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KHI Innovation Conference Highlights Patient-Centered Care

By Karen Blum

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Grant Bonebrake was 11 years old when he was diagnosed with Alport syndrome, a genetic disorder that causes kidney damage and other issues such as hearing loss. A couple of years later, when he participated in the first clinical trial for a drug for the syndrome, the study design was not optimal for an adolescent.

"As a patient, his greatest fear was dialysis, and the study site was at a dialysis center," so Grant had to walk past people receiving treatment, recalled his mother, Lisa Bonebrake, a member of the Kidney Health Initiative's (KHI's) Patient and Family Partnership Council (PFPC). "It really was not a wise choice for a study site for a young person," she acknowledged. In addition, during the very first appointment, the study coordinators collected more than 12 vials of blood, and Grant—who already had low blood pressure from taking angiotensin-converting enzyme inhibitors and angiotensin receptor blockers—passed out.

The family shared their experience during KHI's Kidney Innovation Conference, held in May in Washington, DC, in which one of the themes was designing patient-friendly clinical studies. During a workshop, attendees heard from patients and learned about working with trusted community messengers, such as patient foundations for rare diseases, clinician–researchers, and local spiritual leaders; obtaining the patients' stories and wishes first-hand; and establishing patient advisory boards to improve study designs. Attendees also heard from patient organizations about the value of including patients from day 1.

A big barrier in industry is not understanding how to involve patients in the process of clinical trial development, from stage 1 or in preclinical efforts, said Ms. Bonebrake, who is also executive director of the Alport Syndrome Foundation. PFPC is creating a map-type document, to be released by late 2027, explaining how to involve patients in all phases of development from the preclinical phase through postevaluation.

"We can definitely be helpful when it comes to introducing companies to the trusted experts in our disease

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KidneyCure Transition to Independence Grants Have a Lasting Impact

By Bridget M. Kuehn

https://doi.org/10.62716/kn.003832026

Laisel Martinez, PharmD, MS, a research associate professor in the Department of Surgery at the University of Miami, FL, was at a pivotal moment in her career when she applied for a KidneyCure Transition to Independence Grant in 2023. As a trainee working on her Research Career Development (K) Award, she was gearing up to apply for her first National Institutes of Health (NIH) R01 grant and thinking about the future direction of her research.

Landing the Transition to Independence Grant gave her the confidence and the financial cushion that she needed to pursue her first independent study on vascular access for people requiring kidney replacement therapy. It also allowed her to pivot from atherosclerosis to kidney disease research and secure her first NIH R01 grant. Three years later, Martinez runs her own laboratory with two full-time trainees, codirects a biobank of vascular tissues, and studies how inflammation contributes to venous complications.

"It really opened the door to getting really good data to open a new area of investigation," Martinez said. "None of it would have been possible without the funds from the KidneyCure grant. More than the money, it also gives you confidence that you are doing something that other people think is important."

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KHI Innovation Conference Highlights Patient-Centered Care

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space," she said. "So many patients are involved in natural history studies and providing bio samples. A lot of patient organizations are actually running registries, so we can help not only with preclinical work but getting to know the community through patient listening sessions so that they [companies] understand what's important to that community before they go off and shape a protocol that really isn't addressing the real needs of the community they're targeting."

During previous KHI conferences, it became evident that some stakeholders were not using the same terminology, so PFPC's resource wanted to make very clear what is a patient advisory board and the dos and don'ts of working with one, Ms. Bonebrake said. The group already has created a video series about patient advisory boards, available on the KHI website (khi.asn-online.org/patient-advisory-boards/).

Patient-centeredness was the focus of several other sessions at the conference. "The diversity that we have as patients and members of the PFPC allows us to give you information that you may not have," said Curtis Warfield, MS, PFPC chair, during a panel on building a culture of patient-centeredness. "There's a lot of things that we go through and that we've had to go through, either when being diagnosed or crashed into kidney disease that we have to pick up quickly."

The research community may think that patients do not want to be involved with study design, added Precious McCowan, MS, PhD, a PFPC member, three-time kidney transplant recipient, and one-time pancreas transplant recipient. "We want to be involved," she said. "We also want to know the results of the study and how everything is going. It makes us feel like we're not just the patient but we're partnering with you. We're doing this together to make a difference."

Interaction with patients helps investigators learn how to improve for the next phase of study, McCowan said, even when it comes to language presented to participants and ensuring that language is clear about the benefits, risks, and outcomes of a study.

With the rapid growth of clinical trials for new kidney therapies, there is "an absolute urgency to make sure that we are assessing outcomes that matter to people who are living with kidney disease every day," said Jennifer McKenzie, MD, FAAP, a member of KHI's Board of Directors and a senior clinical program leader at Boehringer Ingelheim, during a session on rethinking endpoints in kidney therapies. "If we want new therapies to truly improve patients' lives, then trials need to measure what patients actually experience, value, and prioritize."

Patients want a lot of the same things as regulators and industry, McKenzie said, "but there's more to it than that. They want to know how the therapy may affect their kidney function and—if this is going to help them delay dialysis—transplant; what impacts it will have on their cardiovascular health…. They want to know if they're going to live longer, if their child is going to live longer." Also important is their ability to work, care for families, and engage in daily life.

Too often, manufacturers worry about their drugs being compared head-to-head against others in case another one appears better in hard endpoints like graft survival, McKenzie said. But having choices for patients so that they can find drugs that work for them is "incredibly important," she explained. "Some people would give up 2 years of prolonged graft survival if that meant the GI [gastrointestinal] side effects for that particular drug were less, if it allowed them to have fuller life participation."

While participating in a clinical drug trial, kidney transplant recipient Jullie Hoggan, MS, served as a resource for other patients deciding whether to enroll. "They would ask questions like, 'I'm a teacher. What do I do if I have to leave my classroom of first-graders 10 times a day to go use the restroom?'" explained Hoggan, who was able to describe her experience of taking the medication and share strategies to manage side effects. "Patients are looking for this kind of information online and from each other," she said. "That helps patients become true partners in decision-making about their medication."

Being told to take immunosuppressants every 12 hours to prevent organ rejection and also that the medications can cause cancer, diabetes, infections, or other serious life-threatening complications is concerning to patients, Hoggan added, on top of managing side effects. Creating tools to support personalized immunosuppression and detection of diseases before they become a crisis "would directly improve the lives of transplant patients," she said. Patients also want to know if they are being treated with the right medication and correct dose to protect their allograft and keep them healthy.

"Many trials still rely on graft survival or acute rejection as endpoints," Hoggan said. "We really need approaches that capture the long-term graft survival, functional outcomes, and how these therapies impact patients in their lives over time." Algorithms such as iBox combine multiple clinical measures to predict long-term outcomes and could help identify therapies sooner. "We also need better and faster ways to learn from the patient experience and translate those lessons into research, patient-reported outcome measures, patient education, and the care that every patient deserves."

"We want to be involved.... It makes us feel like we're not just the patient but we're partnering with you. We're doing this together to make a difference."

Question prompt lists (QPLs) to help patients inquire about clinical and research trials also are important, one session expert panel relayed, especially when it comes to kidney xenotransplantation. A QPL is a structured set of questions given to patients and families to help them ask informed, meaningful questions; engage more actively in decision-making; reduce anxiety and uncertainty; and navigate complex, high-stakes medical choices. It is used widely in oncology and palliative care and is now making its way to transplantation, said Vineeta Kumar, MD, FASN, a transplant nephrologist with The University of Alabama at Birmingham.

"We have to assess patient education needs regarding xenotransplant," said Mary Baliker, a four-time kidney transplant recipient and member of KHI's Board of Directors. "I think it's evolved from a general curiosity about pig-to-human transplants to target necessary dialogue on informed consent in clinical trials…. Patients need specific information on safety, risks, and the hard facts of survival."

Some patients have expressed concern that they are thought of as "guinea pigs" or wonder why they, versus other patients, are being considered for xenotransplantation, Baliker explained. There also are a lot of unknown long-term risks and potential infection. It is essential to make sure consent forms are very clear on risks and benefits, she said. Addressing these uncertainties, KHI, along with the National Kidney Foundation, has recently developed resources to promote understanding and communication about clinical trials for kidney xenotransplantation for patients, their care partners, and health care teams (www.kidney.org/kidney-topics/kidney-xenotransplantation#ongoing-questions). ■

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KidneyCure Transition to Independence Grants Have a Lasting Impact

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Martinez and her fellow grantees are a testament to the program's success. An impact assessment commissioned by KidneyCure recently showed how the program is helping to strengthen the nephrology researcher pipeline, bolster the field of nephrology, and strengthen ASN by training a new cadre of leaders. "The goal of the Transition to Independence Grants, more than anything else, is to grow future leaders, champions, catalysts, and conveners for the kidney community as a whole," said Prabir Roy-Chaudhury, MD, PhD, FASN, KidneyCure Board of Directors chair and ASN past president.

A leg up

KidneyCure has several grant programs, and a recent independent impact evaluation showed that the Transition to Independence program has awarded 246 grants, totaling $48.5 million to early-career faculty at 100 institutions in 31 states (1). Half of the eligible grantees secured tenure within 5 years of receiving their awards, and all achieved it after 10 years. Awardees secured an additional $1.2 billion in research funding via 648 subsequent NIH grants, with one-third securing an R01 within 3 years, and 84% securing one within 9 years. That has led to more than 12,000 scientific publications and 91 NIH-funded clinical trials on neonatal intensive care, pediatric, and adult kidney disease care.

More than 80% of Transition to Independence grantees are continuing their nephrology research a decade after their award.... Many go on to become leaders at ASN, with 47% later serving in a leadership role....

"The Transition to Independence awards are a fantastic vehicle to support young investigators at a really critical time in their career trajectory," said Leslie S. Gewin, MD, FASN, cochair of the ASN Grant Review Committee and Alan A. and Edith L. Wolff Professor of Renal Diseases at Washington University in St. Louis, MO. "Particularly now that there are many challenges in the funding climate, the support that ASN has been able to provide is really transformative for these young investigators."

Gewin explained that the period when young researchers' K awards, which support about 75% of their salary, come to an end can be so challenging that it is sometimes referred to as the "K cliff." She noted that without transitional funding, many feel pressure to take on additional clinical work to help cover their salary, which reduces their time for research, making it harder to generate the data needed to secure additional grant funding.

The 2019 Transition to Independence Grant awarded to Naoka Murakami, MD, PhD, FASN, assistant professor in the Division of Nephrology at Washington University in St. Louis, provided a bridge to help her overcome COVID-19 pandemic-related challenges. Murakami was about to finish her combined research and clinical fellowship and hoped to transition into researching the mechanisms of autoimmune kidney disease and transplant rejection when the pandemic occurred, and her animal colony was shut down for months. "Having extra support from ASN's KidneyCure grant was very helpful to continue my research," she said.

Murakami's grant coincided with the emergence of immune checkpoint therapies for cancer, which have revolutionized cancer therapy, yet can contribute to acute kidney injury. Her work helped identify an immunosuppressive regimen to help prevent acute rejection in transplant recipients treated with immune checkpoint therapy for cancer and tested it in a small clinical trial (2). "We found that using a mammalian target of rapamycin [mTOR] inhibitor treatment was protective against acute rejection for kidney transplant recipients receiving immune checkpoint therapy," she said. "That was very impactful on patient care, enabling patients to safely receive these effective cancer immunotherapies."

That research helped Murakami secure an R01 grant that began in 2024. Now, she has four other investigators working in her laboratory, and she is studying T-cell infiltration in the kidney during immune checkpoint therapy to find ways to prevent kidney injury or acute rejection. Currently, she explained, patients receive high-dose steroids to treat this, but it causes immune suppression, which can increase the risk of infections and decrease the efficacy of the cancer therapy. She hopes to find more specific therapies targeting kidney-related side effects.

Accelerating advances

Martinez used her Transition to Independence Grant to study the role of inflammation in the veins in worsening vascular access outcomes (3). Creating an arteriovenous fistula involves surgically connecting an artery to a vein that can then be connected to a dialysis machine. It is the gold standard for vascular access and can reduce infections and improve outcomes. However, about 40% of patients develop complications after surgery, resulting in an unsuccessful outcome. She noted that there has been little research on veins and that most existing insights have been extrapolated from studies of arteries. "They are different conduits," she explained. "When you create this vascular access to receive hemodialysis, the vein actually responds differently [than the artery] and is the one that usually occludes; it has more problems."

Martinez' Transition to Independence Grant helped fund her research on the role of fibroblasts in veins in driving vascular access complications. She explained that fibroblasts contribute to scar formation throughout the body and, in some circumstances, can drive excess tissue formation, stiffen veins, and interfere with vein remodeling. Some companies are trying to develop synthetic veins—a potentially promising approach in the future—while Martinez is working to deliver medications in the near term that can prevent these complications.

"My dream is that we try to repurpose and test all of these antifibrotic drugs that are in the market, and maybe we can find one that helps with the remodeling of the vein, and being a drug that has already been approved for something else, it may lead to a faster solution for [people undergoing hemodialysis]," she said.

Pathway to leadership

More than 80% of Transition to Independence grantees are continuing their nephrology research a decade after their award, according to the impact report (1). Many go on to become leaders at ASN, with 47% later serving in a leadership role and half serving on at least one ASN committee. Some contribute to ASN in other ways, such as grant reviewers, editorial board members, and in program development for Kidney Week.

"Investment in these early-stage investigators continues to pay dividends in terms of producing future leaders in academic nephrology," Gewin noted. She said that she and her fellow Grant Committee members, along with supporting ASN staff, are committed to helping the grantees learn and grow.

Murakami said that her participation in the grant program felt like being part of a team or a family. It also led to her becoming more involved at ASN. She has participated in the Kidney Students and Residents (STARS) program and Kidney Week and is now serving on the Grant Review Committee for KidneyCure.

Martinez said her KidneyCure grant and the ASN meetings and networking opportunities that it opened up for her have also helped to grow her network, access training, and meet potential collaborators. "The KidneyCure Grant opened all these opportunities to collaborate," she said.

Now, Martinez plays a central role in building collaborations with surgeons and other investigators to spur new vascular access research and discoveries. She is codirector of the University of Miami Vascular Tissue Biobank and says that it is the largest biobank of human samples of vein and fistula tissues collected during vascular access surgeries in the United States and from organ donors without kidney diseases. Thanks to the commitment of collaborating surgeons, Martinez asserts that she plans to continue growing the biobank.

Former grantees also often serve in mentorship roles. Martinez is a mentor in the Regenerative Medicine Scholarly Pathway and the Kidney Innovative and Interdisciplinary Medical Education Research Activities training program and is committed to growing the pipeline of vascular access researchers. "[Vascular access] is a niche area of research, but it has huge importance for the patients, and it's an area that we need new people," she noted. Many renowned researchers in the field are moving into leadership roles or into retirement, creating a need and opportunity for early-career researchers, Martinez explained.

Roy-Chaudhury said that building a robust kidney research pipeline and foundation of leaders has never been more important for the field of nephrology. He explained that for 25 years, kidney therapies had remained static but that there is now a whole continuum of new therapies, from cardiovascular-kidney-metabolic syndrome and glomerular nephritis to innovative kidney replacement therapies. But more innovation is essential. "We need the next generation of leaders so they can take this moment in time and run with it," he said. ■

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Letter to the Editor

By Talha H. Imam, Andrea M. Yeung, and Max T. Hukill

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We read with great interest the recent article, "Core Interventions for the Prevention of Peritoneal Dialysis–Related Infections" by Jeffrey Perl, Kerry Leigh, and Joseph Kessler, published in the May 2026 issue of *Kidney News* (1). However, we believe that one critically important preventive intervention deserves additional emphasis: proper peritoneal dialysis (PD) catheter placement and exit-site planning at the time of insertion (2–4).

In clinical practice, meticulous attention to catheter positioning can substantially influence long-term exit-site care and infection risk. Important considerations include:

- avoiding placement of the exit site along the belt line to prevent rubbing and irritation;
- avoiding exit sites under the abdominal skin folds, ensuring that the patient can easily visualize and care for the exit site;
- making sure the catheter exit faces downward or laterally, but not superiorly, to reduce moisture accumulation and bacterial contamination (5); and
- considering presternal or extended catheters in patients with obesity, which may also improve exit-site accessibility and facilitate daily care (6).

