In many countries, the use of peritoneal dialysis (PD) remains low despite arguments that support its greater use, including dialysis treatment away from hospital settings, avoidance of central venous catheters, and potential health economic advantages. Training patients to manage aspects of their own care has the potential to enhance health literacy and increase patient involvement, independence, quality of life, and cost-effectiveness of care. Complex reasons underlie the variable use of PD across the world, acting at the level of the patient, the health care team that is responsible for them, and the health care system that they find themselves in. Important among these is the availability of competitively priced dialysis fluid. A number of key interventions can affect the uptake of PD. These include high-quality patient education around dialysis modality choice, timely and successful catheter placement, satisfactory patient training, and continued support that is tailored for specific needs, for example, when people present late requiring dialysis. Several health system changes have been shown to increase PD use, such as targeted funding, PD First initiatives, or physician-inserted PD catheters. This review explores the factors that explain the considerable international variation in the use of PD and presents interventions that can potentially affect them.

**Introduction**

Fueled by the global epidemic of type 2 diabetes, demographic changes in the population, and increased recognition of the need to provide kidney replacement therapy (KRT) in locations where this was previously not available, end-stage kidney disease (ESKD) places a huge burden on health economies. In many low- and middle-income countries, access to dialysis and transplantation treatment options are limited, and careful planning of resource use is essential if kidney replacement services are to meet the need. Equally, in richer countries, system-wide approaches are being developed to contain costs.

In 2015, the number of patients with kidney failure receiving dialysis varied nearly 30-fold among countries in which these data were collected, with the lowest rates being in the range of 100 to 200 per million population in Bangladesh, Ukraine, South Africa, Kazakhstan, and Indonesia and the highest closer to 3,000 per million population in Japan and Taiwan. Large numbers of people around the world with kidney failure remain unable to gain access to dialysis, particularly in Asia and Africa. Perhaps counterintuitively, macroeconomic factors (overall gross domestic product and percentage spent on health) and renal service factors (dialysis unit reimbursement rate and private for-profit share of dialysis provision) have a clearer relationship with ESKD incidence rates than do demographic or general population health status factors.

Peritoneal dialysis (PD) is most widely used in Hong Kong, Mexico, New Zealand, Qatar, and Colombia, where the prevalence is ≥30% (Fig 1). Several countries have shown an increase in PD use since 2006, including Argentina, Bangladesh, Chile, Spain, Taiwan, Thailand, and the United States (Fig 2), whereas a decline was reported in a much larger number of countries, including Belgium, France, Singapore, Turkey, and the United Kingdom. Greater use among certain countries with developing health care systems can be attributed to characteristics of PD, such as a lower requirement for highly trained personnel and major infrastructure and more patients managed per nephrologist. Despite these benefits, center-based hemodialysis (HD) is the treatment modality used for >80% of dialysis provision in 82% of countries, but patient quality of life is impacted by its inflexible schedule, and structural arrangements tend to discourage patient involvement in their own care.

Randomized controlled trials comparing the impact of dialysis modality on survival have not been possible for methodological reasons. However, registry reports provide evidence of improvement over time, with most studies reporting advantages for home therapies. In the United Kingdom, a National Institute for Health and Care Excellence (NICE) guideline in 2011 recommended that PD should be offered as the first dialysis treatment modality for people who have preserved residual kidney function and for adults without substantial associated comorbid conditions, based on possible early survival advantage on PD. However, the 2018 NICE guidance on KRT and conservative management prioritized shared decision making for modality selection rather than recommending a dialysis modality. A North American prospective cohort evaluation of patients with advanced chronic kidney disease found that although 98% were considered medically eligible for HD, 87% were medically suitable for PD, decreasing to 78% when psychological factors were taken into account. Patients, carers, and health care professionals report higher desire for dialysis outside the hospital than is delivered in reality.

