

Management of CKD

All stages – to include

- Regular clinical and laboratory assessment (see table overleaf)
- Advice on smoking, weight, exercise, salt & alcohol intake
- Cardiovascular prophylaxis: if risk >20% at 10 years consider
 - aspirin if BP <150/90 mm Hg
 - lipid lowering drugs
- BP monitoring by BHS methods at least once a year
- Meticulous BP control
 - threshold 140/90, target 130/80 mmHg in most patients
 - threshold 130/80, target 125/75 mmHg if urine PCR >100 mg/mmol
 - include ACEI or ARB if urine PCR >100 mg/mmol or if diabetes and microalbuminuria present
 - + check creatinine and potassium - before starting and
 - 2 weeks after start and
 - after each dose change
 - + if creatinine increases by >20% or GFR falls by >15% repeat with potassium and seek advice (?stop ? test for RAS)
- If potassium > 6 mmol/L - check no haemolysis and check diet
 - stop NSAIDs and LoSalt
 - stop K - retaining diuretics
 - stop ACEI/ARB if hyperkalaemia persists

CKD Stage 3: additional management to include

- If Hb <11 g/dL and other causes excluded
 - refer for IV iron +/- ESA to maintain ferritin 200-500 µg/l and Hb 10.5 - 12.5 g/dl - please see NICE guideline 39
- Renal ultrasound if - lower urinary tract symptoms
 - refractory hypertension
 - unexpected fall in eGFR
- Immunise against influenza and pneumococcus
- Review all drugs - ensure correct dose
 - avoid nephrotoxic drugs eg NSAIDs if possible

CKD Stages 4/5 : additional management*

- Dietary assessment
- Immunisation against hepatitis B
- Management of hyperparathyroidism
- Correction of acidosis
- Information about options for treatment including pre-emptive transplantation if clinically appropriate (and conservative care).
- Timely dialysis access procedure
- Referral/discussion even if dialysis may not be appropriate

*in conjunction with secondary care

List of sources of further information

This leaflet was prepared by Dr Steve Blades, Dr Richard Burden and Dr Charlie Tomson (on behalf of the CKD Guideline Development Committee) and Dr Donal O'Donoghue (National Clinical Director for Kidney Care). The information is taken from 'UK Guidelines for Identification, Management and Referral of Chronic Kidney Disease in Adults'; the full version and a concise version as well as electronic guidance are available at:

www.renal.org/CKDguide/ckd.html See also:

Electronic library for Health: www.library.nhs.uk/kidney
 National Kidney Federation: www.kidney.org.uk
 NSF's - Diabetes, Renal: www.dh.gov.uk
 Anaemia Management: www.nice.org.uk/cg39

Abbreviation Key:

ACEI	Angiotensin Converting Enzyme Inhibitor
ARB	Angiotensin Receptor Blocker
BHS	British Hypertension Society
CKD	Chronic Kidney Disease
ESA	Erythropoiesis Stimulating Agent
LoSalt	(Potassium containing salt substitute)
NSAID	Non Steroidal Anti inflammatory Drug
PCR	Protein: Creatinine Ratio (best lab test for proteinuria)
PTH	Parathyroid hormone
RAS	Renal Artery Stenosis
RRT	Renal Replacement Therapy
SLE	Systemic Lupus Erythematosus

Minimum frequency of testing

CKD stage	Tests	Frequency
1 and 2	BP eGFR Urine PCR*	yearly
3	- also Hb, potassium calcium, phosphate	6 monthly (12 if stable **)
4 and 5	- also bicarbonate, PTH	3 monthly (6 if stable CKD stage 4 **)

* if dipstick protein present ** stable=<2mL/min change in eGFR over 6 months

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Continuing good CKD management

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The introduction of guidelines for chronic kidney disease (CKD) and eGFR has led to a substantial increase in workload in primary and secondary care but there is already some evidence that more of the patients who need dialysis are being referred in good time.

Please note it is important to include all the requested information with referrals; in particular it is very helpful to have all previous creatinine results with the date of each measurement, as a simple list. If sending the eGFR, please also include the serum creatinine result.

The main changes in this new edition are:

- reminders to exclude infection as a cause of proteinuria/microscopic haematuria
- a more detailed list of information needed on referral
- NICE recommendations on anaemia have been incorporated
- PTH measurement in primary care has been omitted

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What is eGFR?