These technical and anatomical considerations may appear minor but can have substantial implications for exit-site infections, tunnel infections, and peritonitis risk.

We would suggest that proper catheter placement and exit-site planning be added as a seventh core intervention for the prevention of PD-related infections. In our view, meticulous catheter positioning and individualized exit-site selection represent a foundational yet sometimes under-recognized component of long-term PD success.

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ASN Executive Vice President's Update

Compounded Neglect for Kidney Research

By Tod Ibrahim

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Federal funding for the National Institutes of Health (NIH) nearly doubled over 5 years, from $13.6 billion in 1998 to $27.1 billion in 2003 (1). "The American people's return on their investment in NIH is truly spectacular," Elias A. Zerhouni, MD, told Congress in 2007 (2). To prove this point, Zerhouni—who served as NIH director from 2002 to 2008—highlighted "remarkable advances" in treating cancer, diabetes, heart disease, HIV/AIDS, inflammatory disease, muscular dystrophy, and tuberculosis.

Based on the belief that "a rising tide lifts all boats," doubling the NIH budget over 5 years was intended to double the budgets for all of the agency's institutes and centers as well as to double research funding for every major disease, including kidney diseases. However, the logic behind the phrase failed to consider whether the tide was in or out when the doubling was to start. At the time that the doubling began, funding varied dramatically, so doubling compounded neglect for those institutes, centers, and diseases at "low tide" in 1998.

For example, the National Cancer Institute (NCI) has received an estimated $300 billion more in funding than kidney research in inflation-adjusted dollars since 1971 (3). The $300 billion more than kidney research that NCI has received is equivalent to the inflation-adjusted cost of the Apollo program, which put a man on the moon in 8 years (4). The next time someone compares advances in oncology with advances in nephrology, criticizes nephrology for the lack of an on-study culture like oncology, or carps about the lack of interest in nephrology careers, point them to this funding chasm.

To put these totals in historical context, NCI received approximately $700 million in funding in 1975, which was the total funding for kidney research in 2024 across NIH and not adjusted for inflation (3). As the opening salvo of "The War on Cancer," the National Cancer Act of 1971 more than tripled NCI's budget between 1971 and 1975, from approximately $230 million to approximately $700 million. When adjusted for inflation, $700 million in 1975 would be equivalent to more than $4 billion today.

To put these totals in historical context, NCI received approximately $700 million in funding in 1975, which was the total funding for kidney research in 2024 across NIH and not adjusted for inflation....

By failing to lift all boats equitably, the doubling "locked in" these historical variances, compounding the neglect and benefiting some institutes and centers—NCI; the National Heart, Lung, and Blood Institute; and the National Institute of Allergy and Infectious Diseases—more than others. All boats rose during the doubling, but those that previously had been better funded rose higher during the doubling than those that had not been as well funded. As ASN Health Policy Scholar Suzanne Watnick, MD, FASN, noted in her testimony before Congress earlier this year, "Only $19 per patient is dedicated to kidney research" at NIH "compared to $423 for cancer research and $2745 for HIV/AIDS research" (5).

Additionally, NIH funding stagnated after the doubling. Between 2004 and 2024, the NIH budget increased by 75.7%, from $27.1 billion to $47.7 billion (6). By comparison, the overall federal budget increased by 196.1% during this period, driven mostly by Social Security, the Medicare program, and net interest on the public debt (7). Nondefense discretionary funding increased by 114% during this time, so NIH's funding growth is closer to similar programs but still lagging.

However, when adjusting for the Biomedical Research and Development Price Index—measuring the inflation rate of the costs involved in medical research, such as labor, equipment, and other supplies—the "real" purchasing power of NIH decreased during the past 20 years. This drop means that low-tide institutes, such as the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), and diseases like kidney diseases were even more negatively affected by the doubling.

Doubling the NIH budget over 5 years also caused several unintended consequences beyond compounded neglect. The doubling created a "hard landing" for some researchers when annual funding returned to historical "norms," led to declining success rates because of the increased number of grant submissions, and reduced opportunities for early-career investigators by raising the average age for first-time recipients of R01 grants (for independent research) (8).

Most visibly, the expanding infrastructure at the NIH campus in Bethesda, MD, and at universities across the nation put a bull's-eye on indirect cost rates and fed a narrative about government bloat (9). Although congressional Republicans have used their majority since January 2025 to defend NIH from steep cuts and protect the agency's organizational structure, this conspicuous spend "Inside the Beltway" and at universities has made such support more difficult.

Unfortunately, NIH's advocates, including ASN, have gotten soft since the doubling. With bipartisan, bicameral support in Congress as well as with Presidents Clinton, Bush, and Obama praising NIH as a national treasure for 24 straight years, the research community failed to advocate as effectively, by not emphasizing the urgent need for hope to the millions of Americans living with diseases, like kidney diseases, who have experienced little change in their survival rates. We failed to explain why the intramural program is vital to NIH's overall success. We failed to highlight how this unprecedented investment in medical research was accelerating discovery, producing new therapies, and contributing significantly to the economy.

The business case for continued investment in NIH is self-evident. Every $1 invested in NIH research generates approximately $2.50 in new economic activity. Today, NIH research supports an estimated 390,000 jobs nationwide, acts "as a major economic engine," and produces over $94 billion in new economic activity annually (10, 11). The United States is the leader in medical research, science, and an intelligence-driven economy because of this bipartisan investment.

Last year, ASN worked with other members of the kidney community to produce "Transforming Kidney Health Research: A Research Agenda for the Future" (12). This landmark report provides a comprehensive, multi-year road map to accelerate cures and improve prevention for kidney diseases. In addition to ASN, the American Association of Kidney Patients, the American Kidney Fund (AKF), the American Society of Pediatric Nephrology (ASPN), and the National Kidney Foundation (NKF) helped produce the report, which calls for the federal government to invest $1.8 billion annually in kidney research.

Recommending a down payment on this investment, more than 30 members of the kidney community joined AKF, ASN, ASPN, and NKF earlier this year in requesting $1 billion in funding for NIDDK "designated to pursue research that advances early detection, prevention, novel therapeutics, and transformative approaches to kidney diseases and kidney failure" (13). A unified kidney community asserted, "The limited number of disease modifying therapies and slow adoption of new technologies reflect the lack of investment in this field" by the federal government.

In strong support of "Transforming Kidney Health Research: A Research Agenda for the Future" (12) and the community's request for a down payment, Representatives Joe Wilson (R-SC) and Marilyn Strickland (D-WA) led 29 of their colleagues in urging Congress to appropriate $1 billion to NIDDK for kidney research. They argued that the "federal research investment for kidney health equates to less than 1 percent of Medicare fee-for-service expenditures for Americans with kidney disease" (14).

For too long, compounded neglect has had a disastrous impact on kidney research. Today, Congress and the Trump administration have an opportunity to address the disparities magnified by the doubling of the NIH budget between 1998 and 2003. By following the roadmap produced by ASN and the kidney community in "Transforming Kidney Health Research: A Research Agenda for the Future" (12), the federal government will also give hope to the more than 37 million Americans living with kidney diseases (15). ■

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Disclosures: The data summarized in this editorial are based primarily on the NIH Almanac historical appropriations tables provided by the NIH Office of Budget (16). Artificial intelligence (Google Gemini and ChatGPT) helped collect, organize, and analyze these data, which reflect the annual appropriations to NIH as well as its institutes and centers. Congress provides this funding annually in each fiscal year appropriation law. Important nuances exist with the data:

- The NIH historical tables often present amounts as "program level" or "mechanism totals" after internal distribution adjustments, transfers, evaluation tap transfers, and sometimes mandatory funding supplements.
- Institute-level totals can, therefore, differ slightly from the exact line-item appropriation language in the appropriations bill or the final operating allocations that NIH distributed internally during the fiscal year.

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Letter to the Editor *Continued from page 5*

Author's Response to Letter to the Editor

By Jeffrey Perl, Kerry Leigh, Joseph Kessler

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We thank Dr. Imam and colleagues for their thoughtful Letter to the Editor regarding the May 2026 issue of *Kidney News*' summary of our work on core interventions for the prevention of peritoneal dialysis (PD)–related infections (1). We appreciate their emphasis on optimal PD catheter placement, individualized exit-site planning, and perioperative infection prevention, all of which are important contributors to long-term PD success. We would also direct readers to the full *CJASN* consensus article upon which the *Kidney News* article was based, in which the scope, rationale, and implementation considerations for the core interventions are described in greater detail (2).

We agree that careful attention to PD catheter placement and exit-site location is critical to infection prevention. Avoiding the belt line and abdominal skin folds, ensuring an appropriate downward or lateral exit-site orientation, and considering alternative approaches such as presternal catheters when clinically indicated can facilitate daily exit-site care and reduce the risk of irritation and contamination. These considerations help ensure that patients can easily visualize, clean, and maintain their exit sites and support the long-term success of PD therapy.

These issues were carefully considered during development of the core interventions and were also raised during the public comment process. Ultimately, the workgroup elected not to include PD catheter placement and exit-site planning as a separate seventh core intervention because the interventions were intentionally designed as facility-level practices that could be implemented, monitored, and measured by outpatient dialysis programs. The core interventions therefore emphasize a broader, team-based approach to infection prevention. This distinction is important because decisions regarding PD access such as PD catheter insertion technique, perioperative antibiotic prophylaxis choice, and exit-site location occur before patients present to the outpatient dialysis facility.

Importantly, however, the workgroup recognized that infection prevention begins well before the first PD exchange. Accordingly, we emphasized that PD access planning should incorporate infection-prevention principles, including consideration of optimal exit-site location and orientation. The accompanying discussion further highlights the importance of early preparation for PD, including optimal catheter placement; assessment of the home environment; identification of barriers to safe infection-prevention practices; and collaboration among the dialysis facility, proceduralist or surgeon, patient, and caregivers.

Antibiotic prophylaxis at the time of PD catheter insertion remains one of the strongest recommendations within international PD infection-prevention guidance and represents a critical opportunity to reduce early infectious complications. However, ensuring reliable implementation may be challenging when PD catheter insertion occurs outside the dialysis facility. This challenge reflects the fragmentation that can occur during transitions of care rather than any lack of commitment by individual clinicians or programs. It will be interesting to see, with the launch of the ASN Centers of Excellence in Home Dialysis program, if insights are available on how centers navigate these challenges.

The original *CJASN* article and accompanying ASN Excellence in Patient Care (EPC) implementation resources support many of the principles highlighted by Dr. Imam and colleagues (2). The ASN EPC website hosts a dedicated portal for the Core Interventions for the Prevention of Peritoneal Dialysis-Related Infections, including a Frequently Asked Questions section that addresses optimal exit-site orientation and location. These resources direct clinicians to evidence-based international guidance (3).

We are grateful to Dr. Imam and colleagues for reinforcing the importance of PD access placement and access planning in infection prevention in PD. While we view these activities as critical transition-of-care and access-planning priorities rather than a separate facility-level core intervention, we fully agree that they are foundational elements of PD infection prevention. Future efforts to reduce PD-related infections should focus not only on standardized facility-based practices but also on strengthening communication, coordination, and shared accountability across the continuum of PD access planning, catheter insertion, and early home dialysis care. ■

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Dr. Perl reports being a consultant for Sobi, US Renal Care, iRen Medical, and Vantive Health; receiving research funding from Vantive Health; being a speaker for US Renal Care; and serving on speakers bureaus for Vantive Health and Fresenius Medical Care. Ms. Leigh and Mr. Kessler report no conflicts of interest.

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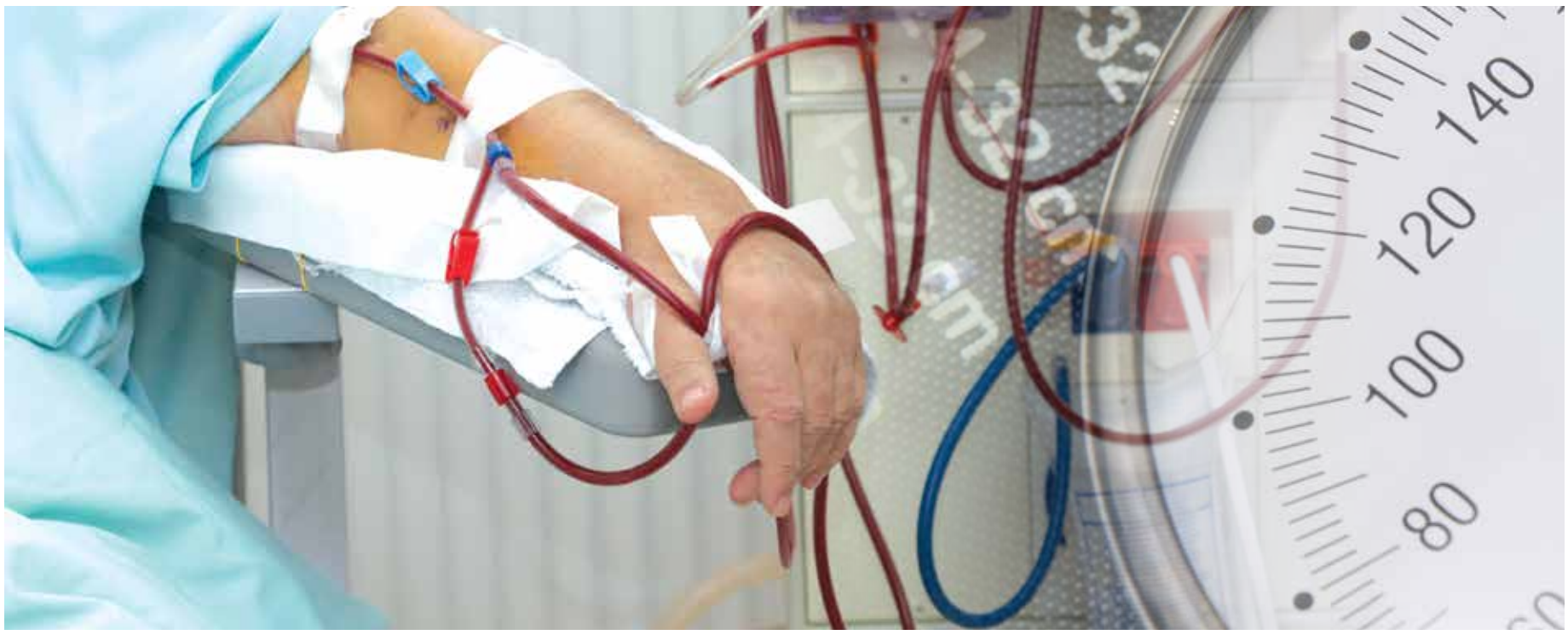

Hypertension in Dialysis: A Sea of Numbers but No Clear Path?

By Maria Clarissa Tio, Linda Highfield, and Tariq Shafi

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Cardiovascular disease affects two-thirds of 500,000 US individuals undergoing dialysis, causing almost half of all deaths (1). Despite its high burden, cardioprotective strategies efficacious in the general population have limited evidence in the dialysis population due to traditional and nontraditional risk factors, many of which are nonmodifiable. However, hypertension, affecting 80% of individuals undergoing dialysis, remains a critical, modifiable exception. Blood pressure (BP) control through volume optimization was linked to improved cardiac structural markers (2), and pharmacologic BP control may reduce cardiovascular events and mortality among individuals undergoing dialysis (3).

Hypertension management in hemodialysis is complex due to several factors. First, nephrologists are inundated with an overwhelming amount of BP data collected before, during, and after each dialysis treatment, complicating interpretation and integration into clinical decision-making. Dialysis induces extreme physiologic flux—predialytic hypertension, often exacerbated by the practice of withholding antihypertensives, is frequently followed by intradialytic or postdialytic hypotension. Another issue is measurement technique; BP readings by dialysis staff are higher than those obtained by research personnel following standardized techniques in the same clinical setting (4). Nephrologists must navigate this "sea of numbers," many of which may not be reliable. Second, our understanding of hypertension outcomes is largely extrapolated from observational data, as people on dialysis have been systematically excluded from landmark trials. However, this is not straightforward in the dialysis population. For instance, predialysis BP has a U-shaped association with mortality, whereas intradialytic hypotension and hypertension may be associated with poor outcomes. Epidemiologic data suggest that interdialytic BP has a more consistent linear association with cardiovascular events and mortality (5, 6). Third, no major organization, to our knowledge, has issued a definitive, evidence-based recommendation for BP targets in people on dialysis. Nephrologists operate on the suggested expert opinions of the 2019 Kidney Disease Outcomes Quality Initiative (KDOQI) to diagnose hypertension based on ambulatory or home BP measurements (7). Finally, implementation remains a barrier, as low uptake of home BP monitoring (<50%) and high rates of discontinuation are common in people on dialysis (8).

