Diabetic Kidney Disease Strategy Conference: Implementing New Diabetic Kidney Disease Treatments – Time to Act

Working Together to Address the Urgent and Unmet Needs in the Diagnosis and Treatment of People with Diabetic Kidney Disease

Conference #2: Primary Care
April 20, 2021

Support of the Diabetic Kidney Disease Collaborative is provided by:
Introductory Remarks

Welcome

KATHERINE R. TUTTLE, MD, FASN, FACP, FNKF
Chair, DKD-C Task Force
Disclosures

**Employer:** Providence Health Care, University of Washington

**Consultancy Agreements:** Eli Lilly, Boehringer Ingelheim, Gilead, AstraZeneca, Goldfinch Bio, Novo Nordisk, Bayer

**Ownership Interest:**

**Research Funding:** Goldfinch Bio, Bayer

**Honoraria:** Gilead, Goldfinch Bio, Bayer

**Patents and Inventions:**

**Scientific Advisor or Membership:** CJASN, Lancet Diabetes Endocrinology, Nature Reviews Nephrology, NIDDK, Kidney Health Initiative

**Speakers Bureau:**

**Other Interests/Relationships:**

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Agenda

**Introductory Remarks**

*Katherine R. Tuttle, MD, FASN, FACP, FNKF and Amy Mottl, MD, MPH, FASN*

**Primary Care: Awareness, Detection, and Intervention**

*Jay Shubrook, DO*

**Implementing Best Practices at the Point of Care**

*Katherine R. Tuttle, MD, FASN, FACP, FNKF*

**Breakout Sessions**

*Frank (Chip) Brosius, MD*

**Breakout Session Reports**

**Next Steps: A Call to Action**

*Christos Argyropoulos, MD and Katherine R. Tuttle, MD, FASN, FACP, FNKF*
Disclaimer

This webinar, Diabetic Kidney Disease Strategy Conference: Implementing New Diabetic Kidney Disease Treatments – Time to Act, is provided as information and education and should not be construed as medical advice or recommendations for patient care. The information expressed is that of the speaker(s) and contributor(s) only. Clinicians are to use their own training, clinical observations, and judgment to make all diagnostic and treatment decisions. The ASN Alliance (including ASN) does not offer medical advice.

Welcome

AMY MOTTI, MD
Co-Chair, DKD-C Education Subcommittee
Disclosures

Employer: University of North Carolina at Chapel Hill
Consultancy Agreements:
Ownership Interest:
Research Funding: Aurinia, Calliditas, Pfizer
Honoraria:
Patents and Inventions:
Scientific Advisor or Membership: Bayer
Speakers Bureau:
Other Interests/Relationships:

ASN
DKD Education Module

Christos Argyropoulos, MD PhD
University of New Mexico
Division of Nephrology and Hypertension

Amy K. Mottl, MD MPH
University of North Carolina
Division of Nephrology and Hypertension
DKD Education Module: Committee Members and Expertise

- Christos Argyropoulos: DKD, Transplant, Nephrology: University of New Mexico
- Petter Bjornstad: Pediatric Endocrinology; DKD: University of Colorado
- Patrick Gee: Patient Representative: ASN DKD Collaborative
- Charbel Khoury: Obesity; Nutrition; Nephrology: Washington University
- Amy Mottl: DKD, Nephrology: University of North Carolina
- Susanne Nicholas: DKD, Racial Disparities; Nephrology: UCLA
- Joshua Neumiller: Pharmacotherapy; Diabetes: Washington State University
- Matthew Sinclair: Racial and Socioeconomic Disparities; Nephrology: Duke University
- Jay Shubrook: Diabetology; Primary Care: Touro University
- Leslie Wong: Care Models; Dialysis: Nephrology Care Alliance; Cleveland Clinic

DKD Education Module: Topics

- Early DKD: Diagnosis and Pathophysiology
- Diet, Exercise, Weight Management
- Racial and Socioeconomic Disparities
- Role of the Primary Care Provider/ Multidisciplinary Care
- Glycemic Targets
- Antihyperglycemic Agents
- Hypertension Targets and Therapies
- Proteinuria Control and RAAS Blockade
- Cardiovascular Disease Evaluation and Treatment
- Acute Kidney Injury, Nephrotic Syndrome, Indications for Kidney Biopsy
DKD Education Module: Purpose

• EDUCATION: Inform primary care providers and subspecialists about the importance of DKD, heterogeneity of disease and best practices
• PERSPECTIVE: Underscore the importance of putting the patient at the center
• ACTION: Increase screening for DKD, patient education, goals of referral and the uptake of medications which mitigate DKD progression
• CULTURAL CHANGE: Promoting collaborative care between primary care providers and subspecialists
Disclosures

Employer: Touro University California  
Consultancy Agreements: Bayer, Sanofi, NovoNordisk, Lilly  
Ownership Interest:  
Research Funding:  
Honoraria:  
Patents and Inventions:  
Scientific Advisor or Membership: Advisor to Diabeteswise.org  
Speakers Bureau:  
Other Interests/Relationships:

In the last 12 months  
Advisory Board  
Bayer  
NovoNordisk  
Eli Lilly  
Sanofi

Objectives

• DKD in primary care  
• Primary Care Experience with DKD  
• Opportunities with DKD
Burden of Diabetes Kidney Disease

Diabetes in Primary Care

• >34 million adults in US have diabetes
• 25% of adults > 60 years old have diabetes
• 34% of adults have prediabetes

• More than 85% of people with diabetes get diabetes care in the primary care setting

Diabetes and Kidney Disease in the US

• More than 1 in 10 adults in US have diabetes
  • 37% of those have diabetes related kidney disease (stage 1-4)
  • Only 1 in 4 with Stage 3 or Stage 4 DKD know they have it


DKD in Primary Care

What makes it challenging to manage DKD in primary care?

