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Best Practices: Kidney Care Clinics

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Best Practices: Kidney Care Clinics

1.0 Background and purpose of document

Chronic kidney disease (CKD) is prevalent worldwide and has direct impacts on global health, both as a direct cause of global morbidity and mortality, and as a key risk factor for cardiovascular disease and other serious health conditions.

- In adults, the most common causes of CKD are diabetes (38%), renovascular disease/hypertension (12%), and glomerulonephritis (10%).[1] In children, congenital anomalies of the kidney and urinary tract (up to 50%), cystic kidney disease (13%), and infection/cortical necrosis (11%) are the most common.[1]
- CKD is recognized as a significant risk factor for cardiovascular disease mortality, as well a risk multiplier in patients with hypertension and diabetes.[2]

CKD affects 9.1% of the general population worldwide (2017)[2] and has an especially large burden in low- income countries,[3] in East and Southeast Asia, Latin America, and the Caribbean.[4]

- Between 1990 and 2016, the global incidence of CKD increased by 89%; prevalence increased by 87%; death due to CKD increased by 98%; and disability-adjusted life-years (DALYs) increased by 62%.[5]
    - The increase in DALYs was driven globally by population growth and aging.[5]
    - In high-income countries (e.g., Canada), the increase in the incidence of diabetes and, to a lesser extent, hypertension also contributed to the increase in DALYs.[5]

Though the global incidence of CKD and renal failure in children is currently unknown, it is estimated to be around 55 – 60 million per age-matched populations.[6] CKD is therefore one of the most common pediatric noncommunicable diseases.[7]

The BC Centre for Disease Control (BCCDC) calculates the provincial prevalence rates of the leading chronic diseases. The age-standardized and crude prevalence rates for CKD in BC have been reported at 3% and 4%[8] using BCCDC case definitions. This translates to over 200,000 British Columbians who have currently been identified as living with kidney disease (relative to BC's population in 2021, which was 5,214,805). However, it is widely estimated that closer to 10% of the population suffers from CKD,[4] so there are likely many more individuals with CKD who have not yet been identified.

The prevalence of CKD is markedly higher in older age groups (>65 years), with an estimated rate of about 31%.[9] Other high-risk groups include females[4] and specific ethnic populations, namely Indigenous peoples, Pacific Islanders, and people of African, East Asian, and South Asian descent.

- While the prevalence of CKD is higher in females, the mortality rate is higher in males, suggesting that males progress to end-stage kidney disease more rapidly.[2]
- The rate of CKD amongst Indigenous peoples in Canada is estimated to be three times higher than amongst non-Indigenous populations.[10]
- CKD is more prevalent in people with diabetes mellitus and hypertension.[4]

Methods to identify CKD early and diagnose specific kidney diseases have improved significantly in recent years. Early identification, followed by risk stratification and treatment, has the potential to substantially reduce both morbidity and mortality from CKD and other related complications such as cardiovascular disease.[11,12] In addition, a growing body of literature now suggests that early identification and appropriate management of CKD (particularly cardiovascular risks) delays CKD disease progression.

Growing awareness and knowledge of CKD amongst primary care providers has further contributed to improvements in early identification. These advances have been supported by the availability of evidence-based CKD guidelines, which facilitate co-management of CKD between specialists and primary care providers.

A wider range of CKD-modifying treatments are now applicable to most patients with CKD (with more emerging). In addition, treatments for patients with specific kidney diseases, such as glomerulonephritis (GN) and autosomal dominant polycystic kidney disease (ADPKD), have improved in recent years.

While most patients with CKD will not progress to later-stage kidney disease, a small proportion will progress and therefore require more intensive kidney care and/or treatments for kidney failure. Our ability to predict more accurately which patients will progress has improved through the use of the Kidney Failure Risk Equation (KFRE) and other disease-specific prognostic tools.

Interprofessional (also known as interdisciplinary) CKD programs seek to provide comprehensive care to patients through the collaboration of various health providers and the integration of their relevant skills. Interprofessional teams can include nephrologists, physicians, nurses, pharmacists, dietitians, and social workers, among other care providers. Studies have shown that interprofessional CKD care results in:

- Reduced rate of all-cause mortality [13,14,15]
- *Reduced hospitalization rate[14,15]
- *Better management of CKD morbidities
- Higher proportion listed for kidney transplant[16]
- *Higher proportion with an optimal kidney replacement therapy start[16]
- Lower risk of starting dialysis[13]
- Less likely to require emergent dialysis[13,15]
- Greater likelihood of starting dialysis on peritoneal dialysis[15]
- Reduced need for temporary catheterization for patients requiring dialysis[14,15]
- Improved patient preparedness and health outcomes during the transition to dialysis [16,17]
- *Slower rates of estimated glomerular filtration rate (eGFR) decline [13,14,15,17]
- *Better nutrition (in children)

*= Published data also supports improvements in the pediatric population.[18,19]

BC'S CKD programs provide repeated, regular, interprofessional team visits to patients, including through our 14 Kidney Care Clinics (KCCs). KCCs are responsible for the delivery of non-dialysis

kidney care services to a diverse population in communities across the province. We provide care, education, and practical support to a wide range of patients, from those experiencing mild to moderate loss of kidney function to those preparing for dialysis or a kidney transplant.

In 2024, 14,808 patients were registered for care in one of BC's 14 KCCs.[20] These numbers represent an increase of 47% over the past 10 years (relative to a 19% increase in the BC population[21]). Of these patients:

- The average age was 71.3 years old;
- 54% were male;
- 50% had diabetes and 38% had cardiovascular disease in addition to kidney disease; and
- The average eGFR at CKD registration was 35.3[20]

KCCs strive to involve patients and families as active partners in our network—respecting their beliefs, values, lived experiences, and diverse cultural and ethnic backgrounds, as well as the unique needs that may arise from their geographical location. Our goal is to create a culturally safe, relevant, and responsive environment in which all viewpoints are considered and respected. As members of the provincial renal network, we are also committed to the co-development of Indigenous cultural safety strategies in kidney care.[22]

There are 14 KCCs across BC's five health authorities, with the majority located in urban centres. Comparatively, 87% of the BC population resides in an urban setting[a] and 13% in a small town/rural setting.[23] This means that a significant number of patients must travel long distances to attend KCC visits, particularly in the Northern, Interior, and Island Health Authorities. The availability of virtual visits for some aspects of care has helped to reduce this travel burden. See Table 1 for the locations of BC's KCCs.

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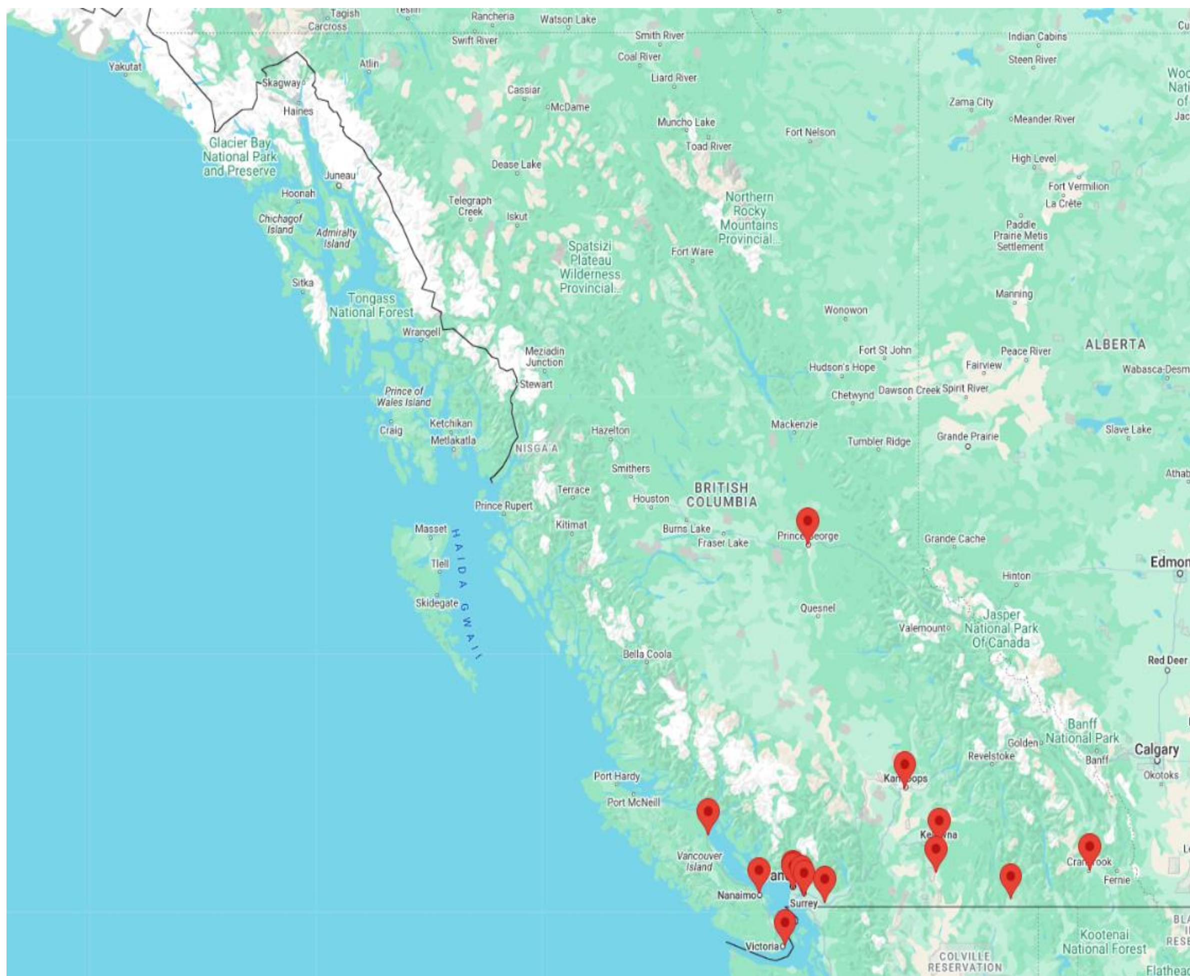
[a] Defined as >1000 inhabitants and a density of >400 inhabitants per square meter.

