



# Cost Controversies of a “Home Dialysis First” Policy

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## Abstract

**Purpose of review:** Kidney Failure is highly prevalent and uses a disproportionate amount of health care funding. In Canada (excluding Quebec), 37 647 people were living with kidney failure in 2016. The single-payer Canadian health care system spends approximately 1.2% of their annual budget on kidney failure. In 2016, 58.4% of patients with kidney failure in Canada (excluding Quebec) were on dialysis as opposed to living with a functioning kidney transplant. Home dialysis modalities including peritoneal dialysis (PD) and home hemodialysis (HD) were used by 18.9% and 4.7% of these patients, respectively. In-center HD and home dialysis (PD and home HD) are often considered equally efficacious and have similar impacts on quality of life. Despite cost minimization analyses suggesting that home dialysis offers cost savings over in-center HD, there has been a slow uptake of home dialysis in developed nations over time, suggesting that controversies and barriers to implementation currently exist. The primary objective of this health policy briefing article is to introduce and address some of the major controversies surrounding the cost effectiveness in supporting advocacy for a “Home Dialysis First” policy with a primary focus on single-payer systems in a developed nation such as Canada.

**Sources of information:** Canadian Agency for Drugs and Technologies in Health (CADTH), Canadian and US epidemiologic databases, national/international conference presentations, primary literature review, and discussion with experts within the field of home dialysis.

**Methods:** We have conducted a focused primary literature review alongside individuals with expertise in the field of home dialysis to discuss the cost controversies surrounding the implementation of a “Home Dialysis First” policy.

**Key findings:** First, the primary literature is limited to mostly observational studies which are highly variable in study design and content. Local economic assessments, however, have provided convincing data for home dialysis cost savings in Canada. Second, the cost of delivering dialysis differs significantly throughout the world, explained by differing costs of labor and supplies in developing nations. Third, the indirect patient costs of water, energy, and home modifications are often barriers to implementation and may be overcome by introducing cost reimbursement programs. Fourth, home dialysis requires upfront training costs. We explore the impact of premature switches from home dialysis to in-center HD or a functioning kidney transplant on overall cost savings. Fifth, we discuss the effect of physician financial incentives and program funding on the uptake of home dialysis. Finally, we introduce the controversial topic of comparing the societal value of freedom of modality choice against the societal cost savings of a “Home Dialysis First” policy.

**Limitations:** Narrative reviews, due to their inherently reduced methodological quality in comparison with systematic reviews, may expose our collected literature to selection bias. We have attempted to compose a diverse collection of available literature alongside consensus expertise to provide a fair and concise review of home dialysis cost controversies.

**Implications:** Implementation of a “Home Dialysis First” policy would be a disruptive change to kidney failure care in Canada. To make informed policy decisions, we should recognize the cost savings associated with home dialysis in developed nations, the significance of patient-borne costs as a barrier to implementation, the impact of training costs and early modality switching in home dialysis, the lack of evidence regarding physician financial incentives, and the importance of program funding. Ultimately, we must consider the societal value of freedom of patient modality choice in comparison with the potential cost savings of a “Home Dialysis First” policy.

## Abrégé

**Justification:** L'insuffisance rénale (IR) est très répandue et occupe une part disproportionnée du financement des soins de santé; le système de santé canadien à payeur unique y consacre environ 1,2 % de son budget annuel. En 2016, au Canada (excluant le Québec), 37 647 personnes vivaient avec une IR, desquelles 58,4 % suivaient des traitements de dialyse plutôt que de vivre avec une greffe fonctionnelle. Les modalités de dialyse à domicile, soit la dialyse péritonéale (DP) et l'hémodialyse à domicile (HD), étaient respectivement employées par 18,9 % et 4,7 % de ces patients. L'hémodialyse en centre (HC) et l'hémodialyse à



domicile (HD) sont souvent considérées tout aussi efficaces et leurs répercussions sur la qualité de vie sont semblables. Bien que les analyses de minimisation des coûts suggèrent que l'HD soit plus économique que l'HC, on a observé au fil du temps une tendance à la baisse du choix de l'HD comme modalité dans les pays développés, ce qui suggère l'existence de controverses et d'obstacles à sa mise en œuvre. L'objectif principal de ce document d'information sur les politiques en matière de santé est de présenter et d'aborder certaines des principales controverses entourant la rentabilité et le plaidoyer en faveur d'une politique «HD en priorité» axée principalement sur les systèmes de santé à payeur unique des pays développés comme le Canada.

