



## Home Dialysis in the United States: A Roadmap for Increasing Peritoneal Dialysis Utilization

Erin P. Flanagan, Yashodhan Chivate, and Daniel E. Weiner

Expanding treatment modalities available to patients with kidney failure is now a priority in the United States. On July 10, 2019, a presidential executive order launched the Advancing American Kidney Health initiative, establishing a goal of 80% of patients with end-stage renal disease (ESRD) treated with either home dialysis or kidney transplantation by 2025. Following this, the Centers for Medicare & Medicaid Services proposed the ESRD Treatment Choices model and described several voluntary models to incentivize kidney health, home dialysis, and kidney transplantation.<sup>1</sup> With transplantation currently accounting for ~30% and home hemodialysis (HD) accounting for 2% of patients, peritoneal dialysis (PD) use will need to increase markedly from its current share of ~10% to approach this lofty goal.<sup>2</sup>

Many reasons exist to promote wider uptake of PD, emulating many nations with developed economies in which home dialysis use is 2- to 3-fold higher than in the United States.<sup>2</sup> Patient experience and satisfaction with care appears equivalent or better with PD versus in-center HD. Nearly 80% of US HD patients initiate with a central venous catheter,<sup>2</sup> resulting in poor outcomes that could potentially be avoided with PD. Comorbid conditions such as heart failure and pulmonary hypertension may be better managed with PD than with HD,<sup>3</sup> and mortality appears similar or better than that seen with in-center HD.<sup>4</sup> However, PD use remains low (Fig S1) despite the modest increase in PD use after financial incentives were provided by the ESRD Prospective Payment System that launched in 2011.<sup>5,6</sup> To approach the remarkably ambitious goal in the executive order, patients and providers must overcome multiple social, clinical, and financial barriers. Building on findings delineated at a recent National Kidney Foundation conference on home dialysis,<sup>7</sup> this editorial highlights several barriers and suggests potential solutions (Box 1).

### Social and Education Factors

To select their optimal kidney replacement therapy modality, patients and their care

partners must be knowledgeable about treatment options. Patients who receive education before dialysis initiation are more likely to choose home dialysis<sup>8</sup> and perceive this education as helping provide them with greater control over their lives.<sup>9,10</sup> Despite this, as few as one-third of incident dialysis patients are presented with all treatment options available to them.<sup>11</sup> Low PD use may reflect patients' lack of early awareness of kidney disease, failure of timely referral to nephrology, and skepticism (or worse, ignorance) from their nephrologist or other providers about the risks and benefits of home dialysis.<sup>12</sup> Regardless, comprehensive education followed by a patient-centric discussion of treatment modalities should occur. Even when dialysis must be initiated within 48 hours of patient presentation, PD is a possibility if the right resources exist and certainly an early transition to PD is possible.

Among populations with greater socioeconomic disadvantages, kidney failure remains an outsized burden, and this disparity is further seen in the relative rates of home dialysis uptake.<sup>13</sup> Factors such as poverty, housing instability, care partner limitations, lack of storage space, and low health literacy present real challenges to home dialysis use,<sup>14</sup> and there may also be provider biases around patients' capacity for learning PD. Some of these factors may be overcome by proactively providing assistance, especially in the early period after PD initiation. Supporting caregivers and patients with home visits and assisted PD can safely increase PD use,<sup>15</sup> while incorporating remote monitoring applications may help maintain PD.

**Take Home:** More patients may be able to achieve home dialysis, particularly with improved education and assistance programs. Education and exposure of medical professionals, including nephrologists, to a high number of diverse PD patients is critical to overcome preconceptions and improve comfort with PD.

