

Original Article

A prospective evaluation of renal replacement therapy modality eligibility

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Abstract

Background. Patient eligibility for renal replacement therapy (RRT) modalities is frequently debated, but little prospective data are available from large patient cohorts.

Methods. We prospectively evaluated medical and psychosocial eligibility for the three RRT modalities in patients with chronic kidney disease (CKD) stages III–V who were enrolled in an ongoing prospective cohort study conducted at seven North American nephrology practices.

Results. Ninety-eight percent of patients were considered medically eligible for haemodialysis (HD), 87% of patients were assessed as medically eligible for peritoneal dialysis (PD) and 54% of patients were judged medically eligible for transplant. Age was the leading cause of non-eligibility for both PD and transplant. Anatomical concerns (adhesions, hernias) were the second most frequent concern for PD eligibility followed by weight. Weight was also a concern for transplant eligibility. The proportion of patients medically eligible for RRT did not vary by CKD stage. There was, however, significant inter-centre variation in the proportion of patients medically eligible for PD and transplant. Ninety-five percent of patients were considered psychosocially eligible for HD, 83% of patients were assessed as psychosocially eligible for PD and 71% of patients were judged psychosocially eligible for transplant. The percentage of patients who were assessed as having neither medical nor psychosocial contraindications for RRT was 95% for HD, 78% for PD and 53% for transplant.

Conclusions. Most CKD patients are considered by their medical care providers to be suitable for PD. Enhanced patient education, promotion of home dialysis for suitable patients and empowerment of patient choice are expected to augment growth of home dialysis modalities.

Keywords: eligibility; haemodialysis; peritoneal dialysis; transplantation

Introduction

Several renal replacement therapy (RRT) modalities are available for the treatment of end-stage renal disease (ESRD). Most experts agree that kidney transplantation is the modality of choice for suitable patients. However, lack of organ availability, increasing patient age and the burden of comorbid diseases limit transplantation as an option for most ESRD patients. The relative use of dialytic modalities shows substantial variability among countries and centres [1], suggesting a strong influence of non-medical factors [2,3]. Definitive evidence-based recommendations about modality eligibility cannot be made because of the paucity of data. Furthermore, there is no clear consensus about modality eligibility criteria or information about variances in eligibility determinations in practice.

Evidence from North America suggests that only a small percentage of suitable patients are being treated with home-based dialysis modalities. Surveys have shown that nephrologists in both Canada and the United States believe that an optimal modality distribution would include 45–55% of patients on home dialysis [4,5]. Most nephrologists agree that patients with chronic kidney disease (CKD) should be referred early to a nephrologist and receive comprehensive modality education, and that informed patient choice should then guide modality decisions. However, it is also recognized that this goal is frequently not met [6]. Many questions remain, however, about the pool of patients suitable for home dialysis, and insight into the evaluative process of eligibility by medical care providers is limited.

While eligibility for RRT modalities has been frequently debated, little prospective data are available from large patient cohorts [7,8]. Most published data is *post hoc* in patients who have already initiated dialysis; non-eligibility was determined retrospectively or the methods of

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determination were not clearly defined. Furthermore, regional variations in reasons for eligibility have been identified [7,9]. The most common approach has been to identify reasons for selection of a particular modality, rather than specific examination of the medical and psychosocial eligibility factors, likely because of the recognition that non-medical factors play an important role in decision making [10–17]. Guideline committees have defined absolute and relative contraindications by consensus, but the relative prevalence of these conditions has not been explored empirically [18,19]. We reasoned that a prospective evaluation of patients in CKD stages III–V using a common non-eligibility template would allow a proper assessment of the prevalence of non-eligibility factors. Such quantification could guide efforts to enhance patient empowerment and participation in modality choice.

Methods

The CKD RenalSoft Informatics Observational Study (CRIOS) is a prospective cohort evaluation study exploring the value of ongoing data analysis and reporting for enhancement of patient care. After local Research Ethics Board approval was obtained, subjects signed informed consent to allow clinical and laboratory data to be entered into the software application. Eligibility for study entry included CKD stages I–V, age >18 years, and ability to provide informed consent. Subjects at each site were identified and approached for study entry by the principal and/or co-investigators in a non-random fashion between January 2003 and December 2006. Subjects were followed at regular intervals as dictated by their stage of kidney disease and the standard of care in the outpatient clinic setting in which they were enrolled. In addition to the clinical and laboratory data collected, a battery of other evaluations including modality education, modality eligibility and patient reported outcomes (quality of life indicators) were measured. Monthly registry-wide and centre-specific summary reports were generated and distributed to participating centres preserving both patient and centre anonymity (except for the receiving centre for the latter).

