Guidelines for the Management of Chronic Kidney Disease (CKD) for Adults

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What is CKD?

CKD is the presence of one of the following for>3 months.

Markers of Kidney Damage (one or more)	• Albuminuria (UACR ≥3 mg/mmol) confirmed on an early morning urine sample if UACR <70mg/mmol. • Urine sediment abnormalities e.g., presence of red (could indicate glomerular disease) or white blood cells (could indicate interstitial nephritis or infection e.g. pyelonephritis) , tubular epithelial cells (could indicate parenchymal disease) • Electrolyte and other abnormalities due to tubular disorders • Abnormalities detected by histology. • Structural abnormalities detected by imaging. • History of kidney transplantation
Decrease eGFR	eGFR of <60 ml/min/1.73 m2 (eGFR categories G3a–G5)

Who to Test

Offer Screening for CKD using eGFR, serum creatinine and Urine Albumin: Creatinine Ratio (UACR) to people with any of the following risk factors:

- All people living with diabetes at least annually.
- For those with an eGFR<60ml/min/1.73m2 a UACR should be requested
- Hypertension–annually as part of hypertensions reviews https://cks.nice.org.uk/topics/hypertension/diagnosis/investigations/
- Cardiovascular disease (ischaemic heart disease, chronic heart failure, peripheral arterial disease or cerebral vascular disease) annually as part of routine reviews
- History of acute kidney injury (monitor yearly for 3 years even if function back to baseline)
- Structural renal tract disease, recurrent renal calculi or prostatic hypertrophy
- Multi-system disease e.g., Systemic lupus erythematosus, vasculitis, myeloma
- Family history of end-stage kidney disease (GFR category G5) or hereditary kidney disease
- Gout
- Haematuria /Proteinuria (opportunistic detection)
- Treated with nephro-toxic agents (NSAIDs, Lithium, Calcineurin inhibitors, Aminosalicylates etc)

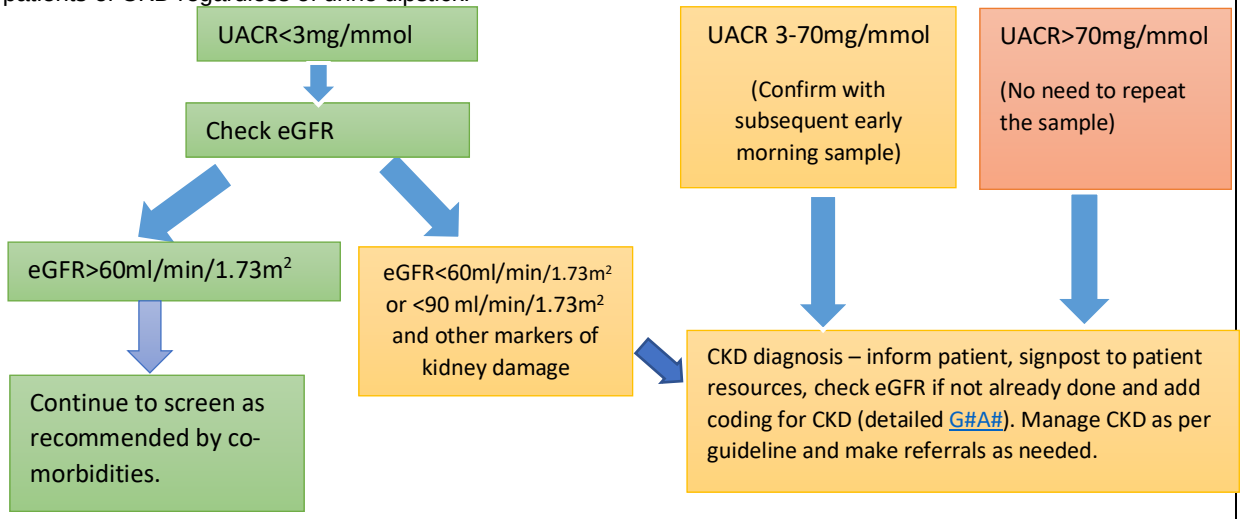
Every patient at the time of a clinician diagnosing CKD should have a urine dipstick because haematuria raises possibility of systemic renal disease or structural renal abnormalities which needs further assessment.

