Clinical Effectiveness
South East London

South East London
Integrated Care System

NHS

Chronic Kidney Disease (CKD)

A guide for South East London Primary Care (Adult)

Key messages

1. Check urinary ACR (albumin : creatinine ratio) in all patients at risk of CKD
2. Manage risk factors for patients with CKD: optimise blood pressure and diabetes control, offer statin
3. Up-titrate ACE inhibitors/ARBs (if indicated) to maximum tolerated dose
4. Offer SGLT2 inhibitors to eligible patients

Always work within your knowledge and competency

July 2023 (review July 2025, or earlier if indicated)

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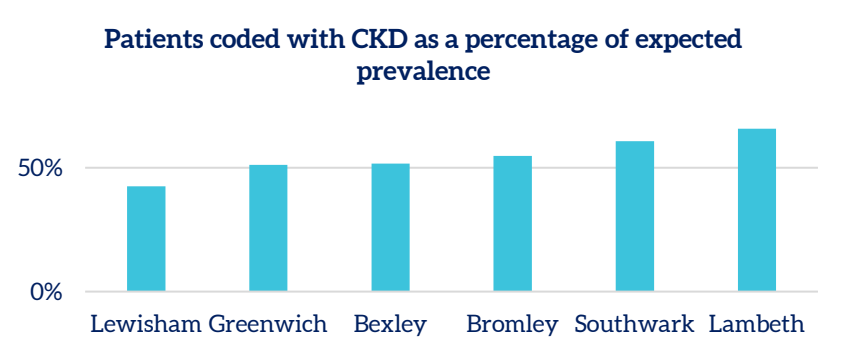
Why focus on CKD in South East London?

CKD is not being diagnosed enough

In South East London (SEL), our CKD registers are **half** their expected size[1,2]



Patients who have CKD but are **not coded**, have **double the mortality rate** and **double the risk of being prescribed nephrotoxic drugs** compared to correctly coded patients[3]

CKD is not being managed well enough[11]

Urine ACR
2/3 of patients with CKD in SEL have **not had Urine ACR checked** in the past year

ACE-I/ARB
1/3 of patients with CKD who have proteinuria are **not on an ACE-I/ARB**

Hypertension
1/3 of patients with CKD have **uncontrolled blood pressure**

Lipid lowering therapy
1/4 of patients with CKD are not on lipid lowering therapy

Impact of CKD

CKD is associated with **reduced life expectancy**, even at early stages[4]

CKD is a stronger **risk factor for cardiovascular** events than diabetes[4]

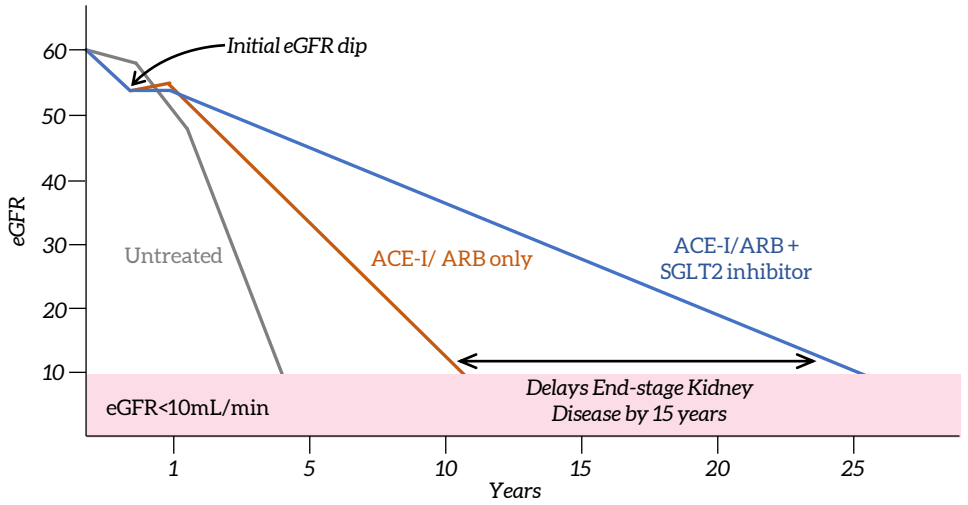
End-stage kidney disease has **worse survival rates than colorectal and breast cancer**[5]

Better treatment is now available for CKD

Dapagliflozin **reduces all cause mortality by 30%** in patients with CKD, and a 37% reduction in significant renal or cardiovascular morbidity[7]

Adding an SGLT2i for patients with diabetes and established nephropathy may **delay their progression** to end-stage kidney disease by 15 years[6]

eGFR fall over time for patients with diabetes and established nephropathy[6]



What is CKD?

Definition

Abnormalities of kidney structure or function
present for >3 months
with associated health implications[8,9]

Diagnosis[9]

Persistent rise in **Urine ACR**
>3mg/mmol (twice, 3 months apart) or >70mg/mmol once

And/ or

Persistent reduction in **eGFR**
<60ml/min (twice, 3 months apart)

And/ or

Rarer markers of renal disease

Rise in ACR is an early and sensitive marker in CKD

You can have CKD with a normal eGFR
A significant increase in creatinine (e.g. >20%), even in presence of normal eGFR

You can have CKD with a normal eGFR and normal ACR
Other markers of kidney damage include structural or histological abnormalities, renal transplant or known tubular disorders.

