Medication Guidance for Patients with Kidney Disease [Chronic Kidney Disease (CKD), Acute Kidney Injury (AKI), or Post-AKI]

Medication	**Potential adverse effects in kidney disease**	**Recommendations for CKD**	**Hold if AKI or risk of AKI? ***	**Recommendations for Post AKI**
Analgesics				
Non-steroidal anti-inflammatory drugs (NSAIDs) – (e.g. ibuprofen, high-dose aspirin, naproxen) and Cox-2 inhibitors – (e.g. celecoxib, etoricoxib, valdecoxib)	Decreases renal perfusion; Risk of interstitial nephritis	Avoid if possible	Yes	Avoid if possible. Topical diclofenac is acceptable, but avoid compounded topical strengths > 2%
Opioids	Active metabolites can accumulate	Consider dose reduction and use opioids with minimal renal excretion (e.g., hydromorphone, oxycodone) For opioids that are considered safer in CKD, and opioids to avoid in CKD, consult BC Renal chronic pain guide	Consider dose reduction and use opioids with minimal renal excretion	If reduced kidney function, consider dose reduction and use opioids with minimal renal excretion
Pregabalin and gabapentin	Accumulation	Consider dose reduction and monitor for adverse effects	Consider dose reduction	If reduced kidney function, consider dose reduction.
Cardio-kidney-metabolic				
Angiotensive converting enzyme inhibitors (ACEi)	Decreased renal perfusion and hyperkalemia	Protective in proteinuria CKD, diabetes, and heart failure	Yes	Restart when AKI improving and/or steady state kidney

– (e.g., lisinopril, enalapril, ramipril) Angiotensin receptor blockers (ARB)- e.g., (losartan, valsartan, candesartan) Angiotensin receptor/neprilysin inhibitor(ARNI)- Sacubitril-valsartan				function achieved in patients with indication and no hypotension
Mineralocorticoid receptor antagonists - MRA (spironolactone, eplerenone, finerenone)	Hyperkalemia	Dose adjustment may be required, based on serum potassium which should be monitored within 4 weeks of initiation.	Yes	Restart when AKI improving and/or steady state kidney function achieved in patients with indication
Diuretics: Loop (furosemide) and thiazides	Volume depletion and electrolyte abnormalities	N/A	Yes, unless volume overloaded	Assess volume status and restart if indicated
Sodium glucose transporter-2 (SGLT-2) Inhibitors (e.g. dapagliflozin, empagliflozin, canagliflozin)	Decreased renal perfusion in the setting of volume depletion	Protective in patients with CKD with eGFR ≥20 ml/min/1.73 m^2, heart failure, and/or diabetes	Yes	Restart when AKI improving and/or steady state kidney function achieved in patients with indication
Metformin	Increased risk of metformin	Avoid if eGFR < 15 ml/min/1.73 m^2. Reduce dose if eGFR is under 45 ml/min/1.73 m^2	Yes	Restart if eGFR >/= 15 ml/min/1.73 m^2

	associated lactic acidosis (MALA)	• 30-44 ml/min/1.73 m^2: maximum daily dose 1000 mg • eGFR 15-29 ml/min/1.73 m^2: maximum daily dose 500 mg See Diabetes Canada guideline		in patients with indication
Hypoglycemics (sulfonylureas, meglitinides)	Accumulation can increase risk of hypoglycaemia	Avoid long-acting preparations in moderate-severe CKD. Monitor for hypoglycemia and adjust dose as needed. Gliclazide and repaglinide are secretagogues of choice in CKD. Avoid glyburide if eGFR < 60. See Diabetes Canada guideline	Yes	Restart when AKI improving and/or steady state kidney function achieved in patients with indication
GLP-1 agonist (semaglutide)	N/A	Protective in diabetic kidney disease	No	Continue/restart if indicated
Statins	Risk of rhabdomyolysis	Consider dose reduction in CKD. Hold if rhabdomyolysis or unexplained / persistent muscle pain See KDIGO Lipid guideline	Stop if AKI due to rhabdomyolysis	If stopped due to rhabdomyolysis, suggest specialist advice regarding restart guidance
Antimicrobials				
Refer to BC renal antimicrobial guide				
Other				
Colchicine	Risk of accumulation and serious toxicity (GI, CNS)	Use lowest effective dose (recommended starting dose 0.3 mg daily for creatinine clearance <30 ml/min). Monitor for adverse	Use lowest effective dose and consider corticosteroids as alternative	Restart/adjust dose depending on kidney function if indicated