Against this backdrop, Bansal et al. explored nephrologists' perceptions of BP management in dialysis using the Diffusion of Innovations framework (9). Clinicians recognized the relative advantages of home BP monitoring, including improved patient engagement and more representative measurements, but identified persistent barriers related to workflow, uncertainty in evidence and treatment targets, and concerns about patient burden and data quality. From an implementation perspective, these findings suggest that home BP monitoring remains in a preimplementation to early-adoption phase, with broad conceptual acceptance but limited integration into routine care. Progress will require addressing gaps in standardization, validation, and operational specifications to ensure that future trials evaluate not only effectiveness but also whether home BP-guided care can be delivered reliably at scale.

Although these insights provide a crucial blueprint for future trials and implementation strategies, we note that the respondents were academic nephrologists (9). Their perspectives may not be generalizable to most nephrologists in the United States. This study also brings us to a more fundamental challenge in the field: How can we successfully conduct clinical trials in a population systematically excluded from landmark studies and successfully implement new evidence within the operational constraints of dialysis clinics? ■

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Listening to the Fears of the Past to Open Hearts for the Future: Addressing Organ Donation Disparities in Minority Communities

By Lisa Schwartz

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When John Bayton arrived seriously ill at the emergency department in 2003, organ transplantation was the last thing on his mind. But a diagnosis of kidney failure that required immediate dialysis suddenly shone a spotlight on his new and sudden reality. His kidneys were failing.

Bayton was suddenly thrust into a new life filled with medications and life-sustaining dialysis treatments as he was forced to come to terms with kidney failure and a precarious future. He said that, like so many other people with the silent killer known as chronic kidney disease, he was unaware of his condition until it was too late.

Then his care team asked a question that would alter the trajectory of his future: Would he consider a kidney transplant?

Bayton recalled feeling overwhelmed and afraid at the lack of information about his disease or the organ donation and kidney transplant process. "Especially in communities of color, there is a fear of not knowing what to expect," Bayton said. "There is a certain distrust of our medical system, and that is felt particularly among minorities, especially lower-income communities of color; the stories of the past are always there, front and center."

After research and many conversations with his care team, Bayton decided to join the national waiting list for a deceased donor kidney, while dialysis became part of his daily reality. In 2009, he received his first transplant. But by 2016, his body began rejecting the kidney, forcing him back onto dialysis and the transplant waiting list. Approximately 3 years later, in 2019, he received a second kidney transplant and another chance at life. He was determined not to let this chance go to waste and has been a vocal proponent of organ donor awareness among racial and ethnic minority communities throughout the Washington, DC, region, where he resides and works.

The trust gap in organ donation

Bayton's story reflects a larger societal challenge. Racial and ethnic minority populations are disproportionately affected by kidney diseases and comprise a substantial share of transplant waiting lists, according to the National Kidney Foundation (1). Organ donation rates are also significantly lower in many racial and ethnic minority neighborhoods. In 2025, Black Americans represented approximately 27% of candidates on the organ transplant waiting list but accounted for about 13% of organ donors nationwide, according to the US Department of Health and Human Services Office of Minority Health (2).

"The answer is never straightforward when it comes to issues connected to health disparities," said Chiledum Ahaghotu, MD, MBA, MHL, FACS, vice president of medical affairs and chief medical officer at MedStar Southern Maryland Hospital Center in Clinton, MD. "There is a history of distrust among African American and other minority communities when it comes to interacting with US health systems, which can be a major impediment to community engagement in conversations about and enrollment in organ donation programs."

According to Tanjala S. Purnell, PhD, MPH, associate professor at Johns Hopkins Schools of Public Health and Medicine, historical and ongoing fears of medical mistreatment continue to shape decision-making about donation. But mistrust is only part of the equation.

Purnell noted that structural barriers, including the timing and quality of patient–practitioner communication, language barriers, fragmented health care, financial concerns, future insurability for living donors, and rising rates of chronic disease, also influence donation rates. The increasing prevalence of hypertension, diabetes, and kidney diseases in racial and ethnic minority communities often limits the number of medically eligible living donors within families and social networks. "There is, however, a clear opportunity to increase the organ donation rates as well as awareness among minorities in our communities," added Ahaghotu.

Creating trusted connections and partnerships

Awareness about the value of organ donation has largely been driven by grassroots, culturally sensitive education, and trusted community partnerships.

Purnell points to valuable community-based strategies that have proven effective, such as partnering with trusted leaders; holding education sessions in locations in which people feel safe, such as churches, libraries, festivals, and health fairs; and employing organ donation professionals who have deep roots within the communities they serve. "There is great work being done in multiple regions around the country to help dispel myths and better highlight the benefits of organ donation. The National Minority Organ Tissue Transplant Education Program (National MOTTEP), for example, has worked diligently since 1991 to demonstrate the value of multipronged community-engaged approaches to increase organ donation by dispelling myths and helping to allay fears," explained Purnell, who also serves on the National MOTTEP board.

Purnell's own work emphasizes this partnership. Through her community advisory board, The Faith-Based Alliance for Kidney Health and Transplant Access, she collaborates with faith communities and patient advocates to better understand fears, improve communication, and identify practical interventions.

At the local level in Southern Maryland's Prince George's County, Ahaghotu sees similar success through partnerships with faith communities, including outreach through churches and trusted community organizations. "The first step in engaging people is to establish open and honest dialogue and provide factual information," he said.

These conversations, he explained, do not just encourage donor registration but also help demystify transplantation by initiating the conversation about what living and deceased donation involves, how organ allocation works, and why concerns about inequitable treatment deserve acknowledgment rather than dismissal.

The role of the nephrology community

For nephrologists and kidney care professionals, addressing organ donation disparities not only requires more educational campaigns but also warrants focused relationship-building with patients and families.

Purnell encourages nephrology teams to practice "bidirectional learning"—listening to patients and greater communities to understand fears and lived experiences. "Often, this involves showing up during times when we are not asking people to participate in research studies, clinical trials, or activities that directly benefit our organizations," she said. "Communities want to first know who we are and that we genuinely care."

Ahaghotu echoes the importance of active listening. "Perception is reality," he said. "When there are concerns, those concerns must be heard and acknowledged. It is only when you authentically create the right tone to the conversation that people become more receptive to hearing other viewpoints and processing new information."

For Bayton, trust is built one conversation at a time. Whether speaking at community events, appearing in public service campaigns for Infinite Legacy—a nonprofit organ procurement organization—meeting with legislators on Capitol Hill, or talking to patients at transplant clinics, he shares a message rooted in deep personal experience: Organ donation saves lives.

Bayton understands the fear because he lived it. He also understands what is possible when patients receive accurate information and compassionate guidance. "As we increase organ donations in minority communities, we increase the pool of available organs, making it easier for [racial and ethnic minority individuals] to receive the transplants they need," Ahaghotu said. "It's a cycle that begins with education, awareness, and trust. As medical professionals, we must go into these conversations with open minds, open hearts, and a willingness to listen." ■

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Is It the AI—and Is It Worth It? AI-Driven Hospitalization Prevention Among People on Dialysis

By Fangning Gu

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Dialysis presents a compelling environment for artificial intelligence (AI), given the extensive structured data it produces and the high health care utilization among its patients (1). However, despite the growing number of models developed in research settings, translation into routine clinical practice has been limited. Chaudhuri et al. make a meaningful contribution toward bridging this divide (2).

Their AI models, developed to predict 7-day hospitalization risk, were implemented at scale across 1786 integrated clinics and incorporated directly into clinical workflows. Every patient was assigned a risk score, with values of 0.64 or more prompting review and intervention by a case manager nurse. Rather than focusing on model performance metrics, the study assessed a clinically meaningful endpoint: 7-day all-cause hospitalization using linked electronic medical records and Medicare claims. The intervention was associated with a statistically significant 8% reduction in hospitalization odds (odds ratio, 0.92; p = 0.025), with the benefit primarily observed in the mid-risk group scores (0.64–0.85) and no significant effect in those with scores above 0.85. These results highlight the feasibility of large-scale implementation. The key question, however, remains: What incremental value does the AI itself provide?

Two issues complicate the interpretation of the observed effect. First, nearly 40% of patients who received the intervention were already under active clinical management independent of the AI-triggered nurse review, raising the possibility that the model is credited for care that it did not initiate. Second, the study design did not allow separation of the effect of nurse case management from that of AI-guided triage because the control group received no intervention. Prior randomized trials have already shown that augmented nurse case management reduces hospitalizations in kidney diseases (3). The relevant question is whether AI meaningfully enhances this effect by targeting patients with higher risk—and at what cost.

That cost is likely high. Only 4% of patients with scores above 0.64 received nurse review, reflecting real-world resource constraints. In the 0.64 to 0.75 risk score range, approximately 370 reviews were required to prevent one additional hospitalization; in the 0.75 to 0.85 range, 148 reviews were needed. Above 0.85, no benefit was observed. These numbers raise questions about whether the observed effect size is clinically meaningful relative to the operational burden required to achieve it.

To be fair, the model does appear to capture true risk signals: Hospitalization rates increase with predicted risk. However, the model was trained on 2020 data and deployed in 2023 without documented recalibration. Model performance metrics at deployment are not reported. Reporting such metrics in the target population is a standard expectation for clinical prediction models (4), and their absence limits interpretability.

Despite these limitations, the study represents a meaningful advance and has been recognized as such (5). The next step is to evaluate such systems with rigor: performance reporting; a comparison arm that isolates effects from AI; a prespecified, sufficiently large effect size before declaring a result "significant"; and a cost-benefit analysis (6). Only then can we determine not just whether these systems work but whether the benefit is attributable to AI—and sufficient to justify its cost. ■

Fangning Gu, MD, is with the University of Colorado Anschutz Medical Campus, Aurora.

The author reports no conflicts of interest.

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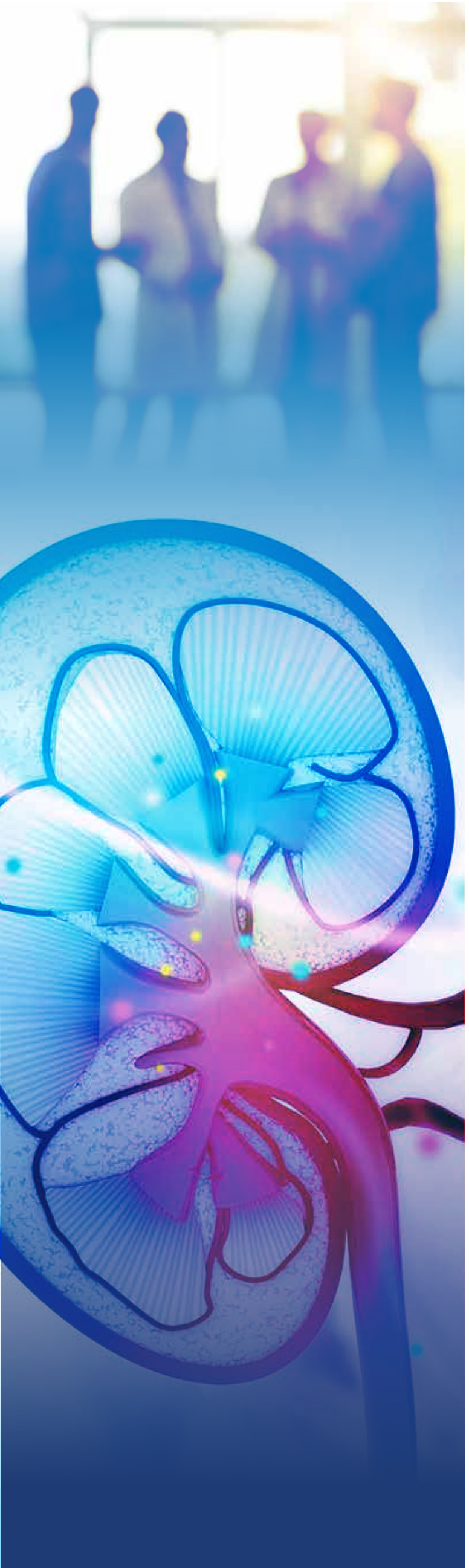

ALIGNING NEPHROLOGY TRAINING

With Advances in Clinical Care

By Matthew A. Sparks and Jia Hwei Ng

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Nephrology is undergoing rapid transformation. As the field sees an increase in mechanistic insights, novel therapeutics, genomics, and biomarkers, educational approaches must evolve to keep pace. Although the volume of information is unprecedented, access to knowledge has never been easier. The digital transformation of medicine began with social media, with nephrology leading through initiatives such as NephJC, NephMadness, GlomCon, and NephSIM, which redefined engagement through open access, global collaboration, and real-time discussion.

We are now entering the next transition: a shift from social media–driven dissemination to an era increasingly shaped by artificial intelligence (AI). Since the public release of tools such as ChatGPT in 2022 to now OpenEvidence, Google NotebookLM, and Claude CoPilot, among many others, AI has found its way into every facet of nephrology including education, research, and clinical care. Unlike social media, which excels in distribution and dialogue, AI enables rapid synthesis of complex data into potentially actionable insights at the point of care or the point of learning. Yet this capability demands caution. AI systems are only as reliable as the data and assumptions that underlie them, and risks of inaccuracy, bias, and over-reliance remain substantial. For nephrology, the goal should not be replacement of clinical reasoning but the advancement of augmented intelligence, tools that enhance rather than supplant clinician judgment, critical thinking, and expertise.

This shift represents both opportunity and responsibility. Just as nephrology once led in adopting social media for education and community building, it is now uniquely positioned to lead in the thoughtful, measured integration of AI, ensuring that innovation is coupled with rigor, oversight, and patient-centered care.

This double-issue (July and August) special section explores frameworks for adapting fellowship education through graduated competency levels. Level I encompasses core skills required of all fellows across chronic kidney disease, electrolytes, stones, glomerulonephritis, onconephrology, transplant, vascular access, genetics, hypertension, and acute kidney injury. Level II includes focused expertise achievable within standard fellowship, such as glomerular disease, stones, genetics, palliative care, and onconephrology. Level III reflects highly specialized training requiring additional dedicated time, including advanced glomerular disease, transplant, and interventional nephrology, among other emerging areas. This tiered approach offers both structure and flexibility while preserving core competency.

The first of a two-part *Kidney News* education issue brings together perspectives reimagining nephrology training. We begin with glomerular disease education as a call to action, followed by innovations in peritoneal dialysis education. The evolution of kidney stone education highlights changing management paradigms, while kidney transplant education addresses growing complexity in care. The "pulse" of progress reflects advances in hemodialysis vascular access, and a forward-looking article on focused learning tracks proposes more individualized training pathways aligned with these competency tiers. Together, these contributions underscore a shared recognition: Nephrology education must evolve in step with the field, thoughtfully integrating new technologies while preserving the primacy of expert clinical judgment. ■

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Now More Than Ever, Glomerular Disease Education Needs to Lead Nephrology Training

By Alessandra Tomasi, Aarushi Varshney, Harpreet Singh, and Pamela Vasquez Buitron

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Clinical education on the diagnosis and management of glomerular diseases is a core component of nephrology fellowship training (1). Accounting for more than 25% of chronic kidney disease and kidney failure, nondiabetic glomerular pathologies remain a significant and prominent cause of both morbidity and mortality among patients of all ages. Additionally, according to the American Board of Internal Medicine, glomerular disorders account for 11% of questions on the nephrology board examinations (2). Yet, the management of glomerular disease remains, as often cited by nephrology fellows, a source of relatively low confidence by the end of training (3, 4).

