Chronic Kidney Disease (CKD) Management in General Practice
Early detection of CKD using kidney health check

Who is at higher risk of kidney disease?
- Age > 50 years
- Diabetes
- High blood pressure
- Smoking
- Obesity
- Family history of kidney disease
- Maori and Pacific people

What should be done?
- Blood pressure
- Urine dipstick (microalbuminuria if diabetes present)
- eGFR

How often?
- If CKD not present: At least every 5 years
- If Diabetes or CKD present: At least every 12 months


<table>
<thead>
<tr>
<th>Albumin/creatinine ratio</th>
<th>Microalbuminuria (Females: 3.6-35 mg/mmol, Males: 2.6-25 mg/mmol)</th>
<th>Macroalbuminuria (&gt;30 mg/mol)</th>
<th>Proteinuria (&gt;30 mg/mmol)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dipstick</td>
<td>&gt;30 mg/L (albumin specific dipstick)</td>
<td>&gt;200 mg/L (albumin specific dipstick)</td>
<td>Dipstick = 1+ or greater</td>
</tr>
<tr>
<td>Protein/creatinine ratio</td>
<td>-</td>
<td>-</td>
<td>&gt;30 mg/mmol</td>
</tr>
<tr>
<td>24 hour protein</td>
<td>-</td>
<td>-</td>
<td>&gt;0.3 g/24 hrs</td>
</tr>
</tbody>
</table>
## eGFR Clinical Action Plan

<table>
<thead>
<tr>
<th>eGFR mL/min/1.73m²</th>
<th>Description</th>
<th>Clinical Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>Stage 1 CKD - kidney damage* with normal kidney function</td>
<td>Further investigation for CKD may be indicated in those at increased risk**:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• blood pressure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• assessment of proteinuria</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• urinalysis</td>
</tr>
<tr>
<td>60-89</td>
<td>Stage 2 CKD - kidney damage* with mild ↓ kidney function</td>
<td>Cardiovascular risk reduction:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• blood pressure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• lipids</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• blood glucose</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• lifestyle modification (smoking, weight, physical activity, nutrition, alcohol)</td>
</tr>
<tr>
<td>30 - 59</td>
<td>Stage 3 CKD - moderate ↓ kidney function</td>
<td>As above, plus:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• monitor eGFR 3 monthly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• avoid nephrotoxic drugs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• prescribe antiproteinuric drugs (ACE inhibitors and/or ARBs) if appropriate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• address common complications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ensure drug dosages appropriate for level of kidney function</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• consider indications for referral to a nephrologist</td>
</tr>
<tr>
<td>15 - 29</td>
<td>Stage 4 CKD - severe ↓ kidney function</td>
<td>As above + referral to nephrologist is usually indicated for physical and psychosocial preparation for renal replacement therapy (dialysis, pre-emptive transplantation, transplantation) or conservative medical management</td>
</tr>
<tr>
<td>&lt; 15</td>
<td>Stage 5 CKD - end-stage kidney disease</td>
<td>As above + referral to a nephrologist</td>
</tr>
</tbody>
</table>

* imaging or biopsy abnormalities, or proteinuria/haematuria

** hypertension, diabetes, smoker, age > 50 yrs, obesity, family history of kidney disease, Maori and Pacific people
Indications for Referral to a Nephrologist

Appropriate referral is associated with

• reduced rates of progression to end stage kidney disease
• decreased need for and duration of hospitalisation
• increased likelihood of permanent dialysis access created prior to dialysis onset
• reduced initial costs of care following the commencement of dialysis
• increased likelihood of kidney transplantation
• decreased patient morbidity and mortality

Who should usually be referred to a nephrologist?

Anyone with

• eGFR <30mL/min/1.73m²
• Unexplained decline in kidney function (>15% drop in eGFR over 3 months)
• Proteinuria >1g/24hrs (see clinical tip)
• Glomerular haematuria (particularly if proteinuria present)
• CKD and hypertension that is hard to get to target
• Diabetes with eGFR <45mL/min/1.73m²*
• Unexplained anaemia (Hb <100 g/L) with eGFR <45mL/min/1.73m² and normal iron stores
• Anyone with an acute presentation and signs of acute nephritis should be regarded as a medical emergency and referred without delay.