A key question is why PD is used relatively little when potential advantages of the technique (in comparison to HD) include lower cost, favorable patient experience, at
least as good outcomes, community-based therapy away from the hospital setting, relative protection of residual kidney function, preservation of vascular access sites, and reduced early graft dysfunction following transplantation.12 This Narrative Review explores international trends in PD use, with the aim of identifying some of the underlying drivers and suggesting directions that can be adopted to try to rebalance the situation. By providing kidney transplantation or home dialysis to a substantial proportion of their patients, several countries are able to contain the use of in-center HD to less than a third of the ESKD population.13

Getting Onto PD: Eligibility and Modality Selection

Patient Factors
The only absolute contraindication to PD is the absence of a functioning peritoneal membrane, such as following major abdominal surgery.14 In practice, a range of barriers reduce the likelihood of PD use in a given patient, such as primary diagnosis, body habitus, physical capacity (eg, poor dexterity), visual and especially cognitive difficulties, and psychosocial factors. A different set of factors affect the likelihood of patients selecting a home therapy, and these include cultural, language, educational, and economic issues, as well as the extent of family and community support, social isolation, and confidence in clinical teams. The goal of health care teams must be to set up a situation that gives patients the confidence to dialyze in the community without experiencing pressure to do so. People who lack social support are much less likely to undertake a home dialysis therapy.15 Inequalities in access to home therapies are compounded by the impact of low health literacy on accessing information.16

Process Factors
Factors external to the patient that influence the likelihood of using PD include local availability of services, cost to the patient or provider, health care policy (eg, the presence of a PD-first policy), physician enthusiasm, and whether there are pathways to PD for people who present in an unplanned way with advanced chronic kidney disease.17 A study from France examined baseline clinical factors and
initial dialysis modality across 59 regions, noting that PD use varied between 0% and 45%. Examination of medical characteristics did not explain this variation, implying that nonmedical factors contributed to the observed differences.

A range of health service strategies are associated with increased PD use (Table 1). Considering the individual, attention can be given to the degree of social support, patient education and choice, technical solutions to overcome barriers, and home care assistance. From a provider perspective, training for health care staff is important, as well as arrangements for remuneration, which range from ensuring that reimbursement is not adversely affected by the dialysis modality selected to financial incentives designed to increase modality use. A key factor that influences PD use is the local availability of dialysis fluids (Fig 3).

**Planned Education and Choice**

There is a strong relationship between patient-targeted education and subsequent selection and use of PD, with a 3-fold increase in the odds of receiving PD as the initial treatment modality. In general, patients and family caregivers value treatment that lengthens survival and can occur at home, includes dialysis-free days, and permits respite and travel. US patients prioritize independence, quality and quantity of life, and flexibility in daily schedule. Patient-related factors that lessen the selection of a home therapy include the perception that care is safer in the hospital, insufficient confidence to take on care, and work and family pressures.

A randomized controlled trial from Western Canada reported an increase in the number of patients planning self-care dialysis following multiple interventions such as small-group education sessions and the inclusion of family members within the educational program. Attempts to overcome bias in the presentation of information to patients has led to the development of dialysis decision aids with the objective of providing material in a format that is easy to interpret and facilitates understanding of the

**Table 1. Strategies to Promote PD Uptake and Reduce Technique Failure**

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suboptimal assessment of PD eligibility</td>
<td>Evaluation by a multidisciplinary team, patient and family support, availability of professional PD assistance</td>
</tr>
<tr>
<td>Inadequate opportunity for high-quality modality choice</td>
<td>Patient education programs, peer educators, decision aids</td>
</tr>
<tr>
<td>Health care team prejudice</td>
<td>Staff education</td>
</tr>
<tr>
<td>Suboptimal catheter insertion practices and pathways</td>
<td>Responsive pathways, availability of catheter insertion pathways that are best suited for the characteristics of the individual patient</td>
</tr>
<tr>
<td>Late presentation with advanced CKD</td>
<td>Bespoke urgent-start PD pathways</td>
</tr>
<tr>
<td>Technique failure</td>
<td>QI around catheter insertion pathways and peritonitis prevention, prescription management (solute and water, including availability of icodextrin and APD), strategies to protect RKF</td>
</tr>
<tr>
<td>Health economic considerations and financial incentives</td>
<td>Incentivizing PD (eg, United States), PD First programs (eg, Hong Kong and Thailand), international availability of PD solutions (fluids)</td>
</tr>
</tbody>
</table>