The treatment of patients with glomerular diseases is complex, expanding, and often multidisciplinary. It involves understanding not only disease pathophysiology and potential immunosuppressive treatment but also gaining the skills to interpret histology, risk stratify clinical presentations, and counsel on, as well as manage, the potential effects of treatments. This practice also entails working alongside other subspecialties to monitor closely, identify treatment gaps, and modify therapy plans.

In the past 5 years, treatment options have quickly evolved to become increasingly targeted toward specific underlying disease mechanisms, made possible by a dramatic increase in clinical trials for patients with glomerular diseases. Because of this, providing a foundation for nephrology trainees to independently manage glomerular diseases requires a multifaceted and intentional approach.

In considering a competency-based training model for nephrology fellowships, level I competency focuses on core skills and knowledge attained by all trainees, whereas level II emphasizes a more advanced, individualized experience within a particular subspecialty of nephrology (5). To this end, education on glomerular disease diagnosis and treatment relies not only on direct exposure through patient care but also on ensuring that nephrology fellows remain up to date on the latest advancements in the field. Learning from patients in the hospital and clinic in real time offers crucial hands-on experience for trainees on management strategies and clinical trajectories. Fellows are exposed to patients presenting with glomerulonephritis (GN) diagnoses through inpatient consult services as well as in their continuity clinics, ensuring attainment of at least a level I competency before fellowship graduation (6). For trainees whose goal is to increase exposure to further subspecialize within the GN field, additional longitudinal clinics can be added to their weekly schedule to work under the mentorship of faculty who subspecialize within glomerular diseases to help increase their breadth of clinical exposure and attain level II competency in the subject (5).

Extra-clinical discussions on novel diagnostic and therapeutic approaches can then occur through academic activities, including department-wide grand rounds and journal clubs, as well as dedicated didactic sessions with nephropathologists and clinical faculty who specialize in glomerular disorders, to help increase trainee competency in the field (Figure). At Duke University in Durham, NC, fellows also participate in the following dedicated conferences and seminars:

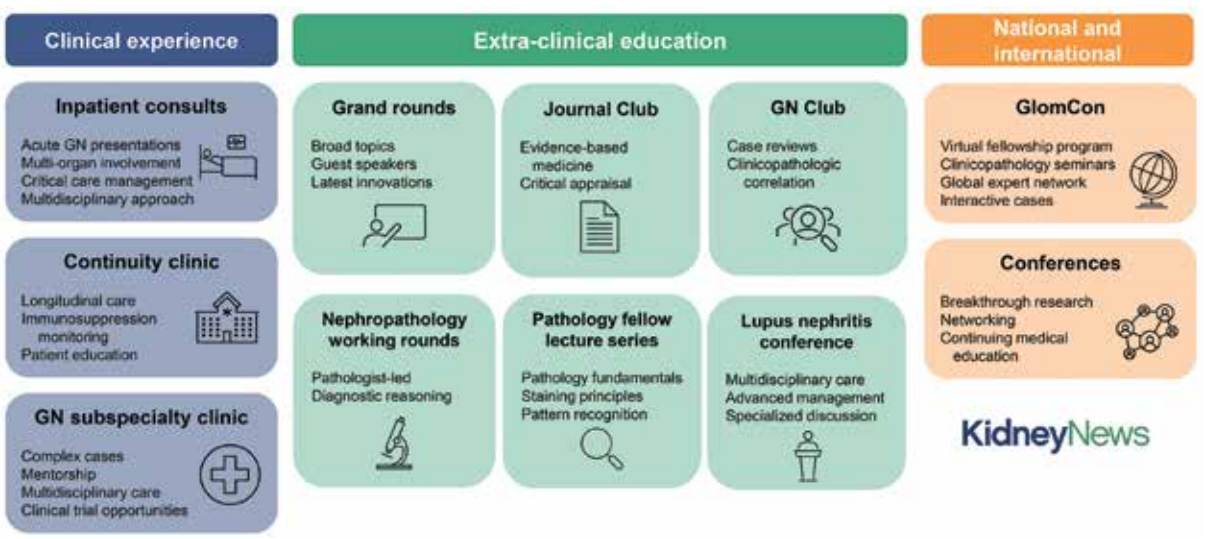
- Nephropathology working rounds: Nephropathologists review kidney biopsies in real time and as a group to discuss complex pathology and align on diagnoses (occurs monthly).
- Fellow-led pathology conferences: Trainees present and interpret histology slides associated with glomerular disease diagnoses in a case-based format (occurs each academic half-year).
- GN Club: Individual case-based sessions focus on a single glomerular disease to present data; discuss management and surveillance strategies, including understanding possible complications and treatment failures; and debate alternative approaches (occurs bimonthly).
- Lupus nephritis: Case discussions involving both the Department of Nephrology and the Department of Rheumatology to review patient cases and discuss clinical management strategies in collaboration with multidisciplinary teams (occurs quarterly).

Through these seminars, trainees are provided with access to dedicated platforms to review each other's cases in real time and understand the underlying medical decision-making. Outside of Duke University, trainees are additionally provided the opportunity to attend and enroll in synchronous online learning opportunities, such as the Glomerular Disease Study and Trial Consortium (GlomCon), continuing medical education activities geared specifically toward the diagnosis and management of glomerular diseases, and conferences on the topic.

Finally, in alignment with the continually expanding field of glomerular disease, nephrology fellows are afforded the opportunity to participate in scholarly activities, including original clinical research; industry-based clinical trials; and publications of case reports, case series, or reviews, and to contribute to additional platforms for GN education, such as NephMadness and podcast recordings. By staying updated on the current literature and expanding conversations to include glomerular disease-trained faculty across different institutions, trainees can glean a diverse perspective on practice strategies.

Ultimately, it has been shown that on a national level, nephrology fellows' exposure to glomerular disease education varies significantly across training programs (3). By identifying and prioritizing opportunities for involvement in educational and scholarly activities that go beyond clinical practice, trainees can start to build their own educational tracks within their training programs, with the goal of increasing confidence in diagnosis and decision-making. Furthermore, by offering enhanced clinical support, mentorship, and access to external opportunities, training programs can help improve trainees' experiences in managing glomerular diseases. ■

Figure. Opportunities beyond clinical practice



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The authors report no conflicts of interest.

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Innovations and Advances in Peritoneal Dialysis Education

By Ankur Shah, Maria Bermudez, and Osama El Shamy

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Peritoneal dialysis (PD) delivery is contingent on both patient and practitioner proficiency. Whereas use of PD in the United States has been expanding steadily, driven by favorable federal reimbursement policies, gaps persist in both practitioner and patient educational attainment.

Patient training

Training patients for PD includes the delivery of educational materials and videos, as well as conducting manual exchanges and/or cycler therapy, typically performed in the home dialysis unit. Although some units provide varying degrees of flexibility, for employed individuals and those with transportation issues, coming to the dialysis unit for treatment sessions can be a tall and prohibitive task. One solution to this problem is the adoption of existing virtual reality training, such as the stay.safe MyTraining VR (Fresenius Medical Care) (1). It is not meant to replace in-person hands-on training but rather to serve as a complimentary training tool for patients. These interactive training modules cover the manual exchange portion of the training and can be completed in the comfort of the patient's home. With visual and auditory prompts, patients must execute each step correctly before moving on to the next step of the setup process. Another add-on feature is that the training can be provided in different languages, making it accessible to patients of different backgrounds. A recent meta-analysis of virtual reality training interventions for 625 individuals on dialysis found improvements in self-efficacy and social functioning, among other psychological and social benefits (2). Virtual reality PD training can also be a useful tool in training new PD nurses and practitioners who are interested in expanding their hands-on experience with PD.

Physician and trainee training

A 2010 survey of nephrology fellows who graduated between 2004 and 2008 found that only 56% felt well-trained and competent in PD (3). A 2025 survey of 645 nephrology fellows demonstrated persistence, with 53% of second- and third-year nephrology fellows reporting feeling well-trained in PD (4). Over 60% of second- and third-year fellows reported having barriers to home dialysis education in their training program (4).

Several home dialysis "boot camps" have formed to improve fellow and physician education, including:

- Home Dialysis University (HDU) for physicians: https://hduphysicians.com/ and for fellows: https://www.hdufellows.com/
- Home Dialysis Academy of Excellence: https://hdexcellence.org/
- ASN-HDU Home Dialysis Scholarship Program: https://epc.asn-online.org/projects/hdp/home-dialysis-scholarship-program/
- Home Dialysis Academy: https://www.uab.edu/medicine/nephrology/news-events/events/academies/home-dialysis-academy

These programs provide attendees with didactics and hands-on training led by experts in the field. The joint ASN-HDU Home Dialysis Scholarship Program adds virtual longitudinal training to HDU, building collaborative working relationships between faculty and attendees. An objective structured clinical examination (OSCE) assessment tool with a high content validity index was developed by the Nephrology Education Research and Development Consortium to determine fellow proficiency in managing PD-associated peritonitis and was tested across 16 programs and 87 fellows (5). The expansion of OSCE measures of proficiency in PD training and management presents an exciting opportunity.

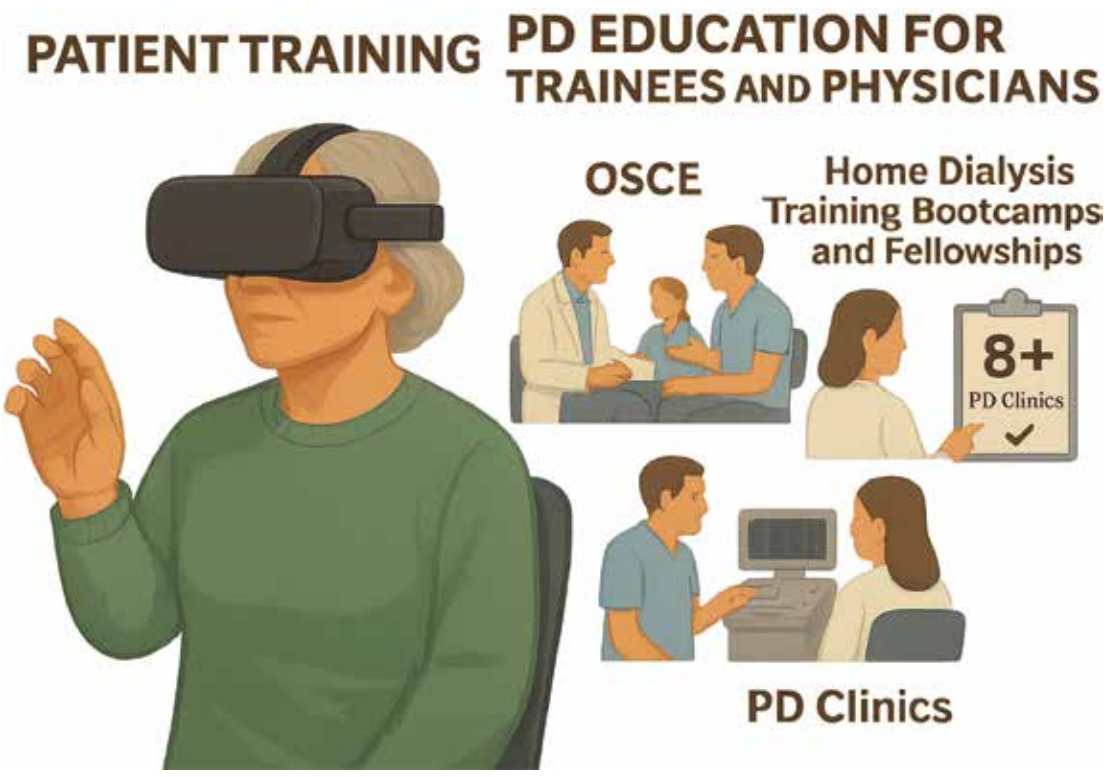
Formally addressing this educational attainment gap, as of July 1, 2024, the American Board of Internal Medicine (ABIM) requires that fellows complete a minimum of eight outpatient PD clinics, be involved in key aspects of initial patient training for PD and the interprofessional nature of PD delivery, and be fully competent in the PD procedure (6, 7). Encouragingly, in the 2025 survey, second- and third-year trainees who had attended 8 or more PD clinic sessions and/or were involved in the care of over 30 patients reported feeling well-trained in PD (73% and 77%, respectively) (4). This finding supports ABIM's clinic exposure requirement and emphasizes the importance of highlighting patient-exposure metrics in future requirements (4).

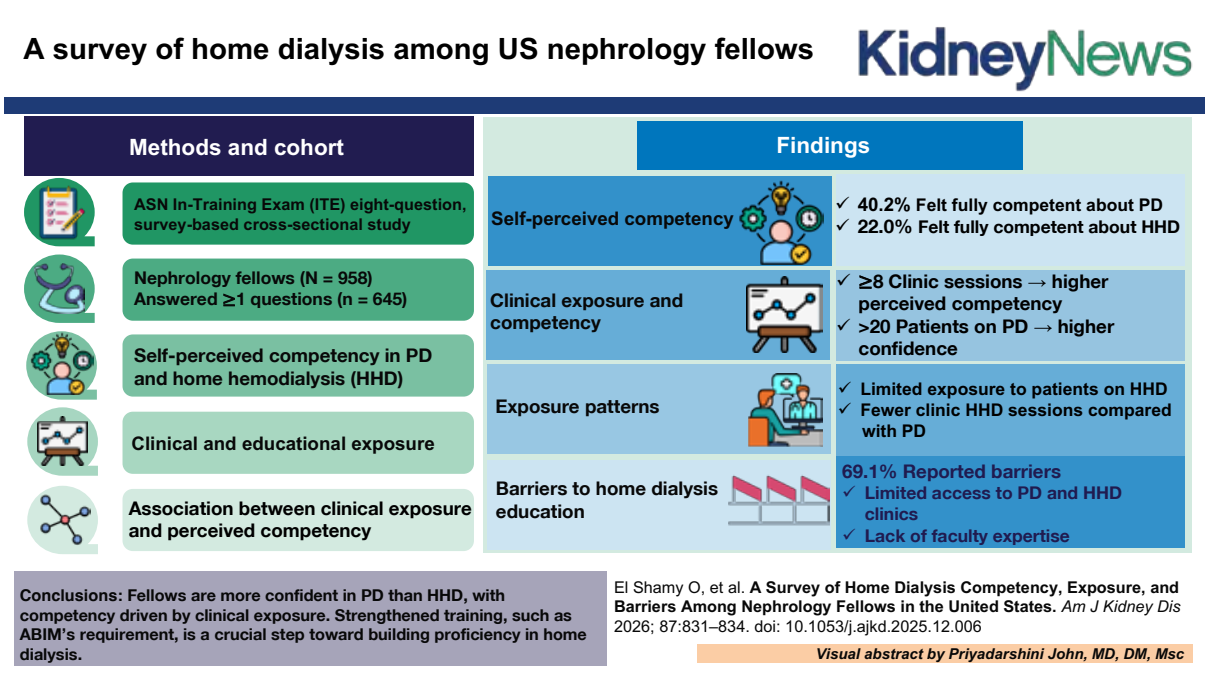
Conclusion

PD education for patients and practitioners requires continued innovation and growth (Figure). There is a need for more hands-on exposure for nephrologists (both in training and in practice) and members of the care team through expanding access to a larger number of patients and clinic sessions. Given the current PD landscape, this can only be achieved through collaborative efforts among local private groups and large dialysis organizations. Wider adoption of virtual reality PD training and simulation-based techniques provides a supplemental tool to bridge this gap in exposure and may help reduce the number and burden of in-person PD training sessions for both patients and practitioners. PD education for trainees is evolving with the development of

Continued on page 14 >

Figure. Developments in PD training





Innovations and Advances in Peritoneal Dialysis Education

Continued from page 13

OSCEs, home dialysis training boot camps and fellowships, and the latest ABIM requirements, the anticipated success of which should open the door for further enhancements and the introduction of some home hemodialysis-specific growth initiatives in the future. ■

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From Foundational Resources to Future Frameworks: The Evolution of Kidney Stone Education in Nephrology

By Kirsten Martin and Jodi Antonelli

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As experts in renal physiology, nephrologists are uniquely equipped to evaluate and manage the metabolic contributors to kidney stone formation, such as renal tubular acidosis, primary hyperparathyroidism, or genetic impairments on renal calcium handling. Despite this, graduating nephrology fellows frequently report low confidence in the diagnosis and management of kidney stones and express a desire for more comprehensive training in this area (1, 2). Historically, pathways for obtaining specialized training in kidney stone prevention and management have also been poorly defined. Together, these gaps underscore the need to expand both interest in and access to education in nephrolithiasis. In this article, we explore recent innovations and advances in kidney stone education that aim to help bridge this gap.

