RESEARCH LETTER

Risk of CKD Progression and Quality-of-Care Indicators in the Primary Care Setting

To the Editor:

Chronic kidney disease (CKD) progression follows a heterogeneous course, with a minority of individuals reaching kidney failure.[1] When recognized early, progression in high-risk individuals can be reduced by managing upstream risk factors using disease-modifying medications, managing blood pressure (BP), and achieving adequate glycemic control.[2] If treatment is delayed until nephrology referral, the therapeutic window for several disease-modifying drugs is narrowed or closed, and kidney failure can only be delayed, not prevented.[2]

Although most patients with CKD are managed in the primary care setting, for which treatment guidelines to mitigate risk currently exist,[3] primary care providers may not be aware of current CKD treatment guidelines and thus quality-of-care indicators may not be met.[4] As such, implementing clinical tools in the primary care setting to improve early identification and stratification based on risk of progression to kidney failure is essential. The Kidney Failure Risk Equation (KFRE), which uses routinely collected variables to predict 2- and 5-year risks of kidney failure,[5] is one such tool. The KFRE has been validated in multiple populations[6,7] and is used to determine the intensity of care and timing of referral from primary care to nephrology in several jurisdictions worldwide.[8,9] It was also recently integrated into the National Institute for Health and Care Excellence CKD guidelines.

We conducted a retrospective cohort study using data from the Canadian Primary Care Sentinel Surveillance Network (CPCSSN) to evaluate CKD quality-of-care indictors. A cohort was developed of individuals managed in primary care clinics from January 1, 2010, through to December 31, 2019, who had at least 1 serum creatinine test with an estimated glomerular filtration rate (eGFR) <60 mL/min/1.73 m^2 plus a urinary albumin-creatinine ratio (UACR), protein-creatinine ratio, or dipstick test available within ±365 days. Quality-of-care outcomes were compared between groups using the χ^2 test. $P < 0.05$ was considered statistically significant. Detailed methods are presented in Item S1.

We identified 24,143 individuals with CKD, 11,035 (45.7%) of whom had a UACR available and were included in the final analyses (Fig S1). Eighty-three percent of these individuals were at low risk of progressing to kidney failure, 10.3% were at intermediate risk, and 6.7% were at high risk (Table 1). Among intermediate- and high-risk individuals, 56% were on an ACEI/ARB and 38% on a statin, 65% of individuals with a recent BP measurement were within target, and only 30% received a nephrology referral (Fig 1). Table S1 displays results from a subgroup analysis of individuals with CKD GFR category 3 (G3)—a population in which all disease-modifying medications can be used, and where care is mostly led by primary care providers. Notably, in this group, SGLT2 inhibitor use was 12% or less in each risk group. Additionally, a sensitivity analysis performed in individuals with at least 2 eGFR tests <60 mL/min/1.73 m^2 more than 90 days apart showed similar results to the main analyses (Table S2).

Kidney disease progression is associated with a high economic and quality-of-life burden and is an important issue for all health systems. Although there is reasonable access to primary care in Canada, the nephrology workforce is proportionately small and shrinking in Canada and the United States.[10] As such, most patients with CKD must be managed in primary care. When CKD is detected early (CKD categories G1-G3), a patient at high risk of kidney failure can potentially avoid kidney failure over their lifetime by using the available disease-modifying therapies, which can change the eGFR slope when eGFR is still preserved.[2] Conversely, if interventions are instituted in CKD category G4, fewer disease-modifying therapies are available and kidney failure can only be delayed.[2] Our findings suggest that although intermediate- and high-risk patients receive more disease-modifying therapies compared to low-risk patients, the gap between the quality-of-care indicators met in intermediate- and high-risk patients is minimal. These findings suggest the need for active dissemination and implementation of the most recent nephrology guidelines in primary care, and integration of tools such as the KFRE into clinical workflow to identify and risk-stratify patients with CKD earlier and aid in appropriate management to either delay or prevent kidney failure. Imperatively, we advocate for increased albuminuria testing to improve CKD identification and management, as well as to facilitate the use of the KFRE.

