NKF, ASN Recommend State Medicaid Changes to Allow Coverage of Scheduled Dialysis for Undocumented Patients

By Bridget M. Kuehn

It’s a week-to-week challenge for Eric Wallace, MD, and his colleagues to treat patients with end stage kidney disease (ESKD) who are undocumented immigrants. Many are young people in their 20s and 30s who are working or in school; one recently was pregnant. They are not eligible for coverage under Medicare and cannot buy coverage through the Affordable Care Act on state exchanges. If they cannot buy private insurance, their only option for care is emergency dialysis, which is covered by the Emergency Medical Treatment and Active Labor Act (EMTALA).

“All of us are hoping and praying they make it to their next treatment,” said Wallace, who as medical director of home dialysis at the University of Alabama at Birmingham frequently cares for undocumented Latinx patients. He worries that a patient may have an emergency between visits and wait too long to seek help. The situation is especially heart-breaking for Wallace, whose mother came to the United States from South America as an undocumented immigrant at 18 years old and later became a citizen.

“We are treating one set of human beings differently, and they are young and exactly like my mom when she came over,” Wallace said. “You get patient and provider burnout because we are providing substandard care.”

Emergency dialysis also contributes to worse outcomes for the estimated 5000 to 7000 undocumented patients with kidney failure in the United States (1) and is about 4 times more costly than scheduled dialysis (2). These costs are paid for by the hospital or state Medicaid programs. To reduce these burdens, at least 12 states have already expanded their Emergency Medicaid programs to cover scheduled outpatient dialysis for this vulnerable group of patients (3). In August 2021, the ASN signed on to a letter from the National Kidney Foundation (NKF) urging more state Medicaid directors to make this change as well as to cover home dialysis.

“The kidney care these individuals receive is inhumane, extraordinarily expensive, and largely ineffectual,” the NKF.

Does Nephrology Need U.S. News & World Report Rankings?

By T. Alp Ikizler and Beatrice Concepcion

Annually, U.S. News & World Report (USNWR) publishes a ranking of the best hospitals in the United States by adult specialties. According to the USNWR website, the aim of these rankings is to provide a tool for patients with life-threatening or rare conditions that would help them find skilled inpatient care at a hospital that excels in treating complex, high-risk cases (1). Hospitals are ranked from 1 to 50 in each specialty, and any hospital in the top 10% of all rated hospitals (but not ranked in the top 50) is given a “high performing” designation (1).

In addition to ranking hospitals by specialties, USNWR also rates hospitals on their performance of procedures and treatment of specific conditions. Hospitals are rated as high performing, average, or below average for each specific procedure and condition. Based on the cumulative performance in specialty rankings and procedures and conditions, the Best Hospitals Honor Roll recognizes the nation’s top 20 hospitals. In 2020−2021, a hospital’s overall score partly came from rankings of 12 “data-driven” specialties (including nephrology) comprising components for patient experience (patient surveys, 5%), discharge-to-home metric (7.5%), reputation (5%), and clinical performance (75%). In 2020, the National Kidney Foundation (NKF) issued a report highlighting disparities in care for patients with ESKD from low-income and certain minority populations.
Now available

Kerendia®
(finerenone) tablets
10 mg • 20 mg

In adult patients with CKD associated with T2D
KERENDIA is indicated to reduce the risk of:

• Sustained eGFR decline
• End-stage kidney disease
• CV death
• Non-fatal MI
• Hospitalization for heart failure

CKD=chronic kidney disease; CV=cardiovascular; eGFR=estimated glomerular filtration rate; MI=myocardial infarction; T2D=type 2 diabetes.

INDICATION:
• KERENDIA is indicated to reduce the risk of sustained eGFR decline, end-stage kidney disease, cardiovascular death, non-fatal myocardial infarction, and hospitalization for heart failure in adult patients with chronic kidney disease (CKD) associated with type 2 diabetes (T2D)

IMPORTANT SAFETY INFORMATION
CONTRAINDICATIONS:
• Concomitant use with strong CYP3A4 inhibitors
• Patients with adrenal insufficiency

WARNINGS AND PRECAUTIONS:
• Hyperkalemia: KERENDIA can cause hyperkalemia. The risk for developing hyperkalemia increases with decreasing kidney function and is greater in patients with higher baseline potassium levels or other risk factors for hyperkalemia. Measure serum potassium and eGFR in all patients before initiation of treatment with KERENDIA and dose accordingly. Do not initiate KERENDIA if serum potassium is >5.0 mEq/L

Measure serum potassium periodically during treatment with KERENDIA and adjust dose accordingly. More frequent monitoring may be necessary for patients at risk for hyperkalemia, including those on concomitant medications that impair potassium excretion or increase serum potassium

MOST COMMON ADVERSE REACTIONS:
• Adverse reactions reported in ≥1% of patients on KERENDIA and more frequently than placebo: hyperkalemia (18.3% vs. 9%), hypotension (4.8% vs. 3.4%), and hyponatremia (1.4% vs. 0.7%)
• Hyperkalemia:
  WARNINGS AND PRECAUTIONS:
  • Patients with adrenal insufficiency
  • Concomitant use with strong CYP3A4 inhibitors

CONTRAINDICATIONS:

IMPORTANT SAFETY INFORMATION

• KERENDIA is indicated to reduce the risk of

INDICATION:

C KD=chronic kidney disease; CV=cardiovascular; eGFR=estimated glomerular filtration rate; MI=myocardial infarction; T2D=type 2 diabetes.

type 2 diabetes (T2D)
with chronic kidney disease (CKD) associated with
cardiovascular death, non-fatal myocardial infarction,
sustained eGFR decline, end-stage kidney disease,
with higher baseline potassium levels or other risk factors for hyperkalemia. Measure serum potassium periodically during treatment with KERENDIA and on day 1 after treatment. Measure serum potassium accordingly. More frequent monitoring may be necessary for patients at risk for hyperkalemia, such as those with baseline serum potassium >5.0 mEq/L, greater than baseline serum potassium levels at any time, or patients who are on concomitant medications that impair potassium excretion or increase serum potassium levels.

The risk for developing hyperkalemia increases with decreasing kidney function and is greater in patients with moderate or severe renal impairment. Measure serum potassium periodically during treatment with KERENDIA if serum potassium is >5.0 mEq/L and eGFR in all patients before initiation of treatment and every 1 to 2 months during treatment. Monitor serum potassium levels at the time of dose adjustment of either KERENDIA or the moderate or weak CYP3A4 inhibitor and adjust KERENDIA dosage as appropriate.

The risk for developing hyperkalemia increases with

• End-stage kidney disease
• Sustained eGFR decline

KERENDIA can cause hyperkalemia.

In adult patients with CKD associated with T2D

Concomitant use of KERENDIA with strong or moderate CYP3A4 inhibitors is contraindicated. Avoid concomitant intake of grapefruit or grapefruit juice.

• Strong CYP3A4 Inhibitors: Concomitant use of KERENDIA with strong CYP3A4 inhibitors is contraindicated. Avoid concomitant intake of grapefruit or grapefruit juice

• Moderate and Weak CYP3A4 Inhibitors: Monitor serum potassium during drug initiation or dosage adjustment of either KERENDIA or the moderate or weak CYP3A4 inhibitor and adjust KERENDIA dosage as appropriate

• Strong and Moderate CYP3A4 Inducers: Avoid concomitant use of KERENDIA with strong or moderate CYP3A4 inducers

• Strong CYP3A4 Inducers:

Monitor serum potassium during drug initiation or dosage adjustment of either KERENDIA or the moderate or weak CYP3A4 inhibitor and adjust KERENDIA dosage as appropriate

Most common adverse reactions reported in ≥1% of patients on treatment with KERENDIA were:

• Lactation: Avoid breastfeeding during treatment with KERENDIA and for 1 day after treatment

• Hepatic Impairment: Avoid use of KERENDIA in patients with severe hepatic impairment (Child Pugh C) and consider additional serum potassium monitoring with moderate hepatic impairment (Child Pugh B)

Please see the following page for brief summary of full Prescribing Information.


Visit KerendiaHCP.com for more information and to request samples from a representative

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Kerendia® (finerenone) tablets, for oral use

1 INDICATIONS AND USAGE
Kerendia® is indicated to reduce the risk of sustained eGFR decline, end-stage kidney disease, cardiovascular death, non-fatal myocardial infarction, and hospitalization for heart failure in adult patients with chronic kidney disease (CKD) associated with type 2 diabetes (T2D).

2 CONTRAINDICATIONS
Kerendia is contraindicated in patients:
• Who are receiving concomitant treatment with strong CYP3A4 inhibitors [see Drug Interactions (7.1)]
• With adrenal insufficiency.

3 WARNINGS AND PRECAUTIONS
5.1 Hyperkalemia
Kerendia can cause hyperkalemia [see Adverse Reactions (6.1)]. The risk for developing hyperkalemia increases with decreasing kidney function and is greater in patients with higher baseline potassium levels or other risk factors for hyperkalemia. Measure serum potassium and eGFR in all patients before initiation of treatment with Kerendia and dose accordingly [see Dosage and Administration (2.1)]. More frequent monitoring may be necessary for patients at risk for hyperkalemia, including those on concomitant medications that impair potassium excretion or increase serum potassium [see Drug Interactions (7.1), 7.2].

6 ADVERSE REACTIONS
The following serious adverse reactions are discussed elsewhere in the labeling:
• Hyperkalemia [see Warnings and Precautions (5.1)]

6.1 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 Kerendia was evaluated in the randomized, double-blind, placebo-controlled, multicenter pivotal phase 3 study FIDELIO-DKD. In this study, 2827 patients received Kerendia (10 or 20 mg once daily) and 2831 received placebo. For patients in the Kerendia group, the mean duration of treatment was 2.2 years. Overall, serious adverse reactions occurred in 32% of patients receiving Kerendia and in 34% of patients receiving placebo. Permanent discontinuation due to adverse reactions occurred in 7% of patients receiving Kerendia and in 6% of patients receiving placebo.

Hyperkalemia led to permanent discontinuation of treatment in 2.3% of patients receiving Kerendia versus 0.9% of patients receiving placebo.

The most frequently reported (≥ 10%) adverse reaction was hyperkalemia [see Warnings and Precautions (5.1)]. Hospitalization due to hyperkalemia for the Kerendia group was 1.4% versus 0.3% in the placebo group.

Table 3 shows adverse reactions in FIDELIO-DKD that occurred more commonly on Kerendia than on placebo, and in at least 1% of patients treated with Kerendia.

Table 3: Adverse reactions reported in ≥ 1% of patients on Kerendia and more frequently than placebo in the phase 3 study FIDELIO-DKD

<table>
<thead>
<tr>
<th>Adverse reaction</th>
<th>Kerendia N = 2827</th>
<th>Placebo N = 2831</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperkalemia</td>
<td>516 (18.3)</td>
<td>255 (9.0)</td>
</tr>
<tr>
<td>Hypotension</td>
<td>535 (4.8)</td>
<td>98 (3.4)</td>
</tr>
<tr>
<td>Hypophosphatemia</td>
<td>40 (1.4)</td>
<td>19 (0.7)</td>
</tr>
</tbody>
</table>

8 USE IN SPECIFIC POPULATIONS
8.1 Pregnancy

There are no available data on Kerendia use in pregnancy to evaluate for a drug-associated risk of major birth defects, miscarriage or adverse maternal or fetal outcomes. Animal studies have shown developmental toxicity at exposures about 4 times those expected in humans. [see Data]. The clinical significance of these findings is unclear.

The estimated background risk of major birth defects and miscarriage for the indicated population is unknown. All pregnancies have a background risk of birth defect, loss or other adverse outcomes. In the U.S. general population, the estimated background risk of major birth defects and miscarriage in clinically recognized pregnancies is 2 to 4% and 15 to 20%, respectively.

Data

Animal Data

In the embryo-fetal toxicity study in rats, finerenone resulted in reduced placental weights and signs of fetotoxicity, including reduced fetal weights and retarded ossification at the maternal toxic dose of 10 mg/kg/day corresponding to an AUC0−12h of 19 times that of humans. At 30 mg/kg/day, the incidence of visceral and skeletal variations was increased (slight edema, shortened umbilical cord, slightly enlarged fontanels) and one fetus showed complex malformations including a rare malformation (double aortic arch) at an AUC0−12h of about 25 times that in humans. The doses free of any findings (low dose in rats, high dose in rabbits) provide safety margins of 10 to 13 times the AUC0−12h expected in humans.

