Trends in Guideline-Directed Medical Therapy Utilization in Chronic Kidney Disease: Evidence from a Large U.S. Nephrology Practice

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Background / Goal

- **Background**
  - Guideline-Directed Medical Therapies (GDMT) for chronic kidney disease (CKD)—including renin–angiotensin system inhibitors (RAASi), sodium-glucose cotransporter-2 inhibitors (SGLT2i), and non-steroidal mineralocorticoid receptor antagonists (ns-MRA)—are recommended to slow CKD progression and reduce cardiovascular risk.
  - However, real-world trends in GDMT use across diabetes subgroups and CKD stages are not well described
- **Goal**
  - Describe GDMT adoption for CKD (by stage, albuminuria, and T2DM) in a large US nephrology practice
  - Analyzes factors associated with GDMT adoption

Methods

- **Sample**:
  - We analyzed 50,547 CKD patients with a nephrology visit in a Nephrology Associates of Northern Illinois and Indiana (NANI) clinic between 2021 and 2023
  - We divided the patients by type 2 diabetes mellitus (T2DM) status and analyzed the cohorts separately
  - Repeated cross-sections of the cohort were constructed at six-month intervals, and patients contributed to each time block in which they had a nephrology visit. For patients with multiple nephrology visits during a six-month time block, the last visit was used.
  - Patient characteristics, comorbidities (including T2DM), biochemical results, and prescriptions were updated to the latest available values during each six-month time block
- **GDMT definition**:
  - **GDMT, T2DM(+)**: RAASi or SGLT2i or finerenone
  - **GDMT, T2DM(-)**: RAASi or SGLT2i
- **Analysis**:
  - Logistic regression was used to model the associations of GDMT prescription with patient and clinic characteristics

Results

Table 1: Patient characteristics, by diabetes (July-December 2023)[a]

Characteristics	T2DM(-) (n = 16,275)	T2DM(+) (n = 12,053)
Demographics		
Age, years	71.4 (13.6)	71.9 (10.9)
Sex		
Female	49.5%	46.1%
Male	50.3%	53.7%
Other/Unknown	0.2%	0.1%
CKD stage		
1	1.5%	1.2%
2	11.7%	8.2%
3a	25.1%	20.0%
3b	35.4%	36.3%
4	21.8%	28.3%
5	4.4%	6.0%
eGFR, mL/min/1.73m^2	42.8 (17.8)	39.2 (17.2)
Nephrology care		
Nephrology clinic visits, n	1.35 (0.67)	1.46 (0.72)
Insurance type		
Public[b]	68.2%	72.1%
Private	31.8%	27.9%
Comorbidities		
Heart failure and non-ischemic heart disease	13.9%	18.3%
MI or ischemic heart disease	5.5%	10.2%
Stroke/TIA	1.5%	2.4%
Atrial fibrillation	7.6%	7.9%
COPD	3.1%	3.8%

a. The number of patients included in the study at each 6-month time-period varied from n=23,678 to 29,421. Only the last 6-month time-period is shown here for simplicity; there were no significant trends in the patient-characteristics included in the table.
b. Medicare or Medicaid

Figure 1: GDMT prescription trends, by T2DM, CKD stage, and albuminuria (2021-2023)

