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ASN 50 years

Kidney News

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Higher Rates of Preventive Care Seen for Dialysis Patients Who Visit Primary Care Physicians

By Tim O'Brien

Can dialysis patients benefit from having a primary care physician (PCP) or a more patient-centered approach to care? Updated data from a study presented at Kidney Week 2015 suggest improvements in some aspects of preventive care associated with PCP involvement.

Although most dialysis patients say they have visited a PCP in the previous year or two, at least one-third have not. That suggests opportunities to improve the outcomes and costs of care for ESRD, according to the new research by Vahakn B. Shahinian, MD, and colleagues of the University of Michigan.

Meanwhile, new approaches to providing more comprehensive care are emerging, including a patient-centered medical home (PCMH) project being evaluated by Anna Porter, MD, and colleagues at the University of Illinois at Chicago (UIC).

Shahinian and colleagues used US Renal Data System data to explore patterns of PCP involvement in the care of dialysis patients. "We know that the chronic dialysis population has a high illness index, and a lot of that comes not only from the dialysis issues, but because of the constellation of comorbidities that they have," Shahinian said.

"We wanted to get a national snapshot of how often these patients were seeing primary care physicians in addition to their nephrologist, and then, secondarily, whether that had any kind of impact on the kind of care that they were getting." The analysis included nearly 250,000 Medicare beneficiaries on chronic dialysis during 2012 and 2013.

Overall, 63 percent of patients had one or more claims for an outpatient visit to a family practitioner, general internist, or geriatrician in the past year. Patients with PCP involvement were more likely to have diabetes as the primary cause of ESRD: about 46 percent compared with 38 percent of those without PCP involvement. Patients who saw a PCP were also older (mean age of 58 versus 53 years old) and more likely to be women and white.

Specific aspects of preventive care were more likely to be in evidence for patients who saw a PCP. For diabetic patients, rates of hemoglobin A1c testing, lipid measurement, and diabetic eye ex-

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Nephrology Fellows Perceive Job Market as Mixed, Challenging in 2015

By Kurtis Pivert

Nephrologists entering practice in 2015 encountered a mixed job market, according to the latest report authored by George Washington University (GWU) and published by the American Society of Nephrology. GWU's analysis of the 2015 Nephrology Fellows Survey noted job search experiences continued to differ substantially between US medical graduates (USMGs) and international medical graduates (IMGs), the latter comprising the majority of physicians choosing the specialty (1).

"The 2015 survey of nephrology fellows found the job market continues to be challenging, especially so in communities near training programs and for IMGs, many of whom are seeking positions in designated underserved areas," said GWU's Edward Salsberg.

Now in its second year, the annual fellows survey is an important component of ASN's ongoing collaboration with GWU to analyze the nephrology workforce. Data garnered in the survey can provide advanced indicators for future physician supply and uncover potential trends for regional and national demand for kidney care. "Workforce

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Inside

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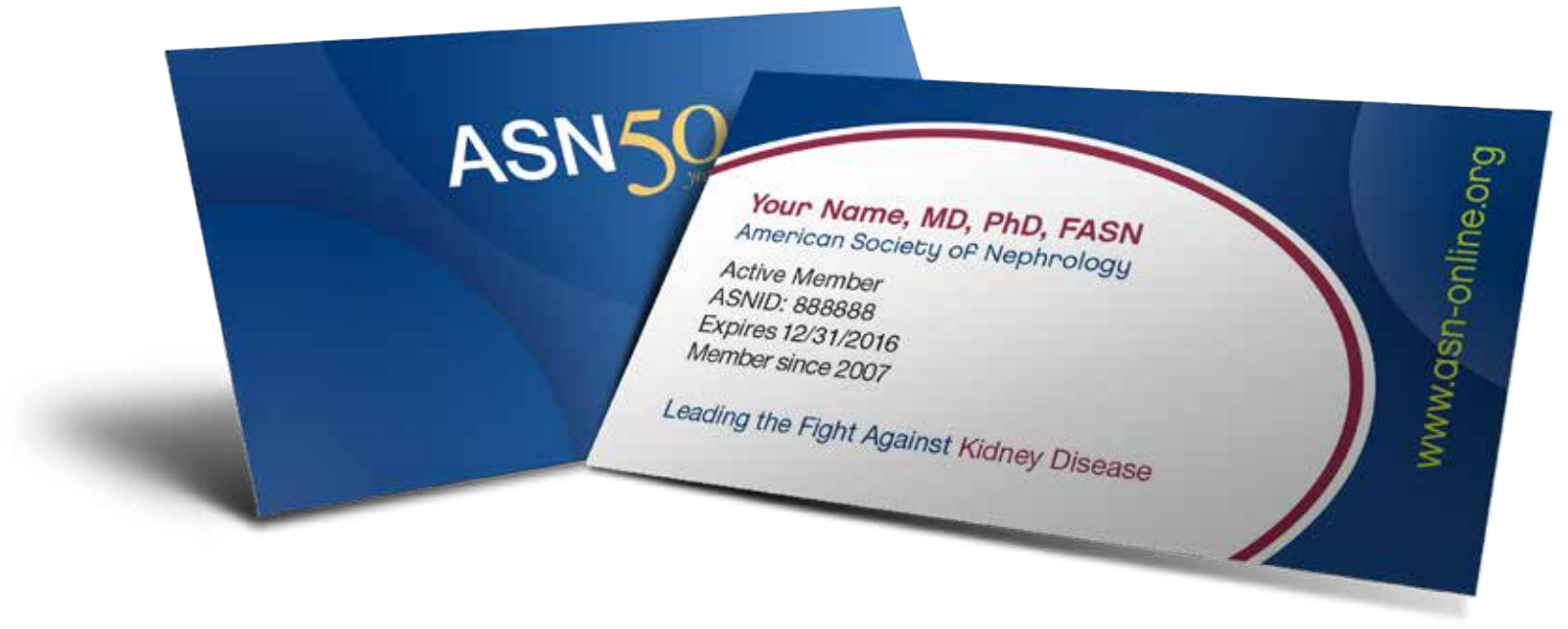

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Job Market

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data collection and analysis are key to informing ASN's efforts to ensure Americans with kidney diseases receive the specialized care only a nephrologist can provide," said ASN President Raymond C. Harris, MD, FASN.

A mixed employment outlook in 2015

The overall survey response rate in 2015 (38.1%) was a slight improvement over last year (35.8%). Respondents' demographic characteristics closely mirrored those of all nephrology fellows according to the most recently available data from the Accreditation Council for Graduate Medical Education (ACGME), the definitive source. Both the survey participants and the total ACGME nephrology fellow population were mostly male and IMG (60.4 percent and 64.8 percent, respectively).

Overall, IMGs tended to be older and have less educational debt than USMGs. While USMG respondents were evenly split between the sexes, women only accounted for a third of IMG fellows.

Of the 91 respondents entering the workforce, most planned to join a group practice (60.6 percent) followed by academic practice (20.2 percent). Contrary to anecdotal evidence, only 8 fellows planned to work as a hospitalist (9 percent); only 1 respondent (1 percent) indicated planning to work for a dedicated dialysis provider. Starting salaries in 2015 were flat compared to 2014, with expected median income ranging between $175,000 and $199,999.

