Review Article

Home haemodialysis: ‘home, home, sweet, sweet home!’

CHRISTOPHER R BLAGG

Northwest Kidney Centers, University of Washington, Seattle, Washington, USA

SUMMARY: Home haemodialysis was first developed 40 years ago as a means of treating more patients with the limited funds then available. It soon became obvious that the treatment worked well and subsequent studies and experience have confirmed that it improves both mortality and morbidity and provides the best quality of life and other benefits for dialysis patients. The present review describes the history of the development of home haemodialysis in Seattle and elsewhere and the lessons learned about its benefits in the early days, which are just as relevant today. The advantages and disadvantages are discussed, as are the issues of which patients are candidates for this treatment and what is required of a home haemodialysis training and support programme. The decline in use of home haemodialysis in the USA and elsewhere is described and the actions that may already be beginning to reverse this trend. The role of home haemodialysis in giving the opportunity for longer hours of dialysis three times a week or on alternate nights is important. There is discussion of the relationship of home haemodialysis and peritoneal dialysis and its important future role as the means to enable treatment with more frequent short daily and long nightly haemodialysis.

KEY WORDS: artificial kidney, haemodialysis, history, home haemodialysis, peritoneal dialysis, quality of life.

INTRODUCTION

Home haemodialysis accounted for a large proportion of the patients treated by dialysis in the 1960s, but for many reasons its use has declined over time. Until very recently, except in Australia and New Zealand, many regarded it as a rather odd endangered species. Now, with increasing patient numbers throughout first-world nations and with recent interest in more frequent haemodialysis, it appears poised for growth. This paper is a review of home dialysis based on a presentation at the First Australasian Home Haemodialysis Workshop in Christchurch, New Zealand in July 2004.

HISTORY

View from Seattle

Haemodialysis for chronic renal failure began in Seattle in March 1960 with the invention of the Teflon shunt by Belding Scribner, and was first reported in the Transactions of the American Society for Artificial Internal Organs of that year.1,2 The first mention of home haemodialysis was in the 1961 presidential address to the American Society for Artificial Internal Organs (ASAIO) by Charles Kirby, a cardiac surgeon: ‘Perhaps what we need is a home dialysis unit to be placed by the patient’s bedside, so that he can plug himself in for an eight-hour period once or twice a week’.3

The next few years saw a rapid sequence of advances from Seattle, including improvements in the shunt and the technique of dialysis and establishment of the Seattle Artificial Kidney Center by Scribner and James Haviland.4 This opened in 1962 and was the first out-of-hospital community-supported dialysis centre and also the first place where haemodialysis was done by nurses rather than physicians.5 The Center gained notoriety later that year when an article about the programme in Life magazine included a description of how an anonymous lay committee was used to decide which patients should be accepted for treatment using the limited funds and space available.6

In 1963, Scribner and his team began a long and fruitful cooperation with Les Babb, professor of nuclear engineering at the University of Washington. One of the first fruits of this was the development of the first proportion-
ing system for preparation of dialysate from concentrate using acetate as the base, which was installed in a four-station unit at the University Hospital. Later that year the 15-year-old daughter of one of Babb's friends was turned down by the Center, and so Babb and his staff rushed to develop a miniature single-patient version of the proportioning system that incorporated monitoring and fail-safe devices intended for unattended home haemodialysis. This machine was the prototype for almost all single-patient dialysis equipment in use today. Caroline and her mother were trained to do dialysis using the shunt and the low-resistance Kiil dialyser that did not require a blood pump (Fig. 1).

As a result, Caroline was able to complete high school and 2 years at university before dying from complications of systemic lupus erythematosus after 4 successful years on home dialysis. Babb and coworkers went on to describe the safety aspects of haemodialysis.

