

## National Kidney Foundation's Kidney Early Evaluation Program (KEEP) Annual Data Report 2011: Executive Summary

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In 2011, the National Kidney Foundation's Kidney Early Evaluation Program (KEEP) continued more than a decade of data collection as part of its national screening program for volunteer participants at high risk of chronic kidney disease (CKD). Through the years, findings from KEEP have yielded important inferences regarding trends in CKD in the United States, including cardiovascular risk factors and other CKD-related comorbid conditions, such as bone and mineral disorder and anemia. Recent work from our group and others has highlighted the importance of CKD awareness,<sup>1-3</sup> especially in earlier stages. In this supplement to the *American Journal of Kidney Diseases*, we turn our attention to access to health care in KEEP participants who become aware of CKD. Recent data from the US Renal Data System Annual Data Report show that a disappointing 43% of patients with newly diagnosed end-stage renal disease had not received nephrology care before kidney failure, and of patients who had received care, only 25% had done so for more than 1 year.<sup>4</sup> We thus present 4 articles regarding access to health care for KEEP participants: (1) Agrawal et al<sup>5</sup> describe access to health care for screened participants, (2) Shah et al<sup>6</sup> focus on the role of access in awareness, (3) Jurkovitz et al<sup>7</sup> explore whether access to nephrology care influences risk-factor control, and (4) Saab et al,<sup>8</sup> in an outcomes-related report, discuss whether access is associated with better or worse mortality in screened participants.

### ACCESS TO HEALTH CARE IN KEEP

Prevalent CKD continues to increase in the United States with a parallel increase in overall morbidity and mortality.<sup>9</sup> In this context, improved access to health care through primary care or nephrology referral for patients with or at risk of CKD is thought to improve CKD-related outcomes. However, understanding of access to health care for patients with kidney disease remains focused on the dialysis population<sup>10-12</sup> and not on earlier CKD stages, for which the opportunity to slow progression and improve CKD-related morbidity is paramount. Access to health care in CKD has focused on the influence of race, insurance status, and risk-factor control related to the risk of incident end-stage renal disease. However, other important indicators of health care access include difficulty obtaining or paying for medical care, types of providers avail-

able, and patient-provider interactions. These issues remain unexplored in the population with or at risk of CKD.

Understanding barriers to care, whether related to nephrology referral or access to primary care, for individuals with CKD may provide information that can improve standards of care, particularly health care delivery and utilization. Data presented by Agrawal et al<sup>5</sup> describe the distribution of various measures of access to medical care across CKD stages and disparities in these measures across age and racial/ethnic groups and chronic diseases (eg, diabetes, hypertension, and cardiovascular disease). Results in this report show that across all CKD stages, adequate access is less likely for KEEP participants who lack insurance, are younger than 65 years, are nonwhite, or have no previously diagnosed comorbid condition. Further, nephrology care utilization is low even for participants with CKD who show acceptable measures of health care access (Table 1).

### ACCESS TO HEALTH CARE AND AWARENESS OF CKD

Shah et al<sup>6</sup> begin to address the role of access to health care in CKD awareness. Recent reports support an alarmingly low rate of CKD awareness in the general population,<sup>1-3</sup> implying that our health care system has been unsuccessful in engaging patients with CKD to implement measures to slow disease progression or reduce cardiovascular risk. Determining

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**Table 1.** Rates of KEEP Participants Identifying a Care Provider

Care Provider	CKD			
	None	Stages 1-2	Stage 3	Stages 4-5
Generalist only	44.1	43.4	44.5	36.3
Nephrologist only	0.1	0.3	0.3	2.2
Generalist and nephrologist	1.1	2.3	5.6	25.2
Other specialist <sup>a</sup>	22.9	26.5	34.0	23.8
Other care providers <sup>b</sup>	19.1	14.6	9.4	4.6
None	12.7	12.9	6.2	8.0

Note: Values are percentages.

Abbreviations: CKD, chronic kidney disease; KEEP, Kidney Early Evaluation Program.

<sup>a</sup>Cardiologist or endocrinologist.

<sup>b</sup>Obstetrician/gynecologist, nurse practitioner, or physician assistant.

predictors of CKD awareness could assist in implementing strategies to mitigate low awareness and potentially increase the number of patients who are adequately treated. KEEP is an integrative system, assessing CKD awareness and detection on a large scale and providing an opportunity to study the interactions among barriers to care, including insurance status and difficulty accessing care, as they relate to awareness of CKD. Shah et al<sup>6</sup> report that most KEEP participants with CKD are unaware of the condition, and this result is not influenced by the availability of health insurance or prescription drug coverage. They observed a strong association between perceived difficulty obtaining care and greater CKD awareness (Table 2). Thus, difficulty getting appointments or referrals may indicate a vulnerable patient who has difficulty navigating the health care system or is

**Table 2.** Rates of KEEP Participants With Insurance and Perceived Difficulty Obtaining Care

Variable	CKD	
	Aware	Unaware
Health insurance		
Missing	3.5	4.2
Yes	80.6	82.5
No	15.9	13.3
Difficulty obtaining care		
Missing	8.8	36.7
Extremely difficult	5.4	2.6
Moderately difficult	5.2	3.0
Somewhat difficult	9.3	5.1
Not very difficult	19.0	13.4
Not difficult	52.4	39.2

Note: Values are percentages.

