

Definition

Defined as abnormalities of kidney function or structure present for more than 3 months, with implications for health. This includes all people with markers of kidney damage and those with a glomerular filtration rate (GFR) of less than $60\text{ml}/\text{min}/1.73\text{m}^2$ on at least 2 occasions separated by a period of at least 90 days.

Who should be tested for CKD?

- Monitor GFR at least annually in people prescribed drugs known to be nephrotoxic, such as calcineurin inhibitors (e.g. ciclosporin or tacrolimus), lithium and non-steroidal anti-inflammatory drugs (NSAIDs)
- Test for CKD (eGFR, serum creatinine and urine ACR) in the presence of the following risk factors: diabetes, hypertension, acute kidney injury, cardiovascular disease, structural renal tract disease, recurrent renal calculi or prostatic hypertrophy, multisystem diseases with potential kidney involvement e.g. systemic lupus erythematosus, family history of end-stage kidney disease (GFR category G5) or hereditary kidney disease, opportunistic detection of haematuria

Measuring kidney function

- For Afro-Caribbean multiply eGFR by 1.159
- At extremes of muscle mass interpret eGFR with caution– e.g. body builders (high creatinine), amputees or muscle wasting disorders (low creatinine)
- Advise people not to eat any meat in the 12 hours before their blood test - meat raises creatinine
- Bloods must be processed within 12 hours of venepuncture

Reporting and interpreting GFR values

- If GFR is greater than $90\text{ml}/\text{min}/1.73\text{m}^2$, use an increase in serum creatinine concentration of more than 20% to infer significant reduction in kidney function.
- Interpret eGFR values of $60\text{ml}/\text{min}/1.73\text{m}^2$ or more with caution, bearing in mind that estimates of GFR become less accurate as the true GFR increases
- Confirm an eGFR result of less than $60\text{ml}/\text{min}/1.73\text{m}^2$ in a person not previously tested by repeating the test within 2 weeks. Allow for biological and analytical variability of serum creatinine (+5%) when interpreting changes in eGFR

Accelerated progression of CKD

Be aware that people with CKD are at increased risk of progression to end-stage kidney disease if they have either of the following:

- A sustained decrease in GFR of 25% or more and a change in GFR category within 12 months or
- A sustained decrease in GFR of $15\text{ml}/\text{min}/1.73\text{m}^2$ per year

Take the following steps to identify the rate of progression of CKD:

- Obtain a minimum of 3 GFR estimation over a period of not less than 90 days
- In people with a new finding of reduced GFR, repeat the GFR within 2 weeks to exclude causes of acute deterioration of GFR e.g. acute kidney injury or starting renin-angiotensin system antagonist therapy

Risk factors associated with CKD progression

Work with people who have any of the following risk factors for CKD progression to optimise their health:

- Cardiovascular disease
- Proteinuria
- Acute kidney injury
- Hypertension
- Diabetes
- Smoking
- African, African-Caribbean or Asian family origin
- Chronic use of NSAIDs
- Untreated urinary outflow tract obstruction
- NSAID use – see below

Chronic use of NSAIDs may be associated with progression and acute use is associated with a reversible decrease in GFR. Exercise caution when treating people with CKD with NSAIDs over prolonged periods of time. Monitor the effects on GFR, particularly in people with a low baseline GFR and/or in the presence of other risks for progression.

Proteinuria

- Do not use reagent strips to identify proteinuria unless they are capable of specifically measuring albumin at low concentrations and expressing the result as an ACR
- To detect and identify proteinuria, use urine ACR in preference to protein
- For the initial detection of proteinuria, if the ACR is between 3 mg/mmol and 70 mg/mmol, this should be confirmed by a subsequent early morning sample. If initial ACR is 70 mg/mmol or more, a repeat sample need not be tested

Regard a confirmed ACR of 3 mg/mmol or more as clinically important proteinuria

Acute kidney injury and CKD

Monitor people for the development or progression of CKD for at least 2-3 years after acute kidney injury, even if serum creatinine has returned to baseline.

