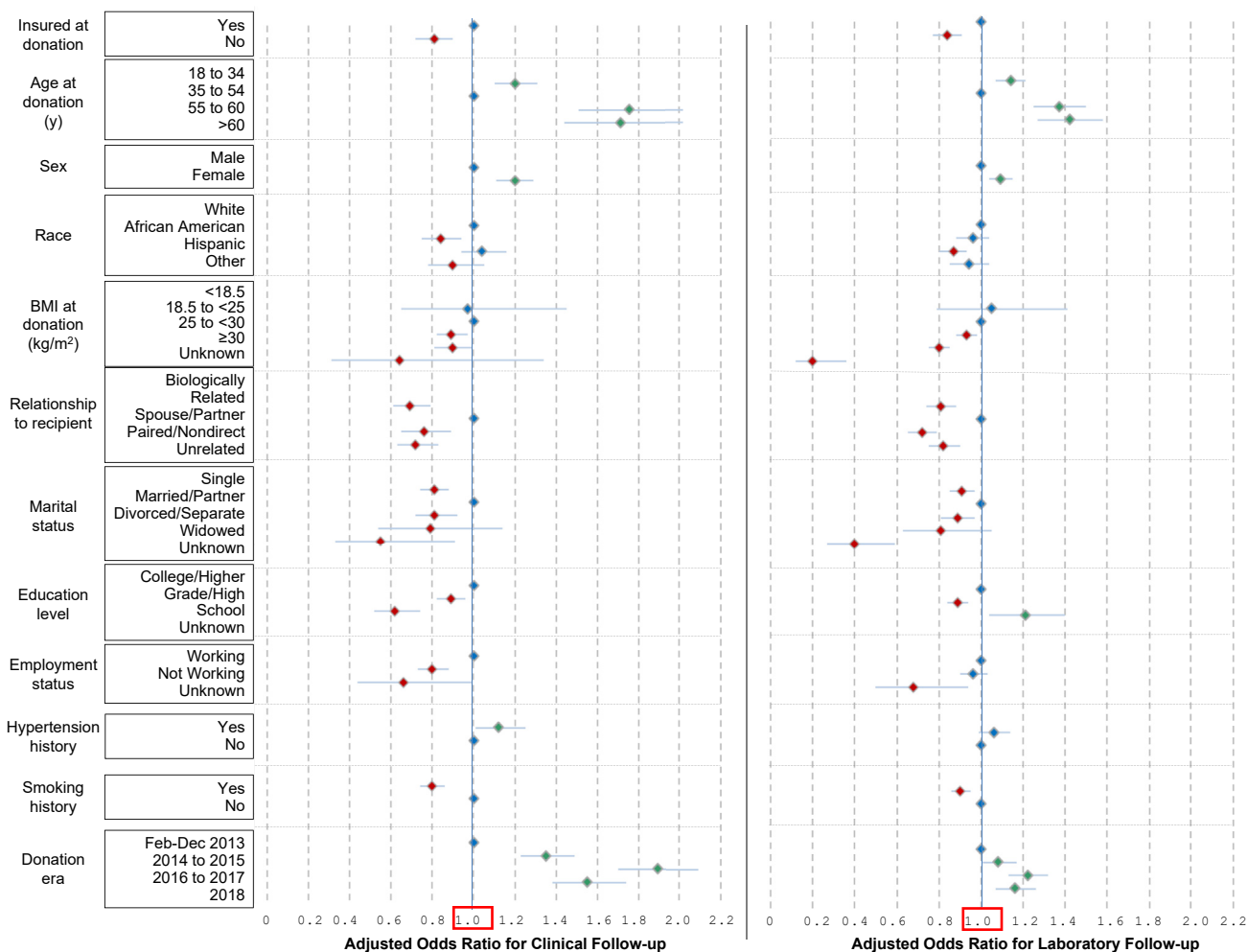
Among adult LKDs recorded in the SRTR database in 2004–2018, the proportion with missing insurance status decreased over time (Fig S1). This analysis included 33,522

LKDs during the study period with insurance status; 90% (n = 30,298) were insured. Compared with insured donors, uninsured donors were more likely to be younger, male, African American, Hispanic, biologically related to their recipient, single, grade school or high school educated, and unemployed; to have a history of smoking; to have obesity; and to have donated earlier (Table S2).