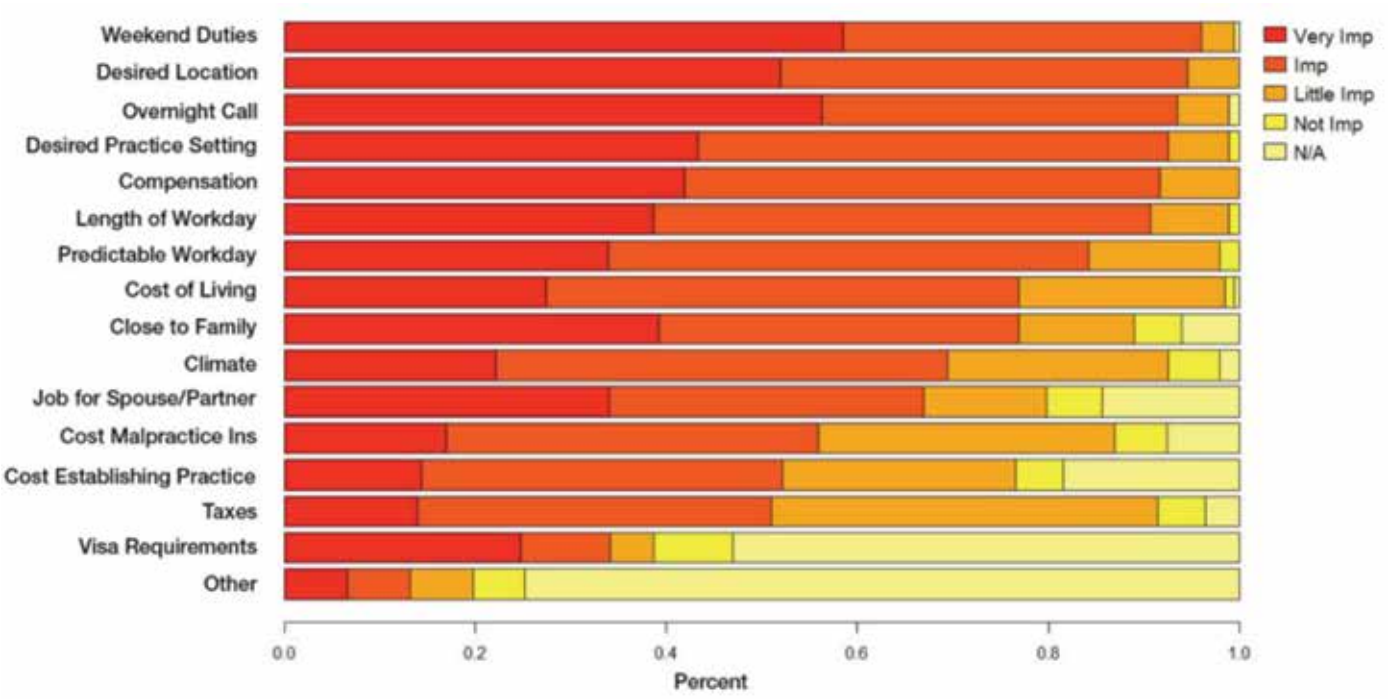
The percentage of fellows having difficulty finding a satisfactory position rose slightly in 2015, both overall and by educational status. Despite applying for more positions than USMGs, IMGs were more likely to report changing their practice plans this year, most likely due to visa issues.

"The overall job market picture for nephrology fellows remained mixed in 2015. Most fellows saw the nationwide job market as stronger than their local job markets, and IMG fellows seemed to have an especially difficult time finding satisfactory positions," said lead author Leah Masselink, PhD.

Quality of life issues remained key determinants when fellows assessed employment opportunities. As in 2014, a job in a desired location continued to be of importance, as well as the volume of weekend duties and frequency of overnight call (Figure 1).

"The bottom line is that there are good jobs for nephrologists but they may be in areas and settings that are not the first choice of graduates," said Salsberg.

Figure 1. Factors influencing job selection



Abbreviations: Imp = important. N/A = not applicable.

Recommending nephrology as a career

Despite a challenging employment environment, a majority of respondents (71.8 percent) would recommend nephrology to students and residents. "Most fellows—both IMGs and USMGs—were glad they chose to be nephrologists because of the variety and intellectual challenge the specialty offers," said Masselink.

Among the reasons to recommend nephrology, fellows indicated the opportunity to build long-term patient relationships and apply learned knowledge, as well as the balance and breadth of procedures and work environments. Those who wouldn't recommend nephrology often cited a poor work-life balance, lower compensation than other specialties, and a lack of jobs in desired locations.

Future GWU research

GWU investigators will continue monitoring trends for both the current workforce (through analysis of AMA Masterfile data) and the future workforce (through the Nephrology Fellows Survey). In particular, Salsberg, Masselink, and their colleagues will focus on supply and demand issues in 2016. GWU will model potential supply scenarios in collaboration with UNC Sheps Center for Health Services Research. They will also conduct an analysis of Medicare claims data and examine new kidney care delivery models to determine their effects on future demand for nephrologists.

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examination were all higher with PCP involvement. About one-third of diabetic patients with PCP involvement received all three tests compared with less than one-fourth of those who had not seen a PCP.

Primary care involvement was also associated with a higher rate of influenza vaccination: 76 percent versus 64 percent.

Delivery of recommended primary care is a key component of efforts to improve health care quality and value. The new results suggest that, although most chronic dialysis patients do continue to see a general internist or other PCP, a substantial minority do not: 30 to 45 percent depending on the definition of PCP involvement used. The findings also draw attention to the need to improve some aspects of care—especially recommended testing for patients with diabetes, which remains suboptimal even for patients who see a PCP.

Could primary care involvement affect other ESRD outcomes as well? "That's the next big question, is to see how much of an impact does it have to have a PCP," Shahinian said. "Do these patients live longer if they have a primary care physician involved? That's certainly something that we are planning to look at moving ahead." The researchers are also interested in looking at other outcomes, such as hospitalization and health care costs.

But there will be challenges to performing such analyses. "We know that patients who have PCPs are somewhat older and are more likely to have comorbidities ... It will require quite a bit of statistical adjustments in order for us to really try to get at the actual impact of having a PCP or not on the outcome."

A medical home for ESRD

The snapshot of PCP involvement in care of dialysis patients will be "unsurprising to most nephrologists," commented Porter. "All nephrologists in practice who see dialysis patients have the impression that the patients absolutely need primary care physicians and that having a PCP would really help improve the health and quality of life of these patients."

"And even though it's sort of intuitive ... there really isn't a lot of good information out there about how to facilitate [increased] PCP involvement," she added. One factor is that patients do not necessarily understand the importance of having a PCP.

"But beyond that it's so difficult and burdensome for these patients when they're seeing a physician on dialysis once a week and the burden of their dialysis treatments themselves is consuming such a huge chunk of their time."

Porter and colleagues of the Institute of Health Research and Policy at UIC are testing a PCMH for patients with kidney disease, with funding from the Patient-Centered Outcomes Research Institute (PCORI). Denise Hynes, PhD, is the principal investigator.

The project "adds a few members" to the usual dialysis care team of dialysis nurse, technician, social worker, and dietician, according to Porter. "We have a primary care physician who comes to the dialysis unit and sees the patients. We also have a pharmacist who rounds with the team and an advanced practice nurse who's available for patient care issues."

The PCMH team also includes some health promoters. "The health promoters are lay people who have been trained in acting as care liaisons and helping patients to negotiate whatever health challenges they're having," Porter explained. For example, "[i]f they're having difficulty taking their medications or scheduling follow-up appointments, the health promoters can help them with those things."

The PCMH approach is being evaluated at a freestanding university-affiliated dialysis center and a nearby Fresenius unit. An 18-month evaluation is planned in the spring of 2016, focusing on outcomes, such as quality of life and emergency department visits.

Porter noted that the PCORI-funded project is not collecting data on cost savings. "But certainly that is an intuitive thing that would result from better coordination of care," she added.

Shahinian mentioned the Comprehensive ESRD Care Model being evaluated as a demonstration project by the Centers for Medicare & Medicaid Services. The project has implemented 13 ESRD Seamless Care Organizations nationwide to evaluate a payment and care delivery model specific to ESRD. Nephrologists and other team members will work as a group to provide a "more holistic kind of care," according to Shahinian: "Not just limited to dialysis aspects of care, but also these more general preventive care and primary care aspects as well."

The project will evaluate per capita Medicare expenditures as well as beneficiary health outcomes. "If there's an expectation that dialysis facilities and the nephrologists and the whole team there is going to provide primary care or preventive care, then it might require some change in the way current quality of care initiatives are being done and how reimbursement is done," Shahinian said.

"So much of the focus right now is on dialysis and dialysis quality," Shahinian added. "There might need to be a shift toward incentivizing and reimbursing the dialysis providers for providing these additional aspects of care."