Abbreviations: CKD, chronic kidney disease; KEEP, Kidney Early Evaluation Program.

**Table 3.** Rates of Improvement in Cardiovascular Risk Factors in Rescreened KEEP Participants

Risk Factors	KEEP Screening	
	First	Second
Presence of risk factors <sup>a</sup>		
3	64.5	72.9
2	31.7	25.4
1	3.7	1.7
All risk factors controlled <sup>b</sup>	13.3	20.9

Note: Values are percentages.

Abbreviation: KEEP, Kidney Early Evaluation Program.

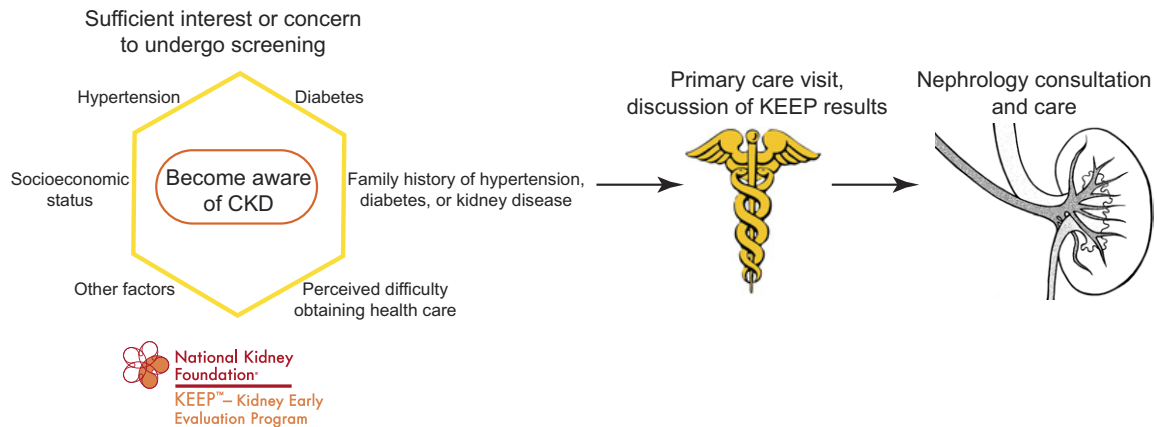
<sup>a</sup>Hypertension (self-reported history of hypertension, use of antihypertensive medications, or measured systolic blood pressure  $\geq 130$  mm Hg or diastolic blood pressure  $\geq 80$  mm Hg for persons with a history of diabetes or chronic kidney disease, otherwise, systolic blood pressure  $\geq 140$  mm Hg or diastolic blood pressure  $\geq 90$  mm Hg), diabetes (self-reported history of diabetes, retinopathy, or fasting blood glucose  $\geq 126$  mg/dL or nonfasting blood glucose  $\geq 200$  mg/dL in the absence of self-report of medicine use), or hypercholesterolemia (receiving medication for high cholesterol or total cholesterol level  $> 200$  mg/dL).

<sup>b</sup>In participants with at least one risk factor. Denominator: all participants with hypertension, diabetes, or hypercholesterolemia, as defined.

not engaged in helpful dialogue with health care professionals regarding CKD.

### ACCESS TO NEPHROLOGY CARE AND RISK-FACTOR CONTROL

Most people with early-stage CKD are managed by primary care clinicians, and rates of comanagement with nephrologists increase as CKD progresses. There has been recent interest in exploring the role of timely nephrologist referral in improving clinical outcomes through delaying progression to end-stage renal disease and decreasing mortality in the transition to dialysis therapy or transplant. However, little is known about the efficacy of comanagement between primary care physicians and nephrologists regarding cardiovascular risk-factor control and control of kidney disease progression. KEEP offers a unique opportunity to develop an understanding of access in a screened cohort at high risk of CKD. Most KEEP participants report that they have a physician, but fewer have seen their physician in the last year. Jurkovitz et al<sup>7</sup> set out to examine whether type of physician (primary care, nephrologist, or other specialist) was a determinant of cardiovascular risk-factor control (hypertension, diabetes, and hypercholesterolemia) and delaying kidney disease progression at first and subsequent screenings. Control of cardiovascular risk factors was poor in the KEEP population, but seemed to improve after screening (Table 3). Because of confounding by indication, that is, sicker participants are more likely to be seen



**Figure 1.** Factors that affect KEEP (Kidney Early Evaluation Program) screening and nephrology care. Abbreviation: CKD, chronic kidney disease. Source of kidney image: National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health.

by a nephrologist, the KEEP investigators have been unable to show an association between early nephrology care and improved outcomes. Early specialist intervention should be the subject of specifically designed observational or randomized trials.

