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

February 27, 2015
Dr. Kerry McBrien
University of Calgary
Faculty/Presenter Disclosure

• Faculty: Kerry McBrien

• Relationships with commercial interests:
  – Grants/Research Support: Not applicable
  – Speakers Bureau/Honoraria: Not applicable
  – Consulting Fees: Not applicable
  – Other: Not applicable
OUTLINE

Background

Diagnosis, medical management and referral

Experience the online CKD clinical pathway
BACKGROUND

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

Severe renal insufficiency

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
“Nearly two-thirds (62%) of publications cited to support primary care recommendations were of uncertain relevance to patients in primary care.”

referring to National Institute for Health and Care Excellence (NICE) guidelines published 2010-2011

WHY A CLINICAL PATHWAY?

- Enhance coordination & continuity of care
- Increase clinic efficiency
- Improve patient safety
- Increase team function
Pathway Characteristics

Practical
Integrate into clinical care
Feasible

Enhance patient care
Harmonize with other Canadian CPGs
Target primary care

Primary Care Physicians
CKD – the guidelines applied to primary care
WHO TO TEST?

Target individuals at 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 (estimated glomerular filtration rate)
- Urine:
  - Random Urine ACR (albumin:creatinine ratio)
  - Urinalysis for hematuria
HOW OFTEN TO TEST?

eGFR, ACR, and urinalysis

Every year for hypertension and diabetes
Every 2 years for all others
HOW TO TEST?

- eGFR, ACR and urinalysis
- If abnormal – repeat abnormal test

- A new finding of reduced eGFR may be due to reversible causes (e.g. acute kidney injury, dehydration, or initiation of ACEi/ARB therapy)
- Rule out rapid deterioration
- Do not need to repeat if prior abnormal within 6 months and stable
WHY REPEAT 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.
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
It’s not just about eGFR

**Albuminuria** must be assessed - 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 - **ACR**
HOW TO DIAGNOSE CKD?

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

Decreased eGFR:
• eGFR <60 mL/min/1.73 m²

OR

>3 months

CKD

Urinalysis for hematuria further stratifies risk
## eGFR Measurement and Severity 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>
# 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>

*Note that where albuminuria measurement is not available, urinalysis results can be substituted.*

Abbreviations: ACR, albumin:creatinine ratio
**HOW CAN I PREDICT PROGNOSIS?**

<table>
<thead>
<tr>
<th>Prognosis of CKD by GFR and Albuminuria Categories: KDIGO 2012</th>
<th>Persistent albuminuria categories Description and range</th>
</tr>
</thead>
<tbody>
<tr>
<td>GFR categories (ml/min/1.73 m²) Description and range</td>
<td>A1</td>
</tr>
<tr>
<td>G1 Normal or high</td>
<td>≥90</td>
</tr>
<tr>
<td>G2 Mildly decreased</td>
<td>60-89</td>
</tr>
<tr>
<td>G3a Mildly to moderately decreased</td>
<td>45-59</td>
</tr>
<tr>
<td>G3b Moderately to severely decreased</td>
<td>30-44</td>
</tr>
<tr>
<td>G4 Severely decreased</td>
<td>15-29</td>
</tr>
<tr>
<td>G5 Kidney failure</td>
<td>&lt;15</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
### 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
Coming soon...

Lab prompt & hyperlink

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

| Glucose, Random | 4.5 mmol/L | 3.3-11.0 |
| Sodium          | 142 mmol/L | 133-145  |
| Potassium       | 4.5 mmol/L | 3.3-5.1  |
| Chloride        | 108 mmol/L | 98-111   |
| Carbon Dioxide Content | 22 mmol/L | 21-31    |
| Creatinine      | 206 mmol/L | 50-120   |
| Estimated GFR   | 52 * mL/min/1.73m² |  

2014-07-09 09:10 MDT Estimated GFR:
This patient may have chronic kidney disease (CKD). Please refer to www.diagnosticsckd.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
- Urinalysis = negative for hematuria
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.