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Advocacy for Basic Research in Nephrology

By Vivek Bhalla, Anupam Agarwal, Kurt Amsler, Christian Faul, Kenneth Hallows, Alicia McDonough, Lilach Lerman, James McCormick, Jeffrey Miner, and Pamela Tran, on behalf of the Biosciences Research Advisory Group of the American Society of Nephrology

Practicing nephrologists and physician scientists have borne witness to the lack of new therapies for the majority of patients suffering from kidney disease. For example, compared with progress made in treating other types of acute organ injury (e.g., acute coronary syndrome and acute respiratory distress syndrome), new therapeutics for acute kidney injury have been absent for the past several decades (1). Moreover, the last Food and Drug Administration (FDA)-approved therapy for diabetic nephropathy, the most common cause of ESRD, was announced 14 years ago (2, 3), and despite several advancements in the materials used for hemodialysis, the prescription for dialysis management today remains similar to that of the 1980s.

While our patients await new therapies, we too face a crisis that threatens our field. The American Society of Nephrology (ASN) recently issued the results of a multifaceted report on the numbers of nephrologists and nephrology trainees (4), showing that interest in nephrology as a medical subspecialty has fallen. This report underscores what nephrology faculty at academic institutions observe each year during fellowship interviews. Specifically, the number of internal medicine residents seeking careers in nephrology has been declining in recent years, despite the increasing prevalence of chronic kidney disease. Although there was a slight increase in the number of fellowship applicants preferring nephrology in the 2016 match, the numbers of unfilled positions and unfilled nephrology programs in the match have steadily risen over the last 8 years (5). Compared with other medical subspecialties, nephrology is losing the recruitment battle (6).

In parallel with the pursuit of clinical nephrology, publication of nephrology-related research has waned (7). Al-Awqati (7) recently tabulated the number of articles related to nephrology in major scientific journals, such as the *Journal of Clinical Investigation, Nature, Nature Genetics*, and the *New England Journal of Medicine*. The results are clear: the number of nephrology-related research publications peaked in the 1970s and 1980s and has subsequently declined annually, whereas manuscripts from other subspecialties (e.g., cardiology and gastroenterology) have increased.

To generate interest in nephrology and to develop new therapies, ASN recognizes that we must encourage cutting edge research in nephrology not only among medical students, residents, and fellows but importantly, among PhD students and postdoctoral fellows. Clearly, kidney-related research has an image problem among basic scientists. Incoming graduate students choose research fields like human genetics, cancer biology, stem cells, and neurobiology, and few of them have the kidney on their radar.

Perhaps basic scientists are similar to the average American, "kidney clueless," as recently documented by a survey from the National Kidney Foundation (8). Basic scientists outside nephrology may not be cognizant of the dimensions of kidney disease, the lack of novel mechanism-based therapies, and the existence of huge knowledge gaps that are consequential both for patients desperate for novel treatments and for establishing excellent scientific niches toward building an independent research career in translational medicine. Furthermore, even if PhD students consider a career in kidney research, they will certainly be aware of the higher rates of National Institutes of Health (NIH) funding for studies of other chronic illnesses. In 2013, the NIH supported HIV/AIDS research with $2.9 billion and cancer research with $7.5 billion, whereas research on kidney disease received only $591 million dollars. This represents only $29 of research funding for a patient with kidney disease compared with other devastating diseases, such as AIDS or cancer ($2978 or $568 per patient, respectively) (9). Who can blame today's graduate students for choosing a research field with the highest levels of NIH support to build a scientific career? If general awareness as well as funding for kidney research increases, then so would the numbers of basic scientists choosing the field of nephrology, research output, and most important, the likelihood of identifying novel drug targets. Until then, kidney research will continue to play in the academic minor league.

However, there is reason for optimism. Nephrology has seen several major breakthroughs in the past several years. Identification of phospholipase A2 as the elusive autoantigen for idiopathic membranous nephropathy (10) has sparked several new studies and a clinical test for this common cause of nephrotic syndrome. Geneticists focused on the kidney have shaped our understanding of the pathogenesis of hypertension (11, 12), nephrotic syndrome (13), and chronic kidney disease (14). Just last year, scientists announced a rapid method for deriving proximal tubular cells from human-induced pluripotent stem cells for drug screening (15) and a method for the growth of three-dimensional kidney organoids in the laboratory (16). Additionally, the promise of new artificial kidneys and the commitment of the FDA to support research in this area may be transformative for the field (17). Change is on the way because of advances made through basic science research in nephrology and the bridging of this research to other disciplines. These advances provide hope for novel therapies for our patients.

As shown by the breakthroughs listed above, scientists working in biology, chemistry, physics, and engineering have the potential to influence/transform nephrology care, and the ASN must recruit and retain minds—young and old—in these disciplines. As part of this larger effort, ASN has made a commitment to fund nephrology research through the Foundation for Kidney Research (www.asn-online.org/foundation/) (18). In part due to advocacy by the ASN, Congress has also increased the 2016 budget for NIDDK by $68 million. To advocate for basic research and ensure that PhD researchers feel welcome and integrated within ASN, the society held a PhD Summit in 2013 that led to positive changes in ASN's efforts to meet the special needs of PhDs in a mostly clinical society. One outcome was the inclusion of PhD students in the Kidney STARS Program on par with medical students, and basic scientists have stepped up to serve as mentors for these young investigators during Kidney Week. ASN has also made an effort to reach out to more basic science-oriented societies (e.g., the American Society for Cell Biology and the American Physiological Society) to attract basic scientists to nephrology research.

As scientists and concerned ASN members, we encourage everyone, particularly those involved in basic nephrology research, to engage with basic scientists both within the ASN community and in the greater scientific community to attract the best and brightest to nephrology research. We believe that the future is bright for nephrology research, with forthcoming major advances in our understanding of basic physiologic processes and development of novel therapeutics to ameliorate and, it is hoped, cure a range of kidney diseases. However, this will only happen if we devote the attention, manpower, and financial resources that this field requires and deserves.

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The Nephrology Elective Experience and Careers in Nephrology

The trend of declining interest in nephrology as a career is of great concern to the nephrology community. Medical education and the nephrology elective experiences that students and residents have may have important influences on career choice, and there have been proposals to introduce new elective models to help provide students and residents with a more representative experience in nephrology (1). A recent study found that nephrology elective experiences continue to be heavily inpatient based, despite the wide spectrum of outpatient experiences in which a practicing nephrologist engages (2).

For this article, *ASN Kidney News* Editorial Board member Joseph Mattana interviewed Dr. Aditya Kadiyala, a practicing nephrologist, who was a fellow at the time he coauthored the recently published study examining the nephrology elective experience (2), and Dr. Joonho Park, a third-year resident who is pursuing a career in nephrology, about their experiences and their thoughts on nephrology elective experiences and choosing a career in nephrology.

Why do you think there has been declining interest in nephrology careers, and what led you to choose nephrology as a career?

Kadiyala: I think there are a few reasons for declining interest in nephrology careers. Some of the major reasons include low reimbursements for nephrologists, decreasing job opportunities, and lack of proper exposure to the field of nephrology during medical school and residencies. I chose nephrology mainly because of my interest in electrolytes, acid–base disorders, and glomerular diseases. My prior experience doing research in the field of kidney transplantation and my elective rotations during residency reinforced my interest to pursue nephrology as a career.

Park offered a similar viewpoint on the reasons for declining interest and the factors that led him to choose nephrology as a career.

Park: From my perspective, the declining interest in nephrology has been driven primarily by limited financial opportunities. Most of my colleagues and I worry about our crushing student debt and our ability to meet lifelong financial goals. The opportunity cost of 2 years of fellowship training at this point in our lives, in addition to the threat of still making less than hospitalists after graduation, is a powerful driver away from nephrology. Another aspect of the same problem is the poor availability of jobs in desirable geographic locations. My choice to pursue nephrology was based on my enjoyment of the scope of practice, building long-term relationships with patients, and willingness to move to locations that are less "physician dense" to gain better compensation. Although hospitalists still earn a better salary for hours worked in remote locations, I know that I will be able to fulfill my financial goals while practicing in a field I find intellectually stimulating.

