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# Evaluation of renal function

## CARI guidelines

The Caring for Australasians with Renal Impairment (CARI) guidelines initiative is an Australian and New Zealand project that aims to provide high quality, evidence based clinical practice guidelines for the management of all stages of kidney disease. This article summarises CARI guidelines on the *Evaluation of renal function* and is the first in a series of articles on aspects of assessment and management of patients with chronic kidney disease. Complete CARI guideline detail is available at [www.cari.org.au](http://www.cari.org.au).

**Data sources**

Medline, Embase, Cochrane Clinical Trials database.

**Study selection and assessment**

No high level evidence (ie. systematic reviews of randomised controlled trials [RCTs] or standard RCTs) was available. Recommendations were developed using evidence from observational studies such as cohort, case control and case series studies.

**Suggestions for clinical care****Plasma creatinine concentration to assess kidney function**

Plasma creatinine concentration should not be used alone as a measure of kidney function as it is particularly insensitive for identifying chronic kidney disease (CKD) in its early to middle stages and in certain patient groups (eg. small body size, females, elderly). Such patients can lose up to 75% of their kidney function before the plasma creatinine value rises above the upper limit of normal. It is most useful for assessing minor changes in renal function over time in the same individual.

**Use of eGFR rate to assess kidney function**

Abbreviated (4-variable) modification of diet in renal disease (MDRD) formula is the best available equation for automated laboratory reporting of estimated glomerular filtration rate (eGFR) and is now routinely reported by most Australian and New Zealand laboratories. The eGFR may not be reliable in some circumstances such as:

- extremes of body size
- children
- exceptional dietary intake (eg. vegetarians)
- skeletal muscle disease
- amputation

**Table 1. Stages of chronic kidney disease<sup>1</sup>**

Stage	Description	GFR (mL/min/1.73 m <sup>2</sup> )
1	Kidney damage with normal or increased GFR	>90
2	Kidney damage with mild decreased GFR	60–89
3	Moderate decreased GFR	30–59
4	Severe decreased GFR	15–29
5	Kidney failure	<15 (or dialysis)

- paraplegia
- severe liver disease
- particular ethnic groups (Aboriginal and Torres Strait Islander peoples, Maori and Pacific Islanders, Indo-Asians), and
- eGFR >60 mL/min/1.73 m<sup>2</sup>.

**Direct measurement of GFR**

Creatinine clearance measurements have generally been shown to provide less reliable estimates of GFR than GFR prediction equations. Direct measurement of GFR by clearance of creatinine or other exogenous filtration markers (iothalamate, DTPA, EDTA, iohexol) may be required in situations where eGFR is unreliable or where a high degree of accuracy in GFR estimation is required, such as before dosing with renally excreted medications that have high toxicity (eg. cytotoxic drugs) or evaluation of renal function in live potential kidney donors.

**Classification of chronic kidney disease**

Diagnosis is based on GFR <60 mL/min/1.73m<sup>2</sup> and/or presence of kidney damage for at least 3 months. Kidney damage is defined as persistent microalbuminuria, persistent proteinuria, persistent haematuria after exclusion of urological causes, or structural abnormalities on kidney imaging tests (eg. polycystic kidneys, renal scarring).<sup>1</sup> Stages of CKD are shown in *Table 1*.

**Reference**

1. National Kidney Foundation. K/DOQI clinical practice guidelines for chronic kidney disease: evaluation, classification and stratification. *Am J Kidney Dis* 2002;39(Suppl 1):S1–266.