



PROVINCIAL STANDARDS & GUIDELINES



Provincial Guidelines for Renal Program Development

Updated Oct 2022

Developed with input from multiple BC Renal modality committees



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IMPORTANT INFORMATION

This BC Renal guideline/resource was developed to support equitable, best practice care for patients with chronic kidney disease living in BC. The guideline/resource promotes standardized practices and is intended to assist renal programs in providing care that is reflected in quality patient outcome measurements. Based on the best information available at the time of publication, this guideline/resource relies on evidence and avoids opinion-based statements where possible; refer to www.bcrenal.ca for the most recent version.





For information about the use and referencing of BC Renal provincial guidelines/resources, refer to bcrenal.ca/health-info.



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A. Rationale

Chronic kidney disease (CKD) is one of the fastest growing health concerns in BC, in part due to our aging population. An estimated one in **10 British Columbians** has some degree of kidney disease.

[BC Renal](#) (BCR) is part of the Provincial Health Services Authority and includes a province-wide network that plans and coordinates health-care services for patients with kidney disease in BC. Programs provided through BC's regional health authorities include:

- Chronic kidney disease clinics (for patients who have kidney disease but do not require dialysis)
- In-hospital hemodialysis
- Community unit hemodialysis
- Independent dialysis: peritoneal dialysis, home-based hemodialysis options and self-care within facilities

Current program locations can be found on bcrenal.ca.

This document was developed to aid health authorities and institutions in the development of new renal facilities and programs in accordance with the provincial approach to ensure equitable and logical distribution of high quality care. Of note, comprehensive statistical methodology is used to calculate kidney care resource needs, based on population demographics and other factors (see [Appendix II](#)). With increasing growth and emphasis on home-based therapies, it may be necessary to revisit previous assumptions regarding facility needs specifically. However, the importance of fully integrated programs with capacity to manage patients throughout the continuum of care remains a key principle.

This document describes the structure, function and expectations of regional renal programs, modified from the original guideline approved in 2005 by the [BCR Executive Committee](#).

B. The Structure and Components of a Renal Program

1. Health Authority Renal Program (HARP)

Each health authority operates a renal program for its region - this is known as a **Health Authority Renal Program (HARP)**. The HARP may consist of one or more **Primary Renal Management Centres**. The HARP is responsible for the regional co-ordination of all renal services within the HARP under the leadership of senior administrator(s), manager(s) and the clinical leadership of a **Medical Director** who is a trained nephrologist qualified to practice in BC and Canada. (Please see the **Medical Director – Kidney Services – Adult and Pediatric** role descriptions in [Appendix I](#)).

Each HARP requires a **Steering Committee** with members representing each Primary Renal Management Centre. The Steering Committee plays an important role in the regional co-ordination of services, facilitation of communication within the HARP and as a communication link with both BCR and the health authority.

2. Primary Renal Management Centre

A Primary Renal Management Centre is based at an acute care hospital and offers a **full spectrum** of renal services for a specified geographic area within the HARP. The centre functions as the “home base” for patients referred to the centre within that geographic area. There may be several centres operating within, and under the co-ordination of, one HARP. Given the complex care requirements of kidney patients, the establishment of a renal centre is restricted to hospital facilities that can provide the necessary resources and for a critical mass of patients (see [Section C](#)). The creation of a Primary Renal Centre within a HARP is done in collaboration with the HA and BCR, and with the expectation that specific resources are available at that location.

The complex care needs of kidney patients should not be underestimated when considering the impact of a Primary Renal Management Centre on the site hospital. If the hospital did not previously admit kidney patients, the impact will be felt by essentially all clinical and operational areas.

3. Full Spectrum Renal Services

A Primary Renal Management Centre must be able to provide a full spectrum of renal services to support the delivery of effective secondary preventative care and treatment of renal failure. These services must include the following:

- In-centre renal dialysis unit
- Independent dialysis services inclusive of peritoneal dialysis and home hemodialysis

- In-patient/acute care nephrology services
- Chronic kidney disease clinic
- Community-based hemodialysis services, or Community Dialysis Units, may also be provided but are not essential to the operation of the centre.

It should be noted that all of the services listed above are interdependent in the matrix of renal care delivery, and no one component should be established independent of the others. One exception would be Chronic Kidney Disease services (pre-dialysis), which may be established as an outreach service of an existing centre.

In addition, the facility where the centre is based must offer emergency, cardiology, ICU, radiology, clinical laboratory and pharmacy services.

Interventional radiology and surgical services (for the creation and maintenance of patients' dialysis access) should be available at a Primary Renal Management Centre. When these services are not available on site, they must be available within the HARP.

It is imperative that centres lacking on-site access to these services establish clinical protocols, processes, and transparent relationships with facilities that do have those services to ensure seamless access to care within any one HARP, with focus on patient-centred processes. Recognizing the development of a Primary Renal Management Centre may be phased over a period of time, the expectation is that all of these services are available on-site within 2-3 years of establishment of a new centre.

4. Human Resources

Kidney patients have complex care needs requiring the coordinated approach of a specialized team. The renal multidisciplinary team includes physicians, nurses (including licensed practical nurses and nurse practitioners in some programs), dietitians, pharmacists, technicians, social workers, care-aids and clerical staff. These resources are essential to the delivery of quality renal services that maximize patient survival and quality of life, and in most cases require specialized education and training.

Nephrologist Recruitment and Coverage

A dedicated renal physician on active medical staff at in-centre facilities is an absolute pre-requisite. Dialysis services should be provided by nephrologists certified by the Royal College of Physicians and Surgeons of Canada (or equivalent). Nephrology coverage must be self-supporting (i.e. sufficient to provide full daily coverage and 24/7 on-call support). Dedicated nephrologists must be on site before a new centre becomes operational.

