

Screening Is Part of Kidney Disease Education

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The National Kidney Disease Education Program (NKDEP), an initiative of the National Institutes of Health, works to reduce the morbidity and mortality caused by chronic kidney disease (CKD) and its complications through educational efforts targeted toward at-risk communities, patients, and health care professionals. Specifically, NKDEP aims to improve early detection of CKD, facilitate identification of patients who are at greatest risk for progression to kidney failure, and promote evidence-based interventions to slow progression of kidney disease. Guided by the Healthy People 2010 (1) objectives for CKD, NKDEP, based in the National Institute of Diabetes and Digestive and Kidney Diseases, works collaboratively with partners throughout the National Institutes of Health, other federal agencies, and voluntary organizations to develop educational messages and deliver them to communities at risk, patients, and health care providers.

Effective communication to the public, patients, and health care professionals is critical to achieving the public health mission of NKDEP. NKDEP emphasizes that screening to identify people with CKD as early as possible in the course of their disease is important because effective interventions that can arrest or retard progression exist; however, several factors mitigate against early screening. Most individuals are asymptomatic until late in the course of their disease. A disproportionate burden of CKD is borne by people with decreased access to and decreased trust in the health care system. Use of the screening tests—creatinine-based calculation of estimated GFR (eGFR) and urine albumin/creatinine ratio (UACR), which provide estimates of GFR and daily albumin excretion, respectively—has been hampered by lack of standardization in measurement and reporting (2,3). Health care providers may lack understanding of CKD, screening methods, and the benefits of early intervention. Clinicians may not understand the tests, may not feel confident in explaining results to patients, and may not know which diagnostic (4) and therapeutic interventions are indicated when screening tests are positive. As a result, screening tests are underused (5); CKD is often unrecognized and may go untreated until late in the course of disease.

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Clinical Chemistry and the Tools of Screening

Serum Creatinine and eGFR

To be effective, screening tests must be simple, reproducible, and easily understandable by the health care professional and the person being screened. Barriers to use of eGFR as a routine screening test include provider confusion about the meaning of eGFR as well as technical issues that result in variability in creatinine measurement and the positive predictive value of the resulting eGFR. NKDEP, through its Laboratory Working Group (LWG) and partner organizations, has been working for several years to standardize creatinine determinations and promote the routine reporting of eGFR when serum creatinine is ordered. In 2003, the LWG, under the leadership of John Eckfeldt, MD, PhD, was established to address the problem of interlaboratory variation in serum creatinine measurement and resulting inaccuracies in eGFR.

Working with an expert panel, with representation from the International Federation of Clinical Chemistry (IFCC), the *in vitro* diagnostics industry, large clinical laboratory service providers, and others from the clinical chemistry community, the LWG developed and published evidence-based creatinine standardization recommendations (2). The recommendations, which are based on secondary research and on primary research conducted in partnership with the National Institute for Standards and Technology and the College of American Pathologists, outline the steps necessary to obtain and properly report reliable creatinine results. Universal creatinine standardization is not likely to be fully realized for a minimum of 18 mo from the time the serum creatinine reference materials became available in spring 2007.

Efforts to standardize the reporting of creatinine results and eGFR were concurrent with the creatinine standardization program. The LWG recommends that laboratories report creatinine results to two decimal places when using mg/dl and to the nearest whole number when using $\mu\text{mol/L}$; calculate eGFR using the Modification of Diet in Renal Disease (MDRD) Study equation (laboratories should begin using the isotope dilution mass spectrometry–traceable MDRD Study equation at the same time they commence using a creatinine method that has its calibration traceable to isotope dilution mass spectrometry); and routinely report eGFR with all serum creatinine results for patients who are ≥ 18 yr of age, whenever appropriate and feasible (2). Because the MDRD estimating equation does not produce accurate results when the eGFR is >60 ml/min per 1.73 m^2 , the NKDEP recommends that a numeric result be

reported only when the eGFR is <60 ml/min per 1.73 m². Significant progress has been made in promoting routine reporting of eGFR with serum creatinine, as reflected by implementation throughout the Veterans Health Administration, the Indian Health Service (IHS), and the two largest US reference laboratories.

Urine Albumin

Kidney disease is identified more often through a urine albumin test than through an eGFR. The Centers for Disease Control and Prevention (CDC) estimate of CKD burden in the United States, based on data from the National Health and Nutrition Examination Surveys (NHANES), projected a 16.8% prevalence in the population aged >20 yr (6). Nearly two thirds of the individuals identified with CKD (11.1% of the >20 -yr-old population) were included on the basis of abnormal albumin excretion alone (National Kidney Foundation stages 1 and 2). It is clear that urine albumin screening will be an important public health tool in identifying people with early CKD in high-risk communities worldwide.

To facilitate the use of urine albumin in screening, clinical care, and research, NKDEP recently initiated a process to address lack of standardization in urine albumin determination and reporting. In March 2007, the NKDEP LWG and the IFCC convened an international group providing wide representation of the clinical chemistry community to describe the barriers to urine albumin standardization and develop an agenda to address those barriers. Technical clinical chemistry issues included the interlaboratory variability in measurement results caused by the lack of a standardized method for measuring urine albumin (and a variety of measurement instruments), the inadequacy of current methods for total protein screening, the different reference ranges for different *in vitro* diagnostic manufacturers, preanalytical instability of albumin and creatinine, the lack of a standard recommendation for specimen collection (e.g., first morning void), and handling and storage of specimens. Clinical and public health issues that bear directly on the use of urine albumin testing in screening include the lack of race- and gender-specific cut points, intraindividual biologic variability, and the effect of drugs that block the angiotensin II system on urine albumin excretion.

