

# Can Community-Based Albuminuria Testing Improve Care?



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According to the Centers for Disease Control and Prevention, chronic kidney disease (CKD) affects 37 million American adults who experience high rates of cardiovascular disease and the risk of kidney failure that confers a 50% five-year mortality, worse than common cancers.<sup>1</sup> The *KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease*,<sup>2</sup> endorsed by the Kidney Disease Outcomes Quality Initiative,<sup>3</sup> included a cause—glomerular filtration rate (GFR)—albuminuria (C-G-A) CKD definition. The recommended tests for CKD are the estimated GFR (eGFR) and urinary albumin-creatinine ratio (uACR).<sup>2,3</sup> In 2016, testing of American adults with both major CKD risk conditions, diabetes and hypertension, was approximately 90% for eGFR by creatinine, yet uACR testing was only 41.8% and 50.7% in the Medicare 5% and commercial

health insurance Optum Clinformatics datasets, respectively.<sup>4</sup> Undertesting of albuminuria in diabetes and/or hypertension is one of the barriers to low CKD diagnosis and in turn limited patient CKD awareness. Low perceived risk for future incident CKD has been demonstrated for hypertension,<sup>5</sup> and awareness of CKD has remained low and unchanged for decades.<sup>1</sup> Identifying ways to heighten awareness of kidney disease among those at highest risk for progression and adverse events is an important area of research for nephrology.

## Kidney Disease Screening and Awareness Program

Community-based testing for albuminuria is one strategy to reinforce public awareness of kidney damage that has the potential to lead to better engagement with the health care system for follow-up testing and management. In this issue of *KI Reports*, Zhuo *et al.*<sup>6</sup> present data from the Kidney Disease Screening and Awareness Program (KDSAP), a cross-sectional community-based cohort in the United States and Canada, demonstrating high 20% prevalence (461 of 2304) of dipstick

proteinuria based on a single +trace or higher result and low 15.8% (67 of 423) awareness. Combining responses to 2 questions defined awareness: (i) *Have you ever had protein in the urine?* Or, (ii) *do you have kidney disease (do not include kidney stones, bladder infections, or incontinence)?* Interestingly, awareness among individuals with albuminuria by questions (i) and (ii) was 15.5% (47 of 303) and 9.7% (40 of 414), respectively, suggesting that awareness of proteinuria was at least as recognized as kidney disease in the community (Supplementary Table S3).

The KDSAP offers free screenings delivered by college students under the direction of academic nephrology faculty. Individuals are targeted who may be vulnerable and mistrust the health care system, although specific risk factors or ethnic/racial groups are not part of the inclusion criterion of age 18 years and older. Exclusions are kidney transplant or dialysis treatment. Although using 2 questions for awareness of CKD may be more sensitive in general, the specific question about CKD is potentially problematic because the participant may have been told about CKD entirely defined by eGFR. Indeed, among the KDSAP population without albuminuria, self-reported kidney disease by question (ii) was 6.2% (99 of 1606). Furthermore, participants who were aware of proteinuria may not realize the prognostic and therapeutic import when combined with reduced eGFR. Lower albuminuria awareness was associated with younger age, African American race, English speakers, better self-assessments of health, lower monthly out-of-pocket medication costs, and lower numbers of prescribed medications. Higher awareness was associated with

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preexisting comorbidities of diabetes, hypertension, and cardiovascular disease, as well as family history of kidney disease and dipstick hematuria. Overall, these analyses suggest that patients with higher comorbid burden are more likely to be aware of albuminuria and kidney disease, possibly because of more frequent testing. However, even among these high-risk groups, significant gaps remain, with participants' CKD awareness of 31.1% in cardiovascular disease and 47.6% for diabetes. The low cost, simplicity, and scalability of the KDSAP are attractive advantages for implementing community-based testing for kidney damage.

The limitations are comprehensively outlined by the authors, but the major caveats are the absence of eGFR by creatinine testing and the use of unique awareness questions, as noted. In addition, without clear explanation, the population is enriched with 53.9% Asian individuals (1241 of 2304). This has the advantage of the capacity to reach a population that has a disparity for high prevalence of CKD<sup>1</sup> and one that is underrepresented in previous studies. Showing that KDSAP can reach other vulnerable populations, such as African American, Hispanic, and Native American individuals is an important future consideration to demonstrate generalizability of this approach. Also, future testing of the efficacy of KDSAP and similar activities to raise the general awareness of CKD longitudinally is important, especially among vulnerable populations and the young. Last, the KDSAP screenings are not yet national, but a regionally concentrated convenience sample with 90% in Massachusetts, New Jersey, Pennsylvania, New York, Michigan, California, and Ontario, Canada.