Glomerular filtration rate is the best measure of kidney function. It is normally close to 100mL/min so the result roughly indicates the % of normal kidney function that someone has.

It is now estimated (hence $eGFR$) by the laboratory from the serum creatinine, gender, and age. $eGFR$ should be multiplied by 1.2 for African-Caribbean patients (unless this correction has been made by the laboratory).

It doesn't apply to acute renal failure nor to children (< 18 years). It tends to underestimate the severity of renal failure in people with muscle wasting or an amputation.

Why the change?

- Serum creatinine on its own does not detect minor degrees of kidney impairment and isn't directly related to the GFR.
- $eGFR$ forms the basis for the classification and management of CKD.
- CKD is an important risk factor for cardiovascular problems. $eGFR$ makes it easier to tell who should be offered treatment to reduce the risk.
- $eGFR$ makes it easier to work out which patients need to be referred for specialist investigation and treatment.

The 5 stages of CKD

eGFR	STAGE
>90 mL/min with another abnormality* - otherwise regard as normal	= stage 1 CKD
60-89 mL/min with another abnormality* - otherwise regard as normal	= stage 2 CKD
30-59 mL/min (moderate impairment)	= stage 3 CKD
15-29 mL/min (severe impairment)	= stage 4 CKD
<15 mL/min (established renal failure)	= stage 5 CKD

*e.g already known to have proteinuria, haematuria (but no urological cause), microalbuminuria (in diabetes), polycystic disease or reflux nephropathy.

If eGFR 60 – 89 ml/min:

On its own this is **not** an indication for further testing and does not mean someone has CKD.

If eGFR <60 ml/min:

- Review all previous creatinine/ $eGFR$ results to assess rate of deterioration
- Review medication, particularly recent additions e.g. non-steroidal anti-inflammatory drugs (NSAIDs), antibiotics, mesalazine, diuretics, ACEIs/ARBs.
- Test urine for haematuria and proteinuria. If protein present send (separate) samples for culture and for protein/creatinine ratio.
- Assess clinically: for urinary symptoms, palpable bladder, BP, sepsis, heart failure, hypovolaemia.
- Repeat serum creatinine/ $eGFR$ within 5 days to exclude rapid progression, if new finding.
- Check referral criteria: ensure entry into a chronic disease management programme if not indicated.

Information needed on referral

- General medical history
- Urinary symptoms
- Medication (with dates of starting and stopping ACEI/ARB if applicable)
- Examination e.g. BP, oedema, bladder
- Urine dipstick for blood and protein
- Urine culture and PCR (if protein present)
- Blood count
- Serum creatinine and $eGFR$, urea, sodium, potassium, albumin, calcium, phosphate, cholesterol, HbA1c (in diabetes)
- List all old creatinine results (as well as any $eGFR$ reports) with dates
- Result of renal ultrasound if available.

Criteria for referral

Stages 1/2

- Malignant hypertension (Urgent)
- Hyperkalaemia ($K^+ > 7$ mmol/L) (Urgent)
- Nephrotic syndrome (Urgent)
- Isolated proteinuria (protein:creatinine ratio (PCR) > 100mg/mmol)*
- Proteinuria and microscopic haematuria (PCR > 45mg/mmol)*
- Diabetes with proteinuria (PCR > 100 mg/mmol) but no retinopathy
- Macroscopic haematuria (after negative urological evaluation)
- Recurrent pulmonary oedema with normal left ventricular function
- Fall of $eGFR$ of >15% during first 2 months on ACEI / ARB

(* exclude urine infection, menstruation etc)

Stage 3

As above, plus:

- Progressive fall in GFR (>4 mL/min over 12 months)
- Anaemia (after exclusion of other causes) - see next page
- Persistently abnormal serum potassium, calcium, phosphate, (uncuffed sample)
- Suspected underlying systemic illness, e.g. SLE, vasculitis, myeloma
- Uncontrolled hypertension (e.g. BP > 150/90 on 3 agents)

Stages 4/5 (Urgent)

All patients should be referred or at least discussed formally with a nephrologist and offered the options of renal replacement therapy (RRT) or conservative therapy, even if it is not anticipated that RRT will be appropriate. Exceptions may include if the CKD is part of terminal illness or function is stable and relevant tests completed and appropriate management implemented with an agreed treatment plan.