To gain insight into the prevalence of medical ineligibility, we prospectively evaluated medical and psychosocial eligibility for the three RRT modalities in 1303 CKD patients stages III–V enrolled in the seven participating North American nephrology practices. Only subjects who had their eligibility assessed for all three modalities were included in this analysis. The centres in the US were Brigham and Women's Hospital, Boston, MA, Metabolism Associates, New Haven, CT, Mid-Atlantic Nephrology Associates, Baltimore, MD and Nephrology Associates, Birmingham, AL. In Canada, the centres were Humber River Regional Hospital, Toronto, ON, Royal Victoria Hospital, Montreal, QU and Queen Elizabeth Health Science Centre, Halifax, NS. Patients were evaluated by their attending nephrologists and other members of the renal team, and specific causes for non-eligibility were captured in predefined structured categories in the software that had been developed based on relevant literature. No *a priori* eligibility guidelines were developed or discussed for this evaluation,

and the determination of eligibility was based on the judgment of the managing clinical team and notably, not from the patient's perspective. Information from the various centres was uploaded to a central registry after removal of specific patient identifiers and analysis undertaken to explore the entire cohort, as well as each individual centre. Confidence intervals for a proportion were calculated according to two methods described by Newcombe [20]. Differences between groups were compared by the chi-square test.

Results

Patient characteristics

Patient characteristics at the time of the eligibility evaluations are shown in Table 1. Patients in this study were analogous in their profile to patients starting renal replacement therapy in their respective countries, including advanced age and a high prevalence of diabetes mellitus. The similarity to the RRT population suggests good representation of the study sample. The biochemical profile of these patients is shown in Table 2.

Centre characteristics

Centre characteristics are shown in Table 3. Canadian centres had higher PD incidence rates during 2006 and higher PD prevalence rates on 31 December 2006, except for New Haven, which had the highest rates. The number of patients enrolled in the study by centre ranged from 53 to 329.

Medical eligibility

Medical eligibility for haemodialysis (HD) Ninety-eight percent of patients [95% confidence interval (CI): 97.4–98.8%] were assessed as medically eligible for HD (Figure 1). The percentage of patients eligible for HD did not vary by CKD stage or study centre (range: 96–100%). The causes of non-eligibility for 19 of the patients included advanced age (mean 82, range 76–86 years), terminal illness, cardiovascular instability (congestive heart failure) and extensive vascular disease.

Medical eligibility for peritoneal dialysis (PD) Eighty-seven percent of patients (95% CI: 85.0–88.6%) were considered medically eligible for PD (Figure 1). The causes of ineligibility for PD are shown in Table 4. Age was the leading cause of non-eligibility with ineligible patients being significantly older than eligible patients (78.7 ± 0.8 versus 65.5 ± 0.4 years, respectively, $P < 0.0001$), although there was overlap in the age ranges of the two groups (68–86 years versus 19–87 years). Anatomical issues (adhesions, hernias) were the second most frequent concern followed by weight. Ineligible patients had a significantly larger body mass than eligible patients (117.9 ± 4.8 versus 83.6 ± 0.7 kg, $P < 0.0001$), although there was overlap in the weight ranges of the two groups (73–157.9 kg versus 35–223 kg).

The proportion of patients medically eligible for PD did not vary based on CKD stage. There was, however, significant inter-centre variation in the proportion of patients

