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>Weight</td>
<td>-30% of ideal</td>
<td>-10% of ideal, or go down to 110 mg/dL if baseline is less than 110 mg/dL</td>
</tr>
<tr>
<td>Physical activity</td>
<td>-10% of ideal</td>
<td>-10% of ideal, or moderate if baseline is moderate</td>
</tr>
<tr>
<td>Albuminuria</td>
<td>1.0 g/day</td>
<td>-10% of ideal, or moderate if baseline is moderate</td>
</tr>
<tr>
<td>Hypertension</td>
<td>140/90 mmHg</td>
<td>-10% of ideal, or moderate if baseline is moderate</td>
</tr>
<tr>
<td>Hypercholesterolemia</td>
<td>&lt;100 mg/dL</td>
<td>-10% of ideal, or moderate if baseline is moderate</td>
</tr>
</tbody>
</table>

CKD management according to stage

<table>
<thead>
<tr>
<th>Stage</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Kidney damage not yet evident</td>
<td>Kidney damage evident</td>
<td>Kidney damage evident</td>
<td>Kidney damage evident</td>
<td>Kidney damage evident</td>
</tr>
<tr>
<td>Treatment</td>
<td>Diuretics, ACE inhibitors/Lisinopril, or ARBs</td>
<td>Diuretics, ACE inhibitors/Lisinopril, or ARBs</td>
<td>Diuretics, ACE inhibitors/Lisinopril, or ARBs</td>
<td>Diuretics, ACE inhibitors/Lisinopril, or ARBs</td>
<td>Diuretics, ACE inhibitors/Lisinopril, or ARBs</td>
</tr>
<tr>
<td>Frequency of treatment</td>
<td>1-2 times weekly</td>
<td>1-2 times weekly</td>
<td>1-2 times weekly</td>
<td>1-2 times daily</td>
<td>1-2 times daily</td>
</tr>
</tbody>
</table>

Referral to a nephrologist is not necessary if:

- Stable eGFR > 60 mL/min/1.73m²
- Urine AER < 3000 mmol/24h (with no haematuria)
- Controlled blood pressure

Tips for referral:

- Familial history of end-stage kidney disease
- Poorly controlled diabetes
- On dialysis
- Cardiovascular disease

Consider referral if:

- Kidney function deteriorates
- New symptoms arise


Revised October 2013
Early detection of CKD using kidney health check

What is the risk of kidney disease? Age 65 years or older

Are you at risk of kidney disease?
- Diabetes
- High blood pressure
- Cardiovascular disease
- Smoking
- Obesity
- Family history of kidney disease
- Māori and Pacific people
- South Asians

What should be done?
- Serum creatinine
- To determine GFR
- Protein test
- To detect albuminuria
- Urinalysis
- To detect proteinuria

How often?
- If CKD not present
  - At least every 1-2 years
- If Diabates or cardiovascular risk, or proteinuria
  - At least every 12 months

Kidney damage stage

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>Clinical Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Normal kidney function</td>
<td>No action needed</td>
</tr>
<tr>
<td>2</td>
<td>Early kidney disease</td>
<td>Monitor GFR every 1-2 years</td>
</tr>
<tr>
<td>3</td>
<td>Moderate kidney disease</td>
<td>Monitor GFR every 3 months, refer to nephrologist</td>
</tr>
<tr>
<td>4</td>
<td>Severe kidney disease</td>
<td>Consider referral to nephrologist</td>
</tr>
</tbody>
</table>

Definitions of Albuminuria and Proteinuria

- Albuminuria: 30-299 mg/day or urine albumin/creatinine ratio (UACR) > 10 mg/mmol
- Proteinuria: > 300 mg/day or urine albumin/creatinine ratio (UACR) > 30 mg/mmol

Clinical action plan

Based on a combination of kidney function (eGFR) and kidney damage (albuminuria/proteinuria)

