Online clinical pathway for chronic kidney disease (CKD) in primary care

November 24th, 2014
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University of Calgary
Outline

• Background
• Diagnosis, medical management and referral
• Experience the online CKD clinical pathway
Faculty/Presenter Disclosure

• Faculty:
  Dr. Wes Jackson

• Relationships with commercial interests:
  None
Disclosure of Commercial Support

• This program has received financial support from CIHR, AIHS and the Northern and Southern Alberta Renal Programs in the form of a research grant

• This program has received in-kind support from the Interdisciplinary Chronic Disease Collaboration (ICDC) in the form of personnel support for development and dissemination of the clinical pathway

• **Potential for conflict(s) of interest:**
  There are no potential conflicts of interest to report
Mitigating Potential Bias

- No potential bias
Background

• The majority of patients with CKD in Alberta are cared for by primary care providers:

Background

Renal disease
Chronic renal insufficiency
Pre-uremic
Advanced renal insufficiency
Mild renal insufficiency
Renal dysfunction
Decreased renal function
Severe renal insufficiency
Pre-end stage renal disease
Moderate chronic renal insufficiency
Why a clinical pathway?

• Coordination & continuity of care enhanced
• Increase clinic efficiency
• Improve patient safety
• Increase team function
Background

- Enhance patient care
- Integrate into clinical care
- Harmonize with other Canadian CPGs
- Practical
- Feasible
- Pathway Characteristics
- Target primary care

Primary Care Physicians
Who to test?

Targeted for individuals of increased risk of CKD:

- Hypertension
- Diabetes Mellitus
- Family hx of Stage 5 CKD or hereditary kidney dz
- Vascular disease (CVD, stroke/TIA or PVD)
- Multisystem disease with potential kidney involvement (SLE)
Recommended tests:

- **eGFR** (estimate glomerular filtration rate)
- Urine:
  - ✓ Random Urine ACR (albumin:creatinine ratio)
  - ✓ Urinalysis for hematuria
How to test?

• Repeat eGFR, random urine ACR (albumin:creatinine ratio) and urinalysis if not tested in the prior 6 months

  – A **new finding** of reduced eGFR may be due to reversible causes (e.g. acute kidney injury, or initiation of ACEi/ARB therapy)

• If **previous finding** of abnormal eGFR and ACR in the past 6 months, you do not have re-test
How frequent to test?

- eGFR (estimate glomerular filtration rate)
- Random Urine ACR (albumin:creatinine ratio)
- Urinalysis for hematuria

- **Every year** for hypertension and diabetes
- Every 2 years for all others
How to diagnose CKD?

Either of the following present for >3 months:

• Markers of kidney damage:
  Albuminuria (ACR ≥3 mg/mmol)

  OR

• Decreased eGFR:
  eGFR <60 mL/min/1.73 m²
Is eGFR always accurate?

- eGFR may be less reliable in:
  - individuals with near normal GFR (>50 ml/min/1.73m²)
  - individuals with markedly abnormal body composition:
    - extreme obesity
    - cachexia
    - paralysis
    - amputations

- Controversies exist as to the applicability of these formulae to various ethnic groups and the very elderly.
Should I repeat eGFR?

Serial eGFR:

• Decisions about diagnosis, management or referral should not be made based on a single measurement

• In a primary care setting, many patients will show improvement or normalization of kidney function upon repeat testing

• The diagnosis of CKD is based on serial measurements of kidney function
What eGFR reading constitutes a diagnosis of CKD?

<table>
<thead>
<tr>
<th>eGFR category</th>
<th>eGFR (mL/min/1.73 m²)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>&gt;90</td>
<td>Normal or high</td>
</tr>
<tr>
<td>G2</td>
<td>60-89</td>
<td>Mildly decreased</td>
</tr>
<tr>
<td>G3a</td>
<td>45–59</td>
<td>Mildly to moderately decreased (CKD)</td>
</tr>
<tr>
<td>G3b</td>
<td>30–44</td>
<td>Moderately to severely decreased (CKD)</td>
</tr>
<tr>
<td>G4</td>
<td>15–29</td>
<td>Severely decreased (CKD)</td>
</tr>
<tr>
<td>G5</td>
<td>&lt;15</td>
<td>Kidney failure (CKD)</td>
</tr>
</tbody>
</table>
Is it just about eGFR?