Initially, patients underwent dialysis at home twice a week for many hours. Because this was inconvenient, the schedule soon was changed to thrice weekly and then, following Stanley Shaldon's suggestion, to thrice weekly overnight for 6–8 h a treatment. These experiences led to adoption of thrice weekly haemodialysis as the standard conventional treatment because the long dialyses meant very adequate dialysis and the economies of home treatment allowed the maximum number of patients to be treated with the limited resources available. Later, thrice weekly dialysis became the norm throughout the world.

The initial success with home haemodialysis in Seattle came at a time when dialysis was unavailable in most cities in the USA and abroad. Consequently the University of Washington developed a remote home haemodialysis programme that trained and supported 52 patients, their families and physicians from elsewhere in the USA and from Chile, Malaysia, the Philippines and the Sudan.

The success of the University of Washington programme soon led to the Seattle Artificial Kidney Center offering home haemodialysis as a treatment option. Because of its low cost when compared with centre haemodialysis, the State of Washington Division of Vocational Rehabilitation agreed to pay for equipment, training and 3 years of ongoing support for patients going home. Because funds for treatment remained short the Center adopted a policy that all patients should dialyse at home, and eventually more than 90% of Seattle patients were on home haemodialysis.

Home haemodialysis elsewhere in the 1960s

While there is some controversy over who was first to do home haemodialysis, as is often the case this treatment began to be used at around the same time, in 1964 in Boston, London and Seattle. In July of that year, John Merrill and his colleagues began using twin coil dialysers in the home to treat four male patients at a cost of $5000–$7000 a year. At about the same time, the first Seattle patient went home assisted by her mother. In September, Shaldon in London began using a set-up similar to that used in Seattle, and in October was the first to use overnight unattended home haemodialysis. In 1966, Kolff and Nosé at the Cleveland Clinic began a home haemodialysis programme using coil dialysers and Maytag washing machines, but soon had to change to the twin coil Baxter machine because of the Maytag Corporation's concern about potential liability.

WHAT WE LEARNED ABOUT HOME HAEMODIALYSIS IN THE EARLY YEARS

The advantages of home haemodialysis soon became obvious. It encouraged patient independence, responsibility and confidence, gave freedom from the centre and enforced socialization, eliminated the need to travel there three times a week, allowed the patient to set their own flexible scheduling, increased comfort and convenience, reduced the risk of infection, and, most importantly, cost significantly less than dialysis in the centre. The disadvantages were the need for space for the equipment and to store supplies, most patients needed help from a family member or other person, it usually needed modifications of domestic plumbing and electricity and increased utility bills, and it had an impact on the family generally.

Patients dialysing in a centre easily become dependent on their doctor, nursing staff and the machine, and when patients lose control of factors that can gratify or hurt them they are eventually reduced to a state of ‘learned helplessness’. Involvement in their own care is important for all patients with a chronic disease, and particularly for those with chronic renal failure, wherever they dialyse. Physician and nursing staff attitudes are
crucial in fostering independence and for educating patients that home haemodialysis is safe for appropriately motivated, trained and supported patients. To achieve independence, dialysis must begin early to avoid hospitalization and debility, physicians and staff must minimize any reinforcement of the 'sick image' and must avoid labelling patients as disabled, and there must be emphasis on the benefits of self-care and the importance of taking as much responsibility as possible for their own treatment. In this regard, the Medicare Programme's introduction of the term 'end-stage renal disease' was not helpful.

Fostering success with home haemodialysis requires commitment and understanding by physicians and staff, a high-quality training programme, patients taking as much responsibility for their own treatment as possible, and ready access to a full range of supporting services. Social work and dietary support are important, as is access to rehabilitation services. Patients should be encouraged to resume work, education or other of their usual activities and to exercise. There also must be ongoing education and reinforcement for the patient and family, as well as for physicians and centre staff. Scribner always believed that the adjustment and rehabilitation of patients with any chronic disease are improved by giving them a full explanation of their disease and its treatment, and as much responsibility for their treatment as they can accept.