Overall, clinical follow-up was more complete than laboratory follow-up at 6, 12, and 24 months (Table S3). Follow-up was less common in uninsured than insured donors (Fig 1). At 24 months postdonation, 73% and 80%



**Figure 1.** LKD clinical (A) and laboratory (B) follow-up by insurance status and year of donation. The 24-M (month) analysis was limited to those with  $\geq 26$  M of observation to allow follow-up form completion.



**Figure 2.** Adjusted associations of baseline characteristics at the time of donation with postdonation clinical and laboratory follow-up at 6 months.

of uninsured and insured donors had clinical follow-up, respectively ( $P < 0.001$ ). After multivariable regression, uninsured status was associated with 19% lower odds of clinical follow-up (AOR, 0.81 [95% CL, 0.72-0.90]) and 16% lower odds of laboratory follow-up (AOR, 0.84 [95% CL, 0.77-0.91]) at 6 months (Fig 2, Table S4). Similar patterns were seen at 12 and 24 months' follow-up.

In this large cohort study of US LKDs, 10% of donors were uninsured and uninsured status was associated with less clinical and laboratory follow-up. Non-White donors and those with less favorable social determinants of health were less likely to be insured,<sup>6</sup> a concerning pattern given known similar disparities in kidney disease risk factors such as obesity, hypertension, and diabetes.<sup>7</sup>

A prior study of US LKDs from 2008-2012 found that lack of health insurance was significantly associated with follow-up deficiencies 12 months postdonation.<sup>4</sup> Our work advances these findings with a larger cohort after implementation of the OPTN follow-up mandate and passage of the Affordable Care Act. We found that the

association of lack of insurance with reduced follow-up persists at 24 months postdonation.

The OPTN follow-up mandate aimed to improve donor follow-up, yet the Centers for Medicare & Medicaid Services cost report excludes costs of routine postdonation follow-up.<sup>8</sup> Since failure to meet minimum reporting standards may have regulatory consequences for programs, effects may include more stringent donor acceptance criteria or the development of alternate approaches to cover follow-up costs.<sup>8</sup>

Our analysis' strengths include its national scope and large sample size. Limitations include lack of information on insurance status after donation. Uninsured status may be a surrogate for other unmeasured factors. Care and patient populations may vary by center. Some donors may have received follow-up care that was not known to the center or not reported by the center.

Resources are needed to provide follow-up care for at-risk LKDs. Recently, the SRTR launched the Living Donor Collective to determine the feasibility of capturing long-

term living donor data, but the project is in early stages.<sup>9</sup> Ongoing efforts to support follow-up for all donors, including attention to financial barriers,<sup>10</sup> are vital to help ensure opportunities for safe donation, especially among vulnerable groups.

Ngan N. Lam, MD, MSc, Anthony N. Muiru, MD, Andrea Tietjen, CPA, MBA, Rebecca E. Hays, MSW, APSW, Huiling Xiao, MS, Amit X. Garg, MD, PhD, Gwen McNatt, ARNP, PhD, Robert Howey, MBA, MHA, CPA, Christie P. Thomas, MD, Nagaraju Sarabu, MD, Cody Wooley, RN, Bertram L. Kasiske, MD, Krista L. Lentine, MD, PhD

## Supplementary Material

### Supplementary File (PDF)

Figure S1; Tables S1-S4.

## Article Information

**Authors' Affiliations:** University of Calgary, Calgary, Alberta, Canada (NNL); University of California, San Francisco, California (ANM); Saint Barnabas Medical Center, Livingston, New Jersey (AT); University of Wisconsin Hospital and Clinics, Madison, Wisconsin (REH); Saint Louis University, St. Louis, Missouri (HX, CW, KLL); Western University, London, Ontario, Canada (AXG); University of Iowa Carver College of Medicine, Iowa City, Iowa (CPT); Toyon Associates, Concord, California (RH); University Hospitals Cleveland Medical, Cleveland, Ohio (NS); Hennepin County Medical Center, Minneapolis, Minnesota (BLK); and University of Iowa Hospitals and Clinics, Iowa City, Iowa (GM).

**Address for Correspondence:** Krista L. Lentine, MD, PhD, Saint Louis University Transplant Center, 1201 S. Grand Blvd, St. Louis, MO 63104. Email: [krista.lentine@health.slu.edu](mailto:krista.lentine@health.slu.edu)

**Additional Information:** ORCIDiDs are 0000-0002-0129-7091 (NNL), 0000-0002-5876-3938 (REH), 0000-0002-5989-9685 (CPT), 0000-0003-4809-6956 (BLK), 0000-0002-9423-4849 (KLL).