<table>
<thead>
<tr>
<th>eGFR</th>
<th>Stage</th>
<th>Description</th>
<th>Clinical Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;60</td>
<td>Stage 1</td>
<td>Normal kidney function</td>
<td>No action needed</td>
</tr>
<tr>
<td>45-59</td>
<td>Stage 2</td>
<td>Early kidney disease</td>
<td>Monitor GFR every 1-2 years</td>
</tr>
<tr>
<td>30-44</td>
<td>Stage 3</td>
<td>Moderate kidney disease</td>
<td>Monitor GFR every 3 months, refer to nephrologist</td>
</tr>
<tr>
<td>&lt;30</td>
<td>Stage 4</td>
<td>Severe kidney disease</td>
<td>Consider referral to nephrologist</td>
</tr>
</tbody>
</table>

Interpreting tests of GFR and albuminuria

- For patients with CKD, the combination of a low GFR and albuminuria/proteinuria is at a greater risk of CKD progression at all ages, with those with just low GFR or albuminuria/proteinuria

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>Clinical Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Normal kidney function</td>
<td>No action needed</td>
</tr>
<tr>
<td>2</td>
<td>Early kidney disease</td>
<td>Monitor GFR every 1-2 years</td>
</tr>
<tr>
<td>3</td>
<td>Moderate kidney disease</td>
<td>Monitor GFR every 3 months, refer to nephrologist</td>
</tr>
<tr>
<td>4</td>
<td>Severe kidney disease</td>
<td>Consider referral to nephrologist</td>
</tr>
<tr>
<td>5</td>
<td>End-stage kidney disease</td>
<td>Refer to nephrologist</td>
</tr>
</tbody>
</table>

Appropriate referral is associated with:
- Reduced rates of progression to end-stage kidney disease
- Increased likelihood of permanent dialysis access created prior to dialysis start
- 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?

- GFR <30mL/min/1.73m²
- Persistent significant albuminuria (urine ACR >30mg/mmol)
- A consistent decline in eGFR from a baseline of >60mL/min/1.73m² (a decline >5mL/min/1.73m² over a six-month period which is confirmed on at least three separate readings)
- Glomerular haematuria with microalbuminuria
- CKD hypertension that is hard to treat despite at least three anti-hypertensives
- Diabetes with GFR <60mL/min/1.73m²

Clinical tip

- Avoid combination of ACE inhibitors and ARBs
Early detection of CKD using kidney health check

Definitions of Albuminuria and Proteinuria

- **Normalbuminuria**: Male < 2.5, Female < 3.5
- **Microalbuminuria**: Male 2.5 - 25, Female 3.5 - 35
- **Macroalbuminuria**: Male > 25, Female > 35

Albuminuria stage

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt; 2.5</td>
</tr>
<tr>
<td>Micro</td>
<td>2.5 - 25</td>
</tr>
<tr>
<td>Macro</td>
<td>&gt; 25</td>
</tr>
</tbody>
</table>

Proteinuria stage

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt; 30</td>
</tr>
<tr>
<td>Moderate</td>
<td>30 - 300</td>
</tr>
<tr>
<td>Severe</td>
<td>&gt; 300</td>
</tr>
</tbody>
</table>

Albuminuria and proteinuria can be detected using 24-hour urine collections or random urine sampling. Early detection of kidney disease is critical for reducing morbidity and mortality. For patients with CKD, the combination of a low GFR and proteinuria places them at a greater risk of deteriorating kidney function (a sustained decline in eGFR of more than 5mL/min/1.73m²/yr). A measured or estimated GFR ≥60 (urine ACR <30mg/mmol) is associated with increased likelihood of arterial, cardiovascular and other clinical outcomes, irrespective of age.

Clinical action plan

Based on a combination of kidney function (eGFR) and kidney damage (albuminuria/proteinuria)

<table>
<thead>
<tr>
<th>eGFR (median 73 mmol/L)</th>
<th>Description</th>
<th>Clinical Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60</td>
<td>Stage 4 CKD - kidney failure</td>
<td>As above + referral to a nephrologist</td>
</tr>
<tr>
<td>60 - 89</td>
<td>Stage 3 CKD - mild-moderate kidney function</td>
<td>As above + refer patients with diabetes to diabetologist</td>
</tr>
<tr>
<td>45 - 59</td>
<td>Stage 3a CKD - moderate-severe kidney function</td>
<td>As above + referral to nephrologist?</td>
</tr>
<tr>
<td>30 - 44</td>
<td>Stage 3b CKD - severe kidney function</td>
<td>As above + referral to nephrologist</td>
</tr>
<tr>
<td>&lt; 30</td>
<td>Stage 5 CKD - end-stage kidney disease</td>
<td>As above + referral to nephrologist</td>
</tr>
</tbody>
</table>