Several other subspecialties within nephrology have emerged in the last several years (e.g., onconephrology, glomerular diseases, and home dialysis) (3). This growth has highlighted the need to more clearly define the educational goals of both general nephrology training and areas of subspecialization such as nephrolithiasis. In 2023, the ASN Task Force on the Future of Nephrology defined three levels of competencies during training (4). Level 1 was defined as the basic level of competency that all graduating fellows should achieve. Level 2 was defined as an "area of concentration," in which a fellow could dedicate 6 to 9 months to more specialized training during the second year of a 2-year training program. Level 3 was defined as competency obtained during an additional year of training, such as an additional fellowship in transplant or interventional nephrology. To our knowledge, there are currently no dedicated year-long fellowships for a nephrologist to obtain additional training in nephrolithiasis, so based on these definitions, there is not currently a pathway for level 3 training. However, there is an abundance of educational material available to fellows interested in obtaining a level 2 type of subspecialty training, which we will explore here.

Optimal treatment of a patient with recurrent nephrolithiasis requires partnership with a urologist who can address stones when they become symptomatic or require surgical intervention. Given that optimal nephrolithiasis care is collaborative, a multidisciplinary approach to kidney stone education can also produce the most robust training in kidney stone management. Within an institution, a multidisciplinary clinic represents a rich resource for education of both urology and nephrology fellows in the management of kidney stones, allowing trainees to learn through seeing patients directly. Such collaborative clinics are not universally available, but any clinic that sees a large volume of patients with kidney stones is still an important resource.

Efforts have also been made at a national and an international level to increase opportunities for interdisciplinary collaboration. For instance, the medical directors of Litholink (nephrologist John Asplin, MD, FASN, and urologist Sara Best, MD) offer an intensive "stone camp" course, which teaches physicians who are interested in pursuing a career in kidney stone prevention about the metabolic evaluation of stone disease. Additionally, the Research on Calculus Kinetics (R.O.C.K.) Society's Annual Meeting is a multidisciplinary meeting that recently opened registration to nonmembers. The International Society of Urolithiasis holds a global symposium every 4 years to bring together health care professionals of all specialties who manage kidney stones and will be resuming an in-person meeting in October at Northwestern University in Chicago, IL, after a hiatus during the COVID-19 pandemic. Such multidisciplinary meetings provide an opportunity for trainees to learn about innovations in management of kidney stones.

Furthermore, there are many published texts and online resources available to learn about management of kidney stones. The 2023 Core Curriculum in Nephrology article on kidney stone evaluation and management provides a concise, case-based approach to the evaluation and management of a variety of different types of kidney stones (5). Fredric Coe, MD, FASN, and Anna Zisman, MD, FASN, have written an accessible online textbook, the *Kidney Stone Guide Book*, which features text, videos, and a series of cases with 24-hour urine data to practice interpretation and simulate management with real patient data (6). The *Pocket Guide to Kidney Stone Prevention* (7) and *Urinary Stones: Medical and Surgical Management* (8) are more traditional textbooks that highlight both medical and surgical management of nephrolithiasis.

Although we are not currently aware of any dedicated training programs for nephrologists to gain additional training in treating patients with recurrent nephrolithiasis, there are many high-quality resources available to those interested in developing a clinical niche in this subspecialty. Additionally, there are increasing opportunities for interdisciplinary collaboration and learning, particularly with urologists, which will hopefully allow more institutions to develop multidisciplinary stone clinics. As these partnerships continue to develop, more educational materials, such as podcasts, online courses, and perhaps ultimately a dedicated fellowship, can be developed to increase access to education about management of nephrolithiasis and ultimately allow patients easier access to physicians who are well trained in kidney stone prevention. ■

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Enhancing kidney stone education

KidneyNews

Lecture topics

Types of stones and risk factors
- Calcium oxalate
- Calcium phosphate
- Uric acid
- Cystine

Interpretation of 24-hour urine

Stone-specific dietary treatments
- Limiting dietary sodium
- Increasing hydration
- Sufficient dietary calcium
- Avoiding excessive protein intake
- Limiting high-oxalate foods

Stone-specific medical treatments

Causes of hypercalciuria
- Primary hyperparathyroidism
- Sarcoidosis
- Multiple myeloma
- "Idiopathic" hypercalciuria

Genetic disorders implicated in nephrolithiasis
- Primary hyperoxaluria
- Cystinuria
- Dent disease
- Genetic drivers of hypercalciuria including SLC24A1, SLC34A1, and SLC34A3

Medications that increase risk for nephrolithiasis
- Vitamin C supplements
- Topiramate and carbonic anhydrase inhibitors
- Loop diuretics
- Steroids
- Calcium-based antacids

Areas of ongoing research

Resources

Key article:
- 2023 Core Curriculum in Nephrology "Kidney Stone Pathophysiology, Evaluation and Management: Core Curriculum 2023" by Shastri et al. (5)

Online text:
- *Kidney Stone Guide Book* with associated patient cases by Coe and Zisman (6)

Textbooks:
- *Pocket Guide to Kidney Stone Prevention: Dietary and Medical Therapy* by Monga et al., eds. (7)
- *Urinary Stones: Medical and Surgical Management* by Grasso and Goldfarb, eds. (8)

Upcoming conferences
- R.O.C.K. (Research on Calculus Kinetics) Society Annual Meeting: January 2027
- International Society of Urolithiasis Symposium (every 4 years): October 2026

Kidney Transplant Education: Current Perspectives and Future Directions

By Mary Ann Lim, Divyanshu Malhotra, and Anju Yadav

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The number and complexity of kidney transplant recipients are increasing, yet the transplant workforce has not grown at the same pace (1, 2). This gap highlights the urgent need to train well-qualified practitioners (1–3).

Kidney transplant education must respond to this challenge by addressing two critical priorities (Table):

1. the recruitment, training, and evaluation of transplant nephrology fellows
2. the provision of robust transplant education for general nephrology fellows and practicing nephrologists, specifically emphasizing curriculum content on patient-selection criteria; immunosuppression management; and post-transplant follow-up care to ensure safe, effective, and seamless transitions of care

Recruitment, training, and evaluation of transplant nephrology fellows

In 2024, ASN and the American Society of Transplantation (AST) achieved a major milestone: The Accreditation Council for Graduate Medical Education (ACGME) recognized transplant nephrology as a subspecialty (4–6). Since then, transplant fellowship programs have pursued ACGME accreditation. The first cohort of fellows trained under ACGME-accredited transplant programs may graduate as early as June 2027. ACGME milestones will guide the development of a standardized trainee evaluation framework, anticipated to be completed before 2027. This initiative marks an important step toward national standardization of transplant nephrology training through competency- and milestone-based education (6). ACGME accreditation will help ensure protected time for educators and institutional support for trainee education (6, 7).

Although these changes represent an initial move toward standardizing transplant education, sustained innovation and investment are essential, most notably in multi-institutional collaboration and the development of a robust, shared curriculum. Existing national educational resources, such as AST's T3 (Timely Topics in Transplantation) webinars, journal clubs, the American Transplant Congress (ATC), Cutting Edge of Transplantation (CEoT), and Kidney Week, may target experienced transplant nephrologists (8). The AST Fellows Symposium on Transplantation offers education and networking for fellows but is not kidney-focused. Institution-specific webinars, case conferences, and didactic sessions vary in scope and quality.

A proposal that transplant nephrology program directors collaborate to establish a national forum that periodically convenes all US transplant nephrology fellows for standardized training is encouraged. This initiative could include a centralized "boot camp" at the start of fellowship focused on foundational transplant principles; longitudinal, case-based learning sessions throughout the year; and later-stage programming dedicated to regulatory, administrative, and financial aspects of transplantation. Implementation of such an initiative would require dedicated resources and funding, which national societies are well-positioned to provide. Importantly, this type of national educational platform could also serve as a pipeline for workforce recruitment by engaging trainees earlier in their careers.

Transplant education for general nephrology fellows and practicing nephrologists

The rapidly expanding population and complexity of kidney transplant recipients necessitate shared-care models involving general nephrologists (2). Thus, adequate transplant education for nephrology fellows and continuing education for practicing nephrologists are essential to ensure safe and effective transitions of care.

Current ACGME requirements for nephrology fellowship training require fellows to gain supervised pre- and post-transplant clinical experience. Fellows complete at least 2 months on an active transplant service, provide immediate post-transplant care for at least 10 new recipients, and spend at least 3 months treating at least 20 transplant recipients in ambulatory settings (9). Fellows who complete these requirements graduate with a foundation in the care of transplant recipients.

The rapid pace of scientific advances, evolving clinical practices, and increasing complexity of transplant recipients demand ongoing transplant education beyond fellowship. nephSAP (Nephrology Self-Assessment Program), the Glomerular Disease Study and Trial Consortium (GlomCon) Transplantation Series, and local or regional webinars and symposia for general nephrologists provide continuing education options. National meetings such as Kidney Week and the National Kidney Foundation (NKF) Spring Clinical Meetings have offered some transplant-focused sessions. National conferences need to provide more robust transplant-specific educational offerings to meet this demand (10). Practicing nephrologists juggle competing clinical and administrative requirements, so they need innovative, flexible educational formats. Reputable organizations can provide short, high-quality online videos or podcasts, especially those offering maintenance of certification (MOC) credit, to deliver accessible, ongoing transplant education.

Table. Status of kidney transplant education, existing resources, and gaps by educational domain

Domain	Current status	Existing resources	Gaps and needs
Training of transplant nephrology fellows			
Accreditation	ACGME recognition achieved in 2024, programs applying for accreditation, and first graduates from ACGME-accredited programs expected June 2027	ACGME transplant nephrology program requirements	Institutional support for funding of fellow salary, faculty FTE, and program coordinator support
Curriculum and evaluation	Competency- and milestones-based framework under development	Institution-specific webinars, case conferences, and didactic sessions	Standardized assessments beyond institutional evaluations (i.e., in-training examination)
National fellow education	No kidney-specific national transplant fellow forum exists.	AST Fellows Symposium (not kidney-specific), AST T3 webinars and journal clubs, ATC, CEoT, and Kidney Week (geared toward experienced nephrologists)	National boot camp-style forum, longitudinal case conferences, sessions on regulatory and financial topics, and national society funding
Transplant education for general nephrology fellows and practicing nephrologists			
Fellowship requirements	ACGME mandates 2 or more months on transplant service, care for 10 or more new recipients, and 3 or more months of ambulatory care with 20 or more recipients.	ACGME nephrology program requirements	Foundational exposure only and insufficient for evolving complexity
Continuing education	Some transplant-focused sessions at national meetings	nephSAP, GlomCon Transplantation Series, local or regional symposia, Kidney Week, and NKF Spring Meeting	Expanded transplant sessions at national conferences; short online videos and podcasts with MOC credit; and flexible, innovative formats for busy practitioners

FTE, full-time equivalent.

Conclusion

Recent advances in transplant education, including ACGME accreditation of transplant nephrology, represent important progress toward improving training for transplant practitioners. Nevertheless, significant gaps remain. Continued and coordinated efforts are needed to ensure efficient, standardized, and sustainable delivery of transplant education for both transplant-focused physicians and general nephrologists. Addressing these gaps will be essential to meeting the growing needs of the kidney transplant population and to ensuring high-quality care across the continuum. ■

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The authors report no conflicts of interest.

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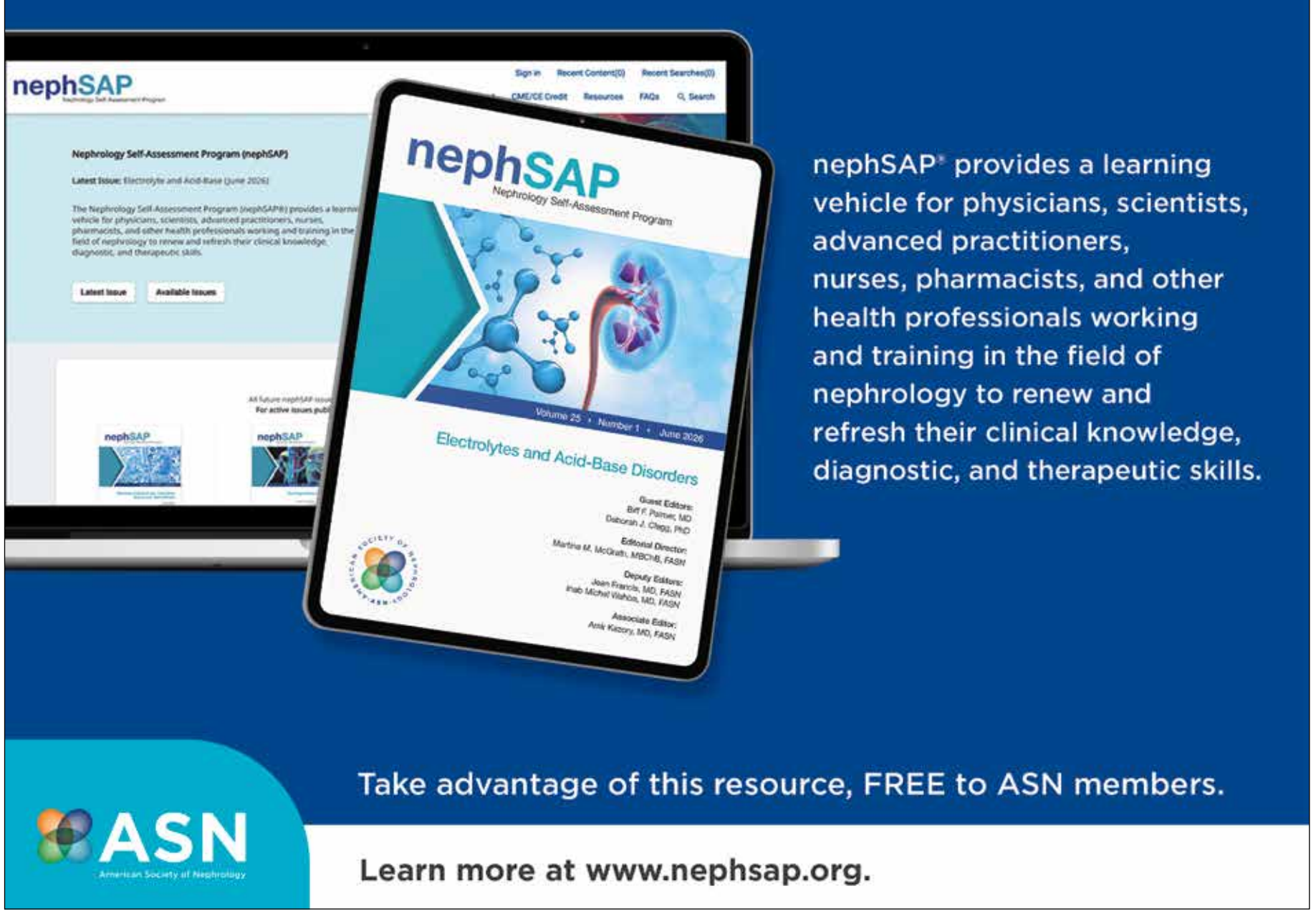

The "Pulse" of Progress: Transforming HD Vascular Access Education

By Atlee Baker, Namrata Krishnan, and Vandana Dua Niyyar

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Of the 550,000 Americans on dialysis, over 90% receive hemodialysis (HD) (1). Irrespective of the underlying cause of kidney disease, they all share a critical need: reliable vascular access. Ideally, their dialysis vascular access should be their lifeline, but it is often their "Achilles' heel"—their most vulnerable part—due to its high risk of clinical and technical failure.

Nephrologists play a central role in the utilization, evaluation, and management of vascular access. We are often the "first responders" when acute access issues arise in the dialysis unit. Our regular interaction with the patient during dialysis can help detect early access issues and allow timely intervention. Additionally, nephrologists who are knowledgeable about access care can advocate for their patients and their clinical needs to optimize dialysis care.