• People might not schedule a diabetes “recheck”
• Often patient presents with a “more pressing” chief complaint
• Often chronic conditions are seen as separate
  • Hypertension, dyslipidemia, heart disease, kidney disease
• These conditions often have no symptoms
  • But the treatments have side effects and cost
Typical Primary Care Patient

- Bobbie is a 54-year-old female who has had type 2 diabetes for 12 years. She had control for a while but since menopause things have been much harder. She is taking metformin 1000 mg bid, Glipizide 10 mg bid and insulin Glargine 64 units each night. She stopped checking her glucose as it is always high. However, she admits that she has shaky spells at least twice a week early am or if she misses a meal. If she has one of those “spells” she will skip her insulin that day. She hurt her neck last night and would like to get this checked out.
- She typically only eats 2 meals per day
- She does home care and has an unpredictable schedule.

Past medical history:
- T2DM (12 yrs), Dyslipidemia (12 years), HTN (16 yrs), Fatty Liver (8 years), Inferior MI s/p PTCA (4 yrs)
- Meds: Simvastatin 40 mg/daily, Lisinopril 20 mg/daily, HCTZ 25 mg/daily, metoprolol 50 mg daily. metformin 1000 mg bid, Glipizide 10 mg bid and insulin glargine 64 units each pm.
- Allergies: None
- ROS: admits fatigue, poor sleep, some knee pain, some swelling in legs
- Exam: BP 142/88, P 78, R 16, BMI 36 Wt 100 kg
- Obese-with truncal obesity
- Plus 1 edema both lower extremities
**Patient Labs**

- HbA1c 8.8%
- BUN- 28
- Cr- 1.4
- eGFR- 54ml/min
- K+- 4.0
- Albumin/creatinine ratio= 368 mg/g

**Lipids**
- Total cholesterol-- 248
- HDL-C- 36
- LDL-C—cannot calc
- Trigs: 480

- ALT: 48
- AST: 40
- CBC-normal
  - Platelets 148

**Case Questions**

- What is on your problem list for Bobbie?
- What do you address first?
- What is your A1c goal for Bobbie?
- What steps for glucose control, BP control, lipids?
- Any special treatment d/t ASCVD?
- Any special treatment d/t NAFLD?
- Any special treatment to address her DKD?
- Who should be on her “diabetes team”, “cardiovascular team” and “kidney team”?
### Bobbie’s Problem list

**Your list**
- Type 2 diabetes uncontrolled
- Hypertension
- Mixed dyslipidemia
- Probable hypoglycemia
- ASCVD s/p MI
- Obesity
- Stage IIIA A3 CKD
- Diabetes Burnout
- Probable NAFLD

**Her list**
- Neck pain
- “spells”
- Edema

### PCP awareness of DKD
What is the PCP knowledge base of DKD?

• Literature is limited
• Good knowledge of needing to screen
  • 50% of patients have had albuminuria screening
• Good knowledge to use ACEI/ARB
  • Rarely at max tolerated dose
• Limited knowledge of optimal time for referral

Primary care awareness of DKD

• Good knowledge of nephropathy as complication
• Good knowledge that glucose and BP contribute to nephropathy

• Little knowledge of renal replacement option specifics
  • Preparation for renal replacement
Knowledge Gap: CKD and CV Disease

• Presence of CKD (eGFR < 60 ml/min/1.73 m², presence of albuminuria) is independent marker
  • All cause mortality
  • CV mortality

• Long term follow up for those with T2DM and CKD
  • 10% progress to ESRD or dialysis
  • 90% will die before ESRD
    • Cardiovascular disease
    • Infection

THE KIDNEY-HEART CONNECTION FOR ORGAN PROTECTION

Scheen AJ. Circ Res 2018;122:1439-1459
Albuminuria (a marker of renal damage) is associated with increased CV morbidity and mortality

Annual transition rates through stages of albuminuria in patients with type 2 diabetes

- No nephropathy: 2.0% (1.9% to 2.2%)
- Microalbuminuria: 2.8% (2.5% to 3.2%)
- Macroalbuminuria: 2.3% (1.5% to 3.0%)

Data from the United Kingdom Prospective Diabetes Study (UKPDS)

**KDIGO 2020 Guidelines**

<table>
<thead>
<tr>
<th>GFR categories (mL/min per 1.73 m²)</th>
<th>Description and range</th>
<th>Persistent albuminuria categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1 Normal or high</td>
<td>≥90</td>
<td>A1 Normal to mildly increased</td>
</tr>
<tr>
<td>G2 Mildly decreased</td>
<td>60–89</td>
<td>A2 Moderately increased</td>
</tr>
<tr>
<td>G3a Mildly to moderately decreased</td>
<td>45–60</td>
<td>A3 Severely increased</td>
</tr>
<tr>
<td>G3b Moderately In severely decreased</td>
<td>30–44</td>
<td></td>
</tr>
<tr>
<td>G4 Severely decreased</td>
<td>15–29</td>
<td></td>
</tr>
<tr>
<td>G5 Kidney failure</td>
<td>&lt;15</td>
<td></td>
</tr>
</tbody>
</table>

Green, low risk (if no other markers of kidney disease, no CKD); yellow, moderately increased risk; orange, high risk; red, very high risk.
Goal Achievement in Diabetes Treatment

- A1c < 7.0%: 52%
- Bp at goal < 130/80: 51%
- ACE/ARB if + albuminuria: 64%
- Bp, glucose and lipids at goal: 14%

Patient awareness of DKD

Patient perspectives of DKD

- Oblivion to Fatalism
- Only know normal and dialysis
- Little awareness that progression can be modified
NHANES participants with CKD aware of their kidney disease,
2001-2012 (a) By stage

Data Source: National Health and Nutrition Examination Survey (NHANES), 2001-2012 participants aged 20 & older.
Abbreviations: CKD, chronic kidney disease.

NHANES participants with CKD aware of their CKD, 2001-2012
(b) By low eGFR and albuminuria status

Data Source: National Health and Nutrition Examination Survey (NHANES), 2001-2012 participants aged 20 & older.
Abbreviations: CKD, chronic kidney disease.
Diabetic CKD + Cardiovascular Disease = Hospitalization + Death


2016 ANNUAL DATA REPORT, VOL 1, CKD, CH

Life expectancy of NHANES participants with or without CKD, 1999–2011

Potential 10 years of life lost from DKD

How do we start the conversation about Diabetes Kidney Disease?

