



# PROVINCIAL STANDARDS & GUIDELINES



## Best Practices- Community Dialysis Units: Description, Selection Criteria, Services & Transitions

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Approved by the BC Hemodialysis Committee

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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.bcrenalagency.ca](http://www.bcrenalagency.ca) for the most recent version.

**For information about the use and referencing of BC Renal guidelines/resources, refer to <http://bit.ly/28SFr4n>.**



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## 1.0 Scope of Guideline

Applicability: Community dialysis units (CDUs).

This guideline provides recommendations about the philosophy, appropriate selection of patients, services offered and the transition in and out of CDUs. It is intended as a guide for BC's Health Authorities in the delivery of CDU services. See [BCRenalAgency.ca](http://BCRenalAgency.ca) ► [Kidney Services](#) ► [HD map](#) for the location of in-centre units and CDUs in BC.

## 2.0 Background (Literature Summary, BC Survey & PROMIS Data)

In preparation for development of this guideline, 3 activities were undertaken:

1. Literature review
2. Survey of BC CDUs
3. Data pull from PROMIS

### 1. Literature summary

At the request of the CDU working group, the Canadian Agency for Drugs and Technologies in Health (CADTH) conducted a literature search on the clinical and cost-effectiveness of community-based hemodialysis (HD). The search included documents published between Jan 1, 2010 and Sept 2, 2015. Eighteen documents were identified: 1 health technology assessment, 7 non-randomized studies, 2 economic evaluations and 8 “miscellaneous” articles. See [www.cadth.ca/community-based-hemodialysis](http://www.cadth.ca/community-based-hemodialysis). A summary of the highlights of each document are included in [Appendix 6](#).

Collectively, the themes in the documents suggest that in comparison to in-centre units, care provided

to appropriately selected patients in CDUs (or equivalent):

- Is as effective or more effective than care provided in an in-centre setting;
- Is lower cost for the unit<sup>1</sup> & the patient (because travel distances are less); and
- Offers higher levels of patient satisfaction (often related to being closer to home).

Other options for providing community-based HD care mentioned in the literature included mobile “HD buses” and “community-based dialysis houses” (like home hemodialysis but provided in a central, unstaffed “house”).

### 2. Survey of BC CDUs

A survey of the 27 CDUs in BC was conducted in January 2015 (100% response rate).

*General questions:*

- 14/27 CDUs were located in or adjacent to an acute care hospital.
- Average number of patients was 32 (range: 3 - 60). CDUs not in or adjacent to a hospital tended to have more patients (average was 50 vs 17 for units in or adjacent to hospitals).
- Average number of chairs operated at once was 9.5 (range: 3 - 21).
- 19/27 operated 6 or 7 days/week. CDUs not in or adjacent to a hospital were more likely to operate 6 to 7 days/wk (vs 3 days/wk).

*Clinical capacity/access to CDUs:*

- Most CDUs offered some variation on standard HD treatments (e.g., sequential ultrafiltration, single needle dialysis, extended length of HD runs, variations on the traditional 3 HD runs/ week).
- There was significant variation across CDUs

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<sup>1</sup> Some articles qualified this to exclude very small units where economies of scale are impossible to achieve.

in the capacity to care for patients requiring a temporary HD catheter, chronic O2, non-HD related wound/dressing changes, assistance with personal care/transfers and isolation. All CDUs were able to accommodate patients requiring IV antibiotics and emergency O2.

- Waiting time to access a CDU space varied from 0 days to 8 weeks. the number of patients waiting varied from 0 (several units) to 4. All new HD starts were done in-centre before transferring to CDU.

#### *Staffing:*

- Nephrologists are on-site from 0 to 4 days per month at each unit.
- Nursing/techs: 27/27 CDUs utilized RNs. 4/27 CDUs utilized LPNs. 1/27 utilized a nursing unit assistant. 11/27 utilized renal techs. 9/27 utilized a Unit Coordinator (Unit Clerk). There was wide variability on the availability of clinical nurse leaders and/or educators.
- RN/pt ratios: Varied from 1:2 to 1:4. 1:2 ratios were for smaller units.
- Renal tech/pt ratios: Varied from 1:3 to 1:11. Some units do not utilize renal techs.
- SW: Most units have access to a social worker. Actual on-site time varies.
- Dietitian: Most units have access to a dietitian. Actual on-site time varies.
- Pharmacist: Most units have access, although access is very limited and often by phone. Only a few units have access to a pharmacy tech.
- Biomed engineer: Most units have access.

### **3. Data from the Patient Outcome and Records Management Information System (PROMIS)**

Data was pulled from the provincial renal information system (PROMIS) for both in-centre and CDU patients. Data is as of Apr 2017 unless otherwise specified.

#### *Overview:*

60% of hemodialysis (HD) patients (n=1,109 including nocturnal dialysis patients) were dialyzing in-centre and 40% in CDUs (n=751). Home HD patients were excluded from the analysis.

When compared to in-centre patients, CDU patients (in-centre figures exclude nocturnal dialysis patients):

- were slightly younger (mean age of 70 vs 68 years old)
- were more likely to be male (64% vs 56%)
- had fewer co-morbidities, especially diabetes (66% vs 70%) and cardiovascular disease (57% vs 62%)
- had a higher percentage with fistulas/grafts in active use (66% vs 53%)
- had lower acuity (87% L1-3 vs 75% L1-L3 - note: acuity levels were only identified for half of the patients in PROMIS, data is as of Dec 2014)

Of the patients that dialyzed in CDUs between Apr 1, 2014 and Sept 30, 2014 (n=1,077), 53% (570) ended dialysis at their CDU between April 1 and Sept 30, 2014:

- 63% (n=357) had returned to their CDU by Dec 31, 2014.
- 37% (n=213) had not returned to their CDU by Dec 31, 2014.
  - 53% (113/213) were transferred to an in-centre unit.
  - 23% (48/213) were transferred to home dialysis (PD or home HD).
  - 24% (52/213) had died, received a transplant or moved/recovered.