**Authors' Contributions:** Study design: all authors; acquisition of data and regulatory approvals: KLL; data analysis: HX; interpretation: all authors. Each author contributed important intellectual content during manuscript drafting or revision and agrees to be personally accountable for the individual's own contributions and to ensure that questions pertaining to the accuracy or integrity of any portion of the work, even one in which the author was not directly involved, are appropriately investigated and resolved, including with documentation in the literature if appropriate.

**Support:** This work was conducted under the auspices of the Hennepin Healthcare Research Institute (HHRI), contractor for the SRTR, as a deliverable under contract no. HSH250201000018C (overseen by US Department of Health and Human Services, Health Resources and Services Administration, Healthcare Systems Bureau, Division of Transplantation). Dr Lentine receives research funding related to living donation from the National Institutes of Health (R01DK120551) and the National Institute of Diabetes and Digestive and Kidney Disease (R01DK120518), and is also supported by the Mid-America Transplant/Jane A. Beckman Endowed Chair in Transplantation. Drs Kasiske and Lentine are senior staff of the SRTR.

**Financial Disclosure:** The authors declare that they have no relevant financial interests.

**Acknowledgements:** The authors thank the American Society of Transplantation Education Committee for review and feedback and SRTR colleague Mary Van Beusekom, MS, ELS, for manuscript

editing. This report is a product of the American Society of Transplantation Living Donor Community of Practice Finance Workgroup.

**Disclaimer:** The SRTR system includes data on all US donors, waitlist candidates, and transplant recipients submitted by members of the OPTN. The interpretation and reporting of these data are the responsibility of the authors and in no way should be seen as an official policy of or interpretation by the SRTR, the US Government, or funding agencies.

**Data Sharing:** Individual participant de-identified data will not be shared by the authors due to restrictions of data use agreements. SRTR registry data can be obtained from the SRTR.

**Prior Presentation:** Portions of this work were included in an oral presentation at the American Transplant Congress Virtual Connect, June 8, 2021.

**Peer Review:** Received October 30, 2021. Evaluated by 2 external peer reviewers, with direct editorial input from a Statistics/Methods Editor, an Associate Editor, and the Editor-in-Chief. Accepted in revised form January 14, 2022.

**Publication Information:** © 2022 Published by Elsevier Inc. on behalf of the National Kidney Foundation, Inc. Published online March 14, 2022 with doi [10.1053/j.ajkd.2022.01.427](https://doi.org/10.1053/j.ajkd.2022.01.427)

## References

- Long J, Lentine KL, Henderson ML. Follow-up care after living kidney donation. In: Lentine KL, Concepcion BP, Lerma EV, eds. *Living Kidney Donation: Best Practices in Evaluation, Care and Follow-up*. Cham: Springer International Publishing; 2021:303-326.
- Organ Procurement and Transplantation Network (OPTN). Procedures to collect post-donation follow-up data from living donors. Accessed January 1, 2022. <https://optn.transplant.hrsa.gov/resources/guidance/procedures-to-collect-post-donation-follow-up-data-from-living-donors/>
- OPTN (Organ Procurement and Transplantation Network)/UNOS (United Network for Organ Sharing). OPTN Policies, Policy 18: Data Submission Requirements. Accessed January 1, 2022. <http://optn.transplant.hrsa.gov/governance/policies/>
- Schold JD, Buccini LD, Rodrigue JR, et al. Critical factors associated with missing follow-up data for living kidney donors in the United States. *Am J Transplant*. 2015;15(9):2394-2403.
- Henderson ML, Thomas AG, Shaffer A, et al. The national landscape of living kidney donor follow-up in the United States. *Am J Transplant*. 2017;17(12):3131-3140.
- Casagrande LH, Collins S, Warren AT, Ommen ES. Lack of health insurance in living kidney donors. *Clin Transplant*. 2012;26(2):E101-E104.
- Lentine KL, Segev DL. Health outcomes among non-Caucasian living kidney donors: knowns and unknowns. *Transpl Int*. 2013;26(9):853-864.
- Tietjen A, Hays R, McNatt G, et al. Billing for living kidney donor care: balancing cost recovery, regulatory compliance, and minimized donor burden. *Curr Transpl Rep*. 2019;6(2):155-166.
- Kasiske BL, Ahn YS, Conboy M, et al. Outcomes of living kidney donor candidate evaluations in the living donor collective pilot registry. *Transplant Direct*. 2021;7(5):e689.
- Lentine KL, Mannon RB, Mandelbrot D. Understanding and overcoming financial risks for living organ donors. *Am J Kidney Dis*. 2022;79(2):159-161.