Approach to the patient with DKD

- Knowledge is power
- “Know your numbers”
- Most complications are preventable—earlier the better
- Provide your patient with a checklist
### How Often Should I Check My Blood Sugar?

<table>
<thead>
<tr>
<th>Times per day</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>X</strong> First thing in the morning before you eat or drink and at bedtime</td>
<td></td>
</tr>
<tr>
<td>___</td>
<td>Before lunch or dinner</td>
</tr>
<tr>
<td><strong>X</strong> Whenever you feel that your blood sugar is low (experiencing symptoms)</td>
<td></td>
</tr>
<tr>
<td><strong>X</strong> Always check before you take a shot of insulin</td>
<td></td>
</tr>
</tbody>
</table>

My basal insulin is ________________. My dose is ______ units at _____ time.

My meal time and correction scale insulin is ________________. I take ______ units for my food 15 or 30 minutes BEFORE breakfast, lunch, dinner (circle time before and meals).

My correction scale is:
- ___ units if less than 150
- ___ units if glucose 151 – 200
- ___ units if glucose 201 – 250
- ___ units if glucose 251 – 300
- ___ units if glucose 301 – 350
- ___ units if glucose greater than 351

I also take ___________________________________________________________________.

### Blood Sugar Goals

<table>
<thead>
<tr>
<th>Blood Sugar Average</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1C blood sugar average over 3 months</td>
<td>Less than 6.5% 7% 7.5% 8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Blood sugar before eating</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 – 130 mg/dL or __________ mg/dL</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Blood sugar 2 hours after a meal</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 180 mg/dL or __________ mg/dL</td>
<td></td>
</tr>
</tbody>
</table>
Other Treatment Goals

<table>
<thead>
<tr>
<th>Blood Pressure</th>
<th>Less than 130/80 mmHg or 140/90 mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin</td>
<td>All people with CV disease and others older than 50 and low risk of bleeding</td>
</tr>
<tr>
<td>Statin</td>
<td>High Intensity</td>
</tr>
<tr>
<td></td>
<td>Moderate Intensity</td>
</tr>
<tr>
<td></td>
<td>None</td>
</tr>
</tbody>
</table>

(based on age and risk of heart attack and stroke in the next 10 years and LDL level)

Diabetes Process-of-Care Check-Off Sheet (American Diabetes Association)

SCREENINGS

Annual “Comprehensive” Foot Exam
Foot should be assessed at each diabetes care visit

Yes  No  Date:

Annual Eye exam
Subsequent examinations for type 1 and type 2 patients with diabetes should be repeated annually by an ophthalmologist or optometrist.

Yes  No  Date:

Annual Lipid Screening

Yes  No  Date:

Annual Liver (LFT) Screening

Yes  No  Date:

Annual Test for Kidney Function
Urine albumin and eGFR in type 1 patients with diabetes duration of ≥ 5 years, in all type 2 patients with diabetes, and in all patients with comorbid hypertension starting at diagnosis

Yes  No  Date:

How often should I get my A1C checked?

A1C well controlled, then check every 6 months
A1C not at goal or ≥ 7%, then check every 3 months

6mo  3mo

Routine Blood Pressure Readings
Blood pressure should be measured at every routine diabetes visit.
Patients found to have systolic blood pressure ≥ 140 or diastolic blood pressure ≥ 90 mmHg

Yes  No
MEDICATIONS

Should I be on Aspirin therapy?
- Yes
- No

Consider aspirin therapy (75 – 162 mg/day) as a primary prevention strategy in those with type 1 or type 2 diabetes
- Increased cardiovascular risk (10-year risk >10%)
- Men or women aged 50 years or older
- At least one additional major risk factor (family history of CVD, hypertension, smoking, dyslipidemia, or albuminuria)

Should I be on Statin therapy?
- Yes
- No

≥ 40 years of age, CVD, or CVD risk factors include LDL cholesterol ≥ 100 mg/dL, high blood pressure, smoking, and overweight and obesity; < 40 years of age with additional ASCVD risk factors

VACCINATIONS

Annual Flu Vaccine
- Yes
- No

≥ 6 months of age

Pneumococcal Vaccine
- Yes
- No

Administer pneumococcal polysaccharide vaccine 23 (PPSV23) to all patients with diabetes ≥ 2 years of age.

Adults ≥ 65 years of age, if not previously vaccinated, should receive pneumococcal conjugate vaccine 13 (PCV13), followed by PPSV23 6 to 12 months after initial vaccination.

Adults ≥ 65 years of age, if previously vaccinated with PPSV23, should receive a follow-up ≥ 12 months with PCV13.

Hepatitis B Vaccination
- Yes
- No

Administer hepatitis B vaccination to unvaccinated adults with diabetes who are aged 19 to 59 years.

Explaining GFR

Your GFR result on __________ was __________.

☐ A GFR of 60 or higher is in the normal range.
☐ A GFR below 60 may mean kidney disease.
☐ A GFR of 15 or lower may mean kidney failure.

What is GFR?
GFR stands for glomerular filtration rate. GFR is a measure of how well your kidneys filter blood.
Key Actions to reduce DKD

• Help patients
  • Control hyperglycemia
  • Control hypertension
  • Reduce weight
  • Quit smoking
• Make sure our patients are informed of kidney status

Office based solutions to DKD

• Keep Problem list up to date
• Make lab testing part of pre-visit planning
• Consider scheduling at least 4 visits per year—just for diabetes
• Rotate the themes of your visits
  • Winter– mental health and prevention (immunizations and appts)
  • Spring- Cardiorenal
  • Summer- neuropathy, hypo, reducing meds
  • Fall- preparing for holidays and winter
• Do not make your lab orders fasting
Summary

• Diabetes kidney disease is common
• Patients do not know about their status
• We can help patients
  • Raising awareness
  • Reducing fatalism
  • Targeted blood pressure and glucose treatment
  • Reducing other risk factors
  • Having a plan
Implementing Best Practices at the Point of Care