Table 1: BC's KCCs



Historically, a lack of standardization across different CKD programs in BC produced variances in patient experience and quality of care (e.g., depending on their specific location, some patients may have had access to a full CKD team, while others could only see a physician). The establishment of the Provincial Kidney Care Clinic (KCC) Committee in 2012 and the subsequent development of provincial guidelines and resources has helped to address these disparities by facilitating the adoption of "best practices" and the standardization of care across all KCCs (with built-in flexibility to accommodate local resources and populations). In a recent BC patient experience survey of Kidney Care Clinic (KCC) patients, 90% of respondents rated the overall quality of kidney services to be either “excellent” (43%), “very good” (31%), or “good” (16%) (with a response rate of 25%).[24]

The purpose of this document is to describe the role of Kidney Care Clinics (KCCs) in supporting “best practices” in the provision of CKD care, drawing on expertise and experience within BC, as well as CKD literature and the recently released KDIGO guideline.[25] For variations in practice and considerations specific to the care of ADPKD patients, refer to our companion document: Best Practices: Care of Patients with Autosomal Dominant Polycystic Kidney Disease (ADPKD).

2.0 Scope of services, goals, and target populations

2.1 Scope of services

The KCC network provides evidence-based kidney care through an interdisciplinary team – including, at minimum, a nephrologist, nurse, dietitian, social worker, and pharmacist. These team members teach patients[b] the necessary skills for self-management and support the creation and implementation of a safe, patient-centered plan for the treatment of kidney disease, prevention of vascular disease, and promotion of a healthy lifestyle. The team works collaboratively with patients throughout their kidney disease journey, guided by a holistic approach to care that seeks to understand patients' challenges from a physical and psychosocial perspective as well as a medical one. Patient confidentiality is a priority throughout the journey.

KCCs provide kidney disease education to patients and, where necessary, support smooth transitions to appropriate kidney care partners in transplant, home dialysis, vascular access, hemodialysis, and palliative care. We lead discussions on health planning, prioritize quality of life (QOL), and support patients in determining and describing their hopes and goals. All team members strive for excellence in communication and collaboration, both within the program and with external health care partners in the community and acute care.

KCCs deliver care via a co-management model. Some care items, such as those directly related to CKD, are managed primarily by the kidney care team,[c] while other items that are not directly kidney-related may be managed by primary care providers, other specialists, or other care teams. The kidney care team strives to be aware and up-to-date on concurrent treatment plans for comorbid conditions. Examples of other care teams include: diabetes centres, heart clinics, urology clinics, pediatric teams, geriatric clinics, and mental health teams.

KCC teams are supported by discipline-specific councils/groups within BC Renal that offer professional development, case consultations, resource updates, and discipline-specific guidelines.

The KCC network is a valuable source of knowledge and provides interprofessional education. Team members educate other health professionals and distribute our many resources by making ourselves available to the healthcare community. The clinics also provide educational opportunities and mentorship to students in all allied health professions. We work in collaboration with patient partners and the Kidney Foundation to co-develop and share educational materials and support tools that reflect lived experiences and promote patient-centered care.

As a member of the provincial renal network, KCCs remain mindful of the link between a healthy environment and a healthy population. In alignment with BC Renal's 2023-2028 strategic plan, which names planetary health as a key priority, we recognize our role in both reducing their

[b] Reference to "'patient" includes the family/caregiver through this document, where appropriate.
[c] 'Kidney care team' and 'KCC team' are used interchangeably in this document.

collective environmental footprint and ensuring our ability to respond to current and future environmental threats.[18]

The KCC teams are effective stewards of health resources. They participate in research and quality improvement opportunities to evaluate and advance care for patients with CKD. Teams are responsible for collecting and reporting data to inform KCC quality indicators, supporting the ongoing review of best practices, providing timely information to funders, and strengthening ongoing advocacy for our patient population.

2.2 Goals

Through our delivery of collaborative, evidence-based, interdisciplinary, and patient-centered care, KCCs aim to optimize the experiences and outcomes of British Columbians living with kidney disease. We seek to provide 'the right kidney care, for the right patient, at the right time' by remaining responsive to patients' individual circumstances and needs. This means the objective of care may vary from patient to patient and/or depend on their stage in the kidney journey. Care goals and aims may include:

1) Initial entry into the interdisciplinary KCC setting;

2) Providing an accurate kidney diagnosis and individualized assessment of kidney failure risk;

3) Selecting and implementing disease- and stage-specific treatment plans for kidney diseases and/or related complications (with a specific focus on treatments proven to arrest or delay progression of kidney diseases);

4) Actively monitoring, supporting self-management, and managing complications related to CKD;

5) Educating and supporting decision-making for long-term planning, including treatments for kidney failure (transplantation, dialysis treatments, and conservative care); and

6) Where necessary, planning for and facilitating transitions: (a) to treatments for kidney failure (transplantation, dialysis treatments, and conservative care); or (b) from pediatric to adult kidney care, as appropriate.

2.3 Target populations

The **target populations** for BC's KCCs are patients:

1) with later-stage CKD
2) with earlier-stage CKD which is predicted to progress rapidly
3) suffering complications related to their kidney disease; and/or
4) with rare or specialized kidney diseases

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3.0 KCC referrals, waiting times, and visit frequency

3.1 Referral criteria

3.1.1 Referral to KCCs

Patients are referred to KCCs by a nephrologist. Considerations for referral may include:

1. Patients whose kidney disease is progressive or at risk of progressing, including but not limited to factors such as:
    1.1 eGFR 30 – 60 mL/min/1.73 m^2 and albuminuria >60 mg/mmol
    1.2 eGFR <30 mL/min/1.73 m^2
    1.3 > 10% risk calculated by the 2-year Kidney Failure Risk Equation (KFRE)

2. Renal specific conditions (irrespective of CKD stage) including:
    a. Polycystic kidney disease (PKD) and other genetic kidney diseases
    b. Recurrent acute kidney injury
    c. Glomerular disorders
    d. Complex, comorbid, or rare medical conditions that would benefit from an interprofessional team approach to kidney care and related complications
    e. Recurrent or extensive nephrolithiasis

3.1.2 Repatriation from KCC to nephrologist/primary care

In certain circumstances, some patients may no longer require KCC support. In such cases, a return to their nephrologist or primary care provider (PCP) may be appropriate.