How important are nephrology electives in influencing career choice?

Kadiyala: I think nephrology electives have a huge influence in career choice among residents. Electives give them firsthand experience in understanding the various clinical aspects of nephrology, like long-term dialysis, kidney transplantation, and chronic kidney disease (CKD) management, apart from more routine clinical problems like acute kidney injury and electrolyte disturbances, which they also encounter during their ward rotations. This gives a comprehensive view of nephrology and may generate further interest in nephrology.

Park was also strongly influenced by elective experiences in nephrology and describes the important role of having ample exposure to outpatient nephrology during those rotations.

Park: My nephrology electives were paramount in my decision to pursue a career in the field. Working with physicians in the hospital on a consultation service is very rewarding from an educational perspective. However, working with a physician in an office setting and being able to participate in long-forged physician–patient relationships between nephrologists and dialysis patients is a completely different experience. The ideals of compassionate medical care, continuity, trust, and mutual respect were best exemplified by the interactions in the outpatient setting.

Park also pointed out that the level of interest in nephrology before an elective experience may have an effect on the impact of the elective experience.

Park: The distinction should be made that I already had a proclivity toward a career in nephrology during medical school before my nephrology elective. An outpatient experience by a medical student without an intellectual interest in nephrology may not have the same impact.

What was your own experience with nephrology electives as a student and/or resident, and did it influence you in choosing nephrology?

Kadiyala: Although I did not pursue nephrology rotations as a student, I rotated twice in nephrology during my residency. During my first rotation in nephrology as a second-year resident, I dealt with routine electrolyte disorders, acute kidney injury, and inpatient management of CKD. I also learned how dialysis works and got to know about the functionality of the fascinating hemodialysis machine. I also rounded with the fellows and was able to get a glimpse of the daily routine of a nephrology fellow and a nephrology attending. My second elective rotation as a third-year resident was more comprehensive. I saw more complex patients in the Intensive Care Unit, posttransplantation recipients, and patients receiving short-term dialysis and continuous renal replacement therapy.

Consistent with the findings of the study on the nephrology elective experience, Kadiyala pointed out that although he enjoyed his experiences, they were based only on inpatients, and he could not attend renal clinics or have other outpatient experiences.

Both Kadiyala and Park also emphasized that in addition to the intellectual stimulation of nephrology, their personal contacts with faculty and fellows had an important influence on them.

Kadiyala: My interaction with the fellows and faculty on a one-to-one basis certainly helped me to learn and understand the concepts better [and this] reinforced my thoughts of pursuing a career as a nephrologist.

Park: My experiences in my nephrology electives during my fourth year of medical school and residency reinforced my desire to become a nephrologist. The personalized education I received from my preceptors, including didactic and bedside teaching on nephrology topics, was intellectually stimulating and inspiring.

Were you surprised by the study's findings that most nephrology electives were primarily or exclusively inpatient based?

Kadiyala: No, not really. My nephrology elective as a resident was inpatient based. My other colleagues (during my fellowship) who trained at various programs in the United States had mainly inpatient-based electives during their residency. It is a fact that most residents do not get exposed to any outpatient nephrology experiences because there is no requirement for it during their electives, and that is what the study showed. Organizing an outpatient-based curriculum is understandably very difficult because it takes a lot of coordination between many parties and requires sacrifice from preceptors.

Park: [There are often service needs on inpatient services and] students and residents can contribute by gathering history and compiling information on a consult service.

In addition, Park said additional teaching in the outpatient setting could be viewed negatively by some, noting that "attending physicians are generally very busy in the outpatient setting, and student involvement will likely slow down patient turnover."

Why do you think it is important to include outpatient experiences in nephrology electives?

Study coauthor Kadiyala points out that much of what a nephrologist does today takes place in the outpatient setting and that inpatient-based electives do not provide a representative exposure to nephrology.

Kadiyala: Outpatient nephrology clinics along with outpatient dialysis are a big part of a nephrologist's career. Patients in those settings are also less sick. I strongly believe that management of CKD in an outpatient is a major part of nephrology that residents should get exposed to. Taking all these into consideration, I believe the residents get a completely different picture about nephrology when outpatient experiences are included in their electives."

Do you think that nephrology electives are a good opportunity to begin mentoring experiences for students and residents?

Kadiyala: Elective experiences give a very good opportunity for residents and students to interact with faculty and fellows on a one-to-one basis. Attending didactic lectures, biopsy conferences, and journal clubs during the electives would certainly enhance interest among the trainees. Electives are a good time for residents to pursue any research ideas they have thought about and also to find the right mentors to guide them.

Park: I believe every interaction between an attending physician and a student or resident or fellow is an opportunity for mentorship. Electives may have an advantage over other rotations because students who are already interested in the field have been self-identified, and more time is available for personalized mentorship.

Aside from introducing more outpatient experiences and promoting mentoring, what changes in the nephrology elective experience do you think would be most likely to increase interest in the field by students and residents?

Kadiyala: The other things that would likely increase interest would be 1) rotating in subspecialties in nephrology, like kidney transplantation and interventional nephrology; 2) exposure to procedures in nephrology like dialysis catheter insertions and kidney biopsies; and 3) involvement in didactics and conferences during their electives."

Park provided a cautionary note, however, and made the point that much more must be done beyond nephrology elective experiences to promote interest in the field.

Park: When nephrology fellows voluntarily take jobs as hospitalists after graduation, demoralization occurs in a top-down fashion, and a very obvious message is sent to residents and medical students. Positive changes in the reimbursement model or work–life balance will stimulate greater interest in nephrology.

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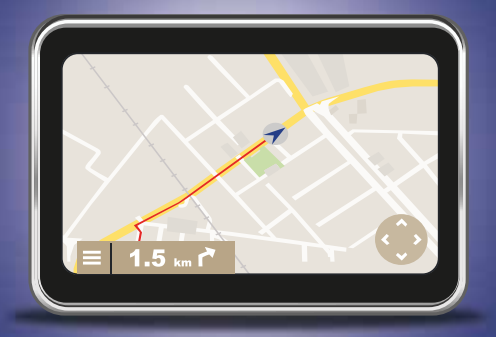

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Findings

Prediabetes a Risk Factor for Hyperfiltration and Albuminuria

Prediabetes is independently associated with glomerular hyperfiltration and an increased albumin-creatinine ratio (ACR) at medium-term follow-up, reports a study in *The New England Journal of Medicine*.

The study included a general population sample of 1261 white, middle-aged adults from the Renal Iohexol Clearance Survey in Tromsø 6 (RENIS-T6) and the RENIS Follow-Up Study. All subjects underwent measurement of glomerular filtration rate (GFR) by iohexol clearance. The presence of prediabetes was assessed from fasting glucose and hemoglobin A1c levels, according to criteria of the American Diabetes Association (ADA) and the International Expert Committee of 2009 (IEC).

Patients were followed up for a median of 5.6 years. Prediabetes was assessed as a risk factor for change in measured GFR; hyperfiltration, defined as GFR over the 90th percentile adjusted for age, sex, weight, and height; and high-normal ACR of greater than 10 mg/g at follow-up.

Prediabetes was present in 595 individuals based on ADA criteria and 169 based on IEC criteria. In multivariable analyses, both definitions of prediabetes were associated with a higher measured GFR at follow-up and with a lower annual rate of decline in GFR. Based on the IEC definition, odds ratios were 1.95 for hyperfiltration and 1.83 for high-normal ACR. The associations remained significant after adjustment for blood pressure and other baseline cardiovascular risk factors, as well as for changes in antihypertensive medication during follow-up.

Prediabetes is cross-sectionally associated with chronic kidney disease—however, it is unclear whether prediabetes predicts CKD in people who do not develop diabetes. The new study, using measured rather than estimated GFR, suggests an independent role of prediabetes in the development of glomerular hyperfiltration and albuminuria. If the results are confirmed by further studies, early treatment for prediabetes might help to lower the burden of CKD in diabetes [Melson T, et al. Prediabetes and risk of glomerular hyperfiltration and albuminuria in the general nondiabetic population: a prospective cohort study [*Am J Kidney Dis* 2015 Dec 16. pii: S0272-6386(15)01389-X. doi: 10.1053/j.ajkd.2015.10.025].