- Should also assess albuminuria - marker of kidney injury
- 24 hour urines are no longer recommended
- Urine dipsticks are affected by hydration status
- Quantify protein excretion with random urine for:
  - Urine albumin to creatinine ratio
How is ACR categorized?

<table>
<thead>
<tr>
<th>Category</th>
<th>ACR (Approximate equivalent) (mg/mmol)</th>
<th>Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>&lt;3</td>
<td>Normal to mildly increased</td>
</tr>
<tr>
<td>A2</td>
<td>3-30</td>
<td>Moderately increased</td>
</tr>
<tr>
<td>A3</td>
<td>&gt;30</td>
<td>Severely increased</td>
</tr>
</tbody>
</table>

Abbreviations: ACR, albumin:creatinine ratio

* Note that where albuminuria measurement is not available, urine reagent strip results can be substituted.
How do I determine cause of CKD?

- Identify reversible causes of kidney disease
- History & physical examination
- Urine dipstick and quantification of albuminuria
- Serial creatinine measurements
- Ultrasound of abdomen as clinically indicated
How can I predict prognosis?

### Prognosis of CKD by GFR and Albuminuria Categories: KDIGO 2012

<table>
<thead>
<tr>
<th>GFR categories (ml/min/1.73 m²) Description and range</th>
<th>Persistent albuminuria categories Description and range</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1 Normal or high</td>
<td>Normal to mildly increased</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G2 Mildly decreased</td>
<td>Moderately increased</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G3a Mildly to moderately decreased</td>
<td>Severe increased</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G3b Moderately to severely decreased</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G4 Severely decreased</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G5 Kidney failure</td>
<td></td>
<td></td>
<td></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.
Where can I find more detailed information?

Evidence based recommendations from:

- Kidney Disease Improving Global Outcomes (KDIGO)
- Canadian Cardiovascular Society (CCS)
- Canadian Diabetes Association (CDA)
- Canadian Hypertension Education Program (CHEP)
- Canadian Society of Nephrology (CSN)
Case: Helen
68 year old retired teacher

PMHX:
- Type 2 DM
- Hypertension
- Anxiety
- OA
- Dyslipidemia

Medications:
- HCTZ 12.5 mg od
- Amlodipine 5 mg od
- Metformin 500 mg TID

BP: 149/84 mmHG
Diagnosis

About Who & How to Test

Who to Test

Testing for CKD should not be universal, but should be targeted for individuals at increased risk of developing CKD:

- Hypertension
- Diabetes Mellitus

- Family history of Stage 5 CKD or hereditary kidney disease
- Vascular disease (prior diagnosis of CVD, stroke/TIA or PVD)
- Multisystem disease with potential kidney involvement (e.g. SLE)

How to Test

For accurate diagnosis, retest eGFR, random urine ACR (albumin:creatinine ratio) and Urinalysis if not tested in the prior 6 months.

In patients with a new finding of reduced eGFR, repeat eGFR to exclude causes of acute deterioration of eGFR (e.g. acute kidney injury, or initiation of ACEI or ARB therapy).

In patients with a previous finding of an abnormal eGFR and ACR in the past 6 months, you do not have to re-test.

Recommended Tests

- eGFR (estimate glomerular filtration rate)
- Random Urine ACR (albumin:creatinine ratio)
- Urinalysis for hematuria
Diagnose

Creatinine / ACR result

eGFR < 60; ACR > 3 mg/mmol

note on lab report / EMR about potential for CKD

hyperlink to the web-based tool / clinical pathway
Diagnose

Lab prompt & hyperlink

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose, Random</td>
<td>4.5 mmol/L</td>
<td>3.3-11.0</td>
</tr>
<tr>
<td>Sodium</td>
<td>142 mmol/L</td>
<td>133-145</td>
</tr>
<tr>
<td>Potassium</td>
<td>4.5 mmol/L</td>
<td>3.3-5.1</td>
</tr>
<tr>
<td>Chloride</td>
<td>1.08 mmol/L</td>
<td>98-111</td>
</tr>
<tr>
<td>Carbon Dioxide Content</td>
<td>22 mmol/L</td>
<td>21-31</td>
</tr>
<tr>
<td>Creatinine</td>
<td>206 umol/L</td>
<td>50-120</td>
</tr>
</tbody>
</table>

2014-07-09 09:10 MDT Estimated GFR:
This patient may have chronic kidney disease (CKD). Please refer to www.diagnoseckd.ca for management and referral.