Interpreting tests of GFR and albuminuria

- For patients with CKD, the combination of a low GFR and proteinuria places them at a greater risk of deteriorating kidney function (a sustained decline in eGFR of more than 5mL/min/1.73m²/yr).
- A measured or estimated GFR ≥60 (urine ACR <30mg/mmol) is associated with increased likelihood of arterial, cardiovascular and other clinical outcomes, irrespective of age.

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, decreased likelihood of kidney transplantation.

Who should be referred to a nephrologist?

- Anyone with:
  - GFR <60 (urine ACR ≥30mg/mmol)
  - Persistent significant albuminuria (urine ACR ≥30mg/mmol)
  - A consistent decline in eGFR from a baseline of ≥60 (urine ACR <30mg/mmol) over a six-month period which is confirmed on at least three separate readings.
  - Glomerular haematuria with macroalbuminuria
  - CKD and hypertension that is hard to get under control and at least three antihypertensives
  - Diabetes with eGFR <60 (urine ACR ≥30mg/mmol)


* Adapted from KHA-CARI Early CKD Guidelines 2013.

** hypertension, diabetes, smoking, age > 60 yrs, obesity, family history of kidney disease, Maori and Pacific people, South Asians

*** eGFR <50, proteinuria 1+ or at least 3 mmol/L of albuminuria

*** Referral may not be appropriate if eGFR stable, proteinuria minor and cardiovascular risk reduction achieved.


<table>
<thead>
<tr>
<th>GFR category</th>
<th>eGFR (L/min/1.73m²)</th>
<th>Albuminuria category</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 60</td>
<td>60 - 45</td>
<td>Microalbuminuria</td>
<td>As above + referral to nephrologist</td>
</tr>
<tr>
<td>45 - 70</td>
<td>70 - 60</td>
<td>Normalbuminuria</td>
<td>As above + routine monitoring</td>
</tr>
<tr>
<td>45 - 60</td>
<td>&gt; 70</td>
<td>Microalbuminuria</td>
<td>As above + referral to nephrologist</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CKD stage</th>
<th>eGFR (median 73 mmol/L)</th>
<th>Albuminuria category</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>&gt; 90</td>
<td>Normalbuminuria</td>
<td>No referral</td>
</tr>
<tr>
<td>Stage 2</td>
<td>&lt; 90, ≥45</td>
<td>Microalbuminuria</td>
<td>As above + referral to nephrologist</td>
</tr>
<tr>
<td>Stage 3a</td>
<td>&lt; 45, ≥30</td>
<td>Moderate/severe albuminuria</td>
<td>As above + referral to nephrologist</td>
</tr>
<tr>
<td>Stage 3b</td>
<td>&lt; 30</td>
<td>Severe albuminuria</td>
<td>As above + referral to nephrologist</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GFR category</th>
<th>Albuminuria category</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 120</td>
<td>Normalbuminuria</td>
<td>No referral</td>
</tr>
<tr>
<td>90 - 120</td>
<td>Microalbuminuria</td>
<td>As above + routine monitoring</td>
</tr>
<tr>
<td>60 - 90</td>
<td>Moderate albuminuria</td>
<td>As above + referral to nephrologist</td>
</tr>
<tr>
<td>&lt; 60</td>
<td>Severe albuminuria</td>
<td>As above + referral to nephrologist</td>
</tr>
</tbody>
</table>

Clinical tip

- Consider indications for referral to a nephrologist?
- Ensure drug dosages appropriate for level of kidney function
- Address common complications
- Prescribe antiproteinuric drugs (ACE inhibitors or ARBs) if appropriate
- Address common complications
- Monitor eGFR 3 monthly
- Lifestyle modification (smoking, weight, physical activity, nutrition, alcohol)
- Avoid nephrotoxic drugs
- Increased likelihood of kidney transplantation
- Decreased patient morbidity and mortality

Interpreting tests of GFR and albuminuria

- For patients with CKD, the combination of a low GFR and proteinuria places them at a greater risk of deteriorating kidney function (a sustained decline in eGFR of more than 5mL/min/1.73m²/yr).
- A measured or estimated GFR ≥60 (urine ACR <30mg/mmol) is associated with increased likelihood of arterial, cardiovascular and other clinical outcomes, irrespective of age.