Evidence supports the safety of discharge in the following situations:[26]

1. PCP repatriation: 2-year KFRE <3% and vascular protection strategies have been implemented (antiproteinuric agents, statin therapy, blood pressure control)
2. Nephrologist repatriation: 2-year KFRE <10%
3. PCP or nephrologist repatriation:
    a. Have opted for conservative treatment, have a care plan, and the nephrologist/PCP and patient are comfortable with the arrangements for ongoing care
    b. Patients who do not wish to attend KCC or fail to attend multiple KCC visits (e.g., multiple unanswered "no shows" for appointments)

Important considerations prior to discharge from KCC:

- Availability of physician to receive/manage patient after discharge (nephrologist or PCP)
- Written discharge plan provided to patient and documentation to PCP
- Coverage for medications currently funded as part of the BC Renal formulary

3.2 Target waiting times and visit frequency

3.2.1 Target waiting time for first KCC visit

When receiving and assessing referrals, KCCs are expected to triage incoming patients according to severity: urgent, priority, or routine. Guidelines for target time from receipt of referral (including triaging to appropriate KCC resources) to a patient's first KCC appointment are shown below (though individual situations may require adjustments):

Urgent <2 weeks:

- New diagnosis of eGFR <10mL/min
- Rapidly progressing glomerulonephritis (GN)

Priority <4 weeks:

- Nephrotic syndrome
- 2-year KFRE >40%
- eGFR < 15mL/min
- Rapid decline in eGFR over days to weeks

Routine: <12 weeks

3.2.1 KCC visit frequency

Table 2 provides guidelines for the frequency of KCC visits based on multiple factors, including:

- The patient's stage in the kidney care journey
- Severity and stability of the patient's kidney disease
- Ability of patient to self-manage
- Patient care needs and preferences
- Nephrologist practice (some nephrologists see patients in their offices between KCC visits)

Table 2: Guidelines for Frequency of KCC Visits

Stage of KCC Journey		**Visit Frequency**	**Type of Visit**
1	Support entry into KCC, provide kidney diagnosis, and assess kidney failure risk		In-person preferred
2	Implement disease-specific treatment plan	Q3-6 mos	In-person preferred
3	Actively monitor the status of CKD and manage related complications	Q3-12 mos	If visit frequency is more frequent than annual, attempt to schedule at least one in-person visit per year. *Consideration: Weather/travel time may impact the preferred timing for the in-person visit.*

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	Stage of KCC Journey	Visit Frequency	Type of Visit
			If visit frequency is annual, attempt to schedule at least one in-person visit every 2 years. Reference: Guidance document for KCCs: In-person & virtual visits
4	Provide education, support, and shared decision-making around treatment options for kidney failure	PRN	Virtual education sessions (group or 1:1) may be appropriate for: • First visit/initial orientation to the KCC and care team • Initial transplant education • Initial dialysis and conservative care education KCCs are expected to maintain capacity for individual, in-person education sessions for patients whose needs are not met by virtual and/or group education. In-person visits are best for follow-up patient-specific education, discussion, and assistance with decision-making. Reference: Guidance Document for KCCs: In-Person & Virtual Visits
5	Support transition to transplant, dialysis, or conservative care	Q1 -6 mos	In-person or virtual

At *Initial entry* to KCC, information on diagnosis and individual prognosis for kidney-related outcomes is provided, as well as patient education to support self-management and health promotion.

At *Implementation of kidney specific treatments,* patients may be seen more frequently to optimize preventative care, including prescribing antiproteinuric agents, blood pressure control, and interventions for cardiovascular disease prevention, as well as addressing complications of progressive kidney disease. Appointments that involve individualized education may be better received in person.[27]

Once in the *Active monitoring* phase, appointments may be less frequent and involve contact via virtual communication support.[28] At this time, the team will continue to review and support patients with personalized and health-related goal-setting. It is important to note that patients may move between the *Implementation* and *Active monitoring* phases of care throughout their journey.

Education and planning for kidney transplant, dialysis, or conservative care occurs as kidney failure progresses based on symptoms, KFRE, and/or eGFR. Initial education may be done virtually but in-person appointments are encouraged for follow-up patient-specific education and discussion.[28]

Appointments for *Transitioning* to transplant, dialysis, or conservative care will vary in frequency and type depending on patient needs.

4.0 KCC patient experience

4.1 Overview of the phases

The algorithm in Table 3 outlines the major phases of the KCC patient experience, from KCC referral through to transition to transplant, kidney replacement therapy, or conservative care.

Major phases (section 4.0) include:
1. Support entry into KCC, provide kidney diagnosis, and assess kidney failure risk
2. Implement disease-specific treatment plan
3. Actively monitor CKD status and manage complications
4. Provide education and support shared decision-making on treatment options for kidney failure
5. Support transition to transplant, dialysis, or conservative care

Concepts which cross the kidney disease continuum (section 5.0) include:
1. Support goal-setting and self-management
2. Promote healthy lifestyles
3. Help build support systems and promote psychosocial health
4. Actively manage medications

4.2 Support entry into KCC, provide kidney diagnosis, and assess kidney failure risk

4.2.1 Key tasks for the KCC team[d]

Support entry into KCC:
- Organize clinics to enable referred patients to receive care within the target wait time: urgent, priority, or routine.
- Record patient preferences for contact, visit reminders, virtual visits and consent to be contacted for research.
- Conduct initial interdisciplinary assessment.
- Find 'what matters most' to the patient by exploring values, concerns, priorities, and care preferences.

[d] Key tasks are identified in this document but not assigned to specific members of the team. Assignment of tasks is the responsibility of individual KCCs and will vary depending on the needs of the patient population served and roles and relative availability of team members.

- Introduce the BCR resource Your First Few Months with the KCC, as well as key websites to support patient learning: BC Renal, Kidney Wellness Hub, My Kidneys My Health, Indigenous Kidney Health Series (Meno Ya Win), PKD Foundation of Canada.
- Introduce the importance of a healthy lifestyle, psychological supports, social well-being, and advance care planning as overarching themes for kidney care.
- Review BC Renal pharmacy medication benefits and how to access.
- Discuss how and when to contact members of the kidney care team.

Provide kidney diagnosis and assess kidney failure risk

- Wherever possible, ensure a specific etiology of CKD has been determined, discussed with the patient, and entered as the primary diagnosis into the Patient Records and Outcome Management Information System (PROMIS).
- Where creatinine-estimated GFR is felt to be inaccurate and an accurate assessment would influence treatment decisions, pursue alternative methods of ascertaining GFR.
    - This can include extremes of muscle mass or physical activity (high or low), patients with amputations or paralysis or those with certain diets such as very high or very low protein.
- Wherever possible, ensure that a validated risk equation is used to estimate the risk of kidney failure and ensure said risk is communicated with the patient.
- Coordinate referrals to diagnostic imaging, other specialists, and community services.

4.2.2 Support entry into KCC

Prior to their first visit, patients will receive a Welcome Package. This includes:

- Welcome letter sent out prior to first appointment (after phone call from clerk)
- Pamphlet about BC's KCCs
- Kidney Care and You questionnaire for patients to complete and bring to first visit

At the first KCC visit, the kidney care team will review the welcome package and provide an additional patient guide: Your First Few Months with the KCC.

Your First Few Months with the KCC includes key points for KCC staff to review with patients during their first few months. The guide is divided into 5 steps:

1. Why have I been referred to a Kidney Care Clinic?
2. What will I learn about in my first few months with my kidney care team?
    a. Eating well
    b. Staying active
    c. Taking medications
    d. Identifying and building a support system
3. What can I do to keep my kidneys healthy?
    a. Take an active role in your care and involve yourself in treatment decisions
    b. Help monitor your kidney function
4. What symptoms might I experience from my kidney disease?
5. What can I expect after my first few months with my kidney care team?

Your First Few Months with the KCC includes links to priority patient resources. For patients seeking further detail, additional information and links are available on the BC Renal website under Health Information, Kidney Care (Non-Dialysis), New to Kidney Care Clinic.

The pace at which topics are discussed will depend on individual patient readiness and ability to receive information. Topics may be covered through educational sessions (individual or group), conversations during KCC team appointments, and/or by providing patients with written materials and links to videos, webinars, etc. Education is best phased-in over time.

An initial team assessment is an integral part of the first KCC phase. This interdisciplinary visit considers and incorporates the perspectives of all KCC team members and is then used as the basis for developing the patient's treatment plan.

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4.2.3 Provide kidney diagnosis and assess kidney failure risk

4.2.3.1 Estimated glomerular filtration rate (eGFR)

CKD, defined as a decrease in kidney function or kidney damage lasting more than 3 months, is often asymptomatic and may remain undetected without laboratory testing. While decreased eGFR and increased albuminuria are markers of kidney damage, the cause of these changes may not always be apparent.

The gold standard for assessing a patient's CKD stage as well as risk of morbidity and mortality is the (1) eGFR calculation based on serum creatinine; and (2) urine albumin to creatinine ratio (ACR). See Figure 1.

In specific situations, the estimation of GFR from serum creatinine alone may not be accurate (e.g., muscle wasting, muscle loss, amputation, high muscle mass, obesity, cancer, or in transgender[e] and gender-diverse populations) or higher levels of accuracy may be required to guide decision-making (e.g., drug dosing). In these situations, an estimated GFR using a combined creatinine and cystatin C or a measured GFR can be used.

Figure 1: Staging of CKD

CKD is defined as abnormalities of kidney structure or function, present for a minimum of 3 months, with implications for health. CKD is classified based on Cause, Glomerular filtration rate (GFR) category (G1–G5), and Albuminuria category (A1–A3), abbreviated as CGA.