ADVANTAGES OF HOME HAEMODIALYSIS

Home haemodialysis provides the best patient survival.22-26 Although these papers are from investigators who favour home haemodialysis, they are confirmed in a paper using data from the United States Renal Data System (USRDS).27 This showed that the unadjusted relative risk of death for home haemodialysis patients compared with centre dialysis patients was 0.37 ($P < 0.01$). Controlled for age, race, gender and cause of renal failure the relative risk was 0.58 ($P = 0.02$), and with additional adjustment for comorbid conditions was 0.57 ($P = 0.03$). All patients in the USRDS data base who had evidence that they had been trained to do self-care dialysis, whether they then dialysed at home or in a centre, had a relative risk of death of 0.78 after adjustment for age, race, gender and diabetes, compared to those who had not been trained.

Similarly, studies of quality of life, rehabilitation and ability to work have shown these to be significantly better in home haemodialysis patients than in patients treated in a centre, and to more closely approach those seen in patients with a successful kidney transplant.28-31 Other important advantages of home haemodialysis over conventional dialysis are better blood pressure control and, most importantly, the best opportunity for patients to be treated by more frequent haemodialysis.

WHY DOES HOME HAEMODIALYSIS FAIL IN SOME PATIENTS?

In a retrospective study of 116 patients trained in the North-west Kidney Centers programme over a 22-month period, 12 (10.3%) had undergone transplant, 14 (103%) returned to centre haemodialysis and 37 (31.7%) died. Compared with those who had undergone transplant or who returned to centre dialysis, the patients remaining on home haemodialysis were more likely to be older, and have been on dialysis longer. Predictors of mortality were age, cause of renal failure and helper status. Older age and diabetes were associated with a higher risk of mortality, and having a related rather than an unrelated helper was protective. Risk of failure, assessed using unconditional logistic regression, showed that cause of renal failure, sex and helper status (related vs unrelated) were not risk factors for failure. The important factor was age. Patients aged between 50 and 65 were less likely to fail than younger and older patients.31

WHAT HAS HAPPENED TO HOME HAEMODIALYSIS SINCE THE 1960S IN THE UNITED STATES AND ELSEWHERE?

In the USA, with the advent of almost universal entitlement to dialysis and transplantation with the Medicare End-Stage Renal Disease (ESRD) Programme in 1973, the proportion of patients at home began to fall steadily.34 In 1972, approximately 40% of patients were treated by home haemodialysis but now this is approximately 0.4%.35 The proportion of patients on peritoneal dialysis was very small until continuous ambulatory peritoneal dialysis (CAPD) was developed in the late 1970s. It then increased, and rose to approximately 15% of all dialysis patients during the first half of the 1990s with the introduction of continuous cycling peritoneal dialysis (CCPD), but has declined somewhat since then. Similar changes have been reported from other countries.36,37 This compares particularly with the use of these treatments in Australia (24% on peritoneal dialysis, 11% on home haemodialysis, 37% on self-care dialysis and only 28% on centre haemodialysis) and New Zealand (48% on peritoneal dialysis, 14% on home haemodialysis, 15% on self-care dialysis and only 23% on centre haemodialysis) in 2002.38

Among the reasons for the decline in home haemodialysis in the USA are the inadequate payments for this modality for the first 5 years of the Medicare ESRD Programme, the proliferation of dialysis units, many of which were for-profit and not at all interested in setting up home haemodialysis programmes, the changing patient demographics with the almost universal entitlement so that the proportion of diabetic and elderly patients increased markedly, and the introduction of CAPD and CCPD. New patients were not expected to
be taking responsibility for their own treatment and were not encouraged to do so by the many nephrologists and staff who had little or no experience with home haemodialysis. Patients were also put off by the extra time and effort involved, the thought of sticking themselves with large needles, the machine and technical aspects of doing dialysis, and concern about being isolated. Perhaps the reason for the continuing greater use of home and self-care haemodialysis and peritoneal dialysis in Australia and New Zealand is in part a reflection of the absence of for-profit dialysis units and the fact that dialysis is mainly coordinated through programmes run by teaching and larger community hospitals.