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, decreased likelihood of kidney transplantation.

Who should be referred to a nephrologist?

- Anyone with:
  - GFR <60 (urine ACR ≥30mg/mmol)
  - Persistent significant albuminuria (urine ACR ≥30mg/mmol)
  - A consistent decline in eGFR from a baseline of ≥60 (urine ACR <30mg/mmol) over a six-month period which is confirmed on at least three separate readings.
  - Glomerular haematuria with macroalbuminuria
  - CKD and hypertension that is hard to get under control and at least three antihypertensives
  - Diabetes with eGFR <60 (urine ACR ≥30mg/mmol)

Clinical tip

- Consider indications for referral to a nephrologist?
- Ensure drug dosages appropriate for level of kidney function
- Address common complications
- Prescribe antiproteinuric drugs (ACE inhibitors or ARBs) if appropriate
- Avoid nephrotoxic drugs
- Increased likelihood of kidney transplantation
- Decreased patient morbidity and mortality
As for stage 1-2

Don’t refer to a nephrologist if targets of therapy are achieved.

Kidney damage +

• The decision to refer or not must always be individualised,
  referral guidelines exist.

• n referral in cases where uncertainty regarding referral
  is achieved.


Treatment targets for people with CKD

| Parameter | Target | Treatment and effects on analytical SP
|-----------|--------|-------------------------------------|
| Weight    | nil    | Achieve and maintain weight within 10% of ideal body weight (BMI 20 - 25 kg/m2) ± 10 kg less (BMI 25 - 30 kg/m2) ± 10 kg less
| Physical activity | nil | Achieve at least moderate physical activity ≥ 150 minutes per week (≥ 75 minutes moderate or ≥ 90 minutes vigorous activity per week) ± 20 minutes less
| Albuminuria or proteinuria | nil | Consider referral if indication is present

CKD management according to stage

<table>
<thead>
<tr>
<th>Stage</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Kidney change is asymptomatic</td>
<td>Kidney damage is present and is asymptomatic</td>
<td>Kidney damage is present and is symptomatic</td>
<td>End-stage kidney disease</td>
<td>Kidney transplant</td>
</tr>
<tr>
<td>Blood pressure (mm Hg)</td>
<td>&lt; 130 - 80</td>
<td>&lt; 130 - 80</td>
<td>&lt; 130 - 80</td>
<td>&lt; 130 - 80</td>
<td>&lt; 130 - 80</td>
</tr>
<tr>
<td>Dipstick and symptoms</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
</tr>
<tr>
<td>Lab Assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FBC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lipids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albuminuria or proteinuria</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>As for stage 1-2 +</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CVD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaemia</td>
<td>nil</td>
<td>nil or nocturia, &lt; 90</td>
<td>&lt; 60</td>
<td>&lt; 50</td>
<td>&lt; 30</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support (may require medication management and kidney/vascular/other complications)</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of clinical review</td>
<td>2 - 3 monthly</td>
<td>3 - 6 monthly</td>
<td>3 - 6 monthly</td>
<td>3 - 6 monthly</td>
<td>3 - 6 monthly</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education regarding complications</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
</tr>
<tr>
<td>Consider patient education</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dialysis or transplantation</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
</tr>
<tr>
<td>Consider complications</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consider complications</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
<td>nil</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CKD Disease (CKD) Management in General Practice

**Prevention • Support • Research**

Kidney Health New Zealand

pknew.org.nz | phone: 0800 250 583 | info@kidney.org.nz | www.kidney.org.nz

PKNZ Education Foundation

pknew.org.nz | phone: 0800 540 530 | info@kidney.org.nz | www.kidney.org.nz


**www.health.govt.nz/preventative-health-wellness/physical-activity/green-prescriptions**

**www.who.int/healthpromotion/workplace/healthy-workplaces/topics/occupational-waste-prevention**

*Stable eGFR > 60 mL/min/1.73m²

Unstable ADR <30 minutes (with no haematuria)

Controlled blood pressure

The decision to refer or not must always be individualised, and particularly in younger individuals the indications for referral may be less stringent.