Driving distance to dialysis is about the same whether patients are going to an in-centre or CDU. 67% live within 10 km of their dialysis unit.

### CDU-specific:

Data was divided into 4 CDUs categories according to the distance to the nearest primary management centre:

CDU Category		Distance to the Nearest Primary Management Centre
Urban		<50 km
Non-urban	Semi-rural	50 - 100 km
	Rural	100 - 125 km
	Remote	>125 km

Of the patients dialyzing in CDUs on Dec 31, 2014 (n=797):

- About three-quarters were dialyzing in urban CDUs:
  - Urban CDU: 76% (n=607/797)
  - Non-urban CDU: 24% (n=190)
    - ◆ Semi-rural: 10% (n=76)
    - ◆ Rural: 5% (n=43)
    - ◆ Remote: 9% (71%)
- When compared across CDU categories (urban and non-urban):
  - the ages of patients were similar (mean age of 67 years old)
  - the % with diabetes (~61%) and CVD (~45%) were similar
  - the % with PVD, stroke/TIA and/or dementia/ cognitive impairment was higher in non-urban CDUs.
    - ◆ PVD: 18% in non-urban vs 13% in urban CDUs
    - ◆ Stroke/TIA: 15% vs 9%
    - ◆ Dementia/cognitive impairment: 9% vs 2%
  - the % of patients with active fistulas were significantly higher in urban CDUs:
    - ◆ urban: 74%
    - ◆ non-urban: 40% - 53%
  - driving distances for patients attending non-

urban CDUs was longer:

- ◆ urban: 94% lived within 25 km of their CDU
- ◆ non-urban: 66%

Of the CDU patients dialyzing between April 1 and Sept 30, 2014 (n=1,074):

- 22% (231/1,074) were admitted to hospital at least once during the period. This was similar for urban and non-urban CDUs.
- 53% (570) ended dialysis at their CDU between April 1 and Sept 30, 2014.
  - the % ending dialysis during this 6-month period in non-urban CDUs was higher (62% vs 50% in urban CDUs).
  - the % that ended dialysis in their CDU and did not return to their CDU within 3 months of leaving was the same (36%) in urban and non-urban CDUs.

### 3.0 Recommendations

The recommendations below were developed by an interdisciplinary working group representing all BC health authorities. Feedback was provided and the recommendations approved by the BC Hemodialysis Committee. With limited literature to guide the discussions, the recommendations are primarily based on expert opinion as to what works and doesn't work in BC.

**Recommendation #1: Each BC CDU to consider adopting the “CDU Description and Philosophy of Care” outlined in [Appendix 1](#).**

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 which 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.

Refer to [Appendix 1](#) for a description of CDU services and the mandate and the benefits of providing care in CDUs.

**Recommendation #2: Each BC CDU to maximize the utilization of CDUs through applying the criteria outlined in the document “Selection of Appropriate Patients for CDUs” ([Appendix 2](#)).**

The “Selection of Appropriate Patients for CDUs” document provides criteria for the appropriate selection of patients to dialyze in a CDU. It is intended as a guideline, with the recognition that exceptions may be made by local nephrology teams in individual circumstances after weighing patient factors and risk.

Two factors are important in the selection of appropriate patients for a CDU:

1. Overall acuity level of the patient (as per the BCR Acuity Scale - 2014 revision); and
2. The ability to accommodate patient-specific requirements regardless of the overall acuity level of the patient (e.g. two-person transfer, specific isolation requirements).

#### *1. Overall acuity level of the patient*

Assuming the patient-specific requirements can be accommodated:

- Patients with an *overall acuity level* of 1-3 are

usually appropriate for a CDU.

- Patients with an *overall acuity level* of 4 may be appropriate for a CDU (situational).
- Patients with an *overall acuity score* of 5 or 6 are usually not appropriate for a CDU.

#### *2. Patient-specific requirements*

Assuming the *overall acuity level* of the patient can be accommodated in a CDU, patient-specific requirements will factor into whether a patient is appropriate for a CDU.

See [Appendix 2](#) for guidance on patient-specific requirements which can/cannot be met in a CDU.

**Recommendation #3: Each BC CDU to utilize the “CDU Services” document ([Appendix 3](#)) to evaluate the types of services appropriate to be offered in a CDU.**

Community Dialysis Units (CDUs) have the capacity to provide a broad range of services to patients who meet the CDU eligibility criteria. The “CDU Services” document ([Appendix 3](#)) describes the types of services which could be potentially offered in CDUs. It is intended as a guideline, with the recognition that some units will have more and some less capacity to offer specific services (e.g., hemodialfiltration, administration of blood products, etc).

**Recommendation #4: Each BC CDU to establish processes to implement the BCR Medical Advisory Committee “Expected Standard of Medical Coverage and Documentation of Follow-Up Care of HD Patients in BC” ([Appendix 4](#)).**

**Recommendation #5: Each BC CDU to utilize the concepts outlined in the Care Team Guides for Transitions (see BCR website) in developing processes and forms for transferring patients**

## between modalities and HD units.

For patients requiring HD, independent HD options are encouraged for patients who meet the criteria (e.g., home HD, self-care dialysis units). If independent HD options are not possible, receiving HD in a CDU is the next best option (see [Appendix 3](#) for selection criteria). If neither of these options is possible, the patient fits the criteria to receive HD in an in-centre unit.

