

CADTH OPTIMAL USE REPORT

Dialysis Modalities for the Treatment of End-Stage Kidney Disease: Recommendations

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Abbreviations

APD	automated peritoneal dialysis
CAPD	continuous ambulatory peritoneal dialysis
ESKD	end-stage kidney disease
ELSI	ethical, legal, and social issues
HTA	Health Technology Assessment
HTERP	Health Technology Expert Review Panel
HD	hemodialysis
HHD	home hemodialysis
ICHD	in-centre hemodialysis
PD	peritoneal dialysis
QoL	quality of life
RCT	randomized controlled trial
SR	systematic review

Summary of Recommendation

An increasing number of patients with end-stage kidney disease (ESKD) are being initiated on long-term dialysis every year in Canada.¹ According to data published by the Canadian Institute for Health Information in 2013,¹ an estimated 41,931 Canadians were living with ESKD, with most (24,114 or 57.5%) being treated with dialysis.¹ Hemodialysis (HD) and peritoneal dialysis (PD) are the two main types of dialysis provided under Canadian kidney care programs.

In all provinces, HD remains the modality most frequently used for new patients who require dialysis, with Newfoundland and Labrador having the greatest proportion of ESKD patients initiated on HD (91%) in 2013.¹ Moreover, for the same year, most Canadian dialysis patients (76%) received in-centre HD (ICHD), which describes HD performed in an institution such as a hospital, satellite unit, or a dialysis facility with the assistance of a health care professional.¹

In contrast, home-based therapies such as PD and home HD (HHD) are less frequently used according to the latest available data. In 2013, about 19% of new ESKD patients in Canada were initiated on home PD, while this rate was 0.6% for HHD.¹ For the same year, the prevalence for patients being treated by home dialysis across the country was about 17% for PD and 2.5% for HHD.¹

Based on the potential comparable clinical effectiveness and potential cost savings that home dialysis therapies may yield, it is often argued these therapies, particularly PD, may be underutilized in eligible patients in Canada and other developed countries.²⁻⁴ Similarly, the literature and jurisdictional input suggest growing interest in other dialysis delivery models, namely, “self-care” ICHD, “assisted” PD, and HHD. These options may allow for effective clinical results while being potentially less costly than standard ICHD and may also be more desirable from a patient and caregiver perspective.⁵⁻⁸

CADTH conducted a health technology assessment (HTA)⁹ to inform policy questions through an assessment of the clinical effectiveness, cost-effectiveness, patient experiences and perspectives, ethical issues, and implementation issues of dialysis modalities for the treatment of ESKD. The following policy questions were addressed: Should the provision of home-based self-care or assisted dialysis (PD or HD) and self-care ICHD be more widely implemented in the jurisdictions? If so, what strategies and practices could improve implementation and uptake of these different dialysis modalities in the jurisdictions? These recommendations are relevant for ESKD patients deemed eligible for home therapies by their care provider. Self-care dialysis is defined as the administration of dialysis by a patient and/or caregiver without the assistance of a health care professional. Assisted dialysis involves the administration of dialysis with the assistance of a health care professional.

HTERP recommends self-care home-based dialysis in patients diagnosed with end-stage kidney disease, either with home hemodialysis or peritoneal dialysis

Technology

In **hemodialysis (HD)**, the patient's blood is circulated to an external dialysis machine, which filters wastes and extra water from the blood before returning it to the body. In terms of administration, conventional HD is typically performed three days a week for three to four hours per session.¹⁰ This schedule can be modified to allow for more frequent or longer dialysis, intended to produce a stronger physiological effect (greater solute clearance and extracellular fluid volume control) and to interfere less with patients' daily lives.^{10,11} Alternatively, short-daily HD can be performed six to seven days a week for two to three hours per session, and frequent nocturnal HD can be administered five to seven days a week for six to nine hours at a time, usually during sleep hours.¹⁰ Further, the provision of HD can be categorized as in-centre HD (ICHD) or home-based HD (HHD) according to the setting where the treatment is delivered. ICHD is dispensed in a health care institution such as a hospital, satellite unit, or other dialysis facility under the direct supervision of health care professionals. Self-care ICHD is also performed in a health care institution, but with patients administering and managing their own dialysis with minimal support from on-site personnel. For its part, HHD is performed at the patient's residence under self-care (administration by the patient and/or caregiver without the assistance of a health care professional) or assisted by a health care professional. Increasingly, patients undergoing HD at home are treated with one of the frequent HD modalities — short-daily HD or frequent nocturnal HD.^{11,12}