Chronic kidney disease is defined by GFR < 60 mL/min/1.73m² or urine albumin-creatinine ratio > 3 mg/mmol for more than 3 months (see www.AKDN.info).
Case: Helen
68 year old retired teacher

Labs:
• eGFR = 42 ml/min/1.73m²
• ACR = 38 mg/mmol
Diagnose CKD

The Chronic Kidney Disease (CKD) Clinical Pathway is a resource for primary care providers to aid in the diagnosis, medical management, and referral of adults with CKD.

Your patient has CKD

The following is recommended:

- **Medical Management**

Investigations for causes of CKD
Medical Management

Sodium Foods

Many foods contain sodium (salt). Ask your dietician how you can limit foods high in sodium.

Choose

These foods are low in sodium.

- Hot cereal with no added salt
- Cold cereal
- Rice
- Bread
- Pasta
- Homemade muffins without salt
- Fresh meat, poultry, or fish
- Canned tuna or salmon, rinsed
- Hard cheese (cheddar, mozzarella, marble, Swiss)
- Crackers, unsalted
- Homemade soups, unsalted
- Fresh fruit
- Pasta sauce, canned tomatoes, and tomato juice with no added salt
- Fresh, frozen or canned vegetables with no added salt
- Herbs and spices
- Vinegar
- Lemon, lime
- Homemade gravies and sauces, unsalted
- Popcorn, unsalted

Limit

These foods have some sodium. Limit them to the amounts listed below.

- Salad dressings (1 Tbsp/15 mL per day)
- Condiments (ketchup, mustard, relish) (1 Tbsp/15 mL per day)
Medical Management

Living with Kidney Disease: What You Can Do to Manage Your Condition

Tips for Managing Your Kidney Disease

1. Choose and prepare foods with less salt.
   - To help control your blood pressure—aim for less than 2,000mg of sodium per day (equates 1 level teaspoon of salt).
   - Buy fresh, unprocessed food.
   - Do not add salt to your food at the table.
   - Do not use salt substitutes when cooking.
   - Use spices and herbs in place of salt.
   - Choose fresh and frozen food over canned food.
   - Rinse canned foods before eating them.

2. Choose foods that are healthy for your heart.
   - To help keep fat from building up in your blood vessels.
   - Grill, broil, bake, roast or stir-fry foods instead of frying.
   - Trim fat from meat and remove skin from poultry before eating.

3. Be physically active.
   - To improve blood pressure, blood sugar and blood cholesterol.
   - Make exercise a regular part of your life.
   - Aim for 30 minutes of activity 5 times per week.

4. Maintain a healthy weight.
   - To protect your kidneys.
   - Being overweight makes your kidneys work harder.
   - Losing weight helps kidneys last longer.
   - Maintain a healthy weight (Body Mass Index (BMI) between 18.5 to 25).

5. Quit smoking.
   - Cigarette smoking can make kidney damage worse.

6. If you have diabetes, control your blood glucose levels.
   - A1C below 7%.
   - Good blood glucose control may help prevent or delay diabetes complications and kidney disease.

For more information, visit the Kidney Foundation of Canada.

Your Next Appointment:

Date: _____________________________
Time: _____________________________
Location: __________________________
Other Notes/Goals: __________________________

Sept 15, 2014
Case: Helen
68 year old retired teacher

**PMHX:**
- Type 2 DM
- Hypertension
- Anxiety
- OA
- Dyslipidemia

**Meds:**
- HCTZ 12.5 mg od
- Amlodipine 5 mg od
- Metformin 500 mg TID

**BP:** 149/84 mmHg
# Medical Management

## Prescribing Information

**Diabetes**
- Prescribe statin unless contraindicated.

**No Diabetes**
- **Age > 50**: Prescribe statin unless contraindicated.
- **Age 18 – 49**:
  - Prescribe statin if no contraindications and if any one of the following:
    - Known coronary disease (myocardial infarction or coronary revascularization).
    - Prior ischemic stroke.
    - Estimated 10-year incidence of coronary death or non-fatal MI >10%. (Calculate your Patient’s Framingham Risk Score)