Kidney Failure Risk Scores Show Good Accuracy Worldwide

Although a calibration factor is sometimes needed, equations for predicting kidney failure risk developed in Canada perform well in widely varying world populations, concludes a study in *The Journal of the American Medical Association*.

Kidney failure risk equations developed and validated in Canada were further validated in 31 cohorts participating in the Chronic Kidney Disease Prognosis Consortium. Those cohorts included more than 720,000 participants with stage 3 to 5 CKD from 30 countries, with data collected from 1982 through 2014. New pooled risk equations were developed to compare with the original risk equations for prediction of kidney failure (dialysis treatment or kidney transplant). Two calibration factors were developed to address regional variations in risk.

The analysis included nearly 24,000 cases of kidney failure developing over a median four-year follow-up. The original Canadian equations showed very high discrimination of patients who developed kidney failure, with C statistics of 0.90 at two years and 0.88 at five years. Discrimination was also excellent in subgroups defined by age, race, and diabetic status, and was not further improved with the use of the pooled equations.

The Canadian risk equations showed good calibration in North American populations, but overestimated risk in some cohorts from other continents. With use of a calibration factor that lowered baseline risk by 32.9 percent at two years and 16.5 percent at five years, calibration improved in most non-North American cohorts.

Kidney failure risk equations can play an important role in targeting high-risk CKD patients for optimized nephrology care. The new study suggests that risk equations developed in a Canadian population accurately predict two- and five-year probability of kidney failure in international cohorts with differing characteristics. A calibration factor improves performance in some non-North American populations [Tangri N, et al. Multinational assessment of accuracy of equations for predicting risk of kidney failure: a meta-analysis. *JAMA* 2016; 315:164–174].

Sclerostin Predicts Arterial Calcification in ESRD

The osetocyte-derived bone formation inhibitor sclerostin predicts vascular calcification in patients with end stage renal disease (ESRD), according to a study in *Kidney International*.

The researchers measured serum sclerostin levels in 89 patients with ESRD, mean age 48 years, who had undergone epigastric artery biopsy. Circulating sclerostin levels were significantly higher in the 37 patients who had moderate to extensive vascular calcification, compared to the 52 with no or minimal calcification. Patients with a coronary artery calcification score of 100 or higher also had higher sclerostin levels: 559 versus 367 pg/mL, respectively.

Serum sclerostin was correlated with patient age, intact parathyroid hormone and bone-specific alkaline phosphatase levels, and percent calcification. On multivariate analysis, sclerostin, age, and male sex were all independently associated with medical vascular calcification.

On receiver operating characteristic curve analysis, sclerostin was a significant predictor of vascular calcification, with an area under the curve of 0.68. There was little or no expression of vascular sclerostin mRNA and protein, suggesting that vascular-derived sclerostin in not a major contributor to circulating levels.

Recent evidence suggests that sclerostin may be an important contributor to vascular calcification and bone disorders associated with chronic kidney disease–mineral and bone disorder (CKD-MBD). The new results show that high serum sclerostin levels are associated with several measures of increased vascular calcification in ESRD patients.

Of several circulating CKD-MBD biomarkers evaluated, sclerostin is the only one that predicts vascular calcification. The authors discuss the implications for understanding the development of arterial calcification in kidney disease [Qureshi AR, et al. Increased circulating sclerostin levels in end stage renal disease predict biopsy-verified vascular medial calcification and coronary artery calcification. *Kidney Int* 2015; 88:1356–1364].

Does Immunosuppression Improve Outcomes in IgA Nephropathy?

For high-risk patients with IgA nephropathy, adding immunosuppression to intensive supportive care doesn't improve clinical outcomes—but does increase the rate of infections and other serious adverse effects, reports a trial in *The New England Journal of Medicine*.

The randomized, open-label trial included 337 patients with IgA nephropathy at 32 German nephrology centers. Three hundred nine patients completed a six-month run-in phase in which supportive care was adjusted according to proteinuria. In 94 patients, urinary protein excretion decreased to less than the target level of 0.75 g/d.

One hundred sixty-two patients with persistent proteinuria were randomly assigned to three years of supportive care alone or supportive care plus immunosuppressive therapy. Two primary endpoints were compared between groups: full clinical remission and at least a 15 mL/min/1.73 m^2 decrease in estimated glomerular filtration rate.

At three years, full clinical remission occurred in five percent of patients with supportive care only and 17 percent with supportive care plus immunosuppressive therapy. This difference was entirely related to remission of proteinuria: nine patients in the supportive care group and 20 in the immunosuppression group. Rates of the threshold decrease in eGFR were 28 and 26 percent, respectively, with no significant decrease in the annual rate of eGFR decline.

Patients receiving immunosuppressive therapy had more adverse events, including severe infections, impaired glucose tolerance, and weight gain of more than 5 kg. There was one case of fatal sepsis in the immunosuppression group.

Some evidence supports the use of immunosuppressive therapy for patients with IgA nephropathy. This three-year trial finds no substantial kidney-related benefit of adding immunosuppression to intensive supportive care for high-risk IgA nephropathy. Immunosuppressive therapy also has significant adverse effects, including a risk of severe infections [Rauen T, et al. Intensive supportive care plus immunosuppression in IgA nephropathy. *N Engl J Med.* 2015; 373:2225–2236].

What's the Fracture Risk after Kidney Transplantation?

Analysis of population-based data questions whether kidney transplant recipients are truly a "high-risk" group for fractures, reports a study in *Transplantation*.

Using Ontario healthcare databases, the researchers estimated cumulative rates of proximal humerus, forearm, and hip fractures at three, five, and ten years after kidney transplantation. These and other fracture outcomes were assessed in 4821 adult transplant recipients, median age 50 years, stratified by sex and age.

Female kidney recipients aged 50 years or older had the highest three-year cumulative incidence of nonvertebral fractures: 3.1 percent. In the overall sample of transplant recipients, three-year fracture incidence was 1.6 percent. That was significantly higher than the 0.5 percent rate in the general population with no previous nonvertebral fractures or the 1.1 percent rate among patients with chronic kidney disease not receiving dialysis.

However, the fracture incidence for kidney transplant recipients was lower than the 2.3 percent rate among the general population with previous nonvertebral fracture. For all kidney recipients, the 10-year cumulative incidence of hip fracture was 1.7 percent, compared to the 3.0 percent cutoff point defined as "high risk" in current clinical guidelines. The three-year cumulative incidence of falls among all transplant patients was 7.9 percent, increasing to 11.1 percent for women aged 50 or older.

Kidney transplant patients have sometimes been considered a group at high risk for fractures, although reported rates vary widely. The new analysis suggests that, while relative fracture risk is higher than in other populations, the absolute risk appears low. The researchers write, "[D]espite the changes in mineral metabolism and the use of steroids after kidney transplantation, recipients may not be a high-risk group for fracture" [Naylor KL, et al. Fracture incidence in adult kidney transplant recipients. *Transplantation* 2016; 100:167–175].

In Kidney Donors, Reduced GFR Is Cardiovascular Risk Factor

The reduction in glomerular filtration rate (GFR) after living kidney donation is associated with increased left ventricular mass and other changes in cardiovascular structure and function, reports a study in *Hypertension*.

The study included 68 living kidney donors and 56 non-donor controls enrolled in the UK prospective Chronic Renal Impairment in Birmingham–Donor study. Potential adverse structural and functional cardiovascular effects associated with unilateral nephrectomy were assessed. The primary outcome was change in left ventricular mass from baseline to 12 months, assessed by magnetic resonance imaging.

Twelve months after nephrectomy, living kidney donation was associated with a 30 mL/min/1.73 m^2 decrease in isotopic GFR. Left ventricular mass increased by 7 g in the donors, compared to a 3 g decrease in controls. Living kidney donors also had a significant increase in left ventricular mass to volume ratio, and significant decreases in aortic distensibility and global circumferential strain.