Despite the nephrologist's critical role in vascular access care, no standardized curriculum exists to train nephrology fellows (2). The Accreditation Council for Graduate Medical Education (ACGME) mandates that nephrology training should include evaluation and management of dialysis access and its complications; however, each training program navigates this requirement differently, which leads to a variable fellow experience (2). Moreover, dialysis access management is complex and requires a multifactorial approach among nephrology, vascular surgery, and interventional specialties. A recent publication from the *Journal of Vascular Surgery–Vascular Insights* highlights a similar issue with dialysis access training for our surgical and interventional colleagues (3).

Currently, available resources for dialysis access education are limited. One example of an open access resource is the Hemodialysis Access 101 series (4). This free, online three-module course with interactive videos and simulated cases provides education on dialysis access, physical examinations, maturation, and complications. Additionally, UKidney offers the Atlas of Dialysis Vascular Access with an artificial intelligence-assisted search function, covering diverse areas of dialysis access (5). The Kidney Academy is another evolving resource for dialysis access education (6). The American Society of Diagnostic and Interventional Nephrology (ASDIN) offers regional hands-on and interactive workshops for nephrology fellows to reinforce dialysis access concepts while practicing important physical examination and ultrasound techniques. Developed as a general resource for fellows, the Renal Fellow Network, supported through a partnership with ASDIN, blogs occasionally to cover topics related to dialysis access. This is not an exhaustive list, and although these individual resources are valuable, the curriculum remains fragmented, lacking a standardized, multidisciplinary approach across US nephrology training programs.

Understanding the need for a structured, comprehensive, and multipronged curriculum on dialysis vascular access and its impact in optimizing patient care and outcomes, ASN created the Transforming Dialysis Access Together (TDAT) initiative (7). Launched in 2022, TDAT brings together important stakeholders, including dialysis access experts from various medical and surgical disciplines (general and interventional nephrologists, radiologists, vascular surgeons, nephrology fellows, dialysis nurses, and technicians), along with people undergoing dialysis, who are at the core of this initiative, with the overall mission to improve the quality of dialysis access care. Since its inception, TDAT workgroups have aimed to develop a standardized educational curriculum, supplemented by educational videos covering the full spectrum of dialysis access care from creation to maturation and complications.

Preliminary work for TDAT workgroups began with a targeted needs survey and subsequent roundtable discussions involving second-year nephrology fellows and nephrology training programs. Important takeaways from these discussions included the need for hands-on access training during fellowship with involvement of a multidisciplinary approach to education. To help standardize the fellow experience across training programs, the need for a structured curriculum was identified (8).

The TDAT medical training workgroup recently published a competency-based curriculum for nephrology fellowship programs to assist in standardizing dialysis access education (2). The ACGME Program Requirements for Graduate Medical Education competencies were used as the framework for curriculum creation. Each educational recommendation was assigned a level: 1 (essential), 2 (individualized), and 3 (subspecialized). Essential recommendations (level 1) generally apply to any standard 2-year nephrology fellowship. Individualized recommendations (level 2) would ideally be met within a 2-year nephrology fellowship, accounting for variability in program resources and local expertise. Subspecialized recommendations (level 3) pertain to training beyond the standard 2-year fellowship and include interventional nephrology training. Although developed for fellows-in-training, these recommendations can also serve as a concise reference for practicing nephrologists.

The TDAT education workgroup is actively developing an online, on-demand comprehensive education platform that aligns with the educational goals outlined by the medical training group. Using artificial intelligence and state-of-the-art technology, evidence-based content will be delivered via educational videos that cover wide-ranging topics on dialysis access creation, examination, care, and management. These videos are designed to incorporate the multidisciplinary nature of access care and will serve as a valuable educational resource for current and future dialysis access professionals (9).

Looking to the future, the TDAT workgroup is also in the process of developing "Train-the-Trainer" workshops. The goal of these workshops is to equip academic nephrologists with skills to teach dialysis access at their home training programs. Complementary to the fellow-oriented workshops offered through ASDIN, these workshops will serve to guide best practices and strengthen the standardization of dialysis access education for our fellows and future colleagues. ■

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The authors report no conflicts of interest.

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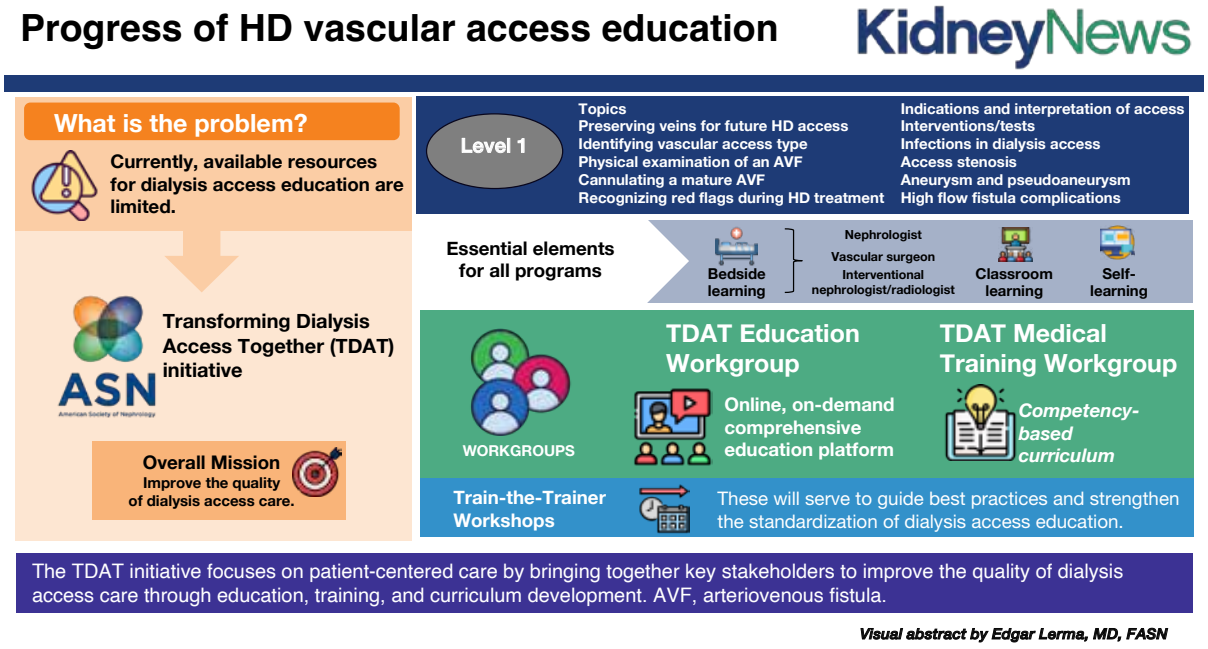

Visual abstract by Edgar Lerma, MD, FASN

Beyond One-Size-Fits-All: Focused Learning Tracks and the Future of Nephrology Training

By Nasim Wiegley

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Contemporary nephrology training sits at the intersection of increasing clinical complexity, evolving care delivery models, and persistent workforce challenges. Fellows must master the foundations of kidney medicine while navigating a rapidly expanding diagnostic and therapeutic landscape. Within the constraints of a 2-year clinical fellowship, this creates an inherent tension between breadth and depth. Focused individualized learning tracks—longitudinal, structured pathways within training—offer a pragmatic approach to reconciling this tension and have gained increasing traction throughout graduate medical education (GME) (1).

Across specialties, training tracks have emerged as a means of aligning education with diverse career trajectories while preserving shared foundational core knowledge (2). Properly designed tracks extend beyond a collection of electives; they are organized around defined focus, longitudinal mentorship, and integrated clinical and scholarly experiences. In addition to advancing clinical expertise, such pathways support development in roles such as clinician–educator, physician–scientist, and leader. Experience from multiple GME fields suggests that structured tracks can facilitate early differentiation, strengthen mentorship, and promote career clarity without compromising generalist competence or affecting success rates at passing standardized specialty board examinations (3–5).

Nephrology has begun to engage more deliberately within this framework. The ASN Task Force on the Future of Nephrology, convened in 2022 in collaboration with the American Board of Internal Medicine and the Accreditation Council for Graduate Medical Education (ACGME), highlighted the growing mismatch between the traditional, undifferentiated fellowship model and the expanding scope of the field (6). The task force recommended three complementary shifts: 1) clearer definition of core competencies, 2) stronger competency-based assessment, and 3) development of individualized pathways, particularly within the second year of training. The task force also defined tiered competencies. Level I establishes the foundational skills that all fellows must master. Level II competencies reflect individualized focus tracks pursued in the second year, spanning areas such as advanced home dialysis, critical care nephrology, glomerular diseases, onconephrology, nephrogenetics, interventional nephrology, transplantation, palliative care, and population health. Level III competencies require an additional fellowship year to build subspecialty expertise (7).

Examples from other specialties across GME illustrate how such subspecialty pathways can be operationalized (4, 5). Nephrology already contains analogous "micro-communities," including transplantation, interventional nephrology, glomerular diseases, and dialysis technologies, but these have not been uniformly formalized into cohesive training pathways in the majority of training programs (6, 8).

In the nephrology fellowship at the University of California, Davis, in Sacramento, these concepts have been operationalized within a 2-year ACGME-accredited program. During the first year, all fellows complete a comprehensive core curriculum. In the second year, they may pursue structured, longitudinal tracks in glomerular diseases and onconephrology, interventional nephrology, transplantation, home dialysis, or a clinician–scientist research pathway, each with defined objectives, dedicated mentorship, and integrated clinical and scholarly activities.

Within these tracks, fellows engage in focused experiences aligned with their interests and potential future career goals. Fellows pursuing glomerular diseases and onconephrology attend subspecialty clinics and multidisciplinary conferences, participate in nephropathology sessions, and participate in scholarly projects with their mentor. Those seeking procedural expertise rotate through the American Society of Diagnostic and Interventional Nephrology-accredited interventional nephrology program with structured exposure to vascular access or peritoneal catheter-related procedures, a point-of-care ultrasound curriculum, and scholarly activities. Fellows interested in transplantation gain enhanced longitudinal experience with transplant services, supporting transition to advanced fellowship training.

The program's early experience highlights several benefits. Fellows report better alignment between training and anticipated career paths, and mentors find that track structures support more intentional longitudinal guidance. All fellows achieve core competencies (level I), whereas those in a pathway engage more deeply in a defined domain (level II), allowing more direct observation, assessment, and feedback. At the same time, implementation is resource-intensive. Scheduling complexity, preservation of the shared core curriculum, heterogeneity in training, and limited faculty time require deliberate planning. Additional challenges noted by early adopters of such pathways include uneven access to mentorship and institutional resources, the risk of premature subspecialization, and potential inequities if participation depends on local infrastructure or informal selection processes. These concerns underscore the need for rigorous evaluation of outcomes, including educational achievement, career trajectories, and patient-centered metrics, and for careful attention to equity, transparency, and alignment with clearly defined core competencies.

Several principles should guide the evolution of nephrology training tracks. They must rest on a foundation of core knowledge and competencies that every graduating nephrologist attains, regardless of pathway. They should be immersive communities of practice, with longitudinal mentorship, peer cohorts, and integrated clinical and scholarly components, rather than disjointed elective rotations. The field should also adopt an expansive view of domains, ensuring that disease- and modality-focused pathways are complemented by tracks in education, population and health services research, health equity, quality improvement, and leadership (7).

The question is no longer whether individualized pathways will become part of nephrology training—they are already emerging—but how thoughtfully they will be designed, resourced, and evaluated. Focused learning tracks, grounded in a strong shared core and aligned with the evolving needs of the field, represent a promising strategy for preparing a diverse and adaptable nephrology workforce. ■

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The author reports no conflicts of interest.

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Women Are at Lower Risk of CKD—Until Age 50

https://doi.org/10.62716/kn.003932026

Compared with men, women are at lower risk of chronic kidney disease (CKD) into middle age, but this nephroprotective advantage disappears after menopause, suggests a study in *Nephrology Dialysis Transplantation*.

The cross-sectional study included data on 9526 adult patients in primary care, who were enrolled in the ONDAAS (Objective No Dialysis: Asymptomatic Albuminuria Screening) study. All participants underwent same-day measurement of serum creatinine and urine albumin-to-creatinine ratio (ACR). Sex- and age-related differences in CKD were analyzed, based on Kidney Disease: Improving Global Outcomes (KDIGO) 2024 estimated glomerular filtration rates (eGFR) (G category) and albuminuria (A category). Aged 50 years was used as a proxy for menopause in evaluating eligibility for renoprotective and cardioprotective therapies among female patients.

The mean eGFR was significantly higher in women compared with men (84.6 versus 81.1 mL/min/1.73 m^2), whereas median ACR was significantly lower (7.0 versus 8.3 mg/g). Before age 50 years, women were at substantially lower risk of advanced CKD: adjusted odds ratio (AOR), 0.18 for CKD G3 to G5. At the same time, A2 to A3 albuminuria was a strong predictor of CKD: AOR, 33.39.

At age 50 years or older, there was no significant sex-related difference in CKD. In contrast, age became a significant factor (AOR, 1.13 per year). Across this age threshold, rates of G3a and G3b increased to 11.3% and 4.9%, respectively, in women, and the risk of CKD G3 to G4 exceeded that in men. The increases in CKD among older women occurred despite lower rates of A2 to A3 albuminuria. Based on KDIGO 2024 criteria, eligibility for renoprotective medications among women aged 50 years or older was 12.1% for renin-angiotensin system inhibitors, 18.7% for sodium-glucose cotransporter-2 inhibitors, 3.6% for nonsteroidal mineralocorticoid receptor antagonists, and 35.2% for statins.

Sex-related differences in CKD are well-recognized. However, there are few data on the potential effects of menopause and the implications for treatments to lower the risk of kidney diseases.

This large analysis of patients in primary care suggests that women have a lower rate of CKD at younger ages, but this advantage disappears at age 50 years or older. The investigators conclude, "These findings support sex- and menopause-aware CKD screening and guideline-directed renoprotective and cardioprotective therapy in older women even in the absence of overt albuminuria" [Izquierdo-Ortiz MJ, et al. Sex, menopause and chronic kidney disease in primary care. *Nephrol Dial Transplant*, published online May 29, 2026. doi: 10.1093/ndt/gfag110]. ■

INDICATION and IMPORTANT SAFETY INFORMATION for VOYXACT® (sibeprenlimab-szsi)

INDICATION

VOYXACT is indicated to reduce proteinuria in adults with primary immunoglobulin A nephropathy (IgAN) at risk for disease progression.

This indication is approved under accelerated approval based on reduction of proteinuria. It has not been established whether VOYXACT slows kidney function decline over the long-term in patients with IgAN. Continued approval for this indication may be contingent upon verification and description of clinical benefit in a confirmatory clinical trial.

IMPORTANT SAFETY INFORMATION

CONTRAINDICATION

VOYXACT is contraindicated in patients with serious hypersensitivity to sibeprenlimab-szsi or any of the excipients of VOYXACT.

WARNINGS AND PRECAUTIONS

Immunosuppression and Increased Risk of Infections: VOYXACT suppresses the immune system by reducing antibody production, which may increase the risk of infections. Patients with chronic or recurring infections may have an increased risk of serious infection. In clinical trials, infections occurred in 49% of patients treated with VOYXACT compared with 45% of patients treated with placebo.

Before initiating VOYXACT, assess patients for active infections. During treatment, monitor patients for signs and symptoms of infection. If a serious infection develops, consider interrupting VOYXACT until the infection is controlled.

Early Tirzepatide Improves Outcomes in Type 2 Diabetes

https://doi.org/10.62716/kn.003912026

For patients with type 2 diabetes (T2D), early treatment with tirzepatide improves blood glucose control and other outcomes compared with intensified conventional care (ICC), suggests a clinical trial in the *Annals of Internal Medicine*.

The randomized, open-label SURPASS-EARLY [A Study of Tirzepatide Compared With Intensified Conventional Care in Adult Participants With Type 2 Diabetes] trial included 794 adult patients with early T2D. All had inadequate glycemic control despite up to 4 years of treatment with metformin, diet, and exercise. Patients were randomly assigned to treatment with tirzepatide or ICC. Tirzepatide dosage was 15 mg or the maximally tolerated dose; ICC could include a glucagon-like peptide-1 receptor agonist other than tirzepatide.