Tips for referral:

• Familiarise yourself with your local nephrology unit’s referral guidelines.

• Don’t refer to a nephrologist if targets of therapy are achieved.

• Pay attention to CKD risk reduction.

• Consider discussing management issues with a nephrologist in cases where uncertainty regarding referral exists.

Reference:

When referring to a nephrologist, ensure patient has had a recent kidney ultrasound, current blood chemistry, and quantification of proteinuria.

Read More
Early detection of CKD using kidney health check

- **Increased risk of kidney disease?**
  - Age > 65 years
  - Other risk factors: Diabetes
  - High blood pressure
  - Cardiovascular disease
  - Smoking
  - Family history of kidney disease
  - Māori and Pacific people
  - South Asians

- **What should be done?**
  - Serum creatinine
  - Determination of GFR
  - Urine protein test
  - Clinical advice
  - GFR on first visit
  - Blood pressure

- **How often?**
  - If CKD not present
  - At least every 1.2 years
  - If GFR < 60 mL/min/1.73 m²
  - At least every 12 months

---

### Definitions of Albuminuria and Proteinuria

<table>
<thead>
<tr>
<th>Albuminuria</th>
<th>Normal</th>
<th>Proteinuria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men: &gt; 25 mg/dl</td>
<td>&lt; 2.5 mg/dl</td>
<td>&gt; 30 mg/dl</td>
</tr>
<tr>
<td>Women: &gt; 15 mg/dl</td>
<td>&lt; 15 mg/dl</td>
<td>&gt; 50 mg/dl</td>
</tr>
</tbody>
</table>

**Kidney damage stage**

- **Stage 1 CKD** - normal kidney function
  - Futher investigation for CKD may be indicated in those at increased risk**:
    - Blood pressure
    - Serum creatinine
  - As above, plus:
    - Monitor GFR monthly
    - Avoid nephrotoxic drugs
    - Prescribe antihypertensive drugs ACE inhibitors or ARBs if appropriate
    - Address common complications
    - Ensure drug dosages appropriate for level of kidney function
    - Consider indications for referral to a nephrologist

- **Stage 2 CKD** - moderate kidney dysfunction
  - As above, plus:
  - Physical activity, nutrition, alcohol

- **Stage 3a CKD** - severe kidney dysfunction
  - As above, plus:
  - Referral to nephrologist

- **Stage 3b CKD** - end-stage kidney disease
  - As above, plus:
    - Referral to nephrologist

- **Stage 5 CKD** - end-stage kidney disease
  - As above, plus:
    - Referral to nephrologist

---

### Clinical action plan

**Based on a combination of kidney function (eGFR) and kidney damage (albuminuria/proteinuria)**

<table>
<thead>
<tr>
<th>eGFR (mL/min/1.73 m²)</th>
<th>Clinical Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 15</td>
<td>Refer to nephrologist</td>
</tr>
<tr>
<td>15 - 29</td>
<td>As above, plus: Referral to nephrologist</td>
</tr>
<tr>
<td>30 - 44</td>
<td>As above, plus: Physical activity, nutrition, alcohol</td>
</tr>
<tr>
<td>45 - 59</td>
<td>As above, plus: Referral to nephrologist</td>
</tr>
<tr>
<td>60 - 89</td>
<td>As above, plus: Physical activity, nutrition, alcohol</td>
</tr>
<tr>
<td>≥ 90</td>
<td>As above, plus: Referral to nephrologist</td>
</tr>
</tbody>
</table>