**Recommendation #6: Each Renal Program to adopt the strategies identified in [Appendix 5](#) CDU to maximize the utilization of CDU spaces for appropriate patients.**

## 4.0 References

Canadian Agency for Drugs and Technologies in Health. 2015. Community-Based Hemodialysis: Clinical Effectiveness, Cost-Effectiveness and Guidelines, Rapid Response Report: Reference List. [www.cadth.ca/community-based-hemodialysis](http://www.cadth.ca/community-based-hemodialysis).

## 5.0 Sponsors

This BCR 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.bcrenalagency.ca](http://www.bcrenalagency.ca) for the most recent version.

Developed by:

- A working group of multidisciplinary renal care providers from across BC

Reviewed by:

- BC Renal Educators Group

Approved by:

- BC Renal Hemodialysis Committee
- BC Renal Medical Advisory Committee

For information about the use and referencing of BCR provincial guidelines/resources, refer to <http://bit.ly/28SFr4n>.

## 6.0 Appendices

Appendix 1: CDU Description and Philosophy of Care

Appendix 2: Selection of Appropriate Patients for CDUs

Appendix 3: CDU Services

Appendix 4: BCR Medical Advisory Committee Expected Standard of Medical Coverage and Follow-Up for HD Patients in BC

Appendix 5: Suggestions to Promote Appropriate Utilization of CDUs

Appendix 6: Summary of the Literature on Clinical and Cost-Effectiveness of CDUs

## Appendix 1: CDU Description and Philosophy of Care

### What is a community dialysis unit?

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.

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.

Patients are referred to a CDU when a CDU is determined to be the best venue for the patient to receive their dialysis care. When CDU or in-centre unit space is limited, the operational needs of other patients and the program are also considered.

### Why promote care in a community dialysis unit?

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 which 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.

#### *Two key mandates of CDUs:*

1. Maximize patient wellness and independence for patients while receiving HD; and/or
2. Allow patients to remain in or near their home community while receiving HD.

#### *Benefits of CDUs for patients:*

1. Maximize patient wellness and independence for patients while receiving HD
  - CDUs utilize a wellness model as the foundation for care.
  - To the extent of a patient’s abilities, CDUs promote patient’s self-care, independence and participation in an active lifestyle.
  - CDUs help patients fit dialysis into their lives rather than patients having to work their dialysis around program needs. CDUs try to accommodate patient-specific requests.
  - CDUs create opportunities for productive social interactions and activities amongst patients.
2. Allow patients to remain in their home community while receiving HD.
  - CDUs accommodate patients who may be in difficult circumstances to remain in or near their home community.

#### *Benefits for the health care system:*

- The cost of providing dialysis care in a CDU is less than facility-based dialysis care. CDU patients generally have fewer complexities and co-morbidities which results in lower costs.



## Appendix 2: CDU Description and Philosophy of Care

This document provides criteria for the appropriate selection of patients to dialyze in a Community Dialysis Unit (CDU). It is intended as a guideline, with the recognition that exceptions may be made by local nephrology teams in individual circumstances after weighing patient factors and risk.

Two factors are important in the selection of appropriate patients for a CDU:

1. Overall acuity level of the patient (as per the BCPRA Acuity Scale - 2014 revision); and
2. The ability to accommodate patient-specific requirements regardless of the overall acuity level of the patient (e.g. two-person transfer, specific isolation requirements).

### *1. Overall acuity level of the patient*

Assuming the patient-specific requirements can be accommodated:

- Patients with an overall acuity level of 1-3 are usually appropriate for a CDU.
- Patients with an overall acuity level of 4 may be appropriate for a CDU (situational).
- Patients with an overall acuity score of 5 or 6 are usually not appropriate for a CDU.

### *2. Patient-specific requirements*

Assuming the overall acuity level of the patient can be accommodated in a CDU, patient-specific requirements will factor into whether a patient is appropriate for a CDU.

See Table 1 for guidance on patient-specific requirements which can/cannot be met in a CDU.