When rats were exposed during pregnancy and lactation in the pre- and postnatal developmental toxicity study, increased pup mortality and other adverse effects (lower pup weight, delayed pinna unfolding) were observed at about 4 times the AUC0−12h expected in humans. In addition, the offspring showed slightly increased locomotor activity, but no other neurobehavioral changes starting at about 4 times the AUC0−12h expected in humans. The dose free of findings provides a safety margin of about 2 times for the AUC0−12h expected in humans.

8.2 Lactation

Risk Summary

There are no data on the presence of finerenone or its metabolite in human milk, the effects on the breastfed infant or the effects of the drug on milk production. In a preclinical developmental toxicity study in rats, increased pup mortality and lower pup weight were observed at about 4 times the AUC0−12h expected in humans. These findings suggest that finerenone is present in rat milk [see Use in Specific Populations (8.1) and Data]. When a drug is present in animal milk, it is likely that the drug will be present in human milk. Because of the potential risk to breastfed infants from exposure to KERENDIA, avoid breastfeeding during treatment and for 1 day after treatment.

8.4 Pediatric Use

The safety and efficacy of Kerendia have not been established in patients below 18 years of age.

8.5 Geriatric Use

Of the 2827 patients who received Kerendia in the FIDELIO-DKD study, 58% of patients were 65 years and older, and 15% were 75 years and older. No overall differences in safety or efficacy were observed between these patients and younger patients. No dose adjustment is required.

8.6 Hepatic Impairment

Avoid use of Kerendia in patients with severe hepatic impairment (Child Pugh C).

No dosage adjustment is recommended in patients with mild or moderate hepatic impairment (Child Pugh A or B).

Consider additional serum potassium monitoring in patients with moderate hepatic impairment (Child Pugh B) [see Dosing and Administration (2.3) and Clinical Pharmacology (12.3)].

10 OVERDOSAGE

In the event of suspected overdose, immediately interrupt Kerendia treatment. The most likely manifestation of overdose is hyperkalemia. If hyperkalemia develops, standard treatment should be initiated.

Finerenone is unlikely to be efficiently removed by hemodialysis given its fraction bound to plasma proteins of about 90%.

13 NONCLINICAL TOXICOLOGY

13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility

Finerenone was non-genotoxic in an in vitro bacterial reverse mutation (Ames) assay, the in vitro chromosomal aberration assay in cultured Chinese hamster V79 cells, or the in vivo micronucleus assay in mice.

In 2-year carcinogenicity studies, finerenone did not show a statistically significant increase in tumor response in Wistar rats or in CD1 mice. In male mice, Leydig cell adenoma was numerically increased at a dose representing 26 times the AUC0−12h expected in humans and is not considered clinically relevant. Finerenone did not impair fertility in male rats but impaired fertility in female rats at 20 times AUC to the maximum human exposure.

17 PATIENT COUNSELING INFORMATION

Advise patients of the need for periodic monitoring of serum potassium levels. Advise patients receiving Kerendia to consult with their physician before using potassium supplements or salt substitutes containing potassium [see Warnings and Precautions (5.1)].

Advise patients to avoid strong or moderate CYP3A4 inducers and to find alternative medicinal products with no or weak potential to induce CYP3A4 [see Drug Interactions (7.1)].

Avoid concomitant intake of grapefruit or grapefruit juice as it is expected to increase the plasma concentration of finerenone [see Drug Interactions (7.1)].

Advise women that breastfeeding is not recommended at the time of treatment with KERENDIA and for 1 day after treatment [see Use in Specific Populations (8.2)].

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letter states. “Our organizations believe it is imperative that states and hospital systems follow the lead of states like Arizona and Colorado and expand Emergency Medicaid for undocumented immigrants living in the United States.”

“Gut wrenching”

When Oanh Nguyen, MD, assistant professor in the Division of Hospital Medicine at the University of California—San Francisco, started seeing patients as an intern at Parkland Hospital in Dallas, she was shocked to learn that patients with ESKD who were undocumented immigrants received emergency dialysis instead of scheduled dialysis. She had gone to medical school in California where the state’s Medicaid program covers scheduled dialysis for this vulnerable population and described what she saw during her residency and later as a member of faculty as “gut-wrenching.”

“These were good, honest, hardworking people just trying to support their families,” Nguyen said. “They were just so grateful to be receiving any care, but it was hard to be face-to-face with them knowing that this is not the type of care they should be receiving.”

As a resident at Indiana University in Indianapolis, Areeba Jawed, MBBS, assistant professor of medicine at Wayne State University in Detroit, saw the difference that scheduled dialysis can make for these patients. The safety net hospital she was interning at initially offered scheduled dialysis as charity care to undocumented immigrants, but a change in leadership led to the decision to switch to emergency-only dialysis due to policy changes, she said, and her colleagues saw a decline in patients’ health. One young man wanted to do his emergency dialysis on the weekends to continue working during the week to support his family. But like many patients on emergency dialysis, he lost residual kidney function over time.

“We saw him deteriorate to the point that he just could not work between Monday and Friday; he couldn’t continue to work,” she said. Jawed’s experience is now backed by a growing evidence base showing the safety and effectiveness of scheduled dialysis for undocumented patients with kidney failure.

“Moving the needle”

Hilda’s case inspired Cervantes and her colleagues to study this issue and push for a change in Colorado’s Medicaid policies. Colorado made the change to its policies in 2019, which is expected to save the state $17 million a year (10). It also has led to dramatic improvements in patients’ health and quality of life (6). She said support from national organizations like NKF and ASN for more states to make this change may help further “move the needle.”

There was a clear consensus among the members of the ASN Quality Committee to support signing on to the letter, said the committee’s chair, Scott Bieber, DO, a nephrologist at Kootenai Health in Coeur d’Alene, Idaho. Bieber, who has practiced in states with and without Medicaid coverage for scheduled dialysis, said there is a stark difference in the quality of care patients receive.

“[Scheduled dialysis] is the right thing to do to keep patients healthy,” Bieber said.

The NKF-ASN letter also advocates for coverage of home dialysis. Wayne Wallace, who is also a member of the ASN Quality Committee and a Medical Director of Home Dialysis, said home dialysis in particular may help improve patients’ quality of life by enabling them to continue with school or work. He called the letter a “first step” and said he’d like to go further to offer transplant as well. Bieber noted that many other committee members shared that sentiment.

“As the data illustrate, the manner in which undocumented people with kidney failure are treated is needlessly expensive,” the letter states. “At a time when states’ budgets are under enormous pressure, ensuring that undocumented people with kidney failure can access Emergency Medicaid is just common sense.”

Moving the needle

There are also cost savings for hospitals that may have to cover the costs of emergency dialysis. In her study, Nguyen estimated that switching all undocumented patients from emergency dialysis to scheduled dialysis would save Parkland Hospital $315 million a year. The study inspired the hospital to change its policy and work with outpatient dialysis providers to provide scheduled dialysis for undocumented patients, she said. Now, they are piloting home peritoneal dialysis, which may further reduce costs and improve patients’ quality of life. Nguyen acknowledged there are challenges in reliably estimating potential cost savings. But she said evidence from California suggests that contrary to some opponents’ fears, allowing coverage for scheduled dialysis does not lead to an influx of undocumented patients seeking dialysis.

“Scheduled dialysis should be the universal standard of care for everyone,” she said. “There is really no reason to withhold that standard of care from an ethical or even an economic standpoint.”

Additionally, offering scheduled outpatient dialysis allows hospitals to more effectively deploy their resources to serve their underserved communities. Nguyen said. Jawed said this is particularly important now in the face of the pandemic. Requiring undocumented patients with kidney failure to come into the emergency department for dialysis increases their risk of becoming infected as well as adds to the burden of already overwhelmed clinicians and facilities running short on beds, said Jawed. Jawed also noted the disproportionate toll COVID-19 has taken on undocumented patients with ESKD in a recent Kidney News article (11). She noted that undocumented immigrants are often frontline workers and may live in crowded housing, increasing their risk of infection.

Jawed said that while physicians may not ultimately make the decision about what policies to enact, they have a role to play in shaping policies. She noted they can help by recognizing the contributions that undocumented immigrants make to our communities whether through the jobs they do or the taxes they pay. They can also make decision-makers aware of how policies are affecting patients, clinicians, and care systems.

“This is an area where not just nephrologists but all clinicians can really come together in solidarity and advocate for a very vulnerable or marginalized population,” Cervantes said.

References

Does Nephrology Need U.S. News & World Report Rankings?
Continued from page 1

(27.5%), structure (capturing staffing and patient services, advanced technologies, external designations [e.g., nurse mag-
et], trauma center, innovation, and volume, 30%), and 3-day mortality (30%). A document detailing the methodology for ranking hospitals and specialties can be found on the US-
NWR website (2).

What changed, and what is the relevance to nephrology?

In an unprecedented move, USNWR did not include nephro-
logy among the 15 adult specialties listed in the 2021–2022 rankings. It is common for USNWR to make changes in its evaluation process on a yearly basis, but based on the com-
munication by USNWR prior to its release, this was not an expected change, at least within the nephrology discipline. Instead of ranking nephrology as a specialty, as has been done in the past, a new “kidney failure” condition was included among the reported conditions that were used to calculate though the rationale for this change is not explicit, the US-
NWR website notes that the kidney failure rating covers nearly all of the same hospital admissions as adult nephrology (1). It is important to note that despite rating hospitals in the treat-
ment of conditions such as chronic obstructive pulmonary disease, congestive heart failure, or diabetes, the specialties of pulmonology and lung surgery, endocrinology and heart surgery, and diabetes and endocrinology remain on the list of ranked specialties.

The relevance and utility of USNWR ratings and rankings have been long debated and are not the focus of this com-
munity. Nevertheless, it is important for the nephrology community to understand what these ratings and rankings represent. First and foremost, the clinical relevance of the USNWR kidney failure rating, the only grading for nephro-
logy in 2021–2022, is limited to only a subset of patients with kidney disease, i.e., ones with acute kidney injury (AKI) (3). In other words, the care delivered by institutions for chronic kidney disease (CKD), end stage kidney disease (ESKD), and kidney transplantation is not included in the evaluation pro-
cess. Although speculative, this change might be an attempt by USNWR to be consistent with its original premise of “a tool for patients with life-threatening or rare conditions that would help them find skilled inpatient care at a hospital that excels in treating complex, high-risk cases.” AKI does indeed represent a high-risk and life-threatening condition, but it con-
stitutes only a small fraction of (hospitalized) patients with kidney disease (see below). Second, USNWR is a customer-
oriented service allowing the clients (patients in this case) to explore and choose the product (the hospital in this case) to seek the best care. The ratings are based on the relevant infor-
mation from the procedure and diagnosis codes. Accordingly, the rating system in place is more than adequate to provide an understanding of whether the hospital can manage a patient with AKI. On the other hand, it is of course debatable how much autonomy a patient has when choosing a hospital in the setting of AKI because the condition is usu-
ally diagnosed after the index hospitalization, and the choice of kidney replacement therapy is usually straightforward once the patient is hospitalized. In rare circumstances, a patient requiring a complex dialysis procedure may be referred to a tertiary hospital due to the lack of services. Even in that case, the patient has minimal to no input because the options are limited to availability.

In terms of rankings, the previous years did include ESKD and CKD codes, reflecting a more thorough catchment of patients with kidney disease for data-driven nephrology rank-
ings. Some of these conditions included glomerular diseases, gout and diabetes-related kidney disease, and kidney trans-
plant status, although nephrology service covers much more than these select diagnoses, especially only when captured dur-
ing a hospitalization. The rankings were also influenced by rec-
ognition of peers, i.e., how many nephrologists considered the hospital as one of the best. Notably, the selection of these peer groups was dependent on many market and hospital factors, so in what way was a hospital being a part of a mailing list or membership to certain online applications. Finally, the hospital’s operational resources and size played a significant role in the final rankings. In the end, it was not surprising to see some highly prestigious institutions dominate the top 10 for many years in a row, regardless of that nephrology was excluded from data-driven rankings by USNWR. In its statement, ASN highlights several important issues: the significantly limited relevance of these rankings in terms of patient population considered (2%), the importance of recognizing kidney disease that affects almost 1 out of 6 individuals in the United States, and an overview of how rank-
nings and ratings are developed and their implications. In this document, targeted toward patients and their caregivers, ASN pledges to make sure credible and comprehensive information from experts is available to the public, to include all people who need care in these rankings, to avoid inappropriate use of rankings and ratings, and to urge legislation to oversee the obj-
jectiveness of these measurements. ASN also provides a short but very comprehensive overview of the rankings.”