**Prognosis of CKD by GFR and albuminuria category**

<table>
<thead>
<tr>
<th>GFR (mL/min/1.73 m²)</th>
<th>Albuminuria/proteinuria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal (&lt;60)</td>
<td>Normal (urine ACR &lt;30)</td>
</tr>
<tr>
<td>Stage 1 CKD</td>
<td>100 - 1000</td>
</tr>
<tr>
<td>Stage 2 CKD</td>
<td>1000 - 5000</td>
</tr>
<tr>
<td>Stage 3a CKD</td>
<td>5000 - 100,000</td>
</tr>
<tr>
<td>Stage 3b CKD</td>
<td>100,000 - 500,000</td>
</tr>
<tr>
<td>Stage 4 CKD</td>
<td>500,000 - 10,000,000</td>
</tr>
<tr>
<td>Stage 5 CKD</td>
<td>≥ 10,000,000</td>
</tr>
</tbody>
</table>

Interpreting tests of GFR and albuminuria

- **For patients with CKD, the combination of a low GFR and albuminuria or proteinuria places them at a greater risk of developing kidney function (a sustained decline in eGFR of more than 5mL/min/1.73m²/yr)**
- **A measured or estimated GFR <60mL/min/1.73m²** is associated with increased risks of adverse renal, cardiovascular and other clinical outcomes, irrespective of age

### 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
  - Decreased likelihood of kidney transplantation
  - Decreased patient morbidity and mortality

- **Who should usually be referred to a nephrologist?**
  - Anyone with
    - GFR <30mL/min/1.73m²
  - Persistant significant albuminuria (urine ACR >30mg/mmol)
  - A consistent decline in eGFR from a baseline of <60mL/min/1.73m² over a six-month period which is confirmed on at least three separate readings
  - Glomerular haematuria with macroalbuminuria
  - CKD and hypertension that is hard to get under control despite at least three anti-hypertensives
  - Diabetes with GFR <60mL/min/1.73m²**
Referral to a nephrologist is not necessary if:
- Stable eGFR > 60 mL/min/1.73m²
- Urine ACR <30 mg/g (with no haematuria)
- Controlled blood pressure

Tips for referral:
- Familiarise yourself with your local nephrology unit’s referral guidelines
- Don’t refer to a nephrologist if targets of therapy are achieved.
- Pay attention to CKD risk reduction
- Consider discussing management issues with a nephrologist in cases where uncertainty regarding referral exists.

Clinical tip
- Referral may be less stringent.
- The decision to refer or not must always be individualised,
- exists.
- nephrologist in cases where uncertainty regarding referral
- achieved.

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

Treatment targets for people with CKD

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>≤ 120</td>
<td>≤ 120</td>
<td>≤ 110</td>
<td>≤ 100</td>
<td>≤ 90</td>
</tr>
<tr>
<td>Physical activity</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Renal function</td>
<td>eGFR &gt; 90 mL/min/1.73 m²</td>
<td>eGFR 60-89 mL/min/1.73 m²</td>
<td>eGFR 30-59 mL/min/1.73 m²</td>
<td>eGFR 15-29 mL/min/1.73 m²</td>
<td>eGFR &lt; 15 mL/min/1.73 m²</td>
</tr>
<tr>
<td>Access</td>
<td>Standard dialysis or peritoneal dialysis if indication is</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Clinical features</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Progression</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Management</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Frequency of clinical review</td>
<td>1-2 months</td>
<td>1-2 months</td>
<td>1-2 months</td>
<td>1-2 months</td>
<td>1-2 months</td>
</tr>
</tbody>
</table>

CKD management according to stage

<table>
<thead>
<tr>
<th>Stage</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>eGFR &gt; 90 mL/min/1.73 m²</td>
<td>60-89 mL/min/1.73 m²</td>
<td>30-59 mL/min/1.73 m²</td>
<td>15-29 mL/min/1.73 m²</td>
<td>&lt; 15 mL/min/1.73 m²</td>
</tr>
<tr>
<td>Target</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Target</td>
<td>–</td>
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<td>Target</td>
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<td>Target</td>
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</tr>
<tr>
<td>Target</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

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

Cortisol Rebound
- People with rickets or severe CKD are at high risk of a 120 mg rebound
- Adrenal suppressive BP targets will often require the use of more than one agent
- An ACR value of 2 mg/L will typically be required to achieve target plasma pressure