In **peritoneal dialysis (PD)**, a permanent catheter inserted into the abdomen is used to fill the peritoneal cavity with a dialysis solution called dialysate.¹³ The dwell, the volume of dialysate in the peritoneal cavity, remains in the patient's body for a few hours. Dialysis occurs as wastes and excess water from the blood flow gradually through the filter-like peritoneal membrane and collect in the dwell. After a period of time, the so-called "exchange" step takes place whereby the peritoneal cavity is drained of the used solution, called the effluent, and filled with fresh dialysate.^{13,14} There are two main types of PD: continuous ambulatory PD (CAPD) and automated PD (APD). CAPD is usually carried out during the daytime; the process of filling and draining the peritoneal cavity is done manually and is commonly repeated four to six times in a 24-hour period.¹³ With APD, a machine performs the automatic cycling of the dialysis solution in the body, usually at night while the patient sleeps.¹³ Whether CAPD or APD, PD is typically delivered in a home setting and prescribed to eligible patients who are able to perform the treatment on their own, or with assistance from a family member or informal caregiver. Some patients, such as the elderly, those with physical limitations or cognitive impairment, and those without

sufficient informal caregiver assistance, may be put on assisted PD in the manner described above for HHD.^{5,7} Assisted PD is a well-established model in several European countries, including France, Belgium, and the United Kingdom.^{5,6}

Methods

CADTH conducted an HTA on the clinical effectiveness, cost-effectiveness, patient experiences and perspectives, ethical issues, and implementation issues of dialysis modalities for the treatment of ESKD.⁹ The Health Technology Expert Review Panel (HTERP) developed recommendations on the appropriate use of dialysis modalities based on the evidence presented in the HTA report. HTERP members reviewed the evidence, discussed all elements of the HTERP deliberative framework¹⁵ (https://www.cadth.ca/sites/default/files/pdf/hterp/HTERP_DFW_e.pdf), and developed a consensus-based recommendation through discussion and deliberation. Additional information on the HTERP process is found on the HTERP page of the CADTH website: <https://www.cadth.ca/collaboration-and-outreach/advisory-bodies/health-technology-expert-review-panel>.

Detailed Recommendation

The objective of these recommendations is to provide advice for Canadian health care decision-makers about the use of dialysis modalities. These recommendations are relevant for patients with ESKD deemed eligible for home therapies by their care provider.

HTERP recommends self-care home-based dialysis in patients diagnosed with end-stage kidney disease, either with home hemodialysis or peritoneal dialysis

Rationale

- There were no consistent differences in health-related quality of life (QoL) between home-based modalities (HHD or PD) and ICHD.
- Home-based dialysis modalities (HHD or PD) may offer a greater survival benefit compared with ICHD among younger, motivated patients (i.e., those willing to undertake home-based dialysis) in supportive settings. However, there is limited evidence to support the position that either home-based modality is clinically superior to ICHD for this outcome.
- Patients with diabetes and other comorbidities on HHD have similar survival rates as patients on ICHD. When comparing PD with ICHD, it is unclear whether there is a survival benefit in these patients because of inconclusive results.
- In terms of cost-effectiveness, home-based therapies may be more attractive economically for eligible patients:
 - In the reference case (i.e., where no clinical difference between modalities was assumed) and most sensitivity analyses, HHD and PD were found to be less costly than ICHD from a Canadian health care payer perspective.