**Table 1: Patient-Specific Requirements which Can/Cannot be Met in a CDU**

Requirement	Acuity Level 4 Description	Appropriate for a CDU		Not Appropriate for a CDU	
		Initial Admission to CDU	Patient in CDU or Returning to CDU		
Hemodynamic stability	Blood pressure	<p>Difficulty completing treatment due to hypotension or hypertension. Requires medical review.</p>	<p>OK: Can complete dialysis run. May have occasional hypotension or hypertension but not on every run. Hypotension or hypertension can be managed by a nephrologist by phone or regular on-site visits.</p> <p>Not OK: Hypotension or hypertension requires continual oversight from a nephrologist.</p>	<p>Same.</p>	<p>Unable to complete dialysis run due to hypotension or hypertension. Requires urgent medical review. Medical needs cannot be managed by a nephrologist by phone or regular on-site visits.</p>
	Cardiac status	<p>Difficulty completing HD treatment due to cardiac related symptoms. Responds to nitroglycerin, oxygen therapy, and/or fluid therapy.</p>	<p>OK: Can complete dialysis run. Has known cardiac condition but cardiac symptoms can be managed by a nephrologist by phone or regular on-site visits. May require nitroglycerin or chronic O<sub>2</sub> (the latter requires pt to bring own O<sub>2</sub> tank or have access to O<sub>2</sub> or O<sub>2</sub> concentrator in the CDU). Ventricular assist device (VAD) OK if medically stable.</p> <p>Not OK: Management of cardiac symptoms requires continual oversight from a nephrologist.</p>	<p>Same.</p>	<p>One of the following is present during dialysis treatment:</p> <ul style="list-style-type: none"> <li>• Unable to complete dialysis run due to cardiac related symptoms. New onset of a cardiac condition such as chest pain or arrhythmia during treatment: requires urgent medical workup and review.</li> <li>• Acute decompensated heart failure (e.g. secondary to infection, failure to take medications as ordered, fluid overload during treatment). Signs and symptoms may include symptomatic hypotension and pulmonary edema.</li> <li>• Pericarditis: requires urgent medical workup and review.</li> <li>• Pericardial effusion: requires urgent medical workup and review.</li> </ul>
	Fluid management	<p>Require extended run or rehydration during treatment.</p>	<p>OK: Extended or more frequent dialysis runs if scheduling allows.</p>	<p>Same.</p>	<p>Difficulty achieving goal weight during treatment and the level of nursing support required would be detrimental to daily CDU operations.</p>
Independent function	<p>One person <u>assist</u> to transfer or reposition. Significantly reduced manual dexterity or strength.</p>	<p>OK:</p> <ul style="list-style-type: none"> <li>• Standby assist.</li> <li>• One person assist IF caregiver available to help get patient in &amp; out of chair &amp; to the bathroom.</li> <li>• Two-person or mechanical lift assist considered on a case-by-case basis if caregiver available to help, other care needs can be met</li> </ul>	<p>OK: Same but may consider on a case-by-case basis if no caregiver to assist if other care needs can be met (e.g., nursing staffing, bed if required, etc) &amp; appropriate control measures are in</p>	<p>Two or more persons or mechanical lift to transfer or reposition &amp; no caregiver available to assist (may consider if patient known to CDU)</p> <p>Care needs are higher than the resources available (e.g., bed to dialyze, staffing, etc).</p>	

Requirement	Acuity Level 4 Description	Appropriate for a CDU		Not Appropriate for a CDU
		Initial Admission to CDU	Patient in CDU or Returning to CDU	
		(e.g., nursing staffing, bed if required, etc) & appropriate control measures are in place for staff safety (e.g., staff education/training on safe transfers, availability of non-mechanical and mechanical devices/lifts, as required for patient, etc). Refer to <a href="http://www.worksafebc.com/en/health-safety/industries/health-care-social-services">www.worksafebc.com/en/health-safety/industries/health-care-social-services</a> .  Not OK: <ul style="list-style-type: none"> <li>Unable to get in &amp; out of chair or go to the bathroom &amp; has no caregiver to assist.</li> </ul>	place for staff safety (e.g., staff education/training on safe transfers, availability of non-mechanical and mechanical devices/lifts, as required for patient, etc). Refer to <a href="http://www.worksafebc.com/en/health-safety/industries/health-care-social-services">www.worksafebc.com/en/health-safety/industries/health-care-social-services</a> .	
Access	Temporary hemodialysis catheter, intended for short-term use.	OK: Temporary catheter in place for a time-limited period (e.g., waiting for PD catheter insertion) and patient has no other exclusion criteria. <sup>2</sup>  Not OK: Temporary femoral catheters.	Same.	Temporary femoral catheters.
	Concluded treatment but with difficulty due to needling, access related pain, positional, vessel spasm, poor flow, intradialytic vigorous flushing of catheter lumens with saline, reversal of lines, TPA administration, redness at the access site, increasing venous pressures, prolonged bleeding intra and/or post at access site.	OK: Accept IF patient can complete treatment & a plan is in place to manage each type of event.  Not OK: Unable to complete run because of vascular access-related complications.	Same.	Unable to complete dialysis run due to vascular access complications.

<sup>1</sup> Dec 2015: Literature search conducted on the safety of temporary (non-tunneled) HD lines in discharged patients. There was limited evidence-based information on this topic and most of the recommendations and protocols were on routine CVC care and the safety of PICC line use. One article (Teleflex, 2013) summarized the limited studies that were available (n=2; Moreau et al, 2002; Gorski, 2002) and concluded that patients may be managed in the outpatient setting and at home with a non-tunneled CVC. While there are many myths about the high risk of complications with non-tunneled CVCs, the data does not demonstrate an unacceptably higher risk when compared to other types of catheters in the same setting. <http://www.teleflex.com/en/usa/productAreas/vascularAccess/productGroups/central/products/long-term-cvc/documents/ARROW%20JACC%20Patient%20Discharge%20White%20Paper%202013-2416.pdf>.