Over 2 years' follow-up, change in hemoglobin A_{1c} (HbA_{1c}) levels was −1.99 percentage points with tirzepatide versus −1.32 percentage points with ICC. The percentage of patients achieving an HbA_{1c} level under 5.7% was 60.2% versus 24.0%, respectively.

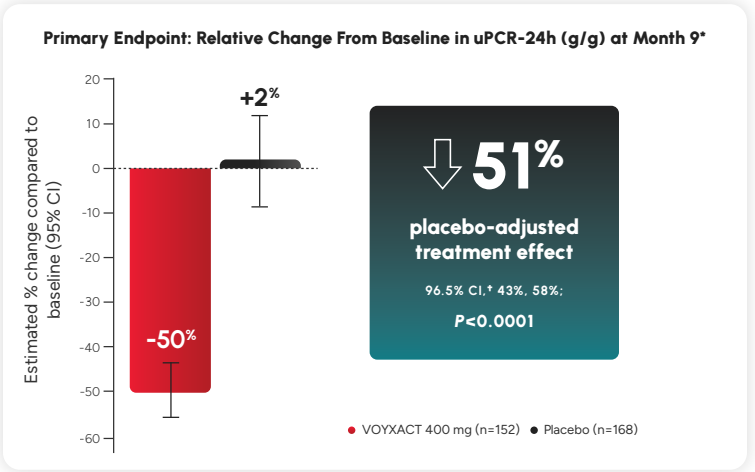
The tirzepatide group also had greater reductions in body weight (−13.8 versus −5.9 kg) and waist circumference (11.6 versus 5.4 cm). Patients assigned to tirzepatide were also more likely to have at least 5% weight loss: 78% versus 50%. Adverse events, mainly gastrointestinal, were comparable between groups.

Continued on page 22

For adults with primary IgA nephropathy at risk for disease progression, VOYXACT® (sibeprenlimab-szsi) delivers significant proteinuria reduction with a demonstrated safety profile

Voyxact® (sibeprenlimab-szsi) Injection 400 mg/2 mL

Patients treated with VOYXACT achieved significant proteinuria reduction at 9 months



*Estimated geometric mean percentage change at 9 months compared with baseline. Data were included in the analysis regardless of early treatment discontinuation and initiation of confounding therapy (treatment policy strategy). Missing data were imputed using multiple imputation.

†96.5% CI corresponds to the two-sided significance level of 0.035 for the interim analysis.

ACE=angiotensin-converting enzyme; ARB=angiotensin receptor blocker; CI=confidence interval; eGFR=estimated glomerular filtration rate; SGLT2=sodium-glucose cotransporter 2; uPCR=urine protein-creatinine ratio.

STUDY DESIGN

- VISIONARY is a randomized, double-blind, placebo-controlled study of 510 adults with biopsy-confirmed IgA nephropathy, an eGFR ≥30 mL/min/1.73 m², and proteinuria (defined as either uPCR based on 24-hour urine collections ≥0.75 g/g or urine protein ≥1.0 g/day)
- Patients were randomized 1:1 to receive VOYXACT (n=259) or placebo (n=251) subcutaneously every 4 weeks and remained on a stable and maximally tolerated dose of ACE inhibitors and/or ARBs with or without an SGLT2 inhibitor throughout the study
- An interim analysis for efficacy was conducted on the first 320 randomized patients who reached the Month 9 visit (VOYXACT, n=152; placebo, n=168)

Safety evaluated in VISIONARY study

- The most common adverse reactions in patients treated with VOYXACT (n=259) and placebo (n=251), respectively, were infections (49% versus 45%) and injection site reactions (24% versus 23%)
- Most adverse reactions were reported as mild or moderate in severity and resolved without treatment interruption or discontinuation

Learn more about VOYXACT now

Reference: 1. Cheung CK, Barratt J, Liew A, Zhang H, Tesar V, Lafayette R. *Front Nephrol.* 2024;3:1346769. doi: 10.3389/fneph.2023.1346769. eCollection 2023.

IMPORTANT SAFETY INFORMATION (cont'd)

WARNINGS AND PRECAUTIONS (cont'd)

Immunosuppression and Immunization Risks: Because of its mechanism of action, VOYXACT may interfere with immune responses to vaccines and increase the risk of infection from live vaccines. Live vaccines are not recommended within 30 days prior to initiation of VOYXACT or during treatment with VOYXACT as safety has not been established. No data are available on the secondary transmission of infection from persons receiving live vaccines to patients receiving VOYXACT or on the efficacy of immunizations administered while receiving VOYXACT.

Common Adverse Reactions: The most common adverse reactions (reported in ≥10% of patients treated with VOYXACT and at a higher incidence than placebo) in patients treated with VOYXACT and placebo, respectively, were infections (49% versus 45%) and injection site reactions (24% versus 23%). The most common infection was upper respiratory infection (15% versus 14%), and the most common injection site reaction was injection site erythema (13% versus 12%). Most adverse reactions were reported as mild or moderate in severity and resolved without treatment interruption or discontinuation.

Pregnancy: There are no available data on VOYXACT use in pregnant women to evaluate for a drug-associated risk of major birth defects, miscarriage or other adverse maternal or fetal outcomes. Monoclonal antibodies, such as sibeprenlimab-szsi, can be actively transported across the placenta as pregnancy progresses; therefore, potential effects on a fetus are likely to be greater during the second and third trimester of pregnancy.

Please see additional Important Safety Information on the following page and accompanying Brief Summary of FULL PRESCRIBING INFORMATION.

Early Tirzepatide

Continued from page 21

Despite guideline-recommended treatment escalation, many patients with T2D do not achieve normoglycemia or goals for body weight, blood pressure, or lipid levels. The previous SURPASS trial reported improvements in glycemic control and body weight with tirzepatide, particularly in patients with shorter durations of T2D.

The SURPASS-EARLY results show improved outcomes for patients with early T2D after 2 years of treatment with tirzepatide versus ICC. The researchers conclude, "[E]arly initiation of tirzepatide treatment could establish better and potentially more durable glycemic control than can be achieved with conventional care" [Del Prato S, et al. Tirzepatide versus intensified conventional care after 2 years of treatment in early type 2 diabetes: A randomized clinical trial. *Ann Intern Med*, published online May 26, 2026. doi: 10.7326/ANNALS-25-05602].

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Lactation: There are no data on the presence of sibeprenlimab-szsi in human milk, the effects of sibeprenlimab-szsi on the breastfed infant, or the effects of sibeprenlimab-szsi on milk production.

Pediatric Use: Safety and effectiveness of VOYXACT in pediatric patients have not been established.

Geriatric Use: Clinical studies of VOYXACT did not include sufficient numbers of patients aged 65 and over to determine whether they respond differently from younger adult patients.

Pregnant women exposed to VOYXACT, or their healthcare providers, should report VOYXACT exposure by calling 1-833-869-9228 or visiting www.VOYXACT.com

To report SUSPECTED ADVERSE REACTIONS, contact Otsuka America Pharmaceutical, Inc. at 1-800-438-9927 or FDA at 1-800-FDA-1088 (www.fda.gov/medwatch).

Please see Brief Summary of FULL PRESCRIBING INFORMATION on the following page.

Voyxact® (sibeprenlimab-szsi) Injection 400 mg/2 mL

Telitacicept Reduces Proteinuria in IgA Nephropathy

https://doi.org/10.62716/kn.003902026

For patients with immunoglobulin A (IgA) nephropathy, the recombinant fusion protein telitacicept produces a sustained reduction in proteinuria while slowing the decline in kidney function, according to a preliminary clinical trial report in *The New England Journal of Medicine*.

The phase 3 trial included 318 adult patients with biopsy-proven IgA nephropathy, enrolled at 72 centers in China. All had sustained proteinuria over 1.0 g/day despite standard care. Patients were randomly assigned to treatment with telitacicept (240 mg subcutaneously once weekly) or placebo. A planned interim analysis focused on change in the geometric mean ratio of the 24-hour urinary protein-to-creatinine ratio (UPCR).

After 39 weeks of treatment, the percentage reduction in adjusted geometric mean ratio of 24-hour UPCR was −58.9% in patients assigned to telitacicept versus −8.8% in the placebo group. The effect became apparent after 4 weeks and persisted through 39 weeks. The

percentage of patients reaching a UPCR under 0.8 was 61.0% with telitacicept versus 19.5% with placebo.

The percentage change in the estimated glomerular filtration rate (eGFR) was −1.0% with telitacicept versus −7.7% with placebo; the percentage of patients with a confirmed eGFR reduction of 30% or greater was 6.3% and 27.0%, respectively. Overall, the adverse event rate was higher with telitacicept than with placebo (89.3% versus 78.6%). However, serious adverse events were less frequent in the telitacicept group (2.5% versus 8.2%).

Telitacicept targets and neutralizes B-cell activating factor (BAFF) and a proliferation-inducing ligand (APRIL), both of which are found at elevated serum levels in IgA nephropathy. Telitacicept has shown efficacy in the treatment of systemic lupus erythematosus, rheumatoid arthritis, and generalized myasthenia gravis. A previous phase 2 study showed improved outcomes in IgA nephropathy.

The results show a lasting reduction in proteinuria and slowing of eGFR decline with telitacicept in patients with IgA nephropathy at high risk of progression. The researchers conclude: "[D]ual inhibition of both BAFF and APRIL by telitacicept might result in more comprehensive blockade of the B-cell activation pathway than agents that inhibit only one of these cytokines" [Lv J, et al.; TELIGAN Investigators. Telitacicept for IgA nephropathy—interim analysis of a phase 3 trial. *N Engl J Med* 2026; 394:1916–1924. doi: 10.1056/NEJMoa2514415]. ■

VOYXACT® (sibeprenlimab-szsi) injection, for subcutaneous use

BRIEF SUMMARY OF PRESCRIBING INFORMATION

(For complete details, please see *Full Prescribing Information and Patient Information*.)

INDICATIONS AND USAGE: VOYXACT is indicated to reduce proteinuria in adults with primary immunoglobulin A nephropathy (IgAN) at risk for disease progression.

This indication is approved under accelerated approval based on reduction of proteinuria. It has not been established whether VOYXACT slows kidney function decline over the long-term in patients with IgAN. Continued approval for this indication may be contingent upon verification and description of clinical benefit in a confirmatory trial.

CONTRAINDICATIONS: VOYXACT is contraindicated in patients with serious hypersensitivity to sibeprenlimab-szsi or any of the excipients of VOYXACT.

WARNINGS AND PRECAUTIONS

Immunosuppression and Increased Risk of Infections: VOYXACT suppresses the immune system by reducing antibody production, which may increase the risk of infections. Patients with chronic recurring infections may have increased risk of serious infection. In clinical trials, infections occurred in 49% of patients treated with VOYXACT compared with 45% in patients treated with placebo.

Before initiating VOYXACT, assess patients for active infections. During treatment, monitor patients for signs and symptoms of infection. If a serious infection develops, consider interrupting VOYXACT until the infection is controlled.

There are limited clinical study data with concomitant use of VOYXACT and systemic immuno-suppressants. Consider the potential for increased immunosuppression when coadministering VOYXACT and immuno-suppresants or when initiating VOYXACT either before or after immuno-suppressive therapy.

Immunosuppression and Immunization Risks: Because of its mechanism of action, VOYXACT may interfere with immune responses to vaccines and increase the risk of infection from live vaccines. Live vaccines are not recommended within 30 days prior to initiation of VOYXACT or during treatment with VOYXACT as safety has not been established. No data are available on the secondary transmission of infection from persons receiving live vaccines to patients receiving VOYXACT or on the efficacy of immunizations administered while receiving VOYXACT.

ADVERSE REACTIONS

Clinical Trials Experience: Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice.

The safety of VOYXACT was evaluated in a randomized, double-blind, placebo-controlled, clinical study in patients with IgAN (VISIONARY). The median duration of exposure was 44 weeks in the 259 patients treated with VOYXACT and 48 weeks in the 251 patients administered placebo. The most common adverse reactions (reported in ≥10% of patients treated with VOYXACT and at a higher incidence than placebo) in patients treated with VOYXACT and placebo, respectively, were infection (49% versus 45%) and injection site reactions (24% versus 23%). The most common infection was upper respiratory infection (15% versus 14%), and the most common injection site reaction was injection site erythema (13% versus 12%). Most adverse reactions were reported as mild or moderate in severity and resolved without treatment interruption or discontinuation.

USE IN SPECIFIC POPULATIONS

Pregnancy: Risk Summary There are no available data on VOYXACT use in pregnant women to evaluate for a drug-associated risk of major birth defects, miscarriage or other adverse maternal or fetal outcomes. Monoclonal antibodies, such as sibeprenlimab-szsi, can be actively transported across the placenta as pregnancy progresses; therefore, potential effects on a fetus are likely to be greater during the second and third trimester of pregnancy. In an enhanced prenatal and postnatal development (ePPND) toxicity study, administration of sibeprenlimab-szsi subcutaneously to pregnant monkeys did not result in any adverse effects on embryofetal or postnatal development at exposures approximately 10-times the clinical exposure at the maximum recommended human dose (MRHD) based on area under the curve (AUC).

Clinical Considerations *Disease-Associated Maternal and/or Embryo/Fetal Risk* IgA nephropathy is associated with adverse maternal outcomes, including increased rates of cesarean section, pregnancy-induced hypertension, pre-eclampsia and preterm delivery, and adverse fetal/neonatal outcomes, including stillbirth and low birth weight. *Fetal/Neonatal Adverse Reactions* Transport of endogenous IgG antibodies across the placenta increases as pregnancy progresses, and peaks during the third trimester. Therefore, VOYXACT may be present in infants exposed *in utero.* Consider the potential clinical impact of VOYXACT exposure in infants who are exposed to VOYXACT *in utero.*

Lactation: Risk Summary There are no data on the presence of sibeprenlimab-szsi in human milk, the effects of sibeprenlimab-szsi on the breastfed infant, or the effects of sibeprenlimab-szsi on milk production. Endogenous maternal IgG and monoclonal antibodies are transferred into human milk. The effects of local gastrointestinal exposure on sibeprenlimab-szsi in the breastfed infant are unknown. The developmental and health benefits of breastfeeding should be considered along with the mother's clinical need for VOYXACT and any potential adverse effects on the breastfed child from VOYXACT or from the underlying maternal condition.

Pediatric Use: Safety and effectiveness of VOYXACT in pediatric patients have not been established.

Geriatric Use: Clinical studies of VOYXACT did not include sufficient numbers of patients aged 65 and over to determine whether they respond differently from younger adult patients.

No clinically meaningful differences in the pharmacokinetics of VOYXACT were observed in patients aged 65 and over compared to younger adult patients.

PATIENT COUNSELING INFORMATION

Advise the patient and/or caregiver to read the FDA-approved patient labeling (Patient Information and Instructions for Use).

Pregnant women exposed to VOYXACT, or their healthcare providers, should report VOYXACT exposure by calling 1-833-869-9228 or visiting www.VOYXACT.com

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Key Federal Developments in Kidney Care

By Ryan Murray, Rachel Meyer, Suzanne Watnick, and Lauren Ahearn

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Federal policymakers continue to advance initiatives aimed at expanding treatment options, improving access to transplantation, and accelerating innovation in kidney care. Recent developments include congressional consideration of home dialysis legislation, new collaborations between the Department of Health and Human Services (HHS) and the kidney community, and updates to a major Centers for Medicare & Medicaid Services (CMS) transplant payment model. ASN remains actively engaged in each of these efforts to help ensure that federal policies support patients, advance innovation, and strengthen kidney care delivery.

Congress takes up home dialysis legislation as ASN continues advocacy

The introduction and rapid advancement of the Improving Home Dialysis Act of 2026 (HR 8875) mark encouraging steps in Congress's continued efforts to expand access to home-based kidney care and to modernize care for people living with kidney diseases (1). Introduced on May 19th and favorably reported by the House Committee on Ways and Means following a May 21st markup, the legislation reflects growing bipartisan interest in removing barriers from people choosing and successfully remaining on home dialysis. ASN has long supported policies that empower people to choose the treatment option that aligns with their needs and goals.