Diagnose CKD
Enter the most recent lab values:

- **eGFR**: eGFR 30 - 60 mL/min/1.73m²
- **ACR**: ACR 3-60 mg/mmol
- **Hematuria**: Negative

**Your patient has CKD**

The following is recommended:

- Medical Management

Investigations for causes of CKD
**Sodium Foods**

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

### Choose

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

- Exercise 30 minutes, 5 times per week
- Achieve a healthy BMI (18.5 - 25)
- Smoking cessation
- Adequate fluid intake; Fluid restriction is not recommended for patients
- Healthy diet: low sodium diet (2000mg/day)

Tips for Managing your Kidney Disease

1. Choose and prepare foods with less salt
   - To help control your blood pressure – aim for less than 2000mg of sodium/day (equals 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
   - 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 kidney complications and kidney disease.

For more information, visit the Kidney Foundation of Canada website.

Drug Therapy

- ACEI/ARB
- Statins
- A2 blockers

Prescribing Information

- Diabetes
  - Prescribe an ACEI or ARB unless contraindicated.

Dosage

- Titrated to maximum tolerable

Contraindications

- Pregnancy
- Women with childbearing potential
- ACEI or ARB if there is a history of kidney disease

General Information

- Check potassium and eGFR at least every 6 months
- Check blood pressure at least twice a week
- Take your medication as prescribed at the same time each day
- Do not skip doses or stop taking medication without checking with your doctor

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

<table>
<thead>
<tr>
<th>Drug Information</th>
<th>ACEi/ARB</th>
<th>Statins</th>
<th>Antiplatelet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>Prescribe an ACEi or ARB unless contraindicated.</td>
<td>Prescribe a statin if evidence of cardiomyopathy.</td>
<td>Prescribe an antiplatelet if there is evidence of cardiovascular disease.</td>
</tr>
<tr>
<td>No Diabetes</td>
<td>Prescribe an ACEi or ARB if systolic blood pressure &gt; 130 mmHg.</td>
<td>Prescribe a statin if there is evidence of dyslipidemia.</td>
<td>Prescribe an antiplatelet if there is evidence of cardiovascular disease.</td>
</tr>
</tbody>
</table>

### Dosage

- Titrate to maximum tolerated dose.

### Contraindications

- Pregnancy
- Women with childbearing potential should avoid the use of ACEi or ARB if there is no reliable contraception.

### General Information

- Check potassium and eGFR within 2 weeks of starting or dose changes.
- Combined therapy of ACEi and ARB is not recommended.
- ACEi or ARBs can cause a reversible reduction in eGFR when treatment is initiated (approximately 25%): if the reduction in eGFR exceeds 25% below the baseline value, stop ACEi or ARB. If the reduction in eGFR is 5 to 25%, re-check in 2-3 weeks to exclude further deterioration.
- Increases in serum potassium of up to 0.5 mmol/L can be expected with ACEi or ARB use.
- ACEi or ARBs can be safely used at all stages of CKD and should not be deliberately avoided with reduced eGFR.
- Assess for baseline cough, if bothersome cough with ACEi consider switching to ARB.
- Check the potassium and eGFR in times of acute illness, particularly influenza and diarrheal illness.

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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
# Medical Management

## Prescribing Information

<table>
<thead>
<tr>
<th>Diabetes</th>
<th>No Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribe statin unless contraindicated.</td>
<td>Age &gt; 50: Prescribe statin unless contraindicated. Age 18 – 49: Prescribe statin if no contraindications and if any one of the following:</td>
</tr>
<tr>
<td>Known coronary disease (myocardial infarction or coronary revascularization).</td>
<td>Prior ischemic stroke.</td>
</tr>
</tbody>
</table>

## Dosage

<table>
<thead>
<tr>
<th>Statin</th>
<th>eGFR &lt; 60 mL/min/1.73m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowstatin</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/kg) of statins in adults with CKD:

## 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

<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>

**Other Considerations**

- Management of elevated serum potassium (PDFs)
- 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
## Medical Management

