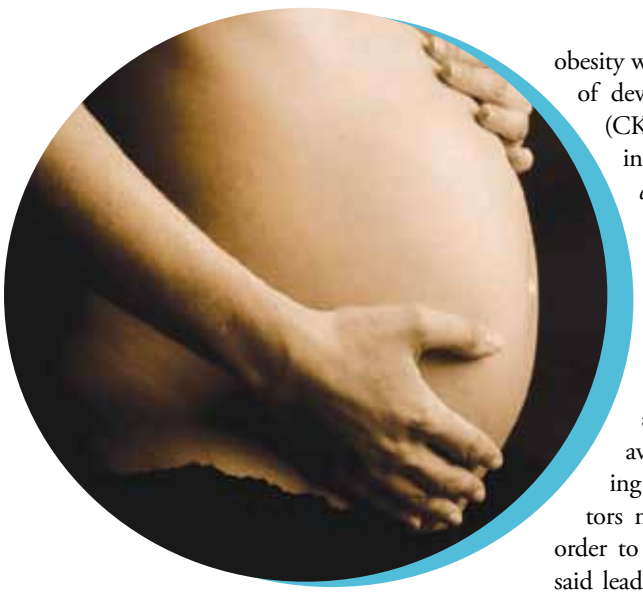
ASN LEADING THE FIGHT AGAINST KIDNEY DISEASE

# KidneyNews

May 2014 | Vol. 6, Number 5

## Certain Prenatal Risk Factors Linked with Increased Kidney Disease Risk for Children



Numerous studies have shown that maternal health and the uterine environment may affect certain aspects of an offspring's well-being. Kidney health appears to be no exception.

Low birth weight and maternal conditions such as diabetes and overweight/obesity were linked with an increased risk of developing chronic kidney disease (CKD) in children, reports a study in the *Journal of the American Society of Nephrology*. Additional research may help determine whether modifying these factors could help protect children's kidney health.

"Data suggest that CKD is on the rise in both children and adults and in the absence of any available cures for CKD, identifying potentially modifiable risk factors may underscore novel targets in order to reduce or even prevent CKD," said lead author Christine Hsu, MD, of the University of Washington in Seattle.

### Risk factors at play

Because some risk factors that contribute to the development of CKD may be programmed prenatally, Hsu and her colleagues looked for an association of childhood CKD with various prenatal risk factors.

They studied nearly 2000 patients with childhood CKD and more than 20,000 controls without the disease. They linked maternal and infant characteristics in Washington state birth records from 1987 to 2008 to hospital discharge data, and they assessed factors including birth weight, maternal diabetes, and maternal overweight/obesity. The Washington state birth record linkage enabled the investigators to conduct the largest study to date of potential prenatal determinants of CKD.

The prevalence of CKD in Washington state was 126.7 cases per 100,000 births, based on a CKD definition that included renal dysplasia/aplasia and obstructive uropathy according to International Classification of Diseases, version 9 (ICD-9) coding at hospital discharge. Infants with low birth weight were nearly three times more likely to develop childhood CKD than infants with normal birth weight, after adjustments were made for potential confounding factors.

*Continued on page 2*

## *Latest "Doc Fix" Legislation Contains New Provisions for Medicare ESRD Program*

The "doc fix"— or Protecting Access to Medicare Act of 2014— that President Obama signed into law in April narrowly averted a 24 percent reduction in Medicare physician payments that was about to go into effect. It was the 17th time Congress enacted legislation to bypass mandated cuts to reimbursements for treating Medicare patients. These laws "patch" required payment decreases calculated by the sustainable growth rate (SGR) formula. In addition to preventing physician payment cuts, this year's SGR patch law includes provisions that affect all health care providers, and in particular members of the kidney community.

### Modifications to the Medicare ESRD program

Of main interest to the kidney care team are four revisions to the Medicare End-Stage Renal Disease (ESRD) Prospective Payment System (PPS). Outlined in Section 217 of the bill, the new ESRD provisions range in scope from changes to the ESRD bundled payment rate to mandated cost report auditing for dialysis providers.

The first ESRD provision delays again the inclusion of oral-only medications into the ESRD PPS, or bun-

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## Inside



# Prenatal Risk Factors

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Infants also had a 54 percent increased odds of developing CKD if their mothers developed diabetes during pregnancy, a 24 percent increased odds if their mothers were overweight, and a 26 percent increased odds if their mothers were obese.

In a subgroup analysis by CKD subtype, low birth weight and maternal pregestational diabetes were linked significantly with increased risk of renal dysplasia/aplasia, while low birth weight, maternal gestational diabetes, and maternal overweight/obesity were linked significantly with obstructive uropathy.

While the mechanisms by which various prenatal factors may affect CKD risk were not assessed in this study, other research suggests that maternal diabetes may adversely compromise fetal programming, resulting in abnormal kidney development. Hsu and her colleagues noted that obesity has also been linked with malformations of the urogenital system, although the data are conflicting and the mechanism that might be involved may be independent of those involving maternal diabetes. For example, obese women may be at increased risk of metabolic conditions such as hyperglycemia or hyperinsulinemia independent of the presence of diabetes, and these may affect developmental risk in offspring.

## Attempting to reduce risk

The study's findings will likely serve as a starting ground for future investigations on ways to target CKD at the earliest stages in life.

"We hope this research leads to further research on ways to reduce kidney disease through either early treatment or prevention that might begin even before birth," Hsu said. "Previous studies show that strict control of maternal diabetes significantly reduces the risk of congenital malformations in children. We hope our work leads to future studies to investigate whether strict control of maternal diabetes and/or reducing maternal obesity/overweight reduces childhood CKD."

The serious nature of CKD in children has led to various multicenter research efforts within the pediatric nephrology community, including the Chronic Kidney Disease in Children (CKiD) study in North America and the Effect of Strict Blood Pressure Control and ACE Inhibition on the Progression of Chronic Renal Failure in Pediatric Patients (ESCAPE) trial in Europe, noted Bradley Warady, MD, who was not involved with the research. Warady is senior associate chair for the department of pediatrics at Children's Mercy Hospitals and Clinics and a professor of pediatrics at the University of Missouri-Kansas City School of Medicine. These studies were designed to delineate risk factors for CKD progression in affected patients.

"The work by Hsu and colleagues nicely complements those initiatives by providing unique insights into the development of two of the most common causes of CKD in childhood, with the identification of multiple and most importantly, potentially modifiable prenatal risk factors," Warady said. "Replication of these data in additional patient cohorts would provide strong support for the aggressive management of these factors with the hope of actually being able to decrease the incidence of this chronic disorder."

Study co-authors include Kalani Yamamoto, MD, Rohan Henry, MD, Anneclaire De Roos, PhD, and Joseph Flynn, MD.

Disclosures: The authors reported no financial disclosures.

The article, entitled "Prenatal Risk Factors for Childhood CKD," is available online at http://jasn.asnjournals.org/.

# Medicare ERSD Program

*Continued from page 1*

dled payment. Previously scheduled for January 1, 2016, the date for adding oral medications without equivalent IV preparations into the bundle has now been pushed back 8 years to January 1, 2024. The Health and Human Services (HHS) secretary is also required to develop a process by 2016 that determines when a drug is no longer considered an oral-only medication, and for inclusion of new injectable and IV medications into the bundle.

Another provision directs the HHS Secretary to specify new quality measures for conditions treated by oral-only medications for the ESRD Quality Incentive Program (QIP).

The new legislation's most significant change is delineated in the third ESRD provision, which redefines requirements for adjusting the bundled payment rate. Specifically, it revises cuts to dialysis providers introduced last year by the Centers for Medicare & Medicaid Services (CMS). The law addresses the final rule issued by CMS that called for a 12 percent decrease to the ESRD PPS spread out over 4 years.

"CMS was required by the American Taxpayer Relief Act (ATRA) to lower the bundled payment to account for lower drug utilization," explained Marc Chow, Executive Director of the National Renal Administrators Association. The ATRA reduction was based on the decrease in drug and biologic use observed between 2007 and 2012.

The SGR legislation replaced sections of last year's Medicare ESRD payment rule that implemented the congressionally mandated rebasing of the ESRD payment bundle due to lower drug use, said Chow. Instead of the planned reimbursement cuts of up to $30 per dialysis treatment, Congress replaced the ATRA bundled payment decreases with a 1.25 percent cut in 2016 and 2017, and a 1 percent decrease in 2018.

The fourth ESRD provision implements auditing of Medicare cost reports of service providers and dialysis facilities. The legislation directs the HHS secretary to audit a random sample of ESRD cost reports beginning with those from 2012.

The SGR patch also addresses the effects of the budget sequestration, which reduces Medicare provider payments, Chow said.

"Under current law, the 'Bipartisan Budget Act of 2013' adjusts budget sequestration for 2024 by requiring a cut of 2.9 percent for the first 6 months of the year and a cut of 1.11 percent for the second 6 months of the year," Chow said. "The SGR bill further adjusts budget sequestration for 2024 by requiring a 4 percent cut for the first 6 months of the year and lowering the cut to 0 percent in the second 6 months."

"On the legislative front, overall the provisions restore some certainty to the payment system," LeAnne Zumwalt, Group Vice President at DaVita told *ASN Kidney News*. "However, the fact remains that Medicare reimbursement is below the cost to deliver care for most patients. Providers rely on the cross-subsidization from the private sector and this is not sustainable for patients or providers. Without cross-subsidization, many geographic areas may ultimately be underserved."

## A sustained attempt to fix the SGR

Congress developed the SGR as a mechanism to control Medicare spending on physician fees. The 1997 formula ties Medicare spending to economic growth rates. If Medicare expenditures exceed the SGR target growth, automatic physician payment reductions are triggered. Since its passage, Congress has avoided implementing the required cuts or replacing the legislation with a more sound approach to cost containment, relying instead on passing temporary patches.

ASN, along with the American College of Physicians, the American Medical Association (AMA) and numerous other medical societies, have called for the repeal and replacement of the SGR with a more stable, predictable system. The odds of successfully repealing and replacing the SGR were, until recently, slim because of its large price tag. However, a revised cost estimate from the Congressional Budget Office—reducing the proposed expense of replacing the current system from $245 billion to $138 billion—spurred lawmakers to craft SGR repeal bills in both the House and Senate.

The proposed bill included physician pay increases over 10 years and a pay-for-performance incentive. Although this bipartisan attempt to eliminate the SGR advanced through congressional committees, it foundered over disagreement on how to pay for the costs of repeal, necessitating the latest patch. Despite calls by lawmakers on both sides of the aisle for SGR repeal, a viable permanent solution remains elusive, leaving an uncertain future for Medicare physician reimbursements.