- Economic results were largely unchanged when a societal perspective was assumed. Under this societal perspective, home-based therapies are associated with:
 - Lower patient travel costs
 - Higher home utility costs (for HHD only)
 - Potential benefit in home and workforce productivity for employed patients.
- Cost differences for ICHD provision are accentuated in rural and remote settings (i.e., ICHD costs more to deliver in rural and remote areas than in urban centres).
- Home-based dialysis modalities may reduce the requirement for central facilities and travel for patients living outside urban centres.
- Patients desire a sense of freedom over their lives and control over their treatment, and they do not want to be a burden to their families and caregivers. For some patients, their life situation, beliefs, and perceptions lead them to prefer home-based modalities. For others, even in similar situations, in-centre modalities are preferred.
- Caregivers face a significant and ongoing burden associated with caring for a loved one on dialysis treatment, regardless of modality choice. At the same time, patients describe feeling reluctant to choose a modality that may disrupt their caregivers' lives. For some patients, home-based therapies were perceived as the least burdensome to their caregivers, while for others in-centre treatments were perceived as the least burdensome.
- For health care providers and policy-makers, an individual patient's desire for choice of dialysis modality must be balanced against the significant health care cost differences. As the available evidence shows no discernable difference in effectiveness between modalities, and as informed choice may be based on education, a "home first" approach for dialysis modalities should be considered.

Considerations

As HTERP worked the dialysis modality treatment issue through its deliberative framework, the following considerations were put forth as part of their discussion.

HTERP considered the clinical evidence,⁹ which demonstrated that home-based modalities (HHD or PD) appear to offer similar clinical benefits overall compared with ICHD. There was insufficient evidence in the clinical review to suggest any differences in safety between all dialysis modalities. Aside from major adverse events leading to death or hospitalization, other adverse events were inconsistently reported. There were no consistent differences in health-related QoL outcomes between home-based modalities and ICHD. Although most of the standardized health-related QoL scales had been validated, few estimates of minimal clinically important difference were available, which limited the assessment of clinically meaningful differences. HHD may offer a potential survival benefit compared with ICHD, while the clinical evidence comparing PD to ICHD varied. However, studies in Canadian settings and patients showed no difference in survival, or better survival for PD. Patients with diabetes and other comorbidities have similar

survival on HHD as patients on ICHD. When comparing PD with ICHD, it is unclear whether there is a survival benefit in these patients.

HTERP acknowledged that there was insufficient evidence to determine if any of the three home dialysis prescriptions (i.e., conventional, short-daily, or nocturnal) was preferable, either for all or a subgroup of patients. Few primary studies compared or allowed comparison of dialysis prescriptions, and some of those that did used variable categorizations of dialysis prescriptions. Standard definitions of dialysis exposures would aid in comparison across research studies. The data also did not allow for the assessment of whether assistance or self-care affected outcomes for HHD, or whether self-care affected outcomes in in-centre dialysis. There is a lack of comparative evidence for several of the clinical subgroups we identified as important, particularly around setting and geography.

For patients who cannot perform PD at home on their own or with a caregiver, assisted PD is emerging as a treatment option in some jurisdictions, but it is not available uniformly across Canada.¹⁶ Data are limited, and no clinical evidence exists suggesting differences in outcomes.

HTERP considered the evidence from the economic evaluation in the HTA,⁹ which revealed that home-based modalities are less expensive from a health systems perspective. However, moving the site of dialysis to the home means that patients may have to assume costs formerly absorbed by the health care system, such as increased utility charges for power and water, costs of modifications to their homes to accommodate their equipment and supplies for dialysis. (In some jurisdictions, utility costs are borne by the health care payers.) The need for assistance may be an additional cost or a source of financial loss if a family caregiver has to reduce or cease employment. Extensive and time-consuming training requirements for patients on HHD and substantial utility costs can be barriers to uptake,¹⁷ although there may be advantages with respect to travel and productivity costs when patients are on HHD. If utility costs are assumed by the health care payer, this would remove a financial barrier for patients and home-based dialysis may still be economically attractive to the health payer. Further, patients with lower socioeconomic status may have other barriers, such as a lack of a stable or suitable home environment. Costs that are covered may vary across jurisdictions. The data for patient-borne costs for home renovations are limited and, although the economic analysis in the HTA found these costs were a minor contributor from a societal perspective, for an individual patient they could prove decisive and be a barrier to access.

Based on findings from the economic evaluation and review of patient perspectives and experiences in the HTA,⁹ HTERP recognized that in general, home-based dialysis therapies may be more attractive than ICHD for eligible patients, primarily due to the lower cost of provision. While home-based therapies, in general, are less costly than ICHD, current evidence suggests assisted PD may cost more than ICHD if delivered continuously.

