Chronic Kidney Disease (CKD) in Primary Care

Identify, Manage, Refer
1 IDENTIFY risk
- Diabetes
- Hypertension
- Family history of kidney disease
- High-risk ethnic groups—First Nations, African, South Asian, Hispanic
- Vascular disease—prior diagnosis of CVD, Stroke/TIA or PVD
- Multi-system disease with potential kidney involvement (e.g. Systemic Lupus Erythematosus)

2 INVESTIGATE through testing
- Creatinine μmol/L / eGFR mL/min/1.73m²
  - If patient of African descent, multiply eGFR results by 1.159
  - In patients with a new finding of reduced eGFR or a rapid decline in eGFR, exclude causes of acute deterioration (e.g. dehydration, intercurrent illness, nephrotoxins, obstruction), then repeat Creatinine/eGFR after correcting for potential causes of deterioration
- Urine ACR mg/mmol (Albumin to Creatinine Ratio)
  - Preferably 1st am void. At least 2 out of 3 random urine ACRs must be elevated in order to be considered abnormal
- Urinalysis

3 ASSESS test results
Patient presenting with one or more of these test results:
- eGFR < 30
- ACR > 60
- ACR > 30 & age < 70
- ACR ≥ 3 with persistent hematuria
  - Present in 2 of 3 random urines
- eGFR decline
  - Defined as >5ml/min in 6 months

Refer to Nephrology
Include the following information and all test results:
- medical history
- medication list
- recent Creatinine/eGFR results (and previous results if available)
- urea
- electrolytes
- bicarbonate
- calcium
- phosphorous
- albumin
- urinalysis
- urine albumin to creatinine ratio (ACR)
- Order renal ultrasound

Action: Retest eGFR/ACR within 2 weeks
Action: Refer to Nephrology
Action: Manage medically
MANAGE medically

Assess patient for reversible causes of renal failure
- Volume depletion, obstruction, nephrotoxic drugs (NSAIDs, Lithium, Aminoglycosides, Tacrolimus, Cyclosporine, and Contrast Media)

Slow Progression of CKD and Modify Cardiovascular Risk Factors
- BP management
  - Diabetes target < 130/80
  - Non diabetes target < 140/90
  - Use ACEi or ARB as 1st line for CKD and add other agents as required
  - Restrict sodium to < 2 gm/day
    hypertension.ca/en/chep

- ACR management
  - If ACR ≥ 3 in diabetics: start ACEi/ARB as tolerated (even if BP at target)

- Glycemic control
  - Target A1C as per Canadian Diabetes Association Guidelines:
    guidelines.diabetes.ca/fullguidelines

- Lipid control
  - Use statins as per Canadian Cardiovascular Society and Canadian Diabetes Association Guidelines: onlinecjca/article/S0828-282X(12)01510-3/abstract and guidelines.diabetes.ca/fullguidelines

- Lifestyle modification
  - Stop smoking
  - Increase physical activity
  - Manage weight

Medication Considerations and Patient Safety
- Nephrotoxic medications should be avoided or used with caution in patients with any degree of CKD, as indicated by eGFR. Regular monitoring of kidney function is required.
- Contrast media dye poses a risk of acute kidney injury (AKI) in patients with CKD. If procedure is medically necessary, monitor renal function pre and post dye. Cessation of ACEi, ARB, diuretics as well as metformin are recommended prior to procedure.
- Be aware of common drugs excreted by the kidneys that may require renal dose adjustments (Novel Anticoagulants, Antihyperglycemics, Antimicrobials, Antifungals, Antivirals, Opioids, Antihyperlipidemics, Psychotropics and Miscellaneous [gabapentin, digoxin, spironolactone, allopurinal, colchicine, ranitidine, metoclopramide]) and ensure all renally excreted medications are dose adjusted as per Cockcroft Gault equation or use alternative treatment.

Cockcroft Gault Equation
\[
CrCl(\text{mL/min}) = \frac{[(140 – \text{age}) \times \text{weight(kg)} \times 1.2]}{\text{SCr(µmol/L)}}
\]
For women, multiply the result by 0.85

- Patients with CKD are at risk of AKI with volume depletion (e.g., severe nausea, vomiting and diarrhea lasting > 24 hours). If unable to maintain adequate fluid intake during an illness, withholding medications is recommended based on the acronym SADMANS: S (sulfonylureas), A (ACEi), D (diuretics, direct renin inhibitors), M (Metformin), A (ARB), N (NSAIDs), S (SGLT2 inhibitors)
  guidelines.diabetes.ca/Browse/Appendices/Appendix7
Definition of Kidney Disease
Kidney Disease Improving Global Outcomes (KDIGO) defines CKD as abnormalities of kidney structure or function, present for > 3 months, with implications for health.

Criteria for CKD are any of the following present for > 3 months:
- Albuminuria ACR ≥ 3mg/mmol
- Urine sediment abnormalities (e.g. RBC casts, RBCs, WBC casts and WBCs)
- Electrolyte and other abnormalities due to tubular disorders
- Abnormalities detected by histology
- Structural abnormalities detected by imaging
- History of kidney transplantation
- eGFR < 60 mL/min/1.73m²

Interpret eGFR with caution
- High or low muscle mass (athletes, malnourished, paraplegics)
- Specific diets with unusually high or low protein, such as high dietary creatine intake (creatine supplements)

Interpreting ACR
- Albumin or protein in the urine is a marker of both progression of kidney disease and increased risk of CV events
- A random urine ACR is preferred (vs. 24 hour) to detect proteinuria (ideally first morning void)
- ACR ≥ 3.0 mg/mmol is clinically significant

Important information regarding eGFR
- eGFR will automatically be reported on all Adult (≥ 18 yrs) outpatient Creatinines (except emergency and renal dialysis units)
- eGFR will be calculated using the CKD-EPI equation, multiply the eGFR results by 1.159 if patient is of African descent
- eGFR results greater than 90 will be reported as > 90
- CKD-EPI eGFR has not been extensively validated for drug dosing

CKD Clinical Decision Support Tools
Chronic Kidney Disease (CKD) Clinical Pathway, University of Calgary:
ckdpathway.ca
Kidney Wise Toolkit: Identification, Detection and Management of CKD, Ontario Renal Network (ORN) kidneywise.ca

Prognosis of CKD by GFR and Albuminuria Catagories: KDIGO 2012
Persistent albuminuria categories

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<th>GFR categories (mL/min/1.73m²)</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
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<tr>
<td>&lt; 3mg/mmol</td>
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<td>3– 30 mg/mmol</td>
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<tr>
<td>&gt;30 mg/mmol</td>
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Adapted from:
kdigo.org/clinical_practice_guidelines/pdf/CKD/KDIGO_2012_CKD_GL.pdf

Acknowledgements
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Disclaimer
This algorithm is intended as a guide only and cannot replace clinical judgment. The recommendations may be inappropriate for specific clinical situations. When in doubt, please consult a Nephrologist.

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