## ICD-10 implementation delayed again

In addition to patching the SGR, the law delayed implementation of ICD-10 coding for reporting diagnoses and procedures. Already postponed several times before, the latest deferment came less than 2 months after Centers for Medicare & Medicaid Services Commissioner Marilyn Tavenner stated that ICD-10 would be implemented on October 1, 2014. The law pushes this back to October 1, 2015, and it remains unclear if this is the last of the delays.

Introduced in 1990 by the World Health Organization, the ICD-10 (International Classification of Diseases, 10th revision) diagnostic and procedural codes are already in wide use around the world. Designed to provide more detail about physician encounters, ICD-9's replacement is broader and more detailed, containing 68,000 codes.

The granularity of the new coding system has garnered attention for such individual codes as being bitten by an orca, walking into a lamp post, or being sucked into a jet engine. Yet ICD-10 incorporates coding for laterality and will capture more specific and detailed data for health researchers than currently available through ICD-9.

The change to ICD-10 coding has long been resisted by several organizations, including the AMA. According to its own research, costs of ICD-10 implementation range from $56,000 for small practices to as much $8 million for large practices. This includes expenses for training, software, and testing. The organization indicated that specialty physician practices would incur the highest costs.

Reaction to the delay has been divided. Some welcomed it, noting the delay will give providers more time to prepare and could reduce the potential for chaos and financial disruption as the new codes are introduced to providers and payers. However, those organizations that have invested heavily in ICD-10 preparations and infrastructure, such as insurers and hospitals, have had to quickly develop contingency plans, and health information technology companies have also experienced a decline in business due to the delayed implementation.

# Policy Update

## ASN President Testifies Before Congress: Calls for Prize Competitions to Spur Kidney Care Innovation

By Grant Olan

On Wednesday, April 9, ASN President Sharon M. Moe, MD, FASN, testified before the House Science, Space, and Technology Committee's Subcommittee on Research and Technology about the long overdue need for more innovation in kidney care.

Dr. Moe voiced support for federal prize competitions as a mechanism to spur scientific and technological breakthroughs to improve kidney care and keep people off of dialysis, which, Dr. Moe testified, could result in significant savings to Medicare.

Inspired by the success of private and philanthropic sector prize competitions, the 2010 America COMPETES Act granted broad authority to federal agencies to use prizes to spur innovative solutions to tough problems who advance their core missions. For example, the U.S. Department of Energy offered $10 million in prizes to competition participants that developed "production-capable, super fuel-efficient vehicles" exceeding 100 miles per gallon, which incentivized more than 100 participants from around the globe.

Subcommittee on Research and Technology Chairman Rep. Larry Bucshon, MD, (R-IN) highlighted the benefits of a kidney prize competition: "As a cardiothoracic surgeon, prize competitions in medical research are of particular interest to me. Rising health care costs are burdening to American families. One example where cost containment is crucial affects the 450,000 Americans who suffer from end-stage renal disease (ESRD), commonly known as kidney failure."

Most Americans with kidney failure rely on the Medicare ESRD Program for lifesaving dialysis. The ESRD Program is the only federal health entitlement program that provides coverage regardless of age. Caring for Americans with kidney failure (less than 1 percent of the Medicare population) costs Medicare nearly $35 billion annually (7 percent of the program's budget). In total, Medicare spends $77 billion annually for the care of beneficiaries with kidney disease (28 percent of the program's budget).

ASN President Sharon M. Moe, MD, FASN, testifies before Congress

Despite the staggering public health and financial burden of kidney disease, total federal funding for kidney research is equivalent to less than 1 percent of what Medicare, and ultimately taxpayers, spend on the cost of care for Americans with kidney disease. Dr. Moe, a Professor of Medicine and Director of the Division of Nephrology in the Department of Medicine at the Indiana University School of Medicine, used these and other statistics to articulate why innovation in kidney care is so important.

"We must work together to innovate, to continually improve care, to help the millions of kidney patients become more productive citizens, and to contain the costs of the Medicare ESRD Program," Dr. Moe said. "We must incentivize the development of therapies that give the ESRD Program greater value for the taxpayers' contribution in terms of lower expenditures on care and better outcomes for patients.

"In addition to the traditional investigator-initiated model, prize competitions are another powerful lever that could spur development of a novel kidney replacement therapy that is more efficient and cost-effective than current therapies and helps patients feel better," Dr. Moe continued. "I wish to thank the chairmen of the committee and subcommittee, Lamar Smith (R-TX) and Larry Bucshon (R-IN), for calling attention to the value of prizes, and for the opportunity to testify at the hearing."

Dr. Moe was one of four public witnesses invited to testify at the April 9 subcommittee hearing on "Prizes to Spur Innovation and Technology Breakthrough." The witnesses also included Christopher Frangione, vice president of prize development at XPRIZE; Narinder Singh, co-founder and chief strategy officer at Appirio and President of TopCoder; and Donnie Wilson, founder and chief executive officer of Elastec American Marine.

Video and a transcript of Dr. Moe's testimony are available online at http://www.asn-online.org/policy/webdocs/page.aspx?code=congress.

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*ASN Kidney News* is published by the American Society of Nephrology
1510 H Street NW, Suite 800, Washington, DC 20005. Phone: 202-640-4660

www.asn-online.org



Postmaster: Please send address changes to *ASN Kidney News*, c/o Customer Service, American Society of Nephrology 1510 H Street NW, Suite 800, Washington, DC 20005.

Publications mail agreement No. 40624074. Return undeliverable Canadian addresses to PO Box 503, RPO West Beaver Creek, Richmond Hill ON L4B 4R6

*ASN Kidney News* (ISSN print 1943-8044 and online 1943-8052) is an official publication of the American Society of Nephrology, 1510 H Street NW #800, Washington DC 20005, and is published monthly. Periodicals postage paid at Washington, DC and at additional mailing offices. Subscription rates: $12 per year. To order, please email bhenkel@asn-online.org. Subscription prices subject to change. Annual ASN membership dues include $12 for *ASN Kidney News* subscription.



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# HYPONATREMIA

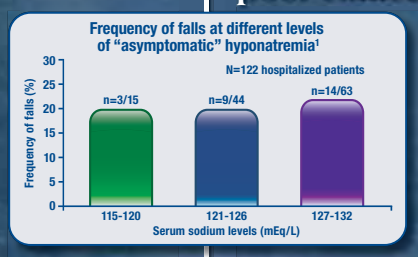
## Asymptomatic does not mean out of danger.[1,2]

### Lack of overt clinical symptoms may be misleading[1-3]

The symptoms of hyponatremia depend on severity and rapidity of onset.[1,4] Gastrointestinal symptoms, such as nausea and vomiting, are common in patients with serum sodium levels between 125 and 130 mEq/L.[4] Severe, rapidly developing symptomatic hyponatremia can cause seizures, coma, and brain damage.[4] However, among hospitalized patients with hyponatremia, an analysis estimated that 79% are actually asymptomatic.[3] But asymptomatic does not mean out of danger.[1,2] Even "asymptomatic" patients have been found to exhibit a range of neurologic deficits.[1]

### Asymptomatic hyponatremia linked to increased falls[1]

A case-control study examining incidence of falls among 122 patients with asymptomatic chronic hyponatremia (126±5 mEq/L) found that 21.3% (26/122) had been hospitalized for falls vs 5.3% (13/244) for normonatremic patients ($P$<0.001).[1] Frequency of falls was similar for all serum sodium levels measured (see figure above).[1] When walking was tested using a pressure-sensitive platform, asymptomatic patients demonstrated irregular gait and balance, and sensitive attention tests showed slower response and higher error rates vs normonatremic patients ($P$<0.001),[1] revealing that even very mild hyponatremia was associated with a 20% risk of falls in patients considered asymptomatic.[1,5]




### Mild asymptomatic hyponatremia may lead to poor clinical outcomes[1,2,5]

An analysis of over 50,000 hospital admissions revealed increased mortality and length of hospital stay in patients with serum sodium levels traditionally considered normal (133-137 mEq/L).[2] A prospective outcomes study in hospitalized patients found 60-fold higher mortality rates, even among patients classified as asymptomatic vs normonatremic patients.[3,6] And patients with mild hyponatremia (<136 mEq/L) in a recent prospective study experienced increased risk of falls and fractures and increased mortality vs normonatremic patients.[7] It may be time to reconsider the concept of mild and/or "asymptomatic" hyponatremia.[1,2,5,7]

***Hyponatremia is a serious condition. Reconsider what asymptomatic actually means.***

RECOGNIZE THE RISKS.
**Realize the consequences.**

**Visit HNupdates.com/asymptomatic**

**References: 1.** Renneboog B, Musch W, Vandemergel X, Manto MU, Decaux G. Mild chronic hyponatremia is associated with falls, unsteadiness, and attention deficits. *Am J Med.* 2006;119:71.e1-71.e8. **2.** Wald R, Jaber BL, Price LL, Upadhyay A, Madias NE. Impact of hospital-associated hyponatremia on selected outcomes. *Arch Intern Med.* 2010;170(3):294-302. **3.** Boscoe A, Paramore C, Verbalis JG. Cost of illness of hyponatremia in the United States. *Cost Effect Resource Alloc.* 2006;4(10):1-11. **4.** Douglas I. Hyponatremia: why it matters, how it presents, how we can manage it. *Cleve Clin J Med.* 2006:73(3):S4-S12. **5.** Decaux G. Is asymptomatic hyponatremia really asymptomatic? *Am J Med.* 2006;119(7A):S79-S82. **6.** Anderson RJ, Chung H-M, Kluge R, Schrier RW. Hyponatremia: a prospective analysis of its epidemiology and the pathogenic role of vasopressin. *Ann Intern Med.* 1985;102:164-168. **7.** Hoorn EJ, Rivadeneira F, van Meurs JBJ, et al. Mild hyponatremia as a risk factor for fractures: the Rotterdam study. *J Bone Min Res.* 2011;26(8):1822-1828.