Table 1. Overall demographics of evaluated patients

| Parameter | | CKD stage | | | |
|-------------------|----------------------------|-----------|-------|-------|-------|
| | | All | III | IV | V |
| Age (years) | <i>N</i> | 1303 | 352 | 565 | 386 |
| | Mean | 65.9 | 65.1 | 67.6 | 64.1 |
| | SE | 0.4 | 0.8 | 0.5 | 0.7 |
| | Range | 19–87 | 21–86 | 19–87 | 19–87 |
| Gender (%) | Male | 57.0 | 60.8 | 57.5 | 52.8 |
| | Female | 43.0 | 39.2 | 42.5 | 47.2 |
| Race (%) | White | 70.9 | 72.4 | 72.2 | 67.6 |
| | Black | 12.6 | 13.9 | 10.1 | 15.0 |
| | Asian/Indian/Filipino | 1.9 | 2.3 | 1.4 | 2.3 |
| | Other/multiracial | 2.2 | 1.7 | 1.9 | 3.1 |
| | Missing | 12.3 | 9.7 | 14.2 | 11.9 |
| Diabetes (%) | Diabetes | 47.4 | 44.0 | 48.3 | 49.2 |
| CKD aetiology (%) | Diabetes | 30.0 | 25.3 | 30.3 | 33.9 |
| | Hypertension/large vessel | 27.5 | 31.8 | 26.7 | 24.6 |
| | Glomerulonephritis | 11.6 | 12.2 | 10.8 | 12.2 |
| | Interstitial nephritis | 3.1 | 2.8 | 3.2 | 3.1 |
| | Cystic/congenital diseases | 7.1 | 6.8 | 5.8 | 9.3 |
| | Miscellaneous conditions | 19.1 | 19.9 | 21.8 | 14.2 |
| | Missing | 1.2 | 0.9 | 0.9 | 2.1 |

Table 2. Overall biochemical profiles of evaluated patients

| Parameter | | CKD stage | | | |
|--------------------|----------|-----------|------|------|------|
| | | All | III | IV | V |
| GFR (mL/min) | <i>N</i> | 1303 | 352 | 565 | 386 |
| | Mean | 23.5 | 40.4 | 22.2 | 10.1 |
| | SE | 0.3 | 0.4 | 0.2 | 0.2 |
| | | | | | |
| BUN (mg/dL) | <i>N</i> | 1262 | 345 | 547 | 370 |
| | Mean | 52.0 | 32.1 | 52.8 | 69.4 |
| | SE | 0.9 | 0.7 | 1.7 | 1.3 |
| Creatinine (mg/dL) | <i>N</i> | 1303 | 352 | 565 | 386 |
| | Mean | 3.6 | 1.7 | 2.9 | 6.3 |
| | SE | 0.1 | 0.0 | 0.0 | 0.3 |
| Calcium (mg/dL) | <i>N</i> | 1284 | 344 | 558 | 382 |
| | Mean | 9.2 | 9.3 | 9.2 | 8.9 |
| | SE | 0.0 | 0.0 | 0.0 | 0.0 |
| Phosphate (mg/dL) | <i>N</i> | 1192 | 297 | 527 | 368 |
| | Mean | 4.2 | 3.6 | 4.0 | 5.1 |
| | SE | 0.0 | 0.0 | 0.0 | 0.1 |
| Albumin (g/dL) | <i>N</i> | 1250 | 334 | 538 | 378 |
| | Mean | 37.4 | 39.0 | 37.6 | 35.7 |
| | SE | 0.1 | 0.2 | 0.2 | 0.3 |
| Haemoglobin (g/dL) | <i>N</i> | 1287 | 342 | 560 | 385 |
| | Mean | 12.0 | 12.8 | 12.0 | 11.4 |
| | SE | 0.0 | 0.1 | 0.1 | 0.1 |

GFR was estimated using the simplified MDRD formula.

considered medically eligible for PD (range 71.9–98.1%). The two centres with the lowest proportion of eligible patients (71.9% and 75.4%) appeared to more often exclude patients for age (38.9% and 29.4% of causes of ineligibility) than centres with high eligibility. In the two centres with lowest eligibility, the mean ages of the evaluated populations (66.2 and 65.7 years) and the age ranges (21–86 and 28–86 years) did not differ from corresponding values in the high eligibility centres.

Medical eligibility for transplant Fifty-four percent of patients (95% CI: 51.4–56.8%) were judged medically eligi-

Table 3. Centre PD incidence (2006) and prevalence (31 December 2006) rates

| Centre | Incidence (%) | Prevalence (%) |
|------------|---------------|----------------|
| Halifax | 22 | 18 |
| Montreal | 20 | 17 |
| Toronto | 26 | 14 |
| Baltimore | 5 | 5 |
| Birmingham | 11 | 5.6 |
| Boston | 18 | 13 |
| New Haven | 35 | 23 |

ble for transplant (Figure 1). The causes of ineligibility for transplant are shown in Table 5. Age was the leading cause of ineligibility, with ineligible patients being significantly older than eligible patients (77.0 ± 0.3 versus 58.9 ± 0.5 years, respectively, $P < 0.0001$). Patients considered ineligible for transplant also had a significantly larger body mass than eligible patients (135.8 ± 7.0 versus 85.5 ± 0.9 kg, respectively, $P < 0.0001$).