What is the relevance of ASN’s announcement in response to USNWR’s rankings?

As the leading entity representing physicians and healthcare workers involved in kidney disease, the American Society of Nephrology (ASN) released a statement when the news broke about the change. The basic knowledge and information for patients and their caregivers. The Division of Nephrology and Hypertension at VUMC.

The authors report no conflicts of interest related to this ar-
ticle.

The Division of Nephrology and Hypertension at VUMC ranked 7th, 9th, and 10th in USNWR rankings over the past 3 years. The content of this article reflects the personal experi-
ce and views of the authors and should not be considered medical advice or recommendation. The content does not re-
SPECT the views or opinions of VUMC. Responsibility for the information and views expressed herein lies entirely with the author.

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Maximizing the Educational Value of Tweetorials

By Amy A. Yau and Sayna Norouzi

Using Twitter is the great new foxy of medical education. It is free and easily accessible, and information is available as short “bite-sized” tweets. Threading together multiple tweets to create a tweetorial is one popular method to reach and educate learners (1) (Figure 1). Beyond dissemination of knowledge, tweetorials are also seen as a tool to stimulate medical curiosity, which has the added benefits of encouraging independent study and critical thinking (2, 3). However, given the lack of definitive studies linking social media and educational outcomes, this begs the question of how to best maximize the educational value of tweetorials (4–6).

For creators, a few tips are provided, but it is important to plan a tweetorial just as you would a lecture (Table 1). First, identify your target audience. Next, pick a topic, and define learning objectives (Figure 2). More specialized topics will narrow your audience, but broader topics may lend to a lengthier tweetorial, which may be off-putting to readers (1). When crafting your tweetorial, the first one or two tweets are the hooks to draw in your reader. The following tweets, or at most pair of tweets, should guide your reader and answer objectives. Your final summary tweet helps reiterate important concepts. A strong summary tweet can also inspire readers to go back and read tweets that they may have initially glossed over (1).

Despite your best efforts, the vast majority of readers will not make it past the first or even second tweet (1). As a tweetorial consumer, maximize your learning by really taking time to read a tweetorial. Look at the images and figures. Open links; read cited material. Think about the content, and ask questions. We encourage readers to read replies to the original thread and “Quote Tweets.” Use tweetorials as a springboard to supplement your current education, or dig deeper into a topic of interest. Not every tweetorial will and should be the same. Just as educator styles vary, so will tweetorial styles. Remember to be engaging, and have fun! For more examples of tweetorials check out the Renal Fellow Network “Have a Nephrology Question? There Might Be a #Tweetorial for That!” (https://www.renalfellow.org/have-a-question-there-might-be-a-tweetorial-for-that/)(8), and if you want to learn more about how to construct tweetorials, consider joining the Nephrology Social Media Collective.

Amy A. Yau, MD, is a Clinical Assistant Professor of Medicine at the University of Arizona, Tucson, AZ. Sayna Norouzi, MD, is Assistant Professor of Medicine at Loma Linda University Medical Center, Loma Linda, CA. Drs. Yau and Norouzi are co-leaders with the Nephrology Social Media Collective Blog and Tweetorial Rotation.

References

For more examples, please check out the Renal Fellow Network (8).

Table 1. Tips for planning a tweetorial

<table>
<thead>
<tr>
<th>Identify your audience.</th>
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</thead>
<tbody>
<tr>
<td>Pick a topic.</td>
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<tr>
<td>Define learning objectives.</td>
</tr>
<tr>
<td>Make it interactive with polls, responding to readers.</td>
</tr>
<tr>
<td>Provide visuals (consider making your own).</td>
</tr>
</tbody>
</table>

Consider the length (recommended optimal length of 10–15 tweets).
Give credit to others (always link to source material).
Provide links to supplementary educational resources (podcasts, videos, books, etc.).
Pin your tweetorial to your profile, or create a moment collating all of your tweetorials.
Indication
Parsabiv® (etelcalcetide) is indicated for the treatment of secondary hyperparathyroidism (HPT) in adult patients with chronic kidney disease (CKD) on hemodialysis.

Limitations of Use:
Parsabiv® has not been studied in adult patients with parathyroid carcinoma, primary hyperparathyroidism, or with CKD who are not on hemodialysis and is not recommended for use in these populations.

Important Safety Information
Contraindication: Parsabiv® is contraindicated in patients with known hypersensitivity to etelcalcetide or any of its excipients. Hypersensitivity reactions, including face edema and anaphylactic reaction, have occurred.

Hypocalcemia: Parsabiv® lowers serum calcium and can lead to hypocalcemia, sometimes severe. Significant lowering of serum calcium can cause QT interval prolongation and ventricular arrhythmia. Patients with conditions that predispose to QT interval prolongation and ventricular arrhythmia may be at increased risk for QT interval prolongation and ventricular arrhythmias if they develop hypocalcemia due to Parsabiv®. Closely monitor corrected serum calcium and QT interval in patients at risk on Parsabiv®. Significant reductions in corrected serum calcium may lower the threshold for seizures. Patients with a history of seizure disorder may be at increased risk for seizures if they develop hypocalcemia due to Parsabiv®. Monitor corrected serum calcium in patients with seizure disorders on Parsabiv®.

Concurrent administration of Parsabiv® with another oral calcimimetic could result in severe, life-threatening hypocalcemia. Patients switching from cinacalcet to Parsabiv® should discontinue cinacalcet for at least 7 days prior to initiating Parsabiv®. Closely monitor corrected serum calcium in patients receiving Parsabiv® and concomitant therapies known to lower serum calcium.

Worsening Heart Failure: In Parsabiv® clinical studies, cases of hypotension, congestive heart failure, and decreased myocardial performance have been reported. Closely monitor patients treated with Parsabiv® for worsening signs and symptoms of heart failure.

Upper Gastrointestinal Bleeding: In clinical studies, 2 patients treated with Parsabiv® in 1253 patient years of exposure had upper gastrointestinal (GI) bleeding at the time of death. The exact cause of GI bleeding in these patients is unknown and there were too few cases to determine whether these cases were related to Parsabiv®. Patients with risk factors for upper GI bleeding, such as known gastritis, esophagitis, ulcers or severe vomiting, may be at increased risk for GI bleeding with Parsabiv®. Monitor patients for worsening of common Parsabiv® GI adverse reactions and for signs and symptoms of GI bleeding and ulcerations during Parsabiv® therapy.

Adynamic Bone: Adynamic bone may develop if PTH levels are chronically suppressed.

Adverse Reactions: In clinical trials of patients with secondary HPT comparing Parsabiv® to placebo, the most common adverse reactions were blood calcium decreased (64% vs. 10%), muscle spasms (12% vs. 7%), diarrhea (11% vs. 9%), nausea (11% vs. 6%), vomiting (9% vs. 5%), headache (8% vs. 6%), hypocalcemia (7% vs. 0.2%), and paresthesia (6% vs. 1%).

Please see Brief Summary of full Prescribing Information on adjacent page.

IV = intravenous; sHPT = secondary hyperparathyroidism; PTH = parathyroid hormone; P = phosphate; cCa = corrected calcium.

Reference: 1. Parsabiv® (etelcalcetide) prescribing information, Amgen.
INDICATIONS AND USAGE
PARSABIV is indicated for the treatment of secondary hyperparathyroidism (HPT) in adult patients with chronic kidney disease (CKD) on hemodialysis.

CONTRAINDICATIONS
Hypersensitivity
PARSABIV is contraindicated in patients with known hypersensitivity to etelcalcetide or any of its excipients. Hypersensitivity reactions, including face edema and anaphylactic reactions, have occurred with PARSABIV. (see Adverse Reactions (6.1) in PARSABIV full prescribing information)

WARNINGS AND PRECAUTIONS
Hypocalcemia
PARSABIV lowers serum calcium (see Adverse Reactions (6.1) in PARSABIV full prescribing information) and can lead to hypocalcemia, sometimes severe. Significant lowering of serum calcium can cause paresthesias, myalgias, muscle spasms, seizures, QT interval prolongation, and ventricular arrhythmias. QT interval Prolongation and Ventricular Arrhythmia
In the combined placebo-controlled studies, more patients treated with PARSABIV experienced a maximum increase from baseline of greater than 60 msec in the QTcF interval (5% placebo versus 1.2% PARSABIV). In these studies, the incidence of a maximum post-baseline predialysis QTcF > 500 msec in the placebo and PARSABIV groups was 1.3% and 4.8%, respectively (see Adverse Reactions (6.1) in PARSABIV full prescribing information). Patients with congenital long QT syndrome, history of QT interval prolongation, family history of long QT syndrome or sudden cardiac death, and other risk factors that predispose to QT interval prolongation and ventricular arrhythmias may be at increased risk for QT interval prolongation and ventricular arrhythmias if they develop hypocalcemia due to PARSABIV. Closely monitor corrected serum calcium and QT interval in patients at risk receiving PARSABIV.

Seizures
Significant reductions in corrected serum calcium may lower the threshold for seizures. Patients with a history of seizure disorder may be at increased risk for seizures if they develop hypocalcemia due to PARSABIV. Monitor corrected serum calcium in patients with seizure disorders receiving PARSABIV.

Risk of Hypocalcemia with Other Serum Calcium Lowering Products
Concurrent administration of PARSABIV with another oral calcium-sensing receptor agonist could result in severe, life-threatening hypocalcemia. Patients switching from cinacalcet to PARSABIV should discontinue cinacalcet for at least 7 days prior to initiating PARSABIV (see Dosage and Administration (2.4) in PARSABIV full prescribing information). Closely monitor corrected serum calcium in patients receiving PARSABIV and concomitant therapies known to lower serum calcium.

Monitoring Serum Calcium and Patient Education
Measure corrected serum calcium prior to initiation of PARSABIV. Do not initiate in patients if the corrected serum calcium is less than the lower limit of normal. Monitor corrected serum calcium within 1 week after initiation or dose adjustment and every 4 weeks during treatment with PARSABIV (see Dosage and Administration (2.4) in PARSABIV full prescribing information). Educate patients on the symptoms of hypocalcemia and advise them to contact a healthcare provider if they occur.

Management of Hypocalcemia
If corrected serum calcium falls below the lower limit of normal or symptoms of hypocalcemia develop, start or increase calcium supplementation (including calcium, calcium-containing phosphate binders, and/or vitamin D sterols or increases in diltiazem calcium concentration). PARSABIV dose reduction or discontinuation of PARSABIV may be necessary (see Dosage and Administration (2.4) in PARSABIV full prescribing information).

Worsening Heart Failure
In clinical studies with PARSABIV, cases of hypertension, congestive heart failure, and decreased myocardial performance have been reported. In clinical studies, heart failure requiring hospitalization occurred in 2% of PARSABIV-treated patients and 1% of placebo-treated patients. Reductions in corrected serum calcium may be associated with congestive heart failure, however, a causal relationship to PARSABIV could not be completely excluded. Closely monitor patients treated with PARSABIV for worsening signs and symptoms of heart failure.

Upper Gastrointestinal Bleeding
In clinical studies, two patients treated with PARSABIV in 1253 patient-years of exposure had upper gastrointestinal (GI) bleeding noted at the time of death while no patient in the control groups in 384 patient-years of exposure had upper GI bleeding noted at the time of death. The exact cause of GI bleeding in these patients is unknown, and there were too few cases to determine whether these cases were related to PARSABIV. Patients with risk factors for upper GI bleeding (such as known gastritis, esophagitis, ulcers, or severe vomiting) may be at increased risk for GI bleeding while receiving PARSABIV treatment. Monitor patients for worsening of common GI adverse reactions of nausea and vomiting associated with PARSABIV (see Adverse Reactions (6.1) in PARSABIV full prescribing information) and for signs and symptoms of GI bleeding and ulcerations during PARSABIV therapy. Promptly evaluate and treat any suspected GI bleeding.

Adynamic Bone
Adynamic bone may develop if PTH levels are chronically suppressed. If PTH levels decrease below the recommended target range, the dose of vitamin D sterols and/or PARSABIV should be reduced or therapy discontinued. After discontinuation, resume therapy at a lower dose to maintain PTH levels in the target range (see Dosage and Administration (2.1) in PARSABIV full prescribing information).