**Sources:** L'Agence canadienne des médicaments et des technologies de la santé (ACMTS), les bases de données épidémiologiques canadiennes et étasuniennes, les présentations faites lors de conférences nationales et internationales, la revue primaire de la littérature et des discussions avec des experts de l'HD.

**Méthodologie:** Nous avons procédé à une revue primaire et ciblée de la littérature aux côtés de personnes possédant une expertise en HD afin de discuter des controverses entourant les coûts liés à la mise en œuvre d'une politique «HD en priorité».

**Résultats:**

- (1) La revue primaire de la littérature est limitée principalement à des études observationnelles dont la conception et le contenu sont très variables. Les évaluations économiques locales ont cependant fourni des données convaincantes quant aux économies réalisées avec l'HD au Canada.
- (2) Le coût de la dialyse varie de façon significative à travers le monde, ce qui s'explique par les différences de coûts pour la main-d'œuvre et l'équipement dans les pays en développement.
- (3) Les coûts indirects (eau, énergie et aménagements requis) assumés par le patient constituent souvent un obstacle à la mise en œuvre qui pourrait être surmonté par la mise sur pied d'un programme de remboursement.
- (4) L'HD entraîne des coûts de formation à l'implantation. Nous explorons les conséquences d'un passage précoce de l'HD à l'HC ou à une transplantation fonctionnelle sur les économies globales.
- (5) Nous discutons de l'effet d'incitatifs financiers auprès des médecins et du financement de programmes encourageant l'HD.
- (6) Enfin, nous abordons le sujet controversé de la comparaison de la valeur sociétale du libre choix par rapport aux économies sociétales d'une politique «HD en priorité».

**Limites:** Les revues narratives, en raison de leur qualité méthodologique intrinsèquement réduite comparativement aux revues systématiques, peuvent exposer la documentation recueillie à des biais de sélection. Nous avons tenté de constituer un éventail diversifié de documents disponibles parallèlement à une expertise consensuelle de façon à fournir un examen juste et concis des controverses entourant les coûts liés à l'HD.

**Conclusion:** La mise en œuvre d'une politique «HD en priorité» constituerait un virage majeur dans les pratiques en insuffisance rénale au Canada. Pour prendre des décisions éclairées, nous devons reconnaître: (1) les économies associées à l'HD dans les pays développés, (2) l'importance des coûts assumés par les patients comme obstacle à la mise en œuvre, (3) l'incidence des coûts incitatifs financiers aux médecins et, (4) l'importance de financer les programmes. Enfin, nous devons examiner la valeur sociétale du libre choix du patient par rapport aux potentielles économies d'une politique «HD en priorité».

**Keywords**

home dialysis, home hemodialysis, peritoneal dialysis, cost effectiveness, health economics

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**Why is this review important?**

Home dialysis modalities including peritoneal dialysis and home hemodialysis are considered equally efficacious and have similar impacts on quality of life. Despite cost minimization analyses suggesting home dialysis offers cost savings over in-centre hemodialysis, there has been slow uptake of home dialysis in developed nations over time.

**What are the key messages?**

This health policy briefing manuscript discusses the cost controversies of home dialysis over in-centre hemodialysis in order to inform key stakeholders regarding the decision to implement a “Home Dialysis First” policy. We have outlined the cost savings associated with home dialysis in developed nations, the significance of patient-borne costs as a barrier to

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implementation, the impact of training costs and early modality switching in home dialysis, and the effect of physician financial incentives and program funding on home dialysis uptake. We also discuss the competing societal values of health care cost savings and freedom of modality choice. Extensive stakeholder engagement will need to drive priorities in creating sustainable comprehensive kidney health care.

