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Changing the Paradigm from Contraction of Peritoneal Dialysis Programs to Increasing Prevalent Peritoneal Dialysis Numbers

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Compared with other European and North American countries, the United Kingdom traditionally had proportionally more dialysis patients treated by peritoneal dialysis. However, as in many economically developed countries, peritoneal dialysis numbers have fallen in the United Kingdom, particularly since the early 2000s. In an effort to increase home-based dialysis therapies, the U.K. Department of Health introduced a new system of reimbursement tariffs favoring peritoneal dialysis and home hemodialysis compared with standard hospital-based hemodialysis. Here, we report how our own center responded to the impending change in reimbursement rates and turned what had been a declining peritoneal dialysis program into one that almost doubled in size within 3 years.

Key words
Hemodialysis, reimbursement, costs, education, complications

Introduction
Since the early 2000s, economically developed countries have seen patient numbers continue to fall for peritoneal dialysis (PD) compared with hemodialysis (HD), whereas economically developing countries have seen the relative percentage of PD maintained, with increased total numbers (1). For example, the percentage of U.K. dialysis patients treated with PD fell to 8% in 2010 from 15% in 1995 (2). In contrast, after the introduction of universal coverage and funding of PD in Thailand, patient numbers increased 10.7% for PD compared with 12% for HD from 2007 to 2009 (3).

In economically developed countries, the paradigm of hospital-based HD has changed since the early 1990s, with the development of freestanding satellite dialysis centers. Although that trend was thought to have reduced PD numbers, studies from Canada did not show any noticeable effect on PD populations (4). Similarly, physician bias to the potential complications of PD—peritonitis (5) and encapsulating peritoneal sclerosis (6,7)—also does not appear to be a factor, because physician surveys have repeatedly shown that many renal clinicians support PD (8,9). Indeed, mortality of patients has been reported across many countries to be either less for those treated by PD than by HD (10), particularly during the first 18 months of treatment, or at least no different than for those treated by HD (11,12). So why are PD numbers falling in economically developed countries?

Change in clinical practice as a result of increased living-donor transplantation has led to pre-emptive transplantation of younger patients who would traditionally have started on PD. Similarly, the increasing numbers of elderly patients taken onto dialysis programs with additional comorbidities and without social support preferentially start on HD (13). Thus, with a relatively high turnover of PD patients, reduction in new PD starts will reduce numbers. Even so, why are not more patients started on PD? The question is especially pertinent given that PD has been shown to be less expensive than HD for most health care systems (14), even after accounting for subsequent patient transfer costs to HD (15). In addition, physician surveys have suggested that patient choice and not physician fees or reimbursements determine the selection of dialysis modality (8,9). Indeed one Canadian study showed no change in modality choice despite a major change in physician reimbursements for PD (16).
Discussion

Why was our PD population falling?
In both the United Kingdom (Figure 1) and at our own center, PD populations have fallen since the start of the 2000s. Locally, we had 153 and 156 PD patients in 2003 and 2004, but those numbers fell steadily to 72 by 2009. During that period, no increase in the number of satellite HD centers occurred, although there had been some growth in HD capacity by expanding evening dialysis shifts. However, transplantation activity increased to 115 in 2009 from 56 in 2004, predominantly because of increasing numbers of living donors. As such, the number of new starts on PD dropped to 22 in 2009 from 48 in 2004. Add in the increasing number of PD patients being transplanted because of increased kidney donations after cardiac death (to 26 in 2008 from 11 in 2005), and PD patient numbers were falling.

Finance initiatives to support PD
Government financial support drove the expansion of PD programs in Thailand (17), and the U.K. Department of Health introduced a pilot scheme in 2009, announcing proposed changes in health care reimbursements to National Health Service hospital dialysis providers. As part of a home-dialysis initiative, the proposed tariffs favored PD [HD £28,298 (US$44,807) and PD £26,636 (US$42,175) per patient–year], which it was hoped would bring about the expansion of PD programs.

Overcoming barriers to improve PD take-on rates
Realizing that reimbursement tariffs for dialysis were about to change and were likely to fall over time, we carefully looked at our new starters to dialysis. Located in a large urban area and serving a migratory racially diverse population, our center started 186 patients on dialysis in 2010. Of those patients, 21% had not been seen by a renal physician before starting dialysis, 33.3% had been seen but had no established dialysis plan, and 45.7% had a planned start. Of the group that had a dialysis plan, 34% started on PD, but only 1 of the unplanned starts was sent home on PD, and once started on HD, no patient subsequently transferred to PD.

Thus, to increase the number of patients starting PD, we had not only to increase the numbers in our specialist chronic kidney disease clinics opting for PD, but also to make sure that, if patients had opted for PD, a sudden and unexpected episode of acute kidney injury did not then lead to emergency HD followed by hospital discharge to HD. We also had to tackle the problem of sudden, unexpected new starters being sent home on HD.