HYPONATREMIA UPDATES.COM

# Hyponatremia can be a serious threat

## Hyponatremia has impact across a wide range of important issues:

- **The "asymptomatic" patient:** Mild hyponatremia, even when characterized as asymptomatic, can be dangerous and lead to poor clinical outcomes, including mortality[1-3]
- **Reassessing fluid restriction:** Fluid restriction in hyponatremia is a standard strategy, but compliance can be a challenge, and fluid restriction can increase hospital length of stay, and expose patients to additional stressors[1,4-7]
- **Heart failure may mask another danger:** The signs and symptoms of heart failure can mimic hyponatremia, and the risk of hyponatremia in these patients may go unrecognized[4,5,8-10]
- **The cirrhotic patient awaiting transplant:** Like MELD scores, hyponatremia is an important independent predictor of increased mortality in cirrhotic patients awaiting liver transplantation[11-13]
- **The hidden costs of hyponatremia:** Complications associated with unaddressed hyponatremia may create avoidable healthcare cost and utilization burden for hospitals[6,14]

**To learn more about the impact of hyponatremia visit HNUpdates.com**

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**References: 1.** Renneboog B, Musch W, Vandemergel X, Manto MU, Decaux G. Mild chronic hyponatremia is associated with falls, unsteadiness, and attention deficits. *Am J Med.* 2006;119:71.e1-71.e8. **2.** Wald R, Jaber BL, Price LL, Upadhyay A, Madias NE. Impact of hospital-associated hyponatremia on selected outcomes. *Arch Intern Med.* 2010;170(3):294-302. **3.** Decaux G. Is asymptomatic hyponatremia really asymptomatic? *Am J Med.* 2006;119(7A):S79-S82. **4.** Douglas I. Hyponatremia: why it matters, how it presents, how we can manage it. *Cleveland Clin J Med.* 2006:73(3):S4-S12. **5.** Verbalis JG, Goldsmith SR, Greenberg A, Schrier RW, Sterns RH. Hyponatremia treatment guidelines 2007: expert panel recommendations. *Am J Med.* 2007;120(11A):S1-S21. **6.** Boscoe A, Paramore C, Verbalis JG. Cost of illness of hyponatremia in the United States. *Cost Effect Resource Alloc.* 2006;4(10):1-11. **7.** Hoorn EJ, van der Lubbe N, Zietse R. SIADH and hyponatraemia: why does it matter? *NDT Plus.* 2009;2(suppl 3):iii5-iii11. **8.** Albert N, Trochelman K, Li J, Lin S. Signs and symptoms of heart failure: are you asking the right questions? *Am J Crit Care.* 2010;19(5):443-452. **9.** Gheorghiade M, Abraham WT, Albert NM, et al; on behalf of the OPTIMIZE-HF Investigators and Coordinators. Relationship between admission serum sodium concentration and clinical outcomes in patients hospitalized for heart failure: an analysis from the OPTIMIZE-HF registry. *Eur Heart J.* 2007;28:980-988. **10.** Lee DS, Austin PC, Rouleau JL, et al. Predicting mortality among patients hospitalized for heart failure. *JAMA.* 2003;290(19):2581-2587. **11.** Kim WR, Biggins SW, Kremers WK, et al. Hyponatremia and mortality among patients on the liver-transplant waiting list. *New Engl J Med.* 2008;359(10):1018-1026. **12.** Heuman DM, Abou-assi SG, Habib A, et al. Persistent ascites and low serum sodium identify patients with cirrhosis and low MELD scores who are at high risk for early death. *Hepatology.* 2004;40(4):802-810. **13.** Moini M, Hoseini-Asl MK, Taghavi SA, et al. Hyponatremia a valuable predictor of early mortality in patients with cirrhosis listed for liver transplantation. *Clin Transplant.* 2011;25:638-645. **14.** Callahan MA, Do HT, Caplan DW, Yoon-Flannery K. Economic impact of hyponatremia in hospitalized patients: a retrospective cohort study. *Postgrad Med.* 2009;121(2):186-191.



March 2014

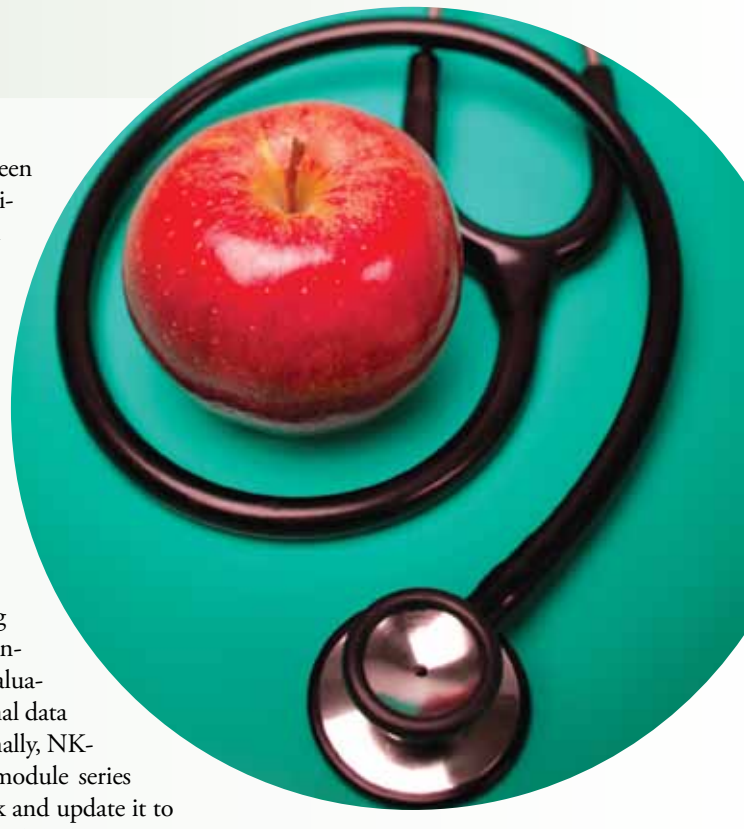
07US14EUP0113

# Diet and Nutrition for CKD Management

ASN Kidney News gratefully *acknowledges the editors of this special section—Uptal Patel, MD, of Duke University, and ASN President Sharon M. Moe, MD, FASN, of the Indiana University School of Medicine—for their contributions.*

## Medical Nutrition Therapy for CKD

By Andrew S. Narva and Jenna Norton



**Medical nutrition therapy (MNT) or dietary counseling in chronic kidney disease (CKD), provided by a registered dietitian (RD), is critical for patients with CKD. It may improve health outcomes, enhance quality of life, and help delay kidney disease progression (1). Additionally, MNT may help prevent or treat complications, including malnutrition, metabolic acidosis, hyperkalemia, mineral imbalance/bone disorders, anemia, and cardiovascular disease (2).**

However, despite its benefits, MNT is underutilized for patients with CKD. Although Medicare provides coverage for 3 hours in the first year and 2 hours in subsequent years, as of 2008 only 9486 RD Medicare providers enrolled (3) and fewer than 4 percent of CKD patients received at least 12 months of MNT prior to developing end stage renal disease (4).

To increase use of MNT for CKD patients, the National Kidney Disease Education Program (NKDEP) developed the CKD Diet Initiative. NKDEP started the effort by conducting roundtable discussions, in-depth interviews, and focus groups with RDs to better understand the barriers that limit their ability to counsel CKD patients. Through this research, NKDEP uncovered several barriers. RDs reported receiving limited referrals for CKD MNT and recommended educating primary care providers on the importance of MNT for CKD (5). In addition, many RDs—despite seeing more and more CKD patients—felt ill-equipped to counsel CKD patients due to insufficient training and a lack of both professional and patient education materials (6). Based on this research, NKDEP developed strategies for the CKD Diet Initiative to meet these needs. The initiative provides simplified and accessible professional and patient education materials on CKD nutrition, tools to increase CKD MNT referral by primary care providers, and training and education on counseling CKD patients for general practice RDs.

Since its inception, the CKD Diet Initiative has made significant progress. NKDEP has developed numerous professional and patient education materials for the practicing RD. These include the *Chronic Kidney Disease and Diet: Assessment, Management, and Treatment* guide and a suite of easy to read English- and Spanish-language patient education materials. NKDEP developed the CKD Diet Counseling Referral Form to support MNT referral by primary care providers. The referral form helps providers share critical patient data with the consulting RD. These materials have become immensely popular. Each month, thousands are downloaded and ordered.

In addition, NKDEP developed the CKD Nutrition Management Training Program. The program includes a series of five training modules that feature engaging activities and case studies. Each module focuses on a specific area of nutrition management for kidney disease patients, including background information on CKD, slowing the progression of CKD, CKD complications, the CKD "diet," and the transition from CKD to kidney failure. The modules are available on the NKDEP website. NKDEP shared the content of the modules with the Academy of Nutrition and Dietetics (the Academy). The Academy developed the modules into an online training certificate program. By completing the module series and accompanying exams, RDs can earn 12.5 continuing education credits from the Academy. In the 2 and a half years since the launch of the training program, over 900 RDs have completed at least one module and 254 have completed all five and received a certificate of training in CKD nutrition management.

The Academy is evaluating the five-module continuing education program through a two-part survey and sharing the data with NKDEP. A survey immediately post-training assesses RD perceptions of program quality and a second survey that is fielded at least 6 months post-training assesses reported behavior change among RDs. In the first year, responses to the first survey have been analyzed for 52 program participants. Of these, the vast majority of surveyed participants have reported knowledge gains (94 percent), increased confidence (84 percent), and intent to change behavior around CKD MNT (71 percent) as a result of the program. Responses to the second survey have been analyzed for 14 participants who reported changes to their clinical practice (86 percent) as a result of the program. The program remains available for continuing education credit through the Academy, and participants who complete the module series are still receiving surveys. NKDEP intends to continue evaluation efforts as additional data are collected. Additionally, NKDEP will revise the module series based on RD feedback and update it to reflect the latest data and evidence.

To enhance the training of CKD nutrition for dietetic students and interns, NKDEP created a set of materials to support dietetic educators in teaching students and interns about managing nutrition for patients with CKD. The materials include a slide deck for use in the classroom and four case studies representing patients in different stages of progressive CKD  This spring, NKDEP is once again collaborating with the Academy and "educating the educators" by presenting how to use the materials with follow-up webinars discussing the cases. For more information on the NKDEP diet program, visit http://nkdep.nih.gov/identify-manage/ckd-nutrition.shtml.

*Andrew S. Narva, MD, FACP, FASN, is director of the National Kidney Disease Education Program of the National Institute of Diabetes and Digestive and Kidney Diseases. Jenna Norton, MPH, is affiliated with the National Kidney Disease Education Program in Bethesda, MD.*

**References**

1. Centers for Medicare & Medicaid Services. *The Guide to Medicare Preventive Service*, 4th ed. March 2011. ICN 006439. Medicare Learning Network website. http://www.cms.gov/MLNProducts/downloads/mps_guide_web-061305.pdf.
2. National Kidney Disease Education Program. *Chronic Kidney Disease and Diet: Assessment, Management, and Treatment*. September 2011. NIH Publication No. 11-7406. http://nkdep.nih.gov/resources/ckd-diet-assess-manage-treat-508.pdf.
3. Centers for Medicare & Medicaid Services. CMS Data Compendium: Table VI.13a and Table VI.13b – Medicare Physician and Other Practitioner Registry by Specialty, July 2008. http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/DataCompendium/15_2009_Data_Compendium.html.
4. U.S. Renal Data System. *USRDS 2010 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States*. Bethesda, MD, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, 2010.
5. Narva AS. How to increase early nutrition intervention with CKD Patients: Key insights from a roundtable discussion with renal dietitians. *Renal Nutrition Forum* 2007; 26:1,3–4
6. Newman EP, Zawislanski A. Addressing the growing need for chronic kidney disease (CKD) medical nutrition therapy in primary care settings: Update on the National Kidney Disease Education Program's CKD Diet Initiative. *Renal Nutrition Forum* 2010; 29:8–10.