Haematuria

1. Use dipstick reagent strips rather than urine microscopy.
2. Evaluate further if a result of 1+ or more (initially repeat dipstick in 2 weeks)
3. Result is not useful if the person is menstruating if someone has a catheter or has a known infection.

Urine Albumin: Creatinine Ratio (UACR) and CKD Diagnosis

UACR is a useful marker of renal damage and complication risk. It is the usual method of assessing proteinuria. A confirmed (repeated) UACR>3mg/mmol represents proteinuria which is clinically significant. Measure UACR in all patients of CKD regardless of urine dipstick.



KFRE (Kidney Failure Risk Equation)

The Kidney Failure Risk Equation

Healthcare professionals can use the Kidney failure risk equation to determine 2 and 5 year risk of treated kidney failure (dialysis and transplantation) for a patient with CKD stage 3a-5

There are also videos available on this website to explain risk to people living with CKD www.kidneyfailurerisk.co.uk

NB: KFRE must be calculated using eGFR EPI (not MDRD)

How do we categorise CKD, how often should we test and when should we refer/seek advice?

When reviewing results, place the test results in clinical context including consideration of why the blood tests were taken. If history of acute illness, then assess and manage accordingly. Consider acute kidney injury (AKI) and the possibility of obstruction if rapidly declining eGFR. Think Kidneys https://www.thinkkidneys.nhs.uk/aki/resources/primary-care/, https://www.thinkkidneys.nhs.uk/campaign/

Frequency of Monitoring (***number of times per year shown in table as italicised number***)				Urinary Albumin Creatinine Ratio (UACR)		
				normal or mildly increased	moderately increased	severely increased
				<30mg/g or <3mg/mmol	30-300mg/g or 3-30mg/mmol	>300mg/g or 30mg/mmol
				A1	A2	A3
EGFR categories	G1	normal or high	≥90	*1* if CKD	*1* monitor	*2* A&G/Refer
	G2	mildly decreased	60-89	*1* if CKD	*1* monitor	*2* A&G/Refer
	G3a	mildly to moderately decreased	45-59	*1* Monitor	*2* monitor	*3* Refer
	G3b	moderately decreased	30-44	*2* Monitor	*3* monitor	*3* Refer
	G4	severely decreased	15-29	*3* A&G/Refer	*3* A&G/Refer	*4+* Refer
	G5	kidney failure	<15	*4+* Refer	*4+* refer	*4+* Refer

A&G = Advice and Guidance or refer NB: G1A1 and G2A1 only classed as CKD if also have additional Markers of Kidney Disease e.g. renal stone disease.

WHEN TO REFER

Where referral required, this should be to renal services if the patient does not have diabetes, or to combined diabetes/renal clinic for patient with diabetes (unless suspected or known non-diabetic kidney disease or eGFR <20ml/min1.73 m2 in which case referral should be to renal service)

Refer adults with CKD for specialist assessment (considering their wishes and comorbidities) if they have any of the following:

- 5-year risk of needing renal replacement therapy of greater than 5% (measured using the 4-variable Kidney Failure Risk Equation)
- ACR of 70 mg/mmol or more, unless known to be caused by diabetes and already appropriately treated
- ACR of more than 30 mg/mmol (ACR category A3), together with haematuria
- a sustained decrease in eGFR of 25% or more and a change in eGFR category within 12 months
- a sustained decrease in eGFR of 15 ml/min/1.73 m2 or more per year
- hypertension that remains poorly controlled (above the person's individual target) despite the use of at least 4 antihypertensive medicines at therapeutic doses
- known or suspected rare or genetic causes of CKD
- suspected renal artery stenosis.
- Patients with eGFR <30 ml/min/1.73 m2 will usually require referral; but with eGFR ≥30 ml/min/1.73 m2 referral will depend on other factors as above.