There is, at present, no official accreditation process for nephrologists working in BC as part of BCR (i.e. as exists at the BC Cancer Agency). However, BCR and PHSA do expect that health authorities, when considering the appointment of nephrologists and/or the establishment of new centres, will do so in accordance with the guiding provincial principles of BCR¹. The HARP will consult with the existing facilities in their region, the Medical Director of the HARP, and BCR Executive Director with respect to recruitment processes and expectations. A process for accountability within the HARP is essential, and nephrologists within health authorities should be reviewed on an annual basis by the appropriate administrative structure within the HA (usually VP Medicine or Acute Services of HA), in collaboration with medical and administrative leads of the HARP. Nephrology resources should be viewed as “restricted” to those nephrologists ‘privileged’ by the HARP to access them.

This accountability structure contributes to the delivery of high quality clinical care, ensures patient safety and maintains a cohesive community of care providers for patients living with kidney disease.

5. Collaborative Staffing Model

Primary management centres should strive to deliver safe, competent, ethical, quality, evidence-informed care, which includes meeting patients’ needs across the continuum of care and bringing about positive health outcomes for them.

Collaborative interdisciplinary care offers the opportunity to improve patient care by using staff to the fullest extent of their knowledge, training and experience. It is about a range of health care providers using all of their valued knowledge, training and ability to care for patients. Most importantly, the model is about the needs of the patient. It allows patients to be a key contributor to their plan of care and goals for their care. Traditionally, patient assignments are based on which care providers are available at any given time. A collaborative patient care model will bring a team together in a new and different way: patients will be at the centre. We believe patients and their families should play an active role in contributing to their care plan, based on their health goals. Patients will be supported by an interdisciplinary team working collaboratively using all of the team’s expertise to discuss patient-centred management plans, goal setting and advance care planning.

6. Funding

Payment to regions for the delivery of renal services to registered patients is predicated on actual patient activity as reported in the provincial renal information system, PROMIS. This funding is targeted to specific renal

¹ [BCR Organizational Structure and Function](#), Updated 2019

costs for management of pre-dialysis and dialysis patients such as labour costs for nurses, dietitians, social workers, pharmacists, clerks, technicians and technologists, as well as hemodialysis supply costs for in-centre units. It does not cover all facility operating costs related to renal care such as hospitalization, operating room utilization, radiology and lab services, which are covered under HA global budget.

[Sections D](#) and [E](#) outline guidelines for the establishment of in-centre and community dialysis units, as well as expectations regarding the accessibility of physician coverage.

7. Virtual Clinics/Care

Technologies for virtual healthcare continue to evolve and have the potential to support enhanced patient-centred care as well as address challenges related to transportation, environmental concerns and specific patient care needs. Virtual health visits may include remote patient monitoring, clinical digital messaging, online treatment and resources, and more. A number of telehealth options are currently being used and/or explored across health authorities. BC Renal aims to support innovative methods of delivering care, education and follow up using virtual health technologies in the most effective way, taking into consideration patient preferences, variations across health authorities and privacy/risk considerations.

C. Guidelines for Chronic Kidney Disease (CKD) Programs And Kidney Care Clinics (KCCs)

1. Justification

Interdisciplinary CKD programs are predicated on the idea that the combination of skills offered to patients improves outcomes for both patients and the health care system.

Studies²⁻⁴ have shown that interdisciplinary CKD care results in:

- Greater likelihood of starting dialysis on a home-based therapy
- Greater likelihood of starting dialysis with a fistula, if hemodialysis (HD) is chosen
- Significantly fewer urgent dialysis starts
- Fewer hospital days in the first months of dialysis
- Improved survival once on dialysis

CKD programs provide repeated, regular, team-based visits or contact (phone, telemedicine) for patients with a chronic condition. Chronic disease research shows that this approach supports patient self-management and wellness.

^{2,4} (Curtis et al, 2005) (Levin, 1997) (Goldstein, M et al, 2004)

There is growing awareness and knowledge about CKD amongst primary care providers. This knowledge is supported by the availability of evidence-based CKD guidelines and education. Most patients with CKD will not progress to later stage kidney disease⁵ and can be appropriately managed by their primary care provider with or without consultation with a nephrologist and access to education about kidney disease and chronic disease management. However, a proportion of patients with CKD will progress to later stage kidney disease or be at significant risk of progression. These patients are the most likely to benefit from the services of an interdisciplinary team and are the primary focus of Kidney Care Clinics (KCCs).

2. Staff Requirements

- Clinical leadership: A designated renal physician on active medical staff at the facility is a prerequisite for the development and ongoing support of a KCC. In areas where many nephrologists practice in the same KCC, one physician should be identified as the clinical lead.
- Operational leadership: A designated operational lead must be identified for the KCCs.
- Interdisciplinary team: An inter-professional team including clerical support, dietitians, nurses, pharmacists, social work are required. Specific responsibilities are highlighted in the BCR document, “Best Practices: Kidney Care Clinics”. All practitioners must be knowledgeable in the care of chronic kidney disease patients, as well as principles of patient education and self-management.

