Chronic Kidney Disease (CKD)

**Screening**

1. **DETERMINE RISK:**

<table>
<thead>
<tr>
<th>High risk</th>
<th>Moderate risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Diabetes.</td>
<td>• Aboriginal people ≥ 15 yrs.</td>
</tr>
<tr>
<td>• Vascular disease.</td>
<td>• BMI &gt; 30.</td>
</tr>
<tr>
<td>• Hypertension.</td>
<td>• Smokers.</td>
</tr>
<tr>
<td>• History of kidney disease.</td>
<td>• Dyslipidaemia</td>
</tr>
<tr>
<td>• History of kidney disease in 1st degree relative.</td>
<td></td>
</tr>
</tbody>
</table>

2. **ANNUALLY TEST:**

<table>
<thead>
<tr>
<th>High risk</th>
<th>Moderate risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>• MSU for dipstick – if nitrites, leucocytes and / or blood present, exclude infection. Send:</td>
<td>MSU for dipstick. If:</td>
</tr>
<tr>
<td>• MSU for MC&amp;S*.</td>
<td>• Nitrites, leucocytes and/or blood detected, send:</td>
</tr>
<tr>
<td>• SOLVS (women) and FVU (men) for NAT (PCR) for gonorrhoea and chlamydia.</td>
<td>• MSU for MC&amp;S*.</td>
</tr>
<tr>
<td>• ACR.</td>
<td>• SOLVS (women) and FVU (men) for NAT (PCR) gonorrhoea and chlamydia.</td>
</tr>
<tr>
<td>• Serum urea, electrolytes and creatinine (UEC).</td>
<td>• Protein and / or blood present in the absence of infection - manage as high risk; see Box 1 - Haematuria.</td>
</tr>
<tr>
<td>• eGFR (see Case Definition).</td>
<td></td>
</tr>
</tbody>
</table>

**Case Definition**

Chronic kidney disease is defined as an eGFR < 60ml/min on 2 separate occasions at least 1 week apart and not explained by an acute insult (illness, urinary infection or medications especially NSAIDs, ACEi and ARBs).

eGFR results above 60 are currently reported by Pathwest only as “>60” rather than as actual values. However, eGFRs > 60 may include patients with early kidney disease – see table 1 below. To determine the exact value for patients with a lab report of “eGFR >60”, an eGFR calculator is available at http://www.kidney.org.au. Note that eGFR values >90 may be unreliable.

**TABLE 1: EGFR AND STAGES OF KIDNEY DISEASE**

<table>
<thead>
<tr>
<th>Stage</th>
<th>eGFR</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&gt; 90 with evidence of kidney damage</td>
<td>May be normal but regular monitoring recommended – declining eGFR indicates CKD. Refer to PROTEINURIA WITH EGFR &gt; 60 protocol.</td>
</tr>
<tr>
<td>2</td>
<td>60-89 w/ additional evidence kidney damage</td>
<td>eGFR declines with age. If eGFR stable and &gt; 70 years old, may be normal for age if there are no other signs of kidney disease. Usually asymptomatic.</td>
</tr>
<tr>
<td>3</td>
<td>30-59</td>
<td>eGFR declines with age. If eGFR stable and &gt; 70 years old, may be normal for age if there are no other signs of kidney disease. Usually asymptomatic.</td>
</tr>
<tr>
<td>4</td>
<td>15-29</td>
<td>Usually mild symptoms. Need referral for predialysis education.</td>
</tr>
<tr>
<td>5</td>
<td>&lt; 15</td>
<td>Usually marked symptoms. Imminent need for renal replacement therapy to support life.</td>
</tr>
</tbody>
</table>

**Principles of Management**

- **Increased creatinine** occurs late in CKD and implies significant kidney damage.
- In CKD, appropriate management and referral improves outcome.
- **Iron deficiency, anaemia and electrolyte abnormalities** are common in CKD.
- **Increased risk in this population of infection and many types of cancer.** Enhanced screening may be required.

**BASELINE ASSESSMENT:**

Please place prominently in patient notes

- **Blood pressure**
- **Urine:** MSU for MC&S and Protein creatinine ration. Urine immunoelectrophoresis (for Bence-Jones protein).