WHO ARE CANDIDATES FOR HOME HAEMODIALYSIS?

Almost anyone can do self-dialysis if motivated, compliant, and able to learn. The medical contraindications to home haemodialysis are severe cardiovascular disease with instability during dialysis, blindness (not with a helper), and contraindications to the use of heparin. Age itself is not a factor, but the need for suitable living accommodation is, unless the patient is going to do self-dialysis in a centre. Generally there should be a family member or someone else to help the patient, although this is much less necessary with new machines such as the Aksys PHD System (Aksys Ltd, Kincolnshire, IL, USA). In terms of intelligence, a study by a clinical psychologist of 100 consecutive patients successfully trained for home haemodialysis in Seattle found them to have an average IQ of 103 ± 16.2 with a range between 76 and 147 compared with a normal IQ of 100 ± 15.0. Thus, almost any patient can be trained to do home haemodialysis if sufficiently motivated.

Similarly a comparison of North-west Kidney Centers’ home haemodialysis patients in 2001 with all Washington State and all US dialysis patients showed a very similar distribution by age (Fig. 2), a slightly higher proportion of male patients, and a similar distribution of diabetic patients (38% vs 37% vs 39%). The major differences were a significantly lower number of black patients compared with US patients generally, reflecting the lower proportion of black people in the general population in the North-west and, related to this, fewer patients with renal failure secondary to hypertension.

REQUIREMENTS FOR SUCCESSFUL HOME HAEMODIALYSIS

Important from the viewpoint of the patient is blood access that is easy to use, a dialyser, treatment duration and ultrafiltration rate selected to provide adequate dialysis while minimizing symptoms during and between treatments, cautious use of antihypertensive drugs, and dialysis equipment designed specifically for easy patient use in the home. The centre must provide dedicated and experienced training staff, one of whom is on call at all times to advise patients regarding problems, and must have readily available technical maintenance and repair staff. The nephrologist should see the patient regularly, the patient’s dialysis log sheets and monthly blood chemistries should be reviewed by the nephrologist and staff, and the staff should make a home visit at least once a year. Our experience, and that of others, is that on-line real-time monitoring is not important for safety, but in the future in the USA this will almost certainly become required from a medico-legal standpoint. However, patients and family should be trained to handle emergencies in the home.

Before installation of the equipment, the home must be surveyed to ensure the adequacy of the electricity and water supplies and drainage, and the availability of a telephone adjacent to the machine. If necessary, electricity and plumbing modifications must be done. The water treatment equipment required must be decided based on analysis of the local water supply. There must be space both for the machine and a bed or chair, and space for the storage of equipment and supplies.

WHY HOME HAEMODIALYSIS WILL INCREASE IN THE FUTURE

The number of dialysis patients worldwide will continue to increase steadily. For example, in the USA it is expected that the numbers will double over the next 10 years and will include many more diabetic and elderly patients. At the same time, the number of nephrologists will increase slowly, if at all, and is in fact declining in some countries, and there is no sign that the nursing shortage will improve. In the USA there will be continuing concern about the quality of care and poorer dialysis patient survival when compared with many European countries, Japan and Australia and New Zealand.
A trend that is gradually increasing is the awareness of patients, nephrologists, unit staff, administrators, dialysis corporations and payers, including governments, of the advantages of home haemodialysis, and that more treatment is better. Overnight haemodialysis thrice weekly is better than conventional thrice weekly centre dialysis, alternate night dialysis is even better, and home haemodialysis is the ideal modality to allow the best treatment of all, more frequent daily or nightly dialysis.44