The proportion of patients medically eligible for transplant did not vary based on CKD stage. There was, however, significant inter-centre variation in the proportion of patients considered medically eligible for transplant (range 38–77.4%). Age was the predominant cause of ineligibility, and it did appear to account for some of the inter-centre variability. In the two centres with the lowest eligibility (38.4% and 45.2%), age was the reason for ineligibility in 82.1% and 70% of cases, while in the other centres age accounted for 33.3%, 52.7%, 69.6%, 75% and 84.5% of the cases.

Psychosocial eligibility

Psychosocial eligibility for HD Ninety-five percent of patients (95% CI: 93.5–95.9%) were assessed as psychosocially eligible for HD (Figure 2). Patient-centric factors accounted for more than two-thirds of causes of

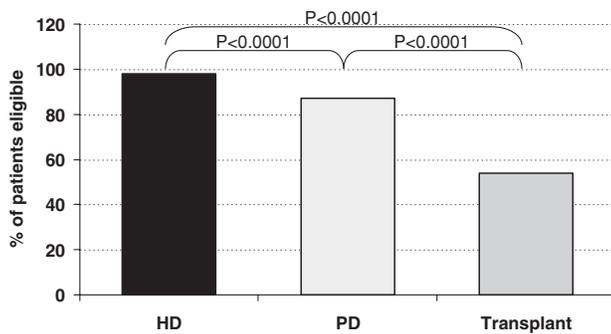


Fig. 1. Medical eligibility for the three RRT modalities.

Table 4. Causes of medical non-eligibility for PD

| | |
|--|------------|
| Number not eligible | 170 |
| Age | 33 (19.4%) |
| Extensive abdominal adhesions/multiple surgeries | 26 (15.3%) |
| Morbid obesity | 20 (11.8%) |
| Uncorrected hernias | 18 (10.6%) |
| Terminal illness | 14 (8.2%) |
| Inflammatory or ischaemic bowel disease | 14 (8.2%) |
| History of noncompliance | 8 (4.7%) |
| Multiple abdominal surgeries | 7 (4.1%) |
| Colostomy | 6 (3.5%) |
| Uncontrolled diabetes mellitus | 6 (3.5%) |
| Lumbar disc problem | 4 (2.4%) |
| Massive polycystic kidneys | 4 (2.4%) |
| Severe pulmonary disease | 4 (2.4%) |
| Obese abdomen | 2 (1.2%) |
| Extensive diverticulitis | 1 (0.6%) |
| Fresh intra-abdominal foreign body | 1 (0.6%) |
| Modality selected was not available | 1 (0.6%) |
| Severe malnutrition | 1 (0.6%) |

Table 5. Causes of medical non-eligibility for transplant

| | |
|-----------------------|-------------|
| Number not eligible | 596 |
| Age | 394 (66.1%) |
| Cardiac disease | 70 (11.7%) |
| Multisystem disorders | 45 (7.6%) |
| Malignancy | 21 (3.5%) |
| Obesity | 11 (1.8%) |
| Terminal illness | 8 (1.3%) |
| Other | 47 (7.9%) |

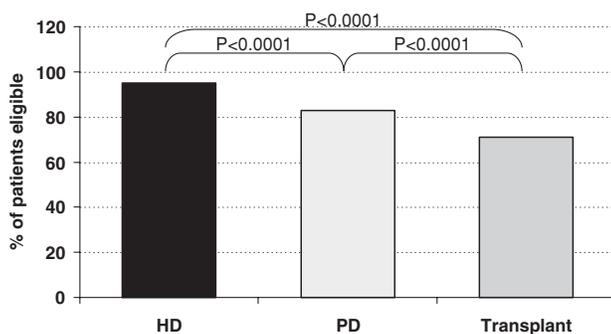


Fig. 2. Psychosocial eligibility for the three RRT modalities.

ineligibility (for example, strong preference against HD, request for conservative therapy) (Table 5). Causes unique to the procedure, such as fear of needles, are difficult to assess because they were rare. The proportion of patients who were psychosocially eligible for HD did not vary based on CKD stage. The small number of patients considered psychosocially ineligible for HD did not allow for an evaluation of inter-centre variability.