Patients inclined to travel less frequently may prefer PD, while patients with significant dietary restrictions due to hyperphosphatemia or volume overload may find frequent HHD to be advantageous. Patients desire control over the

place and timing of their treatment, and choice of modality that optimizes freedom over their day-to-day activities. Being involved in the decision to choose their dialysis treatment is important to patients, if clinically appropriate. Access and availability to appropriate caregivers (either formal or informal) and family or other social support are reported as facilitators to a patients' decision to receive dialysis at home. However, reluctance to inflict a caregiving burden on family was found to be a barrier to choosing home care. Caring for a home dialysis patient can be overwhelming, guilt-inducing, difficult, and stressful.

Supporting patients' choices, whether home-based HD, PD, or in-centre self-care dialysis, requires that the appropriate infrastructure is in place to support the decision. This includes education for all decision-makers involved (policy-makers, nephrologists, nephrology nurses, patients, and caregivers) and the availability of resources (staff, infrastructure, and funding) for these dialysis modalities. Education allows patients to make informed choices about their treatment options and be comfortable with their treatment. Information should be shared with patients' family and caregivers who are also involved in making treatment-related decisions and affected by modality choice. Patient factors, such as the ability to perform dialysis procedures, can limit the choice of a home modality, but there may be ways to introduce a degree of freedom and autonomy in other ways, such as choice regarding the frequency and duration of the specific dialysis modality.

HTERP also recognized that one of the potential advantages of home dialysis modalities is the opportunity to reduce the requirement for central facilities and therefore the need for patients living outside urban centres to travel long distances or even move their place of residence to be nearer to dialysis facilities. While the infrastructure requirements for PD are likely to be minimal, HHD patients may require ICHD for intermittent supportive care, which may necessitate travel or temporary relocation near a dialysis unit, with attendant costs. At the moment, there is a paucity of information about the experience of patients living in remote or rural areas without ready access to dialysis facilities.

Many jurisdictions in Canada either do not have programs in place focusing specifically on remote settings or rural areas or they do not have the resources to provide support and assistance for patients on PD outside of urban areas.¹⁶ In some jurisdictions, patients in rural and remote areas are assessed for suitability for home-based care. Training tends to be provided centrally at the regional renal centre, and supplies, equipment, and renovation costs are often covered by the government health program. Remote patients may require backup dialysis equipment as a safeguard. Inclusion of the delivery of supplies and technical support in the existing treatment plan and vendor contract may ease implementation.

Nevertheless, concerns such as transportation challenges, storage of supplies, and difficulty with the water supply are not insurmountable barriers to providing patients in remote communities with dialysis treatment at home. Some satellite dialysis centres are using video conferencing to link nephrologists with patients. Telehealth has been shown to be successful in helping manage cardiac conditions, mental health conditions, diabetes, and chronic obstructive pulmonary disease, and it may be a viable option for

increasing the use of home-based modalities or self-care dialysis in remote satellite centres.¹⁸

HTERP acknowledged that ethical issues⁹ such as directing resources toward the most efficient treatment options that meet standards for quality patient care, and physician reimbursement on choice of modality, should be considered. Other issues that should be taken into consideration include structural incentives and the availability and distribution at the macro level, while the extent we accommodate individuals' preferences for modes of therapy and how we ensure patients do not assume a heavier financial burden in using these modalities should be considered at the micro level. The needs of Canada's Indigenous communities should be accommodated when considering the distribution of resources for treating ESKD.

The environmental impact of dialysis treatment also warrants consideration. Dialysis treatment in general requires a significant amount of water and energy usage. Patients undergoing home-based dialysis treatments may commonly prefer more frequent and longer dialysis sessions¹⁹ compared with ICHD, which may result in greater water use per session. Dialysis services in general may wish to consider planning, trialling, and implementing environmentally friendly resource management practices, such as reusing reject water for home domestic utilities and gardens¹⁹ and developing programs to use solar power for dialysis equipment in home training services.¹⁹

Recent Canadian guidelines, such as The Canadian Society of Nephrology (CSN) (2014),²⁰ which provided recommendations on when to initiate dialysis, was out-of-scope for this HTA. The authors of the CSN guidelines found no evidence or rationale to support separate recommendations for patients initiating HHD or ICHD versus PD.²⁰