Diagnose and code CKD

Identify cause to guide treatment

Potential causes include:

- Cardiovascular disease
- HTN
- DM
- Increasing age
- Medications (NSAIDS, lithium, ciclosporin, tacrolimus)
- Glomerulonephritis
- Renal artery stenosis
- ADPKD

Patients at risk of CKD[9,10]

All these patients should be offered a **Kidney Health Check**

Long-term conditions
DM, CVD, HF
diabetes and hypertension account for up to 66% of all CKD

Ethnicity
Minority ethnic groups at higher risk of developing CKD and of progression

Medications
Medications that can affect kidney function e.g. calcineurin inhibitors – ciclosporin, tacrolimus, lithium, long-term use of NSAIDs

Incidental detection of **haematuria or proteinuria**

Patients at risk of CKD

Multisystem diseases
Conditions that can have renal involvement e.g. SLE

Structural urological conditions
Structural renal disease, recurrent renal calculi, prostatic hypertrophy

AKI
After an episode of AKI, monitor eGFR for at least 3 years, even if eGFR has returned to baseline

Family history
Of End-Stage Kidney Disease or hereditary kidney disease

Other conditions
e.g. Gout, smoking, obesity

Kidney Health Check[9,15,20]

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What is Kidney Health Check?

A kidney health check consists of having:

both a urine ACR test and an eGFR

Frequency of kidney health checks

Patients with diabetes - at least annually
Hypertensive patients - Poorly controlled at least annually; well controlled at least 5 yearly
Other risk factors - Use clinical judgement or discuss with renal team

Patients who need a Kidney Health Check

- **All patients at risk of CKD** — Especially diabetes and hypertension
- **New eGFR<60 ml/min** — Exclude AKI
- **Dipstick: Incidental proteinuria**
- **Dipstick: Incidental haematuria** — Exclude UTI and malignancy
- **Previous AKI** — Require Kidney Health Check: annually for 3 years

Check urine ACR

- **<3** mg/mmol
  - **Check eGFR**
    - **≥60** ml/min — Repeat Kidney Health Check - frequency according to comorbidity
    - **<60** ml/min — **Confirm with repeat** eGFR in 3 months
- **3-70** mg/mmol — **Confirm with repeat** urine ACR (ideally early morning sample)
- **>70** mg/mmol — Significant proteinuria, **no repeat needed**
  If >250 mg/mmol consider nephrotic syndrome and refer to renal

Diagnose CKD

Check eGFR for staging (if not already known)

- Stage and code CKD
- Consider using Kidney Failure Risk equation
- Lifestyle Advice
- Explain CKD diagnosis prognosis and management

CKD investigations[9,10]

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	Urine ACR	eGFR	HbA1c/Lipids	Urine dipstick	BP	Ultrasound (US)	FBC/ Bone Profile/Vit D/PTH
For diagnosis	YES	YES					
To investigate causes and assess risk factors			YES	YES	YES	CONSIDER- see below	
To include in annual review	YES	YES	YES	YES	YES		CONSIDER - see below
Notes on the investigations	**If urine ACR result:** • **Between 3-70mg/mmol repeat sample to confirm. An early morning sample is ideal but not essential.** • **>70mg/mmol - no repeat needed. The patient has CKD.** Albuminuria is an early and key marker of glomerular damage. Factors that may transiently affect ACR: • Menstruation • Strenuous exercise • Genital discharge • UTI (rarely - always recheck when infection resolved)	**Do not adjust for ethnicity** **Interpret eGFRs as a trend over time** eGFR may be less reliable in: • AKI • Pregnancy • Malnutrition • Protein supplementation • Eating meat 12h before the test • High muscle mass • Oedematous states, muscle wasting disorders, those with amputation If eGFR is >90ml/min/1.73m^2, use an increase in serum creatinine concentration of >20% to infer significant reduction in kidney function. Creatinine clearance should be used in patients >75 years and those with a BMI <18 or >40.	**Statins are recommended for all patients with CKD – no need for QRISK.** HbA1c and lipid blood tests help to assess cardiovascular risk factors which could contribute to CKD progression. If HbA1c or Lipids are raised see relevant section in CESEL Diabetes guides. Atorvastatin is first line. SEL Lipid Management contains more detailed advice.	**Incidental haematuria on urine dipstick must be followed up.** **Non-visible haematuria (NVH)** or microscopic haematuria is when there is at least **1+ of blood on dipstick.** **Visible haematuria (VH)** or macroscopic haematuria is commonly caused by UTI, renal calculi, prostatic disease, menstrual contamination, renal tract trauma (e.g. catheterisation), post-surgical or urinary tumours (<5%).[25] See haematuria outline for further advice, investigations and referrals. **Incidental proteinuria- check Urine ACR**	**NICE targets:** If ACR <70mg/mmol **120-139/90mmHg** If ACR ≥70mg/mmol or co-existent diabetes **120-129/80mmHg** Maintaining BP within target range reduces the progression of CKD and reduces the risk of CVD and mortality. CESEL Hypertension guides	Offer renal tract US in patients with any of: • Accelerated progression of CKD • VH/persistent NVH • Symptoms of urinary tract obstruction • Family history of Polycystic Kidney Disease (PCKD) • eGFR <30 ml/min/1.73m^2	Check FBC regularly in patients with eGFR <45ml/min/1.73m^2 or if symptomatic. If renal anaemia is suspected then refer to specialist (exclude iron deficiency anaemia first). Calcium/Phosphate/ Vit D/PTH should be monitored if eGFR <30ml/min/1.73m^2 or if bone disease is suspected. NICE guidance on frequency of monitoring