KATHERINE R. TUTTLE, MD, FASN, FACP, FNKF
Chair, DKD-C Task Force

Outline

• Kidney outcomes with SGLT2 inhibitors and GLP-1 receptor agonists
• Current guidance for use of glucose-lowering agents in DKD
• Considerations for use of SGLT2 inhibitors and GLP-1 receptor agonists at the point of care
  • Adjustment of background therapies
  • Risk mitigation strategies
• Barriers to implementation and optimized use of recommended therapies in DKD
Kidney Outcomes

SGLT2 Inhibitors and GLP-1 Receptor Agonists

### Secondary Kidney Outcomes with SGLT2 Inhibitors

<table>
<thead>
<tr>
<th></th>
<th>EMPA-REG OUTCOME (n = 7,020)</th>
<th>CANVAS Program (n = 10,142)</th>
<th>DECLARE-TIMI 58 (n = 17,160)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent</td>
<td>Empagliflozin</td>
<td>Canagliflozin</td>
<td>Dapagliflozin</td>
</tr>
<tr>
<td>Median follow-up (years)</td>
<td>3.1</td>
<td>3.6</td>
<td>4.2</td>
</tr>
<tr>
<td>Metformin use (%)</td>
<td>74</td>
<td>77</td>
<td>82</td>
</tr>
<tr>
<td>Prior CVD (%)</td>
<td>99</td>
<td>66</td>
<td>40</td>
</tr>
<tr>
<td>Mean baseline A1C (%)</td>
<td>8.1</td>
<td>8.2</td>
<td>8.3</td>
</tr>
<tr>
<td>Primary outcome(s)</td>
<td>3-point MACE</td>
<td>3-point MACE</td>
<td>3-point MACE</td>
</tr>
<tr>
<td></td>
<td>0.86 (0.74–0.99)</td>
<td>0.86 (0.75–0.97)</td>
<td>0.93 (0.84–1.03)</td>
</tr>
<tr>
<td>Cardiovascular death</td>
<td>0.62 (0.49–0.77)</td>
<td>0.87 (0.72–1.06)</td>
<td>0.98 (0.82–1.17)</td>
</tr>
<tr>
<td>MI</td>
<td>0.87 (0.70–1.09)</td>
<td>0.89 (0.73–1.09)</td>
<td>0.89 (0.77–1.01)</td>
</tr>
<tr>
<td>HF hospitalization</td>
<td>0.65 (0.50–0.85)</td>
<td>0.67 (0.52–0.87)</td>
<td>0.73 (0.61–0.88)</td>
</tr>
<tr>
<td>All-cause mortality</td>
<td>0.68 (0.57–0.82)</td>
<td>0.87 (0.74–1.01)</td>
<td>0.93 (0.82–1.04)</td>
</tr>
<tr>
<td>Worsening nephropathy</td>
<td>0.61 (0.53–0.70)</td>
<td>0.60 (0.47–0.77)</td>
<td>0.53 (0.43–0.66)</td>
</tr>
</tbody>
</table>

CV death or HF hospitalization 0.83 (0.73–0.95)

A1C, hemoglobin A1c; CVD, cardiovascular disease; HF, heart failure; MACE, major adverse cardiovascular events; MI, myocardial infarction.
## Primary Kidney Outcomes with SGLT2 Inhibitors

<table>
<thead>
<tr>
<th>Agent</th>
<th>Canagliflozin</th>
<th>Dapagliflozin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>CREDECE (n = 4,401)</td>
<td>DAPA-CKD (n = 4,304)</td>
</tr>
<tr>
<td>Median follow-up (years)</td>
<td>2.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Key kidney-related enrollment criteria</td>
<td>- eGFR 30 to &lt; 90</td>
<td>- eGFR 25 to 75</td>
</tr>
<tr>
<td>- UACR: &gt; 300 to 5000 mg/g</td>
<td>- UACR: 200 to 5000 mg/g</td>
<td></td>
</tr>
<tr>
<td>Mean baseline eGFR</td>
<td>56 mL/min/1.73m²</td>
<td>43 mL/min/1.73m²</td>
</tr>
<tr>
<td>Median Baseline UACR</td>
<td>927 mg/g</td>
<td>949 mg/g</td>
</tr>
</tbody>
</table>

### Kidney outcome(s)

- **Primary Outcome**
  - ESKD (dialysis, transplantation, or sustained eGFR < 15 mL/min/1.73m²), doubling of SCr, or death from renal causes
  - **HR: 0.70 (0.59-0.82)**

- **Primary Outcome**
  - ≥ 50% decrease in eGFR, ESKD, or death from renal or cardiovascular causes
  - **HR: 0.61 (0.51-0.72)**

---

## Secondary Kidney Outcomes with GLP-1 Receptor Agonists

### ELIXA (n = 6,068) LEADER (n = 9,340) SUSTAIN-6 (n = 3,297) EXSCEL (n = 14,752) REWIND (n = 9,901)

<table>
<thead>
<tr>
<th>Agent</th>
<th>Lixisenatide</th>
<th>Exenatide XR</th>
<th>Dulaglutide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median follow-up (years)</td>
<td>2.1</td>
<td>3.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Prior CVD (%)</td>
<td>86</td>
<td>81</td>
<td>73</td>
</tr>
<tr>
<td>Mean baseline A1C (%)</td>
<td>7.7</td>
<td>8.7</td>
<td>8.7</td>
</tr>
</tbody>
</table>

### Primary outcome

- **4-point MACE**
  - **HR: 0.78 (0.66-0.93)**
- **3-point MACE**
  - **HR: 0.87 (0.78-0.97)**
- **3-point MACE**
  - **HR: 0.74 (0.68-0.80)**

### Cardiac death

- **HR: 0.78 (0.66-0.93)**
- **HR: 0.74 (0.65-0.81)**
- **HR: 0.88 (0.76-0.98)**

### MI

- **HR: 0.78 (0.71-0.86)**
- **HR: 0.73 (0.68-0.79)**
- **HR: 0.86 (0.79-0.94)**

### Stroke

- **HR: 1.21 (0.71-2.02)**
- **HR: 1.05 (0.71-0.86)**

### All-cause mortality

- **HR: 0.78 (0.67-0.92)**
- **HR: 0.64 (0.46-0.88)**

### Worsening nephropathy

- **HR: 0.85 (0.77-0.93)**

---

A1C, hemoglobin A1c; CVD, cardiovascular disease; MACE, major adverse cardiovascular events; MI, myocardial infarction.
**Meta-Analysis: Kidney Outcomes with GLP-1 Receptor Agonists**

