Conservative care in Europe—nephrologists’ experience with the decision not to start renal replacement therapy

Moniek W.M. van de Luijtgaarden¹, Marlies Noordzij¹, Wim van Biesen², Cecile Couchoud³, Giovanni Cancarini⁴, Willem-Jan W. Bos⁵, Friedo W. Dekker⁶, Jose L. Gorriz⁷, Christos Iatrou⁸, Christoph Wanner⁹, Patrik Finne¹⁰,¹¹, Olivera Stojceva-Taneva¹², Svjetlana Cala¹³, Vianda S. Stel¹, Charles Tomson¹⁴ and Kitty J. Jager¹

¹ERA-EDTA Registry, Department of Medical Informatics, Academic Medical Center, University of Amsterdam, Amsterdam, the Netherlands, ²Renal Division, Ghent University Hospital, Ghent, Belgium, ³REIN Registry, Biomedicine Agency, La Plaine-Saint Denis, France, ⁴Nephrology, Spedali Civili and University, Brescia, Italy, ⁵Department of Internal Medicine, St Antonius Ziekenhuis, Nieuwegein, the Netherlands, ⁶Department of Clinical Epidemiology, Leiden University Medical Center, Leiden, the Netherlands, ⁷Department of Nephrology, Hospital Universitario Dr. Peset, Valencia, Spain, ⁸Center for Nephrology «G. Papadakis», General Hospital of Nikaia-Pireaus, Pireaus, Greece, ⁹Division of Nephrology, University Hospital Würzburg, Würzburg, Germany, ¹⁰Division of Nephrology, Helsinki University Central Hospital, Helsinki, Finland, ¹¹Finnish Registry for Kidney Diseases, Helsinki, Finland, ¹²University Clinic of Nephrology, Skopje, FYR of Macedonia, ¹³Nephrology and Dialysis Department, ‘Sestre Milosrdnice’ Clinical Hospital, School of Medicine, University of Zagreb, Zagreb, Croatia and ¹⁴UK Renal Registry, Southmead Hospital, Bristol, UK

Correspondence and offprint requests to:  
Moniek W.M. van de Luijtgaarden;  
E-mail: m.w.vandeluijtgaarden@amc.nl

Keywords: conservative care, dialysis, opinions, renal replacement therapy, end-stage renal disease

ABSTRACT

Background. For some patients with end-stage renal disease (ESRD), providing conservative care until death may be an acceptable alternative for renal replacement therapy (RRT). We aimed to estimate the occurrence of conservative care in Europe and evaluated opinions about which factors nephrologists consider important in their decision not to offer RRT.

Methods. With a web-based survey sent to nephrologists in 11 European countries, we inquired how often RRT was not started in 2009 and how specific factors would influence the nephrologists’ decision to provide conservative care. We compared subgroups by nephrologist and facility characteristics using chi-square tests and Mann–Whitney U tests.

Results. We received 433 responses. Nephrologists decided to offer conservative care in 10% of their patients [interquartile range (IQR) 5–20%]. An additional 5% (IQR 2–10%) of the patients chose conservative care as they refused when nephrologists intended to start RRT. Patient preference (93%), severe clinical conditions (93%), vascular dementia (84%) and low physical functional status (75%) were considered extremely or
quite important in the nephrologists’ decision to provide conservative care. Nephrologists from countries with a low incidence of RRT, not-for-profit centres and public centres more often scored these factors as extremely or quite important than their counterparts from high-incidence countries, for-profit centres and private centres.

**Conclusions.** Nephrologists estimated conservative care was provided to up to 15% of their patients in 2009. The presence of severe clinical conditions, vascular dementia and a low physical functional status are important factors in the decision-making not to start RRT. Patient preference was considered as a very important factor, confirming the importance of extensive patient education and shared decision-making.

**INTRODUCTION**

The main purposes of providing dialysis to patients with end-stage renal disease (ESRD) are to prolong their life and to improve their quality of life. However, for those patients with a relatively short expected gain in survival, providing conservative care may be an acceptable alternative for dialysis [1, 2]. Different definitions for conservative care for ESRD are used in the literature [3]. In the current paper, we define conservative care as conservative palliative care until death, i.e. not just to postpone renal replacement therapy (RRT). If a patient is managed conservatively, all aspects of standard clinical care could be provided including outpatient visits to a nephrologist, the prescription of relevant medication and diet to control blood pressure, nutritional status and uraemic symptoms [4].

Over the last decade, the demographics of the RRT population have changed for various reasons, including an increased acceptance rate for RRT and start of RRT at higher levels of residual renal function [5, 6]. As a result, the proportion of older ESRD patients with comorbidities at the start of RRT has increased [7].