CKD: Staging, coding and what to tell newly diagnosed patients[8,9]

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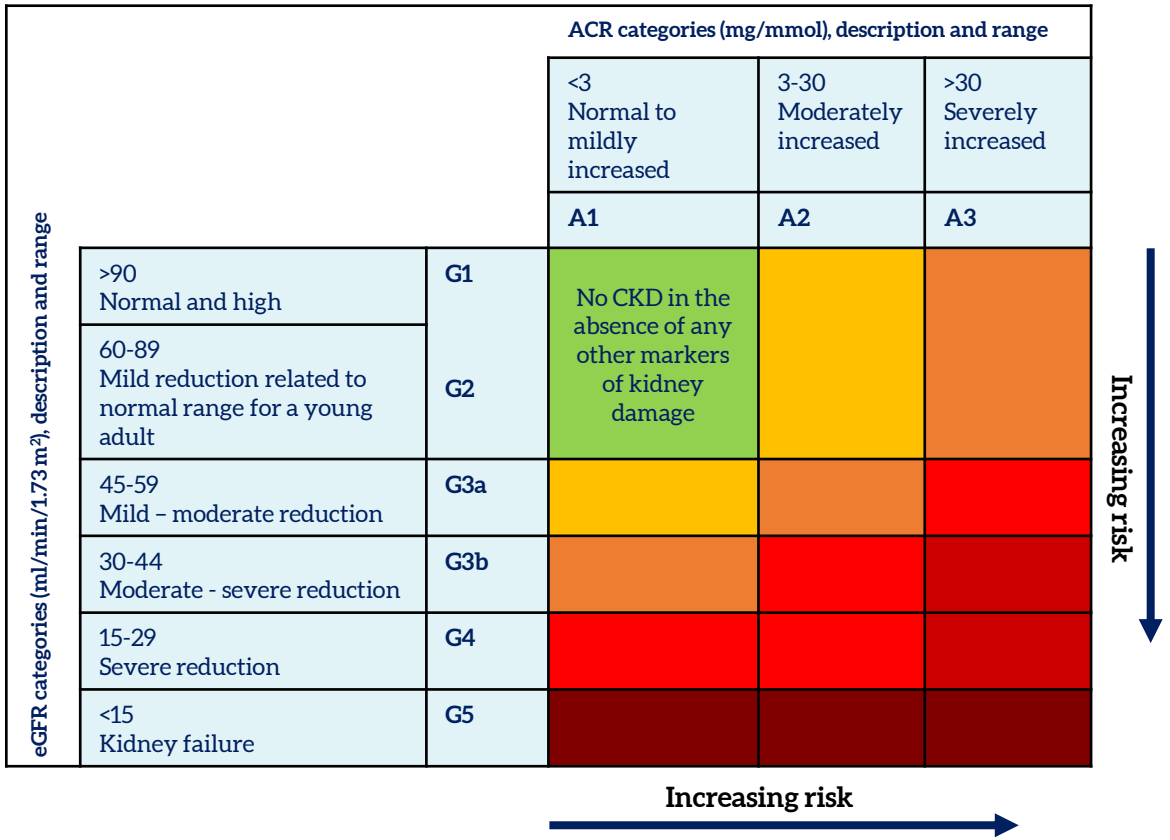
Why stage CKD?

CKD should be staged using "CGA" based on cause of CKD **(C),** GFR category **(G)** and albuminuria category **(A).** The higher the stage, the more 'severe' the CKD

Staging helps inform:

1. Prognosis (risk of progression): the higher the stage the higher the risk of progression
2. Cardiovascular risk
3. Required frequency of monitoring
4. Management – targets and choice of medications

Risk	Minimum number of eGFR checks per year
Low	0-1
Moderate	1
High	1-2
Very High	2
Very High	2-3
Very High	4-4+



What to tell newly diagnosed patients

If CKD stage 3-5, consider advising patients of their **5-year risk of needing renal replacement therapy** using the **Kidney Failure Risk Equation**, which is equivalent to a 'QRISK tool' for the kidneys.

Refer to renal if 5-year risk of needing renal replacement is >5%

Overview of CKD

- What kidneys are and their function (Kidney Care UK)
- How kidney function is tested (Kidney Research UK)
- Know your numbers – encourage patients to know their urine ACR, eGFR, BP and HbA1c (if diabetic)
- The patient's CKD stage and prognosis
- CKD is common in the UK - 10% prevalence. Most people are asymptomatic and monitored by the GP
- Prognosis: <2% of people with CKD progress to renal replacement therapy (dialysis/kidney transplantation) in 5 years.
- Lifestyle advice – connect them with support services
- Explain medical treatment of CKD
- Importance of regular testing/annual review (NHS UK – Living with kidney disease)

Patient resources

- Think Kidneys - range of PILS such as explanation of CKD and at risk of AKI (including sick day rules)
- Kidney Care UK – range of PILS with information on medication, grants, travel, dialysis and more
- Patient.info – PILS
- Living with CKD (nhs.uk)
- Kidney Care UK's National Advocacy Service 01420 541 424 or online community
- National Kidney Federation offer a Free National Kidney Patient's Helpline 0800 169 09 36
- PILS for starting: SGLT2i without diabetes, SGLT2i: with diabetes

How to code CKD

The London Kidney Network (LKN) Coding in Primary Care guidance highlights the importance of accurate and consistent coding of eGFR, Urine ACR and CKD stage to aid appropriate diagnosis and management of CKD. Expert consensus is that CKD stage should be coded in the format CKD G(x)A(y) – e.g. a patient with eGFR 74ml/min and ACR 5.5mg/mol should be coded as **'CKD G2A2.'** The appropriate CKD codes are available in the Ardens' CKD template.

