



## Do I need to refer to a renal physician / nephrologist?

### Indicators of Kidney Disease or Damage

1. Indicators of kidney damage include:

- abnormal (low) glomerular filtration rate (eGFR);
- proteinuria (microalbuminuria (referred to as moderately elevated albuminuria in diabetes mellitus) or macroalbuminuria (severely elevated albuminuria in diabetes mellitus));
- glomerular haematuria (dysmorphic RBCs on microscopy);
- histological abnormalities on a renal biopsy;

2. Radiological imaging abnormalities (eg. scarring on kidneys, unexplained markedly ( $>1.5\text{cm}$  in length) asymmetrical kidney size);

3. Generalised vascular disease with renovascular disease (suspected or proven) – typically associated with hypertension;

4. Inherited renal disorders (eg. polycystic kidney disease, cystine stone formers, reflux nephropathy).

5. Recurrent kidney tract stone formers.

Chronicity is considered when any one or more of the parameters above is present for a period of three months or more.

Renal disease is mostly asymptomatic and previous population and observational studies have revealed that approximately 15-16% of the general population have some renal abnormality. Early detection of renal disease and reduced glomerular filtration (eGFR) is important as random measurement of the serum creatinine alone is not a sensitive indicator of renal function. Other important factors suggestive of kidney disease must be considered in parallel with an abnormal eGFR – especially MSU findings and blood pressure.

### eGFR

The estimated glomerular filtration rate (eGFR) using the MDRD formula is a better indicator of renal function than the serum creatinine alone. Recently the modification of diet in renal disease (MDRD) equation has been validated for adults under the age of 18 in a broad range of patients with a glomerular filtration rate below  $60\text{ml/min}/1.73\text{m}^2$  BSA.

### Factors that may affect the eGFR

The eGFR is only validated in people with an eGFR below  $60\text{ml/min}/1.73\text{m}^2$  BSA. Reporting of the corrected for body size eGFR is now automatic by laboratories in patients who do not have end stage kidney failure (on dialysis) whenever a serum creatinine is requested.

The eGFR is less accurate above  $60\text{ml/min}/1.73\text{m}^2$  BSA. Some laboratories report the absolute value of the eGFR over 60. An eGFR value  $> 60$  alone may not be abnormal. It should not be assessed in isolation. A normal eGFR does not exclude renal disease either.



An eGFR of any value should not be assessed in isolation. Other indicators of renal disease (eg. haematuria, hypertension, proteinuria) should be evaluated at the same time.

Acute kidney failure with sudden changes in the serum creatinine, or resolving acute renal failure will erroneously affect the eGFR, and the eGFR should be ignored in such situations. The serum creatinine is a better indicator and thorough clinical examination and assessment of the clinical progress form part of the renal assessment as well.

Major variations from a standard diet such as vegetarian diets, high protein diets, protein supplement diets (containing creatine) affect the eGFR.

Extremes of body size (large skeletal muscle mass – such as body builders, people in manual jobs; or people with very low muscle mass - such as amputees or those with muscle wasting disorders (eg. Polymyositis and motor-neurone disease) and the elderly may invalidate the eGFR. Such people, as well as children, adolescents and the elderly may require a 24-hour urine creatinine clearance or other measurement of GFR. The eGFR is not well validated in these groups.

### When to refer to a nephrologist?

Decision to refer to a nephrologist will vary on an individual basis. For example a 35 year old woman, otherwise healthy, with an eGFR of 58ml/min/1.73m<sup>2</sup> BSA has moderate renal impairment, and her kidneys may develop severe renal failure in her life-time. Whereas a man aged 86 years with a long history of medical problems that may affect the kidney (eg. hypertension, multiple use of NSAIDs for arthritis and vascular disease) with an eGFR of 28ml/min/1.73m<sup>2</sup> BSA may not require referral.