Another factor is recent attention to better equipment design for home haemodialysis. The main problems with home haemodialysis are the time and effort demanded of the patient and any assistant, the intimidation associated with the machine, the need for self-puncture, and the experience of seeing sick patients in a center who are being dialyzed by staff. In addition, there are the space requirements, the cost of equipment, supplies and the extra utilities, and the need to ensure quality care.45 Many of these problems can be improved by design of equipment specifically intended for self-dialysis at home or in a centre. In addition to the Aksys PHD System,46 other small manufacturers are also developing equipment for home use,47 and the large dialysis equipment corporations are also beginning to respond to the increasing interest in home and more frequent haemodialysis.48–51

Another reason for believing home haemodialysis will increase is that the number of publications dealing with this has begun to increase recently. In 1973, more than 7% of all papers on haemodialysis dealt with home haemodialysis. As with the number and percentage of home haemodialysis patients treated in the USA, the percentage of papers dealing with this treatment also declined steadily after the Medicare ESRD Programme began, and by 1988 was <1%. In the 5 years from 1994 to 1998, the average was only 0.6% per year of all haemodialysis publications, but in the last 5 years this has increased again to an average of 1.2%.

WHAT ARE THE CONCERNS ABOUT HOME HAEMODIALYSIS?

A recent cross-sectional survey of 173 Canadian haemodialysis patients treated in centres was combined with demographic and comorbidity data from a prospectively maintained data base. Multiple logistic regression was used to determine the factors associated with the attitude 'patients should not perform dialysis without being supervised by a nurse'. The most prevalent knowledge barrier was lack of satisfactory explanation of the various techniques. The most prevalent attitude barriers were that patients should not dialyse without direct supervision, fear of failure to do self-dialysis adequately, and fear of social isolation. The most prevalent skill barriers were needle phobia and lack of space in the home. The variables significantly associated with a negative attitude to self-dialysis were age, fear of substandard care, needle phobia, fear of change, fear of social isolation, and unwillingness to remain awake during dialysis.52

Another study from the USRDS asked what modality options were discussed with 1074 patients on peritoneal dialysis and 1175 patients on haemodialysis at the start of treatment. Of patients on peritoneal dialysis, 68.2% were told about centre haemodialysis, 81.7% were told about home CAPD, 60.1% were told about home CCPD, and only 21.2% were told about home haemodialysis. Corresponding numbers for haemodialysis patients were 89.7%, 25.3%, 20.0% and 24.6%.53 This and common experience in talking with patients from across the USA show that patients generally are not given much of a choice, especially where home haemodialysis is concerned.

Physician concerns relate to safety and the adequacy of support for patients dialysing at home. This reflects the fact that in the USA, as in many other countries, few practising nephrologists today have had any experience with home haemodialysis.

From the centre viewpoint, concerns are whether home haemodialysis is cost-effective, that the costs of training are inadequately covered, and that it is simpler just to increase the number of stations rather than to set up a home haemodialysis programme and provide ongoing patient support.

WHAT ABOUT COSTS?

Home haemodialysis was first developed because the ongoing cost was less than centre haemodialysis, primarily because of the lower staffing cost.59 All studies since the early days have confirmed this for conventional three-times-a-week haemodialysis at home. For example, a recent Canadian report showed an annual cost in Canadian dollars of centre haemodialysis of $30 626, for CCPD $24 937, for CAPD $20 029 and for home haemodialysis of $17 547.54 In our Seattle programme, the cost of a home haemodialysis is only approximately 60% of the cost of a centre haemodialysis. However, training for home haemodialysis requires more staffing and materials, and can cost between $350 and $550 per training dialysis. In addition, there is the cost of the equipment, which may range from approximately $10 000 to more than $30 000 for the machine and water treatment, depending on its sophistication. Consequently, many programmes lease the equipment together with technical support and provision of supplies.

WHAT CAN BE DONE TO REVERSE THE DECLINE IN HOME HAEMODIALYSIS?