		effects. Consider corticosteroids as alternative		
Proton pump inhibitors	Risk of interstitial nephritis	Clarify indication. If strong indication (e.g. Barrett's esophagus, Zollinger-Ellison syndrome, complicated ulcer), continue PPI. If used for >8 weeks for GERD/dyspepsia indication, PPI deprescribing trial recommended (taper dose by 50% over 2-4 weeks, then discontinue) Consider alternative agent (e.g. H2 blocker). See Lefebvre et al.	Clarify indication and consider alternative agent (e.g. H2 blocker)	If strong indication for PPI (e.g. Barrett's esophagus, Zollinger-Ellison syndrome, complicated ulcer), restart.
Direct Oral Anticoagulants	May accumulate leading to increased risk of bleeding	Dose adjustment Consider change to less renally excreted agent. For atrial fibrillation indication, preferred agent in CKD is apixaban 5 mg bid, or 2.5 mg bid if 2 of the following criteria are met: age ≥80 years, body weight ≤60 kg, or serum creatinine ≥133 umol/L See DOAC dosing guide	Dose adjustment Consider change to less renally excreted agent	Dose adjustment Consider change to less renally excreted agent
Vitamins, minerals, herbal or other supplements: do not take unless advised by physician or checked for safety and appropriateness by a pharmacist.				

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Disclaimer: This medication guide is designed to provide information and assist decision-making. This is not intended to define a standard of care and should not be construed as one. Neither should it be interpreted as prescribing an exclusive course of management, variations in practice will inevitably and appropriately occur when clinicians consider the needs of individual patients. Every health care professional making use of this guide is responsible for evaluation the appropriateness of applying this in the setting of any particular clinical situation. If additional guidance is needed, please consult nephrology.

*Risk of AKI is defined as: acute Illness causing hypovolemia such as gastrointestinal illness or infection with inability to maintain fluid intake, reduced intake/fasting, IV or intraarterial contrast dye. For medications that should be held if at risk for AKI, counsel on sick day management.

- BC Renal chronic pain guide: http://www.bcrenal.ca/resource-gallery/Documents/Preferred-Medications.pdf
- Diabetes Canada guideline: https://guidelines.diabetes.ca/reduce-complications/renal-dosing-chart
- KDIGO Lipid guideline: https://kdigo.org/wp-content/uploads/2017/02/KDIGO-2013-Lipids-Guideline-English.pdf
- BC renal antimicrobial guide: http://www.bcrenal.ca/resource-gallery/Documents/Common%20Oral%20Antimicrobial%20Therapy%20Dosage%20Adjustment.pdf
- Lefebvre MJ, Ng PCK, Desjarlais A, McCann D, Waldvogel B, Tonelli M, Garg AX, Wilson JA, Beaulieu M, Marin J, Orsulak C, Lloyd A, McIntyre C, Feldberg J, Bohm C, Battistella M. Development and Validation of Nine Deprescribing Algorithms for Patients on Hemodialysis to Decrease Polypharmacy. Can J Kidney Health Dis. 2020 Oct 29;7:2054358120968674. doi: 10.1177/2054358120968674. PMID: 33194213; PMCID: PMC7605037. (see Supplemental Material)
- Direct oral anticoagulant dose adjustment: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7769201/figure/F1/

This tool was adapted from the following resources and underwent review by a multidisciplinary working group.

- Think Kidneys: https://www.thinkkidneys.nhs.uk/aki/wp-content/uploads/sites/2/2016/03/Guidelines-for-Medicines-optimisation-in-patients-with-AKI-final.pdf
- BC Guidelines - Chronic Kidney Disease: https://www2.gov.bc.ca/gov/content/health/practitioner-professional-resources/bc-guidelines/chronic-kidney-disease#appendix-c