3. Space, Equipment And Supplies

There must be a dedicated physical location to allow adequate assessment of patients at regular intervals by all members of the team. In addition, space is required for:

- Individual and group teaching for patients
- Dedicated area for the interdisciplinary team to work in between clinic visits (with access to phone and computer)
- Storage of supplies related to patient education and training

4. Resource Requirements

- **Access to/liaison with the complete complement of KRT (kidney replacement therapy) options, including home therapies, hemodialysis, and kidney transplantation.**

⁵ Only 1% of people with CKD will require dialysis and/or kidney transplantation (Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group, 2013)

- **Access to complimentary outpatient chronic** disease management programs
Patients who require the services of KCCs often have other chronic illnesses that require ongoing outpatient support. This includes access to cardiology, endocrinology, urology and palliative care outpatient support/ programs.
- **Access to timely services for vascular access and peritoneal catheter insertion**
The ability to obtain timely insertion of appropriate dialysis access – peritoneal tube insertion or vascular access (fistula/graft, temporary and tunneled dialysis catheters) is critical for all KCCs. This includes access to interventional radiology, procedure rooms and operating rooms as well as appropriately trained individuals (radiologists, surgeons, nephrologists) to perform the procedures.
- **Outpatient laboratory services**
KCC patients require regular, timely, and ongoing laboratory tests (routine chemistry, hematology, and urinalysis) to evaluate their condition and monitor progress.
- **Timely access to inpatient beds**
Patients managed in a KCC may require admission to hospital for acute episodic changes in their health status (e.g. acute kidney injury (AKI), volume overload, cardiac events) that require timely intervention in an inpatient setting.

In addition, preparation for dialysis requires creation of vascular/peritoneal dialysis access. Although these are generally outpatient procedures, they may require an overnight stay in hospital.

5. Quality And Clinical Guidelines

BCR (in partnership with the local HAs) is responsible for outlining the goals and responsibilities of the Kidney Care Clinics/Programs.

BCR endorses the KDIGO Clinical Practice Guideline for the Evaluation and Management for Chronic Kidney Disease.

[Provincial guidelines for KCCs](#) have also been developed and endorsed by BCR, in consultation with the local HAs.

A set of common performance indicators for the KCCs are distributed every six months for local and provincial review.

D. Guidelines For In-centre Hemodialysis Units

1. Justification

In-centre hemodialysis units (ICHU), by definition, provide care for complex patients with multiple comorbidities whose health status is often unstable. Within an ICHU there is an expected mix of patients, including stable outpatients and patients requiring acute dialysis for potentially reversible diseases. For this reason, an in-centre program is inseparable from a full-service renal program (FSRP) that is able to offer optimal care to CKD patients at all stages, including an early intervention program for CKD. Therefore, when we consider a proposal for an in-centre HD unit we must treat this as a proposal for a full service renal program (FSRP), with all the resource needs that would entail.

Planning for a FSRP should be undertaken when the population of CKD patients in a region reaches a critical mass that would (a) permit efficient use of resources and (b) provide sufficient volume of care (approximately 65-75 patients) to support a nephrologist. Providing close-to-home access to necessary medical care to some of our populations most vulnerable patients is a worthy goal provided it can be achieved efficiently and effectively.

The in-centre hemodialysis unit, as the most resource-intensive component, should be the major deciding factor in the development of a full service program. Acceptable staffing efficiency for an in centre HD unit can be achieved with a 6-station unit operating in 2 shifts 6/7 days per week. This would serve 24 HD patients at capacity, and this should be regarded as a threshold number.

- Creation of an in-centre hemodialysis unit requires appropriate planning and development of the physical and human resources required, including:
- Service needs (case load) projections in regions
- Human resources - recruitment and training
- Space and capital equipment
- Specialized clinical support services - surgery, lab, diagnostics, radiology, ICU

2. Staff Requirements For A Full Service Renal Program

As detailed below in Resource Requirements, human resources requirements include clinical and operational leaders, nephrology consult services, and an interdisciplinary team of nurses, (including LPNs and nurse practitioners in some programs), dietitians, pharmacists, social workers, renal technicians, biomedical engineers, health care aides and clerical staff. These resources are essential to the delivery of quality renal services that maximize patient survival and quality of life, and in most cases require specialized education and training.

3. Space, Equipment and Supplies

- Dedicated treatment area with work stations, dialysis machines, beds, dialysis chairs, needling tables and chairs, oxygen regulators, vacuum regulators, scale, bedside supply carts, etc.
- Tech room for technical equipment, spare parts inventory
- Emergency medical equipment
- Utility rooms, etc.
- Installation of RO system (c/w tank, circulation system, filters, piping)
- Storage room
- Office space
- Patient reception area
- Nursing station
- Nourishment area
- Staff room
- Conference room

4. Resource Requirements

*** Note:** *the resource requirements outlined below apply to the development and ongoing management of programs, not in the case of emergency management situations, where exceptions may be required to ensure continuity of patient care.*

- **Timely access to inpatient beds**

Initiation of dialysis requires creation of vascular/peritoneal dialysis access. This is often done as an outpatient procedure, but may require overnight stay. A proportion of patients will initiate chronic dialysis as inpatients (~10%). Thus, for planning purposes, it is essential to secure hospital beds to accommodate this activity. Secured OR time is also important to ensure timely access creation for all patients. BCR provincial guidelines for timely access creation further define the expectations.

While the number of hospital days per dialysis patient year varies considerably (from 0 days to extended stays), the average is estimated to be 3 days/year. Given that dialysis patients are more likely to be hospitalized than the general population, hospitals within the HARP must be able to accommodate these kidney patients.

Kidney patients are admitted to hospital for a variety of reasons (infections, cardiovascular disease, GI problems, and fractures). These patients require special nursing skills related, for example, to vascular access management, fluid balance and altered drug elimination. It is therefore desirable to have geographically designated beds staffed by nurses and allied health professionals with training and/or experience in renal medicine; or access to those resources.