Using known quality indicators, we identified several areas for improvement in the care of individuals with CKD categories G3-G5 in primary care settings. Addressing these gaps could lead to clinically meaningful delays in progression to kidney failure for patients who are at intermediate and high risk of this outcome. Future studies examining the impact of implementing risk-based care approaches and tools that improve clinical workflow to optimize care in the CKD population are needed.

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Supplementary Material

Supplementary File (PDF)

Figure S1; Item S1; Tables S1-S2.

Table 1. Demographic and Clinical Data for Individuals With CKD categories G3-G5, Stratified by 5-Year Risk of Kidney Failure (N = 11,035)

	Low Risk	Intermediate Risk	High Risk
No. of patients	9,162 (83.0%)	1,132 (10.3%)	741 (6.7%)
Age, y	70.3 ± 12.5	73.4 ± 14.3	69.9 ± 15.5
Age category			
18-44 y	280 (3.1%)	61 (5.4%)	58 (7.8%)
45-64 y	2,473 (27.0%)	200 (17.7%)	166 (22.4%)
65-84 y	5,280 (57.6%)	614 (54.2%)	380 (51.3%)
85+ y	1,129 (12.3%)	257 (23.7%)	137 (18.5%)
Female sex	5,341 (58.3%)	537 (47.4%)	318 (42.9%)
Province			
Alberta	7,781 (84.9%)	947 (83.7%)	604 (81.5%)
Manitoba	1,381 (15.1%)	185 (16.3%)	137 (18.5%)
Dwelling location			
Urban	6,433 (71.9%)	813 (74.9%)	552 (76.8%)
Rural	2,510 (28.1%)	273 (25.1%)	167 (23.2%)
Systolic BP, mm Hg[a]	130.4 ± 18.0	131.9 ± 20.3	135.3 ± 24.0
Diastolic BP, mm Hg[a]	75.3 ± 10.9	72.5 ± 12.1	73.5 ± 13.0
Body mass index, kg/m^2[a]	29.4 [25.9-33.9]	29.3 [25.8-34.0]	29.2 [25.4-34.3]
Serum hemoglobin, g/dL[a]	13.8 ± 1.7	12.8 ± 2.0	11.6 ± 2.2
eGFR, mL/min/1.73 m^2	54.3 [49.0-58.0]	35.0 [29.7-42.0]	20.6 [14.0-27.8]
UACR, mg/mmol	1.3 [0.8-2.9]	9.1 [2.9-36.0]	65.7 [15.0-196.0]
HbA1c, among patients with known DM[a]	6.9 [6.2-7.7]	7.1 [6.4-8.2]	7.3 [6.3-8.4]
Comorbidities[b]			
DM	3,738 (40.8%)	671 (59.3%)	483 (65.2%)
Dyslipidemia	6,312 (68.9%)	760 (67.1%)	500 (67.5%)
Hypertension	5,815 (63.5%)	841 (74.3%)	570 (76.9%)

Continuous variables given as mean ± SD or median [IQR]. eGFR calculated using the 2009 CKD-EPI creatinine equation without the race coefficient. Low risk defined as a 5-year risk of kidney failure <1%; intermediate risk as 1%-<5%; high risk as ≥5%. Abbreviations: DM, diabetes mellitus; HbA1c, glycated hemoglobin.
[a]Within ±1 year of the index date.
[b]The presence/absence of comorbidities prior to the index date was assessed using validated definitions from the CPCSSN for each comorbidity.