Note: Based on information reviewed in Mann et al. Abbreviations: APD, automated peritoneal dialysis; CKD, chronic kidney disease; PD, peritoneal dialysis; QI, quality improvement; RKF, residual kidney function.
available treatment choices. An example is the Yorkshire Dialysis Decision Aid, which in a controlled study impacted beneficially on several self-reported components of decision making. However, a direct effect on modality selection was not tested. Peer educators who have personal experience of the dialysis modality choice can add considerable value to information giving, particularly when cultural barriers exist; for example, among patients from ethnic minorities in Birmingham, United Kingdom.

Importantly, patients often do not get the modality that they choose. A qualitative study from North America found that the reasons for this were arranged within essentially 3 themes: not having confidence, issues related to the home (eg, insufficient space), and not having enough education. It was also noted that nephrologists or other patients may dissuade individuals from their initial choice, leading to a recommendation that nephrologists may require mentoring to enhance their confidence in recommending a home therapy. Even where predialysis education services exist, patients report being poorly prepared and inadequately supported for the start of dialysis.

**Unplanned Start**

An unplanned dialysis start is strongly associated with the use of center-based HD, where patients may become established and then less likely to change to a home therapy. This effect was seen in 2015 UK Renal Registry data: overall, 21.0% of patients started on PD, but among individuals known to nephrology for fewer than 90 days, this was only 11.1%. Most authors conclude that urgent-start PD programs are feasible and safe, with the distinct advantage of reducing the requirement for central venous catheters, and that there are efficiencies in starting patients who wish to be on PD directly on that therapy. However, urgent-start programs require organization and coordination if they are to be successful, with consideration to prompt catheter insertion, program coordination, social work support, shared decision making, dialysis start protocols, and home visits. A report from Singapore describes a systematized approach to establishing such a program (Box 1). A Northern European study found that a targeted educational program for unplanned-start patients facilitated PD use; however, despite this initiative, 14% of those choosing PD still did not receive this modality.

**Frailty and Social Barriers**

In some regions, providing professional assistance for PD through the use of trained health care technicians has allowed dependent individuals to receive the therapy. The need for this approach was highlighted by the Netherlands Cooperative Study on the Adequacy of Dialysis (NECOSAD), a study conducted in the Netherlands that found that although patients older than 70 years were 6 times more likely to receive HD than PD compared with patients aged 18 to 40 years, with support and education, >50% were suitable for PD. Models of assisted PD vary; for example, in France, continuous ambulatory PD is predominantly used, whereas in Denmark and the United Kingdom, the preference is for automated PD. In a study of older more dependent patients that compared assisted PD with a matched center-based HD cohort, quality of life and physical function were no different, but treatment satisfaction was higher for PD patients.

**Socioeconomic Status**

The impact of socioeconomic status on health outcomes varies between countries and affects the use of home dialysis therapies even in the presence of comprehensive

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**Box 1. Essential Elements of an Urgent PD Start Program**

- Sufficient outpatient capacity (in terms of space and beds) to enable low-volume PD exchanges
- A process to guarantee quick insertion of PD catheters
- Adequate staffing levels of PD nurses to permit supervision of low-volume PD exchanges in inpatient and outpatient settings alike
- A dedicated outpatient clinic to quickly assess patients and then follow them up longer term
- A PD coordinator to develop and implement streamlined processes