- **Institutional resources**

- **Laboratory:** Expect increased service volume and STAT requests
- **Pharmacy**
- **Rehabilitation** and physiotherapy services
- **Emergency** department open 24/7
- **Radiology:** renal biopsy, ultrasound (with Doppler), fistulagram, angioplasty, and tunneled catheter insertion
- **OR access:** Timely access for vascular access and PD tube placement⁶

- **Cardiovascular services**

Cardiovascular disease is more prevalent in dialysis patients, which increases demand for assessment, angiography services as well as critical care unit beds and operating room time. Timely access to cardiology and vascular surgery consult services is essential.

- **Providing hemodialysis to ICU/CCU patients**

Creation of an in-centre hemodialysis unit requires appropriate planning for ICU/CCU patients requiring hemodialysis. The clinical judgment required for the care and management of unstable patients is acquired after considerable training and experience. The knowledge and skill set required of a hemodialysis Registered Nurse (RN) performing hemodialysis on a critically ill patient varies from the knowledge and skill set required of a hemodialysis RN performing hemodialysis on a chronically ill or acutely ill patient. An RN trained to perform hemodialysis on a critically ill patient requires considerable exposure to these types of patients to maintain the required competencies to ensure the delivery of safe patient care.

- **Nephrology consult service**

A dedicated renal physician on active medical staff at the facility is an absolute pre-requisite. Dialysis services should be provided by nephrologists certified by the Royal College of Physicians and Surgeons of Canada (or equivalent), Nephrology coverage must be self-supporting (i.e. sufficient to provide full daily coverage and 24/7 on-call support). Dedicated nephrologists must be on site before a FSRP can become operational.

- **Operational leadership**

The leader or manager of the renal program has operational responsibility for the staff and resources in their facility and actively participates in program-related committees within their region, as well as the BC Renal.

⁶ Interventional Radiology and OR/vascular access services may be provided in another centre that is reasonably accessible to patients provided that local services are developed within 2-3 years of the establishment of the in-centre unit. Some patients may be suitable for non-OR based services (outpatient interventional suites).

- **Nursing**
 - Hemodialysis: trained HD nurses⁷ to care for 2 shifts, 6 days minimum
 - Peritoneal Dialysis: trained PD nurses
 - Chronic Kidney Disease: sufficiently trained nephrology nurses to inform patients about treatment modalities

- **Renal technician**
Technician support available on-site or on-call during hours of HD unit operation

- **Biomedical engineering**
Support must be available during HD unit hours of operation

- **Nutritional Support**
Trained renal dietitian(s)

- **Social Work**
Trained in dealing with complex care chronically ill patients and their families

- **Pharmacy**
Access to clinical pharmacists for kidney patients must be available and should be accomplished through institution-based resources.

- **Health Care Aide**
Trained to offer support in the hemodialysis unit

- **Clerical support**
An acceptable ratio of clerical support for renal programs is dependent on institutional and community structure.

5. Quality and Clinical Guidelines

1. BCR (in partnership with the local HAs) is responsible for outlining the goals and responsibilities of the hemodialysis programs.
2. BCR endorses the KDIGO Clinical Practice Guideline for the Evaluation and Management for Chronic Kidney Disease.
3. [Provincial guidelines for hemodialysis care](#) have been developed and endorsed by BCR, in consultation with the local HAs.
4. Provincial guidelines for hemodialysis patients and families have been developed and endorsed by BCR, in consultation with patients and families, and local HAs.

⁷Nurses may include registered nurses (RNs) and licenced practical nurses (LPNs).

E. Guidelines for Community Dialysis Units

1. Justification

Community Dialysis Units (CDUs) are hemodialysis (HD) units that are community based and located as standalone units or in community hospitals. A hospital facility that provides a full service renal program serves as a “home base” for CDU patients. CDUs offer interdisciplinary care with allied health staff on-site or available through telephone/ telehealth, depending on the size and location of the CDU.

Historically, CDUs were set-up to provide an option for patients who were medically stable and independent in their care to receive HD treatments. CDUs are guided by a philosophy that promotes wellness and independence.

In recent years, CDUs have expanded their scope to include patients who have increased medical complexities and care requirements but are still safe to dialyze in a CDU setting. This has enabled patients who would otherwise have had to relocate to be dialyzed in their home community. It also allows higher numbers of patients to dialyze in CDUs, thereby freeing up the more resource intensive in-centre spaces for patients with highly complex medical and care needs.

CDUs provide a range of dialysis care options including conventional HD, self-care limited assistance and self-care independent dialysis, depending on the resources available:

- Conventional hemodialysis
- Self-care limited assistance hemodialysis: Dialysis in a community or a hospital HD unit performed primarily by the patient, with limited assistance from the nurses
- Self-care independent hemodialysis: Dialysis in a community or a hospital HD unit that is run by the patient

Creation of a CDU requires a careful collaborative planning process and should adhere to the following principles:

- Sustained availability of human resources (especially in rural/remote areas):
 - Availability of nephrologists
 - Ability to recruit and retain health care providers, including specialized hemodialysis-trained nursing staff
 - Sufficient patient volumes over time for staff to maintain skills and ensure quality of patient care over the long term
- Availability of appropriate facilities
 - Space that can accommodate supplies, infection control practices, occupational health practices,

water supply, power supply, patients in wheelchairs and patients in chairs

- Facility that can accommodate renovation or expansion to ensure flexibility for future growth
- Patients selected are suitable candidates
 - They are medically stable yet unable for medical or social reasons to manage home-based dialysis

Sustainability: Given the nature of kidney disease, which includes a high dialysis attrition rate, patient volumes within small community dialysis units may fluctuate over time. A periodic review of the sustainability of smaller community dialysis units should be undertaken to ensure quality of care and patient safety.