![Composite kidney outcome including macroalbuminuria](image)

**AWARD-7: Change in eGFR**

![Change in eGFR](image)
## Select GLP-1 Receptor Agonist Kidney Outcome Trials

<table>
<thead>
<tr>
<th>Drug Under Study</th>
<th>Trial</th>
<th>Key kidney-related outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semaglutide</td>
<td>FLOW</td>
<td>o Primary Outcome:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Time to first occurrence of a composite of: eGFR decline of ≥ 50% from baseline, ESRD, or death from kidney or cardiovascular disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Secondary Outcome Measures:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Annual rate of change in eGFR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Time to occurrence of all-cause death</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Time to occurrence of each individual component of the primary composite outcome</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Relative change in UACR</td>
</tr>
<tr>
<td>Semaglutide (in combination with empagliflozin)</td>
<td>EmpaSema</td>
<td>o Primary Outcome:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Change in albuminuria (from randomization to week 52)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Secondary Outcome Measures:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Change in GFR (from randomization to week 52)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Change in inflammatory and endothelial biomarkers</td>
</tr>
</tbody>
</table>


eGFR, estimated glomerular filtration rate; ESRD, end-stage renal disease; UACR, urinary albumin-to-creatinine ratio.

## Current Guidance for Use

Use of SGLT2 inhibitors and GLP-1 receptor agonists in CKD
Key Concepts:
• If patient has indicators of high-risk or established ASCVD, CKD or HF:
  • ASCVD Predominates:
    • Add GLP-1 RA with proven CVD benefit, OR
    • Add SGLT-2 inhibitor with proven CVD benefit
  • HF Predominates:
    • Add SGLT-2 inhibitor with evidence of benefit
  • CKD Predominates
    • DKD + Albuminuria: SGLT2 with primary evidence of reducing CKD progression (preferred) OR SGLT2 with evidence of reducing CKD progression in CVOTs OR GLP-1 RA with proven CVD benefit if SGLT2 inhibitor not a good option
    • T2D and CKD (↑ CV risk): SGLT2 or GLP-1 RA with proven CVD benefit
  • Consider addition for organ protection independent of A1C


Antihyperglycemic Use in Patients with T2D and CKD

Lifestyle therapy

Physical activity Nutrition Weight loss

First-line therapy

Metformin eGFR < 45 eGFR < 30 Dialysis Discontinue Discontinue

SGLT2 inhibitor eGFR < 30 Dialysis Discontinue

GLP-1 receptor agonist (preferred)

DPP-4 Inhibitor Insulin

Sulfonylurea TZD

Alpha-glucosidase inhibitor

Additional drug therapy as needed for glycemic control

Clinical Guidelines: More Similarities than Differences

<table>
<thead>
<tr>
<th>Professional Group</th>
<th>SGLT2i Recommended in CKD</th>
<th>SGLT2i Recommended in ASCVD</th>
<th>SGLT2i Recommended in HF</th>
<th>SGLT2i Recommended Independent of Metformin</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Society of Cardiology/European Association for the Study of Diabetes Guidelines 2019</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (patients drug naïve for glucose-lowering agents)</td>
</tr>
<tr>
<td>American Diabetes Association Standards of Medical Care in Diabetes 2020</td>
<td>Yes (if GFR adequate based on drug approval label)</td>
<td>Yes (if GFR adequate based on drug approval label)</td>
<td>Yes (if GFR adequate based on drug approval label)</td>
<td>No</td>
</tr>
<tr>
<td>Kidney Disease: Improving Global Outcomes Diabetes and CKD Guideline 2020</td>
<td>Yes (if GFR adequate based on drug approval label)</td>
<td>Yes (if GFR adequate based on drug approval label)</td>
<td>No comment</td>
<td>No comment</td>
</tr>
<tr>
<td>American Heart Association Scientific Statement on Cardiorenal Protection in Diabetes and CKD 2020</td>
<td>Yes (if GFR adequate based on drug approval label)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Abbreviations: ASCVD, atherosclerotic cardiovascular disease; CKD, chronic kidney disease; CVRD, cardiovascular disease; eGFR, estimated glomerular filtration rate; HF, heart failure; SGLT2, sodium-glucose cotransporter 2; SGLT3, sodium/gluco cotransporter 2 inhibitor.

Secondary References
Point of Care: Considerations for Use

Adjustment of background therapies and risk mitigation

KDIGO Practice Points: SGLT2 Inhibitors

- For patients in whom additional glucose-lowering may increase risk for hypoglycemia (e.g., those treated with insulin or sulfonylureas and currently meeting glycemic targets), it may be necessary to stop or reduce the dose of an antihyperglycemic drug other than metformin to facilitate addition of an SGLT2i.
- The choice of an SGLT2i should prioritize agents with documented kidney or cardiovascular benefits and take eGFR into account.
- It is reasonable to withhold SGLT2i during times of prolonged fasting, surgery, or critical medical illness (when patients may be at greater risk for ketosis).
- If a patient is at risk for hypovolemia, consider decreasing thiazide or loop diuretic dosages before commencement of SGLT2i treatment, advise patients about symptoms of volume depletion and low blood pressure, and follow up on volume status after drug initiation.
- A reversible decrease in the eGFR with commencement of SGLT2i treatment may occur and is generally not an indication to discontinue therapy.
- Once an SGLT2i is initiated, it is reasonable to continue an SGLT2i even if eGFR falls below 30 ml/min/1.73 m², unless it is not tolerated or KRT is initiated.