Article Information

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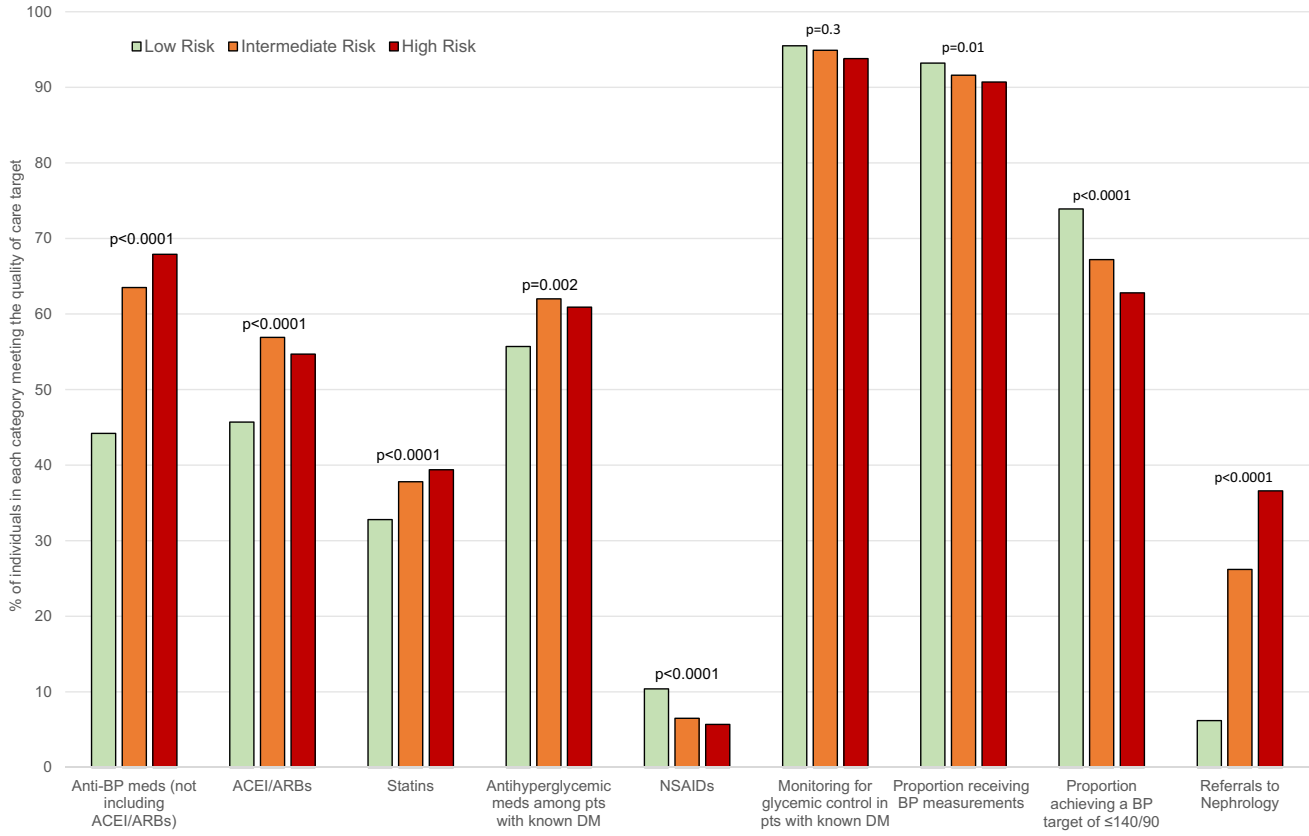

Figure 1. Quality of care indicators for CKD, BP, and glycemic control stratified by 5-year kidney failure risk for individuals with CKD categories G3-G5 (N = 11,035). Prescriptions of disease-modifying medications, monitoring for glycemic control (HbA1c), and BP management were assessed within ±1 year of the index date; nephrology referrals were assessed at any time point. Count of anti-hyperglycemic medications does not include prescriptions of sodium-glucose cotransporter 2 inhibitors. Proportion of patients achieving a BP target of ≤140/90 mm Hg was assessed only among those with a BP measurement within ±1 year of the index date. Abbreviations: ACEI, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; NSAIDs, nonsteroidal anti-inflammatory drugs; pt, patient.

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