Psychosocial eligibility for PD Eighty-three percent of patients (95% CI: 81.1–85.2%) were considered psychosocially eligible for PD (Figure 2). The odds ratio for a patient being considered eligible for HD versus being judged eligible for PD was 10.86 ($P < 0.0001$). Patient-centric factors accounted for more than two-thirds of causes of ineligibility (for example, strong preference against PD, family opinion and responsibilities) (Table 6).

The proportion of patients who were considered psychosocially eligible for PD did not vary based on CKD stage and tended to parallel the medical evaluation. The two centres with the highest medical eligibility for PD also had the highest psychosocial eligibility. The centre with the lowest medical eligibility had the second lowest psychosocial eligibility. There also was significant inter-centre variability in the specific causes of psychosocial non-eligibility.

Psychosocial eligibility for transplant Seventy-one percent of patients (95% CI: 68.3–73.2%) were judged psychosocially eligible for transplant (Figure 2). The odds ratio for a patient being considered eligible for HD versus being judged eligible for transplant was 6.46 ($P < 0.0001$). The odds ratio for a patient being considered eligible for PD versus being judged eligible for transplant was 5.63 ($P < 0.0001$). Patient-centric factors accounted for >75% of causes of ineligibility (for example, strong preference against transplant, choice of conservative management) (Table 5).

The proportion of patients who were considered psychosocially eligible for transplant did not vary based on CKD stage and exceeded the proportion judged medically eligible in six centres (equal proportion in one centre). There was wide inter-centre variability in psychosocial eligibility for transplant as well as in the detailed causes for non-eligibility.

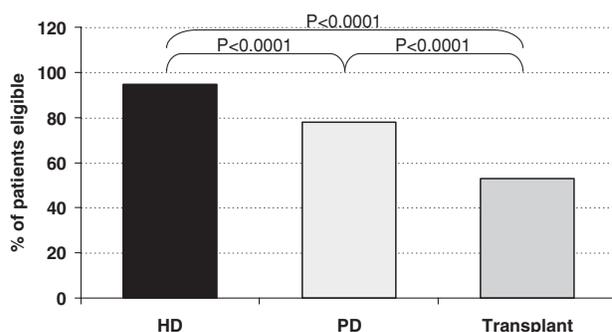
Overall eligibility

Overall eligibility was defined as the percentage of patients who were judged as both medically and psychosocially eligible. For HD, overall eligibility was 94.6% (95% CI: 93.1–95.6%), for PD it was 78% (95% CI: 75.6–80.1%) and for transplant 53% (95% CI: 50.2–55.7%). The odds ratio for a patient being considered overall eligible for HD versus being assessed as overall eligible for PD was 6.22 ($P < 0.0001$). The odds ratio for a patient being considered overall eligible for HD versus being judged overall eligible for transplant was 4.55 ($P < 0.0001$). The odds ratio for a patient being assessed as overall eligible for PD versus being considered overall eligible for transplant was 3.98 ($P < 0.0001$).

Table 6. Causes of psychosocial non-eligibility for all three modalities

| | HD | PD | Transplant |
|------------------------------------|------------|-------------|-------------|
| Number not eligible | 67 | 217 | 377 |
| Strong preference against | 40 (59.7%) | 123 (56.7%) | 265 (70.3%) |
| Request for conservative therapy | 10 (14.9%) | 8 (3.7%) | 30 (8.0%) |
| Expected longevity | 7 (10.4%) | 8 (3.7%) | – |
| Age | 3 (4.5%) | 16 (7.4%) | – |
| Dementia/psychiatric/psychological | 2 (3.0%) | 8 (3.7%) | 34 (9.0%) |
| Family does not want | 1 (1.5%) | 16 (7.4%) | – |
| Behavioural/compliance issues | 1 (1.5%) | 14 (6.5%) | 10 (2.7%) |
| Cultural/religious issues | 1 (1.5%) | 2 (0.9%) | 1 (0.3%) |
| Distance from centre | 1 (1.5%) | NA | NA |
| Fear of needles | 1 (1.5%) | NA | NA |
| Fear of surgery | NA | NA | 2 (0.5%) |
| Fear of medication side effects | NA | NA | 2 (0.6%) |
| Lack of motivation | NA | – | 3 (0.8%) |
| Lack of support | – | 18 (8.3%) | – |
| Family responsibilities | – | 3 (1.4%) | – |
| Work up too complex | NA | NA | 14 (3.7%) |
| Other/unknown | 0 (0%) | 1 (0.5%) | 1 (4.2%) |

NA: not applicable.