2. Staff Requirements

- **Nephrology consult service**

Dialysis services should be provided by nephrologists certified by the Royal College of Physicians and Surgeons of Canada (or equivalent); A nephrologist is available on-call as well as to provide on-site visits.

- **Vascular surgeon consult service**

Timely vascular surgery consultation on an emergent and non-emergent basis ensures that patient vascular access can be safely maintained for dialysis treatment.

- **Nursing**

Sufficiently trained HD nurses must be available in the community to sustain the service. A variety of staff models are in place depending on the size of the CDU:

- for CDUs over 6 stations – RNs, LPNs with Renal Tech support
- for CDUs under 6 stations – RNs

- **Interdisciplinary team**, including biomedical engineering, nutrition, social work, pharmacy and clerical support.

3. Space, Equipment And Supplies

There are recommended unit/station space standards:

- Space must be available on-site (in-hospital or freestanding) with a dedicated treatment area with workstations, dialysis machines, dialysis chairs, needling tables and chairs, oxygen regulators, vacuum regulators, scale, supply carts, etc.
- Dedicated treatment area with work stations
- Tech room – technical equipment, shelving unit, spare parts inventory
- Emergency Medical equipment
- Utility rooms, etc.

- Installation of RO system (c/w tank, circulation system, filters, piping)
- Storage room
- Office space
- Patient reception area
- Nursing station
- Nourishment area
- Staff room
- Conference room

4. Resource Requirements

- **Timely access to inpatient beds**

Community dialysis patients may require hospitalization during the course of their therapy. To ensure the appropriate level of dialysis care is available to them while they are admitted, they may need to transfer to a hospital that operates a full service in-centre dialysis unit. While some CDUs may be located within a community hospital, they are separate and distinct outpatient areas, not operated as part of the hospital's normal inpatient operations. CDUs are designed to provide services to ambulatory, medically stable, relatively independent outpatients and are staffed and equipped for this level of care.

Patient safety is the main consideration in not dialyzing an inpatient at a CDU. While every patient situation is unique, if a dialysis patient's condition warrants admission to a hospital, they are generally considered medically unsafe to be treated in a CDU environment as many non-kidney factors can impact how a patient reacts during dialysis treatment. These patients will be dialyzed in a hospital-based unit that treats inpatients and has specialized resources available, including medical, surgical and intensive care beds, as well as qualified physicians and surgeons (in addition to nephrologists, dialysis nurses and other kidney care staff). These resources are required to meet the acute care needs of dialysis patients when medical and surgical complications arise.

All CDU patient admissions to hospital require coordination with the regional hospital/ primary renal centre and defined transfer guidelines.

- **Resources**

- Access to routine chemistry and hematology laboratory resources
- Access to Emergency department
- Access to pharmacy services

F. Guidelines for Peritoneal Dialysis

1. Justification

BC Renal is strongly supportive of peritoneal dialysis (PD), and recognizes it as a critical component in an efficient, well integrated, patient-focused renal program. There are several aspects of process and patient outcomes that encourage considering PD as the first option for a substantial proportion of patients. Advantages of PD have been identified in certain studies, including the following⁸:

- Superior results on key patient outcome measures (such as survival in the first two years of dialysis treatment, complication rates, and hospitalization rates)
- Better results on key clinical measures (notably, preservation of residual renal function)
- Superior results if transplantation is subsequently employed with the ESRD patient
- Better patient satisfaction; this result is associated with the convenience of being able to accomplish dialysis at home, on a flexible schedule allowing greater patient freedom
- Ability to travel

2. Staff Requirements

As outlined in the sections regarding hospital and community dialysis programs, PD programs have comparable interdisciplinary clinical and administrative staffing needs. These include clinical and operational leadership, nephrology consult services and access to a team of nurses (including LPNs and nurse practitioners in some programs), dietitians, pharmacists, social workers and clerical staff.

Of note, a uniqueness of the PD program is the ability to manage home training and criteria driven home visits, typically provided by an RN, although program flexibility for access to other team members is needed.

- **Peritoneal Dialysis Preparation – Catheter Insertion**

Timing of the PD catheter placement is essential to program effectiveness, and should occur between 10 days and 6 weeks prior to training for PD, be planned in conjunction with the patient, and without a need for interim hemodialysis.

⁸ Dalal P, Sangha H, Chaudhary K. In Peritoneal Dialysis, Is There Sufficient Evidence to Make “PD First” Therapy? International Journal of Nephrology. 2011: E-published ahead of print.

a. Bedside Catheter Insertion

Bedside catheter placement by trained nephrologists, using either a (i) trocar, rigid catheter and guide wire (Seldinger technique); or (ii) preassembled cannula with trocar and a spiral sheath (Quill) and peritoneoscope (Y-Tec technique) have proven to be highly effective in managing the timing of PD starts. Both procedures are done on an outpatient basis, may or may not involve an overnight stay, use a local anesthetic +/- an oral anti-anxiety agent, narcotic or conscious sedation. To maintain skill in bedside insertion it is recommended that nephrologists perform a minimum of 6 insertions in a 12 month period after receiving the appropriate training. In addition to a nephrologist, a PD RN at a 1-1 ratio is needed during pre care, insertion, and post care. Skills needed for catheter removal can be acquired by the nephrologist, or coordinated with the surgical team.

b. Surgical Support Service for Catheter Insertion

A strong surgical support service is a necessary component for vibrant PD programs as not all patients will be appropriate for bedside PD catheter insertion, no nephrologist trained in bedside insertion is available, and for unexpected complications. The referral timing to surgical services must be added to the execution of planned starts. Surgical placements for pre-sternal catheters, as well as embedded catheters may be considered based on patient need.