ADVERSE REACTIONS
The following adverse reactions are discussed in greater detail in other sections of the labeling:

• Hypocalcemia (see Warnings and Precautions (5.1) in PARSABIV full prescribing information)
• Worsening Heart Failure (see Warnings and Precautions (5.2) in PARSABIV full prescribing information)
• Upper Gastrointestinal Bleeding (see Warnings and Precautions (5.3) in PARSABIV full prescribing information)
• Adynamic Bone (see Warnings and Precautions (5.4) in PARSABIV full prescribing information)

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 with rates in the clinical trials of another drug and may not reflect the rates observed in clinical practice.

The data in Table 2 are derived from two placebo-controlled clinical studies in patients with chronic kidney disease and secondary hyperparathyroidism on hemodialysis. The data reflect exposure of 503 patients to PARSABIV with a mean duration of exposure to PARSABIV of 23.6 weeks. The mean age of patients was approximately 59 years, and 69% of the patients were male. Of the total patients, 67% were Caucasian, 28% were Black or African American, 2.6% were Asian, 1.2% were Native Hawaiian or Other Pacific Islander, and 1.6% were categorized as Other. Table 2 shows common adverse reactions associated with the use of PARSABIV in the pool of placebo-controlled studies. These adverse reactions occurred more commonly on PARSABIV than on placebo and were reported in at least 5% of patients treated with PARSABIV.

Table 2: Adverse Reactions Reported in ≥ 5% of PARSABIV-Treated Patients

<table>
<thead>
<tr>
<th>Adverse Reaction*</th>
<th>Placebo (N = 513)</th>
<th>PARSABIV (N = 503)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood calcium decreasedb</td>
<td>10%</td>
<td>64%</td>
</tr>
<tr>
<td>Muscle spasmsc</td>
<td>7%</td>
<td>12%</td>
</tr>
<tr>
<td>Diarrhead</td>
<td>9%</td>
<td>11%</td>
</tr>
<tr>
<td>Nausaat</td>
<td>6%</td>
<td>11%</td>
</tr>
<tr>
<td>Vomitingd</td>
<td>5%</td>
<td>9%</td>
</tr>
<tr>
<td>Headached</td>
<td>6%</td>
<td>8%</td>
</tr>
<tr>
<td>Hypocalcemiab</td>
<td>0.2%</td>
<td>7%</td>
</tr>
<tr>
<td>Paresthesiaf</td>
<td>1%</td>
<td>6%</td>
</tr>
</tbody>
</table>

* Included adverse reactions reported with at least 1% greater incidence in the PARSABIV group compared to the placebo group.

† Asymptomatic reductions in calcium below 7.5 mg/dL or clinically significant asymptomatic reductions in corrected serum calcium between 7.5 and < 8.3 mg/dL (that required medical management)

‡ Symptomatic reductions in corrected serum calcium < 8.3 mg/dL

§ Paresthesia includes preferred terms of paresthesia and hypoesthesia.
Pregnancy

Risk Summary

There are no available data on the use of PARSABIV in pregnant women. In animal reproduction studies, effects were seen at doses associated with maternal toxicity that included hypocalcemia. In a pre- and postnatal study in rats administered etelcalcetide during organogenesis through delivery and weaning, there was a slight increase in perinatal pup mortality, delay in parturition, and transient effects on pup growth at exposures 1.8 times the human exposure for the clinical dose of 15 mg three times per week based on AUC. In a pre- and postnatal development study in Sprague-Dawley rats administered etelcalcetide at doses of 0.75, 1.5, and 3 mg/kg/day by the intravenous route (gestation day 7 to 19), there was a slight increase in perinatal pup mortality, delay in parturition, and transient reductions in postnatal growth at 3 mg/kg/day (representing 1.8-fold human exposures at the clinical dose of 15 mg three times per week based on AUC), associated with maternal toxicities of hypocalcemia, tremoring, and reductions in body weight and food consumption.

Animal Data

No effects on embryo-fetal development were observed in New Zealand White rabbits at doses of etelcalcetide of 0.375, 0.75, and 1.5 mg/kg by the intravenous route (gestation day 7 to 19), representing up to 4.3 times human exposures based on AUC. In separate studies at higher doses of 4.5 mg/kg in rats (gestation days 6 to 17) and 2.25 mg/kg in rabbits (gestation days 7 to 20), representing 2.7- and 7-fold clinical exposures, respectively, there was reduced fetal growth associated with maternal toxicities of hypocalcemia, tremoring, and reductions in body weight and food consumption.

In a pre- and postnatal development study in Sprague-Dawley rats administered etelcalcetide at 0.75, 1.5, and 3 mg/kg/day by the intravenous route (gestation day 7 to 19), there was a slight increase in perinatal pup mortality, delay in parturition, and transient reductions in postnatal growth at 3 mg/kg/day (representing 1.8-fold human exposures at the clinical dose of 15 mg three times per week based on AUC), associated with maternal toxicities of hypocalcemia, tremoring, and reductions in body weight and food consumption. There were no effects on sexual maturation, neurobehavioral, or reproductive function at up to 3 mg/kg/day, representing exposures up to 1.8-fold human exposure based on AUC.

Lactation

Risk Summary

There are no data regarding the presence of PARSABIV in human milk or effects on the breastfed infant or on milk production. Studies in rats showed [14C]-etelcalcetide was present in the milk at concentrations similar to plasma. Because of the potential for PARSABIV to cause adverse effects in breastfed infants including hypocalcemia, advise women that use of PARSABIV is not recommended while breastfeeding.

Data

Presence in milk was assessed following a single intravenous dose of [14C]-etelcalcetide in lactating rats at maternal exposures similar to the exposure at the human clinical dose of 15 mg three times per week. [14C]-etelcalcetide-derived radioactivity was present in milk at levels similar to plasma.

Pediatric Use

The safety and efficacy of PARSABIV have not been established in pediatric patients.

Geriatric Use

Of the 503 patients in placebo-controlled studies who received PARSABIV, 177 patients (35.2%) were ≥ 65 years old and 72 patients (14%) were ≥ 75 years old. No clinically significant differences in safety or efficacy were observed between patients ≥ 65 years and younger patients (≥ 18 and < 65 years old). No differences in plasma concentrations of etelcalcetide were observed between patients ≥ 65 years and younger patients (≥ 18 and < 65 years old).

OVERDOSAGE

There is no clinical experience with PARSABIV overdosage. Overdosage of PARSABIV may lead to hypocalcemia with or without clinical symptoms and may require treatment. Although PARSABIV is cleared by dialysis, hemodialysis has not been studied as a treatment for PARSABIV overdosage. In the event of overdosage, corrected serum calcium should be checked and patients should be monitored for symptoms of hypocalcemia, and appropriate measures should be taken [see Warnings and Precautions (5.1) in PARSABIV full prescribing information].

PARSABIV® (etelcalcetide)

Manufactured for:

KAI Pharmaceuticals, Inc., a wholly owned subsidiary of Amgen, Inc.

One Amgen Center Drive

Thousand Oaks, California 91320-1798

Patent: http://pat.amgen.com/Parsabiv/

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Sodium-glucose cotransporter-2 (SGLT2) inhibitors demonstrate multiple effects beyond improving cardiovascular and kidney outcomes. Although much remains to be learned about the underlying mechanisms, early data suggest possible roles for SGLT2 inhibitors in the management of hyperglycemia, nephrolithiasis, hyponatremia, anemia, cardiorenal syndrome, and in kidney transplant recipients (Figure 1).

SGLT2 inhibitors may increase magnesium reabsorption in the nephron (Figure 2). In clinical trials, SGLT2 inhibitors led to an approximate 0.04–0.1 mM (0.10–0.24 mg/dL) increase in serum magnesium level when compared to placebo (1). This observed effect was generally within the physiological range for serum magnesium level, but one case series suggests that SGLT2 inhibitors may have greater effect and therapeutic potential for patients with refractory urinary magnesium wasting (2). By potently impacting magnesium reabsorption in multiple segments of the nephron, SGLT2 inhibitors may be useful for managing medication-induced urinary magnesium wasting, such as decreased paracellular reabsorption in patients taking loop diuretics or transient receptor potential melastatin type 6 (TRPM6) downregulation in patients taking thiazide diuretics or calcineurin inhibitors.

However, studies have not shown similar effects on handling of urinary calcium, another divalent cation (3). This may be because decreased urinary phosphate excretion in response to SGLT2 inhibition stimulates parathyroid hormone secretion (4). Despite the lack of substantial impact on urinary calcium excretion, the combined effects of SGLT2 inhibitors on urine volume, urinary phosphate excretion, and uric acid homeostasis may decrease the risk of nephro lithiasis (4–6).

The osmotic diuresis generated by SGLT2 inhibitors increases water excretion and may have a role in the management of hyponatremia. Empagliflozin was shown to raise plasma sodium concentration faster than placebo over 4 days in individuals with the syndrome of inappropriate antidiuretic hormone (SIADH) (7). Studies including more prolonged intervention and longer-term follow-up are needed, as transient changes in urine volume due to SGLT2 inhibitor initiation may not produce sustained effects on net water balance (8).

Clinical trials have shown higher hematocrit concentrations with SGLT2 inhibitors compared to placebo and decreased need for iron supplementation, erythropoiesis-stimulating agents, or blood transfusions in those with concomitant diabetes and chronic kidney disease (9, 10). In patients with type 2 diabetes, hyperglycemia causes maladaptive changes in the kidney that alter hypoinsulinemic factor pathways and impair erythropoiesis (10). Although incompletely understood, SGLT2 inhibitors may stimulate erythropoiesis by decreasing glucose accumulation in the cortical interstitium and by altering oxygen tension in the cortex and outer medulla (10–12). Less is known about the therapeutic role of SGLT2 inhibitors for anemia in patients without diabetes.

Given the heart and kidney protective effects of SGLT2 inhibitors, these agents are currently recommended in patients with chronic cardiorenal syndromes. In patients with stable heart failure, natriuresis after initiation of an SGLT2 inhibitor led to decreased blood and plasma volume without the concomitant neurohormonal activation or hypokalemia typically seen after loop diuretic administration (13). Less is known about the use of these drugs in patients with acute cardiorenal syndromes. In rats, SGLT2 inhibition may protect against cardiorenal acute kidney injury by reducing oxidative stress in the kidney (14). In patients with diabetes mellitus, SGLT2 inhibitors were associated with a decreased risk of acute kidney injury compared to other glucose-lowering medications (15–17). Understanding these relationships for patients with cardiorenal physiology will require studies incorporating biomarkers of kidney injury other than glomerular filtration rate, which may reflect hemodynamic changes rather than true kidney injury (18). Existing evidence is insufficient to support SGLT2 inhibitor use in cases of acute cardiorenal syndromes.

Although kidney transplant recipients were excluded from large SGLT2 inhibitor outcome trials, it is plausible that cardiovascular benefits could be extrapolated to this population in appropriate clinical contexts (19). One placebo-controlled randomized trial showed that empagliflozin lowered hemoglobin A1c by a median of −0.2% and body weight by a median of −2.5 kg in 44 kidney transplant recipients with posttransplant diabetes mellitus (20). Despite their immunosuppressed status, there was no increase in infections among patients receiving SGLT2 inhibitors, with three participants each in the

---

**Figure 1. Potential clinical uses for SGLT2 inhibitors**

- **Hypomagnesemia**
  - Increase magnesium reabsorption in the nephron

- **Nephrolithiasis**
  - Affect urine volume, phosphate excretion, and uric acid homeostasis

- **Anemia**
  - Stimulate erythropoiesis

- **Cardiorenal syndrome**
  - Chronic benefits for heart and kidneys

- **Transplant recipients**
  - Long-term cardiovascular and kidney outcome trials are needed

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**Figure 2. Proposed effects of SGLT2 inhibitors on magnesium handling in the nephron**

TRPM6 activity may increase in the distal tubule, in part, stimulated by improved glycemic control and higher glucagon. The electrochemical gradient from increased sodium delivery may also contribute.

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Several mechanisms potentially contribute to increased reabsorption of magnesium in the nephron. NKCC, sodium-potassium-2 chloride cotransporter; ROMK, renal outer medullary potassium channel; SGLT2, sodium-glucose cotransporter-2; TRPM6, transient receptor potential melastatin type 6.
emagliflozin and placebo groups developing urinary tract infections and one participant in the emagliflozin arm with a genital yeast infection. Larger studies are needed to evaluate efficacy and safety of SGLT2 inhibitors in this population and to better understand how these drugs affect allograft perfusion in kidney transplant recipients with impaired autoregulatory mechanisms.