Living kidney donors were more likely to develop detectable levels of highly sensitive troponin T and microalbuminuria: odds ratio 16.2 and 3.8, respectively. There were also significant increases in serum uric acid, parathyroid hormone, fibroblast growth factor-23, and high-sensitivity C-reactive protein, but no change in ambulatory blood pressure. The increase in left ventricular mass was independently related to the decrease in isotopic GFR.

Living kidney donation is associated with a lasting reduction in GFR; the long-term effects on cardiovascular risk are unclear. The new study provides evidence of adverse left ventricular remodeling in donors with reduced renal function after unilateral nephrectomy. Reduced kidney function "should be regarded as an independent causative cardiovascular risk factor," the investigators conclude [Moody WE, et al. Cardiovascular effects of unilateral nephrectomy in living kidney donors. *Hypertension* 2016; 67: 368–377].

NIDDK Director Griffin P. Rodgers Honored for Sickle Cell Research

Griffin P. Rodgers, MD, MACP, director of the National Institute of Diabetes and Digestive and Kidney Diseases, was named a 2015 finalist for the Samuel J. Heyman Service to America Medals, recognizing his dedication to progress in the treatment of sickle cell disease (SCD). Known as the "Sammies," the Heyman awards recognize federal employees for their "noteworthy and inspiring accomplishments." That description certainly applies to Rodgers, a hematologist who has served as NIDDK director since 2007.

The honor reflects Rodgers' career achievements in research on treatments for SCD. Beginning in the mid-1980s, he led studies demonstrating the effectiveness of hydroxyurea treatment for SCD. Since then, hydroxyurea—the only drug approved by the Food and Drug Administration to treat SCD—has become a mainstay therapy for sickle cell disease, reducing the rate of painful sickle cell crises and other complications.

Over the past decade, Rodgers has collaborated on new work on a reduced-toxicity stem cell transplant procedure that offers the hope of cure for many adult patients with SCD. Shortly after he was named a "Sammies" finalist, we talked to Rodgers about this exciting new curative therapy, as well as emerging evidence on genetic factors contributing to kidney disease in African Americans.

Non-myeloablative HSCT—emerging treatment for adult SCD

In addition to his duties as NIDDK Director, Rodgers has set aside time to continue his research on SCD—particularly new approaches to hematopoietic stem cell transplantation (HSCT). In children with SCD, HSCT from a matched sibling donor after myeloablative preparation is potentially curative. So far, hundreds of HSCT procedures have been performed in children with SCD at a handful of centers worldwide.

But for adults with SCD, transplantation hasn't been an option. "One of the problems with doing the full myeloablative transplants in adults with SCD is [that] their organs have been damaged over the years as a result of the sickling process," said Rodgers. "It puts them at very high risk of not actually being able to get through the conditioning regimen necessary for a full transplant."

Last year, Rodgers and coauthors at the National Institutes of Health published a paper reporting an effective HSCT approach for adults with severe SCD. Their protocol used a non-myeloablative approach to conditioning, consisting of low-dose radiation along with small doses of chemotherapy. That regimen was designed to "provide some room in the bone marrow—not completely eradicating the entire marrow, which is the case with myeloablative transplants," Rodgers said.

HLA-matched sibling blood stem cells were then infused, with the goal of achieving a state of "hematopoietic chimerism" in the recipient. "What we hope to correct is just the red cell defect, which is the genetic condition. So their red blood cell production ultimately will be donor origin, whereas their white cells and their platelets are all of recipient origin. And that's what's meant by a stable mixed chimerism—they're half of one, and half of the other."

The study included 30 patients with severe SCD or β-thalassemia major, ranging from 16 to 65 years of age. In 26 patients, HSCT reversed the disease, producing long-term stable donor engraftment without acute or chronic graft-versus-host disease. Fifteen patients of the 26 were able to discontinue immunosuppressive therapy.

After engraftment, hemoglobin levels normalized and hemolysis resolved, while brain imaging findings stabilized. Estimated pulmonary pressure decreased, and several patients were able to undergo phlebotomy to reduce excess iron in the liver. Four of the study participants had sickle nephropathy; none had further declines in renal function during follow-up.

Successful HSCT reduced hospitalizations from an average of 3.23 hospitalizations per year per patient before transplantation, to 0.63 during the first year after transplantation, and down to 0.11 percent in the third year. For patients taking long-term narcotics, morphine-equivalent doses decreased significantly. Since last year's report, the NIH group has performed 12 additional successful HSCT procedures, for a total of 36 treated patients.

Other transplant centers have achieved similar outcomes, including successful outcomes in 15 of 16 patients at the University of Illinois Hospital & Health Sciences System in Chicago, according to Santosh Saraf, MD, assistant professor, internal medicine and oncology/hematology at the University of Illinois College of Medicine.

"We presented our data at the last bone marrow transplant meeting, and there were a lot of transplanters who were excited to see that this was validated, and the toxicity and outcomes were so good," said Saraf. "We know of at least two or three other centers that decided that they were going to start opening this program as well."

Saraf said he thinks the prospect for more widespread implementation in the coming years is "pretty good," adding, "Having such a high cure rate with such low toxicity is kind of that perfect sweet spot of treatment."

As in children, the need for HLA-matched sibling marrow is a key limiting factor. In Rodgers' team's experience screening adults for the study, "We find that somewhere in the neighborhood of one in four or one in five patients are likely to have a sibling match that could be used in this manner." NIH and other transplant centers are also working on half-matched transplants, which could allow more patients to be transplanted.

The ultimate goal is to develop a more widely applicable approach. "The final end point is to take the patient's own bone marrow, correct the mutation—or substitute something that would compensate for the mutation—and then give the bone marrow back to the patient," said Rodgers. "And of course, in that case everyone will be potentially eligible. The problem is, even with the great advances that we currently have in gene editing technology, it still isn't practical at the moment. But there are a number of groups, including our own laboratory, that are working on just this."

Who gets sickle cell nephropathy—and why?

Nephrologists are familiar with nephropathy as a complication of SCD—kidney failure occurs in 5 to 18 percent of SCD patients. Rodgers said the kidneys are very sensitive to the effects of sickled red cells under certain situations, either when oxygen tension is low, or in hyperosmolar environments, when the cells give up their water. Over time, this repetitive sickling, vascular occlusion, and tissue damage eventually leads to sickle cell nephropathy.

And yet, most patients with SCD don't develop renal failure. "There are obviously compensatory mechanisms that exist that allow this process to reverse," said Rodgers.

So why do some patients develop sickle cell nephropathy while others do not? A growing body of evidence implicates genetic factors affecting resistance to parasitic diseases, according to Rodgers. "The mutation for sickle cell disease was thought to have arisen at some point in the old world, in Africa, thousands and thousands of years ago. This abnormality would cause their hemoglobin to polymerize, or aggregate, in affected individuals. And it's this aggregation that causes the cells to sickle.

"As it turns out, the malaria parasite requires hemoglobin in order to undergo its life cycle, and it can't ingest this aggregated hemoglobin very well." Individuals with normal blood would be more vulnerable to malaria, while those with two copies of the sickle cell gene would die later of SCD.

But those who were heterozygous would be more likely to survive malaria, leading to a high frequency of the mutated gene in the population. Such a protective effect might explain why the sickle cell gene became highly prevalent in Africa and parts of the Mediterranean.

Sickle cell trait—one copy of the sickle cell gene—is generally a benign condition. But Rodgers noted a few areas of concern for nephrologists. "The two things that can encourage sickling of the red cells are a lack of oxygen or passing through a region that's quite hyperosmolar. And the renal papilla is one part of the human body, probably the most distinct part, in which those conditions are met.

"So patients with sickle cell trait tend to have impairment in urine concentrating ability—which is due to so-called renal papillary necrosis. And oftentimes when they undergo this necrosis or damage to the renal papilla, that's heralded by blood in the urine, known clinically as hematuria."