## Introduction

Kidney failure is highly prevalent and uses a disproportionate amount of health care funding. In Canada (excluding Quebec), 37 647 people were living with kidney failure in 2016.<sup>1</sup> The single-payer Canadian health care system spends approximately 1.2% of their annual budget on kidney failure. In the United States, 7.2% of Medicare claims (US\$32.8 billion) were directed toward the care of kidney failure.<sup>2</sup> Due to increasing risk factors for chronic kidney disease (CKD) such as hypertension and diabetes, improved survival overall and with kidney failure, and increased access to renal replacement therapy (RRT) in the developing world, the prevalence of kidney failure is expected to double internationally from 2010 to 2030.<sup>3</sup> Budget impact assessments aiming to identify the most cost-effective strategies to manage kidney failure have been explored in many parts of the world.

The impact of dialysis on health care spending is growing. In 2016, 58.4% of patients with kidney failure in Canada (excluding Quebec) were on dialysis as opposed to living with a functioning kidney transplant.<sup>1</sup> Home dialysis modalities including peritoneal dialysis (PD) and home hemodialysis (HD) were used by 18.9% and 4.7% of these patients, respectively. The cost differences between providing facility and home-based dialysis have been well documented within the literature.<sup>4-9</sup> Despite multiple conclusions that home dialysis is a more cost-effective therapy from a societal and health payer perspective, uptake has been slow in developed countries.

In-center HD and home dialysis (PD and home HD) are often considered equally efficacious and have similar impacts on quality of life.<sup>2,5-7,9,10</sup> The Canadian Agency for Drugs and Technologies in Health (CADTH) published a comprehensive review on dialysis modalities for kidney failure which included a narrative on the existing primary literature regarding the effect of each dialysis modality on quality of life, morbidity, and mortality.<sup>9</sup> They found that in-center HD, PD, and home HD were equivalent in most patient populations. The equal efficacy among dialysis modalities has been generally accepted despite limitations in the primary literature.

Because outcomes among patients on in-center HD, PD, and home HD are often considered equal, researchers and policy analysts have focused on cost minimization analyses to compare modalities from a systems perspective. Overall, home dialysis is less expensive than in-center HD in developed countries.<sup>6,11-13</sup> The existing dialysis cost comparison literature

**Table 1.** Cost Controversies of a “Home Dialysis First” Policy.

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1. Primary literature limitations
  2. Cost differences throughout the world
  3. Indirect costs to patients
  4. Training costs and early modality switching
  5. Physician financial incentives and program funding
  6. The cost of freedom of choice
- 

has limitations as studies vary in design, perspective, and content. However, Canadian researchers have replicated the cost savings seen with home dialysis, giving validity to these results.<sup>4,5</sup>

Despite the perceived cost advantages, there has been a lack of home dialysis uptake in developed nations over time. The proportion of patients on PD decreased by 5.3% in developed nations from 1997 to 2008.<sup>14</sup> In Canada (excluding Quebec), the proportion of PD among patients on dialysis has declined from 2008 (19.5%) to 2016 (18.9%), and the proportion of home HD has increased from 2008 (3.6%) to 2016 (4.7%).<sup>1</sup> The rate of incident PD and home HD has slightly risen from 20.2% to 23% and 0.5% to 0.7%, respectively, during the same time period. A government initiative in Ontario, Canada meant to rapidly improve rates of PD use to 30% by 2010 was unsuccessful.<sup>15</sup> The slow growth of home dialysis in developed nations suggests that there are persistent controversies and barriers to implementation. The primary objective of this health policy briefing article is to introduce and address some of the major controversies surrounding the cost effectiveness in supporting advocacy for a “Home Dialysis First” policy from the perspective of a single-payer system in a developed nation such as Canada (Table 1).

## Methods

We have conducted a focused primary literature review alongside individuals with expertise in the field of home dialysis to discuss the cost controversies surrounding the implementation of a “Home Dialysis First” policy. Literature was gathered based on expert opinion of key scientific contributions within this area, as well as a focused literature review using terms related to home dialysis and health economic analyses. Additionally, citations identified within reviewed articles were included if felt to be of relevance to our topic. Specific selection and exclusion criteria of included literature were not implemented for the purposes of our narrative review.