Evidence supporting these potential uses of SGLT2 inhibitors is in early stages. It remains to be determined whether such uses differ among individual SGLT2 inhibitors. More research is needed to assess the mechanisms, durability, and clinical implications of these effects.

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References


Guideline Supported, Bio-Available, GI Friendly Magnesium.

Renamag delivers 1200mg of magnesium glycerophosphate in an orange flavored chewable delivering 150mg of elemental magnesium.

Learn about the guidelines supporting the use of magnesium glycerophosphate to treat hypomagnesemia at renamag.com.

Patients can purchase at renamag.com or by calling 1-844-980-9933.

From the developers of:
Acute kidney injury (AKI) is common in hospitalized patients and is associated with long-term risks of chronic kidney disease (CKD) and end stage kidney disease (ESKD). An abrupt increase in serum creatinine (SCr) over 48–72 hours is the key finding in the diagnosis of AKI, as recommended by the 2012 Kidney Disease: Improving Global Outcomes (KDIGO) clinical practice guideline (1). Despite advances in biomarkers of AKI, over- and under-diagnosis remain challenges in the evaluation of AKI. In patients with CKD, the false positive rate of AKI diagnosis can occur in 30.5% of patients, possibly due to a lack of appreciation of the analytic variability of SCr (2,3).

Most laboratories in the US use one of two types of SCr assays: Jaffe alkaline picrate or enzymatic methodology (3). The coefficient of variation of these assays ranges from 2.7% to 5.3%, according to the College of American Pathologists (CAP) survey, which means some small variation is expected when comparing results across different labs and among serial measurements in a single patient. Also, biological variability of SCr is estimated to be approximately 4.5% in individuals with and without CKD (3–5). Taken together, for most US laboratories using enzymatic or Jaffe methods, a change in SCr from baseline by less than 20% is within the range of normal lab variation and is unlikely to represent significant change in glomerular filtration rate (GFR) (3). Conversely, in critically ill patients, elderly patients, and those with a rapid change in volume status, SCr may not increase by 0.3 mg/dl until significant decline in GFR has developed (6). Therefore, a recent report proposed a revised threshold of SCr change to diagnose AKI, an increase of SCr by 0.2 mg/dl, or 0.3 mg/dl, whichever is higher (3). Further studies are needed to compare the performance of these proposed AKI criteria against the current KDIGO definition.

In addition to SCr, urine microscopy is often used in the evaluation of AKI. The presence of cellular casts, dysmorphic red blood cells, and certain crystals is highly informative in differentiating the etiology of AKI. In patients with suspected acute tubular injury, a validated scoring system can be low in diseases when the kidney is sodium avid and are influenced by dietary sodium intake. A study once commonly performed when interstitial nephritis was suspected was urine eosinophils. This study has shown not to be useful in differentiating acute interstitial nephritis from other causes of AKI and eosinophils have widely been abandoned (10).

Fortunately, many novel biomarkers are on the verge of clinical application to dissect the phenotype and prognosis of AKI and differentiate parenchymal kidney injury from hemodynamic changes. These biomarkers could be used to predict the progression of AKI and predict AKI to CKD transition and may help to guide AKI management, as delineated in our recent review (11). In the ASSESS-AKI (Assessment, Serial Evaluation, and Subsequent Sequelae of Acute Kidney Injury) study, the increase in urine albumin and urine chitinase 3-like protein (YKL-40) and the decrease in uromodulin at 3 months after AKI hospitalization were found to be independently associated with developing CKD or CKD progression (12, 13). Insulin-like growth factor binding protein-7 (IGFBP-7) is an inhibitor of metalloproteinase 2 (TIMP-2), TIMP-2 and IGFBP-7, are measured by various commercially available immunoassay platforms (16). Establishing the proper reference interval, determining the analytical variability across measurement platforms, and understanding biological variability across patient populations by close collaboration with laboratory scientists is crucial for the effective clinical implementation of these novel biomarkers.

There have been many advances in our approaches to diagnose AKI since the KDIGO AKI definition was published in 2012 (Table 1). Clinicians, researchers, and laboratory scientists must continue to work together to fill in the remaining gaps in our understanding of these testing strategies.

### References

**THE FIRST THERAPY APPROVED IN 20 YEARS TO HELP DELAY THE WORSENING OF CKD IN PATIENTS AT RISK OF PROGRESSION, WITH AND WITHOUT T2D**

**HELP PROTECT YOUR PATIENTS WITH CKD AT RISK OF PROGRESSION FROM DIALYSIS AND CV DEATH**

- **39% RRR** in the primary composite of sustained eGFR decline, ESKD, and CV or renal death
- **31% RRR** in all-cause mortality

*The FDA granted its “Breakthrough Therapy” designation to FARXIGA in their review of FARXIGA in CKD.[1] 14.5% vs 9.2% with placebo in adults with eGFR ≤75 to ≥25 mL/min/1.73 m²; HR 0.69 (95% CI: 0.53–0.88); P=0.0035.[2] 6.8% vs 4.7% with placebo in adults with eGFR ≤75 to ≥25 mL/min/1.73 m²; HR 0.69 (95% CI: 0.53–0.88); P=0.0035.[3]

**INDICATIONS AND LIMITATIONS OF USE FOR FARXIGA® (dapagliflozin)**

FARXIGA is indicated:
- as an adjunct to diet and exercise to improve glycemic control in adults with type 2 diabetes mellitus
- to reduce the risk of hospitalization for heart failure in adults with type 2 diabetes mellitus and either established cardiovascular (CV) disease or multiple CV risk factors
- to reduce the risk of cardiovascular death and hospitalization for heart failure in adults with heart failure (NYHA class II–IV) and chronic kidney disease
- for the treatment of chronic kidney disease in patients with polycystic kidney disease or patients requiring or with a recent history of immunosuppressive therapy for kidney disease

**IMPORTANT SAFETY INFORMATION**

**Contraindications**
- Prior serious hypersensitivity reaction to FARXIGA
- Patients on dialysis

**Warnings and Precautions**
- **Ketoacidosis in Diabetes Mellitus** has been reported in patients with type 1 and type 2 diabetes receiving FARXIGA. In placebo-controlled trials of patients with type 1 diabetes, the risk of ketoacidosis was increased in patients who received SGLT2 inhibitors compared to patients who received placebo. Some cases were fatal. Assess patients who present with signs and symptoms of metabolic acidosis for ketoacidosis, regardless of blood glucose level. If suspected, discontinue FARXIGA, evaluate and treat promptly. Before initiating FARXIGA, consider risk factors for ketoacidosis. Patients on FARXIGA may require monitoring and temporary discontinuation in situations known to predispose to ketoacidosis.
- **Volume Depletion:** FARXIGA can cause intravascular volume depletion which may manifest as symptomatic hypotension or acute transient changes in creatinine. Acute kidney injury requiring hospitalization and dialysis has been reported in patients with type 2 diabetes receiving SGLT2 inhibitors, including FARXIGA. Patients with impaired renal function (eGFR less than 60 mL/min/1.73 m²), elderly patients, or patients on loop diuretics may be at increased risk for volume depletion or hypotension. Before initiating FARXIGA, assess volume status and renal function. After initiating therapy, monitor for signs and symptoms of hypotension and renal function.
- **Urosepsis and Pyelonephritis:** SGLT2 inhibitors increase the risk for urinary tract infections (UTIs) and serious UTIs have been reported with FARXIGA. Evaluate for signs and symptoms of UTIs and treat promptly.
- **Hypoglycemia:** FARXIGA can increase the risk of hypoglycemia when coadministered with insulin and insulin secretagogues. Consider lowering the dose of these agents when coadministered with FARXIGA.
- **Necrotizing Fasciitis of the Perineum (Fournier’s Gangrene):** Rare but serious, life-threatening cases have been reported in patients with diabetes mellitus receiving SGLT2 inhibitors including FARXIGA. Cases have been reported in females and males. Serious outcomes have included hospitalization, surgeries, and death. Assess patients presenting with pain or tenderness, erythema, swelling in the genital or perineal area, along with fever or malaise. If suspected, institute prompt treatment and discontinue FARXIGA.
- **Genital Mycotic Infections:** FARXIGA increases the risk of genital mycotic infections, particularly in patients with prior genital mycotic infections. Monitor and treat appropriately.

**Adverse Reactions**

In a pool of 12 placebo-controlled studies, the most common adverse reactions (>5%) associated with FARXIGA 5 mg, 10 mg, and placebo respectively were female genital mycotic infections (8.4% vs 6.9% vs 1.5%), nasopharyngitis (6.6% vs 6.3% vs 6.2%), and urinary tract infections (5.7% vs 4.3% vs 3.7%).

**Use in Specific Populations**
- **Pregnancy:** Advise females of potential risk to a fetus especially during the second and third trimesters.
- **Lactation:** FARXIGA is not recommended when breastfeeding.

**DOSING**

To improve glycemic control, the recommended starting dose is 5 mg orally once daily. Dose can be increased to 10 mg orally once daily for additional glycemic control.

For all other indications, the recommended dose is 10 mg orally once daily.

---

Recommended Dosage

Recommended Dose

FARXIGA® is not recommended for use to improve glycemic control in adults with type 2 diabetes mellitus.

• To reduce the risk of hospitalization for heart failure in adults with type 2 diabetes mellitus and either established cardiorenal disease or multiple cardiovascular risk factors.

To reduce the risk of cardiovascular hospitalization and death for hospitalization for heart failure in adults with chronic kidney disease at risk of progression.

Limitations

• FARXIGA is not recommended for patients with type 1 diabetes mellitus.

• It may increase the risk of diabetic ketoacidosis in these patients (see Warnings and Precautions (5.1) in the Adverse Reactions section).

• FARXIGA is not recommended for use to improve glycemic control in adults with type 2 diabetes mellitus with an eGFR of 45 ml/min or less. eGFR values less than 60 ml/min (1.73 m²) may be risky due to an increased risk related to additional glycemic control.

• For all other indications, the recommended starting dose is 10 mg once daily.

Table 1: Recommended Dosage

<table>
<thead>
<tr>
<th>eGFR (ml/min/1.73 m²)</th>
<th>Recommended Dose</th>
</tr>
</thead>
</table>
| eGFR 45 or greater | To improve glycemic control, the recommended starting dose is 10 mg orally once daily. Dose can be increased to 20 mg orally once daily for additional glycemic control.
| eGFR 25 to < 45 | 10 mg orally once daily.
| eGFR < 25 | 5 mg orally once daily.

On dialysis

| Contraindications |

| Hypoglycemia with Concomitant Use with Insulin and Insulin Secretagogues |

Insulin and insulin secretagogues are known to cause hypoglycemia. FARXIGA may increase the risk of hypoglycemia when these agents are used in combination with FARXIGA.

Necrotizing Fasciitis of the Perineum (Fournier’s Gangrene)

Reports of necrotizing fasciitis of the perineum (Fournier’s Gangrene), a rare but severe and life-threatening necrotizing infection requiring urgent surgical intervention, have been identified in postmarketing surveillance in patients with diabetes mellitus receiving SGLT2 inhibitors, including FARXIGA. Treatment with SGLT2 inhibitors increases the risk for renal tubular acidosis. Evaluate patients for signs and symptoms of urinary tract infection and treat promptly, if indicated (see Adverse Reactions (6.1) in the Full Prescribing Information). A lower dose of insulin or insulin secretagogue may be required to minimize the risk of hypoglycemia when these agents are used in combination with FARXIGA.

Genital Mycotic Infections

FARXIGA increases the risk of genital mycotic infections. Patients with a history of genital mycotic infections were more likely to develop genital mycotic infections (see Adverse Reactions (6.1) in the Full Prescribing Information). Monitor and treat appropriately.

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.

FARXIGA was evaluated in clinical tri- als in patients with type 2 diabetes mellitus, in patients with heart failure, and in patients with chronic kidney disease. The overall safety profile of FARXIGA was consistent with the known safety profile of SGLT2 inhibitors. Severe hypoglycemia and diabetic ketoacidosis (DKA) were observed only in patients with diabetes mellitus.

Clinical Trials in Patients with Type 2 Diabetes Mellitus

FARXIGA is not indicated for the treatment of patients with type 2 diabetes mellitus (see Warnings and Precautions (5.5) in the Full Prescribing Information). Limitations apply to patients with type 1 diabetes mellitus. 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.