### Common drugs that may require renal dose adjustments

#### Anti-diabetic drugs

<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, linagliptin, gliclazide, glimepiride, repaglinide, thiazolidinediones</td>
<td>metformin, saxagliptin (2.5 mg), sitagliptin (50 mg), exenatide, liraglutide, glyburide</td>
<td>liraglutide (eGFR &lt; 50)</td>
</tr>
<tr>
<td>15–29</td>
<td>linagliptin, repaglinide</td>
<td>saxagliptin (2.5 mg), sitagliptin (25 mg), gliclazide, glimepiride, thiazolidinediones</td>
<td>metformin, exenatide, liraglutide, glyburide, acarbose</td>
</tr>
<tr>
<td>&lt; 15</td>
<td>repaglinide</td>
<td>linagliptin, sitagliptin (25 mg), thiazolidinediones</td>
<td>saxagliptin, gliclazide</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><strong>Metformin</strong></td>
<td></td>
</tr>
<tr>
<td>500–1000 mg PO BID-TID (max 2500 mg/day)</td>
<td>100%</td>
</tr>
</tbody>
</table>
CASE: HELEN
68 YEAR OLD RETIRED TEACHER

Ramipril 5 mg daily started

Potassium increased

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 resinum (30g) and lactulose (86cc) 1-2 doses

Re-check potassium in 1-2 weeks

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

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

Low potassium foods
Serving sizes are ½ cup or 1 medium unless another amount is listed.

Apple
Apricots (2 raw, 1 canned)
Berries (strawberries, blueberries, blackberries, raspberries)
Cherries (10)
Grapes (20)
Lemon, lime

Mango (%)
Mandarin orange, tangerine
Peach
Pear
Pineapple
Plum
Pomegranate (½ raw, ¼ cup or 60 mL juice)

Prunes (3 dried or canned)
Watermelon
Beans (green, yellow)
Broccoli
Cabbage
Carrot
Cauliflower

Celery
Corn
Cucumber
Eggplant
Garlic
Leeks
Lettuce

Mushrooms (3 raw or cooked, ½ cup canned)
Onion
Peas
Peppers
Potato (peeled, cut into small pieces, then boiled)

Tomato (½ raw, 2 Tbsp ketchup, ¼ cup/60 mL sauce)
Turnip
Zucchini
### MEDICAL MANAGEMENT

**Framingham Calculator**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
</tr>
<tr>
<td>Age</td>
<td>55-59</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Yes</td>
</tr>
<tr>
<td>Smoker</td>
<td>Yes</td>
</tr>
<tr>
<td>HDL-C (mmol/L)</td>
<td>0.9-1.19</td>
</tr>
<tr>
<td>Total Cholesterol (mmol/L)</td>
<td>4.1-5.2</td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
<td>120-129</td>
</tr>
</tbody>
</table>

**Is blood pressure being treated with medications?**

- Yes
- No

**10-year CVD Risk Score = 15.9%**
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.

LDLc not required at baseline or during follow-up unless patient develops symptoms suggestive of myopathy.
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.

**Diagnose CKD**
Enter the most recent lab values:

- **eGFR**: eGFR 30 - 60 mL/min/1.73m² (✓)
- **ACR**: ACR ≥60 mg/mmol (✓)
- **Hematuria**: Negative (✓)

**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
  - eGFR < 60 mL/min/1.73m²
- An unexplained, progressive decline in eGFR that occurs over 6 months, continuing for 8 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)

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

For specific tests / investigations required with referral:
- Recent serum creatinine / eGFR (including multiple)
- Recent random urine albumin/creatinine ratio (ACR) for known diabetic patients or those patients with eGFR < 60 mL/min/1.73m².

[Referral Form](http://departmentofmedicine.com/mas/documents/mas_form_interactive.pdf)
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 complete 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

The following is recommended:

- Medical Management
- Referral to a nephrologist

Investigations for causes of CKD
CASE: HELEN
69 YEAR OLD RETIRED TEACHER

PMH:
• Type 2 DM
• Hypertension
• Anxiety
• OA
• Dyslipidemia

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

BP: 125/80 mmHG

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.
ACKNOWLEDGEMENTS

CKD clinical pathway working group:

- Dr. Brenda Hemmelgarn
- Dr. Wes Jackson
- Maoliosa Donald
- NARP/SARP
- ICDC

Primary care physicians, nurses, pharmacists, nephrologists
QUESTIONS

ckdpathway@ucalgary.ca