# Phosphate Additives in Food: You Are What You Eat—But Shouldn't You Know That?

By Sharon M. Moe

Phosphorus levels are elevated in patients with chronic kidney disease due to decreased urinary excretion. Higher levels of blood phosphorus are associated with increased mortality in patients on dialysis, patients with kidney disease not yet on dialysis, and in the general population. In animal studies, adding phosphorus to the diet causes calcification of arteries and progression of kidney disease.

In the petri dish in the lab, adding phosphorus to artery vascular smooth muscle cells results in a change of the cell to become a bone-like cell and to calcify. This and other data support the hypothesis that phosphorus is a true uremic toxin and a risk factor for adverse health in the more than 20 million individuals with kidney disease in the United States. Unfortunately, data from the National Health and Nutrition Examination Survey (NHANES) and other studies demonstrate that nearly all Americans eat food that contains far more phosphate than either the estimated average requirement or the recommended dietary allowance.

The approach to kidney patients with elevated phosphorus levels includes the use of phosphate-binding compounds, increased dialysis time, and diet adjustment. It is the latter that becomes tricky. It requires a savvy consumer to truly follow a low-phosphorus diet. Phosphorus is in all proteins, and thus any protein source will be high in phosphate (dairy, meat, or legumes/beans). However, in legumes/beans, the phosphate is bound to phytate. Humans lack the ability to digest phytate as they do not have the enzyme phytase (in contrast to most farm animals). Thus, there is decreased bioavailability, or intestinal absorption, of plant-based sources of phosphate. Short-term studies have demonstrated that vegetarian diets can reduce phosphorus levels and the hormonal elevations in parathyroid hormone (PTH) and fibroblast growth factor 23 (FGF23) that result from increased phosphorus absorption. Whether such diets are efficacious and safe long term in kidney patients has not been studied.

A major source of phosphorus in the diet is not from the diet itself, but rather additives that contain inorganic phosphate salts. These additives will be nearly 100 percent bioavailable, meaning they are completely absorbed across the intestine. They are commonly used in canned and boxed food processing to improve taste, texture, color, and cooking time, and act as a preservative. They are also added to meat and poultry products to help retain moisture and protect flavor. Unfortunately, there is an increasing use of these additives by food manufacturers.

Foods that contain additives have nearly 70 percent higher phosphate content than similar foods without additives. These additives are listed on the U.S. Food and Drug Administration's GRAS (Generally Recognized As Safe) list and specific quantitation on the food label is voluntary (and rarely listed). In contrast, these additives must be listed in the ingredients but these diverse chemical names can be confusing to patients, especially those with low health literacy. One study instructed patients to use a magnifying glass to look at foods and avoid the ones that included ingredients with the letters "Phosphor." The result was a reduction in phosphorus levels in these patients. This should be a call to action to label food as "contains phosphate additives" so that patients and consumers alike know what they are eating. An alternative would be to ban the additives completely.

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# Foods and Nutrients That Interact with Medications by Altering the Function of Metabolism and/or Transport Pathways

By Melanie S. Joy

Clinicians are trained to review prescription drugs with patients during their clinic visits and hospital admissions. However, less emphasis is placed on appropriate review and documentation of foods and nutrients that are known or suspected to interact with medications. This scenario places kidney disease patients at significant risk, given the 10 to 12 different medications that are typically prescribed (1). Although the clinician's time is a limiting factor in conducting nutrient reviews, an even greater problem is the lack of knowledge by clinicians of what nutrients can interact with which drugs and the mechanisms for the interactions. The purpose of this article is to inform clinicians caring for patients with kidney disease by providing a concise overview of nutrients—defined as vitamins, minerals, herbs, and food supplements—that can interact with prescribed medications.

When patients purchase prescription medications from a retail or mail-order pharmacy, either they are counseled by a pharmacist or they receive medication information handouts that address drug–drug interactions. However, patients who purchase over-the-counter nutrients are not counseled by a professional with training about the interactions between nutrients and medications. Further complicating the clinical scenario is the lack of dose standardization between the various over-the-counter nutrient products. Patients are also unaware of the safety issues related to nutrients, such as co-contamination with drugs or toxins. Recent reports suggest that approximately one-third of patients who are prescribed medications consume over-the-counter nutrients, demonstrating the need to understand and screen for potential drug–nutrient interactions (2).

The common understanding of nutrient interactions with drugs is usually limited to warfarin, whereby patients are counseled about the need to maintain the same daily amount of green leafy vegetables in their diet to limit fluctuations in the international normalized ratio. This fairly well-known interaction is secondary to increases in the amount of vitamin K substrate available for blood clotting. The interaction between warfarin and green leafy vegetables is well known to clinicians, and this information is usually forwarded to patients taking warfarin.

Beyond warfarin, clinicians have limited knowledge regarding drug–nutrient interactions and the mechanisms of these interactions. Although several mechanisms can account for drug–nutrient interactions, the remainder of this article will focus on the interactions known to occur with the drug disposition pathways of metabolism and transport.

The liver and kidney are the primary organs for drug metabolism. Mechanistically, nutrients can alter the function of drug-metabolizing enzymes and transporters (3–9). Nutrients can cause induction or inhibition of metabolizing enzymes, leading to reduced or increased activity, respectively, of victim drugs. Common drug metabolizing enzymes are cytochrome P450s, glutathione S-transferases, and uridine diphosphate glucuronosyltransferases. Transporters move drugs across membranes and are commonly found in the liver, kidney, and intestine. Common drug transporters are P-glycoprotein and organic anion transporting polypeptides. Induction and inhibition of transporters by nutrients can occur. However, the effect on transport of the victim drug is dependent on whether uptake or efflux transporters are affected. For uptake transporters, induction would increase and inhibition would decrease intracellular drug exposures. For efflux transporters, induction would decrease and inhibition would increase drug intracellular exposures. Intestinal absorption is a special transport case whereby enhanced efflux from inside the enterocyte interior and back to the intestinal lumen leads to decreased absorption.

Metabolism and transport pathways often work in concert, whereby increased transport uptake function and decreased efflux function would enable the enhanced presence of drug available to intracellular metabolizing enzymes. Some examples of induction and inhibition of drug metabolism and transport pathways

by nutrients are provided in Table 1 (3–9). Although the table primarily includes interactions that have been specifically assessed, the reader is cautioned that extensive studies documenting all the victim drugs that could be affected by each nutrient have not been conducted.

Drug–nutrient interactions in patients with kidney diseases require extensive study secondary to the number of medications prescribed to these patients. Evolving literature also suggests changes to drug metabolism and transport function secondary to kidney diseases per se (10, 11). The triad of polypharmacy, altered function of drug disposition pathways, and ingestion of over-the-counter nutrients with potential for drug interaction predisposes patients with kidney disease to adverse reactions and outcomes. More emphasis on screening and education of kidney disease patients regarding potential drug–nutrient interactions is needed.

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**References**


1. Manley HJ, et al. Medication prescribing patterns in ambulatory haemodialysis patients: comparisons of USRDS to a large not-for-profit dialysis provider. *Nephrol Dial Transplant* 2004; 19:1842–1848.
2. Gardiner P, et al. Factors associated with dietary supplement use among prescription medication users. *Arch Intern Med* 2006; 166:1968–1974.
3. Detampel P, et al. Drug interaction potential of resveratrol. *Drug Metab Rev* 2012; 44:253–265.
4. Gurley BJ. Pharmacokinetic herb-drug interactions (part 1): origins, mechanisms, and the impact of botanical dietary supplements. *Planta Med* 2012; 78:1478–1489.
5. Gurley BJ, et al. Pharmacokinetic herb-drug interactions (part 2): drug interactions involving popular botanical dietary supplements and their clinical relevance. *Planta Med* 2012; 78:1490–1514.
6. Izzo AA, Ernst E. Interactions between herbal medicines and prescribed drugs: an updated systematic review. *Drugs* 2009; 69:1777–1798.
7. Li Y, Paxton JW. The effects of flavonoids on the ABC transporters: consequences for the pharmacokinetics of substrate drugs. *Expert Opin Drug Metab Toxicol* 2013; 9:267–285.
8. Nakamura Y, et al. Zerumbone, a tropical ginger sesquiterpene, activates phase II drug metabolizing enzymes. *FEBS Lett* 2004; 572:245–250.
9. Zhang W, Lim LY. Effects of spice constituents on P-glycoprotein-mediated transport and CYP3A4-mediated metabolism in vitro. *Drug Metab Dispos* 2008; 36:1283–1290.
10. Joy MS, et al. In vivo alterations in drug metabolism and transport pathways in patients with chronic kidney diseases. *Pharmacotherapy* 2013; 34:114–122.
11. Nolin TD, et al. Emerging evidence of the impact of kidney disease on drug metabolism and transport. *Clin Pharmacol Ther* 2008; 83:898–903.


**Table 1. Drug–nutrient interactions**

| Pathway | Effects | Herb/Nutrient | Common Victim Drugs |
|---|---|---|---|
| CYP3A4, UGTs, P-glycoprotein | Induction | Hyperforin: St. John's wort | Cyclosporine, tacrolimus, digoxin, nonnucleoside reverse transcriptase inhibitors, protease inhibitors, etoposide, paclitaxel, vinblastine, vincristine, vindesine |
| CYP3A4, CYP2D6 | Inhibition (MB) | Berberine, hydrastine: goldenseal | Midazolam (CYP3A4 probe), cyclosporine, amitriptyline, clozapine, codeine, desipramine, donepezil, flecainide, fluoxetine, meperidine, methadone, tramadol |
| CYP3A4 | Inhibition | Furanocoumarins: grapefruit juice, Seville orange juice | Benzodiazepines (triazolam, midazolam, diazepam, alprazolam), ritonavir, sertraline, cyclosporine, buspirone, levothyroxine, oxycodone |
| CYP2E1 | Inhibition | Allyl sulfides, isothiocyanates: garlic, watercress | Acetaminophen, chlorzoxazone |
| CYP1A2, CYP2E1 | Inhibition | Sulfur-containing glucosinolates: cruciferous vegetables | Acetaminophen, chlorzoxazone, haloperidol, theophylline |
| GSTs, UGTs | Induction | Cruciferous vegetables | Acetaminophen |
| CYP2C19 | Induction | Ginkgo biloba | Omeprazole |
| CYP2C9, CYP2C19, CYP3A4, OATPs | Inhibition | Silymarins: milk thistle | Losartan, omeprazole, midazolam, warfarin, simvastatin, felodipine, rosuvastatin, nifedipine |
| CYP3A4, CYP2C9 | Inhibition | Ginseng | Warfarin |
| CYP3A4 | Inhibition | Echinacea | Midazolam, estrone 3-sulfate |
| CYP3A4, CYP2D6, P-glycoprotein, UGTs | Inhibition | Piperaceae: black pepper | Phenytoin, rifampicin, propranolol, theophylline, nevirapine |
| GSTs, CYP3A4 P-glycoprotein | Induction Inhibition | Ginger | Midazolam, digoxin |
| CYP3A4, P-glycoprotein | Induction | Vitamin D | Midazolam, digoxin |
| CYP3A4, CYP1A2 | Inhibition | Resveratrol | Cisapride, cyclosporine, testosterone |

**Abbreviations: CYP = cytochrome P450; GSTs = glutathione S-transferases; OATPs = organic anion transporting polypeptides; UGTs = uridine diphosphate glucuronosyltransferases.**



# Fish Oil Supplementation for Cardioprotection in Chronic Kidney Disease

By Allon Friedman

According to the 2007 National Health Interview survey, fish oil is the most popular dietary supplement used by adult Americans (1). This follows on the heels of decades of well-publicized basic science and clinical research into the biology of long-chain omega-3 fatty acids—the major active ingredient in fish oil—and their influence on a variety of disease processes. Although clinical trials of the use of fish oil in the general population have reported conflicting results, patients with chronic kidney disease (CKD)—in particular end stage renal disease—have several characteristics that may make them an ideal group in which to study and observe benefits from the putative salutary effects of fish oil.