Early identification and early referral to a home haemodialysis training programme are important so that poten-
tial patients can learn about their disease, the treatment options, and the advantages of home haemodialysis, and can meet successful home patients and their families. All staff they meet, including their nephrologist, must be staunch advocates for home treatment. Early fistula placement is also important to give time for good fistula to develop so that the patient can learn to insert their own needles. In addition, new educational programmes need to be developed for all patients with chronic kidney disease as well as for new dialysis patients.

There needs to be continuing development of equipment designed to increase adequacy of dialysis, decrease morbidity, and make haemodialysis simpler and safer for patients in the home. This can also lead to more frequent haemodialysis.

Home haemodialysis training and support programmes need to be centralized, just like transplant programmes, because it is unrealistic to expect every dialysis centre to develop an effective home programme. Centralization helps conserve resources and will attract staff with teaching ability and experience with training patients.

A culture change is needed. All haemodialysis patients should be expected to do as much of their own care as possible, particularly inserting their own needles. Self-care dialysis centres should be established that are either free-standing or in a separate dedicated area of a dialysis unit. At the same time, home haemodialysis should be offered to all patients when they first start dialysis and as they progress towards total self-care. The aim should be to have 100% of patients doing at least 50% of their own care and 50% of patients doing 100% of their own care.

Nephrologists all need to learn more about home haemodialysis and ensure that their patients have access to this either at their local centre or the nearest regional centre. They need to be able to assess patient suitability for home haemodialysis and understand the options in dialysis equipment so that they can explain the possibilities to patients and guide their choice.

As for the patients, Scribner always said that patients should take as much responsibility for their own care as they can, and that the good dialysis patient knows as much or more about their care than their doctor. More knowledge helps reduce patient fears and depression, makes it possible for them to face their chronic illness more realistically and positively, and provides them with the opportunity to select the best treatment for themselves.

WHAT ABOUT PERITONEAL DIALYSIS?

Continuous ambulatory peritoneal dialysis and CCPD are also very good home treatments and certainly could be used much more widely than at present in many countries. The advantages are that they are extremely simple to learn and new patients can be treating themselves at home within a week or two of starting treatment. Many of the benefits associated with self-care haemodialysis apply equally to peritoneal dialysis. The ongoing cost lies somewhere between that of conventional thrice weekly centre haemodialysis and home haemodialysis. With appropriate supervision to ensure adequate dialysis, patients can continue these treatments for several years. Unfortunately, after experiencing the benefits of this treatment in the home, most patients in the USA and many other countries have no choice but to go to conventional centre haemodialysis when they are no longer able to continue peritoneal dialysis. There is a good argument for establishing a fistula in every peritoneal dialysis patient once they are stable on this treatment.

LONGER OR MORE FREQUENT HAEMODIALYSIS

The recently completed multimillion dollar Hemodialysis (HEMO) Study showed no significant effect on overall mortality in haemodialysis patients treated three times a week with either increasing the dose of dialysis measured as Kt/V or using more biocompatible membranes. One of the investigators noted that ‘[The results] do indicate that for patients receiving thrice weekly treatments lasting 2.5–4.5 h each we have reached or neared the maximum benefit that can be attained when the benefit is viewed in the traditional dose–response sigmoid curve. This is not to say that future technological advances in dialysis may not provide new solutions or that either longer or more frequent dialysis will not improve outcomes’.

Another noted that ‘the results do not support conventional attempts to lower the high morbidity and mortality in haemodialysis patients. Current efforts are being focused on increasing dialysis time and/or frequency, improving phosphate control, and lowering traditional and non-traditional risk factors for adverse cardiovascular events in this patient population’.