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Medical

Vaccines
Flu
Pneumococcal (5 yearly)
Covid

Comorbidities
Stress the importance of managing especially DM, HTN and cholesterol
Remind them of the importance of regular reviews

Hypertension Targets		
ACR<70	Systolic 120-139	Diastolic <90
ACR>70	Systolic 120-129	Diastolic <80
Frail	Individualised	

Nephrotoxic drugs
Consider stopping:
- All NSAIDs (including topical)
- Aminoglycosides
- Bisphosphonates
- Calcineurin inhibitors (ciclosporin, tacrolimus)
- Diuretics
- Lithium
- Mesalazine

Over the counter (OTC) drugs
Educate about OTC **avoidance of NSAIDs**, herbal remedies and use protein supplements with caution

AKI
Counsel about AKI risk and symptoms (reduced urine output, appetite loss, nausea, vomiting, shortness of breath, oedema)
See for more details on assessment

Sick day rules
Sick day guidance in CKD is nuanced, as stopping or reducing medications may do more harm than good.[12,16,26]

Patients should seek medical advice in the event of acute illness (e.g. diarrhoea or vomiting; fever, sweats or shaking) to discuss temporarily stopping medications that may increase the risk of AKI. Decisions should be carefully made on an individualised basis.

Common medications to consider pausing:
Diuretics (if dehydrated): ACE-I/ARBs; Metformin; NSAIDs; SGLT2i

Restart medicines as soon as well and eating normally. **It is important to restart medications after acute illness.**

Patient advice

Patient education is integral to the management of CKD[9,-13,22]

Lifestyle

Smoking
Support cessation
Major additive CVD risk factor

Education
Provide sources of support

Mental Health
Screen for depression or anxiety
Consider local IAPTs for Long Term Conditions

Weight
Advise patients to maintain a healthy weight
Obesity increases risk of declining eGFR
Signpost to local resources

Exercise
Regular exercise- aim for >150mins/ week

Diet
Healthy diet for CKD
Reduce salt to less than 6g/day (one teaspoon)
Do not offer low protein diets.
Alcohol within healthy limits

CKD management outline[9,15-19]

This management outline does **not** apply to patients with **structural or genetic causes of CKD**, or **Type 1 Diabetes**
This management should be part of a shared decision making process

Minimise Cardiovascular risk factors

Lifestyle advice
Patient education is integral to management of CKD

AND

Optimise BP control
If on ACE-I/ARB **titrate to maximum** licensed tolerated dose.
Reduce other antihypertensives if needed

AND

Offer and optimise lipid control
Offer a statin to all CKD patients (unless contraindicated). Offer even if Qrisk <10%
Atorvastatin 20mg is first line

AND

Optimise DM control
See CESEL Diabetes guide for guidance

CKD without Type 2 Diabetes

Check urine ACR

ACR <22.6 mg/mmol
Lifestyle/ BP/ Lipid control as above

ACR ≥ 22.6 mg/mmol

Offer ACE-I/ARB
Offer ACE-I/ARB, irrespective of co-morbid hypertension (unless contraindicated)
Titrate to maximum licensed tolerated dose (reduce other antihypertensives if needed)

Offer dapagliflozin
Once ACE-I/ARB at maximum tolerated dose: Offer dapagliflozin
eGFR: only start if between 25 - 75ml/min, if eGFR <25 ml/min discuss with renal team
If patient is already on SGLT2i for **heart failure**: continue current SGLT2i

As of January 2023, dapagliflozin is the only licensed SGLT2i for CKD (without T2DM)

See Preferred Medication for further details on prescribing

CKD with Type 2 Diabetes

Check urine ACR

ACR <3 mg/mmol
Standard Diabetes management

ACR ≥3 mg/mmol

Offer ACE-I/ARB
Offer ACE-I/ARB, irrespective of co-morbid hypertension (unless contraindicated)
Titrate to maximum licensed tolerated dose (reduce other antihypertensives if needed)

Offer SGLT2i

Not already on SGLT2i
Use Dapagliflozin or Canagliflozin

Already on SGLT2i:
Continue current SGLT2i

Once ACE-I/ARB at maximum tolerated dose: Offer SGLT2i
eGFR: SGLT2is have different eGFR cut offs (see CESEL Diabetes)

To facilitate introduction, **consider reducing dose of other glucose lowering medications**

Finerenone[27] may be added in secondary care and continued by primary care.

