

Chronic Kidney Disease: Optimal and Coordinated Management



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Chronic kidney disease (CKD) is a common condition, affecting approximately 1.9 million Canadians. It is common, severe and treatable, provided it is recognized at an early enough stage.

CKD is also a disease multiplier for CV disease, meaning that individuals affected with CKD and a "traditional" CV risk factor have a much higher rate of CV events. Indeed, the majority of individuals with CKD do not progress to end-stage kidney failure (*i.e.*, dialysis dependency), but rather die from another cause.

Recent introduction of a staging system for CKD and the increasing trend to standardized reporting of estimated glomerular filtration rate (eGFR) by several Canadian provinces are helpful in the identification of early CKD. Additionally, there are now several clinical practice guidelines in existence to allow primary healthcare professionals to manage many patients with early CKD.

eGFR? What is this anyways?

The eGFR can be derived using mathematical formulae from laboratory testing of the serum creatinine. The most commonly used formula, which provides a reasonably accurate estimation of GFR is the modified Modification of Diet in Renal Disease (MDRD) formula. Several

Robert's case

Robert, 50, a First Nation's individual, has a history of Type 2 diabetes mellitus, complicated by proliferative diabetic retinopathy and hypertension. He presents with progressive swelling of both legs for several months.

History

Robert has not been seen by a physician in several years, but takes medications for his BP and diabetes. Medications include:

- Glyburide
- Metformin
- Hydrochlorothiazide
- Ramipril

For the last several months, Robert has noted that his urine has become quite frothy and that he is having to get up to urinate a couple of times nightly.

Examination

On examination, Robert's BP is 135/85 mmHg and he has peripheral edema bilaterally to his knees. He has changes of diabetic retinopathy bilaterally. Otherwise, his examination was normal.

Laboratory investigations show a normochromic and normocytic anemia, with a hemoglobin of 105 g/L. His creatinine is 200 $\mu\text{mol/L}$, with otherwise normal electrolytes. His HgbA1C is 8.1 g/g.

Read on to learn what to do for Robert.

Table 1

Classifying patients into stage 1 to 5 disease, based on the level of their estimated glomerular filtration rate (eGFR)¹

Stage	eGFR (ml/min/1.73 m ²)	Description	Canadian prevalence	Action steps
1	> 90	Kidney damage, normal GFR	478,500	- Identify cause - Initiate treatment
2	60–89	Kidney damage, mild decline of GFR	435,000	- Identify cause - Initiate treatment
3	30–59	Kidney damage, moderate decline of GFR	623,500	- Treat to target: BP, glycemic control, lipids - Multidisciplinary education
4	15–29	Advanced kidney disease, severely reduced GFR	29,000	- Continue as above - Preparation for renal replacement therapy (dialysis or transplantation)
5	< 15	Kidney failure	14,500	- Renal replacement therapy or palliative management

provinces automatically include eGFR measurements whenever a serum creatinine is ordered.

When interpreting the eGFR, there are several caveats that must be remembered:

- An eGFR is only valid for a steady-state serum creatinine and should not be used for individuals with unstable renal function, such as acute kidney injury
- Extremes of body mass, either obese or significantly malnourished states must be taken into account, because eGFR assumes ideal BMI

The normal range of eGFR is 90 ml/min/1.73 m² to 120 ml/min/1.73 m². This is useful, because it can be used roughly to describe a per cent of normal kidney function, which is often more meaningful to a patient. For instance, an eGFR of 80 ml/min/1.73 m² can be said to equate to approximately 80% normal kidney function.

eGFR is also useful because it is much more sensitive than a serum creatinine in detecting early kidney disease—something that is vital for early recognition and intervention to change the natural history of this condition.

Screening for CKD

Currently, there is no national screening program for the general population in Canada. However, targeted screening in certain high-risk groups has been recommended. Groups of individuals at higher risk for CKD include:

- Diabetics
- Hypertensives with or without known CV disease
- Those with a positive family history of kidney disease