Table 1: Adverse Reactions in Placebo-Controlled Studies of Glycemic Control

<table>
<thead>
<tr>
<th>Patient Subgroup n (%)</th>
<th>Placebo</th>
<th>FARXIGA 5 mg</th>
<th>FARXIGA 10 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=1193</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proteinuria ≤ 3 g/day</td>
<td>4 (0.3%)</td>
<td>2 (0.2%)</td>
<td>3 (0.3%)</td>
</tr>
<tr>
<td>Proteinuria &gt; 3 g/day</td>
<td>21 (1.7%)</td>
<td>16 (1.4%)</td>
<td>17 (1.5%)</td>
</tr>
</tbody>
</table>

Table 2: Adverse Reactions in Placebo-Controlled Studies of Glycemic Control Reported in ≥ 2% of Patients Treated with FARXIGA

<table>
<thead>
<tr>
<th>Adverse Reaction</th>
<th>Placebo</th>
<th>FARXIGA 5 mg</th>
<th>FARXIGA 10 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>8 (0.7%)</td>
<td>8 (0.7%)</td>
<td>7 (0.6%)</td>
</tr>
<tr>
<td>Discomfort with urination</td>
<td>1 (0.1%)</td>
<td>2 (0.2%)</td>
<td>2 (0.2%)</td>
</tr>
<tr>
<td>Constipation</td>
<td>5 (0.4%)</td>
<td>6 (0.5%)</td>
<td>6 (0.5%)</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>27 (2.3%)</td>
<td>33 (2.8%)</td>
<td>38 (3.3%)</td>
</tr>
<tr>
<td>Hematuria</td>
<td>1 (0.1%)</td>
<td>3 (0.3%)</td>
<td>3 (0.3%)</td>
</tr>
<tr>
<td>Dysuria</td>
<td>7 (0.6%)</td>
<td>7 (0.6%)</td>
<td>7 (0.6%)</td>
</tr>
<tr>
<td>Genital mycotic infections</td>
<td>0 (0.0%)</td>
<td>1 (0.1%)</td>
<td>1 (0.1%)</td>
</tr>
</tbody>
</table>

Table 3: Adverse Reactions Related to Volume Depletion in Clinical Studies in Patients with Type 2 Diabetes Mellitus with FARXIGA

<table>
<thead>
<tr>
<th>Overall N (%)</th>
<th>Placebo</th>
<th>FARXIGA 5 mg</th>
<th>FARXIGA 10 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=1193</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proteinuria</td>
<td>1 (0.1%)</td>
<td>2 (0.2%)</td>
<td>2 (0.2%)</td>
</tr>
<tr>
<td>Serum glucose</td>
<td>97 (8.2%)</td>
<td>97 (8.2%)</td>
<td>97 (8.2%)</td>
</tr>
<tr>
<td>Blood glucose</td>
<td>97 (8.2%)</td>
<td>97 (8.2%)</td>
<td>97 (8.2%)</td>
</tr>
</tbody>
</table>

Table 4: Incidence of Severe Hypoglycemia and Hypoglycemia with Glucose < 54 mg/dL in Glycemic Control Clinical Trials in Patients with Type 2 Diabetes Mellitus

<table>
<thead>
<tr>
<th>Glucose (mg/dL)</th>
<th>Placebo</th>
<th>FARXIGA 5 mg</th>
<th>FARXIGA 10 mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 90</td>
<td>601 (50%)</td>
<td>601 (50%)</td>
<td>601 (50%)</td>
</tr>
<tr>
<td>54 to &lt; 90</td>
<td>304 (25%)</td>
<td>304 (25%)</td>
<td>304 (25%)</td>
</tr>
<tr>
<td>&lt; 54</td>
<td>196 (16.5%)</td>
<td>196 (16.5%)</td>
<td>196 (16.5%)</td>
</tr>
</tbody>
</table>

Table 5:散发性胰腺炎：在需要的临床试验中，观察到与使用FARXIGA相关的胰腺炎。在使用FARXIGA的患者中，共观察到1例胰腺炎。
In the DECLARE study ‡ OAD = oral antidiabetic therapy. Infections were vulvovaginal mycotic infections in females and balanitis in males. Patients Discontinuation from study due to genital infection occurred in 0% of placebo-treated Genital Mycotic Infections discontinue use of FARXIGA; treat per standard of care and monitor until signs and cutaneous adverse reactions and angioedema were reported in 0.2% of comparator-treated FARXIGA treatment. In glycemic control studies, serious anaphylactic reactions and severe Hypersensitivity reactions (e.g., angioedema, urticaria, hypersensitivity) were reported with patients treated with placebo. Genital mycotic infections that caused study drug genitogenital mycotic infections were reported in <0.1% of patients treated with FARXIGA and <0.1% of patients treated with placebo. No new adverse reactions were identified in the DAPA-HF heart failure study. FARXIGA and exenatide-extended release treatment groups bicarbonate value of less than or equal to 13 mEq/L compared to one each (0.4%) in the Increases in Serum Creatinine and Decreases in eGFR group. The events were evenly distributed over the study period. Laboratory Tests

In the pool of 13 placebo-controlled studies of glycemic control, increases from baseline in mean hemoglobin A1c values were observed in FARXIGA-treated patients starting at Week 1 and continuing up to Week 16, when the maximum mean difference from baseline was observed. At Week 16, the mean changes from baseline were +0.33% in the placebo group and +0.26% in the FARXIGA 10 mg group. By Week 24, hemoglobin A1c values >5% were reported in 0.4% of placebo-treated patients and 1.2% of FARXIGA 10 mg-treated patients. Increase in Low-Density Lipoprotein Cholesterol

In the pool of 13 placebo-controlled studies of glycemic control, changes from baseline in mean lipid values were reported in FARXIGA-treated patients compared to placebo-treated patients. Mean percent changes from baseline at Week 24 were 0.0% versus 2.5% for total cholesterol, and -0.1% versus 2.9% for LDL cholesterol in the placebo and FARXIGA 10 mg groups, respectively. In the DECLARE study (see Clinical Studies (14.2) in Adverse Reactions (6.1) in the full Prescribing Information), mean changes from baseline after 4 weeks were 0.4 mEq/L for total cholesterol, and -0.2 mEq/L for LDL cholesterol, in FARXIGA-treated and the placebo groups, respectively. Decrease in Serum Bicarbonate

In a study of concomitant therapy of FARXIGA 10 mg with extended-release nitrate-isosorbide in a balanced multivariate regression model, no patients (1.7%) on concomitant therapy had a serum bicarbonate value of less than 14 or equal to 13 mEq/L, compared to one (0.4%) in the FARXIGA treatment group and extended-release nitrate-isosorbide treatment groups (see Warnings and Precautions (5.1) in the full Prescribing Information).

DAPA-HF Heart Failure Study

No new adverse reactions were identified in the DAPA-HF heart failure study.
Transition of Care after Allograft Failure

By Itunu Owoyemi

Transplantation remains the best treatment modality for kidney failure. Despite the significant improvement in immunosuppression and reduction in acute rejection rates, allograft failure with return to dialysis is common (1). Infection and cardiovascular disease are the two major causes of mortality after returning to dialysis (2). It is important to carefully optimize immunosuppression management due to the need to balance the risk of allograft injury, increased cardiovascular risk with continuation on dialysis versus the chronic inflammatory state and increased sensitization to allograft major histocompatibility complex (MHC) antigens with discontinuation of immunosuppression (3).

The American Society of Transplantation-Kidney Pancreas Community of Practice (AST-KPCOP) established a work group to study Kidney Recipients with Allograft Failure, Transition of Care (KRAFT). AST-KPCOP conducted a survey among adult transplant providers covering 69% of transplant centers across the United States. The survey was performed to evaluate current practices that highlighted the need to standardize immunosuppression management after graft failure as well as effective transition of care in clinical practice (4). Only 22% of the respondents mentioned that a majority of their patients with failing allografts were reinitiated for another kidney transplant before starting dialysis. Most of the respondents reported their decision to wean off immunosuppression was most importantly based on the availability of a living donor, followed by risk of infection, risk of sensitization, frailty, and side effects of the medications.

The most common approach for tapering immunosuppression was to initially discontinue the antimetabolite (such as mycophenolate mofetil or azathioprine). The survey also showed that 25% of the respondents would use urine volume/residual kidney function as a guide for weaning immunosuppression. Whereas a paucity of data exists for tapering immunosuppression based on urine volume, survival benefit has been demonstrated in recipients who remained on immunosuppression with residual kidney function (5). Most of the respondents referred patients for nephrectomy when there were persistent signs and symptoms of rejection.

The survey highlighted the varying care of the failing transplant and the need to have high value and collaborative care in clinical practices. The KRAFT study group later proposed a comprehensive shared-care model for improved collaboration between transplant providers and general nephrologists to improve clinical outcomes and the need to have high value and collaborative care in clinical practices. The authors propose a shared-care model in which there is a collaborative shared-care transplant provider and general nephrologists for immunosuppression management and preparation for renal replacement therapy and/or repeat transplantation can be conducted with the goal of improved outcomes and decreased mortality.

Done on an individual basis in consideration of balancing the risks of sensitization and potential complications from prolonged immunosuppression and in coordination with both transplant and general nephrology.

These immunosuppression management strategies represent a general guideline from the consensus committee; however, all changes in immunosuppression and the decision to stop all immunosuppression should be conducted with the goal of improved outcomes and decreased mortality.

Close monitoring of levels of immunosuppression and side effects

Optimize CKD management including BP control, anemia, proteinuria, and secondary hyperparathyroidism.

Routine malignancy surveillance

Establish joint management approach with general nephrologist.

Continue close monitoring at transplant center.

Optimize CKD management including BP control, anemia, proteinuria, and secondary hyperparathyroidism.

Routine malignancy surveillance

Visual Graphic by Edgar Lerma, MD, FASN

References


The RVU Does Have Value but Also a Cost

By Mitchell H. Rosner and Charles R. Manley

We cringe when we hear about how many relative value units (RVUs) we have produced. There is no doubt that being a clinician is defined by much more than our RVUs. Nephrologists care for the most complex patients, and many elements of this care are not easily captured by the RVU system (1, 2). It is no wonder that RVUs have become a "four-letter word" for clinicians.

Relative value scales date back to the 1950s and were designed to establish prices that state and federal governments would pay for physician services on the basis of relative value of time and intensity of physician work and resource costs. The Centers for Medicare & Medicaid Services (CMS) is responsible for updating RVUs, and CMS relies on advice and recommendations from the American Medical Association/Specialty Society Relative Value Scale Update Committee (2). RVUs are broken down into three components as shown in Figure 1.

Despite the system being designed to determine reimbursement and compensation, RVUs are the de facto national standard for measuring productivity. A work RVU approximates the amount of work required to perform a service, thus providing a quantitative measure for tracking productivity beyond counting numbers of patients seen and procedures performed. There are clear flaws in the RVU system, most notably its failure to capture the effort outside of procedures performed. There are several components to the RVU system itself that have value that is well validated (3).

There are three commonly used benchmarking services: Clinical Practice Solutions Center (CPSC, Vizient), Sullivan-Cotter, and Medical Group Management Association (MGMA). All attempts to describe the distribution of RVU productivity levels (given as percentiles). There are variations among these services that include nuances for regional variations, academic versus private practice, as well as specialty care. It is commonplace for a clinician to be told, for example, that his or her productivity target is the 55th percentile or 6500 RVUs.

CPSC benchmarks are derived using the CMS payment rule directly from encounter-specific billing data, and the MGMA and Sullivan-Cotter benchmarks are derived using self-reported data. All benchmarks emanate from small samples ranging from approximately 180 to 300 physicians. These are woefully small surveys and subject to reporting bias. Factors that are not clearly accounted for in these benchmarking data include: 1) normalization to amount of clinical activity; 2) use of fellows or residents to enhance productivity in academic settings (some benchmarks have an academic subcategory); 3) use of physician extenders; 4) normalization to the amount of dialysis care provided, which is valued at a higher level than clinic work (some benchmarking groups include a dialysis component, and some do not); and 5) actual mix of clinical activity. For example, subspecialties within nephrology participate in extensive work that has no RVU value and is not captured in current benchmarking. This might include traveling to a remote dialysis center, care coordination meetings for patients with end-stage kidney disease (ESKD), or transplant-related meetings such as donor and recipient selection meetings. In addition, many benchmarking services do not include specific percentiles of productivity for transplant physicians or interventional nephrologists.