## SGLT2 Inhibitors: Dose Considerations in CKD

<table>
<thead>
<tr>
<th>SGLT2 inhibitor</th>
<th>Dose</th>
<th>Kidney function eligible for inclusion in pivotal randomized trials</th>
<th>Dosing approved by the US FDA</th>
</tr>
</thead>
</table>
| Canagliflozin   | 100–300 mg once daily | CANVAS: eGFR ≥30 ml/min per 1.73 m²  
CEDENCE: eGFR 30–90 ml/min per 1.73 m² | No dose adjustment if eGFR >60 ml/min per 1.73 m²  
100 mg daily if eGFR 30–59 ml/min per 1.73 m²  
Avoid initiation with eGFR <30 ml/min per 1.73 m²; discontinue when initiating dialysis |
| Dapagliflozin   | 5–10 mg once daily | DECLARE-TIMI 58: CrCl ≥60 ml/min  
DAPA-HF: eGFR ≥30 ml/min per 1.73 m²  
DAPA-CKD: eGFR 25–75 ml/min per 1.73 m² | No dose adjustment if eGFR ≥45 ml/min per 1.73 m²  
Not recommended with eGFR <45 ml/min per 1.73 m²  
Contraindicated with eGFR <30 ml/min per 1.73 m² |
| Empagliflozin   | 10–25 mg once daily | EMPA-REG: eGFR ≥30 ml/min per 1.73 m²  
EMPA-KIDNEY: eGFR 20–90 ml/min per 1.73 m²  
EMPEROR-Reduced: eGFR ≥20 ml/min per 1.73 m² | No dose adjustment if eGFR ≥45 ml/min per 1.73 m²  
Avoid use, discontinue with eGFR persistently <45 ml/min per 1.73 m² |

**Practical Approach to Initiating SGLT2 Inhibitors in T2D: Mitigating Hypoglycemia Risk**

**Is the patient receiving a background antihyperglycemic agent?**

- **A1C <8.5%?**
  - **SU:** Reduce dose by 50% or discontinue
  - **Insulin:** Reduce dose by 20%*
  - Adjust SU or insulin dose as needed to prevent hypoglycemia

- **A1C >8.5%?**
  - **SU:** Continue same daily dose
  - **Insulin:** Continue same daily dose*
  - Adjust SU or insulin dose as needed to prevent hypoglycemia

- **Metformin or an Incretin-Based Therapy**
  - Continue same daily dosage of background agent
  - If GI adverse events:
    - Adjust dose of metformin, DPP-4 inhibitor or GLP-1 receptor agonist
    - Ensure adequate fluid intake
    - Monitor Ketones

* Avoid insulin withdrawal to minimize the risk of DKA

Practical Approach to Initiating SGLT2 Inhibitors in T2D: Mitigating Hypovolemia Risk

Is the patient receiving background diuretic or other antihypertensive treatment?

Another Antihypertensive?

- BP<140/80mmHg, >65 years old, or hemodynamically unstable?
  - Reduce antihypertensive agent dose
  - Adjust antihypertensive dose according to blood pressure monitoring

- BP>140/80mmHg, <65 years old, and hemodynamically stable?
  - Continue same daily dose of antihypertensive agent
  - Adjust antihypertensive dose according to blood pressure monitoring

A Diuretic?

- Withdraw or reduce dose by 50%
- Reintroduce treatment according to clinical situation and response

Practical Approach to Initiation of SGLT2 Inhibitors in T2D and CKD

Practical Approach to Initiation of SGLT2 Inhibitors in T2D and CKD

- **Sick Day Protocol** (illness, excessive exercise or alcohol intake):
  - Temporarily hold SGLT2 inhibitor
  - Continue consuming fluids and food (if possible)
  - Check blood glucose and ketones frequently
  - Seek medical care early

- **Periprocedural/Perioperative Care:**
  - Educate about risk of DKA
  - Hold SGLT2 inhibitor on day of day-stay procedures
    - Limit fasting to minimum required
  - Hold SGLT2 inhibitor ≥2 days prior to procedure/surgery requiring ≥1 days in hospital and/or requires bowel preparation
    - Measure blood glucose and ketones at hospital admission (proceed if patient is clinically well and ketones <1.0 mmol/L)
    - Restart SGLT2 inhibitor after procedure/surgery only when eating and drinking normally

---

SGLT2 Inhibitors and AKI

<table>
<thead>
<tr>
<th>Event</th>
<th>Patients</th>
<th>RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREDENCE</td>
<td>184</td>
<td>0.85 (0.64-1.13)</td>
</tr>
<tr>
<td>DECLARE-TIMI 58</td>
<td>300</td>
<td>0.69 (0.55-0.87)</td>
</tr>
<tr>
<td>CANVAS Program</td>
<td>58</td>
<td>0.66 (0.39-1.11)</td>
</tr>
<tr>
<td>EMPA-REG OUTCOME</td>
<td>401</td>
<td>0.76 (0.62-0.93)</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td>0.75 (0.66-0.85; p&lt;0.0001)</td>
</tr>
</tbody>
</table>

**KDIGO Practice Points: GLP-1 Receptor Agonists**

- The choice of GLP-1 RA should prioritize agents with documented cardiovascular benefits.
- To minimize gastrointestinal side effects, start with a low dose of GLP-1 RA, and titrate up slowly.
- GLP-1 RA should not be used in combination with dipeptidyl peptidase-4 (DPP-4) inhibitors.
- The risk of hypoglycemia is generally low with GLP-1 RA when used alone, but risk is increased when GLP-1 RA are used concomitantly with other medications such as sulfonylureas or insulin. The doses of sulfonylurea and/or insulin may need to be reduced.