Take, for example, the highly investigated relationship between fish oil and cardiovascular disease. Because of the elevated rates of CKD-associated cardiovascular events and mortality and the questionable efficacy of standard-of-care therapies such as aspirin, β-blockers, and statins in the CKD population, CKD patients offer an excellent study population in which to examine the cardiovascular effects of fish oil. Further strengthening this argument are the types of cardiovascular outcomes observed in CKD patients. Approximately 25 percent of dialysis patients die of sudden cardiac death, a disease entity that may be particularly amenable to the effects of fish oil (2). Finally, CKD patients have among the lowest documented circulating levels of omega-3 fatty acids (3). Inasmuch as circulating levels reflect baseline omega-3 dietary consumption (which is believed to be inversely related to the benefits accrued from omega-3 fatty acid supplementation) (4), CKD patients are an ideal group for fish oil studies. In fact, investigators have already begun to perform such studies.

The first such study was a randomized, placebo-controlled trial performed by Svensson et al. (5) in 206 prevalent Danish patients receiving hemodialysis. The investigators randomized the patients to fish oil (containing 1.7 g omega-3 fatty acids) or placebo and monitored them for 2 years. They reported no improvement in the primary end point, which was a composite of myocardial infarction, angina requiring investigation, transient ischemic attack or stroke, peripheral vascular disease needing interventions, or death. However, they did observe a statistically significant improvement with the use of fish oil in the secondary end points of myocardial infarction (70 percent reduction) and major coronary events (60 percent reduction).

The second study, by Lok et al. (6), tested the effects of fish oil (containing 1.6 g omega-3 fatty acids) on arteriovenous graft patency in a cohort of 201 prevalent Canadian patients receiving hemodialysis. The primary outcome was loss of native graft patency, which fish oil improved by 22 percent ($p = 0.06$) compared with placebo. The secondary end point of cardiovascular events, a composite of myocardial infarction, congestive heart failure requiring hospitalizations, and cardiac-related death, was significantly improved by fish oil supplementation to a statistically significant extent.

The last study, by Friedman et al. (7), used a case-control design to examine the relationship between omega-3 fatty acid levels and the risk of sudden cardiac death in a cohort of 400 patients in the United States who were beginning long-term hemodialysis. They found an inverse and steeply graded relationship between serum omega-3 fatty acid levels at baseline and the odds of dying of sudden cardiac death during the first year of dialysis, even after controlling for a variety of major risk factors.

In general, these studies support the need for a well-powered randomized controlled trial to determine definitively whether fish oil improves cardiovascular outcomes in hemodialysis patients. That being said, in which patients should such a study be performed? The ideal population would be one in which dietary omega-3 fatty acid intake and blood levels are low, because this is the population most likely to benefit. Interestingly, patients in the Danish trial had levels that were higher than those in the Canadian and especially United States study populations, perhaps explaining in part why its findings were negative. On the basis of this criterion, it seems that North American hemodialysis patients, whose dietary omega-3 fatty acid consumption is among the lowest according to the medical literature, offer an excellent population in which to study the cardioprotective effects of fish oil. In light of the large potential benefits and low risks of fish oil supplementation, such a trial should be enthusiastically welcomed by the nephrology community.

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**References**


1. National Center for Complementary and Alternative Medicine. Using Dietary Supplements Wisely. http://nccam.nih.gov/health/supplements/wiseuse.htm#use.
2. London B, et al. Omega-3 fatty acids and cardiac arrhythmias: prior studies and recommendations for future research: a report from the National Heart, Lung, and Blood Institute and Office of Dietary Supplements Omega-3 Fatty Acids and their Role in Cardiac Arrhythmogenesis Workshop. *Circulation* 2007; 116:e320–e335.
3. Friedman AN, et al. Low blood levels of long-chain n-3 polyunsaturated fatty acids in US hemodialysis patients: clinical implications. *Am J Nephrol* 2012; 36:451–458.
4. Mozaffarian D, Rimm EB. Fish intake, contaminants, and human health: evaluating the risks and the benefits. *JAMA* 2006; 296:1885–1899.
5. Svensson M, et al. N-3 fatty acids as secondary prevention against cardiovascular events in patients who undergo chronic hemodialysis: a randomized, placebo-controlled intervention trial. *Clin J Am Soc Nephrol* 2006; 1:780–786.
6. Lok C, et al. Effect of fish oil supplementation on graft patency and cardiovascular events among patients with new synthetic arteriovenous hemodialysis grafts. *JAMA* 2012; 307:1809–1816.
7. Friedman A, et al. Long chain n-3 fatty acids and risk of sudden cardiac death in patients starting hemodialysis. *Kidney Int* 2013; 83:1130–1135.

# Chronic Kidney Disease and Access to Healthful Foods

By Deidra C. Crews

Individuals at high risk for the development of chronic kidney disease (CKD), or who already have the disease, are frequently encouraged by their health care providers to follow a "healthful" diet. Such a diet may be particularly difficult to follow if the recommended foods cannot be easily acquired—a situation that individuals living in poverty often face.

Poverty affects over 46 million (15 percent) Americans and has a disproportionate impact on racial and ethnic minorities (e.g., 35 percent of African Americans live in poverty), who also bear the greatest burden of advanced and progressive CKD (1, 2). Food insecurity ("limited or uncertain ability to acquire nutritionally adequate and safe foods in socially acceptable ways") (3) often accompanies poverty. Affecting 17 million households in the United States (4), food insecurity is associated with several diet-related conditions—including diabetes and hypertension (5, 6)—and has recently been reported to be associated with CKD in the presence of either diabetes or hypertension (7).

Food-insecure individuals tend to follow dietary patterns characterized by decreased consumption of fruits, vegetables, and fiber, and increased intake of energy-dense foods, such as those rich in fat and sugar (8), which are often available at a lower price and may be more palatable than healthful foods (9). They also generally contain sodium-based food additives, which account for 75 percent of total sodium intake in the United States (10). Moreover, food-insecure individuals frequently reside in neighborhoods lacking the grocery stores most likely to sell healthful foods. Low-income neighborhoods often have few supermarkets and more fast-food and corner stores, whereas higher-income neighborhoods have many supermarkets with healthful food options (11–13). The neighborhood food environment has been shown to have variable associations with health outcomes. Although some investigators report no association between obesity and density of fast-food stores in low-income neighborhoods (14), others have shown that changing the available food options in corner stores leads to better food choices, including an increase in fruit and vegetable consumption (15).

Several studies now document the association of healthful dietary patterns with better CKD outcomes. In addition to its favorable effects on blood pressure, adherence to the Dietary Approaches to Stop Hypertension (DASH) diet (16) has been associated with a lower risk of decline in estimated GFR (17). Furthermore, adherence to a Mediterranean dietary pattern has been associated with better kidney function among older men and with better survival among individuals with CKD (18). The alkali-inducing fruits and vegetables that are the mainstays of these diets may improve metabolic acidosis and attenuate kidney injury (19, 20).

Although large-scale clinical trials are certainly needed to test the hypothesis that these healthful dietary patterns improve CKD outcomes independently of other lifestyle factors, we likely already have enough data to warrant recommending such diets in the clinical setting. Thus, an assessment of potential barriers or competing priorities to following these dietary recommendations is essential. A simple screening question regarding food insecurity (e.g., "Have you had to skip meals because there wasn't enough money?") could allow the identification of patients at increased risk of poor outcomes and guide dietary recommendations that take into account potential barriers to accessing healthful foods. Longitudinal studies in this area are needed to fully elucidate the role of dietary access in CKD outcomes.

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**References**


1. DeNavas-Walt C, et al. U.S. Census Bureau, Current Population Reports, P60-243, *Income, Poverty, And Health Insurance Coverage in the United States: 2011*. Washington, DC: U.S. Government Printing Office, 2012.
2. US Renal Data System. *USRDS 2012 Annual Data Report: Atlas of End-Stage Renal Disease in the United States*. Bethesda, MD: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Disease, 2012.
3. Anderson SA. Core indicators of nutritional state for difficult-to-sample populations. *J Nutrition* 1990; 120:1559–1599.
4. Coleman-Jensen A, et al. *Household Food Security in the United States in 2010*. ERR-125, U.S. Dept. of Agriculture, Econ. Res. Serv. September 2011. (http://www.ers.usda.gov/Publications/err125/).
5. Castillo DC, et al. Inconsistent access to food and cardiometabolic disease: the effect of food insecurity. *Curr Cardiovasc Risk* Rep 2012; 6:245–250.
6. Seligman HK, et al. Food insecurity is associated with chronic disease among low-income NHANES participants. *J Nutrition* 2010; 140:304–310.
7. Crews DC, et al. for the Centers for Disease Control and Prevention Chronic Kidney Disease Surveillance Team. Effect of food insecurity on chronic kidney disease in lower-income Americans. *Am J Nephrol* 2014; 39:27–35.
8. Popkin BM. Contemporary nutritional transition: determinants of diet and its impact on body composition. *Proc Nutr Soc* 2011; 70:82–91.
9. Offer A, et al. Obesity under affluence varies by welfare regimes: the effect of fast food, insecurity, and inequality. *Econ Hum Biol* 2010; 8:297–308.
10. U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2010. 7th Edition. Washington, DC: U.S. Government Printing Office, 2010. 11. Lovasi GS, et al. Built environments and obesity in disadvantaged populations. *Epidemiol Rev* 2009; 31:7–20.
12. Zenk SN, et al. Fruit and vegetable access differs by community racial composition and socioeconomic position in Detroit, Michigan. *Ethn Dis* 2006; 16:275–280.
13. Morland K, Filomena S. Disparities in the availability of fruits and vegetables between racially segregated urban neighbourhoods. *Public Health Nutr* 2007; 10:1481–1489.
14. Richardson AS, et al. Neighborhood fast food restaurants and fast food consumption: a national study. *BMC Public Health* 2011; 11:543.
15. Gittelsohn J, et al. An urban food store intervention positively affects food-related psychosocial variables and food behaviors. *Health Educ Behav* 2010; 37:390–402.
16. Appel LJ, et al. A clinical trial of the effects of dietary patterns on blood pressure. DASH Collaborative Research Group. *N Engl J Med* 1997; 336:1117–1124.
17. Lin J, et al. Association of dietary patterns with albuminuria and kidney function decline in older white women: a subgroup analysis from the Nurses' Health Study. *Am J Kidney Dis* 2011; 57:245–254.
18. Huang X, et al. Mediterranean diet, kidney function, and mortality in men with CKD. *Clin J Am Soc Nephrol* 2013; 8:1548–1555.
19. Goraya N, et al. Dietary acid reduction with fruits and vegetables or bicarbonate attenuates kidney injury in patients with a moderately reduced glomerular filtration rate due to hypertensive nephropathy. *Kidney Int* 2012; 81:86–93.
20. Goraya N, et al. A comparison of treating metabolic acidosis in CKD stage 4 hypertensive kidney disease with fruits and vegetables or sodium bicarbonate. *Clin J Am Soc Nephrol* 2013; 8:371–381.

