Choosing the type of therapy best suited to their medical and social circumstances—whether dialysis, transplantation, or conservative therapy—is perhaps the most important decision for patients during their CKD journey. This decision carries major implications for patients and health systems alike. Although transplantation would be the ideal therapy for most patients, a scarcity of organs means that the vast majority of patients are treated with dialysis.

The decision as to what dialysis therapy to select is complex and involves several factors, primarily related to the patient, the provider, and the health care system.

Rates of home dialysis use vary widely between countries, with rates of peritoneal dialysis ranging from 7.4% in the United States to 74.1% in Hong Kong (1). Even across American states and Canadian provinces, there is a wide variation in use of peritoneal dialysis. For example, at 90 days after dialysis initiation, the proportion of patients in Canadian provinces treated with peritoneal dialysis varies from 19.8% to 36.1% (2).

In this issue of CJASN, Grace et al. examine the issue of socioeconomic differences in the uptake of home dialysis for 25,759 patients initiating dialysis in Australia between 2000 and 2011 (3). The importance of this study is that it examined barriers to use of peritoneal dialysis in a health care system that includes complementary public and private systems and because its results vary from the results of several past studies from other jurisdictions. The authors noted that patients from the quartile of the most disadvantaged income areas were less likely to initiate peritoneal dialysis (odds ratio, 0.63; 95% confidence interval, 0.58 to 0.69) for highest versus lowest income quartile) and instead were more likely to use in-center hemodialysis.

As expected, the authors noted 38% higher use of peritoneal dialysis in patients initiating dialysis outside a major city, 45% lower use in Caucasians, and that patients from the quartile of the most disadvantaged income areas were more likely to use private hospitals than those from the most advantaged quartile.

As with most other studies of this type, Grace et al. observed patient behavior in the setting of measurable health system and patient characteristics and inferred (based on association) potential barriers to use of home dialysis (3). On the basis of their analyses, Grace et al. suggest that the relatively low use of peritoneal dialysis, particularly among advantaged areas, is multifactorial. The results of this study differ from the results of a recent Canadian study (4) that identified barriers specific to patients with lower socioeconomic status (SES), but no overall difference in peritoneal dialysis use across SES strata. The findings of Grace et al. are also contrary to American studies that have documented greater use of peritoneal dialysis among those with higher income, or education, and those of white race (5–7), also suggesting variation in the drivers of home dialysis use across jurisdictions.

Is SES an independent predictor of modality choice in Australia? The authors refer to several unmeasured factors associated with SES that may confound its relationship with modality choice—most notable among these is geographic proximity to a major dialysis center. It seems reasonable to conclude that patients residing in more remote areas would face greater pressures to remain on home-based therapies than their counterparts in major urban centers. The study also identified an SES gradient for transplantation, with a qualitatively large separation between SES quartiles at 1 year. This raises the possibility that home therapies and transplantation compete for the same pool of patients, who might defer home dialysis if a living donor transplant was thought to be imminent.

Grace et al. also refer to the potential contribution of financial (dis)incentives in driving modality decisions (3). Patients with higher SES are more likely to receive care in private hospitals. Private hospitals in Australia and New Zealand are reimbursed at a higher rate for in-center hemodialysis over peritoneal dialysis (8), yet they serve the more affluent and lower comorbid populations that are typically more likely to receive peritoneal dialysis. The effect of facility financial incentives in a for-profit environment should not be underestimated. The recent changes in funding for dialysis therapy in the United States allow for an illustrative natural experiment. The prospective (bundled) payment system was adopted by the US Centers for Medicare & Medicaid Services in 2011 (9). The proposed new bundles now include separately billed injectable drugs and other services, which were previously billed separately, rendering peritoneal dialysis more profitable compared with center hemodialysis (10). A reversal was seen in the downward trend in peritoneal dialysis use before implementation of this funding bundle in

**Do Socioeconomic Factors Affect Dialysis Modality Selection?**

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**Editorial:**

Choosing the type of therapy best suited to their medical and social circumstances—whether dialysis, transplantation, or conservative therapy—is perhaps the most important decision for patients during their CKD journey. This decision carries major implications for patients and health systems alike. Although transplantation would be the ideal therapy for most patients, a scarcity of organs means that the vast majority of patients are treated with dialysis.

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As expected, the authors noted 38% higher use of peritoneal dialysis in patients initiating dialysis outside a major city, 45% lower use in Caucasians, and that patients in privately funded hospitals rarely used home dialysis. Patients from the most advantaged quartile were more likely to use private hospitals than those from the most disadvantaged quartile.

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2011 (1). Between 2011 and 2013, there was a 15% increase in the number of patients on home dialysis among United States dialysis providers, suggesting a strong link between prof fromability and modality distribution (11).