Recent studies showed that patient choices regarding dialysis and conservative care were affected by different factors. In a ‘discrete choice’ study, Morton et al. [8] showed that patients reported that theoretically they would prefer conservative treatment over dialysis treatment if fewer hospital visits were required and if conservative treatment resulted in fewer restrictions to their ability to travel or go on short trips. Chanouzas et al. found that of 242 incident pre-dialysis patients (eGFR <25 mL/min/1.73 m²) who had completed a formal, multidisciplinary pre-dialysis education package, 10% chose conservative care rather than dialysis treatment. This choice for conservative care was associated with being unmarried or living alone, high age, having a higher comorbidity score or lower functional status [9].

For nephrologists, different factors may be involved in the decision-making, but which factors are considered most important is unknown. With this study, we aimed to estimate the occurrence of conservative care in Europe and to evaluate nephrologists’ opinions on which factors influence their decision not to start RRT but to provide conservative care instead. In addition, we evaluated whether these opinions differed by nephrologists’ and facility characteristics.

**METHODS**

**Survey design and distribution**

This study is part of a survey aiming to evaluate current opinions of nephrologists on the decision-making process on both when to start and not to start RRT. We developed a 26-item web-based survey in English using the online tool Survey-Monkey (SurveyMonkey.com, Portland, Oregon, Ryan Finley).
In autumn 2010, we distributed the survey to as many nephrologists as possible via the national renal registries and/or national societies of nephrology in 11 European countries, i.e. Belgium, Croatia, Germany, Finland, Greece, Italy, FYR of Macedonia, the Netherlands, Romania, Spain and the UK. Survey completion was voluntary and invitations included the option to decline. Those opting out were removed from the contact list and not contacted further. No incentives were offered for survey completion and responses were collected and analysed anonymously. The survey is described in more detail elsewhere and a copy of the survey is provided as supplementary data [10].

We defined conservative care as palliative treatment with the intention to provide it until death, i.e. not just to postpone RRT. For this part of the study, we asked how often RRT was not started and how specific factors would influence the nephrologist’s decision to provide conservative care (Table 1).

### Table 2. Baseline characteristics of the nephrologists

<table>
<thead>
<tr>
<th>Facility type</th>
<th>Total (n = 433)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>280 (65%)</td>
</tr>
<tr>
<td>Age of the nephrologist</td>
<td></td>
</tr>
<tr>
<td>≤44 years</td>
<td>178 (41%)</td>
</tr>
<tr>
<td>45–64 years</td>
<td>247 (57%)</td>
</tr>
<tr>
<td>≥65 years</td>
<td>8 (2%)</td>
</tr>
<tr>
<td>Low-incidence RRT countries</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>35 (8%)</td>
</tr>
<tr>
<td>Romania</td>
<td>18 (4%)</td>
</tr>
<tr>
<td>Spain</td>
<td>53 (12%)</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>51 (12%)</td>
</tr>
<tr>
<td>UK</td>
<td>88 (20%)</td>
</tr>
<tr>
<td>High-incidence RRT countries</td>
<td></td>
</tr>
<tr>
<td>Belgium (Dutch-speaking part)</td>
<td>37 (9%)</td>
</tr>
<tr>
<td>Croatia</td>
<td>17 (4%)</td>
</tr>
<tr>
<td>Germany</td>
<td>69 (16%)</td>
</tr>
<tr>
<td>Greece</td>
<td>44 (10%)</td>
</tr>
<tr>
<td>Italy</td>
<td>6 (1%)</td>
</tr>
<tr>
<td>FYR of Macedonia</td>
<td>15 (3%)</td>
</tr>
<tr>
<td>Facility type</td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>350 (81%)</td>
</tr>
<tr>
<td>Private</td>
<td>83 (19%)</td>
</tr>
<tr>
<td>Academic</td>
<td>199 (46%)</td>
</tr>
<tr>
<td>Non-academic</td>
<td>234 (54%)</td>
</tr>
<tr>
<td>For profit</td>
<td>100 (23%)</td>
</tr>
<tr>
<td>Not for profit</td>
<td>333 (77%)</td>
</tr>
</tbody>
</table>

### RESULTS

We received 433 completed surveys. The characteristics of the responding nephrologists are presented in Table 2. The majority of them were male (65%) and between 45 and 64 years (57%). Most nephrologists worked in public not-for-profit centres (71%), whereas 13% worked in private for-profit centres, 10% in public for-profit centres and 6% in private not-for-profit centres. The percentage of nephrologists working in public not-for-profit centres was higher in low-incidence RRT countries (85%) than in countries with a high incidence of RRT (52%).

As not all members of the national societies were actually nephrologists and not all nephrologists were involved in decision-making on the start of RRT, we were unable to determine the number of recipients eligible for participation in the survey and therefore, could not assess the response rate. When assuming that all recipients (excluding bounced emails) were eligible respondents, the response rates would range from <1% (n = 6 in Italy) to 44% (n = 15 in FYR of Macedonia).