HTERP encourages future research be directed toward filling the evidence gaps that are particularly pertinent to the Canadian context, given the geographical spread of the Canadian population, and the need to provide care in diverse settings and to people with diverse needs and cultural backgrounds. From a clinical perspective, it would be worthwhile to further explore clinical and socioeconomic factors that would be expected to influence outcomes. From an economic perspective, there is a paucity of Canadian cost data on some of the modalities, specifically assisted PD and in-centre frequent dialysis. If all patients are suitable and eligible for a home-based therapy, this is likely to be preferred even if the provision costs are greater in rural and remote settings. However, the suitability and eligibility component for each patient is a key factor for selecting a modality. As noted above, implementation considerations for patients needing dialysis in rural and remote populations in Canada need further exploration.

Background

Available evidence suggests that home PD and HHD may achieve similar clinical outcomes for most patients compared with in-centre ICHD.^{21,22}

Studies also indicate that home PD and HHD are potentially more cost-effective relative to ICHD.^{21,23-25} An analysis of the clinical effectiveness, cost-effectiveness, patient experiences and perspectives, ethical issues, and implementation issues of dialysis modalities for the treatment of ESKD was conducted to inform decisions about improving the implementation and uptake of these different dialysis modalities in Canada.

The clinical, economic, patient experiences and perspectives, ethical issues, and implementation evidence used for developing this guidance was derived from the CADTH HTA: *Dialysis Modalities for the Treatment of End-Stage Kidney Disease*.⁹

Research Questions

1. What is the clinical effectiveness and safety of HHD or PD compared with ICHD for the treatment of ESKD?
2. What is the clinical effectiveness and safety of HHD compared with PD for the treatment of ESKD?
3. What is the comparative clinical effectiveness and safety of HHD modalities, including nocturnal, short-daily, and conventional?
4. What is the clinical effectiveness and safety of self-care ICHD compared with traditional in-centre HD?
5. What is the cost-effectiveness of different dialysis modalities across different delivery settings for the treatment of ESKD in Canada?
6. What are the experiences and perspectives of adults with ESKD, their family members, and their caregivers regarding dialysis care?
7. What are the main ethical issues that ought to be considered when considering expanding the offer of self-care or assisted home dialysis (PD or HD), and self-care ICHD for patients with ESKD?
8. What strategies and processes have been used to implement home-based and self-care in-centre dialysis programs for eligible patients with ESKD?
9. What contextual factors contribute to the implementation of home-based and self-care dialysis programs for eligible patients with ESKD?

Summary of the Evidence

Clinical Evidence

A review of the clinical effectiveness literature was conducted to assess HHD or PD compared with ICHD, HHD compared with PD, HHD modalities compared with each other, and self-care ICHD compared with traditional ICHD. The population of interest was adults (18 years and older) with ESKD of any cause who need dialysis treatment, either as lifetime treatment or while waiting for kidney transplantation. The primary outcome of interest was patient QoL, while other secondary outcomes included mortality, hospitalization, adverse events, and technique failure (see HTA report for a complete list⁹). Systematic reviews, randomized controlled trials (RCTs), and non-randomized controlled studies were considered for inclusion. The heterogeneity of study designs, patient populations, interventions, and outcomes was such that statistical pooling was not appropriate, and narrative synthesis was conducted instead. In total, six systematic reviews (SRs) and 154 primary studies met the inclusion criteria for the overview. Duplicate effort was avoided by synthesizing the studies that would have been available at the time the SRs were in process, whether or not they were included in a systematic review. Therefore, when the SRs addressed any of the research questions, the results of the SRs were considered, and an additional synthesis of studies published since that time was included to update the evidence. Forty-three articles describing 34 primary studies were subsequently synthesized.