The NKDEP/IFCC group outlined several key tasks: Develop a definition of clinical measurement goals for both albumin and creatinine in urine, conduct research on preanalytical issues for urinary albumin and creatinine, define a reference system for urine creatinine, define a reference system for urine albumin, and develop standard nomenclature for clinical reporting. It is expected that completion of these tasks will enhance the utility of urine albumin testing in screening, clinical, and research settings.

Patient Education

NKDEP has addressed the underrecognition of CKD through public awareness programs such as the Family Reunion Initiative (<http://www.nkdep.nih.gov/familyreunion>), which provides African American and other individuals with materials that are useful for talking to family members about CKD risk

and testing. Standardization of screening tests and reporting of results are expected to facilitate education of the public and professionals (e.g., physicians, nurses, nutritionists, pharmacists) about what these tests mean and how they should be interpreted. Materials to explain eGFR and UACR to professionals are being developed along with patient materials that explain these tests in a way that is accessible to people with low literacy and educational levels.

Provider Education

Providers may be hesitant to order a screening test if they are uncertain how to respond to positive results. NKDEP is working with collaborators in a variety of primary care settings that serve high-risk populations (e.g., community health centers, IHS clinics) to promote early identification of patients and to develop clinical models that promote the concept that “CKD is Part of Primary Care.” This collaboration will include a range of activities that focus on provider education and the development of clinical tools that facilitate care of CKD without requiring additional resources or personnel. Providers in participating centers will pilot-test materials, clinical algorithms, and clinical software. The goal is to develop tools that can be adapted to a wide range of primary care settings.

One project that is intended to improve provider understanding of kidney tests is the development of a UACR and eGFR reference card for certified diabetes educators. Key players in preventing earlier stages of CKD from progressing to kidney failure, these professionals use laboratory results as a basis for planning individualized instructional sessions for their patients. The reference card explains what the tests are, how frequently they should be used, and how to interpret the values. Materials are available at <http://www.nkdep.nih.gov/professionals>.

Kidney Community Partners

Community-based screening efforts, such as the National Kidney Foundation’s Kidney Early Evaluation Program (KEEP; <http://www.kidney.org/news/keep>) and the American Kidney Fund’s Minority Intervention and Kidney Education Program (MIKE; <http://www.mikehelps.org>), provide an opportunity to identify people with early kidney disease and to educate the public about the risks of kidney disease and the benefits of early care. These programs target high-risk communities, provide a broad battery of screening tests, and usually conduct screening activities in nonclinical settings (e.g., health fairs) and in nonmedical locations (e.g., churches, community halls). Clinically based screening offers the provider an opportunity to identify primary or secondary kidney injury, initiate early care, discuss potential kidney complications in patients with diabetes or hypertension. NKDEP complements these activities through patient and health professional education with the expectation that providers will order screening tests (eGFR and UACR) if they have a better idea of how to respond to a positive screening result.

NKDEP collaborates with other federal agencies and voluntary organizations to promote early identification of people with CKD in a systematic way. An important partner is the

CDC. In 2006, the CDC was mandated by Congress to develop a CKD initiative to include surveillance, epidemiology, and state-based demonstration projects and economic studies with the intent to build capacity and infrastructure for a public health approach to CKD. The CDC has convened an expert advisory group to outline recommendations for comprehensive public health strategies to prevent the development and progression of CKD in the United States. These efforts include an assessment of the burden of kidney disease, a screening program for kidney disease in states, documentation of the direct and indirect costs of kidney disease, and development of a model that will not only help predict the progression of kidney disease but also test the effectiveness of various public health interventions. NKDEP will collaborate with the CDC to promote implementation of the national screening program and surveillance system within the context of a comprehensive public health approach to CKD. (For more information about the CDC's CKD initiative, visit <http://0-www.cdc.gov.mill1.sjlibrary.org/Diabetes/projects/kidney.htm>.)

The challenge of promoting CKD as part of the public health agenda requires collaboration among public health agencies, professional organizations, and voluntary organizations that serve the patient and the family community. NKDEP works to promote communication among all of the federal agencies that are involved in CKD through the National Institutes of Health-based Kidney Interagency Coordinating Committee (KICC). CKD is a particularly important issue for several KICC member agencies: CDC, Food and Drug Administration, Centers for Medicare and Medicaid Services, Agency for Healthcare Research and Quality, Veterans Administration, Health Resources and Services Administration, and IHS. KICC meets regularly to share information, avoid duplicative efforts, and promote collaborative efforts that draw on the technical strengths of each agency.

The importance of screening as a public health tool for promoting the early identification of people who are at risk for progressive kidney disease is a consistent message in all NKDEP materials. Screening programs offer NKDEP an ideal opportunity to educate the public, patients, and providers and assist NKDEP in fulfilling the goal of reducing the morbidity and mortality that are associated with CKD.

Disclosures

None.

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