Factors on their own likely to require referral include:

- eGFR below 30ml/min/1.73m<sup>2</sup> body surface area;
- rapidly deteriorating glomerular filtration rate - greater than 15% to 20% decline in the eGFR over two to three months - irrespective of the baseline level.
- Macroalbuminuria (> 1g/24hrs);
- Microalbuminuria and diabetes mellitus and a GFR < 60ml/min/1.73m<sup>2</sup>;
- Anaemia (haemoglobin < 100g/L) with a low eGFR;
- Electrolyte abnormalities;
- Incidental findings of kidney disease with no other abnormality, eg renal scarring, polycystic kidney disease;
- Difficult to control hypertension;
- Suspected renovascular disease;
- Recurrent or multiple urinary tract stone formers.



**Higher risk groups that are susceptible to chronic kidney disease include patients:**

1. who smoking
2. with diabetes mellitus
3. have hypertension;
4. over 70 years of age
5. have a family history of kidney disease; and
6. Pacific Islanders and Maori.

Chronic renal failure (chronic kidney disease, CKD) has been classified into five stages (see table).

CKD Stage	Characteristics	eGFR (ml/min/1.73m <sup>2</sup> BSA)
1	Kidney disease with normal kidney function eg. early diabetes mellitus with increased GFR.	>90
2	Kidney disease with mild reduction in kidney function	60 - 90
3	Kidney disease with moderate reduction in kidney function	30 - 59
4	Kidney disease with severe reduction in kidney function	15 - 29
5	End-stage kidney failure	<15

eGFR (mL/min/1.73m <sup>2</sup> )	Description	Clinical Action Plan
≥ 60	No kidney damage or CKD Stage 1 or 2	<p>Further investigation for CKD may be indicated in those at increased risk, e.g. hypertension, or diabetes mellitus.</p> <ul style="list-style-type: none"><li>• Assessment of proteinuria (ACR (albumin creatinine ratio) or PCR (protein-creatinine ratio) or 24-hour urine collection).</li><li>• Urinalysis (MSU, including RBC morphology).</li><li>• Blood pressure.</li></ul> <p>Cardiovascular risk reduction (factors to be addressed include: blood pressure; lipids; blood glucose; smoking; obesity; physical activity)</p> <p>Ultrasound of renal tract (including bladder) may be appropriate.</p>



30-59	CKD Stage 3	<p>In addition to factors for eGFR &gt; 60ml/min/1.73m<sup>2</sup> BSA:</p> <ul style="list-style-type: none"><li>• Monitor eGFR 2 to 3 monthly.</li><li>• Avoid nephrotoxic drugs.</li><li>• Consider prescription of anti-proteinuric medications (even in absence of hypertension), eg. angiotensin converting enzyme (ACE) inhibitors and/or angiotensin receptor blockers (ARBs).</li><li>• Anaemia treatment appropriate? Is patient suitable for erythropoietin (Hb &lt; 100g/L).</li><li>• Acidosis (oral bicarbonate therapy).</li><li>• Hyperparathyroidism and serum phosphate control.</li><li>• Medication dosage adjustment for degree of kidney function.</li></ul> <p>Ultrasound of renal tract if not previously done.</p> <p>Consider referral to nephrologist.</p>
15-29	CKD Stage 4	<p>As for eGFR &lt;60ml/min/1.73m<sup>2</sup> BSA, and; referral to nephrologist is usually indicated.</p> <p>Nephrologist assesses and plans for renal replacement therapy (if indicated)</p> <ul style="list-style-type: none"><li>• Education</li><li>• Choice of dialysis modality<ul style="list-style-type: none"><li>◦ Peritoneal dialysis (PD)</li><li>◦ Haemodialysis (HD)</li></ul></li><li>• Access surgery<ul style="list-style-type: none"><li>◦ Tenckhoff (for PD)</li><li>◦ Fistula (for HD)</li></ul></li><li>• Renal transplantation assessment</li></ul>
< 15	CKD Stage 5	<p>As above plus referral to nephrologist</p> <p>Continuing care usually closely monitored by nephrologist</p>