Clinical tip

Urine protein:creatinine ratio of 100 mg/mmol $\equiv$ daily protein excretion of 1g/24hrs

* See Management of Type 2 Diabetes . New Zealand Guidelines Group 2003 www.nzgg.org.nz
Who does not usually need to be referred to a nephrologist?

**CKD Stage 2**
- Stable eGFR 60-89 mL/min/1.73m²
- Minor proteinuria (<0.5 g/24hrs with no haematuria)
- Controlled blood pressure

**CKD Stage 3**
- Stable eGFR 30-60 mL/min/1.73m²
- Minor proteinuria (<0.5 g/24hrs with no haematuria)
- Controlled blood pressure

The decision to refer or not must always be individualised, and particularly in younger patients the indications for referral may be less stringent (e.g. minor proteinuria).

In CKD Stages 2 and 3
- Don’t refer to nephrologist if targets of therapy are achieved
- Pay attention to CVD risk reduction
- Use ACE inhibitors/ARBs
- Monitor 3-6 monthly

Clinical tip

When referring to a nephrologist, ensure patient has had a recent kidney ultrasound, current blood chemistry, and quantification of proteinuria.
## Treatment targets for people with CKD

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Target</th>
<th>Treatment and effects on systolic BP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lifestyle Factors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td>Cease smoking</td>
<td>Lifestyle modification - refer to The assessment and management of cardiovascular risk. New Zealand Guidelines Group 2003*</td>
</tr>
</tbody>
</table>
| Weight                                       | BMI at least < 30 and ideally < 25 kg/m²       
WC males < 100 cm        
WC females < 90cm       | Lifestyle modification - refer to NZGG guide  
~ SBP reduction = 5-20 mmHg/10 kg loss                                                                 |
| Physical activity                            | >30 mins moderately intensive physical activity/day (3-6 METs)         | Lifestyle modification - refer to NZGG guide and “Green Prescriptions”**  
~ SBP reduction = 4-9 mmHg                                                                 |
| Nutrition                                    | Dietary salt intake 40-100 mmol/day                                   | Lifestyle modification - refer to NZGG guide  
~ SBP reduction = 2-8 mmHg                                                                 |
| Alcohol                                      | Moderate alcohol consumption only (2-3 standard drinks/day or 12-14 standard drinks/wk) | Lifestyle modification - refer to ALAC 2003  
Recommended upper limits for safer drinking  
~ SBP reduction = 2-4 mmHg                                                                 |
| **Clinical Factor**                          |                                                                        |                                                                                                     |
| Blood pressure                               | <130/80 mmHg  
<125/75 mmHg if proteinuria >1g/24hrs    | Lifestyle modification  
ACE inhibitor and/or ARB first line.                                                                 |
| Proteinuria                                  | >50% reduction of baseline value                                      | ACE inhibitor and/or ARB first line.                                                                 |
| Lipids                                       | Treat if TC or TC:HDL ratio > 8, CVD risk > 15%, or clinically high CVD risk | Drug treatment and specific lifestyle advice*  
Treatment based on individual cardiac risk*                                                                 |
| Blood glucose (for people with diabetes)    | Pre-prandial BSL 4.4 - 6.7 mmol/L  
HbA1c <7.0%                                                                 | Lifestyle modification  
Oral short-acting hypoglycaemics  
Insulin                                                                 |

Consider immunisation against influenza and invasive pneumococcal disease for people with diabetes or CKD.

**Golden Rules!**

Blood pressure targets in CKD are <130/80 mmHg or <125/75 if proteinuria > 1 g/24hrs
Urine protein:creatinine ratio of 100 mg/mmol ≥ daily protein excretion of 1g/24hrs
Achieving adequate BP targets will often require the use of more than one agent
As eGFR declines more drugs will typically be required to achieve target blood pressure