---

**GLP-1 RA Dose Modification for CKD**

<table>
<thead>
<tr>
<th>GLP-1 RA</th>
<th>Dose</th>
<th>CKD adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dulaglutide</td>
<td>0.75 mg and 1.5 mg once weekly</td>
<td>No dosage adjustment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use with eGFR &gt;15 ml/min per 1.73 m²</td>
</tr>
<tr>
<td>Exenatide</td>
<td>10 µg twice daily</td>
<td>Use with CrCl &gt; 30 ml/min</td>
</tr>
<tr>
<td>Exenatide extended-release</td>
<td>2 mg once weekly</td>
<td>Use with CrCl &gt; 30 ml/min</td>
</tr>
<tr>
<td>Liraglutide</td>
<td>0.6 mg, 1.2 mg, and 1.8 mg once daily</td>
<td>No dosage adjustment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limited data for severe CKD</td>
</tr>
<tr>
<td>Lixisenatide</td>
<td>10 µg and 20 µg once daily</td>
<td>No dosage adjustment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limited data for severe CKD</td>
</tr>
<tr>
<td>Semaglutide (injection)</td>
<td>0.5 mg and 1 mg once weekly</td>
<td>No dosage adjustment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limited data for severe CKD</td>
</tr>
<tr>
<td>Semaglutide (oral)</td>
<td>3 mg, 7 mg, or 14 mg daily</td>
<td>No dosage adjustment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Limited data for severe CKD</td>
</tr>
</tbody>
</table>
# Summary of Risk Mitigation Strategies for SGLT2 inhibitors and GLP-1 RAs in DKD

<table>
<thead>
<tr>
<th>Adverse Events</th>
<th>Potential Mitigating Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SGLT2 Inhibitors</strong></td>
<td></td>
</tr>
<tr>
<td>Genital mycotic infections</td>
<td>- Stress hygiene – keeping genital area clean and dry</td>
</tr>
<tr>
<td>Volume depletion</td>
<td>- Proactive dose reduction of diuretics in patients at risk for hypovolemia</td>
</tr>
<tr>
<td></td>
<td>- Hold SGLT2 inhibitors during illness (nausea, vomiting, diarrhea)</td>
</tr>
<tr>
<td></td>
<td>- Implement sick day protocol</td>
</tr>
<tr>
<td><strong>DKA</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Educate patients on early recognition</td>
</tr>
<tr>
<td></td>
<td>- “STOP DKA” protocol (stop SGLT2 inhibitor, test for ketones, maintain fluid and carbohydrate intake, use maintenance and supplemental insulin)</td>
</tr>
<tr>
<td><strong>Amputation</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Encourage foot self-examinations; examinations by healthcare providers at each visit</td>
</tr>
<tr>
<td><strong>Hypoglycemia</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Adjustment of background antihyperglycemic agents, as appropriate</td>
</tr>
<tr>
<td><strong>GLP-1 Receptor Agonists</strong></td>
<td></td>
</tr>
<tr>
<td>Nausea/vomiting/diarrhea</td>
<td>- Patient education on tolerability and symptom recognition</td>
</tr>
<tr>
<td></td>
<td>- Start at lowest dose and titrate slowly</td>
</tr>
<tr>
<td>Hypoglycemia</td>
<td>- Adjustment of background antihyperglycemic agents, as appropriate</td>
</tr>
</tbody>
</table>


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# Barriers to Optimized Use in CKD
Potential Barriers to Optimized Utilization of SGLT2 Inhibitors in T2D and CKD

- Suboptimal CKD identification and awareness
- Historical avoidance of SGLT2 inhibitors in patients with low eGFR
- Potential confusion with multiple clinical practice guidelines/recommendations
- Suboptimal care coordination?
  - Multiple providers – who prescribes and manages?
- Adequate patient follow-up and education
  - Risk mitigation strategies
  - Diabetes self-management

Overcoming Barriers to Management of DKD

Summary

- Recent clinical practice recommendations stress use of SGLT2 inhibitors and GLP-1 receptor agonists for organ protection
- Patient education and follow-up are critical to mitigate adverse events
  - Adjustment of background therapies
  - Self-management education
- Multiple barriers to uptake and utilization of SGLT2 inhibitors and GLP-1 receptor agonists in patients with CKD exist
  - Self-management programs
  - Team-based integrated care models
Thank you!

Breakout Sessions
Breakout Sessions

FRANK (CHIP) BROSIUS, MD
Moderator

Disclosures

Employer: University of Arizona; University of Michigan
Consultancy Agreements:
Ownership Interest:
Research Funding: NIH/NIDDK
Honoraria: various universities; no corporate sponsors
Patents and Inventions:
Scientific Advisor or Membership: Associate Editor – Diabetes; editorial board – American Journal of Physiology; JCI
Speakers Bureau:
Other Interests/Relationships:
Breakout Session Moderators

**Group 1:** Joanna Hudson, PharmD, BCPS, FASN, FCCP

**Group 2:** Jay Shubrook, DO

**Group 3:** Patrick Gee, PhD

**Group 4:** Alan Kliger, MD

**Group 5:** David Cherney, MD CM, PhD, FRCP(C)

---

Breakout Moderator Disclosures

**David Cherney, MD CM, PhD, FRCP(C)**
- **Employer:** Toronto General Hospital
- **Consultancy Agreements:** Boehringer Ingelheim-Lilly, Merck, AstraZeneca, Sanofi, Merck, Mitsubishi-Tanabe, Abbvie, Prometic, NovoNordisk and Janssen, Bayer
- **Research Funding:** Boehringer Ingelheim-Lilly, Merck, Janssen, Sanofi, Novo Nordisk, and AstraZeneca
- **Honoraria:** Boehringer Ingelheim, Merck, Otsuka, JNJ, Astellas, AstraZeneca, Lilly, Sanofi, Abbvie, Prometic, Novo Nordisk
- **Scientific Advisor or Membership:** Janssen, Boehringer Ingelheim, Merck, AstraZeneca, Sanofi, Novo Nordisk

**Patrick O. Gee, Sr., PhD**
- see following slide

**Joanna Q. Hudson, PharmD, BCPS, FASN, FCCP**
- **Employer:** University of Tennessee – Memphis College of Pharmacy
- **Consultancy Agreements:** Lexi-drugs; PeerView Institute for Medical Education
- **Honoraria:** Medscape/WebMD; PeerView Institute for Medical Education
- **Speakers Bureau:** Amgen

**Alan S. Kliger, MD**
- **Employer:** Metabolism Associates, New Haven
- **Consultancy Agreements:** ASN; National Institute of Diabetes, Digestive Diseases and the Kidney
- **Honoraria:** several universities and medical schools, professional organizations – honoraria for lectures, seminars, webinars
- **Scientific Advisor or Membership:** Qualdig (Quality Improvement Organization)
- **Other Interests/Relationships:** Renal Physicians Association; American Society of Nephrology
- **Ownership Interest:**