## Review

### Primary Literature Limitations

Despite a significant body of cost comparison literature by multiple investigators in numerous health systems, there are

ongoing concerns regarding the quality, reproducibility, and utility of this information throughout the world.<sup>11,12</sup> First, the concept that all dialysis modalities are equal in efficacy and safety has limitations which affects how we compare their cost to society. These studies are largely observational, as very few randomized control trials have been conducted.<sup>16</sup> Patient populations starting either in-center HD, PD, or home HD may have inherent differences at baseline that are difficult to adjust for such as patient motivation for self-care and support networks which may affect these results. For example, there may be a mortality benefit for young, motivated patients on home dialysis, and there may be harm associated with women more than 65 years old with diabetes on PD.<sup>9,17</sup> It is important to recognize the limitations in our current knowledge of the efficacy between dialysis modalities and understand that outcome comparisons, and thus cost comparisons, may evolve as we expand the patient populations receiving each modality.

Another limitation to consider is the heterogeneity between cost comparison studies in the literature. Although many studies have been conducted, there are inherent differences between them, particularly the types of costing inputs included in their analyses.<sup>7</sup> Dialysis costs have been described as including direct medical costs, direct nonmedical costs, indirect costs, and intangible costs.<sup>11</sup> Direct medical costs are regularly compared between modalities, and costs such as infrastructure, overhead, and indirect costs to the patient are often overlooked. This limits our ability to generalize the true cost differences between modalities to other jurisdictions.

Ultimately, many economic assessments have shown a cost savings to delivering dialysis through home-based modalities within most health care systems.<sup>6</sup> However, there are obvious limitations within these studies and they are difficult to reciprocate among different health economies. Canadian researchers have conducted careful local reviews of their own economic data which have supported the perceived cost advantages of home dialysis.<sup>4,5,9,18</sup> It is our opinion that enough evidence exists for health payers to consider policy changes which aim to increase rates of home dialysis. A “Home Dialysis First” policy should be considered once a locally conducted economic assessment has determined a clear cost benefit.

### *Cost Differences Throughout the World*

International discrepancies have led to controversy regarding the true cost effectiveness of home modalities, particularly in developing nations.<sup>6,7,11</sup> A systematic review by Karopadi et al<sup>6</sup> included 48 countries and found the cost of in-center HD between 1.25 and 2.35 times the cost of PD in 22 countries (17 developed), between 0.90 and 1.25 times in 15 countries (13 developing), and between 0.22 and 0.90 in 9 countries (8 developing). They concluded that most developed nations can provide PD at a lesser cost than in-center

HD. The lack of cost benefit with PD seen with certain developing nations is explained by multiple factors. Some developing nations have lower labor costs for staff providing in-center HD, and they have high import costs on PD equipment and solutions.<sup>7</sup> There is also a concern that developing nation cost comparisons have not accounted for the direct nonmedical costs associated with in-center HD, therefore artificially lowering the perceived costs required to provide this service.<sup>11</sup>

The uptake of PD has been highly variable in North America as the proportion of PD in Mexico, Canada, and the United States is 75%, 19%, and 8%, respectively.<sup>14</sup> Government policy and local pricing has likely been the biggest driver in uptake of PD, or lack thereof. Governments have implemented policies to improve cost of PD supplies (India, Nepal, Malaysia),<sup>6</sup> and others have adopted true “PD First” policies including Thailand and Hong Kong where patients are obliged to do PD unless certain criteria are met.<sup>13,19</sup> Thailand prioritized the implementation of a publicly funded dialysis program in their country by mandating eligible patients receive PD.<sup>20,21</sup> Prior to the introduction of this publicly funded program, patients were required to seek privately funded dialysis or not receive therapy.<sup>13</sup> Although beyond the scope of this discussion, many reports regarding the evaluation of home modalities in nations across the world have been published.<sup>19,22-24</sup>

Overall, the current literature has identified a clear cost benefit for home dialysis within the developed world. In Canada, this has been corroborated by previous economic reviews<sup>5,9</sup> and recently modeled by a Canadian province.<sup>4</sup> In the developing world, home dialysis is not yet the clear cost-effective option. Given the lack of generalizability between studies and the concern for unsatisfactory cost analyses in some developing nations, it is difficult to conclude which modality is costlier within each country. Developing nations have a responsibility to review the medical therapies they implement within the context of their existing societal needs. The nations that do have the ability to provide dialysis should pursue the most cost-effective programs to provide as many of their eligible citizens with dialysis as possible. PD and home HD may be attractive forms of dialysis for developing economies with limited infrastructure and high proportions of rural and remote citizens, although in some jurisdictions with inexpensive labor and high cost of producing consumables the economics may differ. Efforts should be made to ensure that government policies are implemented to eliminate the barriers to cost-effective PD and ensure these cost savings can be met.