For further details on prescribing see Preferred Medication

CKD: Preferred Medication [9,12,17,18,23,24]

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	Drug	Starting dose	Daily Range	Notes (This information is not exhaustive, please refer to the SEL Joint Medicines Formulary for further details and the BNF for additional information especially titration increments/cautions/contra-indications)
ACE-I	Ramipril	5mg OD (or 2.5mg OD if 5mg clinically inappropriate**) (1.25mg OD in frail/elderly or CrCl <30ml/min)	1.25mg-10mg OD (max 5mg if CrCl <60ml/min)	• **For people of Black African or African-Caribbean family origin, use ARB instead of ACE-I (as increased risk of angioedema with ACE-I)** • Check base line U&Es and renal profile (Na/K/Cr/eGFR). Hyperkalemia may occur, therefore close monitoring of serum potassium is required. **If serum potassium is greater than 5 mmol/L, do not start treatment with an ACE-I/ARB and seek renal advice** • Re-check renal profile within 2 weeks of initiation or dose increase and then at least annually • Creatine clearance ought to be calculated using Cockcroft and Gault calculator for these medicines, refer to BNF and SPC for further information regarding dosing • **Titrate ACE-I/ARB up at 2-4 weekly intervals to achieve optimal BP control** • If eGFR decreases by >25% or creatinine increases by >30%, investigate for other causes of a deterioration in renal function and if no additional cause is found then stop ACE- I/ARB or reduce to a previously tolerated lower dose and recheck levels in 5–7 days. See CKS guidance for further formation • **ACE-I/ARB dose should be optimised before the addition of a second agent** • Side effects: symptomatic hypotension can occur on first dosing – suggest take at night. Dry cough with ACE-I, consider switch to ARB • **Caution:** Do not combine ACE-I and ARB without specialist advice • ACE-I and ARBs should be avoided in pregnancy unless essential. See BNF and SPC for further information on pregnancy/breastfeeding and hepatic impairment • Multiple drug interactions, refer to BNF before initiating treatment • **To start at 5mg dose patients need to have low falls risk, normal or high BP, be clinically stable and have few or no comorbidities. Advise to stay well hydrated and review if dizzy or unwell. Use clinical judgement.
	Lisinopril	10mg OD 2.5mg -5mg OD if CrCl <30ml/min	2.5mg-80mg OD (20mg for HTN maintenance)	
ARBs	Losartan	50mg OD (25mg OD in frail/ elderly or those taking diuretics)	25mg-100mg OD	
	Candesartan	8mg OD (4mg OD in frail/ elderly or those taking diuretics)	4mg-32mg OD	
Statin	Atorvastatin	20mg OD	20-80mg OD	• Increase up to 80mg to achieve target cholesterol (max dose 40mg if eGFR<30ml/min). NICE recommend aiming for a 40% fall in non-HDL cholesterol levels • Seek specialist advice if eGFR <30ml/min, liver disease, untreated hypothyroidism, heavy drinker • **CI** in pregnancy, breast feeding, avoid or address contraceptive needs for women of childbearing age. Advise patient to stop treatment, 3 months before conception • Multiple drug interactions refer to BNF before initiating treatment - avoid grapefruit juice • Advise patient to visit GP if they experience unexplained muscle pains • Refer to SEL IMOC Guidelines on Lipid Management if Atorvastatin contraindicated or not tolerated.

SGTL2i	Dapagliflozin
	
	Indicated for CKD with or without T2DM
		10mg OD	10mg OD	**For full information please see SEL Guide for Prescribing SGLT2i in HbA1c Management in Adults with T2DM and CESEL Diabetes Guide**
				
				• Dapagliflozin can be taken orally, once daily, at any time of day, with or without food. Canagliflozin can be taken orally, once daily, preferably before breakfast
				• **Contraindications:** Hypersensitivity to the active substance or excipients and DKA. Refer to the SPC and BNF
				• **Use in caution in patients for:**
				  ◦ Whom SGLT2i induced drop in blood pressure could pose a risk (SPC)
				  ◦ BMI <25 (<23 in South Asian people)
				  ◦ People diagnosed with, or at risk of frailty
				  ◦ DKA- review DKA risk factors and address modifiable risk factors. Note DKA can occur with normal glucose levels with SGLT2i (euglycemic ketoacidosis)
				• **MHRA/CHM advice:**
				  ◦ **SGLT2i:** Risk of diabetic ketoacidosis (April 2016), increased risk of lower-limb amputation (mainly toes) (March 2017), Fournier's gangrene (necrotising fasciitis of the genitalia or perineum) (Feb 2019), and monitor ketones in blood during treatment interruption for surgical procedures or acute serious medical illness (March 2020)
				• **Common side effects:** Increased risk of UTI and genital infections. For full side effect profile refer to the BNF, and SPC
				• **Interactions:** Multiple drug interactions. Risk of hypotension and hypoglycaemia. See BNF before initiating treatment, currently no severe interactions known.
				• **Hepatic impairment:** Use dapagliflozin with caution in severe impairment. Canagliflozin is not recommended for patients with severe hepatic impairment (BNF)
				• **Renal impairment: Dapagliflozin:** eGFR <15ml/min- do not initiate. eGFR <25ml/min- seek specialist advice (BNF). **Canagliflozin**: Do not initiate if eGFR< 30ml/min
				• **Pregnancy and breastfeeding:** Avoid- toxicity reported in animal studies (BNF)
				• **Sick day rules for T2DM:** Please refer to Trend T2DM sick day rules

	Canagliflozin Indicated for CKD with T2DM	100mg OD	100mg – 300mg OD (max 100 mg once daily when eGFR less than 60ml/min	

CKD: Preferred Medication [9,12,17,18,23,24]