Dosing adjustment of these agents is necessary in cases of chronic kidney disease (CKD) and is therefore

| **www.alcohol.org.nz**
Early detection of CKD using kidney health check

<table>
<thead>
<tr>
<th>Albuminuria stage</th>
<th>Men &gt; 25</th>
<th>Women &gt; 35</th>
<th>Male &gt; 35</th>
<th>Female &gt; 35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microalbuminuria</td>
<td>&lt; 25</td>
<td>&lt; 3.5</td>
<td>&lt; 2.5</td>
<td>&lt; 3.5</td>
</tr>
<tr>
<td>Macroalbuminuria</td>
<td>&gt; 25</td>
<td>&gt; 35</td>
<td>&gt; 25</td>
<td>&gt; 35</td>
</tr>
</tbody>
</table>

**Definitions of Albuminuria and Proteinuria**

- **Microalbuminuria**: In the first void specimen:
  - Male: < 25 mg/day
  - Female: < 3.5 mg/day

- **Macroalbuminuria**: In the first void specimen:
  - Male: > 25 mg/day
  - Female: > 35 mg/day

- **Urine protein/creatinine ratio** (urine ACR mg/mmol):
  - Male: < 2.5 mg/mmol
  - Female: < 3.5 mg/mmol

- **Urine albumin/creatinine ratio** (urine ACR mg/mmol):
  - Male: < 2.5 mg/mmol
  - Female: < 3.5 mg/mmol

**Interpreting tests of GFR and albuminuria**

- **GFR** (ml/min/1.73m²)
  - Stage 1: 90-120
  - Stage 2: 60-89
  - Stage 3a: 45-59
  - Stage 3b: 30-44
  - Stage 4: 15-29
  - Stage 5: < 15

- **Albuminuria stage**
  - Microalbuminuria: < 2.5 mg/mmol
  - Macroalbuminuria: > 25 mg/day

**Clinical action plan**

**Based on a combination of kidney function (eGFR) and kidney damage (albuminuria/proteinuria)**

<table>
<thead>
<tr>
<th>eGFR (ml/min/1.73m²)</th>
<th>Description</th>
<th>Clinical Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 60</td>
<td>Normal kidney function</td>
<td>Further investigation for CKD may be indicated in those at increased risk**</td>
</tr>
<tr>
<td>30-60</td>
<td>Mild-moderate kidney function</td>
<td></td>
</tr>
<tr>
<td>15-29</td>
<td>Severe kidney function</td>
<td></td>
</tr>
<tr>
<td>&lt; 15</td>
<td>End-stage kidney disease</td>
<td></td>
</tr>
</tbody>
</table>

**Clinical tip**

- Avoid combination of ACE inhibitors and ARBs

**Prognosis of CKD by GFR and albuminuria category***

<table>
<thead>
<tr>
<th>GFR (ml/min/1.73m²)</th>
<th>Albuminuria (urine ACR mg/mmol)</th>
<th>Provincial</th>
<th>National (ACEi/ARB)</th>
<th>Stage 1: 90-120</th>
<th>Stage 2: 60-89</th>
<th>Stage 3a: 45-59</th>
<th>Stage 3b: 30-44</th>
<th>Stage 4: 15-29</th>
<th>Stage 5: &lt; 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>Normal</td>
<td>1: 0%</td>
<td>0%</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>&lt; &lt;15 &lt;15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate-severe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>End-stage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Clinical**

- Appropriate referral is associated with:
  - Reduced rates of progression to end-stage kidney disease
  - Increased likelihood of permanent dialysis access initiated prior to dialysis start
  - Reduced initial costs of care following the commencement of dialysis
  - Increased likelihood of kidney transplantation
  - Decreased patient mortality and morbidity

**Who should be referred to a nephrologist?**

- If diabetes with eGFR <45mL/min/1.73m²**
- Persistent significant albuminuria (urine ACR >30mg/mmol)
- A consistent decline in eGFR from a baseline of >60mL/min/1.73m² (a decline >5mL/min/1.73m² over a six month period which is confirmed on at least three separate readings)
- Glomerular haematuria with macroalbuminuria
- CKD and hypertension that is hard to get to target despite at least three anti-hypertensives
- Diabetes with eGFR <60mL/min/1.73m²**