### *Indirect Costs to Patients*

The indirect costs to patients on home dialysis can be a barrier to implementation.<sup>9</sup> These include costs for utilities such as water and energy to operate home HD equipment, as well as potential requirements to improve home infrastructure

such as plumbing and electrical. A recent simulated assessment of annual utility costs for home HD patients in Edmonton, Canada estimated that patients pay approximately CA\$420 to CA\$1269 for water and electricity per year depending on their HD prescription.<sup>25</sup> For in-center HD, transportation to and from treatments is the largest indirect patient cost identified.<sup>9</sup> Additionally, in-center HD often results in decreased home or work productivity, whereas home modalities preserve this more often. However, home modalities can decrease work productivity of a caregiver if their services are required. Economic assessments from the perspective of society or the health payer often leave out these indirect costs when evaluating dialysis modalities.<sup>11</sup> From the perspective of a patient, these costs can be a major barrier to implementation. If a patient cannot afford the indirect costs required to begin home dialysis, should the government lose the opportunity to pay for a cheaper, equally effective therapy?

The Kidney Foundation of Canada recently conducted and published a survey of kidney failure patients regarding their costs associated with dialysis.<sup>26</sup> They found that the annual average out-of-pocket costs were CA\$1400 to CA\$2500 for all-comers, and respondents on frequent home HD with a conventional machine indicated that electricity and water costs totaled CA\$1152 annually on average. This is significant given that 44% of kidney failure patients are below the Canadian Low-Income Cut-off (LICO), compared with the national average of 8% to 14%. In particular, 47% of patients on in-center HD are below LICO, compared with only 22% of home HD patients. The high rate of low-income users on in-center HD may represent an economic barrier to home modalities, among other possibilities.

The governments in two Canadian provinces (Manitoba and Ontario) have implemented financial reimbursement for utility costs associated with home dialysis.<sup>26</sup> Financial reimbursement programs for patients on home dialysis have been implemented in Australia as well.<sup>27</sup> Given the savings associated with offering home dialysis to eligible patients, it should be considered advantageous to reimburse patients for upfront utility costs and infrastructure expenses which would have typically become a barrier to implementation. Even with these reimbursements, home modalities remain substantially less costly than in-center HD.