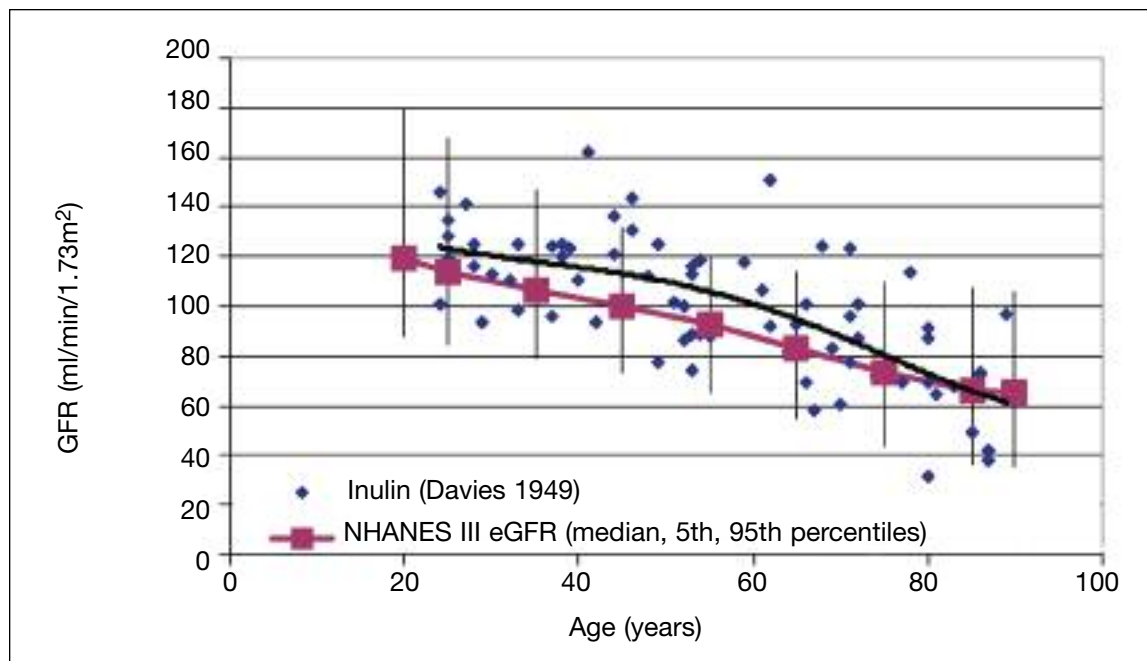


Figure 1. Expected change of GFR as a function of aging.

- Certain ethnic populations:
 - First Nations/Aboriginals
 - Pacific Islanders
 - African-Canadians

Screening for these groups should include a measurement of BP, serum creatinine (to obtain an eGFR) and a urine measurement of albuminuria (*i.e.*, urinalysis, except for diabetic patients, in whom an albumin-creatinine ratio [ACR] should be checked if the urinalysis is negative for protein). If these screening tests are negative, they should be repeated annually.



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Diagnosing CKD

CKD can be said to be present if one of the following criteria are met:

- eGFR < 60 ml/min irrespective of urinary findings
- Presence of urinary sediment changes (*i.e.*, non-urological hematuria, persistent proteinuria, cellular casts) irrespective of level of eGFR
- Radiological evidence of kidney disease (*i.e.*, polycystic kidney disease)
- Presence of these finding for greater than three months

Although eGFR falls with aging, it has been clearly demonstrated that it should not fall < 70 ml/min/1.73 m². Based on this, an eGFR < 60 ml/min/1.73 m², irrespective of age, is considered abnormal. However, this does not

imply that everyone with an eGFR < 60 ml/min/1.73 m² requires referral to a Nephrology team.

If CKD has been identified, the next step is to determine its severity. Several international bodies, including the Canadian Society of Nephrology (CSN) have adopted a five stage system to determine severity of CKD as developed by the Kidney Dialysis Outcome Quality Initiative (K-DOQI) in the US.¹ This system classifies patients into stage one to five of the disease, based on the level of their eGFR (Table 1).

Treatment targets for individuals with CKD

Recommended treatment targets can be divided into general and kidney disease specific targets.²

General targets include:

- BP control:
 - $< 130/80$ mmHg ($< 125/75$ mmHg for patients with diabetes)
 - For patients with proteinuric kidney disease (diabetic and non-diabetic), therapy should include an ACE inhibitor and ARB, or both, unless not tolerated by the patient)
- CV risk profile assessment and modification, including smoking cessation
- Diabetes control:
 - Target hemoglobin A1c $< 7\%$
- Vaccinations:
 - Influenza
 - Pneumococcus
- Psycho-social health:
 - Patient
 - Family members

Kidney disease specific targets include:

- Serial eGFR measurements:
 - Provides estimation of disease progression
- Urine testing for proteinuria:
 - Goal of treatment is to get urine protein to < 2 g q.d. to prevent progressive loss of kidney function
- Monitor for the development of complication of kidney disease:
 - Anemia secondary to reduced endogenous erythropoietin production
 - Calcium, phosphate and other metabolic derangements
- Hepatitis B screening plus vaccination if serologically naïve
- Avoidance of nephrotoxic medications or procedures unless absolutely needed:
 - Non-steroidal anti-inflammatory medications, including cox-2 inhibitors
 - Radio-contrast dye
 - Nephrotoxic antibiotics (*i.e.*, aminoglycosides)


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When should I refer to a specialist?

Not all cases of CKD need to be referred to a specialist.³ In fact, if all patients with an impaired eGFR were referred, it would quickly overwhelm the system. With the use of the parameters outlined in various clinical practice guidelines and applying the principles of chronic disease management, primary care providers can manage many patients with CKD.

However, there are times that referral to a specialist should be considered. The CSN has put forward a position paper regarding timeliness of referral to a centre able to provide multidisciplinary kidney care. This was prepared in September 2006 and is available on the CSN webpage.³

Recommendations for referral to a kidney team include:

- Patients with unexplained kidney disease, needing further workup, including consideration of a renal biopsy
- Patients with kidney disease with evidence of systemic involvement (*i.e.*, systemic lupus erythematosus, systemic vasculitis, *etc.*)
- Rapid loss of renal function
- Inability to achieve treatment targets, as outlined in the clinical practice guidelines
- Anticipated requirement for renal replacement therapy (to allow adequate preparation for vascular access for dialysis, or pre-emptive renal transplantation from a living donor) 

Take-home message

- Chronic kidney disease (CKD) is common, severe and treatable
- Treatment success depends on early recognition of CKD and implementation of appropriate therapies
- Populations at high risk for kidney disease should be screened routinely to pick up CKD as early as possible
- The primary care provider can manage many patients with CKD successfully

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