# Journal View

## Increased Stroke Risk in Long-Term Dialysis Patients

Patients receiving long-term hemodialysis or peritoneal dialysis are at substantially increased risk of stroke, reports a study in the *American Journal of Kidney Diseases*.

The retrospective cohort study included approximately 74,000 hemodialysis patients and 6000 peritoneal dialysis patients in Taiwan, along with 670,000 control individuals not receiving dialysis. Both groups were drawn from a national insurance research database; the participants had no history of stroke or cancer at baseline. The rates of initial hospitalization for ischemic or hemorrhagic stroke, as either a primary or a secondary diagnosis, were assessed.

The incidence of hospitalization for ischemic stroke (per 10,000 person-years) was 102.6 in hemodialysis patients and 100.1 in peritoneal dialysis patients, compared with 42.5 in age- and sex-matched control individuals. For hemorrhagic stroke, the rates were 42.4 in hemodialysis patients and 59.4 in peritoneal dialysis patients, compared with 13.0 in the reference group.

In addition to dialysis, older age, male sex, diabetes, and hypertension were independent risk factors for both types of stroke. On adjusted analysis, including competing risks of death and propensity score matching, hemorrhagic stroke risk was one fourth lower in patients receiving peritoneal dialysis versus those receiving hemodialysis: hazard ratio 0.75. Ischemic stroke risk was not significantly different between the two dialysis groups.

The study helps to clarify the excess stroke risk associated with maintenance dialysis. Ischemic stroke risk is higher in hemodialysis and peritoneal dialysis patients than in population control individuals. Both groups are also at increased risk of hemorrhagic stroke, although peritoneal dialysis patients are somewhat less so. "Comprehensive control of hypertension and diabetes is necessary when delivering dialysis treatment," the investigators conclude [Wang H-H, et al. Risk of stroke in long-term dialysis patients compared with the general population. *Am J Kidney Dis* 2014; 63:604–611].



## No Benefit of Renal Denervation for Refractory Hypertension

Renal artery denervation does not reduce blood pressure in patients with refractory hypertension, concludes a sham-controlled trial in the *New England Journal of Medicine*.

The randomized, single-blind SYMPLICITY HTN-3 trial included 535 patients with severe resistant hypertension despite maximally tolerated doses of three or more drugs including a diuretic. In a 2:1 ratio, patients were assigned to catheter-based renal denervation or a sham procedure. The effects on blood pressure at follow-up were assessed, along with safety outcomes.

At 6 months, the mean change in office systolic blood pressure (the primary efficacy outcome) was 14.13 mm Hg in the renal denervation group versus 11.74 mm Hg in the sham group. There was also no significant difference in 24-hour ambulatory systolic blood pressure response: 6.75 and 4.79, respectively.

Analysis of diastolic blood pressure showed similar patterns. The rates of a composite safety outcome of death, ESRD, and other serious complications were not significantly different.

Unblinded studies have suggested a benefit of renal denervation for severe hypertension that is resistant to medical therapy. However, this single-blind trial found no significant difference in systolic blood pressure at 6 months' follow-up. The authors discuss possible reasons for the discrepant results compared with

the results of previous renal-denervation studies. [Bhatt DL, et al: A controlled trial of renal denervation for resistant hypertension. *N Engl J Med.* 2014; 370: 1393–1401].

## $HbA_{1c}$ Doesn't Aid Risk Prediction in Nondiabetic Patients

Glycated hemoglobin (HbA1c) does not provide additional information on cardiovascular risk in patients without diabetes or cardiovascular disease (CVD), suggests a meta-analysis in the *Journal of the American Medical Association*.

The meta-analysis included individual-level data on 294,998 participants, all initially without known diabetes or CVD, from 73 prospective cohort studies. Glycated hemoglobin level was evaluated as a predictor of initial cardiovascular events in patients in different 10-year cardiovascular risk categories: low, less than 5 percent; intermediate, 5 percent to less than 7.5 percent; or high, 7.5 percent or greater. The analysis included measures of risk discrimination and reclassification.

The data included 20,840 fatal and nonfatal CVD events—13,237 coronary heart disease and 7603 stroke outcomes—at a median follow-up time of 9.9 years. After adjustment for some conventional cardiovascular risk factors, the slope of the association between HbA1c and CVD risk was approximately J-shaped. There was little effect of further adjustment for total cholesterol and triglyceride levels or estimated GFR. The association was attenuated by adjustment for high-density lipoprotein cholesterol and C-reactive protein.

Risk discrimination was little improved by the addition of HbA1c data to a model incorporating conventional cardiovascular risk factors, and net reclassification improvement was not improved at all. The results were similar in all 10-year CVD risk categories. The additional risk information from HbA1c was similar to or greater than that provided by fasting, random, or postload plasma glucose levels.

Higher levels of glycemia have been linked to increased CVD risk, suggesting a role of HbA1c for cardiovascular risk assessment in asymptomatic, nondiabetic adults. However, the new analysis showed limited value of adding HbA1c to conventional models for predicting initial CVD events. The authors call for further studies to evaluate the significance of the "consistent J-shaped associations between various glycemia measures and CVD incidence" [The Emerging Risk Factors Collaboration. Glycated hemoglobin measurement and prediction of cardiovascular disease. *JAMA* 2014; 311:1225–1233].

## ACEIs, but Not ARBs, Reduce Mortality in Patients with Diabetes

Two classes of renin-angiotensin system blockers have differing effects on mortality in diabetic patients, concludes a meta-analysis in *JAMA Internal Medicine*.

A systematic review identified 35 randomized trials evaluating the effects of renin-angiotensin system blockers on all-cause and cardiovascular mortality and major cardiovascular events in patients with diabetes. There were 23 trials comparing angiotensin-converting enzyme inhibitors (ACEIs) with placebo or active drugs, including 32,287 patients, and 13 trials comparing angiotensin II receptor blockers (ARBs) with no treatment, including 23,867 patients. The outcomes with ACEIs and ARBs were separately evaluated in random-effects meta-analyses.

With ACEIs, there were significant reductions in all-cause mortality, odds ratio (OR) 0.87; cardiovascular death, OR 0.83; and major cardiovascular events, OR 0.86. The reduction in cardiovascular events was significant for both

*Continued on page 14*

# Journal View

## ACEIs

*Continued from page 15*

myocardial infarction, relative risk (RR) 0.79; and heart failure, RR 0.81.

Neither mortality outcome was significantly reduced by treatment with ARBs. Overall cardiovascular events were unaffected as well, although there was a significant reduction in heart failure risk: RR 0.70. Neither class of drug reduced stroke risk. Metaregression analysis suggested that ACEIs reduced mortality independently of baseline blood pressure or proteinuria, patient age, type of ACEI, or presence of diabetes.

Treatment with ACEIs or ARBs is recommended for diabetic patients with high blood pressure. However, these two drug classes have differing mechanisms and may differ in their clinical effects.

The new meta-analysis found significant reductions in overall and cardiovascular mortality in diabetic patients receiving ACEIs but not ARBs. The ACEIs were also associated with a reduced risk of cardiovascular events, whereas ARBs reduced only heart failure risk. The results support ACEIs as "first-line therapy to limit the excess mortality and morbidity" in hypertensive patients with diabetes [Cheng J, et al. Effect of angiotensin-converting enzyme inhibitors and angiotensin II receptor blockers on all-cause mortality, cardiovascular deaths, and cardiovascular events in patients with diabetes mellitus: a meta-analysis. *JAMA Intern Med* March 31, 2014. doi:10.1001/jamainternmed.2014.348].



## STONE Score Helps in Assessing Ureteral Stones

A five-item clinical prediction rule performs well in identifying patients with uncomplicated ureteral stones, according to a report in the *British Medical Journal*.

The score was developed in a retrospective cohort of 1040 adults undergoing noncontrast computed tomography (CT) for suspected uncomplicated kidney stones under a "flank pain protocol." The factors associated with CT findings of symptomatic ureteral stones were incorporated into a scoring system identifying groups at low, moderate, and high probability of stones. The resulting 13-point STONE score was tested in a prospective validation cohort of 491 patients.

The five strongest predictors of ureteral stones were male sex, short duration of pain, nonblack race, nausea and vomiting, and microscopic hematuria. In the derivation cohort, the rates of ureteral stones were 8.3 percent in patients with a low-probability STONE score (0 to 5 points), 51.6 percent in those with a moderate probability score (6 to 9 points), and 89.6 percent in those with a high-probability score (10 to 13 points).

In the validation cohort, the rates were 9.2 percent, 51.3 percent, and 88.6 percent, respectively. Among patients with high-probability STONE scores, there was a 0.3 percent rate of acutely important alternative findings in the derivation cohort and 1.6 percent in the validation cohort.

Computed tomography is an accurate test for kidney stones, but it may not affect important clinical outcomes. The STONE score provides an easily calculated, objective clinical prediction rule for the assessment of renal colic patients.

The results suggest that the STONE score accurately predicts the likelihood of ureteral stones, which is inversely associated with the likelihood of acutely important alternative findings. With further validation, this score could help to select patients who could be treated without CT or with reduced-dose CT [More CL, et al. Derivation and validation of a clinical prediction rule for uncomplicated ureteral stone—the STONE score: retrospective and prospective observational cohort studies. *BMJ* 2014; g2191].