The overall findings of this review suggest that there is no consistent difference in QoL outcomes between HHD or PD compared with ICHD, although studies may not have been large enough to reliably detect a difference. Both home-based dialysis modalities (HHD or PD) may offer a greater survival benefit among younger, motivated patients in supportive settings compared with ICHD. However, there is insufficient high-quality evidence to clearly support that either is clinically superior to ICHD. Patients with diabetes and other comorbidities on HHD have similar survival rates as patients on ICHD. When comparing PD with ICHD, it is unclear whether there is a survival benefit in these patients. HHD may offer a potential survival benefit compared with PD, but the findings are based on limited evidence. There is insufficient evidence to determine which HHD prescription (i.e., nocturnal, short-daily, and conventional) might be preferable and of greater clinical benefit. There was no evidence found regarding the clinical effectiveness and safety of self-care versus assisted ICHD. The quality of the included SRs presented a low risk of bias. In regards to the included primary studies, the two RCTs were of moderate overall quality and were generally well conducted, with blinding of allocation of the intervention, use of validated endpoints, and a low proportion of dropouts. The majority of the primary non-randomized studies were of adequate quality, allowing for the limitations imposed by their data sources and their non-randomized, non-blinded design.

Economic Evidence

A review of the literature was conducted that identified numerous economic evaluations and costing studies in Canada but few have looked at all modalities and prescriptions of interest to this review. A Markov cohort model was constructed to assess the lifetime incremental cost-effectiveness of alternate dialysis modalities and prescriptions in patients with ESKD in Canada. The intent was to conduct a cost-utility analysis, but given that the clinical review identified a paucity of high-quality RCTs to inform relative efficacy and safety parameters, the reference case assumed no clinical difference between modalities which was tested in sensitivity analyses (following a priori methods). The reference case patient population was incident dialysis outpatients (i.e., those initiating dialysis treatment for ESKD for the first time), with patient characteristics defined by data from the Canadian Organ Replacement Registry. In the reference case, it was assumed all patients would be eligible for all modality types being considered. Various prescriptions of HD (including conventional, short-daily, and frequent nocturnal) were compared. The location in which dialysis is performed (in-centre or home for HD), differences in how assisted dialysis modalities are delivered, and geographical settings (urban, rural, and remote regions) were also considered. The primary perspective was that of a Canadian health care payer, although a societal perspective was also examined to account for patient- and caregiver-borne costs. Costs and outcomes were discounted at 5% per year.

Given the available clinical evidence, no differences in efficacy and safety were assumed in the reference case, which reflects a comparison of lifetime costs for each dialysis modality. The least costly modality was conventional HDD (\$561,962). Other home-based dialysis modalities (with the exception of assisted PD) were found to be less costly than ICHD in eligible patients. The cost of assisted PD depends on how it is delivered; for example, short-term or intermittent assisted PD appeared less costly than ICHD. Under a societal perspective, the cost of water and power for HDD may be significant for patients although this may be offset from reduced costs associated with travel and lost productivity. Probabilistic sensitivity analyses and the comparisons among specific dialysis modalities were conducted, incorporating the treatment effects from observational studies. The economic findings were found to remain relatively robust in most sensitivity analyses.

Patient Perspectives and Experiences Evidence

An overview of SRs relevant to the research question on patient experience and perspectives was conducted.⁹ Six SRs were included in the thematic synthesis, and three analytic themes emerged from the data. The first theme identified patients' desires for a sense of freedom over their lives, and control over their treatment. This influences their perspectives, and sometimes choice, of dialysis modalities. The dialysis setting (i.e., home versus in-centre), the frequency of treatment, the need to travel for treatment, and perceptions of how these factors affect patients' and their caregivers' ability to maintain normal activities appear to influence individuals' preferences for home or in-centre treatment, but with no clear

pattern. While all patients appeared to want a treatment that they perceive to be the least intrusive, for some this meant home-based therapies but others with similar living arrangements and lifestyles preferred in-centre modalities. The second analytic theme identified a significant and ongoing burden for caregivers, who may be affected (positively or negatively) by modality choice. Patients described being concerned about being an emotional, physical, and financial burden to their families and were reluctant to choose a modality that may disrupt their family members' lives. Again, for some patients home-based therapies were perceived as the least burdensome to others (for example due to reduced opportunity to travel or ability to work). For other patients in-centre treatments were perceived as the least burdensome as caregivers would not have to assume responsibility for treatment and their home would not turn into a "private hospital." Regardless of modality choice, caregivers are faced with lifestyle, relationship, and family role changes, many of which lead to feelings of isolation, guilt, fear, anxiety, and feeling overwhelmed. The third analytic theme revealed a range of factors that influence people's perspectives and experiences of dialysis modalities. Minimal disruption to daily activities, previous familiarity with modalities, previous beliefs or experiences with modalities, and the opinions of family and friends all contribute to how patients choose between modalities, when appropriate, as well as how they perceive their experience on dialysis treatment. Patients reported feeling more empowered to make choices, and more comfortable with their treatments when they have information about all treatment options and what they can expect.