Requirement	Acuity Level 4 Description	Appropriate for a CDU		Not Appropriate for a CDU
		Initial Admission to CDU	Patient in CDU or Returning to CDU	
Medications	Any of: (1) Patient requires IDPN (intradialytic parenteral nutrition) (2) Patient requires blood products (3) Patient requires in-patient prescribed infusions not related to dialysis.	<p>OK:</p> <ul style="list-style-type: none"> <li>Administration of blood products IF CDU is located on a hospital site &amp; logistics can be worked out.</li> <li>Administration of intradialytic parenteral nutrition (IDPN) if logistics can be worked out<sup>3</sup> (e.g., pharmacy to mix, storage on unit, dietician for consult, RN education).</li> <li>IV infusions if medication is available (e.g., IV antibiotics x 6 weeks) &amp; no specific monitoring requirements (e.g., cardiac monitoring).</li> </ul> <p>Not OK:</p> <ul style="list-style-type: none"> <li>Administration of blood products IF CDU is not located on a hospital site.</li> <li>IV infusions if requires cardiac monitoring is required.</li> </ul>	Same.	New condition/onset of an event requiring specialized medications without critical care intervention.
Respiratory therapy	Use of oxygen or nebulizer therapy that also indicates a need for a medical review or respiratory investigation during treatment.  Acute Respiratory Distress: episodes of acute respiratory distress that resolves with nursing intervention using the site-specific hypoxemia protocols.	<p>OK:</p> <ul style="list-style-type: none"> <li>CPAP or BiPAP if patient brings &amp; manages own equipment.</li> <li>Chronic O<sub>2</sub> if pt brings own O<sub>2</sub> tank or has access to O<sub>2</sub> or O<sub>2</sub> concentrator in the CDU.</li> <li>Nebulizers (e.g., Ventolin) if able to meet air system &amp; isolation (if needed) requirements.</li> <li>Respiratory condition can be managed by a nephrologist by phone or regular on-site visits.</li> </ul> <p>Not OK:</p> <ul style="list-style-type: none"> <li>Regular, profound periods of respiratory distress during dialysis requiring medical &amp; nursing intervention.</li> </ul>	Same.	<p>Sudden onset of acute shortness of breath unresolved with intervention. Suctioning or airway management.</p> <p>Medical needs cannot be managed by a nephrologist by phone or regular on-site visits.</p>
Specialized treatment	Patient unstable/potentially unstable requiring treatments that need	<p>OK:</p> <ul style="list-style-type: none"> <li>Specialized treatments where patient/caregiver manages the (e.g., suprapubic</li> </ul>	Same although may do a short-term treatment for a week or two if	Patient unstable or immediately post-op from major surgery requiring, for example, plasma therapeutic exchange only or

<sup>3</sup> Refer to BCR document on IDPN (2014) at [http://www.bcrenalagency.ca/resource-gallery/Documents/Intradialytic\\_Parenteral\\_Nutrition\(IDPN\).pdf](http://www.bcrenalagency.ca/resource-gallery/Documents/Intradialytic_Parenteral_Nutrition(IDPN).pdf).

Requirement	Acuity Level 4 Description	Appropriate for a CDU		Not Appropriate for a CDU
		Initial Admission to CDU	Patient in CDU or Returning to CDU	
	continuous monitoring. e.g. NG tube feed, continuous NG to suction, management of a supra-pubic catheter, continuous bladder irrigation.	catheter, gastric feeding tubes, wound drains, chronic trach, bladder irrigation).  Not OK: <ul style="list-style-type: none"> <li>Specialized treatments beyond what CDU staff or home care team can manage.</li> </ul>	patient is stable (e.g., continuous bladder irrigation). If condition is deteriorating, transfer to in-centre unit.	combination with hemodialysis, chest tube management, epidural, CVP, PCA pump.
Patient monitoring	Vital signs q15 min	OK: As long as patient is stable, any frequency of vital signs is ok.	Same	Unstable patient.
Infection control	Contact and droplet precautions, isolation requirements	OK: <ul style="list-style-type: none"> <li>Contact precautions (used for all patients).</li> <li>Droplet precautions (e.g., influenza) (isolation room or patient wearing mask during dialysis).</li> <li>Airborne precautions (e.g., TB, measles) IF a negative pressure room is available.</li> <li>VRE+ with no active diarrhea.</li> </ul> Not OK: <ul style="list-style-type: none"> <li>Airborne precautions (e.g., TB, measles) unless negative pressure room is available.</li> <li>C diff with diarrhea.</li> <li>VRE+ with active diarrhea.</li> </ul>	Same.	Airborne precautions if no negative pressure room available.
Individual needs	Psychosocial/emotional support; Foot assessment; Access flow measurement; Booking medical appointments; Reviewing in-patient chart and coordinating MARs; Changing machine set up.	OK: Wound care/dressing changes done by Home & Community Care RN if appropriate space is available & the RN brings supplies & cleans up after.  Not OK: <ul style="list-style-type: none"> <li>Pain requiring administration of narcotics by CDU staff.</li> <li>Infected, draining wound that cannot be contained.</li> </ul>	Same.	
Psychosocial emotional factors	During treatment presents as having high level of anxiety, depression, non-compliance or aggressive behaviour placing limitations on ability to cope with disease and follow treatment requirements.	OK: <ul style="list-style-type: none"> <li>High level anxiety</li> <li>Non compliant or aggressive behaviour ("purple dot") ok if patient is stable on behavioural plan..</li> </ul> Not OK: <ul style="list-style-type: none"> <li>Serious or unresolved psychosocial problems affecting their behaviour on dialysis.</li> <li>Verbal or physically aggressive behaviour &amp; no plan in place.</li> </ul>	Same but may manage periods of instability if anticipated to be temporary & a plan & appropriate security is in place.	<ul style="list-style-type: none"> <li>Presents as confused and there is no caregiver available to stay with the patient.</li> <li>Impaired by substance abuse that affects their treatment.</li> <li>Serious psychosis, harmful to self or others.</li> </ul>

## Appendix 3: CDU Description and Philosophy of Care

Community Dialysis Units (CDUs) have the capacity to provide a broad range of services to patients who meet the CDU eligibility criteria.