Haematuria

When testing for the presence of haematuria, use reagent strips rather than urine microscopy

- Evaluate further if there is a result of 1+ or more
- Do not use urine microscopy to confirm a positive result

Indications for renal ultrasound

Offer a renal ultrasound scan to all people with CKD who:

- Have accelerated progression of CKD
- Have visible or persistent invisible haematuria
- Have symptoms of urinary tract obstruction
- Have a family history of polycystic kidney disease and are aged over 20 years
- Have a GFR of less than 30 ml/min/1.73 m² (GFR category G4 or G5)
- Are considered by a nephrologist to require a renal biopsy

Blood pressure targets

<140/90 (Qof <140/85)

<130/80 in diabetes or ACR > 70

Choice of antihypertensive agent in CKD

Hypertension, no diabetes, ACR < 30mg/mmol (ACR categories A1 and A2) - follow NICE HT clinical guideline 127

Start with ACE inhibitor (or ARB if ACEi intolerant) for:

- Diabetes with ACR > 3mg/mmol (ACR category A2 or A3)
- HT with ACR ≥ 30mg/mmol (ACR category A3)
- ACR ≥ 70mg/mmol (start even if no hypertension)

Following the introduction or dose increase of ACEi / ARB:

U+E at 7 – 10 days

If either the eGFR decrease from pre-treatment baseline is less than 25% OR the serum creatinine increase from baseline is less than 30%

Do not modify the dose, repeat U+E in 1-2 weeks

If the eGFR decrease is 25% or more, OR the change in serum creatinine is 30% or more:

- Investigate other causes such as volume depletion or concurrent medication e.g. NSAIDs
- If no other cause for the deterioration in renal function is found, stop ACEi / ARB or reduce to a previously tolerated dose, and add an alternative antihypertensive medication if required.

Hyperkalaemia

Stop ACEi / ARB if the serum potassium 6.0 or more; discontinue other drugs known to promote hyperkalaemia e.g. potassium-sparing diuretics, spironolactone, NSAIDs, beta-blockers. NB the product "Lo-Salt" for food flavouring is HIGH in potassium content

Chronic kidney disease

Updated: August 2018

Early identification and management of chronic kidney disease in adults in primary and secondary care

GFR and ACR categories and risk of adverse outcomes, and Frequency of monitoring (no of times per year: ≤1 to ≥4)		ACR categories (mg/mmol), description and range			
		<3 Normal to mildly increased	3–30 Moderately increased	>30 Severely increased	
		A1	A2	A3	
GFR categories (ml/min/1.73m ²), description and range	≥90 Normal and high	G1	No CKD in the absence of markers of kidney damage	1	≥1
	60–89 Mild reduction related to normal range for a young adult	G2	≤1	1	≥1
	45–59 Mild–moderate reduction	G3a ¹	1	1	2
	30–44 Moderate–severe reduction	G3b	≤2	2	≥2
	15–29 Severe reduction	G4	2	2	3
	<15 Kidney failure	G5	4	≥4	≥4

Increasing risk →

↑ Increasing risk

¹ Consider using eGFR_{cystatinC} for people with CKD G3a1

Abbreviations: ACR, albumin:creatinine ratio; CKD, chronic kidney disease; GFR, glomerular filtration rate
Adapted with permission from Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group (2013) KDIGO 2012 clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney International (Suppl. 3): 1–150

Frequency of monitoring

Use the Table opposite to guide the frequency of GFR monitoring for people with, or at risk of CKD, but tailor it to the person according to:

- The underlying cause of CKD
- Past patterns of eGFR and ACR (but be aware that CKD progression is often non-linear)
- Comorbidities, especially heart failure
- Changes to their treatment (such as renin-angiotensin-aldosterone system (RAAS) antagonists, NSAIDs and diuretics)
- Intercurrent illness
- Whether they have chosen conservative management of CKD

Referral criteria

People with CKD in the following groups should normally be referred for specialist assessment:

- GFR less than 30ml/min/1.73 m² (GFR category G4 or G5) with or without diabetes
- ACR 70 mg/mmol or more, unless known to be caused by diabetes and already appropriately treated
- ACR 30 mg/mmol or more (ACR category A3), together with haematuria
- Sustained decrease in GRF of 25% or more and a change in GFR category or sustained decrease in GFR of 15ml/min/1.73 m² or more within 12 months
- Hypertension that remains poorly controlled despite the use of at least 4 antihypertensive drugs at therapeutic doses
- Known or suspected rare or genetic causes of CKD
- Suspected renal artery stenosis

This table is taken from UKMi North West NICE Bites September 2014 No: 67
N.B. the eGFR_{cystatinC} test is not currently available.