3 Step Solutions for the Management of Chronic Kidney Disease (CKD)

(ideally do in every patient with eGFR<60 or UACR ≥ 3 mg/mmol)

Month 1

Maximum intensity RAS/ * RAAS blockade and Optimise Lipids

Start **ACE-inhibitor or ***ARB in the following populations:

1. Adults with hypertension and an ACR>30mg/mmol (category A3 or above)
2. Adults with diabetes and an ACR>3mg/mmol (category A2)
3. Adults without diabetes and ACR>70mg/mmol (also refer to nephrology)

Titrate to maximum tolerated licensed dose (*NICE, NG203*) Ideally do this within one month (see rapid titration protocol for RAAS blockade below)

Atorvastatin 20mg once daily should be offered as initial therapy for primary and secondary prevention and national guidelines followed for review and titration. Optimise lipid lowering therapies according to national lipid lowering guidance NHS Accelerated Access Collaborative » Summary of national guidance for lipid management (england.nhs.uk)
If the patient is young (below 40 years) and has CKD -Use **QRISK®3-lifetime cardiovascular risk calculator:** QRISK3-lifetime
Stop nephrotoxic medications : Advise against use of NSAID's and discuss alternatives.

Month 2

Start SGLT-2 inhibitors

(Refer **to** 'Clinical Pathway for the use of SGLT-2 inhibitors in CKD and T2DM **'** guidance)

Person with Type 2 Diabetes

Start Canagliflozin 100mg once daily ensuring the person has eGFR 30-90ml/min/1.73m^2

OR

Start Dapagliflozin **OR** Empagliflozin 10mg once daily ensuring the person has an eGFR 20-90ml/min/1.73m2

Note that glycaemic benefits will be limited at an eGFR <45ml/min/1.73m^2

Person without Type 2 Diabetes

Start Dapagliflozin **OR** Empagliflozin 10mg once daily ensuring the person has either:

1. An eGFR 20 to <45ml/min/1.73m^2
   OR
2. An eGFR 45ml -90ml/min/1.73m^2 and UACR ≥ 22.6mg/mmol

Follow the guidance in the document 'Clinical Pathway for the use of SGLT-2 inhibitors in Chronic Kidney Disease (CKD) and Type 2 Diabetes Mellitus (T2DM)**'**
We would not advocate switching SGLT2i's so in those already established (including those on Canagliflozin) we would advise they continue and those already established on empagliflozin 25mg once daily should continue unless indicated to drop dose.
Specialist initiation only if history of: transplantation; on immunological therapy; polycystic kidney disease; haemodialysis.
The least expensive option of the available treatments should be used

Month 3

Optimise Blood Pressure and Other Cardiovascular Risk Factors

Initiate further blood pressure agents to treat to target

- No diabetes or proteinuria- Target <140/90 mmHg
- UACR < 70mg/mmol: <130/80mmHg
- UACR>70mg/mmol: Ideally <130-120/80mmHg taking into consideration frailty and co-morbidities.

Caution in the elderly/frail – consider reviewing the targets

Encourage home monitoring of Blood Pressure (NB targets are 5mmHg lower for HBPM)