### *Training Costs and Early Modality Switching*

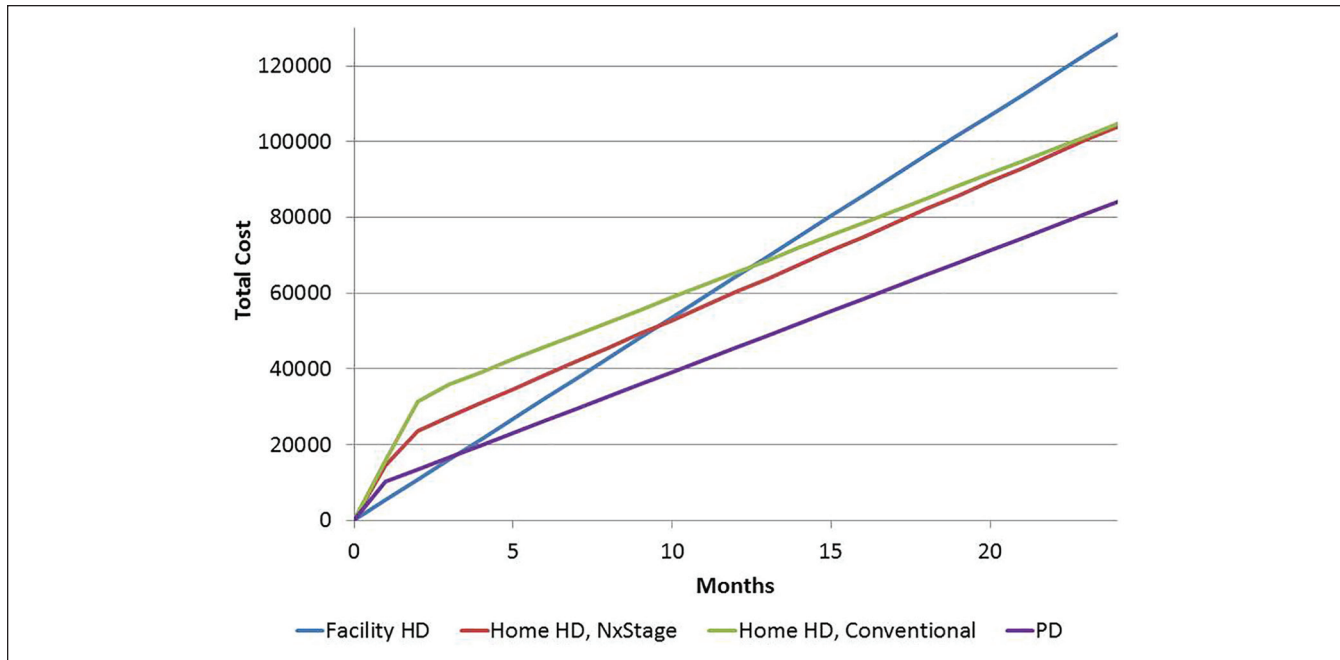
Patients starting home dialysis incur upfront training costs. These costs are recovered over time, leading to an overall cost savings from home dialysis.<sup>4</sup> However, up to 40% of patients switch dialysis modalities throughout their lifetime.<sup>28,29</sup> Some patients may have modality failure and switch from home dialysis to in-center HD soon after onset. Alternatively, patients may receive a living kidney donor shortly after beginning home dialysis. A “Home Dialysis First” policy may increase the overall rates of modality

failure and switching, due to expansion of the target patient population. Given the upfront costs of home dialysis training, it is important to recognize the implications of modality switching on cost savings overall and how this may be interpreted as a barrier to the cost effectiveness of a “Home Dialysis First” policy.

Multiple reviews have concluded that the cost savings of PD and home HD often persist despite modality switching. Klarenbach et al<sup>5</sup> demonstrated the decreasing costs of home modalities in the second year following initial training costs and concluded that patients who failed PD requiring a transition to in-center HD still observed a cost benefit. An analysis of a subset of dialysis starts from United States Renal Data System (USRDS) Medicare expenditures in 2004 showed that patients who started PD and switched to in-center HD still had a statistically significant cost savings compared with patients who started with in-center HD.<sup>30</sup> The recent Manitoba, Canada cost model calculated the required time on each modality to begin seeing cost savings.<sup>4</sup> As described, the threshold point to achieve cost neutrality in comparison with in-center HD was determined to be 9.7 months for home HD with NxStage and 3.2 months for PD (Figure 1). CADTH, while accounting for upfront incurred training costs, identified a cost savings potential through all combinations of home modalities over in-center HD, except for full-time assisted in-center PD.<sup>9</sup>

Canadian Agency for Drugs and Technologies in Health acknowledged that there is a lack of high-quality data evaluating the cost of assisted PD. Based on the 2016/2017 Chronic Kidney Disease Amalgamated Funding Guideline in Ontario, Canada, the cost ratio for assisted PD in comparison with in-center HD was 1.15.<sup>31</sup> Additionally, data from a retrospective study out of France found that the annual cost ratio for assisted PD in comparison with in-center HD was 0.94.<sup>32</sup> However, CADTH concluded that assisted PD delivered in a noncontinuous fashion, such as during times of illness, respite, or initiation of dialysis, may have cost savings over full-time in-center HD.<sup>9</sup> The conclusions surrounding the costs of continuous and noncontinuous assisted PD are not strong and require further investigation.