Some reports suggest that African Americans with sickle cell trait may be at increased risk of kidney disease. One recent study of more than 2200 patients with chronic kidney disease (CKD) found that 19.2 percent of those who had sickle cell trait also had CKD, whereas 13.5 percent of those without sickle trait had CKD. Although the result was statistically significant, the effect size was modest, Rodgers said.

Sickle cell, APOL1, and kidney disease

Meanwhile, an emerging body of evidence implicates a different genetic factor, apolipoprotein L1 (APOL1), as playing a role in kidney disease progression in those with SCD. An APOL1 gene variant is far more common among African Americans than other groups—noteworthy since most people with sickle cell disease are also of African descent. It appears that those who have these APOL1 variants are protected against one of two forms of another type of parasitic disease: African sleeping sickness, or trypanosomiasis. "If it turns out that you have APOL1 kidney risk variants, and you also have sickle cell disease, this is what probably explains why certain patients go on to have kidney failure and others don't," Rodgers said. Approximately 13 percent of African Americans, or more than 5 million individuals, have two APOL1 risk variants, placing them at increased risk for kidney disease. This is a prime opportunity for precision medicine—one day developing effective medications that can treat APOL1 kidney disease.

"Recent research has suggested that sickle trait confers a small increased risk for CKD, much smaller than the effect of APOL1," Rodgers said.

APOL1 is "really a remarkable story," Rodgers added. "Understanding how it is that APOL1 perturbs either podocyte function or other cellular functions inside the kidney and leads to damage and ultimately to progression to end stage kidney disease is an area of intense investigation."

Rodgers sees an opportunity to develop new classes of drugs that might be effective not only for those with two APOL1 gene variants, but also for those at risk of diabetic nephropathy—the most common cause of kidney disease and renal failure in the United States.

Meanwhile, increasing compliance with proper hydroxyurea dosing to improve SCD outcomes is an area of ongoing investigation. For example, a recent analysis looked at 383 patients with SCD who were seen at the NIH. While 66 percent of study participants were taking hydroxyurea, only 44 percent of those taking the drug were taking doses high enough to fall within the recommended range. The analysis was published in *PLOS One* in November (1). Rodgers was a co-author, as well as other researchers at NIDDK and the NIH's National Heart, Lung and Blood Institute.

Participants taking recommended doses of hydroxyurea were 64 percent less likely to die from SCD, compared to those not taking hydroxyurea—a survival benefit not seen in patients taking lower doses. "This analysis suggests that many patients who take hydroxyurea should gradually increase their dose levels as tolerated, based upon the desired effect and side effects," according to an NIH media advisory.

Hydroxyurea may also help protect kidney function in patients with SCD, according to a recent report in the *Journal of the American Society of Nephrology* (2). In that study, 58 adults with SCD had significant improvement in their urinary albumin/creatinine ratios six months after starting hydroxyurea therapy.

Rodgers didn't win this year's "Sammies" in the field of science and the environment—that honor went to Jacob Moss, a senior advisor from the Environmental Protection Agency, for his work on more efficient cook stoves and cleaner-burning fuels to reduce indoor pollution in developing countries.

But the NIDDK director's dedication to scientific research and discovery has benefited countless patients and families affected by SCD. "Hydroxyurea elevated the quality of life and outcomes for our patients, and stem cell transplant is another level of elevation that will help cure patients with SCD," Saraf said. "I think both have been very important strides for the care of our patients, with the hope of a new approach to cure in the future."

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2. Pablo Bartolucci, et al. Six Months of Hydroxyurea Reduces Albuminuria in Patients with Sickle Cell Disease. *JASN*, November 2015 DOI: 10.1681/ASN.2014111126

Advice for Managing SCD and Kidney Disease

1. Get an estimate of kidney function by measuring either creatinine clearance or cystatin C. Also key: Advise patients to always stay hydrated. "Dehydration makes the cells more prone to sickling and causing damage to the kidneys and other organs." Rodgers said. Adequate hydration is also important for individuals with sickle cell trait because of their impaired urine concentration.

2. Be aware that nonsteroidal anti-inflammatory drugs (NSAIDs)—which patients with SCD may take for pain—can cause additional problems with the blood circulation and the kidneys. "We suggest to their doctors to have them avoid NSAIDs or to use the least medication possible to control their pain," Rodgers said. They should also consider other types of therapies for pain control."

3. Consider ACEIs and ARBs. While these medications are traditionally used in patients with diabetic or hypertensive kidney disease, several nephrology research groups have found that they are also effective in slowing the progression of chronic kidney disease in patients with SCD. "I think that's a fact that not as many people are aware of," Rodgers said.

Policy Update

US Senate Takes up Chronic Care: An Opportunity for Positive Change

By Mark Lukaszewski

Last year, the US Senate Committee on Finance (SFC) took its first step toward developing legislation that would advance higher quality care at lower cost for the millions of Americans managing chronic illness.

Patients with multiple chronic conditions are the most difficult to treat, and also the most expensive to care for in the Medicare system. Medicare's traditional fee-for-service payment system rewards providers for delivering increased volume of services but does not incentivize coordinated medical care, the type of care necessary for those with chronic conditions.

At a May 15, 2015, hearing, the Committee heard testimony from experts at the Centers for Medicare & Medicaid Services (CMS) and the Medicare Payment Advisory Commission (MedPAC). The hearing gave members an opportunity to more closely examine how current chronic care coordination programs work today, the challenges that remain, and possible solutions to improving health outcomes for Medicare beneficiaries. From that hearing, the SFC announced the formation of a bipartisan chronic care working group, co-chaired by Senators Johnny Isakson (R-GA) and Mark Warner (D-VA).

The working group was tasked with analyzing current law, discussing alternative policy options, and developing bipartisan legislative solutions for consideration by the full Finance Committee.

After meeting with interested stakeholders (including ASN) over the course of the year the working group in late December 2015 developed a white paper on ways to improve outcomes for vulnerable Medicare beneficiaries living with multiple chronic health conditions. The white paper is intended for possible use in developing future legislation.

With data-driven congressional and stakeholder input, the working group hopes to develop policy options that deliver high quality care, improve care transitions, produce stronger patient outcomes, increase program efficiency, and contribute to a reduction in the growth of Medicare spending. ASN is currently developing recommendations that will address these goals, such as expanding access to home dialysis, expanding telehealth options for ESRD patients, and allowing end stage renal disease beneficiaries to choose a Medicare Advantage (MA) plan if they wish.

For more information regarding ASN's comments to the working group or other policy questions, please visit the ASN policy website.

New NIH 5-Year Strategic Plan Includes Three ASN Recommendations

By Grant Olan

The new National Institutes of Health (NIH) strategic plan (Figure 1) released in December 2015 includes three ASN recommendations that will guide the agency's research agenda over the next five years. During summer 2015, 450 stakeholders in the research community responded to NIH's request for feedback and input.

ASN called on NIH to consider disease burden when setting research funding priorities. Currently, NIH investments in kidney research ($585 million) are less than 1% of total Medicare costs for patients with kidney diseases ($80 billion). In fact, costs of care for patients with kidney failure alone—the only health condition that Medicare automatically provides coverage for regardless of age or disability—are more than NIH's entire budget ($35 billion vs. $30 billion annually).

Despite the medical and economic burden of kidney diseases, NIH invests less per patient in kidney research than many other diseases (Table 1). ASN also urged NIH to prioritize efforts to both enhance workforce diversity and reduce administrative burden on investigators and research institutions.

"Scientific and technological breakthroughs that have arisen from NIH-supported research account for many of the gains that the United States has seen in health and longevity," said NIH Director Francis S. Collins, MD, PhD. "But much remains to be done. This strategic plan will guide our efforts to turn scientific discoveries into better health, while upholding our responsibility to be wise stewards of the resources provided by the American people."