KDIGO: Prognosis of CKD by GFR and albuminuria categories				Persistent albuminuria categories Description and range		
				A1	A2	A3
				Normal to mildly increased	Moderately increased	Severely increased
				<30 mg/g <3 mg/mmol	30–300 mg/g 3–30 mg/mmol	>300 mg/g >30 mg/mmol
GFR categories (ml/min/1.73 m²) Description and range	G1	Normal or high	≥90			
	G2	Mildly decreased	60–89			
	G3a	Mildly to moderately decreased	45–59			
	G3b	Moderately to severely decreased	30–44			
	G4	Severely decreased	15–29			
	G5	Kidney failure	<15			

Green: low risk (if no other markers of kidney disease, no CKD); Yellow: moderately increased risk; Orange: high risk; Red: very high risk. GFR, glomerular filtration rate.

Source: KDIGO, 2024[17]

[e] This is irrespective of whether hormone replacement therapy is used. This is because GFR calculations are calibrated based on averages of biologic sexes so in situations where the sex-based average does not apply, the creatinine estimated GFR will not be accurate.

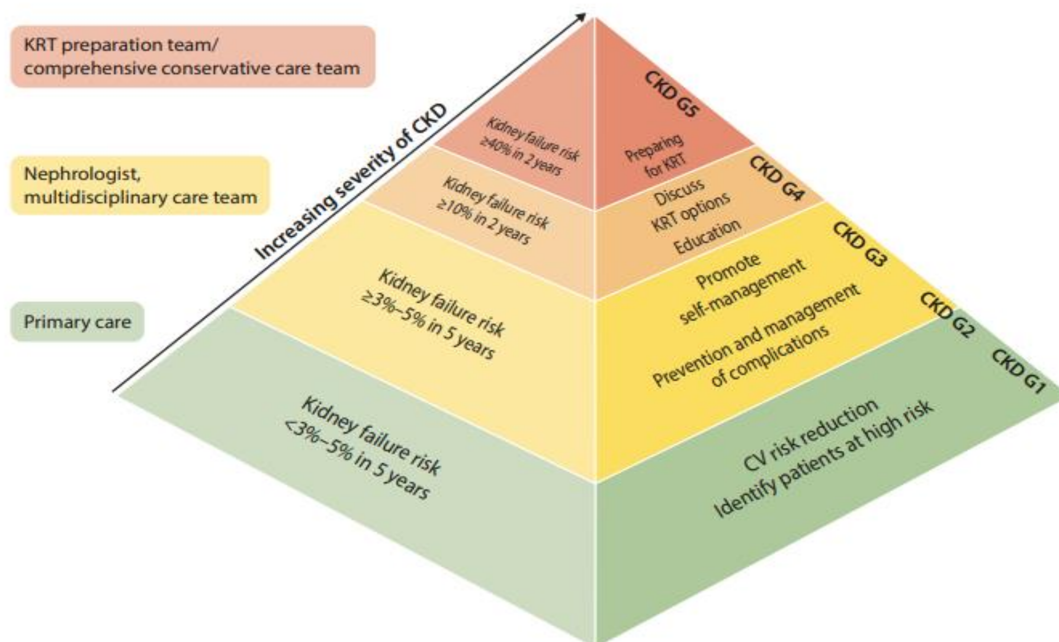
4.2.3.2 Kidney failure risk equation

Children:
Predicting if a child will progress to later-stage kidney disease and/or is at significant risk of progression (i.e. most likely to benefit from KCC services) can prove challenging. While prognostic tools are available for children (e.g., the Pediatric Estimated Time to Kidney Replacement Therapy or [KRT calculator]), the clinical utility of these tools still require further evaluation.

Adults:
The use of an externally validated risk equation (e.g., Kidney Failure Risk Equation or KFRE) to estimate the absolute risk of kidney failure is recommended for patients at CKD stages 3-5. It can help guide providers and patients in making key decisions. The 2-year KFRE equation is integrated into PROMIS for easy reference. The KFRE equation should not be used in patients with eGFR over 60 mL/min/1.73^2 and the KFRE results will not be displayed in PROMIS for this group. In addition, certain diseases such as PKD or glomerulonephritis (GN) have their own disease-specific prognostic tools, and those more specific tools should be used rather than the KFRE.

Using the results of a validated risk prediction tool, in conjunction with eGFR and other clinical considerations, can help to individualize care. For example, in adults where the KFRE applies, KDIGO guidelines suggest using a 2-year KFRE of >40% to help determine the timing for: (1) referral to transplant; (2) modality education; and (3) preparing for dialysis, including vascular access planning. See figure 2.

Figure 2: Optimal care model by increasing severity of CKD



Source: KDIGO, 2024[25]

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4.3 *Implement disease-specific treatment plan*

4.3.1 Key tasks for the KCC team

- Collaborate with patients on establishing clear therapeutic goals and individualized treatment plans. Revisit and adapt as necessary.
- Develop and implement interdisciplinary treatment plans, with attention paid to diet, lifestyle, and psychosocial health.
- Remain aware of the high incidence of cognitive impairment amongst CKD patients and refer to appropriate resources for assessment and follow-up where necessary.
- Take primary responsibility for management strategies and interventions known to impact CKD progression:
    - Optimize blood pressure, educate and encourage patients to self-monitor, and take appropriate action if blood pressure is outside target range.
    - Prescribe appropriate, evidence-based medication(s), including angiotensin-converting enzyme inhibitors (ACEi's)/angiotensin 2 receptor blockers (ARB's), sodium-glucose transport protein 2 inhibitors (SGLT2i's), aldosterone receptor antagonists (MRA's), or glucagon-like peptide-1 (GLP-1) agonists shown to delay kidney failure.
    - Prescribe emerging medications and therapies shown to delay kidney failure.
    - Prescribe targeted therapies for specific diagnoses (e.g., GN, PKD).
    - Consider offering participation in clinical trials as appropriate.
- Refer complex disease and mental health concerns outside the scope of the KCC team to appropriate health care partners (e.g., diabetes care, cardiovascular care, peripheral vascular disease care, hyperlipidemia care, rheumatology care, urology care, pediatrics, counsellor).
    - Make recommendations to health care partners on considerations for treatment in the context of kidney disease.

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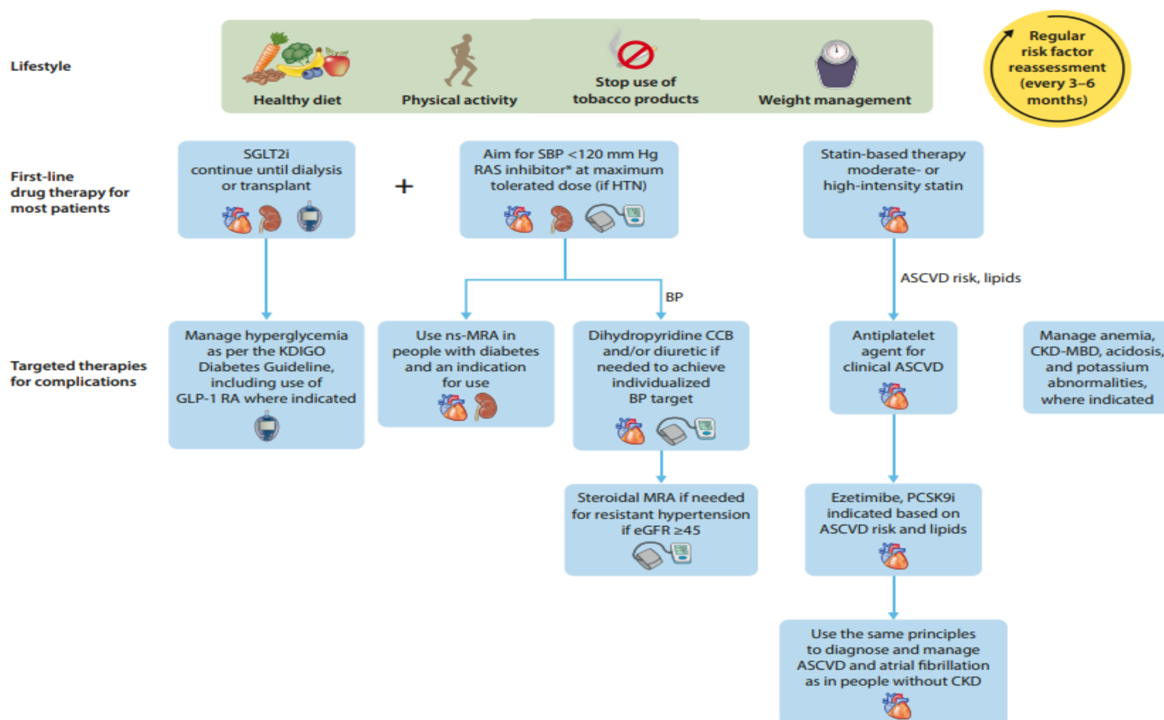
4.3.2 Delay CKD progression

Delaying CKD progression requires a holistic, multi-targeted approach and is best supported by an interdisciplinary team. See Figure 3.