**Jay Shubrook, DO**
- **Employer:** Touro University California
- **Consultancy Agreements:** Bayer, Sanofi, NovoNordisk, Lilly
- **Scientific Advisor or Membership:** Advisor to Diabeteswise.org
Breakout Moderator Disclosures

Disclosures – Patrick O. Gee, Sr., PhD

Leadership Positions/Membership/Affiliations:

- Quality Insights EVRD Network 5 Patient Advisory Committee Chair.
- Founder & CEO, Advocate, Inc.
- Quality Insights EVRD Network 5 Medial Review B.O.D.
- Polycystic Kidney Disease (PKD) Patient Advisory Committee (PAC) Director.
- American Association of Kidney Patients (AAKP) B.O.D.
- Otsuka Pharmaceutical Advisory Board Member for their Autosomal Dominant Polycystic Kidney Disease campaign.
- Chronic Disease Coalition Southeast Region Co-Chair.
- Center for Dialysis Innovation (CDI) Patient Advisory Board
- American Society of Nephrology (ASN) Diabetic Kidney Disease Collaborative Task Force.
- BMI Rapid Recommendation on TGAT2 Inhibitors Research Patient Representative.
- PCORI Comparative Effectiveness of Home-Based Strategies to Control Blood Pressure in Patients with High Cardiovascular Risk During the COVID-19 Pandemic Member.
- Patient Family Advisors Network (PFAN)
- PFI Network Advisor member
- PFACountry Diversity, Equity, and Inclusion Workgroup
- American Kidney Fund (AKF) Ambassador & Certified Kidney Coach
- National Kidney Foundation (NKF) KAC member
- Donate Life DC Ambassador
- NPFE-LAN Legacy SARN member

Financial Disclosure: Honorary:

- Otsuka Pharmaceutical Advisory Board Member for their Autosomal Dominant Polycystic Kidney Disease Campaign. Honorarium $150.00
- Center for Disease Innovation Patient Advisory Board/Kidney Research Institute Patient Advisory Committee for Research Development on a Portable/Wearable Dialysis Unit. Honorarium $1,000.00
- Patient Family Advisors Network Guest Speaker for three Webinars on Kidney Disease. Honorarium $1,000.00
- ASN Board of Directors
- ASN Council of Scientific Advisors
- ASN Clinical Affairs
- ASN Global Affairs
- ASN Patient/Advocate
- ASN National Advisory Board, Patient/Caregiver
- ASN National Council of the Americas.

Organizational Affiliation and Travel Reimbursements:

- American Association of Kidney Patients for attendance at National Patient’s Meeting and any other events representing the organization as a Board of Director and Ambassador.
- American Kidney Fund Ambassador and Advocacy Day meeting of Capital Hill.
- CareX Ambassador Ambassador Meeting.
- Quality Insights EVRD Network 5 PAC Chair Quality Conference Meetings and Medical Review Board Meeting.
- Polycystic Kidney Disease (PKD) Patient Advisory Committee (PAC) Collaborative Task Force Member and in-person meeting.
- Kidney Health Initiative Patient Family Partnership Council Member and in-person meetings and KHI Stakeholders Annual Conferences and attendance to ASN Annual Kidney Week Conferences.
- National Kidney Foundation (NKF) Chair Conference/Annual National Patient and Family Engagement Learning and Action Network (NLA) Member and attendance to the CMS Quality Conference.
- Global Centers for Inclusion Global Council International Faculty Member and attendance to the Annual COVT Forum.
- Patient Centered Outcomes Research Institute Ambassador and attendance to the Annual PCORI meetings.
- Patient Family Advisor Network events.

Other Interest/Disclosures

Nothing further to disclose in the realm of kidney disease/medical innovation/pharmaceutical at this time.

Breakout sessions

Group questions

- What are the current barriers/challenges to managing DKD in primary care?
  - What are the easy solutions that can be implemented widely?

- When thinking about a team-based approach to managing patients with DKD -
  - Who would be on your team?
  - What team members do you not have access to?
  - What are examples of best practices in team-based care?

- How can DKD care be prioritized?
  - How do we help patients engage in the importance of DKD?

- How can healthcare systems and payers be encouraged to support new life-saving therapies?

- How do we ensure optimal care and access to new therapies for vulnerable and underserved populations?

Diabetic kidney disease collaborative
Discussion strategies

• Do not feel you have to answer all questions!!
• Pick the questions you feel are most important.
• If there are more important questions that are not on the list, please discuss those.
• Consensus is not necessary.
• Please make specific recommendations.
• Leaders will report your conclusions and recommendations at the end of meeting.

Zoom logistics

When the breakout sessions begin, participants will see this prompt:

Please share your webcam and unmute your line as soon as you enter the breakout room.

When the breakout sessions are concluding, participants will see this prompt, and will then be returned to the main room:
Breakout Session Reports

Next Steps: A Call to Action

CHRISTOS ARGYROPOULOS, MD
Co-Chair, DKD-C Education Subcommittee
Disclosures

Employer: University of New Mexico
Consultancy Agreements: 1) Momenta Pharma; 2) Alkahest
Ownership Interest:
Research Funding: DCI, Inc.; University of Pennsylvania

Honoraria:
Patents and Inventions:
Scientific Advisor or Membership: 1) Baxter Healthcare; 2) Health Services Advisory Group; 3) Bayer

Speakers Bureau:
Other Interests/Relationships: 1) DCI Inc: Medical Director – Outpatient Dialysis Unit in Cuba, New Mexico; 2) Akebia: PI in two Phase 3 trials of an investigational product for the correction and maintenance of anemia in patients with non-dialysis dependent Chronic kidney Disease and one Phase 3 study of the same agent in dialysis; 3) Abbvie: Sub-I in aa Phase 3 study of an experimental agent in diabetic nephropathy; 4) DOPPS: PI for CKD-DOPP

Closing Remarks

KATHERINE R. TUTTLE, MD, FASN, FACP, FNKF
Chair, DKD-C Task Force