Appendix 1: Specific prescribing considerations in CKD (from Kidney Care UK)

ACEI/ARB Consider starting RAS (renin-angiotensin system) blocking agents in patients with CKD and urinary ACR>30, diabetes and/or hypertension

Allopurinol Can cause increased risk of leucopenia and hypersensitivity reactions, especially in people with renal impairment.

Antacids May reduce absorption of ACE-inhibitors with use of an antacid.

Ciclosporin Hyperkalaemia may occur during concomitant use of ACE inhibitors with ciclosporin.

Digoxin Loading and maintenance doses of digoxin should be reduced in patients with impaired renal function because the major route of elimination is renal excretion of unchanged drug. The tendency to impaired renal function and low lean body mass in the elderly influences the pharmacokinetics of digoxin, such that high serum digoxin levels and associated toxicity can occur quite readily, unless dosages of digoxin lower than those in younger patients are used. Serum digoxin levels should be checked regularly, and hypokalaemia avoided.

Diuretics In patients with fluid retention associated with heart failure, high doses of diuretic are needed and a decline in renal function is not an indication to reduce diuretic dose, in normal circumstances. Evidence shows that in clinical practice, the initial diuretic doses prescribed are often far too low, perhaps driven by (an inappropriate) fear of an adverse impact on renal function. Clinical assessment is key. If the patient is improving clinically, declines in renal function are of secondary importance.

DOACs A dose reduction may be required in those with a low BMI or with renal impairment. Creatinine clearance should be used to calculate correct dosage where required.

Heparin Low Molecular Weight Heparin (LMWHs) are renally excreted and should be used with caution in patients with CKD stages 4-5 or AKI. Unfractionated heparin is advised by some for patients with eGFR < 25ml/min. Dose reduction of LMWH in patients with renal impairment is required, if used. Hyperkalaemia may occur during concomitant use of ACEI and monitoring of potassium is recommended.

Metformin Can be associated with increased risk of lactic acidosis in high risk patients with AKI.

Nitrofurantoin Can be used as a first line for most uncomplicated lower UTIs in adults if the GFR is > 45 otherwise, it causes peripheral neuropathy and will be ineffective for treating UTI's due to inadequate urine concentration

NSAIDs Should generally be avoided in significant renal impairment, though in mild/moderate CKD they can be used after discussion and with monitoring if alternatives are much less effective. Avoidance is not essential for patients on dialysis but risk of GI bleeding is probably already increased in end stage renal disease and so caution is advised. Use of NSAIDs for prolonged periods may irreversibly reduce native urine output for patients on haemo- or peritoneal dialysis, and this may have long term implications for their fluid balance. Monitor the effects on GFR, particularly in people with a low baseline GFR and/or in the presence of other risks for progression.

Opiates The effects of almost all except for fentanyl are very much prolonged in renal failure. There is great potential for active metabolites to accumulate. These can have significant adverse effects. It is recommended to avoid modified-release preparations, opting instead for low dose immediate-release drugs with careful monitoring for adverse effects.
[Specialist reviewer's comments: I wouldn't want patients to be denied adequate pain relief. The point needs to be to start at low doses and titrate carefully.]

Sacubitril Manufacturer advises to avoid concomitant use of lisinopril with sacubitril/valsartan therapy. Lisinopril must not be initiated earlier than 36 hours after the last dose of sacubitril/valsartan

Trimethoprim Increases the risk of hyperkalaemia especially in those with CKD, poorly controlled DM, or those using concomitant potassium-sparing diuretics, potassium supplements, potassium containing salt substitutes, ACEIs or ARBs. This drug also interferes with tubular creatinine secretion, and therefore causes a rise in creatinine levels and may result in a 'false positive' diagnosis of AKI. Monitoring of renal function and serum electrolytes should be considered particularly with longer term use. Trimethoprim should only be initiated and used in dialysis patients under close supervision from specialists in both infectious disease and renal medicine.