Figure 3: Holistic approach to CKD treatment and risk modification



Source: KDIGO, 2024[25]

4.3.3 Blood pressure management

Blood pressure (BP) management is one of the most important therapeutic interventions to help delay CKD progression and reduce cardiovascular (CV) risk. BP management is a primary responsibility of the KCC team.

Assessment of BP is the first step in the management process. Standardized clinic BP or home-based BP monitoring are both acceptable means of assessing blood pressure. We encourage home-based BP monitoring for KCC patients and have developed a staff guideline and patient resource guides on the topic.

Establishing an individualized target for blood pressure is the next step. This target blood pressure should be evidence-informed, taking into consideration individual patient factors such as orthostatic hypotension and fall risk.

To achieve target blood pressure, interventions like sodium restriction, physical activity, and maintenance of a healthy weight can be explored prior or simultaneously to the addition of antihypertensive medications. Antihypertensive medications that have kidney and cardiovascular

benefits, like renin-angiotensin-system inhibitors (RASi), should be considered (where appropriate) when individualizing therapy.

4.3.4 Proteinuria management

Proteinuria (or albuminuria) refers to an abnormal loss of protein in the urine (or albumin, which is the plasma protein found in higher quantity in the urine of CKD patients) and is a key factor in CKD risk assessment. Higher levels of proteinuria are associated with a higher risk of both kidney failure and cardiovascular disease. An albumin-to-creatinine ratio (ACR) test is used to measure proteinuria.

Surveillance of proteinuria, along with eGFR, helps to support accurate staging and prognosis, identify timing for interventions, and assess the effectiveness of kidney treatments. There is no established target proteinuria level. ACR measurements can vary significantly based on factors such as exercise level, sodium intake, and illness, and should be considered on an individualized basis during the ACR review.

To reduce the risk of proteinuria, lifestyle interventions should be encouraged (such as sodium restriction, achieving a healthy weight, treatment of obstructive sleep apnea [if applicable]), in addition to medications like renin-angiotensin-system inhibitors (RASi), sodium-glucose-transporter-2 inhibitors (SGLT-2i), aldosterone-receptor-antagonists (MRA), and glucagon-like peptide-1 (GLP-1) agonists. All the above therapeutic options have shown benefits in the CKD population, including slowing the progression of kidney disease and decreasing cardiovascular risk. Other medication options are in future development and will be adopted by KCCs when available.

4.3.5 Diabetes management

Diabetes management is another key component of delaying CKD progression and reducing CV risk. In most cases, diabetes management and related goal/target-setting are outside the scope of the KCC team. Rather, their primary responsibility is to stay up-to-date with a patient's diabetes plan and make recommendations to health care partners on treatment considerations within the context of kidney disease.

Therapies that have both kidney and cardiovascular benefits, such as Metformin, SGLT2i's, and glucagon-like peptide (GLP-1) agonists, should be prioritized when establishing the CKD therapeutic plan (where appropriate).

4.3.6 Cardiovascular disease management

Patients with CKD are at increased risk of cardiovascular disease (CVD), including structural heart disease, heart failure, atherosclerotic disease, and sudden death. These risks increase progressively as eGFR declines and ACR increases. In the majority of CKD patients, the risk of CVD mortality exceeds the risk of progression to kidney failure. Prevention of atherosclerotic cardiovascular disease (ASCVD) should focus on traditional cardiovascular risk factors (hypertension, diabetes management, dyslipidemia, smoking cessation) as well as mineral bone disorder, which can accelerate vascular calcification.

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For patients with established CVD, management is typically outside the scope of the KCC team. Like with diabetes care, the KCC team will stay up-to-date with a patient's CVD plan and make recommendations to health care partners on considerations within the context of kidney disease (e.g., dyslipidemia, antiplatelet therapy, and anticoagulation). Furthermore, the KCC team will ensure that patients at higher CV risk are referred for specialized assessment and management.

4.3.7 Obesity management

Obesity has been linked to an increase in CKD progression, development of glucose intolerance/insulin resistance, and increased risk of CVD. Intentional weight loss is associated with a decrease in proteinuria, improvement in blood pressure, as well as potential kidney benefits, particularly for CKD patients who are obese with eGFR > 30 mL/min.[29]

The achievement and maintenance of a healthy weight can improve the scope of available treatment options for CKD patients as they progress to end-stage kidney disease (ESKD). Obesity can be a barrier to kidney transplantation because of the increased risk of postoperative complications and mortality. Supporting weight loss in patients experiencing obesity is a key way for KCC teams to help patients access transplantation.

In addition to lifestyle counselling and medications, there are specialized programs in BC to help patients achieve a healthy weight. KCC teams should remain aware of available resources in their local area and can play an important role in helping patients access these services.

4.4 Actively monitor CKD status and manage related complications

Once a disease-specific treatment plan has been implemented by the KCC team (e.g., optimized BP, pharmacotherapy, education for self-management), a period of active monitoring follows. At this stage, complications of CKD may arise and need to be addressed.

4.4.1 Key tasks for the KCC team

- Efficiently and effectively utilize healthcare resources and services, regularly reflecting on practices for quality improvement within clinics (i.e. "right person, right task" and lab frequency intervals).
- Educate and coach patients on strategies for disease monitoring and self-management.
- Establish a CKD monitoring plan (including blood pressure monitoring and frequency of lab work and appointments) to be reviewed at least once per year.
- Monitor and manage lab results as per BCR protocols, including anemia, potassium, and bone mineral axis.
- Assess and manage kidney disease-related symptoms as per BCR protocols, including providing info on both non-medication and medication-related options to patients.
- Provide patients with information about nephrotoxic medications, as well as sick day advice.
- Offer guidance on over-the-counter medications and herbal products.
- Take primary responsibility for developing and managing treatment plans for kidney-related comorbidities, including:
    - Metabolic acidosis

  - Hyperkalemia
  - Anemia (if deemed to be CKD-related)
  - CKD-mineral-bone disorder
  - Growth and nutrition (pediatrics)
- For co-morbidities outside the scope of the KCC team, refer to appropriate health care partners (e.g., diabetes care, cardiovascular care, PVD care, dyslipidemia care, rheumatology care, counsellor) and make recommendations to said partners within the context of kidney disease.
- Provide information on vaccinations and recommend accessing public health or primary care provider. BCCDC recommended vaccines with chronic kidney disease.[30]
- Discuss future planning for health and health-related challenges by (1) providing prognostic information where possible; and (2) supporting the creation of an advance care plan (ACP) that includes family and partners in the conversation.
- Update and record changes to ACP regularly, particularly after sentinel events (e.g., stroke, cardiovascular event)

4.4.2 Hyperkalemia

Potassium is a key electrolyte for cell membrane functioning, particularly nerve and muscle cell activity. Since potassium is eliminated by the kidneys, CKD patients are at higher risk of high serum potassium levels, or hyperkalemia. In some cases, hyperkalemia can cause cardiac conduction abnormalities and arrythmia.

Various factors and mechanisms impact serum potassium measurements. The KCC team is responsible for gathering pertinent information which may explain the reason for hyperkalemia. An individualized approach to hyperkalemia is preferred, incorporating dietary and pharmacologic interventions and considering comorbidities and QOL. Refer to the BCR guideline Ordering, Reviewing and Follow-Up of Lab Work. Patients can be referred to the resource Potassium Management in Kidney Disease.

4.4.3 Metabolic acidosis

As kidney function declines, the kidneys' ability to excrete hydrogen ions and generate bicarbonate decreases, resulting in metabolic acidosis. Dietary modifications that limit the consumption of acid-rich foods and increase the consumption of alkaline-rich foods may help control metabolic acidosis. Limited evidence suggests that the use of sodium bicarbonate tablets to correct metabolic acidosis helps delay CKD progression and related complications. Sodium bicarbonate supplementation may be considered in patients with serum bicarbonate less than 18 mmol/L (adults) or 22 mmol/L (children). Refer to the BCR guideline Ordering, Reviewing and Follow-Up of Lab Work.

4.4.4 Anemia

Anemia associated with CKD is caused by a decrease in endogenous erythropoietic activity. Anemia incidence, defined as an Hgb < 130 g/L in adult men and Hgb < 120 g/L in adult women and age-appropriate norms for children, increases with CKD progression. Other potential contributing factors include iron deficiency and (less commonly) vitamin B12 and folic acid deficiencies. The KCC team should ensure a work-up has been completed to rule out non-CKD-related causes of anemia

prior to initiating the CKD Non-Dialysis Anemia Management Protocol (adults) or BCCH Pediatric CKD Anemia Management (children).

For patients that are anemic and iron-deficient, iron should be repleted by offering PO or IV iron first, before adding an erythropoietin stimulating agent (ESA) to enhance drug efficacy. ESA agents are indicated when a patient is experiencing anemia-related symptoms, has a Hgb < 95-100 g/L, and is iron repleted. The goal of anemia treatment is to decrease symptoms and target a Hgb between 95-115 g/L. As previously mentioned, refer to BCR guideline CKD Non-Dialysis Anemia Management Protocol (adults) or BCCH Pediatric CKD Anemia Management (children).