The end result of over-reliance on flawed benchmarking data is that clinicians are not appropriately evaluated for their efforts, feel disrespected, suffer burnout, and ultimately feel like they are chasing numbers rather than focused on high-value, cost-conscious care. The issue is not the RVU system but how RVU benchmarking has been translated into inflexible productivity targets.

A potential solution to the issue of inadequate benchmarking is for organizations such as the American Society of Nephrology (ASN) to contribute to producing granular, accurate, and actionable data to measure our work and ensure we are appropriately compensated for our efforts.

Nephrologists’ Value Exceeds RVU Calculations

By Timothy A. Pflederer

In their article "The RVU Does Have Value but Also a Cost," authors Rosner and Manley note that the relative value unit (RVU) system for determining physician work and reimbursement has merit, but it does not fully account for non-encounter-based work that supports patient care.

The Renal Physicians Association (RPA) concurs with this assessment. Furthermore, although this shortfall admittedly affects all physicians, specialties, and practice settings, nephrology is uniquely poised to be adversely affected by virtue of the patient population for which it provides care. Activities that support high-quality patient care but are not reflected in Current Procedural Terminology (CPT) code-specific RVUs include but are not limited to the following: 1) team leadership and running team-based care models; 2) travel to remote locations required for dialysis-dependent patients; 3) membership and participation in committees (such as for quality improvement); and 4) administrative time spent in private or academic practice management.

Moreover, nephrologists serve as key liaisons among patients, dialysis organizations, hospitals, and academic institutions. Certain activities should not be included, such as time spent on dialysis, facility medical director responsibilities (separately reimbursed), and those activities not part of the face-to-face patient encounter but for which Medicare is now assigning work value (e.g., care management), a move that reflects recognition of the concept that comprehensive patient care may require work not captured by the RVU as currently defined. In fact, effective use of the care management code families (chronic care management, transitional care management, or principal care management), in addition to participation in value-based payment models in the kidney arena, may provide a pathway to accounting and receiving compensation for activities that historically have fallen outside of a specific reimbursable physician service.

Given these advancements, the time seems ripe for a re-examination of how the RVU methodology is utilized. In both private practice and academia, there is great variability with regard to how this work is valued and credited, and as noted by Rosner and Manley, the RVU has become a measure of productivity used by many institutions to determine compensation. We agree that commonly used benchmarking surveys do not capture the essence of the work done by a nephrologist and join the call for the national specialty societies for nephrology (RPA and the American Society of Nephrology) to lead efforts to clarify the scope of the problem and identify the non-patient encounter activities where value has not been recognized. Understanding the degree of value associated with these activities and the volume or frequency at which those activities occur would enhance applicability across geographies and practice settings.

Existing structures could inform the data-gathering process, notably the RPA Nephrology Practice Business Benchmarking Survey, which has been conducted biannually by RPA for over 20 years. This initiative compiles data from nephrology practices nationwide on diverse data points, such as physician compensation, use of advanced practitioners, total income per full-time employee in nephrology practices, and integration of clinical research, among many others. A survey of patient care activities occurring outside of patient encounters, based on the RPA Benchmarking data, would be of tremendous benefit to the nephrology community and provide a more realistic basis upon which to apply productivity targets. This would provide nephrology practices, regardless of setting, with benchmarks and points of comparison through which value for currently uncompensated work could be ascertained. RPA welcomes the opportunity to participate in such an endeavor.

Timothy A. Pflederer, MD, is a nephrologist with the Illinois Kidney Disease & Hypertension Center in Peoria, IL, and is affiliated with multiple hospitals.

Dr. Pflederer is President of the Renal Physicians Association.

Mitchell H. Rosner discloses that he is a member of the CJASN Editorial Board and serves on the Data Safety Monitoring Board for Clinical Trials supported by Reata, Travere, and AstraZeneca. Charles R. Manley has nothing to disclose.

References


Figure 1. The three components of RVUs

Components of the Total Relative Value Unit

- Physician Work
- Practice-Related Expenses
- Malpractice Expense
The Rise, Fall, and New Rise of Home Hemodialysis

By Sindhura Talluri and Sadichya Lohani

The rise
Hemodialysis became a reality in 1960 with the development of Belding Scribner’s Teflon arteriovenous shunt (1). Yukihiko Nost started home hemodialysis (HHD) in Japan in 1961 (2). Shortly thereafter, in 1964, Scribner developed a hemodialysis machine that was used in a young patient at home (Figure 1), marking the beginning of HHD in the United States (1, 3–5). Subsequently, John Merrill and Stanley Shaldon developed HHD programs in Boston and London, respectively, which quickly spread to France and Italy. In 1967, with the direction of the Seattle Artificial Kidney Center Unit Board, all new patients were started on HHD, and patients using in-center hemodialysis were transitioned to HHD, leading to the establishment of a HHD training center in Seattle (1, 4). HHD rose to be the preferred modality into the 1970s, as HHD became safer compared to the former years and more cost effective compared to the limited in-center hemodialysis.

The fall
In 1972 when HHD accounted for 50% of all patients using dialysis in the United States, an addendum to the Social Security Amendment Act H.R.1 (section 299) led to Medicare assuming responsibility for the payment for maintenance dialysis, establishing nearly universal coverage, which turned out to be favorable for the development of for-profit dialysis centers. This led to fiscal bias against HHD, as funding was preferably directed toward in-center hemodialysis, distincentivizing the growth of HHD (1–6). The complexity of training and support—complications without direct physician supervision—further contributed to the decline of HHD. With the growth of kidney transplant, the highly motivated patients using HHD became more likely to get transplantation (7). Peritoneal dialysis also emerged as a lucrative modality after the development of the Trenchkoff peritoneal catheter in 1968 (8).

By the 1980s, only 4.6% of patients with end stage kidney disease (ESKD) were on HHD in the United States. This further declined to 0.58% by 2005 (9). Reimbursement policies in Europe also strongly favored for-profit in-center-based care, reducing interest in HHD (6). Only Australia, New Zealand, and Turkey continued to report significant use of HHD (around 11%–13%) in the early 2000s (7).

Despite the similar legislation around dialysis coverage in both countries, Australia continued to flourish on home hemodialysis (6).

The new rise—a promising future
After decades of decline, as studies demonstrated improved mortality outcome, blood pressure control, functional status with frequent hemodialysis, as well as cost effectiveness, the interest in HHD is rising again (Figure 2). HHD machines became safer, more efficient, and easier to operate as the NxStage machine received clearance for this purpose in 2005. Technologies have reassured physicians and patients of safe HHD monitoring (4).

In 2020, the Centers for Medicare & Medicaid Services (CMS) announced the End-Stage Renal Disease (ESRD) Treatment Choices Model for ESRD Medicare beneficiaries. The home dialysis payment-adjustment model provides bonus payments for HHD for 3 years. Providers can use this to invest in home therapies and performance payment adjustment based on HHD increased accountability. Medicare started paying for a monthly comprehensive tele-visit in 2019, which removed any geographic limitations. In the past decade, HHD has seen a threefold increase from 0.4% to 1.5% (6) and is expected to increase with the new initiatives and as the ESKD population grows out of proportion to the existing in-center hemodialysis resources.

This enthusiasm for HHD is increasing worldwide. Incentive models like those used in Australia for HHD programs (4, 7), if modeled across the globe, could lead to significant increases in HHD usage. Moreover, the availability of newer technologies and improved patient education portends a very bright future for the further rise in HHD worldwide in the next decade.

Sindhura Talluri, MD, and Sadichya Lohani, MD, are with the Renal Electrolyte and Hypertension Division, Department of Medicine, University of Pennsylvania, Philadelphia, PA.

The authors report no conflicts of interest or financial disclosures.

References
Campaign Aims to Expand Home Dialysis

Several healthcare organizations have joined forces to launch Innovate Kidney Care, a campaign to improve patient options to receive home dialysis training and support. The organizations include Anthem, Inc.; Cricket Health; CVS Kidney Care; Home Dialyzors United; Intermountain Healthcare; the National Kidney Foundation; Outset Medical, Inc.; Strive Health; as well as ASN.

As part of its efforts, Innovate Kidney Care plans to advocate for the Centers for Medicare & Medicaid Services (CMS) to modernize its end-stage renal disease Conditions for Coverage and related guidance to achieve the quadruple aim of better patient outcomes, improved patient and provider experience, and lower costs of care. Among the group’s goals are the following:

• removing barriers to home dialysis training and support;
• differentiating regulations to expand home dialysis training and support and improving transitions of care;
• alleviating the clinical burden of administrative tasks to focus on patient outcomes, empowerment, and safety; and
• allowing for home dialysis training and support to be delivered in a variety of healthcare settings.

With improvements in technology, as well as new service models aiming to create more convenient, flexible options for patients as to when, where, and how they receive dialysis, “We could be right at the cusp of a new dawn for home dialysis,” said Leslie Trigg, MBA, Chief Executive Officer of Outset Medical.

Some elements of CMS’ regulations stem from a decade or so ago and “don’t quite match” today’s environment, Trigg said. “We were interested in joining because we believed in the power that some modernization of regulations could have in creating this tipping point for home dialysis.”

The Conditions for Coverage were designed for an era in which all patients would dialyze in a clinic, she said. “That’s 1.0 dialysis. 2.0 dialysis is flexibility, convenience, and choice.”

One aim would be to allow service providers to more easily offer transitional care units designed to transition patients to home dialysis. Currently, providers offering this service must adhere to the same regulatory requirements of a conventional dialysis clinic even though their mission is different, Trigg said. There also is a lack of clarity in the regulations around who can help train patients to transition to home dialysis—a dialysis nurse or a technician or nurse practitioner working under the direction of a dialysis nurse. A better explanation of this could help, especially during the nation’s current shortage of dialysis nurses, Trigg said.

Furthermore, nephrologists currently do not receive the same payments for supporting dialysis patients at home versus the clinic, Trigg said. “It seems pretty good common sense that their workload is certainly at least equivalent when supporting patients at home versus in-center. We feel that it’s important for nephrologists to have pay equity between the center and home.”

The campaign’s goals aligned for Intermountain Healthcare, which about 2 years ago developed a value-based kidney care program focused on early identification and management of individuals with chronic kidney disease, said Ray Morales, MPA, the health system’s Assistant Vice President of Kidney Services. The company has a home-first policy for patients needing dialysis.

“This collaboration really fits well within our mission and the program we’ve built to look at empowering the patients with the right information at the right time,” Morales said. “It also modernizes existing policies and regulations to help support advancements in home dialysis therapies and allows for support around self-care dialysis.”

The campaign’s work also fits for the National Kidney Foundation, said Miriam Godwin, the organization’s Director of Health Policy.

“What patients want…is a system that’s really designed around how people with kidney failure want to live, rather than having people try to fit their lives around dialysis,” she said. “It’s a really exciting time in kidney care to try and do things differently, and we’re really honored and pleased to be part of that innovation.”

The group plans to produce a white paper describing its position, Godwin said. For more information, see https://www.innovatekidneycare.com/.
As nephrologists, we are perpetually searching for more time in our workdays. Oftentimes, we find ourselves juggling among inpatient, clinic, dialysis unit, and administrative duties, all within the same day. This begs the question: Can nephrologists be more efficient while still providing high-quality patient-centered care? In the current fee-for-service Medicare payment model, dialysis patients are mandated to have a comprehensive nephrologist evaluation at least once monthly, irrespective of medical necessity. While the rollout of these initiatives is likely to initially involve a small percentage of nephrology practices, future expansion of these quality-based incentives can potentially entice nephrology practices to focus more on patient outcomes rather than number of patient visits.

Although change is difficult, we need to implement ways to deliver care that makes a difference for our patients by optimizing efficiency of each patient visit. Intervening early in high-risk patients and analyzing data to risk-stratify patients would then work with the care team to address specific quality metrics (12, 13). This systematic change will require a culture shift of expectations by dialysis providers, patients, and nephrologists in the way care is delivered. Although there are some potential downsides to this approach (weakened patient-physician relationship, more screen time), each patient interaction will be better focused on the patient's issues and quality metrics that are aimed at improving patient outcomes. Moreover, it could potentially lower the cost of care delivery by focusing resources on where they are needed most.

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The authors report no conflicts of interest related to this article.
SARS-CoV-2 Vaccinations in Transplant Recipients

The More the Better?