	Drug	Starting dose	Daily Range	Notes (This information is not exhaustive, please refer to the SEL Joint Medicines Formulary for further details and the BNF for additional information especially titration increments/cautions/contra-indications)
Non-steroidal mineralocorticoid receptor (MR) antagonist	**Finerenone** Indicated for CKD (stage 3&4 with albuminuria) associated with T2DM in adults.	Serum potassium and eGFR have to be measured to determine if finerenone treatment can be initiated and to determine the starting dose. Refer to BNF and SPC If serum-potassium ≤5 mmol/L and eGFR ≥60 mL/min: **20mg OD** If serum-potassium ≤5 mmol/L and eGFR 25 to 59 mL/min: **10mg OD** If serum-potassium >5 mmol/L **or** eGFR <25 ml/min: **Not recommended**	10mg to 20mg OD	• **Finerenone should be prescribed in line with the NICE [TA 877]-** March 2023. • **Finerenone is currently RAG rated as Amber 2 and will be started in secondary care. Primary care may be asked to continue prescribing after 6 months of dose stabilisation.** • **Dose adjustment:** Dose to be adjusted according to serum potassium levels and eGFR, for dose adjustments, interruption, and discontinuation according to serum potassium levels and eGFR, refer to the SPC • **Continuation of treatment:** Serum potassium and eGFR should be remeasured 4 weeks after initiation or re-start of finerenone treatment or increase in dose, Refer to SPC for further information. • **Missed Dose:** A missed dose should be taken as soon as the patient notices, but only on the same day. The patient should not take 2 doses to make up for a missed dose. • **Elderly:** No dose adjustment needed. • **CI:** Addison's disease; strong inhibitors of CYP3A4 and hyperkalaemia. Do not initiate treatment if serum-potassium > 5 mmol/L and withhold if serum-potassium increases to > 5.5 mmol/L during treatment. Refer to BNF and SPC for further information. • **Common side effects:** hyperkalaemia; electrolyte imbalance; hypotension; pruritus. For full side effect profile refer to the BNF and SPC • **Interactions:** Multiple drug interactions, refer to BNF before initiating treatment- avoid grapefruit and grapefruit juice. Consider temporary discontinuation of finerenone if the patient is prescribed trimethoprim or co-trimoxazole until treatment course complete due to risk of hyperkalaemia • **Hepatic Impairment:** Avoid in severe impairment. Consider additional serum-potassium monitoring in moderate impairment. Refer to SPC • **Renal Impairment:** The risk of hyperkalaemia increases with decreasing renal function. Ongoing monitoring of renal function should be performed as needed according to standard practice. Finerenone treatment should be discontinued in patients who have progressed to end-stage renal disease (eGFR < 15 mL/min. • **Contraception in females:** Women of childbearing potential should use effective contraception during treatment with finerenone • **Pregnancy and breastfeeding:** Avoid • **Swallowing difficulties:** Kerendia® tablets may be crushed and mixed with water or soft foods, such as apple sauce, immediately before oral use.

Acute kidney injury (AKI)[12,13,22]

AKI Definition
A rise in serum creatinine of ≥26 mmol/L within 48 hours **OR**
A ≥50% rise in serum creatinine (>1.5 times baseline) within the past 7 days **OR**
A fall in urine output < 0.5 ml/kg/hour for more than 6 hours in adults

Why is early AKI detection important? AKI is associated with high inpatient mortality rates (20-35%), incomplete recovery of kidney function and poor long-term outcomes (reduced life expectancy and increased CVD risk)

Who is at risk of AKI? Those with:
- Evidence of sepsis, dehydration, other symptoms such as nausea, vomiting, confusion, fatigue
- Prior history of AKI or CKD
- Long-term conditions such as heart failure, liver disease, diabetes
- Recent iodine contrast or nephrotoxic drug use (includes DAMN drugs: **D**iuretics, **A**CE-I/ARBs, **M**etformin, NSAIDs)

How to assess and manage AKI (see RCGP AKI toolkit for advice)
1. Respond to AKI warning stage test results within an appropriate timescale as per NICE advice
2. Identify the cause of AKI and treat as appropriate
3. Review medications: use the BNF for dosing advice in patients with AKI or CKD
   a. Consider withholding DAMN drugs (see above). List of potentially problematic drugs.
   b. Consider reducing dose of medicines which need renal adjustment
4. Add **EMIS AKI code** and consider adding warning to notes
5. Repeat blood tests and reassess U&Es: frequency depending on clinical need but certainly at 3 months
6. Counsel patient: which medications to restart and to avoid, provide a patient information leaflet

After an episode of AKI, monitor eGFR for at least 3 years (at least annually), even if eGFR has returned to baseline
Ensure regular medications are restarted

Hyperkalaemia (Potassium>5.5 mmol/l)[21]

Mild hyperkalaemia	**5.5 – 5.9 mmol/l**	If clinically well, → repeat renal profile within 3 days If unwell or suspected AKI → urgent hospital assessment
Moderate hyperkalaemia	**6.0 – 6.4 mmol/l**	If clinically well → repeat renal profile within 1 day If unwell or suspected AKI → urgent hospital assessment
Severe hyperkalaemia	**≥ 6.5 mmol/l**	Refer to A&E for urgent assessment

Monitoring: Patients at risk of hyperkalaemia should be monitored 2-4 times/year, especially those with CKD, previous AKI, diabetes or HF