There are now a number of glowing reports in the world literature on the benefits of both short daily and long nightly haemodialysis, and these have helped contribute to the revival of interest in home haemodialysis because home is the obvious place to do this. However, home haemodialysis does not necessarily need to be synonymous with daily or nightly haemodialysis to be better than conventional centre treatment. In the late 1960s the usual treatment schedule was between 5 and 8 h thrice weekly, often overnight. This changed with the obsession with a Kt/V of 1.0 as adequate dialysis, and development of more efficient dialysers. Today, the best published survival results with thrice weekly haemodialysis are from Tassin, France, using long slow dialysis. In a report on 445 unselected patients treated with 8 h of centre haemodialysis three times a week and a mean Kt/
V of 1.67, it was shown that 6 months after starting this regimen 98% of patients were normotensive without any antihypertensive medication. Survival in these patients was 87% at 5 years, 75% at 10 years, 55% at 15 years and 43% at 20 years. A more recent paper from Tassin reviewed 30 years and more than 6500 patient-years of experience.

Interestingly, approximately two-thirds of haemodialysis patients in the USA dialyse for <4 h thrice weekly compared with only approximately 10% of Australian and 5% of New Zealand patients (Fig. 3). This is at least a partial explanation for the better survival of Australasian haemodialysis patients. Similarly, recent Australian data based on approximately 4000 patients showed that if 4–4.4 h per dialysis is taken as the reference point, the relative risk of death (RR) adjusted for age, race, smoking status, body mass index (BMI), hypertension, chronic lung disease, coronary artery disease, cerebrovascular disease, diabetes and primary renal disease was 1.29 for 3–3.4 h and 1.06 for 3.5–3.9 h. With 4.5–4.9 h it was 0.77 and with >5 h it was 0.93.

The rationale for more frequent dialysis is that thrice weekly haemodialysis is unphysiological. One of the most telling arguments against conventional thrice weekly haemodialysis is that Monday and Tuesday are the commonest days for sudden and cardiac deaths of patients, while for peritoneal dialysis patients sudden and cardiac deaths are evenly distributed throughout the week.

The future use of more frequent haemodialysis will depend primarily on payors, and in the USA the government must become willing to accept that the increased supply costs can be offset by the reduction in costs associated with fewer hospitalizations and hospital days. In any case, with wider recognition of the significant potential for cost savings with conventional home haemodialysis, use of both thrice weekly and alternate night treatment will increase because both provide more dialysis than conventional centre dialysis, especially as practised in the USA. Self-care haemodialysis in a unit is also likely to increase. Most importantly, home haemodialysis can be the transition stage until governments and payors are sufficiently pressured by patients and physicians to accept that daily or nightly haemodialysis is the best and the most cost-effective treatment for many more patients.

CONCLUSIONS

Pre-ESRD patient education should be improved and must include information on the advantages of home dialysis. Because new patients not already embedded in a dialysis centre are ideal candidates for home dialysis, they should receive information on all treatment modalities, including home haemodialysis and peritoneal dialysis.

In a successful home haemodialysis programme the patient profile is not very different from the overall patient profile. A much higher percentage of dialysis patients than at present would be able to do home haemodialysis if they had access to effective regionalized training and support programmes.

Experience in New Zealand and Australia suggests that at least 20% of patients in Western countries could be trained to do self-haemodialysis, even with current dialysis equipment. New, more patient-friendly machines designed specifically for self-dialysis are being developed and could increase the use of this treatment in future years (Fig. 4). Patients who can do home haemodialysis are ideal candidates for more frequent haemodialysis.

What is needed is to convince nephrologists, patients, dialysis unit staff and payers that this is the best treatment available for our patients.

There’s no place like home!

ACKNOWLEDGEMENTS

I would like to thank Dr Tom K Sawyer for his help and support over many years, the many North-west Kidney...
Centers staff who have made our programme what it is, and the nephrologists from Washington State who have supported home haemodialysis. I owe a particular debt of gratitude to the late Belding Scribner who was responsible for most of the developments and ideas covered in this review.

Competing interests: The author is a consultant to Aksys, a maker of home haemodialysis equipment.

REFERENCES