4.4.5 CKD-mineral bone disorder

CKD-mineral bone disorder (CKD-MBD) is a spectrum of disease that involves biochemical changes (including changes in serum phosphorus, calcium, and iPTH), bone abnormalities, and vascular and soft tissue calcification. CKD-MBD increases the risk of fractures, CV complications, and mortality.

As per CSN KDIGO commentary,[31] laboratory monitoring for CKD-MBD should be initiated for adult CKD stage 4 patients (earlier CKD stages are at limited risk). For CKD stages 4 and 5 (and for pediatrics, CKD stages 2 – 5):

- Utilize serial measurements for recommendations on MBD parameters: total calcium, phosphorus, and intact parathyroid hormone (iPTH) levels.
    - Reduce phosphate to a normal range and provide education on inorganic phosphate additive and low-value foods with high phosphate.
    - Target total calcium to a normal range.
        - If calcium is high in the absence of a calcium-based phosphate binder or activated vitamin D, this would indicate an etiology separate from CKD and is thus outside the scope of the KCC.
    - For levels of iPTH that are progressively rising or persistently above the upper normal limit, evaluate for modifiable factors, including hyperphosphatemia, hypocalcemia, and vitamin D deficiency.
- Consider alfacalcidol and/or calcitriol for severe and progressive hyperparathyroidism or hypocalcemia.
- Calcium carbonate can be used as a calcium supplement or a phosphate binder.

4.4.6 Uremic Symptoms

Late-stage CKD can come with many uremic symptoms that may be under-recognized, underdiagnosed, and/or undertreated. These symptoms can greatly affect QOL, social relationships, and financial stability, and contribute to overall poor well-being.

For patients in CKD stage 5 and/or reporting significant uremic-related symptoms, a standardized validated assessment tool – like the Edmonton symptoms assessment (ESAS) tool or Patient-reported outcome measure for the assessment of symptom burden in pediatric CKD (PRO-Kid)[32] – should be used. Refer to BCR guideline Systematic Symptom Assessment & Management,[33] Symptom Management Checklists[33] (available in multiple languages), and Common Symptom Guides[33] (for KCC staff and patients).

4.4.7 Hyperuricemia

Uric acid is the end product of purine metabolism, which is eliminated by the kidneys. Its accumulation can lead to gout.

Uric acid-lowering therapy can be used to manage symptomatic hyperuricemia (gout or uric acid stone). For patients with established gout or uric acid stone, management is outside the scope of the KCC team in most cases. The KCC team should stay up-to-date with related plans and provide medical or dietary recommendations to health care partners and patients for treatment in the context of kidney disease. There is no evidence that treatment of asymptomatic hyperuricemia delays CKD progression and therefore is not recommended.

4.4.8 Growth and nutrition (pediatrics)

Optimizing growth and nutrition is a key component of pediatric CKD management. Growth impairment in children with CKD is a multifactorial process, influenced by inadequate nutritional intake, metabolic complications such as metabolic acidosis and mineral bone disorder, as well as resistance to endogenous and exogenous growth hormone. Effective management requires a multidisciplinary approach to monitor and address these factors, with the goal of supporting optimal growth, development, and overall well-being.

As per the Pediatric Renal Nutrition Taskforce Recommendations. the KCC team should:

- Assess and educate on optimal nutrition (ideally carried out by registered dietitians).
    - Ensure patients meet their protein and energy requirements (avoiding any restriction and aiming for the upper end of the normal range for healthy children).[34]
    - Recommend age- and disease-appropriate sodium and fluid intake[35]
    - Ensure age-appropriate intake of calcium and phosphorus to support bone growth.[36]
    - Educate and advise on optimization of dietary potassium intake.[36]
    - Ensure adequacy of vitamins and minerals.[37]
- Encourage regular physical activity, with levels meeting the World Health Organization (WHO). guidelines (i.e. at least 60 minutes/day), while aiming for maintenance of a healthy weight.

KCC teams should evaluate the appropriateness of recombinant human growth hormone (rhGH) therapy in pediatric patients who, despite optimized nutritional status, fail to achieve satisfactory growth.[f] Careful assessment of eligibility, initiation of therapy, and ongoing surveillance for potential adverse effects are essential components of care. Refer to the Canadian Association of Pediatric Nephrologists (CAPN) guidelines on the use of rhGH in CKD[38] for evidence-based recommendations.

[f] Defined as height SDS < –1.88 (3rd percentile) or height SDS < 0 when height < 10th percentile or height >2 SD below the mid-parental height.

4.5 Provide education and support shared decision-making on treatment options for kidney failure

4.5.1 Key tasks for the KCC team

- Review the PROMIS eGFR report of KCC patients at least monthly to identify patients with a 2-year KFRE>40%.
    - If KFRE does not apply, utilize eGFR <20 mL/min/1.73m^2 as the threshold.
- Provide timely information and support shared decision-making on active treatment options (in preferred order, as appropriate to the patient and family/caregiver):
    1) Living kidney donor transplant (provided separately and in advance of dialysis education)
    2) Home therapies: Peritoneal dialysis (PD) or home hemodialysis (HHD)
    3) Facility-based dialysis
- For patients interested in pursuing transplantation, assist in the development of a living donor outreach plan and facilitate connections with the Kidney Foundation.
- For patients choosing to pursue conservative care, provide relevant information and resources.
- Assist in preparations for patient transition, including timely referral to transplant, dialysis, vascular access team, and other specialists.
- Include ACP in discussions of treatment options.
    - Dialogue between the patient, family/caregiver, and health care team should include open communication and a review of care goals. This process may also involve the completion of the My Voice guide (or comparable tool) and/or working through the process for Medical Order for Scope of Treatment (MOST).

4.5.2 Supporting education and decision-making

Choosing a treatment option is often a difficult process for patients and family members, and decisions may shift over time. Staff and physician support are crucial throughout the decision-making process. Areas of support include the acknowledgement and exploration of patient and family concerns, needs, anxieties, and barriers, as well as ensuring adequate time and education for decision-making.

Patient resources

- All treatments
    - Treatments for Kidney Failure
    - Patient Education Webinars on Treatment Options (recorded)
    - Living with Kidney Failure (Book #2, The Kidney Foundation of Canada)
    - Indigenous Kidney Health Series
- Transplant
    - Living Donor Kidney Transplant
- Home therapies
    - Introduction to Home Dialysis
    - Dialysis options in BC
    - Peritoneal dialysis
    - Home hemodialysis
- Conservative care

  - Transitioning to Conservative Care
- Advance care planning
  - BC Renal Advance Care Planning
  - My Voice: Expressing My Wishes for Future Health Care Treatment
  - Advance Care Planning: Respecting Indigenous Ceremonies and Rites

Staff resources
- Palliative care
  - Integrative Palliative Nephrology Resource Guide
- Serious illness conversations
  - Starting the Conversation: Exploring Key Concepts Throughout the Renal Journey
  - Serious Illness Conversation Guide
  - Serious Illness Care Program: Reference Guide for Interprofessional Clinicians

4.6 Support transitions

4.6.1 Key tasks for the KCC team

- Review readiness for transition on a regular basis.
- Ensure timely activation of transplant, dialysis access, and/or dialysis initiation plan; or, for those choosing conservative care, involve palliative care team where appropriate.
- Provide supported, seamless transitions to transplant or dialysis team, avoiding the need for acute care whenever possible.
    - The KCC team is responsible for collaborating with receiving teams to develop clear timelines for transition based on local resources and patient needs (e.g., PD tube insertion, referral for vascular access).
- Communicate patient/family-specific information to receiving transplant, dialysis, or palliative care team during transition.
- Continue reviewing and updating patient goals, as well as supporting treatment and symptom management options that promote the optimization of QOL.

4.6.2 Transition to transplant, dialysis, or conservative care

Kidney failure typically requires a number of transitions, including preparation for kidney replacement therapy or shifts to conservative care. Such changes may elicit stress and fear in patients who are unsure how their day-to-day lives will be impacted or how they will respond to the new treatment/regimen. Changes that seem routine for KCC staff are often highly stressful for patients. Striving to understand the experience of transition from the patient’s perspective is crucial, as is providing patients with a clear understanding of what to expect throughout the process. It is important that patients know how and who to ask for help and feel empowered to engage as active partners in the transition process. Clear, coordinated communication with patients and between health care providers is key to a successful transition.[39]

Detailed (patient-focused) transition guides are available as follows:

- Kidney Transplant from a Living Donor
- Peritoneal Dialysis Transition Guide

- Home Hemodialysis Transition Guide
- Welcome to the Hemodialysis Unit
- Transition to Conservative Care (KCC)

4.6.3 Transition to adult care from pediatrics

For youth living with kidney disease, transitioning from pediatric to adult care is challenging. This longitudinal youth-focused process requires individualized education and support from multidisciplinary KCC teams, starting at the early stages of adolescence. Prior to transfer of care to adult providers, KCC teams must assess readiness and prepare youth for the next step in their care through an individualized transition process. This should include early preparation (around 12-14 years) to practical components of transition (e.g., gradually increasing independence in self-management skills), as well as providing education on transition tailored to the patients' readiness and developmental/intellectual capabilities. Parents, caregivers, and other significant people should be included in the transition process.