**Indications for referral to a nephrologist**

- For patients with CKD, the combination of a low GFR and albuminuria or proteinuria places them at a greater risk of CKD progression at all ages, than those with just low GFR or albuminuria/proteinuria
- Physical testing is needed to track up the patient with rapidly deteriorating kidney function (sustained decline in eGFR of more than 5mL/min/1.73m²/yr)
- A measured or estimated GFR <60mL/min/1.73m² is associated with increased odds of adverse renal, cardiovascular and other clinical outcomes, irrespective of age

**Clinical**

- For patients with CKD, the combination of a low GFR and albuminuria or proteinuria places them at a greater risk of CKD progression at all ages, than those with just low GFR or albuminuria/proteinuria
- Physical testing is needed to track up the patient with rapidly deteriorating kidney function (sustained decline in eGFR of more than 5mL/min/1.73m²/yr)
- A measured or estimated GFR <60mL/min/1.73m² is associated with increased odds of adverse renal, cardiovascular and other clinical outcomes, irrespective of age

**Appropriate referral is associated with**

- Reduced rates of progression to end-stage kidney disease
- Increased likelihood of permanent dialysis access initiated prior to dialysis start
- Reduced initial costs of care following the commencement of dialysis
- Increased likelihood of kidney transplantation
- Decreased patient mortality and morbidity
As for stage 1-2
Pay attention to CVD risk reduction.
Don’t refer to a nephrologist if targets of therapy are achieved.
Consider discussing management issues with a nephrologist.
Urine ACR <30 m/mmol (with no haematuria)
Consider referral
Kidney damage + ultrasound, current blood chemistry, and quantification of proteinuria.

- Referral may be less stringent.
The decision to refer or not must always be individualised, ensuring the referral guidelines are followed.

As eGFR declines more drugs will typically be required to achieve target blood pressure.
Achieving adequate BP targets will often require the use of more than one agent.
Consider immunisation against influenza and invasive pneumococcal disease for people with diabetes or CKD.

### CKD management according to stage

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>Grade A/B/C</th>
<th>Grade A/B/C</th>
<th>Grade A/B/C</th>
<th>Grade A/B/C</th>
<th>Grade A/B/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No signs or symptoms of CKD</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>2</td>
<td>Mild to moderate kidney damage</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>3</td>
<td>Severe kidney damage</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>4</td>
<td>End-stage kidney disease</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
</tbody>
</table>

**CKD Stage 1**
- **Description:** No signs or symptoms of CKD
- **Grade A/B/C:** A
- **Grade A/B/C:** B
- **Grade A/B/C:** C

**CKD Stage 2**
- **Description:** Milder to moderate kidney damage
- **Grade A/B/C:** A
- **Grade A/B/C:** B
- **Grade A/B/C:** C

**CKD Stage 3**
- **Description:** Severe kidney damage
- **Grade A/B/C:** A
- **Grade A/B/C:** B
- **Grade A/B/C:** C

**CKD Stage 4**
- **Description:** End-stage kidney disease
- **Grade A/B/C:** A
- **Grade A/B/C:** B
- **Grade A/B/C:** C

**CKD Stage 5**
- **Description:** Dialysis or transplantation (or conservative medical management)
- **Grade A/B/C:** A
- **Grade A/B/C:** B
- **Grade A/B/C:** C

**CKD management in general practice**

- **Prevention:** Supportive management of diabetes, hypertension, and lipid disorders.
- **Supportive management:** Management of diabetes, hypertension, and lipid disorders.
- **Diet:** Low in salt and high in potassium.
- **Exercise:** Regular physical activity.
- **Other:** Smoking cessation, weight management, and alcohol moderation.

**CKD complications management**

- **Kidney-related complications:** Management of proteinuria, albuminuria, and anemia.
- **Cardiovascular complications:** Management of hypertension, hypercholesterolemia, and dyslipidemia.
- **Renal complications:** Management of azotemia, uremia, and electrolyte disturbances.

**Frequency of clinical review**

- **Stage 1 or 2:** Every 12 months.
- **Stage 3 or 4:** Every 6 months.
- **Stage 5:** Every 3 months.
- **Nephrologist review:** Monthly, with 1 to 2 visits per month.

**Revised October 2013**