*Note: Based on information covered in Javaid et al.*

Abbreviation: PD, peritoneal dialysis.
health care systems. For incident dialysis patients in the United Kingdom between 2011 and 2015, PD was commenced in 22.1% of the least-deprived quintile compared to 16.7% of the most deprived (Fig 4).41 PD is used in diverse circumstances and despite challenging social situations in both dense urban and remote rural communities.40 Still, a study from East London reported that only 29% of housing stock was assessed as being suitable for PD, with just 33% fulfilling a government minimum housing standard.41 Multidisciplinary team assessment helps identify barriers to self-care dialysis and plan pragmatic solutions to overcome them because many patients would be keen to dialyze at home given the opportunity. Initiatives are required to resolve problems presented by substandard accommodation and overcrowded urban environments.42

Although socioeconomic status affects survival and is strongly associated with comorbid conditions, a data linkage study from ANZDATA did not demonstrate a relationship with PD technique failure,43 although this lack of association is not universal.44 Potential explanations for this variation might include the effect of patient selection at the time of the modality decision or the impact of patient training and staff support to overcome barriers, thus ensuring that people are able to benefit from the therapy despite challenges that they may face in their social circumstances.

Health Economics and System-Wide Approaches
In Australia, the annual therapy cost for PD has been estimated at $53,000 compared to $79,000 for hospital-based HD45; in a 2005 study in the United States, the annual cost of PD was $12,000 less than for center-based HD.46 A Norwegian cost-analysis model that included personnel, transport, and dialysis supplies indicated that increasing the proportion of patients with ESKD receiving PD from 10% to 30% would realize a potential savings in excess of €10 billion within the European Union over a 5-year period.47 A budget impact analysis from Indonesia found cost advantages for a PD-first policy, with an enormous predicted financial burden for that country if the current practice of HD dominance continues.48 In the United Kingdom, a cost-effectiveness analysis suggested that increasing the number of patients receiving PD would bring about a significant cost saving while increasing quality-adjusted life-years.49 In pediatric practice, international economic variations affect the use of PD for very young infants, automated PD, and expensive drugs, and although there is no association with technique failure, there is a relationship with mortality.50

The EVEREST study group has attempted to explain global differences in dialysis modality mix using a combination of registry-based secondary data sources, interviews, and questionnaires.51 Lower PD use was found to be associated with higher diabetes prevalence, higher health care expenditures, greater proportion of private for-profit centers, and higher costs of PD consumables in comparison to staffing. It is clear therefore that the factors determining PD use are complex, and if high-level financial disincentives or medical preconceptions are present, these will strongly influence modality use. This must be borne in mind when considering the application of strategies designed to increase PD use (summarized in Table 1). In addition to the macroeconomic costs of dialysis, direct costs to patients and their families are also important because when incomes are low, these present a substantial barrier. A study of home HD from New Zealand found that these fall into 3 categories: out-of-pocket costs, loss of earnings due to alterations in employment, and the impact of socioeconomic deprivation.52

The possibility of a cost advantage for PD has influenced health policies such as PD-first models and financial incentives designed to increase PD use. PD first has been used in Hong Kong for many years with excellent outcomes and more recently in Thailand as part of a plan to make KRT universally available. This has led to a large expansion of PD in that country, which previously only offered HD to civil servants or those wealthy enough to self-fund. It is too early to say just how successful this policy has been, but the effort has been impressive and outcomes are improving.53 In the United States, a budget impact model that estimated dialysis-associated costs under the bundled Prospective Payment System concluded that increasing PD from the baseline of 7.7% to 11.7% over 5 years would result in cumulative savings to Medicare of $114.8 million.5 Since the introduction of this more PD-favorable bundle, the number of patients on PD in the United States has almost doubled (Fig 2). In the United Kingdom, the effect of financial incentives in dialysis units to promote uptake of home therapies was more mixed and detailed analysis demonstrated the importance of patient support in achieving this goal.54 If system-wide measures are to have a major impact on PD use, health care providers will have to address both existing incentives to nephrologists and