A generic transition checklist may be used to facilitate individualized discussions and structured assessment of competencies. One example of a transition checklist is the **TR$_x$ANSITION** Index™, which addresses:

- **T**ype (of illness)
- **R**x (medication)
- **A**dherence
- **N**utrition
- **S**elf-Management Skills
- **I**nformed Reproductive Health
- **T**rade/school
- **I**nsurance
- **O**ngoing Support

Information about patient care should be communicated with receiving adult teams. If possible, pediatric and champions within the adult clinic should be identified to facilitate the coordination of the transition process. Ideally, there should be some flexibility in exact timing of transfer from the pediatric program, such that the transfer timeline can be modified in times of crisis. Upon transitioning to adult care, young people living with CKD may require more frequent follow-up compared to older adults for the same stage of disease. With the patient's agreement, the inclusion of caregivers and/or significant others for the first 1-3 years following transition to adult care may also help ensure a successful integration into an adult model of care.

Detailed transition guidelines for the care teams are available as follows:

- Canadian Association of Pediatric Health Centers: Guideline for the Transition from Paediatric to Adult Health Care for Youth with Special Health Care Needs
- International Pediatric Nephrology Association Transition from pediatric to adult renal services

BCRenal
Provincial Health Services Authority

5.0 Concepts across the KCC continuum

5.1 Support goal setting and self-management

5.1.1 Key tasks for the KCC team

- Review and discuss responses with patients to the questionnaire Kidney Care and You (patients are asked to complete and bring to their first visit).
- Following the interdisciplinary team assessment, utilize the responses from the Kidney Care and You questionnaire to assist patients in identifying important personal goals, and support them in developing a plan to meet these goals. Ensure mechanisms are in place within the KCC for the team to collaborate with patients on priorities.
- Regularly check-in with patients on their progress towards meeting their goals, adjusting as needed and overcoming barriers. Actively revisit these discussions after sentinel events.

5.1.2 Goal setting and self-management

Goal-setting and self-management are important components of kidney care. When done in collaboration with patients/families (best practice), goal-setting supports patients in the self-management of their kidney disease.

In conjunction with the Kidney Care and You questionnaire, exploring "What Matters to You?" (WMTY) with patients is a helpful way to initiate goal-setting conversations. (See the link above to learn more about WMTY and why it's important for both patients and health professionals.)

Other important concepts to discuss with patients/families include:

- What is self-management? Why is it important?
- Information about the stages of change and their relationship to setting and achieving goals
- How to set goals (e.g., blood pressure, physical activity, eating, smoking, QOL)
- How to develop an action plan to meet goals
    - E.g., break into a series of small steps; identify barriers and ways to overcome them; assess self-confidence in ability to meet goals and ways to make goals more achievable
- Review community resources that will aid patients in meeting their goals

Resources

- Self-Management British Columbia (multiple program formats including virtual groups, in-person workshops, telephone peer health coaching)
- Kidney Wellness Coaching (Kidney Wellness Hub)

5.2 Promote healthy lifestyles

5.2.1 Key tasks for the KCC team

- Provide tools to encourage physical activity and, where appropriate, refer to community programs.
- Observe changes in physical abilities and refer to appropriate allied health supports.

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- Provide evidence-based dietary resources and encourage dietary education and counselling from allied health team members.
- Continually revisit dietary issues and improvements.
- Observe signs of weight change and refer to appropriate allied health supports.
- Consistently and optimistically encourage smoking reduction and cessation.
- Observe signs, symptoms, and concerns related to mental health and substance use, and refer to appropriate supports for assessment and treatment.
- Where appropriate, address sexual health and family planning within the context of CKD concerns.
- Acknowledge and respect gender diversity.
- Acknowledge Canada's ongoing legacy of colonialism and its devastating effects on the health of Indigenous peoples, as well as the rights of Indigenous peoples to integrate traditional healing practices into their care.

5.2.2 Eating well

In CKD patients, diets that are more plant-based (e.g., DASH, Mediterranean diet) are associated with a decreased risk of CKD progression, a reduced rate of kidney failure, a reduction in mortality, and an improvement in some areas of QOL. A diverse diet rich in vegetables, fruits, nuts, beans, and whole grains is recommended. Ultra-processed food should be limited. Renal dietitians can provide patient education and adapt their dietary recommendations to individual factors, including patient comorbidities (e.g., gout), CKD stage, and specific lab parameters.

Patients that have stage 4 or 5 CKD, are older than 65, or show symptoms of involuntary weight loss, frailty, or poor appetite should be assessed for malnutrition using a validated assessment tool, such as the 7-point Subjective Global Assessment (SGA), and provided with appropriate dietary advice and recommendations.

5.2.4 Staying active

In CKD patients, lower level of physical activity and physical fitness are associated with a higher risk of CVD and mortality.[26] In both the general population and the diabetic population, an increase in one's physical activity level provides cardiometabolic, kidney, and cognitive benefits. Furthermore, patients participating in regular physical activity report higher overall wellbeing and quality of life (QOL).

The 2024 KDIGO CKD guidelines recommend that CKD patients undertake moderate to intense physical activity for a cumulative duration of at least 150 minutes weekly, or at a level compatible with their current cardiovascular and physical tolerance. Patients should engage in a multi-component physical activity program, including aerobics, muscle strength training, and balance training exercises, with consideration paid to specific energy levels.

In addition to available local resources (e.g., cardiac rehab program, local physiotherapist), patients can be referred to the following for support in adopting and maintaining an active lifestyle and healthy weight:

- Kidney Wellness Hub

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- Health Link BC - Physical Activity (resource for patients with multiple co-morbidities)

5.2.5 Smoking reduction and cessation

It is generally accepted that smoking has a nephrotoxic effect. CKD patients who smoke are at higher risk of premature cardiovascular disease (CVD), respiratory diseases, and cancer. All CKD patients who smoke should receive education on the risks, as well as support (pharmacological and non-pharmacological) for smoking reduction and cessation. Patients can also be referred to Health Link BC's webpage on Quitting smoking.

5.2.6 Sexual health

Kidney disease can impact sexual health in a number of ways, including changes to libido, erectile dysfunction, difficulty reaching orgasm, and fertility issues. These changes may be physical (e.g., hormonal changes, blood vessel damage), emotional (e.g., stress, anxiety, depression), or related to medications (e.g., antihypertensives, beta-blockers, tricyclic antidepressants).

Not every patient with CKD will experience changes to their sexual health, and those who do may experience such challenges to varying extents. The KCC team should remain open to discussions about sexual health, aware of available local resources, and support patients in accessing these services. For more information, refer to the BC Renal's information on Sexual Health and Kidney Disease.

5.2.6 Family planning

CKD is associated with decreased female and male fertility. This is related partly to impaired function of the hypothalamic-pituitary-gonadal axis, alongside various other factors. For those interested in family planning, ongoing discussion between the patient and kidney team (e.g., contraception, optimal timing for pregnancy, resources for fertility challenges, and potential adverse outcomes and complications of pregnancy) is essential.

Specialized teams (including high-risk obstetrics, maternal-fetal medicine, and pregnancy/CKD clinics) are available across the province to help patients achieve the best outcomes for family planning. In addition to providing services during the pregnancy and peripartum periods, pregnancy/CKD clinics offer preconception counselling and counselling on contraceptive options, medication adjustments, and other optimization strategies.

5.3 Help build support systems and promote psychosocial health

5.3.1 Key tasks for the KCC team

- Utilize motivational interviewing tools to assist with goal setting. Encourage inclusion of patients' social supports in care planning.
- Recognize, acknowledge, and assess psychological, social, educational/vocational, and financial impacts of chronic disease, including employment and depression. Where appropriate, facilitate the navigation of services and referrals to community partners.
- Monitor for frailty as an independent factor in morbidity and mortality, including physical deterioration and malnutrition. Refer to appropriate support.

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- Monitor for depression, cognitive decline, anxiety, caregiver burnout, and emotional distress as common CKD-related complications that require assessment and referral. Involve appropriate health care partners and community services.
- Encourage patients to access the Kidney Foundation for additional resources, such as peer connections and support groups. For people with PKD, encourage access to the PKD Foundation.