## Dosage

<table>
<thead>
<tr>
<th>Statin</th>
<th>eGFR &lt; 60 mL/min/1.73 m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lovastatin</td>
<td>Not studied</td>
</tr>
<tr>
<td>Fluvastatin</td>
<td>80 mg</td>
</tr>
<tr>
<td>Atorvastatin</td>
<td>20 mg</td>
</tr>
<tr>
<td>Rosuvastatin</td>
<td>10 mg</td>
</tr>
<tr>
<td>Simvastatin/ezetimibe</td>
<td>20 mg/10 mg</td>
</tr>
<tr>
<td>Pravastatin</td>
<td>40 mg</td>
</tr>
<tr>
<td>Simvastatin</td>
<td>40 mg</td>
</tr>
</tbody>
</table>

*Recommended doses (mg/d) of statins in adults with CKD*

## Other Considerations

- **Management of elevated serum potassium (PDF)**
- **Potassium Food Handout (PDF)**
- **Drugs that may raise potassium (PDF)**

**Common drugs that may have nephrotoxic effects**

**Common drugs that may require renal dose adjustments**

**Sick day Medication List**

## Contraindications

- Active liver disease, high alcohol consumption or pregnancy.
- Women with childbearing potential should only use statin if there is reliable contraception.
# Medical Management

## Drug Therapy

### Antiplatelet

<table>
<thead>
<tr>
<th>Prescribing Information</th>
<th>Diabetes</th>
<th>No Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dosage</strong></td>
<td>81 mg</td>
<td></td>
</tr>
<tr>
<td><strong>Contraindications</strong></td>
<td>History of ASA induced GI bleed.</td>
<td></td>
</tr>
<tr>
<td><strong>General Information</strong></td>
<td>Low dose ASA for secondary prevention only.</td>
<td></td>
</tr>
</tbody>
</table>

Low dose ASA (81mg) may be used for secondary prevention in patients with established vascular disease:
- Acute coronary syndrome
- Prior MI or coronary revascularization
- Prior stroke or TIA
- PVD (high risk patients with low bleeding risk).

### Other Considerations

- [Management of elevated serum potassium](#)
- [Potassium Food Handout](#)
- [Drugs that may raise potassium](#)

- Common drugs that may have nephrotoxic effects
- Common drugs that may require renal dose adjustments

- [Sick day Medication List](#)
### Medical Management

<table>
<thead>
<tr>
<th>eGFR (mL/min/1.73m²)</th>
<th>Safe</th>
<th>Caution</th>
<th>Stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 60</td>
<td>All agents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30–59</td>
<td>acarbose</td>
<td>metformin</td>
<td>liraglutide (eGFR &lt; 50)</td>
</tr>
<tr>
<td></td>
<td>linagliptin</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>gliclazide</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>glimepiride</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>repaglinide</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>thiazolidinediones</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15–29</td>
<td>linagliptin</td>
<td>saxaglaptin (2.5 mg)</td>
<td>metformin</td>
</tr>
<tr>
<td></td>
<td>repaglinide</td>
<td>sitaglaptin (25 mg)</td>
<td>exenatide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>gliclazide</td>
<td>liraglutide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>glimepiride</td>
<td>glyburide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>thiazolidinediones</td>
<td>acarbose</td>
</tr>
<tr>
<td>&lt; 15</td>
<td>repaglinide</td>
<td>linagliptin</td>
<td>saxaglaptin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sitaglaptin (25 mg)</td>
<td>gliclazide</td>
</tr>
<tr>
<td></td>
<td></td>
<td>thiazolidinediones</td>
<td></td>
</tr>
</tbody>
</table>
## Medical Management

### Anti-diabetic drugs

#### Biguanide

- Use with caution in patients with eGFR < 60 mL/min/1.73m²
- Avoid in patients with eGFR < 30 mL/min/1.73m²
  - Metformin may be used in certain circumstances if eGFR is 20–29 mL/min/1.73m², but requires very close monitoring of serum bicarbonate levels to detect acidosis

When deciding which agent to add to metformin, consideration should be given to a number of factors including effectiveness in blood glucose lowering, degree of hyperglycemia, kidney function, and risk of hypoglycemia.