### KDSAP Compared With Other Community-Based CKD Programs

Other large-scale community-based programs that test for CKD include the Centers for Disease Control and Prevention's National Health and Nutrition Examination Survey (NHANES)<sup>7,8</sup> and the National Kidney Foundation's Kidney Early Evaluation Program (KEEP),<sup>8,9</sup> which both feature major advantages, including national distribution and testing with eGFR by creatinine and uACR, rather than only urine dipstick testing in KDSAP. NHANES is a cross-sectional assessment of the U.S. ambulatory adult noninstitutionalized, nonmilitary population for CKD among a variety of chronic conditions, whereas KEEP tests for CKD targeting participants with CKD risk conditions.

Different kidney disease awareness questions are used by NHANES, KEEP, and KDSAP. In NHANES, CKD awareness was defined by kidney function rather than kidney damage using the question, *Have you ever been told you have weak or failing kidneys?*<sup>7</sup> This question was also incorporated into the Centers for Disease Control and Prevention's telephone survey, Behavioral Risk Factor Surveillance System.<sup>7</sup> Similarly, KEEP defined awareness using 2 relevant questions: *Have you ever been told by a health care professional that you have kidney disease?* or *Have you ever been told by a doctor or a health care professional that you have protein or blood in your urine?*<sup>9</sup> Both NHANES and KEEP questions ask lay participants to disregard kidney stones, bladder infection, and urinary incontinence as potential forms of kidney disease.<sup>7,9</sup> Awareness questions can thus be categorized as those asking about a previous diagnosis of a kidney problem, or being informed about an abnormal laboratory test

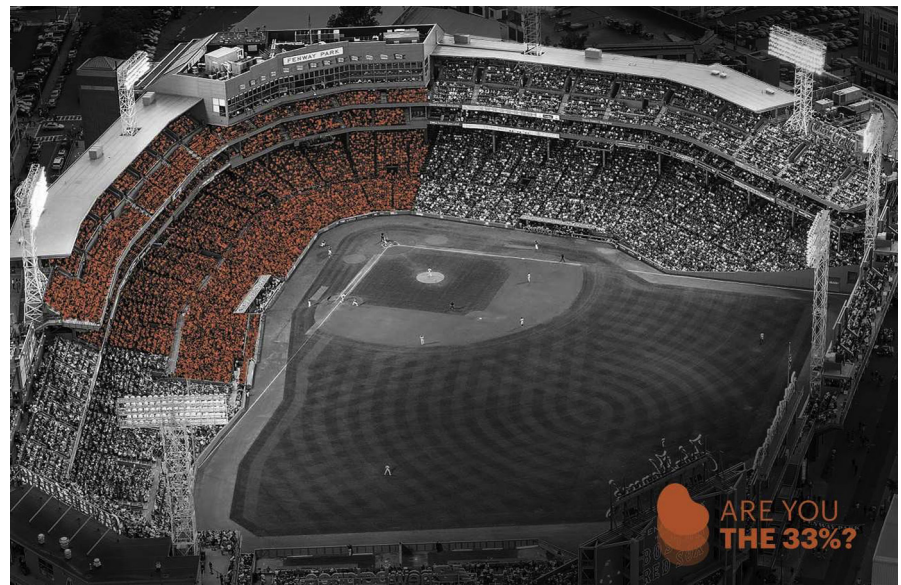
pertaining to kidney function (eGFR) or kidney damage (albuminuria/proteinuria or hematuria). Awareness based on the NHANES question is sobering or 9.0% (95% confidence interval, 8.0%–10.0%) in an analysis of more than half a million participants in the 2011 Behavioral Risk Factor Surveillance System and more than 20,000 NHANES 2005–2012 subjects with large state-level variation, ranging from 5.8% (95% confidence interval, 4.8%–6.8%) in Iowa to 11.7% (95% confidence interval, 9.7%–13.7%) in Arizona.<sup>7</sup> Even among the high-risk motivated KEEP participants, only 23% were aware of their CKD status.<sup>9</sup> The recent demonstration that the NHANES and KEEP cohorts are directly comparable after accounting for the self-selection of high-risk participants in KEEP,<sup>8</sup> supports a persistent gap in improving the awareness of CKD and its laboratory manifestations. Importantly, low levels of CKD awareness likely contribute to awareness as a proxy for CKD severity, demonstrated in NHANES studies that showed associations between awareness and adverse outcomes.<sup>S1</sup> Future CKD awareness longitudinal investigation should monitor these associations.