The literature above supports the notion that incident PD remains cost effective even if patients require a premature transition to in-center HD, and incident home HD will become cost effective over time due to the higher training costs. Patients who spend a fraction of their dialysis time on home modalities will likely still contribute cost savings to the overall system. Based on this information, it is reasonable to promote a “Home Dialysis First” policy for new dialysis starts for patients who are medically eligible for these modalities. There should be minimal concern from health care providers regarding the expected length of time on PD to ensure cost benefit, whereas the initiation of home HD may require a closer evaluation of expected duration. Further research on the cost effectiveness of continuous and noncontinuous assisted PD programs is needed. Overall, upfront



**Figure 1.** Time on therapy required to achieve cost savings.  
 Note. HD = home dialysis; PD = peritoneal dialysis.

initiation of home modalities will likely equate to a lower lifetime cost in comparison with in-center HD and will provide a societal financial benefit.

### Physician Financial Incentives and Program Funding

Implementing a “Home Dialysis First” policy for purposes of reducing health care spending is a disruptive policy requiring significant change management. Just et al<sup>11</sup> concluded that policy changes reflecting facility or physician financial reimbursement have been the biggest nonmedical drivers of dialysis modality choice globally. Thailand implemented a “PD First” policy with a 4-pronged approach that led to a high proportion of eligible patients on PD.<sup>20,21</sup> Similar examples have been demonstrated in Hong Kong and Mexico.<sup>13,29</sup> The opposite has been true in Japan, where fee-for-service of hospital-based therapies led to 96% of patients with kidney failure on in-center HD by 2006.<sup>33</sup> Changes to the US Medicare kidney failure reimbursement system has led to increased uptake in home modalities.<sup>2,34</sup> A Canadian province, Ontario, introduced a capitation fee to equalize dialysis reimbursements independent of modality choice.<sup>35</sup> Although the rate of decline of PD slowed, this did not increase rates as expected. In response to the growing demand of kidney failure and stretching of the current in-center HD resources, they attempted a PD expansion program.<sup>15</sup> Their committee implemented a multipronged approach without altering physician reimbursement further. They did not achieve their original target of 30% PD use by

2010; however, Ontario’s rates of home dialysis increased from 21.6% in 2012 to 26.1% in 2017, almost entirely due to a rise in PD.<sup>35</sup> A time series analysis awaiting publication out of Alberta, Canada reviewed the impact of introducing a dedicated PD billing code to fee-for-service physicians over 15 years, identifying no effect on the rate of initiation of home dialysis (B. Manns, personal communication, September 19, 2018)

In developed nations that provide home dialysis at a significantly reduced cost in comparison with in-center HD, it is necessary to consider all strategies that may increase uptake of these home modalities. Manns et al<sup>36</sup> recently published a review of the economic incentives for home dialysis. This report included a comprehensive literature review and conclusions from a workshop of experts within the field of home dialysis, health economics, and policymakers from multiple countries. They concluded that physician financial incentives are likely to have a minimal impact on home dialysis uptake, whereas funding models that incentivize dialysis providers are likely to have more success. However, they believe that nephrologist reimbursement should be equitable among all modalities.

The implementation of a physician financial incentive program for purposes of successfully implementing a “Home Dialysis First” policy is controversial. Previous attempts to equalize physician reimbursement between modalities have not been entirely successful and there is a lack of research on the impact of additional physician payment incentives. Although physicians are the prescriber of dialysis and key influencers in patient decision making, dialysis program

structures are key in modality uptake. Ensuring adequate program funding for modality education, training, support, and equipment, monitoring and body access at economies of scale may have more influence on improving home modality uptake than simply physician reimbursement.

### *The Cost of Freedom of Choice*

Economic responsibility and sustainability is an important part of any health care system, yet it is only one aspect of delivering appropriate patient care. Given the equal efficacy and quality-of-life data seen between in-center HD, PD, and home HD, it is tempting to create government policy that directs eligible patients to the cheapest modality.<sup>10,19-21</sup> A “Home Dialysis First” policy takes advantage of these economic benefits but reduces patient independence and choice. The Canadian Society of Nephrology (CSN) endorsed a position statement in 1997 from the Professional and Public Policy Committee of the CSN entitled “Principles of End-Stage Renal Disease Care.” One of the statements encouraged nephrologists to promote home-based nephrology care in suitable patients, yet also noted that patients should be able to choose which dialysis modality best suited their lifestyle.<sup>37</sup> A survey of Canadian nephrologists published in 2006 found that approximately 80% of respondents believed nephrologists should be promoting home dialysis but not making it mandatory, whereas approximately 20% of respondents believed suitable patients should be obligated to learn home dialysis.<sup>38</sup> There are many factors that influence a patient’s initial dialysis modality choice, independent of efficacy or cost. As a society, we need to determine what cost we are willing to pay for a patient’s freedom of choice.