Despite their apparent importance, socioeconomic factors and their correlates represent only part of a much larger explanatory framework for modality selection. We and others have classified determinants of modality choice within several broad domains (12,13), which are as follows: (1) the patient (medical indications or contraindications, home environment, psychologic and cognitive factors [knowledge, attitudes, and coping styles], and social factors [supports, lifestyle, and other correlates of SES]); (2) organizations (dialysis program, local hospital or regional health authority, each offering varying expertise, resources, and cultural attributes); (3) providers (knowledge, attitudes, and reimbursement); (4) health systems (funding models such as quality-based procedures, pay for performance, bundled payment schemes, and private coverage); and (5) exogenous factors (primary care [late referral] and technological innovations). The multitude of factors highlights the complexity of modality decisions, especially given the potential for interactions between them. It is perhaps therefore not surprising that rates of home dialysis uptake and the types of barriers identified can vary between countries with similar health systems, such as Canada and Australia.

Although barriers to home dialysis appear to differ between countries, a more regional or local approach to barrier management may lead to more effective interventions to improve home dialysis use. A recent Canadian study identified significant between-physician variability in peritoneal dialysis prescription within a single large renal program (14). Although there are several factors operating at the individual renal program level, some special consideration of the provider-patient dyad is warranted. According to patients, important barriers to home dialysis include fear of medicalizing the household (15,16), lack of social support (17), and lack of confidence or fear of dialyzing without supervision (15). Important factors favoring home dialysis selection include the convenience associated with dialyzing at home and potentially improved life-expectancy (18). Among these, the patient perceptions factor regarding the comparability of dialysis therapies is the most likely to lie within the control of the provider, but do health care professionals provide similar messaging when discussing benefits and harms of dialytic therapies? There are currently no clinical practice guidelines that address modality selection, and providers are left to their own interpretation and synthesis of a complex body of biased observational literature. Accordingly, a European panel recently concluded that the dialysis comparative effectiveness literature was inconclusive and that a "modality neutral" approach is warranted—modality options should be presented to patients as providing similar outcomes, and patient preferences should be the final arbiter of the modality choice (19). Others have suggested that home therapies should be favored on the grounds that they are presumed to provide greater patient autonomy and quality of life (20) at a lower overall cost. Finally, nephrologists have a variety of approaches, ranging from a position of neutrality to a strong preference for home intensive hemodialysis, whereas criteria for referral for home dialysis ranged from stringent to broadly inclusive (13).

Regardless of the acceptability of these disparate approaches by the renal community, it seems likely that physician biases and practices have a great potential to "color" patients' decision making, and the patient-provider dyad is likely the single most important component of the modality selection process.

Assuming that optimizing the appropriate use of home dialysis is a desired goal of a health system, several priorities for future research and policy development should be considered. (1) Generation of new evidence: The comparative effectiveness of dialytic therapies is central to informed decision making, and comparative clinical trials are needed. Historically, such studies have been challenging or infeasible, partly as a result of patients' reluctance to be randomly allocated to different treatment settings (21,22). However, with the growing availability of home dialysis, trials that compare various home options may be feasible. (2) Practice guidelines: With higher-quality evidence, stronger practice recommendations can be made, and guidelines are more likely to be more effective. Even in the absence of high-quality evidence, guidelines addressing modality selection can be used to highlight potential subgroup effects (e.g., diabetes, advanced age, seeking pregnancy), and the role of patient values and preferences in selecting a modality. A broadly endorsed guideline could help reduce undue variation in physician attitudes and behaviors. (3) Measurement efforts: The study by Grace et al. reaffirms that factors affecting modality selection vary across jurisdictions, and that local, rather than global, efforts are needed to identify and overcome them. The Ontario Renal Network links bundled payments for CKD care to electronic tracking and reporting of program efforts to provide predialysis education, as well as to the measurement of barriers ("reason codes") for modality decisions. This is intended to facilitate a deeper understanding of patient and organizational barriers, and will inform the appropriate application of policy, funding, and educational interventions to ensure that patients seeking home dialysis are given the option to do so. The effectiveness of this approach is currently under study. (4) Funding models: Grace et al. also identify profitability as a potential driver of modality decisions. Because money affects human behavior in most facets of our lives, this should be no surprise; if payment systems for physicians and facilities are structured poorly, this could be used to the benefit of patients and health systems. New funding schemes have been adopted in a number of jurisdictions in recent years, and future studies evaluating their potential effects on modality distribution and cost will be informative. Such studies should consider the effects of physician and facility reimbursement separately.

In summary, until new comparative effectiveness research and guidelines are available, policy makers and providers would do well to ensure that, above all else, patients are given the opportunity to make informed decisions, by providing adequate training, education, and support to patients and staff. Routine measurement of barriers to the use of home dialysis among all incident patients will facilitate both a better understanding of what constitutes an optimal modality mix and which tailored interventions can help achieve it.

Disclosures
None.
References


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