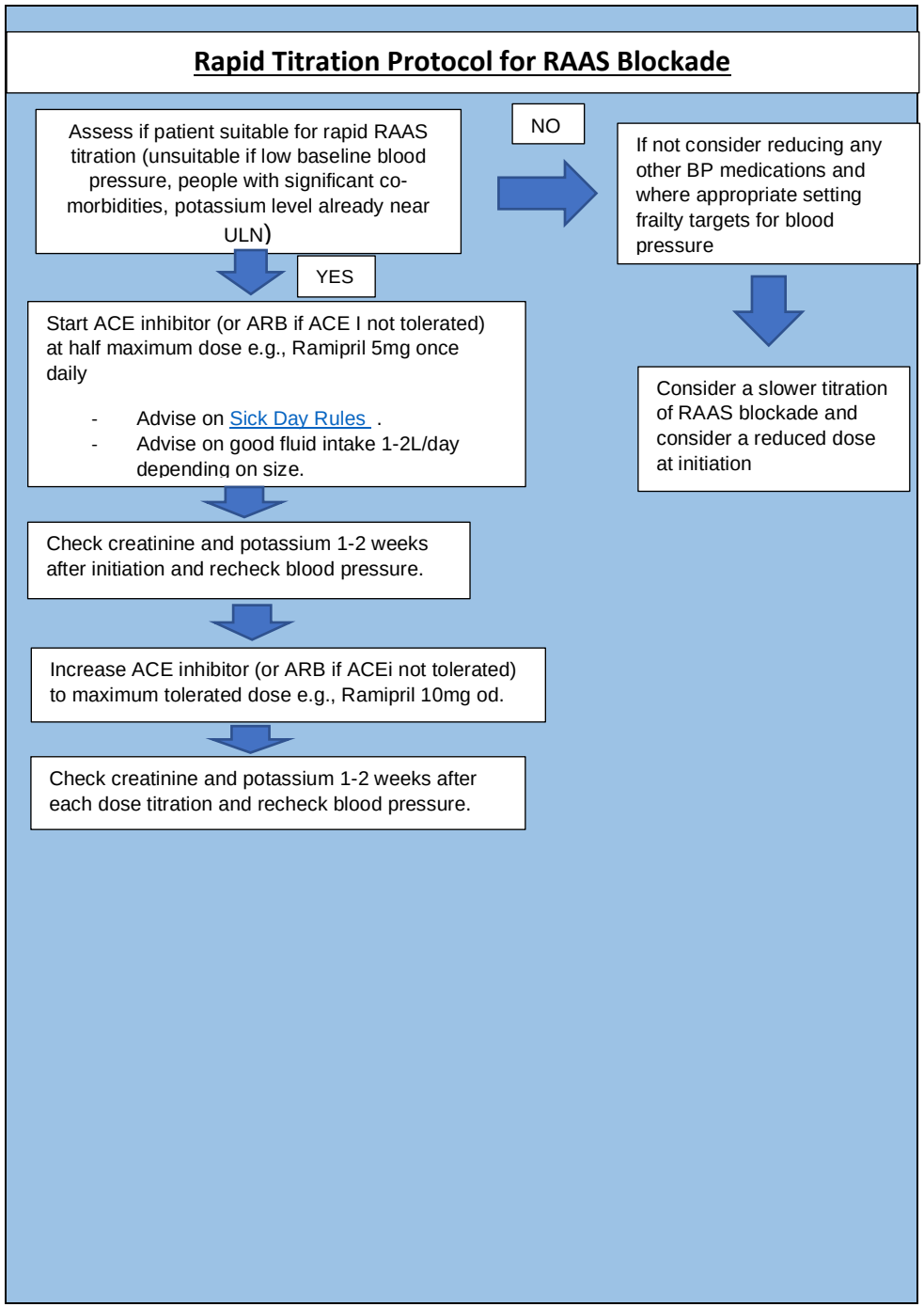
In those who have had a cardiovascular event, ensure offered aspirin with appropriate gastric protection (in some cases a H2 receptor antagonist may be preferred e.g., if having electrolyte abnormalities or in the instance of acute interstitial nephritis (ANI). Famotidine is the H2 receptor antagonist of choice in this situation).

Aspirin may be considered for primary prevention in those at high cardiovascular risk. Initiation should be balanced with consideration of the increased bleeding risk, including thrombocytopathy with low eGFR.

In those with established CAD or PAD at high risk of ischaemic events (see NICE) consider 2.5mg bd rivaroxaban alongside aspirin. Only if eGFR>15ml/min.