This document describes the types of services available in CDUs. It is intended as a guideline, with the recognition that some units will have more and some less capacity to offer specific services (e.g., hemodialfiltration, administration of blood products, etc).

In general, services provided by CDUs include the management of patients who require:

### Hemodialysis

- Extended or more frequent dialysis runs if scheduling allows.
- HD with on-line priming and HDF if the water treatment system can handle the additional supply requirements and the logistics can be worked out (e.g., availability of appropriate machines, disinfecting of machines after each patient use, education of staff).

### Therapeutic services

- Vascular access:
  - Temporary catheter in place for a time-limited period (e.g., waiting for PD catheter insertion).
  - Flush a tunelled CVC.
- Respiratory:
  - Chronic O2 if pt brings own O2 tank or has access to O2 or O2 concentrator in the CDU.
  - Nebulizer (e.g., Ventolin) if able to meet air system & isolation (if needed) requirements.
  - CPAP or BiPAP if patient brings & manages own equipment.
- Ventricular access device (VAD)
- Specialized treatment where patient/caregiver manages the treatment (e.g., suprapubic catheter, gastric feeding tubes, wound drains, chronic trach, bladder irrigation).
- Wound care/dressing change if Home & Community Care RN and appropriate space is available & the Home Care RN brings supplies & cleans up after. No infected, draining wounds unless the drainage can be contained.
- If logistics can be worked out:
  - Administration of blood products IF CDU is located on a hospital site.
  - Administration of intradialytic parenteral nutrition (IDPN).
  - IV medication infusion (e.g., antibiotics) and no specific monitoring requirements (e.g., cardiac monitoring).

### Personal assistance

- Standby assist.
- One person assist IF caregiver available to help get patient in & out of chair & to the bathroom.
- Two-person or mechanical lift assist considered on a case-by-case basis if caregiver available to help and other care needs can be met (e.g., nursing staffing, bed if required, etc).

## Appendix 4: BCR Medical Advisory Committee Expected Standard of Medical Coverage and Documentation of Follow-Up Care of HD Patients in BC

BC Renal Agency (BCR) through its various core sub-committees is responsible for setting and communicating the ‘best practice’ standards of care for kidney patients across the province of BC. The BCR Medical Advisory Committee (MAC) has developed this policy document to ensure optimal quality of care of hemodialysis (HD) patients across different regional programs and to help align local or individual practices to this provincial standard to minimize variability in care.

This policy pertains to patients undergoing chronic hemodialysis at home, in-centre, community and independent units in BC. This policy does not apply to temporary visiting patients.

**The BCR MAC recommends that the following should be used as a minimum standard for medical coverage, documentation and follow up care of these patients:**

1. The name of nephrologist responsible for the care of each patient must be displayed or easily available in the unit and on the patient’s chart.
2. Nurses in the unit must know exactly who to call in an emergency.
3. A responsible nephrologist or their delegate must be available to take calls, respond to faxes, electronic communication from the unit regarding non-emergent matters in a timely manner.
4. Each patient undergoing HD needs a **complete clinical review** by their nephrologist or their delegate in the unit or in a clinic setting.
5. The **complete clinical review** should:
  - a) occur at least once a year. This frequency may increase depending on the clinical condition and needs of the individual patient or needs of individual program.
  - b) always be followed by a dictated note addressed to patient’s primary care provider and can occur either via video-conferencing or face-to-face.
  - c) be additional to routine HD rounds aimed at optimizing dialysis prescription or troubleshooting day-to-day patient issues.
6. We also recommend that any clinically significant change in the health status or a clinical event should trigger a review by nephrologist to update plans of care and communication rather than wait for the next scheduled complete clinical review.

For questions, please refer to: MAC Chair or BCR Executive Director

BCR Medical Advisory Committee: Dec. 2017

## Appendix 5: Suggestions to Promote Appropriate Utilization of CDUs

In communities where both in-centre and community dialysis units (CDUs) exist, patients have been reported to be reluctant to transfer to the CDU once they start their HD treatments in an in-centre unit. This reluctance may be due to:

- “Fear of the unknown” (e.g., new routine)
- Logistical reasons (e.g., location of the CDU, change in HD schedule, nephrologist not on site, dialyzing in a chair and not a bed, etc.).

If a patient meets the CDU criteria and a space becomes available, the patient will be transferred regardless of their stated wishes. It is the job of all modality teams to prepare patients for this eventuality and to provide information to ease the transition.

Suggestions of ways for all modality teams to promote appropriate utilization of CDUs include:

1. Discuss advantages of CDU vs in-centre HD:
  - CDUs utilize a wellness model as the foundation for care.
  - CDUs have more of a focus on self-care, independence and participation in an active lifestyle (to the extent of the patient’s abilities).
  - CDUs are usually smaller and it may be easier to accommodate patient-specific requests.
  - CDUs create opportunities for productive social interactions and activities amongst patients.
  - Parking/transportation may be easier and less costly than in centre units.
2. Arrange for patient to tour a CDU (ideally the CDU for which the patient will be destined).
3. Place CDU-specific promotional information available in strategic locations (e.g., posters, pamphlets, etc).

Specifics, by modality team, are shown on Table 2.