The implementation of a true obligatory, “Home Dialysis First” policy would have a drastic effect on the way we deliver dialysis in Canada. The incidence of dialysis in Canada was more than 5400 in 2016,<sup>1</sup> and a prospective study in Canada and the United States in 2009 found that more than 85% of patients approaching kidney failure were PD candidates.<sup>39</sup> Neil et al<sup>40</sup> argued in 2009 that the United States could save US\$ 1.1 billion in Medicare costs over 5 years if PD use was increased from 7% to 15%.<sup>40</sup> A recently presented abstract at the 17th Congress for the International Society of Peritoneal Dialysis outlined the expected cost-utility and budget impact of increasing the incidence of PD in Canada from 20% to 30%.<sup>41</sup> Evaluations were based on Canadian Organ Replacement Register (CORR) data from 2004 to 2013, and costs were estimated based on current dialysis practice in Canada. This model predicted that an increase in PD from 20% to 30% would lead to a 10-year cost savings of CA\$123 000 000 (CA\$34 000 per additional PD patient). With these estimates, it is reasonable to assume that a “Home Dialysis First” policy has the potential to create significant cost savings. These cost savings could relieve the current in-center HD programs, prevent further need for investments in capital infrastructure and expansion

into rural and remote communities, and may redirect funding toward more cost-effective screening and prevention programs for CKD.

In contrast to the economic benefits of a “Home Dialysis First” policy, there is a prevailing school of thought among certain stakeholder groups in encouraging patient modality choice.<sup>9</sup> Each patient has unique reasons for preferring one modality over the other, the most important of which is the impact on their own lives and the lives of their caregivers. Although patients feel empowered when they are counseled to make an informed treatment decision, it is easy to recognize the challenges of fully understanding the intricacies of this decision and the impact it has on themselves, their family, and their society. It is important to note that a policy allowing unrestricted choice in the area of dialysis bears opportunity costs for patients in other aspects of kidney care such as access to certain medications, screening and prevention programs, and cost-effective treatments in other areas of the health system. Patients who are clinically and socially eligible for all modalities may choose in-center HD, the more expensive option in our current system. Based on the cost estimates outlined above, we must acknowledge the large portion of health care spending that may be lost if we prioritize patient choice by withholding implementation of a “Home Dialysis First” policy.

### **Conclusion**

Implementation of a true “Home Dialysis First” policy would be a disruptive change to kidney failure care in Canada. A shift of this magnitude should be pursued only if there is clear evidence of improved quality of care, patient satisfaction, and societal cost savings. Patients, caregivers, clinicians, policymakers, data scientists, health economists, industry members, and payers should all be part of this important conversation. There are many facets to this proposed policy that require ongoing discussion. In this article, we have introduced and discussed some of the major controversies surrounding the cost effectiveness of a true “Home Dialysis First” policy. To make informed policy decisions, we should recognize the cost savings associated with home dialysis in developed nations, the significance of patient-borne costs as a barrier to implementation, the impact of training costs and early modality switching in home dialysis, the lack of evidence regarding physician financial incentives, and the importance of program funding. Ultimately, we must consider the societal value of freedom of patient modality choice in comparison with the potential cost savings of a “Home Dialysis First” policy. Extensive stakeholder engagement will need to drive priorities in creating sustainable comprehensive kidney health care.

### **Ethics Approval and Consent to Participate**

No ethics approval or consent to participate was sought for this narrative review.

## Consent for Publication

No consent for publication was sought for this narrative review.

## Availability of Data and Materials

All data was collected via literature review and discussions with experts in the field of home dialysis.


## Declaration of Conflicting Interests

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