<table>
<thead>
<tr>
<th>Normal dose range</th>
<th>eGFR (mL/min/1.73m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt; 50</td>
</tr>
<tr>
<td></td>
<td>30–50</td>
</tr>
<tr>
<td></td>
<td>&lt; 30</td>
</tr>
<tr>
<td>Metformin</td>
<td>500–1000 mg PO BID-TID (max 2500 mg/day)</td>
</tr>
<tr>
<td></td>
<td>Use with caution with eGFR less than 60 mL/min; dose reductions may be necessary</td>
</tr>
</tbody>
</table>
Case: Helen
68 year old retired teacher

- Ramipril 5 mg daily started
- Potassium increase from 4.9 mmol/L to 5.2 mmol/L
# Medical Management

## Management of Elevated Serum Potassium

### Potassium

5.5 - 6.2 mmol/L

### Acute management

- Stop ACEI, ARB or other drugs that may raise potassium
- Low potassium diet (patient handout)
- Consider reserpin (30g) and lactulose (30cc) 1 - 2 doses

### Re-check potassium in 1-2 weeks

### Normal

If potassium normalizes, consider restarting ACEI, ARB or other drugs at reduced dose

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## Potassium Foods

Ask your dietitian how many servings of potassium foods you should have from each group.

### Low potassium foods

Serving sizes are 1/2 cup or 1 medium unless another amount is listed.

<table>
<thead>
<tr>
<th>Fruit</th>
<th>1/2 cup</th>
<th>1 medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apricots</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Berries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cherries</td>
<td>(10)</td>
<td></td>
</tr>
<tr>
<td>Grapes</td>
<td>(20)</td>
<td></td>
</tr>
<tr>
<td>Mango</td>
<td>(½)</td>
<td></td>
</tr>
<tr>
<td>Mandarin orange</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peach</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pineapple</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pomegranate</td>
<td>(½ raw, ½ cup or 60 mL juice)</td>
<td></td>
</tr>
<tr>
<td>Prunes</td>
<td>(3 dried or canned)</td>
<td></td>
</tr>
<tr>
<td>Watermelon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beans</td>
<td>(green, yellow)</td>
<td></td>
</tr>
<tr>
<td>Broccoli</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cabbage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cauliflower</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Celery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cucumber</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eggplant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garlic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lettuce</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mushrooms</td>
<td>(3 raw or cooked, 1/2 cup canned)</td>
<td></td>
</tr>
<tr>
<td>Onion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peppers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potato</td>
<td>(peeled, cut into small pieces, then boiled)</td>
<td></td>
</tr>
<tr>
<td>Tomato</td>
<td>(½ raw, 2 Tbsp ketchup, ⅛ cup/80 mL sauce)</td>
<td></td>
</tr>
<tr>
<td>Turnip</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zucchini</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Case: Helen – 1 year later
69 year old retired teacher

Labs:

• eGFR = 46 ml/min/1.73m²

• ACR = 70 mg/mmol
The Chronic Kidney Disease (CKD) Clinical Pathway is a resource for primary care providers to aid in the diagnosis, management, and referral of adults with CKD.

Your patient has CKD

The following is recommended:

- **Medical Management**
- **Referral to a nephrologist**

Investigations for causes of CKD
# Referral

## Routine Referral

Recommended for any one of the following:

- eGFR < 30 mL/min/1.73m², irrespective of albuminuria or hematuria.
- Persistent albuminuria (ACR > 60 mg/mmol), irrespective of hematuria.
- Hematuria sustained and not readily explained by a urinary tract source with:
  - Persistent albuminuria (ACR 3 – 60 mg/mmol) irrespective of eGFR
  - or -
  - eGFR < 60 mL/min/1.73m²
- An unexplained, progressive decline in GFR that occurs over 6 months, continuous for 3 weeks (ACEI or ARBs can cause a reversible reduction in eGFR when initiated).