Figure 1. 2016–2020 NIH strategic plan

1. Advance opportunities in biomedical research in fundamental science, treatment and cures, and health promotion and disease prevention.
2. Foster innovation by setting NIH priorities to enhance nimbleness, consider burden of disease and value of permanently eradicating a disease, and advance research opportunities presented by rare diseases.
3. Enhance scientific stewardship by recruiting and retaining an outstanding biomedical research workforce, enhancing workforce diversity and impact through partnerships, ensuring rigor and reproducibility, optimizing approaches to inform funding decisions, encouraging innovation, and engaging in proactive risk management practices.
4. Excel as a federal science agency by managing for results by developing the "science of science," balancing outputs with outcomes, conducting workforce analyses, continually reviewing peer review, evaluating steps to enhance rigor and reproducibility, reducing administrative burden, and tracking effectiveness of risk management in decision making.

Table 1. NIH research funding by disease

Disease	Prevalence, millions	2014 Budget,* (millions)	% of 2014 NIH budget	NIH spending per patient
HIV/AIDS	1.2†	$3677	12%	$3064
Cancer	14‡	$7957	27%	$568
Heart disease	27§	$1645	5%	$61
Kidney disease	**20‖**	**$585**	**2%**	**$29**

*www.report.nih.gov/categorical_spending.aspx.
†Centers for Disease Control and Prevention (CDC), www.cdc.gov/hiv/basics/statistics.html.
‡American Cancer Society, www.cancer.org/cancer/cancerbasics/cancer-prevalence.
§ CDC, www.cdc.gov/nchs/fastats/heart-disease.htm.
‖ CDC, www.cdc.gov/diabetes/pubs/pdf/kidney_factsheet.pdf.

Updated ASN Dialysis Advisory Group Online Curriculum Now Available

By Jennifer E. Flythe, Timmy Lee, and Laura M. Dember

The American Society of Nephrology (ASN) Dialysis Advisory Group announces the release of its updated online curriculum, the Dialysis "Virtual Mentor" Curriculum.

End stage kidney disease affects more than 500,000 Americans, and the majority of these patients receive dialysis therapy. Recognizing the importance and centrality of this therapy to physician training and patient care, the ASN Dialysis Advisory Group developed a comprehensive online curriculum for trainees and nephrologists.

The curriculum covers important topics related to dialysis care that trainees need to understand and practicing nephrologists may want to refresh. Originally developed in 2010 under the leadership of Rajnish Mehrotra, MD, MS (University of Washington), and Suzanne Watnick, MD (Oregon Health & Science University), the curriculum covers a broad spectrum of topics including complications of hemodialysis and peritoneal dialysis, daily hemodialysis, dialysis access, dialysis equipment and technical issues, drug dosing on dialysis, dialysis initiation, medical management of dialysis patients, and administrative issues related to managing a dialysis center.

In 2014 and 2015, the ASN Dialysis Advisory Group updated the existing educational presentations and expanded the curriculum to include a wider range of home hemodialysis and vascular access-related subject matter. The curriculum update was spearheaded by Dialysis Advisory Group members Jennifer Flythe, MD, MPH, and Timmy Lee, MD, MSPH, under the leadership of Drs. Mehrotra and Laura Dember. Existing presentations on intradialytic hypotension and hypertension, anemia management, bone mineral disease dysregulation, cardiovascular risk factors, sudden cardiac death and arrhythmias, uremic toxins, and financial considerations related to reimbursement bundling were updated to include new evidence, practice guidelines, and policy. Recognizing the growth of home therapies, new presentations on writing the home hemodialysis prescription and managing home hemodialysis patients were added. The curriculum was expanded to include a greater focus on vascular access with new educational presentations on vascular access placement, surveillance and monitoring, and cannulation, as well as catheter malfunction and infection. Finally, a presentation on hemodiafiltration was developed to highlight technological advances in the field.

The ASN Dialysis Advisory Group would like to thank the authors of the revised and new curriculum presentations (Table 1). ASN is grateful to the authors for their substantial time and expertise devoted to developing the curriculum content. The ASN Dialysis Advisory Group would also like to thank ASN Policy Associate Mark Lukaszewski for his coordination and oversight of the curriculum update initiative. And the group expresses gratitude to the International Society of Peritoneal Dialysis, which provided many of the presentations related to the peritoneal dialysis prescription, patient training, and staff education.

Providing the optimal dialysis care for patients with kidney failure demands considerable breadth and depth of expertise. This updated and expanded curriculum will yield substantial benefits for kidney care professionals and the patients they treat. The curriculum is just one aspect of ASN's continued efforts to lead the fight against kidney diseases.

The curriculum is freely accessible to all ASN members and is available on the ASN website at www.asn-online.org/education/distancelearning/curricula/dialysis/. ASN members must be logged on to the website in order to access the curriculum.

Jennifer E. Flythe, MD, MPH, is affiliated with the University of North Carolina at Chapel Hill; Timmy Lee, MD, MSPH, is affiliated with the University of Alabama at Birmingham; and Laura M. Dember, MD, is affiliated with the University of Pennsylvania.

Table 1. Updated ASN Dialysis Advisory Group curriculum presentations and authors

Jeffrey Berns, MD University of Pennsylvania	Anemia, iron, and erythropoietin
John Burkart, MD Wake Forest University	Financial considerations in the era of bundling
Christopher Chan, MD University of Toronto	Home hemodialysis
David Charytan, MD, MSCE Brigham and Women's Hospital	Management of non-traditional cardiovascular risk factors
Michel Chonchol, MD University of Colorado	Assessing patient eligibility for home hemodialysis
Joel Glickman, MD University of Pennsylvania	Writing the home hemodialysis prescription
Jula Inrig, MD, MS Quintiles	Intradialytic hypotension and hypertension
Martin Kuhlmann, MD, PhD Vivantes Klinikum im Friedrichshain	Hemodiafiltration
Charmaine Lok, MD, MSc University of Toronto	Prevention and treatment of dialysis catheter malfunction and infections
Brent Miller, MD Washington University	Medical management of home hemodialysis patients
Sharon Moe, MD Indiana University	Bone mineral disease
Louise Moist, MD University of Western Ontario	Obtaining and maintaining vascular access
Patrick Pun, MD, MHS Duke University	Sudden death and rhythm disturbances in end stage kidney disease
Robert Toto, MD University of Texas Southwestern	Management of traditional cardiovascular risk factors
Tuschar Vachharajani, MD W.G. (Bill) Heffner Veterans Affairs Medical Center	Monitoring and surveillance of vascular access
Raymond VanHolder, MD, PhD Ghent University	Uremic toxins
Suzanne Watnick, MD Oregon Health & Science University	Patient perspectives, including quality of life and end of life care
Deborah Zimmerman, MD University of Ottawa	Cannulation of vascular access

Industry Spotlight

No. 3 Dialysis Business Merger

A newly approved merger seals one of the largest recent dialysis business deals. U.S. Renal Care (USRC, Plano, TX) announced in early January that it had finalized its deal to merge with DSI Renal. U.S. Renal Care, already the nation's third largest provider of dialysis, will now operate 300 outpatient clinics, 147 home dialysis programs, and 26 acute care hospital contracts throughout the United States.

DSI Renal, based in Nashville, TN, had been treating about 7000 patients at the time of the merger, according to its website in January. The company has only existed in its latest form since 2011, but the dialysis provider is well established in Nashville, according to *Nashville Business Journal*. The forerunner of DSI sold to DaVita in 2011, but afterward investment firms announced a new partnership and investment that formed the most recent DSI business, the *Journal* reported.

The newly merged company will serve about 23,000 patients in 33 states, as well as sites in Guam. As of Jan. 1, 2016, when the terms of the merger were realized, USRC became responsible for 99 facilities and 58 home-based therapy programs operated by DSI Renal.

In comparison, DaVita, the second largest dialysis business in the country, serves 173,000 patients in 46 states, which is about 13.3 percent of U.S. Renal Care's clientele, according to its latest annual report. In the 2014 Annual Report (released in May 2015), DaVita noted that it "believes it has about a 35% share of the market." (Fresenius North America, part of the conglomerate Fresenius Medical Care based in Germany, is the number 1 provider of dialysis services.)

U.S. Renal's 300 dialysis clinic business is 13.8 percent of the 2179 DaVita dialysis centers. DaVita also provides acute inpatient dialysis to approximately 1000 hospitals.

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