*RAAS inhibitors-Renin-angiotensin-aldosterone system inhibitors, **ACE inhibitors-Angiotensin-converting enzyme (ACE) inhibitors ***ARB – Angiotensin Receptor Blocker. RAAS inhibitors include ACEI (e.g. ramipril) and ARB (e.g. losartan).
Diagnosing and coding CKD early enables people to access interventions such as Lifestyle advice and pharmacotherapy to reduce the risk of CKD progressing and of significant cardiovascular complications.
Lifestyle advice – diet, exercise, weight management, smoking cessation, Vaccination-Flu, Pneumococcal

Rapid Titration Protocol for RAAS Blockade



Finerenone

At month 4 onwards consider Finerenone for people with Type 2 Diabetes and who also has:

- stage 3 or 4 CKD (eGFR ≥25-<60 ml/min with albuminuria (UACR ≥3mg/mmol) and
- been optimised on standard care (RAAS blockade and SGLT2 inhibitors) unless unsuitable.

The starting dose is 10mg once daily. The recommended target dose is 20mg once daily.

Treatment initiation

Serum potassium level (mmol/L)	
≤ 4.8	Start Finerenone 10mg daily
4.9 to 5.0	Finerenone may be considered with additional serum potassium monitoring within the first 4 weeks, based on the patient's co-morbidities and subsequent potassium levels.
> 5.0	Do not start Finerenone
eGFR (mL/min/1.73m^2)	
≥ 25 to < 60	Start 10mg daily
< 25	Do not start Finerenone

Refer to APC Finerenone guidelines for further information on treatment initiation, continuation, dose adjustment and monitoring.

Blood Results and Monitoring

ACE inhibitor and ARB

eGFR and Serum Creatinine

Accept a serum creatinine rise < 30% or eGFR fall of < 25% from baseline: after ACEi/ARB initiation or dose increase. Avoid initiating ACEI/ARB and SGLT2 inhibitors together as it can have a cumulative effect of <30%.
If renal function deterioration greater than stated above seek nephrologist advice (to exclude possible reno-vascular disease)
STOP ACEi/ARB if changes in creatinine/ eGFR exceed the above and no other causes of deteriorating renal function (e.g., dehydration, use of NSAIDs) is found.

Potassium (K+)

If K^+ >6.0 mmol/L -would need urgent repeat U&E (please follow local guidance and ideally this would be a same day repeat) and if 6.5 mmol/L or greater or if there are symptoms consistent with hyperkalaemia, you would usually send to A&E for repeat potassium and ECG. If K^+ >6.0 mmol/L stop ACEi/ARB and start low potassium diet, a recommended patient information can be found: https://www.kidney.org.uk/potassium.

If K+ remains persistently ≥6.0mmol/L and because of this hyperkalaemia people are unable to take an optimised dose of RAAS inhibitor. consider referral for sodium zirconium cyclosilicate (for CKD stage 3b-5, not on dialysis only)

If K^+ >5.5mmol/ stop MRAs (including Finerenone)

Aim to restart medications once K^+ ≤ 5.5 mmol/L (note lower starting doses with Finerenone below)

If the patient has proteinuria or heart failure with reduced ejection fraction and would benefit from an ACEi/ARB seek nephrologist advice as introduction of furosemide, potassium binders or bicarbonate to facilitate reintroduction of these agents.
Concomitant use of ACEi/ARB with spironolactone and other potassium sparing diuretics requires close monitoring of potassium. The Think Kidneys campaign has a useful guidance which can be found 2020-statement-on-Changes-in-Kidney-Function-FINAL.pdf (thinkkidneys.nhs.uk)