### Clinical Factors

The only absolute clinical barrier to PD is the lack of a functioning peritoneal membrane. Despite this, our ability to predict long-term PD use is limited. In the United States, 17%

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*Policy Forum highlights aspects of nephrology relating to payment and social policy, legislation, regulation, demographics, politics, and ethics, contextualizing these issues as they relate to the lives and practices of members of the kidney community, including providers, payers, and patients.*

**Box 1.** Solutions to Increase PD Use in the United States**Education and Social Factors**

- Broaden education to patients and their care partners about home dialysis
  - ◊ Decision aids and health literacy appropriate educational tools
  - ◊ Allow separate billing for options discussions in the inpatient setting in addition to a daily nephrology visit
- Improve education and comfort with PD among nephrologists, both during fellowship and in practice
  - ◊ Incorporate longitudinal home dialysis exposure in fellowship
  - ◊ Provide resources and opportunities for training and retraining practicing nephrologists in home dialysis
- Improve education and comfort with PD among non-nephrology clinicians who commonly provide care for patients with kidney failure, including primary care providers, cardiologists, diabetologists, access surgeons, and others
  - ◊ Promote broad outreach to non-nephrology specialists
  - ◊ Introduce PD into the popular culture to improve awareness, supplanting the default hemodialysis facility image

**Clinical Factors**

- Dialysis facilities
  - ◊ Incentivize growth of the home nephrologist nurse workforce
  - ◊ Incentivize urgent-start PD programs for individuals who “crash” onto dialysis
- Nondialysis facilities
  - ◊ Allow reimbursement for assisted PD at home and for multiple training visits
  - ◊ Promote PD in rehabilitation centers, nursing homes, and skilled nursing facilities to bridge the gap between inpatient and outpatient PD
  - ◊ Reduce regulatory burden for skilled nursing facilities that treat PD patients
  - ◊ Provide resources for respite PD care for patients who rely on care partners
- Home environment
  - ◊ Provide resources for assisted PD
  - ◊ Increase telehealth resources as currently permitted by regulation
  - ◊ Reduce costs associated with more frequent supply delivery for patients with limited storage space
- Increase research into PD, including improved PD solutions, technologies for identifying causes of catheter malfunction, and advances to improve catheter function

**Financial Factors<sup>a</sup>**

- Modify the existing payment structure to incentivize PD by equalizing physician payments for in-center and home care supervision
- Increase reimbursement for home dialysis, incorporating reduced transportation costs and other potential societal savings associated with home dialysis
- Revisit the QIP such that facilities providing PD are not more likely to receive financial penalties
- Incentivize surgeons for successful PD catheter placement
- Ensure adequate availability of fairly priced home dialysis supplies

Abbreviations: PD, peritoneal dialysis; QIP, quality incentive program.

<sup>a</sup>Financial factors refer to those potentially modified by US federal policy.

of incident PD patients transfer to HD within a year, and fewer than half the patients who start PD use this modality 2 years later.<sup>16</sup> On a population level, precise causes for transfer to HD remain uncertain and likely heterogeneous, but the high transfer rate may incorporate a reflexive transition to HD when problems with PD arise. Better determining the causes of transfer will help both reduce the need for transition through earlier interventions and ensure a smooth transition from PD to HD should it occur.

Currently, the average patient treated with PD is healthier than the average patient treated with HD. As PD expands, the PD population will include more individuals with greater comorbidity burden. These individuals will have acute illnesses requiring acute-care and rehabilitation hospitalizations, as well as chronic conditions limiting physical and cognitive function. The lack of clinical

expertise in many hospitals and the paucity of rehabilitation facilities, long-term acute-care hospitals, and nursing homes with the willingness or ability to care for PD patients limits PD as an option. Additionally, patients with greater comorbid conditions are more reliant on family support, potentially resulting in greater need for respite and assisted-PD options.

Initiating PD is far more time intensive than HD. It requires more extensive discussions with patients and their families; identifying and interfacing with other providers who are comfortable with PD, including access surgeons, primary care providers, cardiologists, and others; and empowering patients and their families to take a leadership role in their own care. Recognizing this, modality education must begin earlier in the disease course and be facilitated by timelier referral to nephrologists and better decision aids for patients.