Interventions (See Renal association hyperkalaemia guidance for more detailed advice)
1. Low Potassium (K^+) diet → offer dietary advice in those with a **K^+ > 5.5 mmol/l**
2. Medication review→ ACE-I/ARB, K^+ sparing diuretics, K^+ supplements, Trimethoprim, NSAIDs and non-selective beta-blockers are commonly implicated in hyperkalaemia
   - **Hyperkalaemia in patients with ACE-I/ARB:** increase frequency of monitoring if **K^+ 5.5 – 5.9 mmol/l** and consider dose reduction of implicated drugs. **Stop** ACE-I/ARB if **K+ ≥ 6.0**.
   - Withhold ACE-I/ARB during acute illnesses at **all severities of hyperkalaemia**
3. Consider initiating loop diuretics in chronic hyperkalaemia to promote urinary K^+ excretion
4. Whilst currently not common practice, expert guidance is to check sodium bicarbonate level to assess for metabolic acidosis and treat if sodium bicarbonate is <22 mmol/l. See section 6.1 in Renal association guidance.

If ongoing hyperkalaemia despite interventions, refer to renal team

Haematuria outline[14]

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Visible haematuria (VH)

This is a simplified overview
See NICE NG12 for full details

UTI?
Signs/ symptoms/ urine dip consistent with UTI?

Treat UTI

Repeat dip 7-14 days after antibiotics

If VH persists after successful treatment of UTI

No UTI
In men consider prostate assessment

In women consider gynaecological assessment

<45years → **Investigate as clinically appropriate**

≥45years → **2WW urology**

Non-Visible haematuria (NVH)

There are no nationally or locally agreed guidelines on the investigation or management of NVH beyond NG12 which advises 2WW urology referral if patient is:

- **over 60 years** old with
- **unexplained NVH and** with
- Dysuria **OR** raised white cell count

In patients with NVH: Assess fully for UTI. Ensure follow up in place. Consider checking **BP, renal profile and urinary ACR.**

Consider the need for **urological, renal or gynaecological investigations and/or referral**

Referral and Secondary care support[9,20,21]

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Consider urgent renal referral (or discussion)

ACR **>250** mg/mmol- consider nephrotic syndrome

eGFR **< 15** ml/min (G5)

AKI (without an obvious cause manageable in primary care)

Multisystem disease suspected with evidence of renal involvement

Hypertension accelerated/ malignant

Severe hyperkalaemia > 6.5 mmol/l

Consider routine renal referral

ACR **>30 mg/mmol with haematuria** (follow haematuria outline in addition)

>70 mg/mmol (unless known to be caused by diabetes and already appropriately treated)

eGFR **15-29** ml/min, (G4) particularly if new

ACE-I/ARB induced fall in eGFR > 25%, or >30% rise in creatinine

Accelerated progression of CKD (eGFR 30-59 ml/min):
- Persistent decrease in eGFR of ≥25% and a change in CKD category within 12 months
- Or a persistent decrease in eGFR of 15ml/min within 12 months

Normal eGFR but evidence of kidney disease (e.g. genetic diagnosis, associated urinary abnormalities) or rapidly progressive renal impairment

Uncontrolled BP >150/90 mmHg on 4 agents at therapeutic doses

Unexplained anaemia – Hb <110 g/L or symptomatic

Renal bone disease suspected - abnormal potassium, calcium or phosphate

Non-visible haematuria unexplained (not meeting 2WW criteria or negative urological investigations)

5-year risk of needing renal replacement therapy **> 5%** (measured using the 4-variable Kidney Failure Risk Equation)

Rare or genetic causes of CKD (known or suspected)

Consider Advice & Guidance or Consultant Connect

Unclear cause of CKD

Difficulty interpreting investigations

Renal Advice and Referrals

All urgent referrals should be discussed with the renal registrar on-call
- Guy's: 07789 505 184 (Direct) / 0207 188 3026 (via Switchboard) for renal SPR on call
- King's: 0203 299 9000 and ask for Bleep 622 or Renal SPR on call
- UHL: does not accept urgent referrals

Consultant connect GSTT/KCH- Renal Medicine, UHL- Ambulatory Care

Non-urgent advice: eRS 'Advice & Guidance' or Refer to the following clinics via eRS

GSTT
Chronic Kidney Disease (CKD)
Nephrology – GSTT
General Nephrology and Renal Medicine – UHL

KCH
Nephrology clinic – Queen Elizabeth Woolwich
Nephrology CAS – Renal KCH
Nephrology CAS – Renal PRUH

Referral form (on DXS): 'SEL Nephrology and CKD Referral Form Final
Bromley: use Referrals Optimisation Protocol: Nephrology/referrals

For Diabetes team contact information see CESEL guides. For Heart failure contacts see local resources.