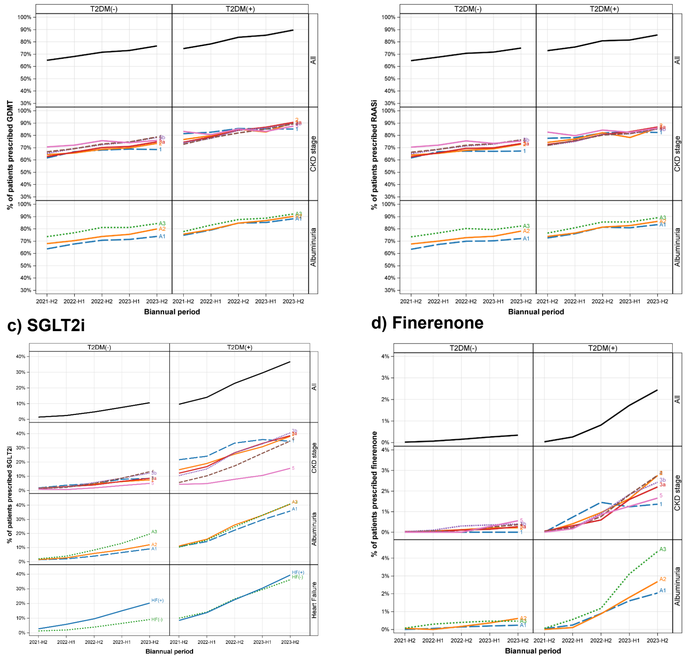

Table 2: Predictors of GDMT[a] prescription, by T2DM (2021-2023)

Parameter	Odds Ratio[b] (95% CI), by T2DM	
	T2DM (-)	T2DM(+)
Age, per 5 years	1.06(1.05,1.07)	1.02(1.00,1.03)
Female	0.86(0.82,0.90)	0.91(0.86,0.98)
CKD stage		
1	0.98(0.87,1.10)	1.08(0.87,1.33)
2	1.00(ref)	1.00(ref)
3a	0.97(0.93,1.02)	0.96(0.88,1.04)
3b	1.01(0.95,1.06)	0.94(0.86,1.03)
4	1.02(0.96,1.08)	0.95(0.86,1.05)
5	1.16(1.05,1.28)	1.13(0.98,1.30)
Albuminuria[c]		
A1	1.00(ref)	1.00(ref)
A2	1.11(1.07,1.16)	1.09(1.03,1.16)
A3	1.30(1.23,1.36)	1.18(1.10,1.26)
Not measured	0.88(0.85,0.91)	0.77(0.73,0.82)
Comorbidities		
Heart failure	0.85(0.79,0.91)	0.72(0.66,0.78)
MI/Ischemic heart disease	1.04(0.93,1.16)	1.02(0.91,1.13)
N visits last 6 months		
1	1.00(ref)	1.00(ref)
2	0.90(0.87,0.93)	0.89(0.86,0.93)
3+	0.77(0.73,0.82)	0.80(0.74,0.86)
Private insurance (vs. public)	0.96(0.92,1.00)	1.01(0.95,1.08)
Urban clinic location (vs. rural)	0.99(0.91,1.07)	0.86(0.76,0.97)

T2DM(-): N=75,857 six-month patient observations, N=29,698 unique patients, n=53,942 GDMT prescriptions
T2DM(+): N=56,581 six-month patient observations, N=20,730 unique patients, n=46,722 GDMT prescriptions
a. GDMT includes RAASi or SGLT2i for T2DM(-); additionally includes finerenone for T2DM(+)
b. Adjusted for all variables listed in the table and additionally adjusted for clinic groups (n=17), patient race, and year; models account for patient clustering
c. A1=uACR (urinary albumin to creatinine ratio) < 30 mg/g, A2 = uACR 30-300 mg/g, A3=uACR>300 mg/g

Summary / Conclusions

- In summary, our study demonstrates encouraging progress in the adoption of evidence-based therapies for CKD in a large community-based U.S. nephrology practice, while also underscoring persistent gaps in risk stratification and optimal treatment, particularly among patients without diabetes, those with advanced CKD, and females.
- Continued efforts are needed to improve albuminuria measurement (despite increasing from 43% to 51% in 2021 to 2023), increase awareness of the benefits of GDMT in populations where these therapies remain underused, and address disparities in GDMT uptake to ensure that all eligible patients benefit from the latest advances in CKD care.

Disclosures

MF, JE, AK, and YW are full-time employees of Bayer US. JM was employed by Bayer US at the time of this research and is now employed by AstraZeneca Pharmaceuticals. SU reports consultancy honoraria from Boehringer-Ingelheim and Astra-Zeneca and receives research funding support from Bayer, Boehringer-Ingelheim and Astra-Zeneca, BB, NC, and RP have no additional conflicts of interest to declare.

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