**Table 2: Suggestions to Promote Appropriate Utilization of CDUs**

<b>Modality Team</b>	<b>Suggestions to promote appropriate utilization of CDUs</b>
Kidney Care Team/ Nephrologist's Offices	<p>For patients selecting HD, encourage them to learn about options available in their region and to become as independent as possible. Encourage peritoneal dialysis (PD) or home hemodialysis (HHD) where feasible.</p> <p>If neither PD nor HHD is feasible, let patient know he/she will start HD in an in-centre unit but will be transferred to a CDU as soon as stable and space is available. See above for suggestions to promote appropriate utilization of CDUs.</p>
In-centre HD Team	<p>Provide patient with "Welcome to the HD Unit" Patient Guide" (<a href="http://www.bcrenalagency.ca/HD_welcome_guide.pdf">www.bcrenalagency.ca/HD_welcome_guide.pdf</a>). Review expectations on pages 1 &amp; 2 with patients (i.e., once stable, patients will transfer from their in-centre unit to a CDU, an "involved" or "independent" unit or HHD.</p> <p>See above for suggestions to promote appropriate utilization of CDUs. Additional suggestions for promoting CDUs to patients already dialyzing include:</p> <ul style="list-style-type: none"> <li>• Arrange for patient to connect with patient on destination CDU to learn more about care in the CDU.</li> <li>• In situations where the patient is ready to be transferred but a permanent space is not available, offer patient a "practice run" in the CDU.</li> <li>• Consider arranging for patients to receive some dialysis runs in in-centre units and some in CDUs until the patient can be transitioned full-time to a CDU.</li> <li>• Add to checklist of tasks to complete during the first three HD runs (see sample at <a href="http://www.bcrenalagency.ca/patient_orientation_checklist.pdf">www.bcrenalagency.ca/patient_orientation_checklist.pdf</a>).</li> </ul>
CDU Team	<ul style="list-style-type: none"> <li>• Provide tours to patients likely to move to a CDU.</li> <li>• Develop a list of "volunteer" CDU patients willing to connect with patients who are likely to move to a CDU.</li> <li>• Create opportunities for patients who are likely to move to a CDU to have a "practice run" in the CDU.</li> <li>• Accommodate patients receiving some dialysis runs in an in-centre unit and some in a CDU until the patient can be transitioned to full-time to a CDU.</li> <li>• Develop CDU-specific promotional information and make available for modality teams to display in strategic locations (e.g., posters, pamphlets, HA website).</li> </ul>
PD Team	<p>For patients transferring to HD, encourage them to learn about options available in their region and to become as independent as possible. Encourage home hemodialysis (HHD) where feasible.</p> <p>If HHD is not feasible, let patient know he/she will start HD in an in-centre unit but will be transferred to a CDU as soon as stable and space is available. See above for suggestions to promote appropriate utilization of CDUs.</p>
Home HD Team	<p>For patients transferring off HHD, encourage them to learn about options available in their region and to become as independent as possible.</p> <p>Let patient know he/she will start HD in an in-centre unit but will be transferred to a CDU as soon as stable and space is available. See above for suggestions to promote appropriate utilization of CDUs.</p>

## Appendix 6: Summary of the Literature on Clinical and Cost-Effectiveness of CDUs

At the request of the CDU working group, the Canadian Agency for Drugs and Technologies in Health (CADTH) conducted a literature search on the clinical and cost-effectiveness of community-based hemodialysis (HD). The search included documents published between Jan 1, 2010 and Sept 2, 2015.

Eighteen documents were identified: 1 health technology assessment, 7 non-randomized studies, 2 economic evaluations and 8 “miscellaneous” articles. A summary of the highlights of each document are included below. Refer to CADTH report for details, including authors: [www.cadth.ca/community-based-hemodialysis](http://www.cadth.ca/community-based-hemodialysis).

**Document #1:** Organization and financing of chronic dialysis in Belgium. Health Technology Assessment. 2010. [http://kce.fgov.be/sites/default/files/page\\_documents/d20101027313.pdf](http://kce.fgov.be/sites/default/files/page_documents/d20101027313.pdf).

- Discusses the organization of dialysis services in Belgium and the impact (or not) of funding mechanisms.
- Highest cost was in-centre HD, then PD and then CDU HD.

**Document #2:** Patterns of health-related quality of life and associated factors in Chinese patients undergoing HD. 2015. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4517648/>

- Health-related quality of life scores (HRQOL) were higher for patients receiving community-based dialysis than those receiving hospital-based HD.

**Document #3:** Quality of life and emotional distress between patients on PD vs community-based HD. 2014. <http://www.ncbi.nlm.nih.gov/pubmed/23689932>.

- PD patients were more satisfied with care but had more symptoms of depression and poorer physical health (case-mix-adjusted comparisons).

**Document #4:** How do hospitalization patterns of HHD patients compare with a reasonably well dialysis patient cohort? 2014. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4051731/>

- Compared HHD to CDU patients.
- CDU patients spent more time in hospital than the HHD group. Influence of patients selection bias on the perceived benefits of HHD not identified.

**Document #5:** Independent community house HD as a novel dialysis setting: an observational cohort study. 2013. <http://www.ncbi.nlm.nih.gov/pubmed/23219810>.

- Patients from urban settings undertake independent HD in unstaffed nonmedical community-based home-like settings.
- Shows community house HD to be an effective option to improve the uptake of home HD (lower mortality rates than facility HD or PD but higher than for HHD).

**Document #6:** HD in a satellite unit: clinical performance target attainment and health-related quality of life. 2011. <http://www.ncbi.nlm.nih.gov/pubmed/21566106>. London Health Sciences Centre.