3. Space, Equipment And Supplies

Traditionally PD units are set in close configuration with in-centre hemodialysis units, providing a physical opportunity for program integration and in smaller programs sharing of staff, IT resources etc. Given the outpatient nature of PD, it is feasible to have a PD unit in a community setting, outside of an acute care hospital, but timely access to laboratory and radiology services are essential.

Given the multiple roles of a PD unit, patient flow should be a key consideration in the design of a PD space. Unique attention must be given to:

- adequate waiting room
- education area
- training areas
- adequate space for Intermittent Peritoneal Dialysis (IPD)
- adequate space for clinic follow-ups
- consultation rooms

From a supply perspective, both continuous ambulatory peritoneal dialysis (CAPD) and automated peritoneal dialysis (APD) should be available, as well as necessary ancillary supplies.

All peritoneal dialysis supplies, including delivery, are provided to each patient with costs assumed by BCR. This coverage extends to supplies needed while traveling.

4. Resource Requirements

There are a number of different pathways through which individuals with kidney disease will access PD. In each situation, adequate patient preparation and education is fundamental to ongoing patient success with PD. Each PD program must be able to meet the needs of all patients regardless of how they arrive in the program, including:

- referred from kidney care clinics, and with interaction by the PD team well in advance of treatment initiation
- referred from hemodialysis (any setting) or as a failing transplant
- unplanned presentation, where patients have an urgent need to initiate dialysis. The ability to acutely insert a PD catheter, offer urgent PD, and revisit the traditional patient information/education once health is stabilized is key in these referrals.

5. Quality and Clinical Guidelines

- BCR (in partnership with the local HAs) is responsible for outlining the goals and responsibilities of the peritoneal programs.
- BCR endorses the KDIGO Clinical Practice Guideline for the Evaluation and Management for Chronic Kidney Disease.
- [Provincial guidelines for peritoneal dialysis care](#) have been developed and endorsed by BCR, in consultation with the local HAs.
- Provincial guidelines for peritoneal dialysis patients and families have been developed and endorsed by BCR, in consultation with patients and families, and local HAs.

G. Guidelines for Independent/Home Hemodialysis

1. Justification

Home hemodialysis is more complex than the other home-based therapy, peritoneal dialysis, as each patient requires their own machine and water treatment system. It takes a significant training period (an average of 6 weeks) for patients to become proficient with their own dialysis provision. However it is an excellent therapy and when nephrology professionals (physicians and nurses) were surveyed, home hemodialysis was their preferred maintenance therapy⁹.

The flexibility of treatment regimes within home hemodialysis is a key feature of this therapy and includes short daily, nocturnal, and conventional options. The short daily and nocturnal dialysis routines more closely resemble normal kidney function than three- times-a-week treatments available in hospitals and community dialysis units. This additional therapy time generally translates into better sense of overall health.

The benefits of home hemodialysis include:

- More frequent dialysis resulting in fewer medications and more liberal diet
- Improved blood pressure control
- Reduction in symptoms with enhanced feeling of wellness
- Greater independence
- Lower transportation costs.
- Considerable time savings, including less time away from work and home

2. Staff Requirements

As outlined in the sections regarding hospital and community dialysis programs, home hemodialysis programs have comparable interdisciplinary clinical and administrative staffing needs, with the exception of biomedical engineers or renal technicians. Human resource requirements for HHD programs include clinical and operational leadership, nephrology consult services and access to a team of nurses (including LPNs and nurse practitioners in some programs), dietitians, pharmacists, social workers and clerical staff.

Home hemodialysis programs also rely on core services provided in the primary care centre (i.e. vascular access, radiology etc).

⁹ Perceptions about renal replacement therapy among nephrology professionals. Schiller B, Neitzer A, Doss S. Nephrol News Issues. 2010 Sep;24(10):36, 38, 40.

Of note, qualified home hemodialysis nurse educators are essential to program success. As well, home hemodialysis programs must ensure that patients can access clinic staff by telephone and in person during normal working hours for response to patient concerns or medical evaluation. Criteria-driven home visitation by members of the health care team (likely RN and social worker) should also be factored into the staffing allotment.

Technical services for home patients are provided by the vendors, as per provincial contracts, which specify technical support availability 365 days/year from 0700 – 2300 hours. In addition vendors are responsible for a yearly preventative maintenance service and will attend a patient's home within 24 hours if unable to solve a machine issue over the phone.

3. Space, Equipment and Supplies

Given the outpatient nature of home hemodialysis, it is feasible to have a program situated in a community setting, outside of an acute care hospital, but timely access to laboratory, radiology and vascular services are essential.

From a space planning perspective, all traditional needs exist (i.e. staff room, storage areas) but unique attention must be given to:

- adequate waiting room
- education area
- training areas
- adequate space for respite dialysis
- adequate space for clinic follow-ups
- consultation rooms

4. Resource Requirements

As outlined in the section on peritoneal dialysis, there are a number of different pathways through which individuals with kidney disease will access home hemodialysis. In each situation adequate patient preparation and education is fundamental to ongoing patient success with home hemodialysis. Each home hemodialysis program must be able to provide assessment for patients that are referred:

- In a planned manner, coming from kidney care clinics, and with interaction by the home hemodialysis team well in advance of treatment initiation
- In a planned manner, coming from hemodialysis (any setting), from a peritoneal dialysis program, or as a failing transplant.

Prompt access to back-up hemodialysis is needed in either a hospital affiliated with a home hemodialysis program, or in an appropriate community dialysis unit, if technical, social or medical problems prevent the patient from dialyzing at home.