**Fig. 3.** Overall eligibility for the three RRT modalities.

For each RRT, overall eligibility was lower than either medical or psychosocial eligibility (Figure 3), but the number of overall non-eligible patients was always lower than the sum of medical and psychosocial non-eligible assessed patients because some patients had both medical and psychosocial non-eligibility. No discernible inter-centre variability was observed for overall HD eligibility. As expected, the inter-centre variability for medical and psychosocial eligibilities for PD and transplant were reflected in the inter-centre variability of overall eligibility.

Overall eligibility for HD by centre ranged from 93% to 100%, and US centres rated more patients eligible (96.6%), compared to Canadian centres (93.0%). This difference is statistically significant ($P = 0.0040$). Similarly, for PD, overall eligibility by centre ranged from 58.1% to 92.7%, and US centres rated more patients eligible (82.1%) compared to Canadian centres (74.9%). This difference is also statistically significant ($P = 0.0021$). Overall eligibility for transplant by centre ranged from 39.3% to 78.8%, and US centres rated more patients eligible (55.8%), compared to Canadian centres (50.9%). This difference is not statistically significant ($P = 0.0794$).

Discussion

The present study examined the determination of eligibility of patients with CKD stages III–V for the various modalities of renal replacement. Ninety-eight percent of patients were judged medically eligible for HD, 87% of patients were considered medically eligible for PD and 54% of patients were assessed as medically eligible for transplant. There was, however, significant inter-centre variation in the proportion of patients considered medically eligible for PD and transplant. Ninety-five percent of patients were judged psychosocially eligible for HD, 83% of patients were assessed as psychosocially eligible for PD and 71% of patients were considered psychosocially eligible for transplant. Patient-centric factors were predominant causes of ineligibility for PD and transplant. Overall eligibility for HD was 94.6%, for PD was 78% and for transplant 53%.

Each clinical team specifically evaluated medical eligibility, psychosocial eligibility and overall eligibility. For all three categories, patients were overwhelmingly judged to be eligible for HD. Eligibility for PD was affected by demographic factors as well as anatomical issues of the peritoneum. With respect to anatomical issues, inflammatory bowel disease was identified as a reason for non-eligibility for PD in 14 of 1303 patients (1074 cases per 100 000). This prevalence is higher than the corresponding prevalence in the general population in the USA (408 cases per 100 000) and in Canada (368 cases per 100 000) [21]. Hernia as a cause of ineligibility for PD was identified in 18 of 1303 patients, a prevalence lower than that in the general population in the USA (13.9% in men and 2.1% in women) [22]. This is a reversible cause, as correction of a hernia prior to initiation of PD would make this modality feasible. Similarly, anatomical concerns such as adhesions following extensive abdominal surgery are a presumptive cause that may be mitigated with the use of advanced laparoscopic techniques [23]. Polycystic kidney disease was considered as a cause of non-eligibility in only four patients, far lower than the prevalence of the condition in the general

population. This is consistent with secular trends in the overall population as the use of PD in patients with polycystic kidney disease is indeed higher than that for other aetiologies of ESRD [24], likely reflecting the younger age of these patients and the lower prevalence of comorbidities.

Like other studies, older age was associated with ineligibility for PD. Because the ESRD population in North America is growing older, it has frequently been cited as a factor in the decline of PD utilization. Indeed, patients on PD are considerably younger than those on HD [25,26]. However, surveys have shown that age *per se* is not a contraindication for PD; rather, the comorbidities and social conditions that accompany ageing make home dialysis more difficult [4,5]. The trend towards increased use of automation in therapy delivery may help reverse this trend [26,27]. An increased interest in assisted PD, which provides help at home for marginal and/or elderly patients [28–34], may also have a beneficial role. Whether this approach will prove to be a stimulus for PD growth, and whether it will be cost effective, remain unresolved at this time [35].