By Vinay Nair and Mersema Abate

Routine administration of inactivated, age-appropriate vaccines is recommended for organ transplant recipients. As with response to other vaccinations (1), antibody response to SARS-CoV-2 vaccine is diminished in transplant recipients (2). Moreover, these individuals face worse outcomes following COVID-19 infection (3). A Correspondence in the New England Journal of Medicine by Hall et al. found a booster dose of mRNA-1273 vaccine 2 months after the standard 2-dose series improved both antibody and T-cell immunity to SARS-CoV-2 in organ transplant recipients (4). At month 4, patients who received three doses of vaccine had a threefold increase in positive antibody response, higher viral neutralization, and SARS-CoV-2-specific T-cells. Two retrospective studies from France (5) and the US (6) demonstrate similar findings (Table 1), and an NIH-funded study (clinicaltrials.gov NCT04896263) is underway. Subsequently, the FDA authorized booster mRNA vaccination for transplant recipients. Although a major milestone, there are several questions that need to be answered: What antibody titer is required to prevent COVID-19? How do neutralizing antibodies translate to the more commonly available spike protein antibody assay? How effective is cellular immunity in the prevention of COVID-19? If antibody response improves after each subsequent dose, should non-responders be given a fourth dose?

As transplant nephrologists, it is our duty to protect our patients from severe illness associated with COVID-19. The manuscript by Hall et al. (4) is a step toward this goal. However, larger studies are still needed that will look at hard endpoints, such as hospitalization and mortality due to COVID-19. Vinay Nair, DO, is Associate Professor of Medicine and Medical Director of Kidney Transplantation, and Mersema Abate, MD, is Associate Professor of Medicine, Division of Kidney Disease and Hypertension, Donald and Barbara Zucker School of Medicine at Hofstra Northwell, Hempstead, NY. The authors report no conflicts of interest associated with the work.

References


Table 1. Results of studies about SARS-CoV-2 vaccines in transplant recipients

<table>
<thead>
<tr>
<th>Study</th>
<th>n</th>
<th>Design</th>
<th>Vaccine</th>
<th>Positive anti-SARS-CoV-2 antibody response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hall et al., Canada</td>
<td>117</td>
<td>Randomized clinical trial</td>
<td>Moderna</td>
<td>18%* 55%*</td>
</tr>
<tr>
<td>Kamar et al., France</td>
<td>101</td>
<td>Retrospective cohort</td>
<td>Pfizer</td>
<td>40%** 68%**</td>
</tr>
<tr>
<td>Werbel et al., USA</td>
<td>30</td>
<td>Retrospective cohort</td>
<td>Initial 2 doses Moderna or Pfizer</td>
<td>20%*** 47%***</td>
</tr>
</tbody>
</table>

*Anti-receptor-binding domain (RBD) antibody ≥ 100 U/mL.
**Total anti-SARS-CoV2 spike protein antibodies (IgG, IgM, IgA) signal-to-cutoff ratio >1.1.
***Anti-SARS-CoV-2 spike protein antibodies (EUROIMMUNE) IgG ≥ 1.1 arbitrary units, or anti-RBD (Roche) par/ml ≥ 0.8 U/mL. Includes any level of positive antibody.

Randomized Trial of a Third Dose of mRNA-1273 Vaccine in Transplant Recipients

In the safety evaluation, local and systemic events were slightly more common after the 3rd dose of mRNA-1273 than after the 2nd dose of placebo, but no grade 3 or 4 events and no cases of acute rejection occurred.


Visual Abstract by Edgar Lerma, MD, FASN
What's in a Name, and Who's the Audience? “Kidney” vs. “Renal”

By Eric Seaborg

A broad consensus exists that patients understand the word “kidney” better than “renal.”

Thanks to that consensus, moves like the one for ASN to change its annual meeting from Kidney Week to Kidney Week in 2011 to make its subject matter more understandable to the general public have been welcomed.

But the recent word usage proposals from a Kidney Disease: Improving Global Outcomes (KDIGO) meeting have proven more controversial. In June 2019, KDIGO convened a consensus conference in Amsterdam with the goal of standardizing and refining the English-language nomenclature to describe kidney function and disease. The “executive summary and glossary” of the meeting was published concurrently in 23 journals, a list that was wide ranging enough to include the European Heart Journal (1) and American Journal of Transplantation (2).

Although the stated aim was to present a “glossary,” one short phrase has generated backlash and debate: “Use the term ‘kidney’ rather than ‘renal’ to describe kidney function and kidney disease.”

As part of the pushback, a group of 27 leaders in nephrology, including several from the patient-advocate side, published a “point of view” in the Journal of Nephrology, “Nomenclature in nephrology: Preserving ‘renal’ and ‘nephro’ in the glossary of kidney health and disease” (3). The authors said: “‘Renal’ and ‘nephro’ should not be removed from scientific and technical writings. Instead, the terms can coexist and be used in their relevant contexts.”

The editors of the ASN-published journals, Journal of the American Society of Nephrology (JASN) and Clinical Journal of the American Society of Nephrology (CJASN), have taken somewhat different approaches, which ASN Executive Vice President Tod Ibrahim said is attributable to the “editorial firewall” between the publisher and the editors: “The editors of JASN, CJASN, Kidney 360, and Kidney News have the authority to decide which terms to use in each publication, not ASN.”

JASN JASN Editor-in-Chief Josephine Briggs, MD, said: “JASN is taking what I would call a light-touch approach to these issues. In the main text of the paper, we view this as a matter of author’s choice. There are many settings where authors elect to use renal, and we do not feel it is essential to remove this word from our vocabulary. The critical issue is the context in which it is being used, and that is what I mean by a light touch.”

CJASN CJASN Editor-in-Chief Rajnish Mehrotra, MD, FASN, said the use of “renal” depends upon the context in which it is being used. The editors review every paper and determine the appropriate nomenclature to be used. It is not something that has been so front and center and important to us that we have a written policy.”

“Our approach of not going down the path of required nomenclature is author friendly. One of the biggest complaints authors have is that each journal has its own unique formating requirement. And if their paper is unsuccessful in one journal, authors can spend hours just reformating to the requirements of the next journal. [For the articles we accept], we take it upon ourselves to guide the authors, rather than ask authors to take it on. We want rigor, and an important component of rigor is to be consistent in the way information is presented in the journal. ‘Renal’ vs. ‘kidney’ is a very small part of the bigger whole of rigor such that [the] material [that] appears in the pages of CJASN is consistent from article to article, from issue to issue over the years,” Mehrotra said.

“We value patients accessing our content,” he added. “Three years ago, we started an article type that is called ‘the patient’s voice,’ where we invite a patient to review an article that we have published and provide a commentary on what that article means to [him or her] and the journey [he or she] had with [his or her] illness.”

ASN supports the journals by issuing press releases to publicize the articles the editors deem the most newsworthy, and the press releases use lay-friendly language. The editors all participated in the KDIGO consensus conference.

They agree that even journals have some aspects that are more patient facing than others—such as abstracts and summaries—in which they are more likely to favor “kidney.” But they also said they are not trying to remove “renal” from scientific and technical writings.

The significance statement is a brief summary of the highlights in the paper. The in-...
Organizations continually grapple with the language they use to present themselves to the world, and ASN is no exception, according to ASN’s Ibrahim: “All three words—American, society, and nephrology—have generated discussions. Because ASN is an international organization, with members in more than 130 countries, we’ve considered changing American to something more global. Many people also associate a society with a club, and we’re a much broader, dynamic organization than that.” Finally, with the emphasis on kidney health, the term nephrology merits consideration. That’s part of the reason why we branded in July 2019 the ASN Alliance for Kidney Health, which includes ASN, KidneyCare, Nephrologists Transforming Dialysis Safety, the Kidney Health Initiative, and KidneyX.

References

Hypomagnesemia in Critically Ill Patients on Kidney Replacement Therapy

Hypomagnesemia is a common electrolyte disorder in critically ill patients and is associated with increased morbidity and mortality risk. Many clinical conditions may contribute to hypomagnesemia through different pathogenetic mechanisms. In patients with acute kidney injury (AKI) the need for continuous or prolonged intermittent kidney replacement therapy (CKRT and PIKRT, respectively) may further add to other causes of hypomagnesemia, especially when regional citrate anticoagulation (RCA) is used. This webinar explores strategies aimed at how precisely tailoring both dialysis prescriptions and the composition of KRT fluids, as well as early magnesium supplementation and close monitoring of magnesium, including ionized magnesium could represent a cornerstone in reducing KRT-related hypomagnesemia.

Primary Presenter
Francesca Di Mario, MD
Internal Medicine and Nephrology Department
Parma University Medical School
Parma, Italy

The importance of measuring ionized magnesium in critically ill patients

Dr. Ferrari will discuss the advantages of measuring whole blood ionized magnesium (Mg), the only physiologically and chemically active form of magnesium, for more effective management of dysmagnesemia in critically ill patients.

Presenter
Germano Ferrari, Ph.D., MBA
Director of Medical & Scientific Affairs
Nova Biomedical
Creating personalized care plans through genomic implementation

Chronic kidney disease and kidney failure affect over 20 million Americans and confer substantial morbidity and mortality. Recent studies show that genomic sequencing approaches, such as exome sequencing, can identify a specific monogenic disease in 10% to 35% of kidney disease patients (1–6). Hereditary nephropathies are genotypically and phenotypically heterogeneous and are often difficult to diagnose because of overlapping, nonspecific features (e.g., elevated serum creatinine, proteinuria, etc.). The establishment of a molecular diagnosis can support personalized nephrology care by informing targeted workup, disease prognosis, choice of therapy, and/or family counseling. However, genomic sequencing technologies are still emerging diagnostic tools, and despite their increased use in medicine subspecialties like nephrology, many physicians may lack the requisite knowledge and experience to apply genomic findings into clinical practice. This can be exhibited particularly if one is called upon to interpret unsolicited genomic findings, such as when patients undergo sequencing through their participation in genomic research, expanded carrier screening as part of family planning, or direct-to-consumer testing to learn about their ancestry. Overall, nephrologists’ lack of familiarity in utilizing genomic data poses a significant barrier to their participation in precision medicine efforts and to broader implementation of genomics in routine nephrology care. However, these barriers can be overcome with customized tools tailored to nephrologists’ needs (Figure 1).

The workflow and technology imperatives

Although consensus guidelines are available for the evaluation and/or management of some hereditary nephropathies (e.g., autosomal dominant polycystic kidney disease, Alport syndrome, etc.), these resources may be difficult to access in real time and at the point of care. Furthermore, they often require nephrologists to already suspect a hereditary etiology for an individual’s kidney disease. Thus, there is great need for technologic solutions that support nephrologists’ use of genomic data at the point of care, despite their level of expertise in clinical genomics. However, the development of novel, nephrology-tailored tools that clinicians will want to use, such as interactive electronic health record (EHR)-integrated, genome-informed clinical decision support tools, requires further study into the informational and workflow support needs of the intended user (7, 8). Insights into nephrologists’ unmet needs will inform the design of tools that are versatile enough to be used across diverse practice settings, address specific knowledge gaps, and potentially increase users’ willingness to deliver more personalized nephrology care. Development of these novel aids relies on nephrologists’ participation in genomic implementation and bioinformatics research. For example, Columbia University needs US nephrologists, particularly those who practice outside of large academic institutions, to share their user experiences with existing decision aids and technology-based tools and to help us pilot preliminary decision support tools intended for the EHR. Technologic tools tailored to address nephrologists’ needs will allow us to provide more personalized care, work toward improving long-term outcomes in our patients, and deliver on the promises of precision nephrology.

The author reports no conflicts of interest.

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15. Nestor JG. Assessing physician needs for the implementation of novel bioinformatic solutions. For questions or to share implementation in nephrology through the development of novel bioinformatic solutions. For questions or to share

Figure 1. User experience: needs and values

Understanding the intended users’ needs and values is essential for the development of EHR-integrated decision support tools that effectively enhance clinicians’ use of genomic data.

Figure adapted with permission from Peter Morville (2004).
DON’T LEAVE YOUR IGA NEPHROPATHY PATIENTS HANGING

The IgA Nephropathy Foundation is a community resource dedicated to the support of IgA Nephropathy (IgAN). We are a patient run organization, working together with the hope of finding better treatment options and the ultimate cure.

Please have your patients visit igan.org/support or contact bonnie@igan.org

Are you a fellow and have a tip or idea you’d like to share with your fellow peers and the broader kidney community?

Send your idea to the Kidney News Fellows First column at kidneynews@asn-online.org

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