Ethics Evidence

An ethical, legal, and social issues (ELSI) analysis combined a targeted literature search on various aspects of ESKD treatment modality selection and use with philosophical analyses to identify a range of ethical issues pertinent to the reimbursement and implementation of in-centre and HHD and PD. The issues were discussed in terms of their relation to the level of decision-making at which they occur. The ELSI analysis revealed ethical issues at the macro, meso, and micro levels. Perhaps most significantly, at the macro level, the history of ESKD treatment in North America has created a kind of "exceptionalism" with regards to the management of ESKD. For a variety of reasons, including structural incentives and the availability and distribution of specialist services, a bias toward conventional ICHD developed over the past decades. The factors affecting modality selection for ESKD are complex and systemic, and any efforts to affect a cultural shift away from in-centre HD will occur only with a sustained effort at multiple levels and over an extended period. There is also a need to provide special attention to the needs of Canada's Indigenous communities when considering the distribution of resources for treating ESKD. Meso-level issues involve a responsibility for administrators to direct resources toward the most efficient treatment options that meet standards for quality patient care. The influence of physician reimbursement on choice of modality at the institutional level is also an important consideration, as is appropriate patient and provider education. The standard of evidence required for drawing conclusions regarding funding is also an issue as RCTs may not be able to resolve uncertainty around effectiveness of home-based dialysis modalities. At the micro level, exceptionalism may also be an issue when it comes to

how we accommodate individuals' preferences for modes of therapy. In addition, efforts to increase home-based HD or PD should ensure that patients using these modalities do not assume a heavier financial burden.

Implementation Evidence

Two surveys of a cross-Canada network of dialysis stakeholders (one for dialysis program professionals and another for nephrologists) were conducted to collect information on the range of strategies that have been used to establish or improve the uptake of home-based HD and PD and self-care in-centre dialysis programs in Canada.⁹ Specific questions regarding implementation considerations for rural and remote patient populations were also included. In conjunction with the surveys, a narrative literature review was conducted to identify information on issues relevant to implementation of home-based and in-centre, self-care dialysis in Canada. The review of implementation issues and strategies around home-based and in-centre self-care dialysis identified several important barriers, facilitators, and strategies that will influence the ultimate knowledge mobilization strategy. Central to the findings is the importance of patient choice in decision-making, while considering the various perspectives of stakeholders, policy-makers, and clinicians. Education to address knowledge gaps at various levels of health care decision-making as well as sharing successful strategies already underway will be central to implementation support in all jurisdictions across Canada.

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Appendix 1: HTERP

The Health Technology Expert Review Panel (HTERP) consists of up to seven core members appointed to serve for all topics under consideration during their term of office, and up to five expert members appointed to provide their expertise for a specific topic. For this project, two expert members were appointed; their expertise included internal medicine, clinical chemistry, pathology, and family medicine. The core members include health care practitioners and other individuals with expertise and experience in evidence-based medicine, critical appraisal, health technology assessment, bioethics, and health economics. One public member is also appointed to the core panel to represent the broad public interest.

HTERP is an advisory body to CADTH and is convened to develop guidance or recommendations on non-drug health technologies to inform a range of stakeholders within the Canadian health care system. Further information regarding HTERP is available at www.cadth.ca/en/advisory-bodies/health-technology-expert-review-panel.

HTERP Core Members

Dr. Stirling Bryan (Chair)

Dr. Leslie Anne Campbell

Dr. Lisa Schwartz

Dr. Jenny Basran

Dr. Hilary Jaeger

Dr. Jeremy Petch

Ms. Tonya Somerton

Expert Members

Dr. Mauro Verrelli

Dr. Gihad Nesrallah

Conflict of Interest

No members declared any conflicts of interest. [Conflict of Interest Guidelines](#) are posted on the CADTH website.