Three prior studies have evaluated dialysis modality eligibility and choice. Little and colleagues in the UK reported on 333 new patients, of whom 76% had no contraindications for any dialysis modality [7]. Jager *et al.* prospectively evaluated 1347 consecutive patients initiating dialysis in the Netherlands. Of note, 64% of patients had no contraindication to either PD or HD [9]. Older age was associated with more contraindications for PD and a stronger patient preference for HD. Similarly, Oliver *et al.* [30] recently reported a prospective non-randomized study comparing patients who were offered assisted home PD with a group who were not. Detailed information about modality eligibility was assessed for 134 patients. Amongst patients who were not offered assistance, 65% were suitable for home PD, while the offer of assistance increased the percentage to 80% [30]. Our study confirms in a large, multi-centre, North American cohort that a majority of new patients are eligible for home dialysis. A caveat on these findings, however, is that the proportions identified as eligible for any modality may be altered by the findings or exigencies of patient work-up, as is often the case in transplantation.

It is perhaps a surprise that US centres rated more patients eligible for PD than Canadian centres, given the much lower PD prevalence (total PD patients/total PD and HD patients) in the USA (7.6%) [1] compared to Canada (18.6%) [36]. Indeed, no US centre rated <67.2% of patients eligible for PD, despite a PD prevalence rate of <6% at two of the four American centres. Notwithstanding that New Haven had the highest percent of patients rated eligible for PD and the highest PD incidence and prevalence rates amongst the seven study sites, it does not appear that centres with more PD experience assess many more patients as being eligible. This is concordant with a previous survey which showed that low PD penetrance in the USA does not appear to be strongly influenced by nephrologists knowledge or bias [37].

Since our results indicate that a large proportion of patients are considered suitable for PD, what steps need to be taken to shift modality distribution? Firstly, early referral to a nephrologist is required. Efforts around eGFR being reported in Canada [38] and the USA [39–41] are ongoing and

are designed in part, to achieve this goal. Secondly, patients who are referred late must receive the same intensive education, even after they initiate HD, in order to identify suitable candidates for home therapy and to implement a conversion plan. Thirdly, Canada has a well-developed integrated system of multidisciplinary predialysis clinic care that is designed to provide education and to help promote early modality decisions [42]. Finally, Canadian nephrologists have endorsed an official Canadian Society of Nephrology policy that suitable patients should be encouraged, but not mandated, to choose home dialysis [43]. Unlike Canada, the CKD care system in the USA is much more fragmented and suboptimally funded. A system redesign that integrates and emphasizes CKD care at all stages is urgently required. Recent legislation has been passed by the US House of Representatives emphasizing patient education and providing funding impetus for home dialysis therapies. These efforts should be supported strongly by the medical community.

There are limitations inherent in the design and execution of the CRIOS study. The cohort was a convenience sample. Each centre determined its own criteria for subject inclusion, and its own procedures for carrying out each patient encounter. The characteristics of patients who refused to consent or who were not approached are not known. Failure to account for the information from patients not included in the study introduces biases that cannot be quantified or adjusted for in our analysis. Further, this analysis reports the assessment of eligibility by the medical team and does not include the patients' perspective. However, the strength of this study is that it involved a large number of patients from seven diverse North American sites, who were prospectively followed using an electronic database with a common assessment of end-points.

In summary, this large, prospective observational study was designed to look specifically at issues around suitability for RRT modalities. We showed that 78% of patients are considered suitable for PD, and believe that this result is generalizable across urban centres in North America. In order to continue to treat the epidemic of ESRD such that all patients who might benefit will receive access to high quality dialysis care, promotion of an optimal and cost-effective modality distribution will be increasingly required [44]. Our results support the care paradigm that early referral and appropriate modality education will identify a very large cohort of patients who are suitable for home dialysis. Promotion of home dialysis for suitable patients, and empowerment of patients to make informed therapy choices would be expected to lead to a major shift of dialysis modality distribution in Canada and in the USA [45]. Such an approach is both ethical and cost effective, and should serve as a foundation for public policy in ESRD care.

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Toronto, ON: David Mendelssohn MD; Royal Victoria Hospital, Montreal, QU: Tomoko Takano MD, Paul Barre MD; and Queen Elizabeth Health Science Centre, Halifax, NS: Steven Soroka MD.

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