We began with an education program for the specialist chronic kidney disease clinic nurses who support our outreach clinics, because they have greatest patient contact and are involved in providing information to and educating patients about end-stage kidney disease modality choices, and because the number of referrals for PD had fallen to 42 in 2009 from 80 in 2005. It appeared that the perceptions of the nurses about the potential risks associated with PD had been overplayed and those of HD marginalized, and had of course affected the choices made by prospective dialysis patients. We therefore explained to the chronic kidney disease team that our PD infection rates were much less than those for HD with catheter access (18,19) and that the risk of other complications such as encapsulating peritoneal sclerosis were much lower than those for post-transplant proliferative disorders.

To try to prevent patients who had opted for PD being started on HD because of an unexpected episode of acute kidney injury and acute hospital admission, we changed clinical practice and started to insert buried PD catheters as originally described by Moncrief and Popovich (20). In addition, we ran education programs for the in-patient nursing and medical teams.
and actively canvassed for patients acutely admitted to hospital needing to start chronic dialysis to have PD catheters inserted so that, although the in-hospital modality was HD, patients were sent home with a PD catheter for outpatient PD training.

Earlier studies have reported that elderly patients with additional comorbidities and without social support are most likely to be offered HD (13). Before 2009, the U.K. Department of Health had started an initiative to increase PD numbers by offering a limited number of elderly patients a degree of assistance for PD, in that a helper was funded to set up a PD cycler in the evening and then to dismantle the cycler the following morning. However, patients had to be able to connect to and disconnect from the cycler and to manage overnight alarms by themselves. After introduction of the proposed tariffs for PD, the money for that assistance was withdrawn. However, after successful lobbying, the Department of Health reintroduced a special tariff for assisted PD, now with the inclusion of help with connectology, thus potentially allowing nursing home residents and other frail patients to benefit from home therapies.

After those innovations, the number of PD catheters inserted increased to 71 (13 embedded) in 2011 from 33 (2 embedded) in 2008, and PD numbers continue to increase (Figure 2), with more than 20 elderly patients now benefiting from assisted PD at home.

**Problems associated with rapid growth of a PD program**

As expected, a relatively rapid increase in PD patient numbers led to increased staff workload, not only in terms of training patients, but also in terms of routine work such as outpatient reviews, with testing of PD transport and dialysis adequacy (21,22). Although the increase had been anticipated and the need to recruit more trained staff appreciated, with additional nursing posts advertised to support both inpatient and outpatient PD activities, positions remained unfilled because of a lack of suitably trained candidates. Insertion of more PD catheters and increased numbers of PD patients resulted in more patients on PD being admitted to the hospital, and on one occasion, we lacked enough cyclers for all inpatients. We therefore had to increase nursing and medical staff awareness about managing PD patients and adjusting dialysis prescriptions, and also to reinforce treatment protocols and to increase education about drug dosing.

To meet the increased workload generated from the increased number of PD catheter insertions, additional operating theatre time was required, and for the unplanned patients admitted to hospital with unrecognized uremia in particular, peritoneal catheters were often inserted on weekends and at other times outside formal operating lists. The expansion in PD numbers therefore relied heavily on the cooperation and support of our surgical colleagues.

At a time when the U.K. National Health Service is looking to cut health care costs by reducing inpatient beds and length of hospital stays, we had to plan for patient discharges before PD was established. That requirement led to the development of an acute PD prescription so that PD use could start immediately after surgical catheter insertion, with a plan for reattendance for intermittent PD as an outpatient until patients could be formally trained to perform their own exchanges.

**Future problems**

After the initial pilot of shadow tariffs for dialysis reimbursement (meant to ensure that they were realistic), the real tariffs were introduced. Unfortunately, the reimbursement rates for PD and, in particular, for assisted PD are being reduced. Although the proposed tariffs for PD are lower, PD remains financially viable compared with HD (Table 1). However, the reduction in payment will affect clinician choice by limiting prescription of the more expensive peritoneal dialysates. It is somewhat disappointing that, after earlier Department of Health guidelines aimed at offering assisted PD to more patients, the proposed tariff is
being reduced. However, the reimbursement rates are just proposed at this point, and there may be options for change.

Summary
Governments and health care providers can bring influence to bear on health care provision and clinical practice by changing reimbursement rates. However, to successfully implement such changes, appropriate time is required to make the necessary changes in infrastructure and staffing. In the United Kingdom, the Department of Health proposed that all dialysis providers increase the proportion of patients treated by home dialysis therapies, be it home HD or PD. That proposal was followed by the introduction of shadow reimbursement rates in a number of pilot centers. Once those changes were deemed successful, changes in the reimbursement of dialysis modalities were introduced to favor home-based dialysis therapies. By announcing its intention and forewarning centers such as our own were able to implement changes in clinical practice and to reverse what had been a declining PD program into an expanding program, almost doubling its size within a few years.

Disclosures
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References

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