Figure 4. Level of social deprivation in the prevalent dialysis population by dialysis modality on December 31, 2015. Adapted from Tabinor M et al,39 a chapter of the 19th Annual Report of the Renal Association,40 with permission of the UK Renal Registry. Abbreviations: HHD, home hemodialysis; ICHD, in-center hemodialysis; PD, peritoneal dialysis.
larger dialysis providers that come from greater in-center HD use, as well as costs and transport logistics associated with dialysis fluid production. In the future, dialysis systems that use adsorbent technology to reduce the volume of dialysate required may have a role.

PD Catheter Insertion and Therapy Initiation

PD catheter insertion has a major impact on the uptake of the therapy for 2 reasons. First, poorly responsive pathways for arranging catheter insertion delay and therefore inhibit access to PD, and second, catheter dysfunction increases early technique failure. International variations in PD access are beginning to be reported from the Peritoneal Dialysis Outcomes and Practice Patterns Study (PDOPPS), which includes 7 countries. For example, the general surgical approach is used more commonly in Japan, and laparoscopic insertion is frequent in the United States. Access to urgent-start PD is least likely in Japan, but this country has the greatest experience with embedded catheters. Outcomes for catheter insertion vary considerably between centers; 1-year catheter failure rates range between 0% and 40% in the UK Renal Registry, with the median being 13%. A study from Brazil reported surgical complication rates of 10.5% and peritonitis rates of 10.2% by 3 months postinsertion, with higher rates in centers in which the number of catheter insertions was low. There is little difference in outcome for PD catheters placed using the percutaneous method compared with surgical insertion, and results are inconsistent comparing open surgical to laparoscopic surgical insertion. Cohort studies report an advantage for advanced laparoscopic interventions consisting of rectus sheath tunneling and adjunctive procedures compared with basic laparoscopy, but there are no randomized controlled studies in this area. Certain characteristics currently define those who are more suitable for medical insertion, including the absence of major abdominal scars and significant central obesity. With the surgical insertion technique, the majority of patients will receive a general or spinal anaesthetic, which can be a barrier for those with significant cardiopulmonary comorbid conditions. A key determinant of success is the enthusiasm and experience of the operators who place catheters and it is clearly important that centers audit their results, including catheter failure and complication rates.

Reports from across the world describe an association between percutaneous insertion by nephrologists and increased uptake of PD, with particular advantages for patients presenting late with advanced chronic kidney disease and in need of urgent-start PD. In the United Kingdom, among centers that used the percutaneous approach, 25.9% of incident KRT patients started PD, compared to 21.0% overall. A Canadian urgent-start PD program developed as an alternative to acute HD through tunneled dialysis central lines used both nonsurgical (fluoroscopic-guided) and surgical (laparoscopic) insertion of PD catheters depending on patient characteristics.

PD was commenced within 2 weeks in all patients, with a median time to start of 6 days. As a consequence of this initiative, the PD program grew by 48% over 3 years. PD catheters can be used immediately with acceptable results as long as care is taken to control factors that are likely to result in fluid leaks. This is achieved by ensuring that when dialysis is performed, it is done using low dialysate volumes (eg, 1.2 L) with the patient remaining supine during treatment.

Mechanical complication rates in early-start programs vary. A recent report from Australia found leak rates of 12% in patients who started dialysis within 2 weeks of catheter insertion compared with 1% in the later-start group; catheter migration rate was 12% versus 1%. A single-center experience of urgent-start dialysis using nephrologist-inserted catheters in 922 patients from China reported abdominal wall and catheter complications at rates of 4.8% and 9.5%, respectively. However, a randomized controlled trial from Brisbane, Australia, that allocated patients to start at 1, 2, or 4 weeks post–catheter insertion demonstrated significantly higher catheter leak rates in the early-versus later-start group. A protocol for the early use of PD catheters is described in the acute kidney injury guideline from the International Society of Peritoneal Dialysis (ISPD). This has particular relevance in low-income countries in which PD is widely used in this context, for example, as part of the Saving Young Lives Program in Western Africa.