Evaluating awareness across different survey questions in a regional urban ambulatory safety-net primary care population revealed these questions are highly specific for CKD (range, 82.2%–97.6%), but sensitivity is much lower (range, 26.4% for *kidney damage* to 40.1% for *kidney problem*).<sup>S2</sup> In contrast, the same study showed awareness of CKD risk conditions was high—90.1% for hypertension and 91.8% for diabetes.<sup>S2</sup> Community-dwelling adults who may not be engaged in primary care have even lower CKD awareness by the same questions (range, 2.2% for *kidney damage* to

5.2% for kidney problem).<sup>S3</sup> These findings should not be interpreted as indicating a weak performance of the questions *per se*, rather they indicate the low CKD awareness among community participants and high-risk patients alike. In fact, an examination of 3 compound questions (analogous to the 2 questions used in KEEP) indicate awareness of 19.5%, which compares favorably with the Healthy People 2020 goal of 13.4%.<sup>S3</sup> The present study awareness level is intermediary between these previous assessments, and should serve as a call to arms to come up with better strategies or approaches to raise awareness.

A broader question that needs to be considered is the importance of awareness of albuminuria by patients. An examination of the analyses from NHANES, KEEP, and this study would suggest that a major reason for the low albuminuria awareness is that health care practitioners do not assess uACRs in practice,<sup>4</sup> or despite measuring it, do not use the results to communicate risk to patients, or do so ineffectively. We feel that clinicians are in general aware of the importance of albuminuria as a predictor of cardiovascular and kidney risk. In the authors' opinion, the most plausible explanation is that albuminuria is not frequently assessed in clinical practice. In other words, clinicians (and in turn patients) are simply not aware of the things that are not measured in routine clinical workflows. Our interpretation is also supported by empirical evidence: diagnosis of CKD in the primary care setting was highly associated with awareness in a primary care study of more than 10,000 individuals with type 2 diabetes.<sup>S4</sup>

One may wonder if not measuring albuminuria has detrimental implications on clinical outcomes and the cost of care,



**Figure 1.** The National Kidney Foundation's public kidney risk awareness campaign (1 in 3 Americans are at risk for kidney disease) in support of the Advancing American Kidney Health Initiative.

beyond the lack of CKD awareness. A recent scalable CKD population health intervention shows that this is indeed the case. Implementing a care plan according to the CKD heat map class or risk stratification by eGFR and uACR measurements, demonstrated decreased hospitalizations, fewer readmissions, and net per member per month savings in medical expenditures of \$276.80 and \$480.79 for CKD heat map classes 3 and 5, respectively.<sup>S5</sup> Going forward, recognition of albuminuria will aid the selection of patients who need additional interventions above and beyond the current paradigm of inhibitors of the renin angiotensin-aldosterone system, including, for type 2 diabetes, sodium-glucose cotransporter-2 inhibitor and/or glucagon-like peptide-1 receptor agonist use.<sup>S6</sup> Without recognition of the persistence of albuminuria, many individuals who might benefit will not be offered these therapies, thus missing the opportunity to meaningfully improve outcomes in

CKD. The National Kidney Foundation is advancing multiple initiatives to enhance testing, detection and management CKD primary care.<sup>S7,S8</sup> Based on the Centers for Disease Control and Prevention's definitions and reported prevalence of diabetes and hypertension,<sup>1</sup> the National Kidney Foundation is promoting the 1 in 3 public kidney risk campaign (Figure 1) as part of the Advancing American Kidney Health Initiative in support of the U.S. Department of Health and Human Services and the American Society of Nephrology.

## DISCLOSURE

JAV reports consulting fees from Janssen Inc., the manufacturer of canagliflozin, a sodium-glucose cotransporter-2 inhibitor. The other author declared no competing interests.

## SUPPLEMENTARY MATERIAL

[Supplementary File \(PDF\)](#)

[Supplementary References.](#)

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