**BLOODS:**

- FBE, CRP, ESR.
- UEC, eGFR, LFTs.
- Corrected Ca, PO4, HCO3.
- Serum Protein Electrophoresis
- If not known to have diabetes, screen for diabetes (see DIABETES TYPE II protocol).
- **Renal ultrasound scan.**

**GOALS OF TREATMENT FOR STAGES 1-3:**

BP <125/75. All other indices as per normal (see table below):

**GOALS OF TREATMENT FOR STAGES 4-5:**

<table>
<thead>
<tr>
<th>BP &lt; 125/75</th>
<th>PTH &lt; 20 - 25 pmol/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb &lt; 10 – 120 mg/dL</td>
<td>PO4 &lt; 1.6 mmol/L</td>
</tr>
<tr>
<td>HCO3 &gt; 20mmol/L</td>
<td>Corrected Ca &gt; 2,15 mmol/L</td>
</tr>
<tr>
<td>Albumin &gt; 35 g/L</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Albumin:Creatinine Ratio (ACR) is a screening tool. Protein:Creatinine Ratio is used for follow-up after moderate proteinuria has been diagnosed.
### Chronic Kidney Disease (CKD)

#### Therapeutic Protocol

- See **HEALTHY LIVING** protocol.
- Encourage smoking cessation and safe alcohol use.
- Refer early for dietary advice.
- Aim for optimal control of DM, HT and dyslipidaemia.
- Ensure pneumovax and flu immunisations up to date.
- If hep B non-immune, ensure hepatitis B immunisation.

**DRUG TREATMENT** (in all people with Proteinuric CKD, unless there are contraindications):

1. Start ramipril, if not already on ACEi, then irbesartan as per **PROTEINURIA + eGFR > 60** protocol.
2. If hypertension is present and still not controlled (<125/75), manage as per **HYPERTENSION** protocol.
3. In all people with non-proteinuric CKD, ACEi and ARB in combination is not recommended. In this group, please follow the **HYPERTENSION** protocol.

**BOX 2: WEEKLY CHECKLIST WHILE CHANGING THERAPY**

- **BP** – if symptomatic hypotension develops, correct any dehydration, review other medications (e.g. diuretics), reduce dose until symptoms resolve / BP normalizes, and attempt gradual increase in dosage again. Discuss with Nephrologist if not tolerating ACEi/ARB.
- Some rise in urea, creatinine and potassium is expected after commencing an ACEi / ARB; if the increase is small and asymptomatic, no action is necessary.
- A rise in creatinine of up to 30% above baseline is acceptable.
- An increase in potassium to ≤ 5.9 mmol/L is acceptable.
- If potassium ≥ 6.0 mmol/L and/or creatinine increases by > 30%, STOP medications and discuss with Nephrologist. A persistent excessive rise in creatinine may indicate bilateral renal artery stenosis and needs investigation.

### TABLE 2: COMMONLY PRESCRIBED DRUGS WHICH REQUIRE CAUTION IN CKD

<table>
<thead>
<tr>
<th>Drug</th>
<th>Risks in CKD</th>
<th>Action required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metformin</td>
<td>Increased risk of lactic acidosis once eGFR &lt; 60, eGFR &lt; 30 - cease.</td>
<td>eGFR 30-50: reduce to max. dose of 1g per day</td>
</tr>
<tr>
<td>Diuretics</td>
<td>↓ eGFR; electrolyte disturbance</td>
<td>Avoid dehydration; monitor UEC regularly;</td>
</tr>
<tr>
<td>Glitazones</td>
<td>Patients with CKD are at particularly high risk of CAD – given the potential cardiac risks with glitazones, use with caution</td>
<td></td>
</tr>
<tr>
<td>Digoxin, colchicine</td>
<td>Accumulation and drug toxicity</td>
<td>Reduce dose / cease – refer to therapeutic guidelines</td>
</tr>
<tr>
<td>NSAIDS</td>
<td>↓ eGFR</td>
<td>Avoid / cease</td>
</tr>
<tr>
<td>ACEis, ARBs</td>
<td>If prescribed in patients with proteinuria for prevention of renal disease progression ALONE, cease when eGFR &lt; 15. For all other indications, continue but with caution – see Box 2 on this page: “2 weekly check-list while changing therapy”</td>
<td></td>
</tr>
<tr>
<td>Antibiotics</td>
<td>Consider doses of all antibiotics, but in particular: Gentamicin, Vancomycin &amp; Trimethoprim.</td>
<td></td>
</tr>
</tbody>
</table>