Keeping People on PD and Reducing Technique Failure

An important explanation for the low prevalence of PD is that mean time on the therapy is only between 2 and 3 years, in part due to high rates of technique failure. In a study from ANZDATA, 18% of PD patients switched to HD in the first year. This inability of patients to remain on their chosen therapy places a considerable burden on the individual and on health care systems. Given its importance, technique failure has been selected as the primary outcome measure of PDOPPS. Reporting technique failure is complex because causes may be multifactorial and clinical teams will be well aware how one reported cause may affect another. It is important to distinguish total technique failure from death-censored technique failure, particularly because center effects are increasingly recognized as have a greater impact on the latter.

Common reasons for technique failure include catheter dysfunction, peritoneal or catheter-related infection, and changes in social circumstances; for some patients, transfer to HD becomes necessary if PD is unable to deliver sufficient metabolic and fluid control once residual kidney function has failed. Early in the course of PD, mechanical complications predominate, underlining the importance of strategies to reduce these. Patient characteristics that are associated with the risk for death-associated technique failure include increasing age, vascular and diabetic
comorbid conditions, late presentation, and HD as a prior therapy. In addition, treatment in small centers more commonly confers increased risk in death-censored technique failure.\textsuperscript{79} Center practices have a greater impact on technique failure than patient characteristics and can be affected by care quality initiatives, for example, focusing on infection control.\textsuperscript{72} Interest is growing in the use of remote patient monitoring with anticipation that providing more responsive support to patients might benefit technique failure.\textsuperscript{73} Key areas in which attention should be given to reduce technique failure are highlighted in Table 1.

**Peritoneal Infection and Continuous Quality Improvement**

Prevention of infection is a key focus of the management of patients receiving PD. Wide variation in peritonitis rates is reported between centers, some of which is associated with inconsistent adherence to clinical guidelines, such as use of prophylactic antibiotic and antifungal agents.\textsuperscript{74} Regional variation in the treatment and prevention of PD-related infections has been reported in PDOPPS, demonstrating limited adherence to ISPD guidance in the key area of antibiotic prophylaxis before catheter insertion or the use of fungal prophylaxis during courses of antibiotics.\textsuperscript{74,75} Despite considerable progress in reducing infection rates during the last 3 decades, the emerging threat from the growing problem of antimicrobial resistance is worrying, especially in relation to virulent Gram-negative enteric bacteria such as *Escherichia coli* and *Klebsiella pneumoniae* that produce extended-spectrum β-lactamases and carbapenemases, with particular concern in South Asia.\textsuperscript{26} In Hong Kong, carbapenem-resistant *Acinetobacter* species resulted in either catheter loss or death in 80% of cases.\textsuperscript{77} Central to quality improvement (QI) is the documentation of peritonitis rates reported as infections per year of therapy; this is most effective when a national registry such as ANZDATA reports rates to every PD unit on a quarterly basis. In Victoria, Australia, a key performance indicator working group set up in 2011 established a data collection and benchmarking program underpinning a state-wide QI process that rapidly improved peritonitis rates (Box 2).\textsuperscript{78} In North America, the SCOPE QI collaborative, which checks compliance with catheter care bundles, also delivered a sustained reduction in peritonitis rates.\textsuperscript{79} Within the collaborative, lower compliance with standardized practices for follow-up of PD catheter care was associated with higher risk for peritonitis. The impact of this initiative is reported on the collaborative’s website in terms of episodes of peritonitis prevented and hospitalizations avoided, with a cost saving of >$7.2 million.\textsuperscript{80} In Colombia, a similar initiative led to a sharp decline in peritonitis episodes, from 1 per 21 to 1 per 60 patient-months, with estimated prevention of 1,300 episodes of peritonitis and savings of $207,000 per year.\textsuperscript{81}