Principles of management of hypertension in people with CKD

1. **Person has CKD**
   - **Does the person have diabetes or proteinuria?**
     - **YES**
       - **Stop ACEI/ARB**
       - **Continue to monitor BP and manage lifestyle risk factors**
     - **NO**
       - **Start ACEI/ARB**
       - **Monitor**
         - eGFR
         - Potassium
         - Creatinine
       - **Potassium > 6mmol/L**
         - **ACEI/ARB tolerated**
         - **Is BP at target <130/80 (or <125/75 if proteinuria >1g)**
           - **YES**
             - **Review antihypertensive medication and dose**
           - **NO**
             - **Continue to monitor BP and manage lifestyle risk factors**
       - **Increased creatinine >30% above baseline**
         - **Stop medication and check renal artery stenosis**
       - **Potassium < 6mmol/L**
         - **Is BP at target <130/80 (or <125/75 if proteinuria >1g)**
           - **YES**
             - **Review antihypertensive medication and dose**
           - **NO**
             - **Increase ACEI/ARB or combine ACEI + ARB**
       - **Decrease dose**
         - Diuretic
         - Restrict dietary potassium

2. **ACEI/ARB tolerated**
   - **Is BP at target <130/80 (or <125/75 if proteinuria >1g)**
     - **YES**
       - **Review antihypertensive medication and dose**
     - **NO**
       - **Increase ACEI/ARB or combine ACEI + ARB**

*Modified from original from Med-E-Serv PTy, Chronic Kidney Disease (CKD) Update (http://www.kidney.primed.com.au)*
### CKD management according to stage

<table>
<thead>
<tr>
<th>CKD Stage</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td>Kidney damage + normal or ↑eGFR</td>
<td>Kidney damage + mild ↓eGFR</td>
<td>Moderate ↓eGFR</td>
<td>Severe ↓eGFR</td>
<td>End-stage kidney disease</td>
</tr>
<tr>
<td><strong>eGFR(ml/min/1.73m²)</strong></td>
<td>&gt; 90</td>
<td>60 - 89</td>
<td>30 - 59</td>
<td>15 - 29</td>
<td>&lt; 15 or on dialysis</td>
</tr>
<tr>
<td><strong>Common Signs and Symptoms</strong></td>
<td>Nil</td>
<td>Nil or nocturia, mild malaise, anorexia</td>
<td>As for stage 3 + nausea, pruritis, restless legs, dyspnoea</td>
<td>As for stage 4</td>
<td></td>
</tr>
<tr>
<td><strong>Common Complications</strong></td>
<td>Hypertension</td>
<td>As for stage 1-2 + Anaemia, Sleep Apnoea, CVD, Malnutrition</td>
<td>As for stage 3 + Hyperphosphataemia, Acidosis, Hyperkalaemia, Restless legs</td>
<td>As for stage 4 + Pericarditis, Encephalopathy, Neuropathy</td>
<td></td>
</tr>
<tr>
<td><strong>Clinic Assessment</strong></td>
<td>BP, Weight, Urine dipstick</td>
<td>As for stage 1-2</td>
<td>As for stage 1-2 + Fluid overload</td>
<td>As for stage 4</td>
<td></td>
</tr>
<tr>
<td><strong>Lab Assessment</strong></td>
<td>General chemistry, eGFR, Glucose, Lipids, Urine protein/creatinine (if dipstick test positive)</td>
<td>Urine protein/creatinine if dipstick test positive</td>
<td>As for stage 1-2 + FBC, Iron stores, Ca/PO4, PTH (repeat test on nephrologist advice)</td>
<td>As for stage 3 + plasma bicarbonate</td>
<td>As per monthly blood schedule specified by Renal Unit</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>Diagnosis (may require renal biopsy) Cardiac and kidney risk factor modification BP to target &lt;130/80 mmHg or &lt;125/75 mmHg if proteinuria &gt;1g/24hrs (Urine protein/creatinine 100 mg/mmol = protein excretion of 1g/24hrs)</td>
<td>As for stage 1-2 + Treat complications, Medication review</td>
<td>As for stage 3 + Dialysis education, Dialysis access surgery</td>
<td>As for stage 4 + Dialysis or transplantation (or conservative medical management)</td>
<td></td>
</tr>
<tr>
<td><strong>Frequency of clinical review</strong></td>
<td>6 - 12 monthly</td>
<td>3 - 6 monthly</td>
<td>3 monthly</td>
<td>Monthly (shared with renal unit)</td>
<td></td>
</tr>
<tr>
<td><strong>Nephrologist Referral</strong></td>
<td>Consider referral if indication is present</td>
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<td>All patients should be referred to a nephrologist</td>
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<td></td>
</tr>
</tbody>
</table>

Based on original guidelines developed by Kidney Health Australia and modified with permission.