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ASN LEADING THE FIGHT AGAINST KIDNEY DISEASE

# Journal View

## How Many ESRD Patients Undergoing Dialysis Regain Kidney Function?

More than 5 percent of Medicare patients starting hemodialysis go on to have sustained recovery of renal function, according to a study in the open-access journal *PLOS One*.

The researchers analyzed follow-up data on 194,007 patients in the United States who began receiving hemodialysis in 2008 or 2009, with outcomes tracked through 2010. Sustained recovery of renal function was assessed, defined as an event code of "9" and no return for dialysis or transplantation through at least 1 year. The analysis excluded patients with temporary recovery of renal function who subsequently returned to dialysis.

Overall, 6.69 percent of patients had evidence of recovery of renal function, although 14.8 percent of these returned to dialysis during follow-up. The rate of sustained recovery of renal function increased from 5.6 percent in 2008 to 5.9 percent in 2009. Renal recovery mainly occurred in the first 2 months after dialysis initiation and was associated with etiologic factors associated with acute kidney injury, most commonly acute tubular necrosis.

The patients with sustained renal recovery had very low rates of permanent vascular access. Consistent with this, recovery was less likely for patients who had any previous nephrologist contact. These findings suggested that patients with a slower, chronic disease process may have more time for long-term access planning.

Renal recovery was also less likely for nonwhite patients. Recovery rates varied widely by region, from 3.4 percent in ESRD network 3 to 7.6 percent in network 7.

Recent estimates of renal recovery in patients starting long-term hemodialysis have ranged from 0.9 percent to 2.3 percent. This large analysis of patients enrolled in the U.S. Medicare ESRD program finds much higher rates of over 5 percent. The authors suggest that ESRD patients with diagnoses associated with acute kidney injury may benefit from close monitoring of residual kidney function and interventions to avoid further renal injury [Mohan S, et al. Recovery of renal function among ESRD patients in the US Medicare program. *PLoS ONE* 2013;8:e83447. doi: 10.1371/journal.pone.0083447].

## Low- Versus Mid-Hematocrit Strategy for Dialysis Patients with Complex Conditions

A simulated randomized trial suggests similar outcomes with two common strategies for anemia management in elderly dialysis patients with multiple chronic conditions, reports *Medical Care*.

The researchers used data from the U.S Renal Data System to emulate a randomized comparative effectiveness trial of two hematocrit target strategies for older adults receiving dialysis who had serious comorbidities. The study compared a "low" hematocrit target of 30.0 to 34.5 percent and a "mid" target of 34.5 to 39.0 percent. The analysis included 22,474 dialysis patients, aged 65 or older, who had both diabetes and cardiovascular disease and who started dialysis between 2006 and 2008.

The analysis used follow-up data from 3 to 9 months after the patients started hemodialysis, including the "observational analogs" of intention-to-treat and per-protocol analyses. The models included inverse-probability weighting to adjust for time-dependent confounding by indication. All-cause mortality and a composite of mortality and cardiovascular events were compared between strategies.

The models found no significant differences between the mid- versus the low-hematocrit strategies. On both intention-to-treat and per-protocol analyses, hazard ratios were nonsignificant for all-cause mortality and for the composite outcome. There was also no evidence of benefit on analysis of patients with hematocrit greater than 30 percent at baseline, of those with serum albumin less than 3.5 g/dL, and excluding those with a poor response to epoietin.

Randomized trials have found that anemia management strategies targeting near-normal hematocrit levels (>39.0 percent) may lead to increased cardiovascular risk and mortality. By contrast, few studies have examined the outcomes of the most widely used hematocrit target of 34.5 to 39.0 percent.

The new analysis finds no difference in outcomes with the low- and mid-hematocrit targets studied, among elderly dialysis patients with multiple chronic conditions. The findings support recent advisories recommending a hematocrit target of less than 33 percent in treating hemodialysis patients, including those with major comorbid conditions [Zhang Y, et al. Comparative effectiveness of two anemia management strategies for complex elderly dialysis patients. *Med Care* 2014; 52(Suppl 3):S132–S139].

## Rising Use of Anemia Treatments Before ESRD

For older Americans approaching ESRD, the use of erythropoiesis-stimulating agents (ESAs) and intravenous iron for anemia management has increased in recent years, as has the rate of blood transfusion, according to a study in *JAMA Internal Medicine*.

The study included U.S. Renal Data System data on 466,803 patients, 67 years or older, who began receiving maintenance dialysis or underwent preemptive kidney transplantation between 1995 and 2010. All patients had uninterrupted Medicare coverage throughout the 2 years before the development of ESRD. Trends in the use of anemia treatments during this time were analyzed.

The rates of ESA use during the 2 years before incident ESRD increased from 3.2 percent in 1995 to 40.8 percent in 2007, then decreased to 35.0 percent in 2010. On multivariable analysis, patients in 2010 were nearly 10 times more likely to receive ESAs than were those in 1995: utilization prevalence ratio (PR) 9.85. The median times from ESA use to incident ESRD were 120 and 337 days, respectively.

There was a similarly sharp increase in the use of intravenous iron: from 1.2 percent in 1995 to 12.3 percent in 2010, PR 9.20. At the same time, the rate of blood transfusions approximately doubled: from 20.6 percent to 40.3 percent, PR 1.88. The mean hemoglobin levels at the time of incident ESRD were 9.5 g/dL in 1995, 10.3 g/dL in 2006, and 9.9 g/dL in 2010.

Several high-profile studies have examined the use of ESAs and other anemia treatments in patients with ESRD, but less is known about trends in anemia care before ESRD develops. This study shows sharply increased rates of treatment with ESAs and intravenous iron in older adults approaching ESRD from 1995 to 2010.

Despite the use of these treatments, the use of blood transfusions also increased. The researchers call for efforts to identify "safe, effective, and economical anemia treatment strategies" for patients with chronic kidney disease [Winkelmayer WC, et al. Trends in anemia care in older patients approaching end-stage renal disease in the United States (1995–2010). *JAMA Intern Med.* March 3, 2014. doi: 10.1001/jamainternmed.2014.87].

## Bariatric Surgery Improves Diabetes Outcomes at 3 Years

The addition of bariatric surgery to intensive medical therapy improves glycemic control and other 3-year outcomes for obese patients with type 2 diabetes, reports a trial in the *New England Journal of Medicine*.

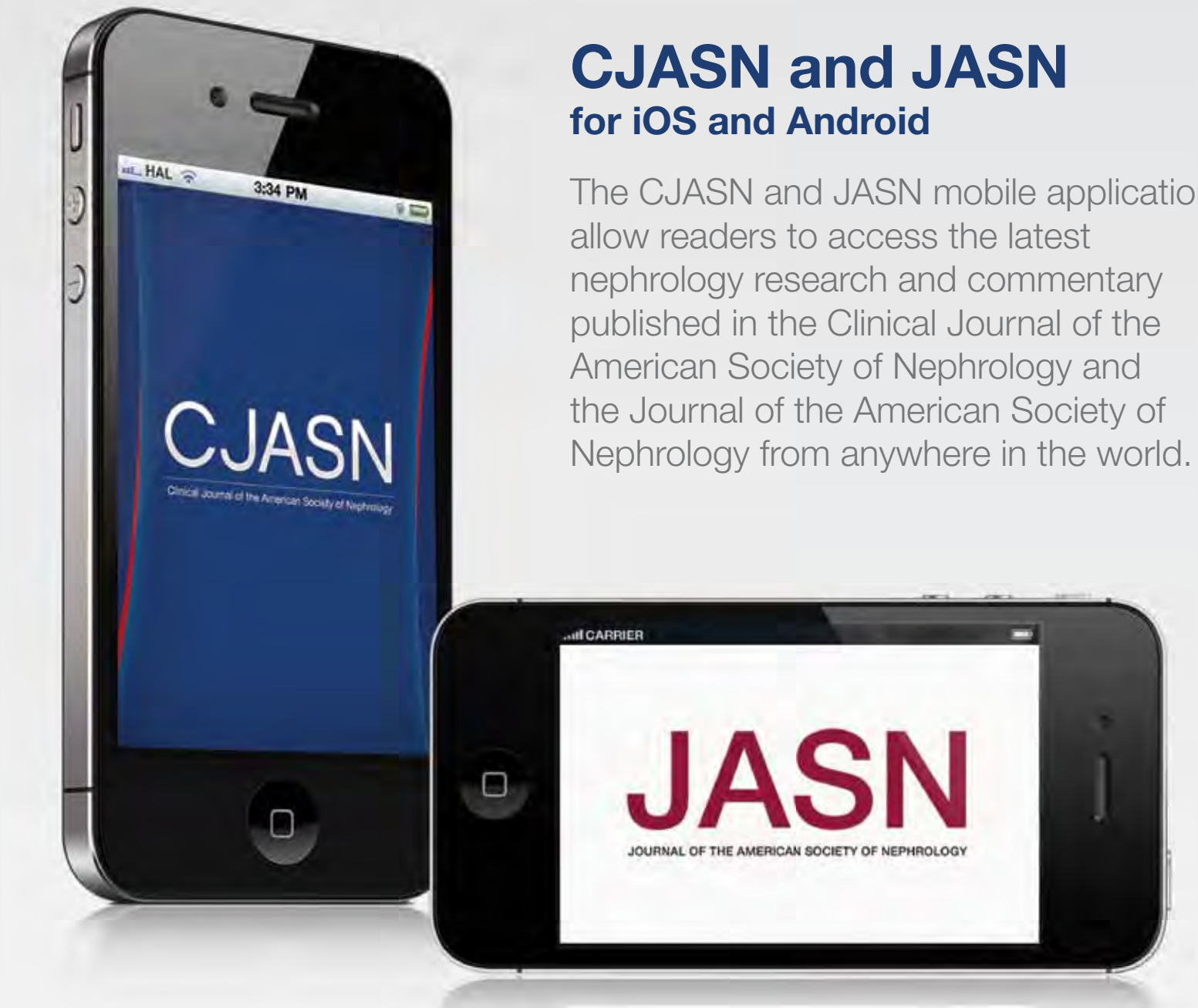
In the STAMPEDE trial, 150 obese patients with uncontrolled type 2 diabetes were randomly assigned to intensive medical therapy alone or with bariatric surgery (Roux-en-Y gastric bypass or sleeve gastrectomy). The mean age was 48 years; more than two thirds of the patients were women. At baseline, the patients had a mean body mass index of 36 and a mean glycated hemoglobin of 9.3 percent. At 3 years, the rates of glycemic control (glycated hemoglobin 6.0 percent or less) were evaluable in 137 patients.

The target glycated hemoglobin level was achieved by 5 percent of patients receiving medical therapy only versus 38 percent of those receiving medical therapy plus bariatric surgery. The patients in the surgery group were also using less insulin and other glucose-lowering agents.