			Urine Albumin measurement			
		Category	A1	A2	A3	
		ACR	< 3.0	3.0-30	>30	>300 Urgent Clinician Consultation within 48 hours
				Repeat early morning sample if >3.0 within 3 months		
		PCR	<15	15-50	>50-100	>300 Urgent Clinician Consultation within 48 hours
		Urinalysis	Negative to trace	Trace to 1+	2+ or higher	
	BP targets		<140/90			KEY
GFR categories (mL/min/1.73 m2) description and range	G1	≥90	≤1	1 CKD G1A2/ 1Z1N • Commence or titrate ACEi/ARB •If T2DM consider SGLT2i	≥1 CKD G1A3/ 1Z1P •Commence or titrate ACEi/ARB Commence Statin • if T2DM consider SGLT2i	CKD GxAx = Emis Code
	G2	60-89	≤1 Commence SGLT2i if T2DM	1 CKD G2A2/ 1Z1R • Commence or titrate ACEi/ARB •If T2DM consider SGLT2i	≥1 CKD G2A3/ 1Z1S Commence Statin •Commence or titrate ACEi/ARB • If T2DM consider SGLT2i	1 Monitoring frequency per year [NICE]
	G3a	45-59	1 CKD G3aA1/ 1Z1T Commence Statin Commence SGLT2i if T2DM	1 CKD G3aA2/ 1Z1V •Commence Statin •Commence or titrate ACEi/ARB •Consider SGLT2i	2 CKD G3aA3/ 1Z1W •Commence Statin •Commence or titrate ACEi/ARB • Commence SGLT2i	
	G3b	30-44	2 CKD G3bA1/ 1Z1X Commence Statin Commence Empagliflozin	2 CKD G3bA2/ 1Z1Y •Commence Statin • Commence or Titrate ACEi/ARB •Consider SGLT2i Consider Finerenone if T2DM nephropathy	≥2 CKD G3bA3/ 1Z1Z •Commence Statin •Commence or titrate ACEi/ARB • Commence SGLT2i Consider Finerenone if T2DM nephropathy	Moderate risk of progression
	G4	15-29	2 CKD G4A1/ 1Z1a •Commence Statin Commence SGLT2i (GFR ≥20) •Review regular medication	2 CKD G4A2/ 1Z1b •Commence Statin • Commence or titrate ACEi/ARB • Commence SGLT2i if GFR ≥20 Consider Finerenone if T2DM nephropathy •Review regular medications	3 CKD G4A3/ 1Z1c •Commence Statin • Commence or titrate ACEi/ARB • Commence SGLT2i if GFR ≥20 Consider Finerenone if T2DM nephropathy Review regular medication	High risk of progression
	G5	<15	4 CKD G5A1/ 1Z1d •Commence Statin •Review regular medications	≥4 CKD G5A2/ 1Z1e •Commence Statin • Commence or titrate ACEi/ARB •Review regular medications	≥4 CKD G4A3/ 1Z1f •Commence Statin • Commence or titrate ACEi/ARB •Review regular medications	Very High risk of progression
Referral criteria	KFRE >5% in 5 years		Uncontrolled HTN despite ≥3 antihypertensives at max doses	Suspected renal artery stenosis	ACR ≥30 + Haematuria (Exclude UTI) ACR ≥70 regardless of eGFR (If not diabetic)	Suspected complication of CKD: E.g. Anaemia, malnutrition

3 Step Solution for the Management of Chronic Kidney Disease (CKD)

Step 1
- EARLY diagnosis and identification of patients

Step 2
- Medicines Optimisation

Step 3
- TIMELY REFERRAL to secondary care of those at risk of progression to end stage renal disease

Step 1: Early Diagnosis & Identification

NHS
Nottinghamshire Area Prescribing Committee

Failure to identify and treat CKD doubles mortality

Diagnosing and coding CKD early enables people to access interventions such as lifestyle advice and pharmacotherapy to reduce the risk of CKD progressing and of significant cardiovascular complications

Lifelong monitoring with U&E, eGFR, urine ACR and Blood Pressure in those at risk and with CKD

What is CKD?