Modifications related to electricity and plumbing are typically needed in a private home, and to ensure equal access to home hemodialysis, BCR covers the costs for these technical upgrades, and will also cover costs of take down when a patient permanently exits the program. All supplies, including delivery costs, needed for home hemodialysis are provided by BCR.

5. Quality and Clinical Guidelines

The BC home hemodialysis program is a provincial program with local implementation. As such, provincial standards for training and patient follow-up apply. To ensure consistent nursing practice, comprehensive training on the use of the home machine is required, as is participation in monthly home hemodialysis teleconferences and attendance at two provincial learning sessions per year.

Home hemodialysis provincial guidelines include:

- BCR (in partnership with the local HAs) is responsible for outlining the goals and responsibilities of the independent/home hemodialysis program.
- BCR endorses the KDIGO Clinical Practice Guideline for the Evaluation and Management for Chronic Kidney Disease.
- [Provincial guidelines for home hemodialysis care](#) have been developed and endorsed by BCR, in consultation with the local HAs.
- Provincial guidelines for home hemodialysis patients and families have been developed and endorsed by BCR, in consultation with patients and families, and local HAs.
- Yearly recertification of all home hemodialysis patients
- Minimum of yearly review of vascular access
- Process for regular monitoring of raw and product water in the patient's home
- Clinic visits at appropriate intervals with review by both nephrologist and RN, and access to allied health as needed

Appendix I

Medical Director – Kidney Services Joint Position Health Authority Renal Program (HARP) and BC Renal (BCR)

Role Summary

The Medical Director – Kidney Services (MD-KS) has a unique role with dual accountabilities to the health authority (HA - regional) and to BCR (provincial) bodies responsible for the care of patients with kidney disease. As facilitator and leader within the HA, the MD-KS leads by example to establish effective cross functional teams that promote optimal patient care through all stages of chronic kidney disease.

The MD-KS is an essential link between the Health Authority Renal Program (HARP) and BCR. Through a high level of initiative, excellent organizational skills, and superior leadership qualities the MD-KS promotes and enhances excellent communications and positive working relationships between BCR and the HARP.

Primary Working Relationships

The Medical Director – Kidney Services works in close collaboration with the manager/director of the Renal Program(s) and is accountable to the executive sponsor of the Health Authority Renal Program and the executive director of BCR. Additionally the MD-KS, through leadership and guidance, and working jointly with clinical regional and provincial teams, aids in the achievement of cohesive care for individuals diagnosed with chronic kidney disease, within the HA and across the province of British Columbia. The Medical Director – Kidney Services supports the coordination of renal services for a defined geographic area, including the provision of continuity of patient care, adherence with standardized best practices, and alignment of services to match the strategic plan of the Health Authority Renal Program.

Responsibilities

- Collaborates with the clinical, administrative and leadership teams to assure the provision of patient care that is safe, effective, caring, timely and appropriate for the needs of the individual;
- Supports, facilitates and participates in the development of quality improvement and quality assurance programs and in the ongoing monitoring of quality in patient care provision;
- Ensures Nephrologist representation/and appropriate membership on local and provincial committees as required. As a key member of the HARP Steering Committee and leadership team, consults to assure appropriate representation from the HA on provincial committees. Participates as required in the selection of renal clinical care providers for committee work within, and between, the HA and BCR and that communication among and between committees is carried through;
- Attendance and participation in the Medical Advisory Committee (MAC) of BCR, the Executive Committee meeting of BCR, and appropriate committees within the HA;

- Works in collaboration with the director and/or manager of the renal program/ program(s) to ensure fair equitable use of the resources which may exist as part of various provincial contracts. Identifies potential overlap between HA and provincial initiatives and fosters collaboration as appropriate;
- Responsible for medical human resources planning and recruitment for the Renal Program. Participates as required in the development of the regional renal human resources plan; is actively involved in developing and implementing the strategic plan for the HARP; works to maximize educational opportunities and facilitates good communication between and among the HARP.

Time Commitment and Compensation

The MD-KS is expected to attend BCR Executive Committee meetings in addition to the time involved in the coordinating and facilitating activities outlined in the above section. Attendance by the MD-KS, or delegate(s) at Medical Advisory Committee meetings is also expected.

BCR's annual commitment towards reimbursement of the MD-KS salary is \$20,000. It is BCR's expectation that this remuneration will at least be matched by the HA, given the duality of the reporting relationship and responsibilities of the MDKS. Any clerical or administrative support will be the responsibility of the HA, and will be negotiated with the MD-KS directly. Additional funds from the HA to supplement or extend activities listed above may be available to the MDKS.

Periodic review of this proposed structure and functioning will occur in conjunction with HA and BCR.

Term of Appointment

The Medical Director – Kidney Services is appointed for a period of two (2) years with the possibility of extension for a second two (2) year period. Further extension of tenure is possible if mutually agreed to be both appropriate and beneficial, by the Health Authority Renal Program and the Medical Director-Kidney Services.

Qualifications

The Medical Director – Kidney Services would be a licensed nephrologist, preferably he/she would be familiar with local practice of region, as well as British Columbia.

Selection Process

Given the depth and breadth of this position selection of the appropriate individual is essential to his/her future effectiveness. A process that encourages contribution from team members, senior Health Authority executives, and nephrologists of the HARP is critical.

Medical Director – Kidney Services Pediatric Program Joint Position Health Authority Renal Program (HARP) and BC Renal (BCR)

Role Summary

Pediatric Renal Services, centralized at the British Columbia Children’s Hospital, have a unique situation by functioning in both regional and provincial capacities while providing care for a distinct population. An agency of the Provincial Health Services Authority (PHSA), the Pediatric program is also an active participant in the Vancouver Coastal Health Authority/Providence Health Care Renal Program (HARP) and works closely with the British Columbia Provincial Renal Agency (BCR). To ensure appropriate, broad representation with these governing bodies the position of Medical Director- Kidney Service: Pediatrics is essential.