When to refer to Urology

Urology 2ww criteria (see haematuria section and **NICE NG12**)

Obstructive uropathy/renal outflow obstruction - Should usually be referred to urology unless urgent medical intervention is needed for the metabolic effects of renal failure e.g. hyperkalaemia, symptomatic uraemia or fluid overload

Dialysis information

List of dialysis units at GSTT Kidney dialysis - Dialysis units | Guy's and St Thomas' NHS Foundation Trust (guysandstthomas.nhs.uk)

List of dialysis units at KCH Renal - King's College Hospital NHS Foundation Trust (kch.nhs.uk)

CKD management at practice level

The following tasks may be done by administrators, social prescribers, care co-ordinators, HCAs, nurses, pharmacists, physician associates or GPs – depending on practice pathways and staff availability

Contact CESEL team for advice and information on searches and quality improvement support

Tasks		Tools/support
1. Maintaining the CKD register (prevalence improvement)	**Unknown CKD** Patients at risk of CKD without a recent Urine ACR/ eGFR	• EMIS searches e.g. QOF/Ardens
	Uncoded CKD Ensure CKD is coded [Coding TBC]	
	How to get renal profile and Urine ACR	• During consultations • Send text with request • Medication reviews/note on prescription • Secondary care resources: Cerner, clinic letters
	How to get BP readings	• HBPM: AccuRx florey, eConsult hypertension review • Secondary care sources: Cerner, London Care Record, clinic letters • Hypertension Check Service by Community Pharmacy
2. Call/Recall	**Prioritise high risk patients**	• EMIS searches e.g. Ardens • Text messaging service e.g. AccuRx, Mjog, iPLATO • Patient letters • Telephone call
	Pre-patient review • Arrange bloods (renal profile, lipids + HbA1c to assess for CVD risk factors , FBC for renal anaemia and bone profile/Vit D/PTH for renal metabolic disease – depending on CKD stage or clinical suspicion) • Arrange urine ACR • Arrange BP measurement and pulse check (in practice/machine at home/pharmacy) • Book appointment for annual review	
3. QOF CKD review (at least annually)	• **History:** patient concerns • **Review investigations:** BP*, blood and urine results. Urine dipstick to check for haematuria, if present follow pathway • **Ensure correct CKD stage is coded** • **Discuss risk-reduction and offer lifestyle advice**: BMI*, smoking*, alcohol*, diet, activity. Advise on increased risk of AKI if unwell • **Mind and body**: consider screening for mental health conditions* • **Medications review**: concerns, side-effects, adherence. Identify potential nephrotoxic drugs and adjust doses of medications according to renal profile. Caution use of NSAIDs. Ensure medications are appropriately reconciled and titrated after hospital admissions. • **Immunisations**: ensure up to date with influenza, pneumococcal (5 yearly) and Covid 19 • **Refer to secondary care if** eGFR<30 mL/min/1.73 m^2 or accelerated CKD progression • Check for other long-term conditions e.g. diabetes and hypertension * These indicators make up the **Vital 5** which are key factors to improve individual and population health outcomes.	**In practice consultations** • F2F or remote consultation using a CKD template e.g. Ardens • Structured medication review with pharmacist **Out of practice consultations** • Home visiting team • Out of hours primary care services • Secondary care
	Follow-up The frequency of monitoring depends on their CKD stage.	Set up recall with EMIS template or text messaging service

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Abbreviations

2WW – 2 week wait
A&E – Accident and Emergency
ACE-I– Angiotensin converting enzyme inhibitor
ACR – Albumin-Creatinine Ratio
ADPKD – Autosomal Dominant Polycystic Kidney Disease
AKI – Acute Kidney Injury
ARB – Angiotensin II Receptor Blocker
BMI – Body Mass Index
BNF – British National Formulary
BP – Blood Pressure
CESEL – Clinical Effectiveness South East London
CGA - CKD should be staged using "CGA" based on Cause of CKD (C), GFR category (G) and albuminuria category (A).
CI - Contraindication
CKD – Chronic Kidney Disease
CHM – Commission on Human Medicines
CV - Cardiovascular
CVD – Cardiovascular Disease
DKA –Diabetic Ketoacidosis
DM – Diabetes Mellitus
ECG - Electrocardiogram
eGFR – Estimated Glomerular Filtration Rate
EMIS – Electronic patient record system used in general practice
ESKD – End-Stage Kidney Disease
F2F – Face to Face
FBC – Full Blood Count
FH – Family History
GP – General Practitioner/ Practice
GPEA – GP Extended Access
GSTT – Guy's and St Thomas' NHS Trust
Hb - Haemoglobin
HbA1c – Haemoglobin A1c
HF – Heart Failure
HTN - Hypertension
IAPT – Improving Access to Psychological Therapies programme
K^+ – Potassium
KCH – King's College Hospital NHS Trust
MHRA – Medicines and Healthcare products Regulation Authority
NICE – National Institute for Health and Care Excellence
NSAIDs – Non-Steroidal Anti-Inflammatory Drug
NVH – Non Visible Haematuria
OD – Once Daily dosing
OTC – Over The Counter
PCKD – Polycystic Kidney Disease
PILS – Patient Information Leaflets
PRUH – Princess Royal University Hospital
PTH – Parathyroid Hormone
QOF – Quality and Outcomes Framework (contract)
QRISK – an algorithm that predicts 10-year CVD risk. EMIS is currently using QRISK2 (although QRISK3 was released in 2017)
SEL – South East London
SGLT2i – Sodium/Glucose Cotransporter 2 inhibitor
SLE – Systemic Lupus Erythematosus
SPC – Summary of Product Characteristics
SPR – Specialist Registrar
U&E – urea and electrolytes
UHL – University Hospital Lewisham
US – Ultrasound
UHL- University Hospital Lewisham
UTI – Urinary Tract Infection
VH – Visible Haematuria
Vit D – Vitamin D

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Contact CESEL at clinicaleffectiveness@selondonics.nhs.uk and/or visit https://selondonccg.nhs.uk/covid_19/clinical-effectiveness-sel/

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