### ACCESS TO HEALTH CARE AND MORTALITY

Saab et al<sup>8</sup> explore KEEP data in relation to CKD-related mortality. Early and more frequent nephrology care is thought to improve outcomes before and after the initiation of renal replacement therapy. Therefore, measures that encourage referral to a nephrologist might be expected to result in improved outcomes. Given the heightened cardiovascular risk in the CKD population, Saab et al<sup>8</sup> examined the associations of physician care from a primary care physician or nephrologist. Interestingly, their report highlights the extreme level of morbidity and mortality associated with care by a nephrologist. Unfortunately, by the time most patients are seen by nephrologists, their disease has progressed far down the path toward mortality. These data suggest that specialty intervention would be better applied early in the disease process. Primary care or allied health professional education and care ultimately may influence the natural history of CKD and related mortality.

### SUMMARY

KEEP is the world's only sustained chronic disease screening and awareness program. Its success is partially attributable to the continued dedication and commitment of stakeholders (the National Kidney Foundation, local affiliates, and the academic community), but also to a unique set of methods that balance detail with simplicity and place efficiency and patient care at a premium. Early access to health care through primary care or nephrology referral is critical to

improving CKD-related outcomes. However, our understanding of barriers to such care is limited.

KEEP participants appear to experience a lack of adequate health care access and nephrology care. This finding may be influenced by the nature of a large-scale screening program dedicated to providing some level of access to participants who are concerned about the personal possibility of CKD. Not surprisingly, we observed a low rate of CKD awareness in participants with CKD newly recognized through the KEEP screening, findings not modified by insurance or prescription drug coverage. However, the strongest association occurred between perceived difficulty obtaining access to care and greater CKD awareness. These findings may partially explain the findings of high-level cardiovascular risk factors and mortality in patients receiving nephrologist care.

The KEEP Steering Committee continues to work to expand the understanding of barriers to care, awareness of CKD, and measures to improve cardiovascular and renal risk (Fig 1). We anticipate that future findings from our longitudinal program will continue to shape our understanding of CKD and the complex interface between recognition of the disease, navigation of the health care system, and related consequences.

### REFERENCES

1. Saab G, Whaley-Connell AT, McCullough PA, Bakris GL. CKD awareness in the United States: the Kidney Early Evaluation Program (KEEP). *Am J Kidney Dis*. 2008;52:382-383.
2. Whaley-Connell AT, Bomback AS, McFarlane SI, et al. Diabetic cardiovascular disease predicts chronic kidney disease awareness in the Kidney Early Evaluation Program. *Cardiorenal Med*. 2011;1:45-52.
3. Plantinga LC, Boulware LE, Coresh J, et al. Patient awareness of chronic kidney disease: trends and predictors. *Arch Intern Med*. 2008;168:2268-2275.

4. US Renal Data System. USRDS 2010 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States. *Am J Kidney Dis.* 2011;57(1)(suppl 1):e1-e526.
5. Agrawal V, Jaar BG, Frisby XY, et al. Access to health care among adults evaluated for CKD: findings from the Kidney Early Evaluation Program (KEEP). *Am J Kidney Dis.* 2012;59(3)(suppl 2):S5-S15.
6. Shah A, Fried LF, Chen SC, et al. Associations between access to care and awareness of CKD. *Am J Kidney Dis.* 2012;59(3)(suppl 2):S16-S23.
7. Jurkovitz CT, Elliot D, Li S, et al. Physician utilization, risk-factor control, and CKD progression among participants in the Kidney Early Evaluation Program (KEEP). *Am J Kidney Dis.* 2012;59(3)(suppl 2):S24-S33.
8. Saab G, Chen SC, Li S, et al. Association of physician care with mortality in Kidney Early Evaluation Program (KEEP) participants. *Am J Kidney Dis.* 2012;59(3)(suppl 2):S34-S39.
9. Coresh J, Selvin E, Stevens LA, et al. Prevalence of chronic kidney disease in the United States. *JAMA.* 2007;298:2038-2047.
10. Perneger TV, Whelton PK, Klag MJ. Race and end-stage renal disease. Socioeconomic status and access to health care as mediating factors. *Arch Intern Med.* 1995;155:1201-1208.
11. Ward MM. Access to care and the incidence of end-stage renal disease due to diabetes. *Diabetes Care.* 2009;32:1032-1036.
12. Kausz AT, Obrador GT, Arora P, Ruthazer R, Levey AS, Pereira BJ. Late initiation of dialysis among women and ethnic minorities in the United States. *J Am Soc Nephrol.* 2000;11:2351-2357.