The Medical Director – Kidney Services (MD-KS): Pediatrics, has a unique role with accountabilities to the VCH/ PHC Health Authority Renal Program and to BCR (provincial) bodies responsible for the care of patients with kidney disease, As facilitator and leader within the HA, the MD-KS: Pediatrics leads by example to establish effective cross functional teams that promote optimal patient care through all stages of chronic kidney disease.

The MD-KS Pediatrics is an essential link between the Health Authority Renal Program (HARP) and BCR. Through a high level of initiative, excellent organizational skills, and superior leadership qualities the MD-KS Pediatrics promotes and enhances excellent communications and positive working relationships between BCR and the HARP.

Primary Working Relationships

The Medical Director – Kidney Services: Pediatrics works in close collaboration with the manager/director of the Renal Program(s) and is accountable to the executive sponsor of the Health Authority Renal Program and the executive director of BCR. Additionally the MD-KS: Pediatrics, through leadership and guidance, and working jointly with clinical regional and provincial teams, aids in the achievement of cohesive care for individuals diagnosed with chronic kidney disease, within the HA and across the province of British Columbia. The Medical Director – Kidney Services Pediatrics supports the coordination of renal services for not only a defined geographic area but also for the province of British Columbia as well as parts of the Yukon and North West Territories, including the provision of continuity of patient care, adherence with standardized best practices, and alignment of services to match the strategic plan of the Health Authority Renal Program.

Responsibilities

- Collaborates with the clinical, administrative and leadership teams to assure the provision of patient care that is safe, effective, caring, timely and appropriate for the needs of the individual;
- Supports, facilitates and participates in the development of quality improvement and quality assurance programs and in the ongoing monitoring of quality in patient care provision;
- Assures Nephrologist representation/and appropriate membership on local and provincial committees as required. As a key member of the HARP Steering Committee and leadership team, consults to assure

appropriate representation from the HA on provincial committees. Participates as required in the selection of renal clinical care providers for committee work within, and between, the HA and BCR and that communication among and between committees is carried through;

- Attendance and participation in the Medical Advisory Committee (MAC) of BCR, the Executive Committee meeting of BCR, and appropriate committees within the HA;
- Works in collaboration with the director and/or manager of the renal program/ program(s) to ensure fair equitable use of the resources which may exist as part of various provincial contracts. Identifies potential overlap between HA and provincial initiatives and fosters collaboration as appropriate;
- Responsible for medical human resources planning and recruitment for the Renal Program. Participates as required in the development of the regional renal human resources plan; is actively involved in developing and implementing the strategic plan for the HARP; works to maximize educational opportunities and facilitates good communication between and among the HARP

Time Commitment and Compensation

The MD-KS: Pediatrics is expected to attend two BCR Executive Committee meetings per year in addition to the time involved in the coordinating and facilitating activities outlined in the above section. Attendance by the MD-KS: Pediatrics, or delegate(s) at two Medical Advisory Committee meetings per year is also expected.

BCR's annual commitment towards reimbursement of the MD-KS: Pediatrics salary is \$20,000. It is BCR's expectation that this remuneration will be matched or supplemented by the HA, given the duality of the reporting relationship and responsibilities of the MDKS. The MD- KS: Pediatrics does have the opportunity to apply for sessional funding through BCR as appropriate. Any clerical or administrative support will be the responsibility of the HA, and will be negotiated with the MD-KS: Pediatrics directly.

Periodic review of this proposed structure and functioning will occur in conjunction with HA and BCR.

Term of Appointment

The Medical Director – Kidney Services: Pediatrics is appointed for a period of two (2) years with the possibility of extension for a second two (2) year period. Further extension of tenure is possible if mutually agreed to be both appropriate and beneficial, by the Health Authority Renal Program and the Medical Director-Kidney Services.

Qualifications

The Medical Director – Kidney Services: Pediatrics would be a licensed nephrologist, preferably he/she would be familiar with local practice of region, as well as British Columbia.

Selection Process

Given the depth and breadth of this position selection of the appropriate individual is essential to his/her future effectiveness. A process that encourages contribution from team members, senior Health Authority executives, and nephrologists of the HARP is critical.

Appendix II

Patient Volume Projections: Methodology

Patient volume is projected considering the actual growth trends over the previous three years as obtained from the BCR Patient Record/Registration and Outcome Management Information System (PROMIS). Patient data includes age, gender, home address and treatment modality at the end of each quarter. Using the patient home address postal code, patients are grouped by health authority of their residency. The agency uses cut-off-points standard for Chronic Kidney Disease to group patients by age into five categories: 0-19, 20-44, 45-64, 65-74, 75+. PEOPLE35 population numbers are aggregated using the same classification. Treatment rate per million population, or prevalence, is calculated for each health authority, age and gender group.

BCR uses regression analysis to analyze the trend in historical treatment rate per million population specific for each health authority, age and gender group. Based on historical trends, the analytical team estimates future treatment rate per million population and then applies PEOPLE35 data to predict chronic dialysis patient numbers.

The applied methodology is similar to other reported methodologies, and has been consistently accurate when predicted and actual patient numbers have been compared over the last five years.

While it is recognized that a number of factors impact these trends, neither the impact of any single factor nor the relative contribution of these factors to the historical trends are quantifiable. Thus, the resulting historical trends in patient growth are de facto considered to represent the sum effect of these factors and the most reliable basis for forecasting.