**Box 2. Key Areas of Attention to Improve Peritonitis Outcomes**

- Identifying patients suitable for PD
- Prophylactic strategies and treating infectious complications in a timely manner
- Examining social causes of technique failure
- Providing patient education and ongoing support
- Putting into place clinical governance and professional standards

**Table 2. Putative International Comparative Data Set for PD**

<table>
<thead>
<tr>
<th>Domain</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program characteristics</td>
<td>Size (&lt;10, 10-25, 25-50, 51-100, &gt;100)</td>
</tr>
<tr>
<td></td>
<td>Prevalence of PD in total dialysis population</td>
</tr>
<tr>
<td></td>
<td>Presence of an urgent-start program</td>
</tr>
<tr>
<td></td>
<td>Staffing (no. of nurses, doctors, health care assistants, &amp; other supportive staff, including administrators)</td>
</tr>
<tr>
<td>Geographical considerations</td>
<td>Distance from the center to farthest patient</td>
</tr>
<tr>
<td>Catheter insertion</td>
<td>Methods (percutaneous, open surgical, laparoscopic)</td>
</tr>
<tr>
<td></td>
<td>Operators (nephrologists, surgeon, interventionist, nurse, other)</td>
</tr>
<tr>
<td></td>
<td>Catheter function rate 3 mo postinsertion for nonburied catheters</td>
</tr>
<tr>
<td></td>
<td>Surgical complication rates</td>
</tr>
<tr>
<td>Patient management</td>
<td>Patient training (total no. of hr, duration in d)</td>
</tr>
<tr>
<td></td>
<td>Use of home visits</td>
</tr>
<tr>
<td></td>
<td>Frequency of multidisciplinary meeting to review patient progress</td>
</tr>
<tr>
<td>Quality assurance</td>
<td>Peritonitis rate per y of therapy</td>
</tr>
<tr>
<td></td>
<td>Use of regular audit/QA meetings in which data about the program are presented</td>
</tr>
</tbody>
</table>

Abbreviations: PD, peritoneal dialysis; QA, quality assurance.

Important to infection control is patient and staff training, and the former is the subject of guidance from the ISPD.\textsuperscript{82} International variation in training practices have started to be reported from PDOPPS.\textsuperscript{83} For example, the United Kingdom is unique in the use of home-only training in some centers, whereas Japan is most likely to undertake training before catheter insertion. A multicenter randomized controlled study from Northern Europe of directed retraining on peritonitis rates in incident patients did not find benefit.\textsuperscript{84} To better provide comparative data on PD, consideration should be given to the establishment of an international registry of key domains such as that which has been developed in pediatric practice.\textsuperscript{85} Examples of appropriate data field domains that could be included in such a registry are presented in Table 2.
Conclusions and Recommendations

Although there are advantages to the use of PD for the patient and health care systems, a range of factors favor institutional dialysis. These include the relative ease with which center-based HD can be initiated, the requirement for patient education and training to support the selection and execution of a dialysis home therapy, and health care financial systems that favor center-based dialysis. These are most obvious in the context of an unplanned dialysis start. Well-recognized barriers reduce the likelihood of patients receiving PD, including lack of family support, socioeconomic circumstances, ethnic minority status, and inadequate pathways for PD access placement.

Wide international variations in the use of PD are largely a consequence of the different characteristics of health care systems and can be affected by key initiatives such as adjusting reimbursement, encouraging percutaneous PD catheter insertion by medical teams, and developing urgent-start PD programs. If PD is to grow internationally, greater emphasis is required on educational programs for patients and health care professionals to create the culture and means to increase opportunities for self-efficacy. To maintain people on PD, emphasis should be on QI initiatives to reduce technique failure, such as documenting adherence to evidence-based international guidelines. Strategies that increase the proportion of KRT provided in the community contribute to effective high-quality dialysis care, with benefits for patient experience and outcomes.

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