- Patients in CDUs were just as likely, or more likely, to demonstrate attainment of clinical performance targets as those dialyzing in-center, while maintaining a similar HRQOL. This supports the use of satellite units to provide care closer to the patient’s home community.

**Document #7:** Outcomes in patients on home HD in England and Wales. 2011. <http://www.ncbi.nlm.nih.gov/pubmed/20841489>.

- Home HD had a survival benefit compared with PD and a borderline advantage compared with hospital HD. There was no evidence of an advantage compared with satellite HD.

**Document #8:** A comparison of quality of life and travel-related factors between in-centre and satellite-based HD patients. 2010. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2827602>.

- Patients in CDUs demonstrated similar characteristics co-morbidities, surrogate outcomes and most aspects of HRQOL to in-centre patients, however those in CDUs reported a significantly superior score on the dialysis stress domain of the HRQOL questionnaire (although no difference on the basis of the SF-36).
- CDU patients reported a significantly decreased cost of transportation, a significantly increased proportion who drive themselves to clinics and a significantly decreased travel time. These factors may explain the reported reduction in stress on one of the questionnaires.

**Document #9:** An economic assessment model of rural and remote satellite HD units. 2015. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4540589/>. Manitoba.

- Constructed a cost model based on data derived from 16 remote CDUs in Manitoba.
- Cost/patient ranged from \$80K-\$216K per patient per year. Median cost was \$100K. Primary cost drivers were capital costs (construction), human resources and expenses for return to tertiary care centres (especially if transport required plane or helicopter).
- Concluded that CDUs in remote areas are more expensive on a per patient basis than in-centre or CDUs in urban areas. In some rural, remote locations, better value for money may reside in local surveillance and prevention programs in addition support for home dialysis therapies over construction of new satellite HD units.

**Document #10:** Analysis of the costs of dialysis and the effects of an incentive mechanism for low-cost dialysis modalities. 2013. <http://www.ncbi.nlm.nih.gov/pubmed/23523345>. Belgium.

- In-centre HD is the most expensive modality per patient year, followed by PD and finally CDUs.
- Need to align policies to maximize the use of lower cost dialysis modalities.

**Document #11:** Satellite HD services for patients with ESRD. 2014. Canada.

- CDU improved access to dialysis services and enhanced the quality of life of those patients who participated in the study (n=7).
- <http://www.ncbi.nlm.nih.gov/pubmed/24783770>

**Document #12:** Guidelines for renal programs. BCPRA. 2013.

<http://www.bcrenalagency.ca/sites/default/files/documents/files/GuidelinesforRenalProgramsupdated2013v10FINAL1.pdf>.

- Guidelines for CDUs (pages 11 - 13). Includes justification for a CDU (travel distance, volumes, etc), staff requirements, space/equipment/supplies and resource requirements (access to inpatient beds, lab services, ED and pharmacy services).

**Document #13:** Providing access to holiday dialysis: a literature review. 2014. Australia. <http://www.kidney.org.au/LinkClick.aspx?fileticket=fFHV0x2qUlw%3D&tabid=839&mid=2016>.

- 3 categories: satellite services (mobile or fixed), services for “transient” patients (e.g., “holiday homes”, kidney bus, camper vans, etc) and specialized vacation booking brokering systems (connect patients to centres worldwide - e.g., B. Braun, MHL Ltd and Diaerum).

**Document #14:** Health guiding note 07-01: Satellite dialysis unit. 2013. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/147869/HBN\\_07-01\\_Final.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/147869/HBN_07-01_Final.pdf). London, England.

- Specifications for CDUs if building new.

**Document #15:** Does HHD produce better outcomes for patients? 2010.

<http://www.ncbi.nlm.nih.gov/pubmed/21072013>

- HHD has better survival rates than in-centre or CDU HD.

**Document #16:** NS Renal Program. Hands satellite dialysis review: report for the Deputy Minister. <http://novascotia.ca/dhw/publications/Provincial-Programs-Hants-Satellite-Dialysis-Review-Report.pdf>

- Review done to see if it would be feasible to place a new CDU in the community of Windsor.
- Focus of review was mostly on travel times. Recommended a maximum of 1 hour travel time (BC guidelines are 90 min travel time). Concluded CDU in Windsor was not necessary.

**Document #17:** Preferential Access Inquiry. See 4: Renal Dialysis Rimbey Support Group Report (page 245). 2013. <http://novascotia.ca/dhw/publications/Provincial-Programs-Hants-Satellite-Dialysis-Review-Report.pdf>

- Proposal to create a dialysis unit in Rimbey (Alberta) to reduce travel times & costs (currently must travel to Red Deer - 170 km round trip) and related car accidents.
- Considered HHD, hemodialysis outside the home (in-centre, CDU or specially equipped mobile facility), PD and transplant.

**Document #18:** WACHS renal dialysis plan 2010 - 2021. 2010. Western Australia. [http://www.wacountry.health.wa.gov.au/fileadmin/sections/publications/Publications\\_by\\_topic\\_type/Service\\_Plans/WACHS\\_SP\\_Renal\\_Dialysis2010-2021.pdf](http://www.wacountry.health.wa.gov.au/fileadmin/sections/publications/Publications_by_topic_type/Service_Plans/WACHS_SP_Renal_Dialysis2010-2021.pdf)

- Focuses on areas where dialysis options need to be enhanced (e.g., HHD, interdisciplinary team, adding nursing support staff, etc).
- Includes satellite unit suitability (e.g., well functioning VA, medical stability, etc) and dependency (independence with mobility, hemodynamic stability, medical interventions while dialyzing) criteria.