"For many people, home dialysis offers greater convenience and independence, allowing them more time for work, family, and community, than dialyzing in-center—particularly for rural Americans who may otherwise have to travel long distances," said ASN President Samir M. Parikh, MD, FASN. "Yet, we know that fewer Americans can take advantage of this option than would likely benefit from it. The [Improving Home Dialysis Act] addresses some of the known barriers that prevent people from starting or staying at home for their dialysis care" (2).

As the bill moves through the legislative process, ASN will continue to engage with lawmakers and stakeholders to ensure that any final policy supports patient-centered care, promotes equitable access to home dialysis, and advances the broader goal of expanding treatment options for individuals with kidney failure. ASN looks forward to sharing recommendations to strengthen the legislation as congressional consideration continues.

"I am optimistic about the momentum the House Committee on Ways and Means is creating for kidney health policy to advance in the 119th Congress," Parikh added. "Following the Health Subcommittee's Wednesday, March 18th, hearing focused on prevention and innovation in kidney care, the Thursday, May 21st, markup—which includes the Improving Home Dialysis Act of 2026—sends a clear signal that kidney health policy is primed for action on a bipartisan basis" (2).

HHS highlights innovation and collaboration at the Kidney Innovation Conference

The 2026 Kidney Innovation Conference underscored the strong partnership between the kidney community and federal agencies, with leaders from HHS participating in discussions focused on accelerating innovation in kidney care. Thomas Keane, MD, MBA, National Coordinator for Health Information Technology (Office of the National Coordinator for Health Information Technology [ONC], HHS) emphasized a new effort, in partnership with ASN and the nephrology community, to advance data standardization and interoperability across the kidney care ecosystem, recognizing the critical role of health information technology in improving patient outcomes and supporting innovation.

During a fireside chat, Suzanne Watnick, MD, FASN, ASN Health Policy Scholar, and Stephen Konya, chief, Innovation and Strategic Partnerships (ONC, HHS), discussed the 2026 Kidney Innovation Accelerator (KidneyX) EMPOWER Prize Challenge, a $4 million competition designed to spur innovative solutions that reduce barriers to living kidney donation and improve support for donors and transplant recipients. They also discussed the nascent effort to standardize data and pave the way for nephrology interoperability. The conference provided an important forum for government, industry, clinicians, patients, and entrepreneurs to explore opportunities to transform kidney care and reinforce the value of continued collaboration between the federal government and the kidney community.

ASN recommendations finalized in updates to the IOTA Model

Many key ASN recommendations to strengthen the Increasing Organ Transplant Access (IOTA) Model were finalized in a CMS rule in late May, taking effect with performance year 2, beginning July 1st (3).

Led by the ASN Transplant Policy Committee, in February, ASN submitted detailed recommendations to improve the overarching goal of the IOTA Model to increase patients' access to kidney transplants and keep allografts healthy over a period of several years. The following are among ASN's suggestions that were finalized.

- **Share center-specific evaluation criteria for both prospective transplant recipients and living donors, providing publicly available information about which types of recipients or donors may or may not be a good fit for the expertise of a given transplant center so that people can make more informed choices about where to consider pursuing care or donation**. The final rule requires that eligibility criteria for both living donors and prospective transplant candidates be made publicly available by IOTA participants.
- **Notify patients when their waitlist status changes from active to inactive—and create a mechanism allowing patients to view their status in close to real-time via an online platform**. The final rule determined that IOTA participants must notify Medicare beneficiary waitlist patients of status changes within 10 days when they become ineligible for organ offers, providing the reason and reactivation information and notifying the patient's dialysis facility and nephrologist or managing clinician when applicable.
- **Institute a risk adjustment model for the Quality Domain with a small number of components that have a well-demonstrated effect on patient outcomes and are clinically coherent.** The final rule instituted a risk-adjustment methodology for the Quality Domain that is based on an adapted Scientific Registry of Transplant Recipients framework that closely mirrors ASN's recommendations.
- **Identify a pathway to include people with Medicare Advantage (MA) plans, given that approximately half of beneficiaries are now enrolled in MA plans**. The final rule allows for the inclusion of people with MA in the definition of Medicare kidney transplants so that upside risk payments and downside risk payments are only based on kidney transplants for beneficiaries with Medicare Fee-for-Service or MA as a primary or secondary payer while maintaining a maximum upside risk payment at $15,000.

ASN had also advocated for IOTA to add a requirement that participants of IOTA provide waitlisted patients with retrospective, asynchronous information regarding organ offer declines made on their behalf every 6 months. The society suggested that the Center for Medicare and Medicaid Innovation support the development of, in partnership with the Health Resources and Services Administration and the Organ Procurement and Transplantation Network, a platform that allows prospective patients and donors to view center-specific information about transplant centers (such as evaluation criteria), compare centers, and access information about their own care (such as organ offer declines or waitlist status). Although these specifics were not finalized in the IOTA rule, ASN will continue to advocate for them as needed changes to make the system more transparent and patient-centered moving forward.

The IOTA Model is a 6-year mandatory payment model that seeks to test whether performance-based incentives for selected kidney transplant hospitals can increase access to transplantation, promote equity, and improve quality while reducing Medicare expenditures. As CMS refines the model, ASN will continue to monitor implementation closely and engage with federal policymakers to help ensure that program requirements support patient access to transplantation; accurately reflect clinical complexity; and advance high-quality, equitable kidney care. Performance year 2 will run through June 30, 2027. ■

Ryan Murray is the senior manager of Policy and Government Affairs, Rachel Meyer is the strategic policy advisor to the executive vice president, and Lauren Ahearn is senior quality and regulatory affairs associate at ASN. Suzanne Watnick, MD, FASN, is a professor of medicine in the Division of Nephrology at the University of Washington in Seattle and the ASN Health Policy Scholar.

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CREATIVE CORTEX

Nutrition as Compassion

By Anil Saxena

https://doi.org/10.62716/kn.003152026

Artwork by AnilzArt. Anil Saxena, MD, is a digital artist based in Dubai, United Arab Emirates. His abstract artwork blends trained medical expertise with vibrant color palettes, creating visually captivating landscapes of human identity and transformation. Saxena's work has been exhibited internationally and featured on the covers of medical journals.

A plant-based diet becomes a quiet ally to tired kidneys—roots and leaves offering gentler work, cleaner rivers within. Colors nourish without burden, fiber whispers balance, and salt retreats into humility. In green patience and ripe restraint, the kidney relearns harmony, healing not by excess, but by mindful simplicity. ■

Artificial Intelligence in Nephrology Training: Tool or Threat?

By Zahoor Ahmed and Daranee Chewaproug

https://doi.org/10.62716/kn.002982026

Artificial intelligence (AI) is no longer a futuristic concept in nephrology; it is already in the workroom. AI has moved from the outskirts of medicine into the daily workflow of nephrology. AI technologies are rapidly advancing and increasingly integrated across multiple domains of clinical practice, including diagnostic decision support, clinical documentation, and evidence synthesis (1). These tools leverage machine learning and natural language processing to analyze complex datasets, identify patterns, and generate outputs that augment clinical workflows (2). However, as AI capabilities expand, becoming more relevant and providing in-depth answers quickly, training programs must decide whether to harness these innovations, set boundaries for AI's use, mitigate risk, and ensure patient privacy. The question is no longer whether AI belongs in nephrology training but how we choose to engage with it and how to teach its responsible and effective use.

One of the most notable recent shifts in medicine has been the rise of the AI-driven clinical decision support platforms that have been integrated into the clinical workflow. For example, OpenEvidence has secured multi-year agreements with publishers such as *The New England Journal of Medicine's* (*NEJM's*) group to deliver AI responses grounded in peer-reviewed content from *NEJM*, *NEJM Evidence*, *NEJM AI*, and related sources. Such a partnership promises faster access to evidence-based medicine answers based on decades of clinical research (3). A recent study on OpenEvidence scores highly on clarity, relevance, and evidence-based support; however, its impact on modifying clinical decision-making can be limited, often reinforcing rather than changing physician plans (4). Meanwhile, UpToDate's Expert AI leverages generative AI built on curated, expert-authored content to provide rapid, clinical insights for trainees and clinicians (5). At the time of writing, the US Food and Drug Administration had approved over 1200 AI-based medical devices, demonstrating the regulatory acceptance of these technologies. This regulatory validation reinforces the broader role of AI in medicine by underscoring that when developed and evaluated within rigorous evidence-based frameworks, AI tools can meaningfully support clinical decision-making and enhance the reliability of point-of-care guidance.

These AI advancements enhance learning for fellows by enabling faster, more comprehensive, and evidence-linked responses to complex clinical queries than traditional searches, although expert oversight remains essential. In academic research, AI can accelerate literature review, data screening, and early manuscript drafting (6). However, these tools are only as safe as their user's literacy. AI outputs can mispresent, embed bias, and oversimplify complex care decisions—issues highlighted both in academic evaluations of large language models and ongoing debates about their clinical readiness (7). Risks and benefits of AI tools in nephrology are shown in the Table.

Ethical concerns loom large. Key ethical concerns with AI in diagnosis and treatment planning include algorithmic bias, accountability ambiguity, data privacy risks, and transparency limitations. When AI aids in diagnosis or therapeutic planning, fellows in training must understand limitations, biases, and accountability. Without formal instructions, fellows learn ad hoc, and they can fail to achieve proper proficiency and appropriate and safe use of the technology. The lack of formal AI training for fellows creates significant gaps in their ability to critically evaluate, safely implement, and responsibly use these technologies in clinical practice (8). The goal is not to turn nephrologists into data scientists but to cultivate AI fluency—a basic competency akin to evidence appraisal or statistics.

Nephrology fellowships should not ignore AI or assume that informal training will be sufficient training. Instead, structured AI literacy, highlighting teaching core concepts such as strengths and limitations of models, bias recognition, appropriate clinical use, protection of patient privacy, and ethical guardrails should be championed. Just as we teach statistics without expecting students to become biostatisticians, we can teach AI without losing the soul of clinical training.

AI in fellowship is neither unequivocally a tool nor a threat. It is a force multiplier that, if paired with structured education, can improve patient care, heighten clinical acumen, sharpen reasoning, support safer decisions, and empower research. ■

Zahoor Ahmed, MD, and Daranee Chewaproug, DO, are with Jefferson Einstein Philadelphia Hospital, Philadelphia, PA.

The authors report no conflicts of interest.

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Table. Risks and benefits of AI in nephrology training

Domain	Benefits of AI	Risks of AI
Clinical decision support	Provides rapid, evidence-based answers on platforms such as OpenEvidence and UpToDate Expert AI, supporting guideline-based care and fellow education	Over-reliance on AI-generated recommendations may erode independent clinical reasoning and reduce engagement with primary literature.
Diagnostic reasoning	Helps fellows generate broad differentials and recognize risk patterns (e.g., acute kidney injury prediction, dialysis complications)	AI may misdiagnose or oversimplify differentials and/or management plans.
Efficiency and workflow	Improves note quality and efficiency of charting through proper information retrieval, bolstering patient care and education	Efficiency gains may mask knowledge gaps or encourage superficial understanding.
Research productivity	Streamlines literature searches, data analysis, and manuscript organization and layout	The extent of AI use and assistance raises concerns about academic integrity and transparency.
Evidence appraisal	Improves access to evidence-based medicine and curated sources (e.g., *NEJM* content, expert-reviewed UpToDate topics)	There is a risk of accepting AI summaries without verifying material source, quality, or context.
Education and training	Personalizes learning, real-time education, and nontraditional mentorship	Lack of formal AI education and curriculum can lead to a false sense of security, improper use, inexperience, and lack of insight into the limitations.
Ethics and professionalism	Promotes discussion of bias, accountability, liability, patient privacy, and responsible innovation in medicine	Unregulated use may compromise patient safety, privacy, and trust.
Future workforce readiness	Prepares fellows for AI-integrated clinical environments and responsible AI use	Failure to define boundaries may prevent proper training of fellows and shift responsibility away from clinicians.

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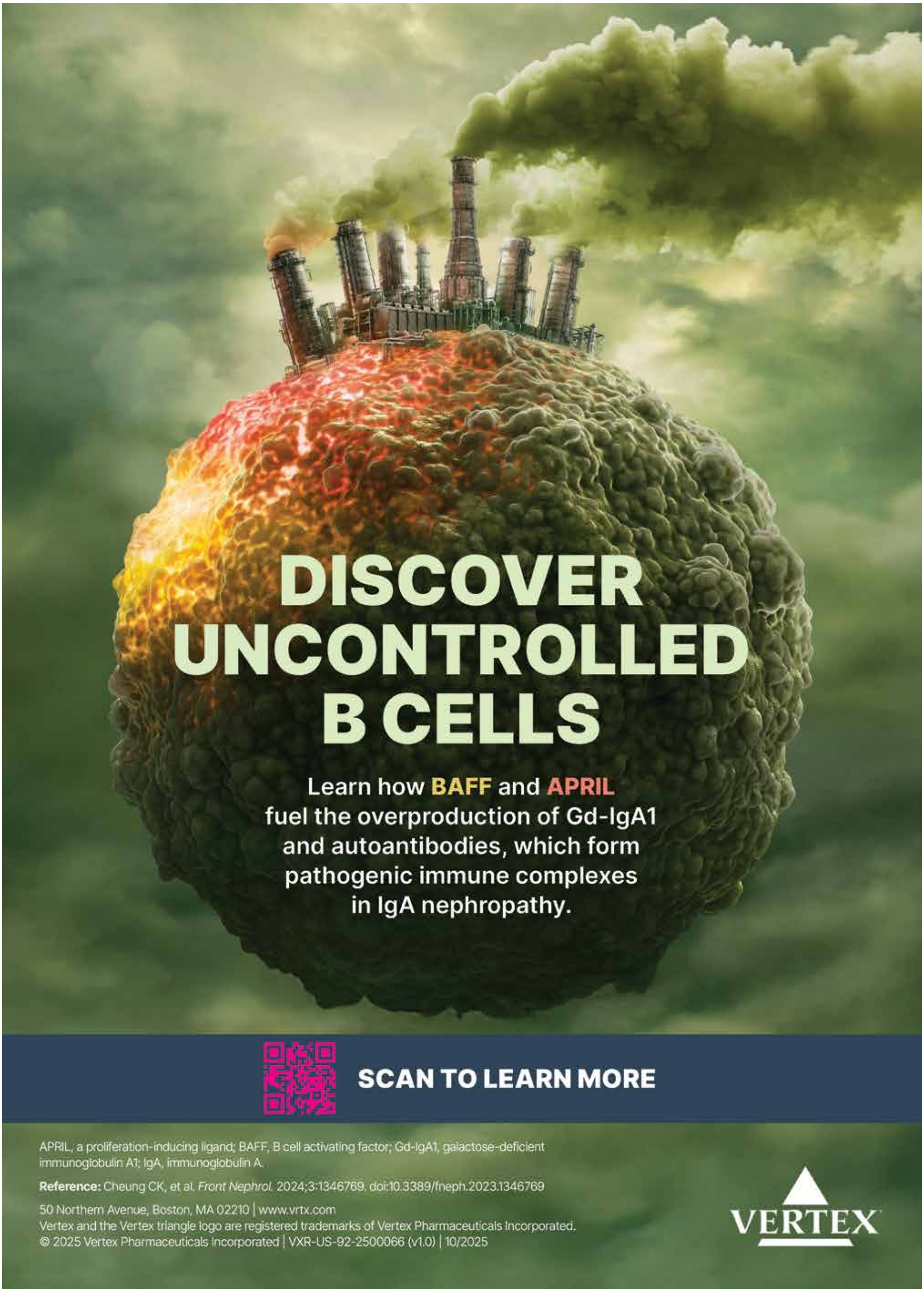
DISCOVER UNCONTROLLED B CELLS
Learn how BAFF and APRIL fuel the overproduction of Gd-IgA1 and autoantibodies, which form pathogenic immune complexes in IgA nephropathy.
SCAN TO LEARN MORE
APRIL, a proliferation-inducing ligand; BAFF, B cell activating factor; Gd-IgA1, galactose-deficient immunoglobulin A1; IgA, immunoglobulin A.
Reference: Cheung CK, et al. Front Nephrol. 2024;3:1346769. doi:10.3389/fneph.2023.1346769
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