**Take Home:** Transfer from PD to HD is common. Early troubleshooting, maximizing patient flexibility to avoid burnout, and interfacing with other providers—including primary care providers, subspecialists, and nonhome medical facilities—to improve awareness of PD, knowledge of potential benefits of PD, and availability of PD should increase PD use.

### Financial Factors

Multiple incentives currently predispose to greater use of HD than PD.<sup>17,18</sup> For nephrologists, assuming 4 encounters with HD patients per month, the monthly capitated payment is significantly less for PD versus HD, although clinical encounters with PD patients may be more meaningful and time consuming. The PD training fee may compensate for some of this differential, although this is not always claimed and is a one-time distribution. Even with Medicare coverage in the month of PD initiation, insufficient insurance before dialysis initiation is associated with lower PD uptake, likely reflecting the default to HD in the absence of sufficient patient education on home dialysis options.<sup>19</sup> Expanding kidney failure education to these individuals, particularly if they will qualify for Medicare at the time of PD initiation, is an attractive policy albeit one with legislative barriers.

The major disincentive for nephrologists occurs before dialysis initiation, when the time required to provide meaningful education to patients and their families regarding PD while concurrently managing their comorbid conditions may result in unreimbursed effort. Currently, Medicare provides a Kidney Disease Education benefit only for patients with chronic kidney disease stage 4, but this benefit is underused,<sup>1</sup> with reimbursement lagging that of a typical evaluation and management clinic visit. The proposed ESRD Treatment Choices model expands the education benefit to chronic kidney disease stages 5 and 5D (for 6 months following dialysis initiation), with additional clinical staff, including dietitians and social workers, able to provide education.

For dialysis providers, PD is a mixed proposition. Typically, per-patient provider costs for PD patient management are less than those for in-center HD, although increases in PD solution and equipment costs could reduce this difference. The major conflict involves the opportunity cost of PD, which is a potential unfilled chair at an HD facility. Filling an existing empty HD chair will result in greater financial benefits than treating a patient with PD, providing an incentive to initiate and maintain patients on HD. Additionally, facilities with PD programs are at higher risk for quality incentive program penalties.<sup>20</sup> The dialysis adequacy metric currently incorporates both PD and HD adequacy into a single measure. The HD adequacy metric is topped out (<10% of facilities have results below the achievement threshold), representing the ease of achieving solute clearance. In contrast, a third of facilities that offer PD have PD adequacy results below the achievement threshold.<sup>20</sup> Additionally, there is no patient experience measure in PD, magnifying the financial importance of other measures for facilities that provide PD.

**Take Home:** Multiple financial incentives favor HD over PD, despite the latter's potentially lower costs. Increasing PD requires realigning incentives, including: (1) reimbursing more for PD; (2) correcting quality incentive program disincentives for PD; (3) controlling costs of PD supplies to maintain financial incentives for PD; (4) establishing PD centers of excellence beyond dialysis facilities, including hospitals, skilled nursing facilities, and rehabilitation centers able to provide high-quality care when a PD patient is not at home; and (5) providing sufficient reimbursement for assisted PD.

### Conclusions

Although in-center HD is the current default kidney replacement therapy in the United States, the Advancing American Kidney Health Initiative represents an opportunity to increase PD use and improve kidney care. While there is no consensus on the number of US dialysis patients who should use PD, the current prevalence of 10% is far too low. Increasing the use of PD requires broad changes in knowledge, infrastructure, and incentives. Patients, family members, nephrologists, and non-nephrology providers must be aware of PD, recognize advantages associated with PD, view potential barriers as surmountable, and support the uptake and, critically, maintenance of PD. Financial incentives must be appropriately aligned to promote PD uptake and maintenance, with support for assisted PD and PD in settings outside the home.

### Supplementary Material

#### Supplementary File (PDF)

**Figure S1:** Incident and prevalent ESRD cases in the United States, by modality.

### Article Information

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