GFR<60ml/min/1.73m2 for >3 months

OR

Kidney damage defined by:
- Pathological abnormalities
- Markers of damage
- Blood tests
- Albuminuria (urine albumin to creatinine ratio >3mg/mmol)
- Haemoproteinuria in absence of UTI
- Abnormal Imaging studies

Who to test?

- Diabetes
- Hypertension
- Acute Kidney Injury
- Cardiovascular disease
- Structural renal tract disease: renal calculi or prostatic hypertrophy
- Multisystem diseases with potential kidney involvement
- Systemic lupus erythematosus, inflammatory arthritis, myeloma
- Family history of stage 5 CKD or hereditary kidney disease
- Opportunistic detection of haematuria or proteinuria
- Gout

https://www.nice.org.uk/guidance/ng203

Step 2: Medicines Optimisation

RAASi+ Statin
- CKD with DM & urine ACR >3mg/mmol or
- CKD with hypertension
- Titrate to highest tolerated dose
- Statin: Atorvastatin 20mg OD for primary and secondary prevention of CVD

SGLT2i
- T2DM only: Dapagliflozin, Canagliflozin, Empagliflozin, (Ertugliflozin - Offer if eGFR ≥ 60)
- T2DM and eGFR 20-90: Dapagliflozin OR Empagliflozin , Canagliflozin if uACR >30 mg/mmol and consider if uACR 3-30 mg/mmol
- CKD - if eGFR ≥ 20 – 44 OR eGFR ≥ 45 and uACR ≥ 22.6 mg/mmol: Dapagliflozin **OR** Empagliflozin
- Local SGLT2i guidelines

CV risk
- BP control: if urine ACR <70 aim for clinic BP <140/90, if urine ACR ≥70 aim for clinic BP <130/80
- Consider aspirin

Finerenone
- CKD due to diabetic nephropathy (**T2DM only**) and eGFR ≥ 25 and ACR ≥ 3
- Start at 10mg OD and titrate to 20mg OD where possible
- Local finerenone guidelines

Step 3: Timely referral to secondary care of at-risk groups

- **KFRE 5 year risk** of ESKD >5% (www.kfre.co.uk)
- **Higher levels of proteinuria** (uACR ≥ 70mg/mmol, uPCR ≥ 100mg/mmol) unless known to be due to diabetes and already appropriately treated
- **Proteinuria** (uACR ≥ 30mg/mmol, uPCR ≥ 50mg/mmol) together with **haematuria**
- **Rapid Progression** (eGFR decline> 15 ml/min/1.73 m2 or > 25% decline and progression to next stage in 1 year)
- **Hypertension – poorly controlled** despite the use of at least four antihypertensive drugs at therapeutic doses.
- People with/suspected of having, **rare/genetic causes of CKD**
- Suspected **renal artery stenosis**
- CKD **heatmap** can be found here

Chronic Kidney Disease In Primary Care

Nottinghamshire Area Prescribing Committee

Definition

or

or

eGFR < 60 ml/min/1.73m^2
2 consecutive tests at least 3 months apart

Haemoproteinuria
uACR > 3 mg/mmol

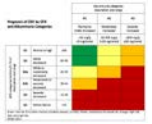
Abnormal renal scan or biopsy

Investigate

AND

Offer **blood and urine** testing for adults with high risk for CKD: diabetes, hypertension, previous AKI, CVD, urinary tract disease, incidental detection of haematuria or proteinuria, family history of renal disease, on nephrotoxic agents

Coding



Code CKD diagnosis on electronic patients' record based on eGFR (G1-5) and urine ACR (A1-3)

Blood pressure

- If ACR < 70 mg/mmol: aim for clinic **BP < 140/90 mmHg**
- If ACR ≥ 70 mg/mmol: aim for clinic **BP < 130/80 mmHg**