5.3.2 Building a support system and promoting psychosocial health

Chronic kidney disease can impact patients' physical, emotional, social, and spiritual health, and each individual may react to their diagnosis differently. Learning to live with a chronic illness and manage the progression of one's condition may prove difficult for some individuals. It is the KCC team's responsibility to identify patients who may be facing these challenges, provide support, and refer to resources available in the local area or virtually. As always, encouraging patients to build a support system and seek out the kidney community is key.

Further information on mental wellbeing and social connection, as well as access to peer support programs, can be found via the Kidney Foundation Wellness Hub.

5.3.3 Navigating services

People with CKD often experience financial challenges and are disproportionately impacted by the costs of transportation and medications.[40] The KCC team plays an important role in assessing, acknowledging, and supporting these needs, particularly upon entry to the clinic and/or at points of significant health decline and care transitions. Finances and access to housing and transportation can act as barriers to certain treatment modalities but can also be addressed with timely and individualized support from the KCC team.

5.4 Actively manage medications

5.4.1 Key tasks for the KCC team

- Complete best possible medication histories (BPMHs), medication reconciliations, and medication reviews as per section 5.4.2.
- Utilize a judicious, cost-effective, thoughtful, and environmentally responsible approach to selecting medications.
- Optimize medications, deprescribe when appropriate, and prioritize treatments based on patient limitations, such as cost and pill burden.
- Review and implement strategies for medication adherence.
- Liaise with community pharmacies, primary care providers, and specialty care teams as needed to ensure accurate medication information.
- Educate patients about processes for medication coverage, including Pharmacare, BC Renal Formulary, and private insurance.
- Maintain current documentation of pharmacy/pharmacies used by patient.

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5.4.2 Medication update, medication reconciliation, and medication review

Ensuring that the entire KCC team has up-to-date knowledge of their patients' medications is integral to providing safe and effective kidney care. Because patients with CKD typically require multiple medications and/or frequent prescription changes, they are also at higher risk than most for medication errors. These errors can cause harm, including severe illness or death. As such, it is key that the KCC team perform regular medication reviews and check in with patients about their experiences on current prescriptions.

Definitions and standards[41]

Best possible medication history

A best possible medication history (BPMH) is a review of a patient's medications to establish an accurate and complete list (or as close to such as possible) of the prescribed and non-prescribed drugs that the patient is currently taking. See the BCR website or the Institute for Safe Medication Practices Canada (ISMP) website for examples of interview guides.

Additions, deletions, or changes made since the previous clinic visit are entered into the electronic health record used by the KCC and flagged to the KCC team. Medications included in the KCC BC Renal indicator reports must also be entered into PROMIS, including:

- Erythropoiesis-stimulating agents (ESAs)
- Renin-angiotensin system inhibitors (RASIs)
- Sodium-glucose cotransporter 2 inhibitor (SGLT2is)
- Lipid-lowering therapy
- Immunosuppressants
- Mineralocorticoid receptor antagonists (MRAs)
- Glucagon-like peptide-1 (GLP-1) agonists
- Tolvaptan
- Meds on BC Renal Formulary

Completion of the BPMH is undertaken at each KCC visit (involving the full team), and can be performed by a nurse, pharmacist, pharmacy technician, or nephrologist.

Medication reconciliation

Medication reconciliation (or med rec) is a three-step process, in which the team (e.g., physicians, nurses, pharmacists) work in collaboration with patients and families to:

1. Complete a BPMH (see BPMH standard above).
2. Compare BPMH to medication regimens listed on PharmaNet and/or documentation by patient's other health care providers (e.g., notes from specialists). (This step is usually undertaken by a pharmacist or nephrologist.)
   - Identify and resolve medication discrepancies related to CKD practice (e.g., incorrect dosages, patient is not taking medication or not taken as prescribed).
   - Medication discrepancies outside the KCC's scope of practice should be communicated to the PCP and/or relevant specialist(s).

3. Communicate a complete and accurate list of medications to the patient, family members, and their other care providers. (This step can be done by a nurse, pharmacist, pharmacy technician, or nephrologist.)

Medication review

A medication review is a med rec (see 3 steps above) with the addition of a step to evaluate the patient's overall medications, taking into consideration all relevant conditions/co-morbidities. Medication reviews at the KCC can be done by a pharmacist and/or nephrologist. Med recs identify drug-related problems with a focus on issues and conditions related to CKD (e.g., renal drug dosing, assessment for potential nephrotoxins, assessment for drug interactions, adverse drug reactions, barriers to taking medications). Medication issues outside the CKD scope of practice should be communicated to the PCP and/or relevant specialist(s).

Medication reconciliation or medication review should be undertaken (at a minimum) as follows:

1. Upon entry into KCC
2. When a patient is transferred to another care team (receiving team is responsible for the med rec or med review)

5.4.3 Deprescription

CKD patients are at a higher risk for polypharmacy and potential harms related to adverse drug events (ADEs), as they often have multiple comorbidities and many prescribers involved in their care. Polypharmacy leads to increased pill burden, increased cost, potential harm-related ADEs, and increased risk of drug-drug interactions. Periodic medication reviews by the nephrologist and/or pharmacist can help to ensure that the patient is receiving appropriate therapy, and that medications that are no longer needed are discontinued. This review is particularly useful if there are changes in the patient's care goals.

5.4.4 Sick day management

In the case of acute and dehydrating illness, holding off on medication may help to prevent acute kidney injury. Plans to restart medication should be clearly communicated to the patient and documented. See this handout on sick day management.

5.5.5 KCC quality indicators

Quality indicators are reported semi-annually, drawing from data collected over the previous 6-month period (with cutoffs on March 31st and September 30th, respectively). These reports capture trends at the provincial, health authority, and local KCC level, and help the KCC to determine both positive trends/successes and areas of improvement. Quality indicators are integral to the continuous quality improvement that forms a key component of the KCC philosophy of care.

Data for the KCC Quality Indicator Report is pulled from the provincial Patient Records and Outcome Management Information System (PROMIS). Some of this data is received electronically from other systems (e.g., laboratory data), and some requires manual data entry. The accuracy of the KCC Quality Indicators is dependent upon accurate data entry. Table 4 provides a listing of the data elements which require capture.

Table 3: KCC PROMIS Data Entry Requirements

CKD Patients as of September 30, 2023	
	Missing f/u loc
KCC Patients as of September 30, 2023	
	Comorbidity assessment available in PROMIS
Delaying Disease Progression & Managing Complications	
	Pts with BP recorded in past 12 mos
	Patients with individualized BP target identified
	Patients who received home BP monitoring teaching
Promoting Self-Management	
	Pts assessed for symptoms (mESAS) within the 12-mo period
	Pts with eGFR<15 and has ANY record in ACP module
Participating In & Optimizing Treatment Decisions	
	Potential candidate for transplant (education) recorded in PROMIS
	Pts with modality decision documented
	Pts with transplant decision="Yes" or "Undecided" with "back up" modality decision documented
Transitions from KCC during Current 6-Month Period	
	Pts with modality decision documented
Several indicators	
	Medications as per 5.4.2

Table 4: Extensive list of medications required to be entered in PROMIS medication list

Renin-Angiotensin System Inhibitors (RASi)	
Azilsartan	Losartan
Candesartan	Olemsartan
Captopril	Perindopril
Eprosartan	Quinalapril
Enalapril	Ramipril
Fosinopril	Telmisartan
Irbesartan	Trandolapril
Lisinopril	Valsartan
Sodium-Glucose Cotransporter 2 Inhibitors (SGLT-2i)	
Canagliflozin	Dapagliflozin
Empagliflozin	
Mineralocorticoid Receptor Antagonists (MRAs)	
Eplerenone	Spironolactone
Finerenone	
Glucagon-like Peptide-1 (GLP-1) Agonists	
Dulaglutide	Semaglutide
Liraglutide	Tirzepatide
Lipid-Lowering Therapy	
Alirocumab	Fluvastatin

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Atorvastatin	Gemfibrozil
Bezafibrate	Lovastatin
Evolocumab	Pravastatin
Ezetimibe	Rosuvastatin
Fenofibrate	Simvastatin
Immunosuppressants	
Azathioprine	Mycophenolate Mofetil
Belimumab	Mycophenolate Sodium
Cyclophosphamide	Prednisone
Cyclosporine	Rituximab
	Tacrolimus
Anemia	
Darbepoetin alfa (Aranesp)	Ferrous fumarate
Epoetin alfa (Eprex)	Ferrous sulfate
Electrolytes Disturbances	
Alfacalcidol	Calcium carbonate/acetate
Calcitriol	Sodium bicarbonate
Calcium polystyrene	Sodium polystyrene
Symptoms management	
BC renal pruritus cream	Levodopa-carbidopa
Diphenhydramine	Nortriptyline
Gabapentin	PEG without electrolyte
Glaxal base cream	Ropinirole
Hydroxyzine	Sennosides
Lactulose	Vitamin E
Polycystic Kidney Disease Drug	
Tolvaptan	

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