## Urgent Referral

Recommended for any one of the following:

- Rapid decline in eGFR over days to weeks.
- eGFR declining over weeks to months PLUS hematuria and/or albuminuria.
- eGFR < 15 mL/min/1.73m²
- Acute nephrotic syndrome (ACR > 180 mg/mmol or proteinuria > 3g/d)
- Suspected vasculitis / autoimmune disease in the setting of hematuria and/or albuminuria.

## Emergent Referral

Recommended for any one of the following:

- New diagnosis of eGFR < 10 mL/min/1.73m²
- Life threatening uremic symptoms (marked hyperkalemia > 6.5)

If you are concerned about a patient that does not fall within these categories contact the nephrology group in your area.

### Referral Form (PDF)

Specific tests / investigations required with referral:

- Recent serum creatinine / eGFR (including multiple

Referral

Specific tests / investigations required to enable triage:

- Recent serum creatinine / eGFR (including multiple measurements over previous years)
- Recent routine urinalysis
- Recent random urine albumin/creatinine ratio (ACR) (for known diabetic patients or those patients with eGFR < 60 mL/min/1.73m²)
Elements of a good referral:

- Clinical question (what do you want)
- Past medical history
- Medication list
- **Serial** creatinine measurements
- Urinalysis
- Quantification of albuminuria
- Ultrasound only if clinically indicated
The Chronic Kidney Disease (CKD) Clinical Pathway is a resource for primary care providers to aid in the diagnosis, management, and referral of adults with CKD.

Your patient has CKD

Date: September 25, 2014 12:14

The following is recommended:

- Medical Management
- Referral to a nephrologist

Investigations for causes of CKD
Case: Helen
69 year old retired teacher

**PMHX:**
- Type 2 DM
- Hypertension
- Anxiety
- OA
- **Dyslipidemia**

**Meds:**
- HCTZ 12.5 mg od
- Amlodipine 5 mg od
- Metformin 500 mg TID
- Ibuprofen

**BP** – 125/80 mmHG
Medical Management

Framingham Calculator

- Gender: Male
- Age: 55-59
- Diabetes: Yes
- Smoker: Yes
- HDL-C (mmol/L): 0.9-1.19
- Total Cholesterol (mmol/L): 4.1-5.2
- Systolic BP (mmHg): 120-129
- Is blood pressure being treated with medications?: Yes

10-year CVD Risk Score = 15.9%
Medical Management

LDLc monitoring is not recommended:

- The "treat-to-target" strategy has not been proven beneficial in any clinical trials.
- Escalation of statin dose based on lipid levels is not recommended because the safety of high dose statins is unknown in CKD patients and they are at higher risk of adverse effects.
- Association between LDLc and clinical outcomes is weaker in CKD patients so does not reliably predict prognosis.
- Use "treat-and-forget" strategy with statin doses known to be safe in CKD population.
Case: Helen
69 year old retired teacher

- Meds:
  - HCTZ 12.5 mg od
  - Amlodipine 5 mg od
  - Metformin 500 mg TID
  - Ramipril 5 mg od
  - Ibuprofen

- BP: 125/80 mmHG

- PMHX:
  - Type 2 DM
  - Hypertension
  - Anxiety
  - OA
  - Dyslipidemia

NSAIDs and COX-2 inhibitors

### Nephrotoxic Effects
- Altered intraglomerular hemodynamics resulting in acute kidney injury (AKI)
- Acute or chronic interstitial nephritis
- Glomerulonephritis

### Management
- Avoid in patients with eGFR less than 30 mL/min/1.73m²
- Avoid long term use
- Use alternative agents that are less likely to cause nephrotoxicity such as acetaminophen or certain opioids
3 Key Messages
1. Who should be tested?

- Hypertension
- Diabetes Mellitus
- Family hx Stage 5 CKD or hereditary kidney dz
- Vascular disease (CVD, stroke/TIA or PVD)
- Multisystem disease with potential kidney involvement (SLE)
2. What tests should be ordered?

- eGFR to assess kidney function
- Random urine ACR to assess for significant persistent albuminuria
- Urinalysis to assess hematuria
3. What do you do with the results?

Go to www.ckdpathway.ca to determine medical management and referral.
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Questions

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