**NB:** Statins and low-dose aspirin can be used relatively safely

**MANAGING COMPLICATIONS OF CKD**

1. **HYPERPHOSPHATAEMIA:** If PO4 > 1.6 mmol/L, start **calcium carbonate** (500mg as Cal-Sup or 600mg as Caltrate) tds with meals increasing as required to maximum dose of 1000mg tds.
2. **HYPOCALCAEMIA:** If corrected Ca < 2.15 mmol/L and PO4 < 2 mmol/L OR PO4 > 2 mmol/L on maximum dose **calcium carbonate** (see above), start **calcitriol** 0.25mcg daily and double dose every 2 weeks to maximum dose of 1.0 mcg daily.

3. **ACIDOISIS:**
   - If HCO3 15 - 20 mmol/L and corrected Ca > 2.15mmol/L or HCO3 < 15 mmol/L, start **sodium bicarbonate** 1 tablet (840mg) daily increasing as required to 2 tablets tds. Monitor for exacerbation of hypertension and heart failure.

4. **LOW VITAMIN D:** In CKD stages 3,4 & 5 - all patients not on 1,25-dihydroxycholecalciferol (eg. Calcitriol) should be on cholecalciferol (eg. Ostein) (see point 2 ‘HYPOCALCAEMIA’ above)

5. **ANAEMIA +/- IRON DEFICIENCY:** See page 3 of this protocol.

### Follow-up

**TABLE 3: FOLLOW-UP SCHEDULE**

<table>
<thead>
<tr>
<th></th>
<th>6 monthly</th>
<th>3 monthly</th>
<th>Monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>eGFR &gt; 60</td>
<td>See proteinuria with eGFR &gt; 60 protocol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>eGFR 30 – 59</td>
<td>Fe studies, CRP, Ca, PO4, Albumin, ACR if previously normal</td>
<td>UEC, eGFR, BP, BP, weight, Cardiovascular risk factors</td>
<td></td>
</tr>
<tr>
<td>eGFR 15 – 29</td>
<td>Review by pre-dialysis coordinator</td>
<td>Fe Studies</td>
<td>Clinical review, UEC, eGFR, FBE, BP, weight, Fe studies, Ca, PO4, Albumin</td>
</tr>
<tr>
<td>eGFR &lt; 15</td>
<td>As above</td>
<td>Fe Studies, PTH</td>
<td></td>
</tr>
</tbody>
</table>

Note: If eGFR <30 and bloods being taken, always use non-dominant arm (unless directed otherwise by KRSS notes).

**Women of Child Bearing Age**

See **PROTEINURIA + eGFR > 60** protocol.

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Chronic Kidney Disease (CKD)

Refer / Discuss

TO NEPHROLOGIST:
• eGFR < 30 mL/min/1.73m²
• PTH > 25 pmol/L
• Rapid decline in renal function e.g. 15% decrease in eGFR in one year
• Suspected connective tissue disease based on clinical picture +/- abnormal baseline investigations.
• Iron therapy according to protocol has failed to correct iron deficiency.

TO KIMBERLEY PRE-DIALYSIS COORDINATOR:
• When eGFR < 30 mL/min/1.73m² for pre-dialysis education and planning. (Ph: 0400 336 069 or email: predialysis@kamsc.org.au).

TO PHYSICIAN:
1. eGFR < 55 mL/min/1.73m² on two separate occasions.
2. Protein:Creatinine ratio >50 on two separate occasions, in absence of a UTI.
3. Pregnancy: Refer for pre-pregnancy counselling or in early pregnancy.

ANAEMIA +/- IRON DEFICIENCY
1. Aim is to keep Hb between 110 – 120g/L.
2. Check folate and B12 and treat if deficient.
3. Check iron studies. Remember if absolute iron deficiency is confirmed, consider other possible causes including menorrhagia and GI blood loss.
4. Follow flow chart on this page for all clients with CKD and Hb <11g/L.
5. For details on administration of IV iron, refer to IV iron protocols at: www.kamsc.org.au/cd_protocols.html.

FLOW CHART – MANAGEMENT OF ANAEMIA IN CLIENTS WITH CKD

- Refer / Discuss
- TO NEPHROLOGIST:
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  - PTH > 25 pmol/L
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