The patients undergoing bariatric surgery also had greater weight loss: 24.5 percent with gastric bypass and 21.1 percent with sleeve gastrectomy, compared with 4.2 percent with medical therapy. The surgery group had better quality-of-life scores and no late surgical complications.

Previous studies with 1- to 2-year follow-up have reported improved outcomes with bariatric surgery in patients with type 2 diabetes. The new trial shows improved glycemic control and other outcomes 3 years after bariatric surgery, compared with intensive medical therapy only.

"Some patients in our study had complete diabetes remission, whereas others had a marked reduction in the need for pharmacologic treatment," the researchers write. They also note sustained reduction in cardiovascular risk factors after bariatric surgery [Schauer PR, et al. Bariatric surgery versus intensive medical therapy for diabetes—3-year outcomes. *N Engl J Med* March 31, 2014. doi: 10.1056/NEJMoa1401329].

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ASN LEADING THE FIGHT AGAINST KIDNEY DISEASE

# Industry Spotlight

## Water And Filter Experts Team Up

Two companies involved in water filtration and purification inked a non-exclusive agreement in March to distribute dialysis filters to U.S. and Canadian dialysis clinics.

The companies, Nephros and Mar Cor Purification, will distribute Nephros' ultrafilters.

Mar Cor President and Chief Executive Officer (CEO) Curtis Weitnauer noted, "We are very excited about incorporating the Nephros ultrafiltration family of products for hemodialysis water and bicarbonate concentrate into our product portfolio for dialysis customers. Their unique hollow fiber filter offers unparalleled filtration, flow performance, patient health and economic benefits to complement our array of portable and central delivery water purification systems in dialysis."

Nephros President and CEO John Houghton said, "We are extremely pleased to be working with Mar Cor Purification. Combining their proven distribution capabilities and installation base with their field specialists and service provider locations will provide Nephros products the necessary visibility and customer contact required for growth in dialysis and potentially other markets." Nephros provides filters for both water and blood filtration during dialysis, as well as water filters for hospitals to use for drinking and washing, and for military usage for clean drinking water when soldiers are in the field.

In late March, Nephros reported that its total water filter sales had increased by 23 percent, from $1,005,000 in 2012 to $1,240,000 in 2013. Nonetheless, total revenues for the year 2013 dipped to $1,740,000 when compared to revenues of $1,807,000 for 2012.

"We have continued to show growth with our water filtration business; however, this was offset by the unanticipated voluntary product recall in the fourth quarter of 2013," said Houghton. "In 2014 we intend to continue to focus our efforts on expanding the availability of our water filtration products by enhancing our relationships with key distributors. In addition, we also expect to commence commercialization of our online mid-dilution hemodiafiltration system in the second quarter of 2014."

Nephros' key business segments, dialysis water and hospital water system sales, grew by approximately 66 percent and 25 percent, respectively, Nephros noted. These increases were partially offset by a sharp reduction in military water sales of approximately 83 percent.

## Dialysis Drug Costs Too High for Hospitals, According to HHS Inspector General Report

Medicare has miscalculated the costs of dialysis drugs in bundled costs, according to a report released by the US Health and Human Services Office of the Inspector General in late March.

In the first quarter of 2012, independent dialysis facilities could purchase ESRD drugs for less than the reimbursement amounts provided by the ESRD base rate (9 percent below, in the aggregate), but average acquisition costs for hospital-based dialysis facilities exceeded reimbursement amounts (5 percent above, in the aggregate), the report noted. By law, CMS was required to lower the bundled rate for 2014.

The OIG report noted that in the past three years, "dialysis facilities' average acquisition costs for the majority of drugs under review had decreased, but average costs for epoetin alfa, (which) represented more than three-quarters of the drug costs in responding facilities, had increased by at least 17 percent."

(http://oig.hhs.gov/oei/reports/oei-03-12-00550.pdf)

The *Journal of the American Medical Association* noted that on a per treatment basis, the use of erythropoiesis-stimulating agents (ESAs) for treating anemia, as well as iron, vitamin D agents, and antibiotics decreased by 38% from 2007 to 2012 as dialysis facilities began their belt-tightening efforts and bundling took effect.

While the acquisition costs for most of the drugs under review have decreased, the costs for drugs that represented the majority of facilities' total drug costs have increased, OIG reported. Thus, any savings resulting from a decrease in utilization may potentially be offset by the drugs' cost increase.

The OIG report recommended that CMS:

- Redetermine the basis of the ESRD base rate to reflect current trends in drug acquisition costs, as required by law;
- Distinguish payments in the ESRD base rate between independent and hospital-based dialysis facilities, the latter of which have trouble purchasing drugs at below CMS reimbursement levels; and
- Consider updating the ESRD payment bundle using a factor that takes into account drug acquisition costs.

With regard to the recommendations, CMS did not explicitly state whether it agreed with the first recommendation, and clearly didn't agree with the second, but CMS did agree that the third recommendation was warranted: that CMS should closely consider drug costs when updating the bundled payment.



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**Thursday, June 5**
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**Wednesday, July 23**
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**Tuesday, October 14**
Housing Closes

**Wednesday, November 5**
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**Tuesday, November 11**
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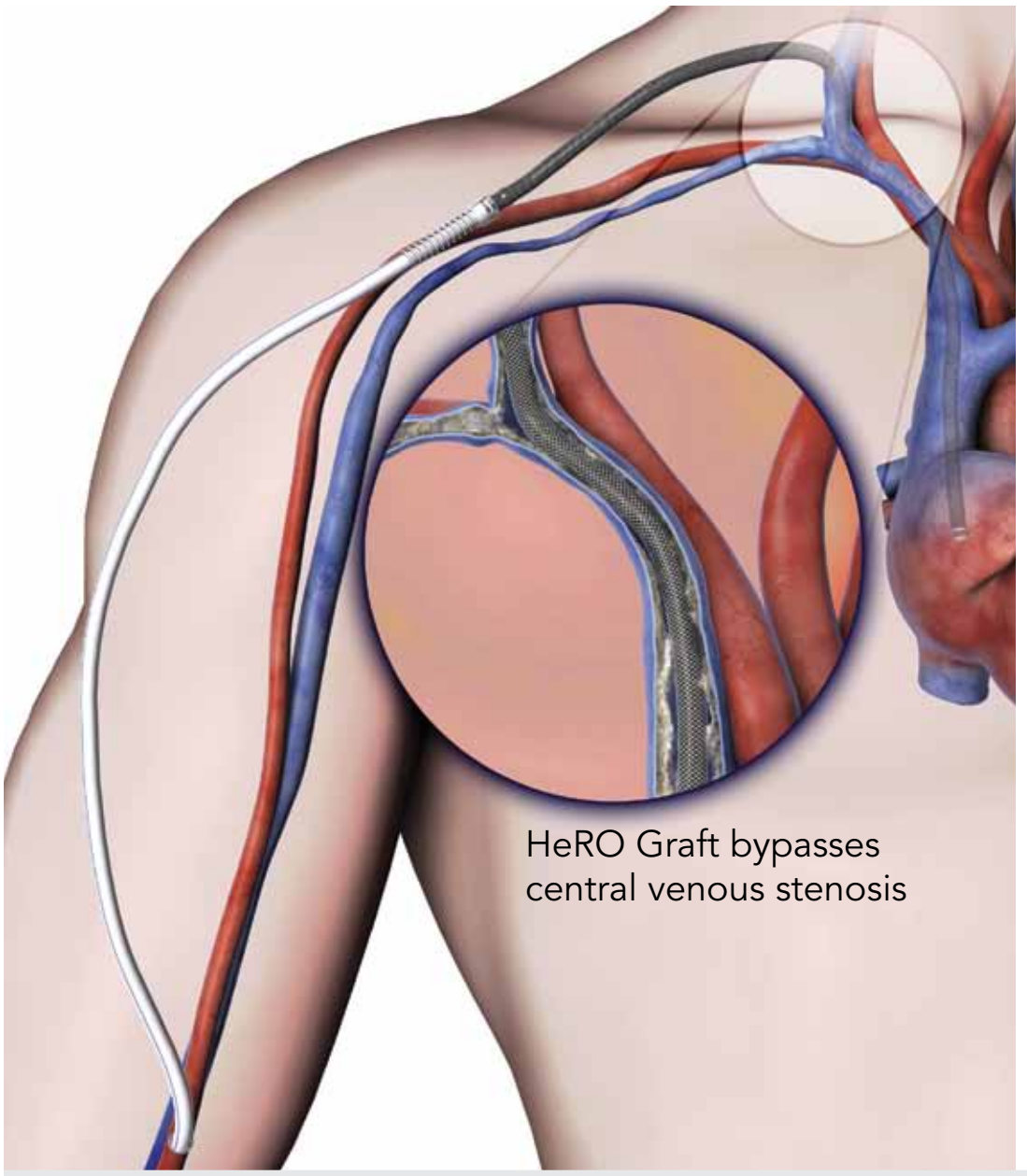

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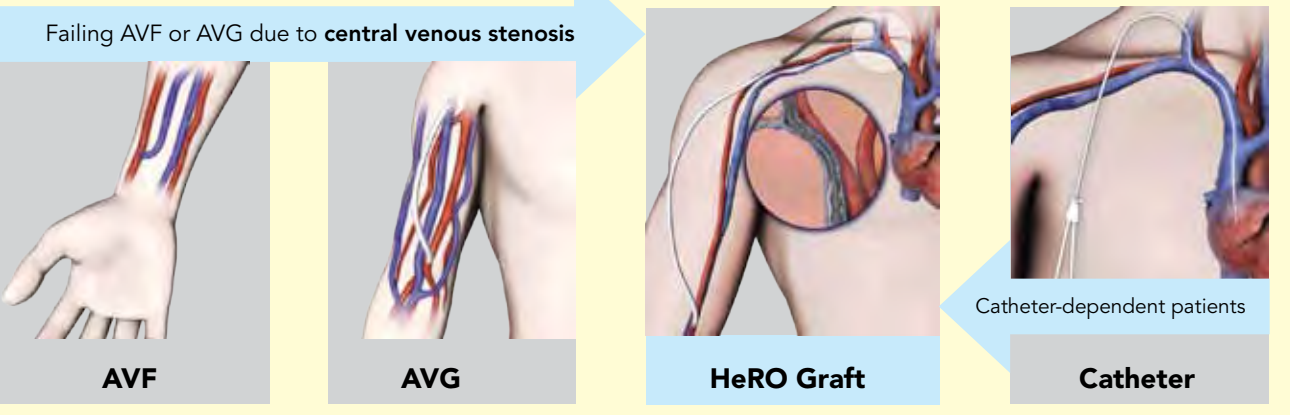


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1) Katzman et al., J Vasc Surg 2009. 2) Gage et al., EJVES 2012. 3) Dageforde et al., JSR 2012.

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