RASi

+

or

+

- CKD with T2DM and uACR > 3mg/mmol

- CKD with HTN and uACR > 30mg/mmol

Offer an **ARB or ACE inhibitor (titrated to highest licensed dose tolerated)**

Adopted from Midlands Kidney Network V1.2 Approved :November 2024 Review date : November :2027

SGLT2i

Offer SGLT2i if on maximally tolerated RASi or contraindicated **and**
- Not T1DM **and** no previous DKA

Canagliflozin 100mgOD if:
eGFR ≥30 plus T2DM

Dapagliflozin OR Empagliflozin 10mg OD if :
- T2DM and eGFR 20-90ml/min
- CKD - if eGFR ≥ 20 – 44 OR
  eGFR ≥ 45 and uACR ≥ 22.6 mg/mmol

Statin

Offer **Atorvastatin 20mg OD** for primary and secondary prevention of CVD.

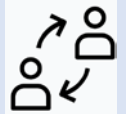
Increase the dose if do not achieve > 40% reduction in non-HDL cholesterol and eGFR > 30 ml/min

Stop nephrotoxins

Stop nephrotoxins, for instance NSAIDs.
Adjust medication dosage according to eGFR. https://renaldrugdatabase.com/

Risk evaluate

Calculate 5-year risk of needing replacement therapy using 4-variable Kidney Failure Risk Equation- www.kfre.co.uk (if eGFR ≤60 ml/min/1.73m^2)



Referral

Refer for specialist assessment if:
- 5-year KFRE risk > 5%
- uACR ≥ 70 mg/mmol, unless known to be caused by diabetes and already appropriately treated
- uACR > 30 mg/mmol, together with haematuria
- A sustained decrease in eGFR of 25% or more and a change in eGFR category within 12 months
- A sustained decrease in eGFR of 15 m/min/1.73m^2 or more per year
- Hypertension that remains poorly controlled despite the use of at least 4 antihypertensive medicines
- Known or suspected rare or genetic cause of CKD
- Suspected renal artery stenosis

Finerenone

CKD stage 3 or 4 (with albuminuria) associated with type 2 diabetes
Offer Finerenone* as an add-on if on maximally tolerated RASi **and**
SGLT2 inhibitor, unless unsuitable or contraindicated
*NB: * please refer to local NAPC Finerenone prescribing guidelines*

Patient Information and Resources

How to Look after your kidneys https://www.kidneycareuk.org/order-or-download-booklets/ckd-health-check-look-after-your-kidneys-and-keep-yourself-well/

Chronic Kidney Disease https://www.kidneycareuk.org/order-or-download-booklets/chronic-kidney-disease/

A healthy diet and lifestyle for kidneys https://www.kidneycareuk.org/order-or-download-booklets/healthy-diet-and-lifestyle-your-kidneys/

Medicines for chronic kidney disease https://www.kidneycareuk.org/order-or-download-booklets/medicines-chronic-kidney-disease/

Medicines for high blood pressure https://www.kidneycareuk.org/order-or-download-booklets/medicines-high-blood-pressure/

Diabetes and kidney disease https://www.kidneycareuk.org/order-or-download-booklets/diabetes-and-kidney-disease/

Kidney Beam: https://kidney.org.uk/kidney-beam • Leicester youtube videos: Your kidneys and how to look after them - public education campaign by NHS Leicester, Leicestershire and Rutland – YouTube (How to keep your kidneys healthy | UHL NHS Trust)

Patient Knows Best for results via nhs app

https://ckdexplained.co.uk/

Think Kidneys: https://www.thinkkidneys.nhs.uk/aki/resources/primary-care

Acknowledgments

Part of this guideline was adopted from:

Midlands Kidney Network

West Yorkshire Guideline for the Management of Chronic kidney Disease (CKD) for Adults

CKD Heatmap - this piece of work was created by Dr Safran Chaudrey (GP Registrar) and Dr Valeed Ghafoor (GP Partner) and adapted by Midlands Kidney Network

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This document contains tables intended for use by healthcare professionals and may not be accessible to screen readers.