### Occurrence of conservative care

First, we asked how often conservative care was offered in 2009 to patients with a level of renal function on which nephrologists normally would decide to start RRT. On average, the respondents answered that they decided to offer conservative care to 10% (IQR 5–20%) of their patients. Next, we focused on patient refusal of RRT, in the patients in whom nephrologists intended to start RRT. Nephrologists indicated that when they intended to start RRT, on average an additional 5% (IQR 2–10%) of their patients refused treatment and as a consequence received conservative care.

Eight percent of all nephrologists stated that they would never offer RRT to patients in whom the anticipated gain in
survival or quality of life was relatively low. In contrast, 14% of the nephrologists indicated always to offer RRT to all their patients. This percentage was statistically significantly higher among nephrologists from countries with a high incidence of RRT (20%) when compared with nephrologists from countries with a low incidence (8%), P < 0.001 (Figure 1).

Factors influencing the decision to provide conservative care

We asked the respondents to score the importance of several factors in their decision not to start RRT in four categories ranging from ‘extremely important’ to ‘not important at all’ (Table 3). When combining the categories ‘extremely important’ and ‘quite important’, we found that the nephrologists considered patient preference (93%) and the presence of severe clinical conditions (93%) as the most important factors in their decision making. Regarding patient preference, we found differences in opinion by facility or nephrologist characteristics. In not-for-profit centres, nephrologists more often rated patient preference as extremely or quite important (94%) than in for-profit centres (88%), P = 0.03. A similar difference was found between nephrologists from low-incidence (96%) versus high-incidence RRT countries (89%), P = 0.001 (Figure 2). The importance of the presence of severe clinical conditions in this decision making did not differ between subgroups.

Two other factors considered to be extremely or quite important by the majority of the nephrologists were the presence of vascular dementia (84%) and the presence of a low physical functional status, e.g. frailty (75%). The importance of these factors also differed between nephrologists from low-incidence versus high-incidence RRT countries with percentages of 94 versus 70% (P < 0.001) for vascular dementia and 85 versus 60% (P < 0.001) for the presence of a low physical functional status. A low physical functional status was also considered more important by nephrologists working in public versus private centres: 78 versus 61% (P < 0.001).

Although all factors were considered important to a certain extent, some factors, including wishes of the family, age of the patient and low mental functional status (other than vascular dementia) were considered less important than the aforementioned factors and were scored extremely or quite important by only half of all respondents. Finally, of the factors studied, social support was considered least important: 41% of the nephrologists scored this factor as extremely or quite important. For virtually all factors, nephrologists from low-incidence countries rated the importance of factors not to start RRT

| Table 3. Please indicate the importance of the following factors in your decision NOT to start RRT but to provide conservative palliative treatment instead |
|-------------------------------------------------|-----------------|-----------------|-----------------|-----------------|
| Patient preference                               | Extremely important n (%) | Quite important n (%) | Slightly important n (%) | Not important at all n (%) |
| Wishes of the family                             | 293 (75%)         | 72 (18%)         | 25 (6%)          | 3 (1%)           |
| Age                                              | 20 (5%)           | 176 (43%)        | 147 (38%)        | 49 (13%)         |
| Severe clinical conditions                       | 224 (57%)         | 142 (36%)        | 24 (6%)          | 2 (1%)           |
| Vascular dementia                                | 158 (40%)         | 174 (44%)        | 53 (14%)         | 8 (2%)           |
| Other low mental functional status              | 45 (11%)          | 153 (39%)        | 143 (36%)        | 53 (14%)         |
| Low physical functional status                   | 116 (30%)         | 177 (45%)        | 89 (23%)         | 10 (3%)          |
| Social support                                   | 19 (5%)           | 143 (36%)        | 160 (41%)        | 71 (18%)         |

This question was answered by 394 respondents.

Abbreviations: RRT, renal replacement therapy.
higher when compared with nephrologists from high-incidence countries (Figure 2).

The patient’s role in the decision-making by nephrologists

As mentioned above, we found that nephrologists consider patient preference as one of the most important factors in their decision not to start RRT. In Table 4, we present how often the nephrologists discussed their decision not to start RRT with the patients and his or her family. According to 81% of the nephrologists, the decision to provide conservative care rather than to start RRT is always discussed with the patient and his or her family, whereas 1% reported never to discuss this decision. In not-for-profit centres, the nephrologists more often discussed their decision with the patients than their counterparts from for-profit centres, i.e. 82 versus 77%, \( P = 0.04 \).

In the case that a nephrologist initially intended not to start RRT, the preference of the patient always changed this decision according to 10% of the nephrologists (Table 5). This percentage was 8% in low-incidence RRT countries and 14% in high-incidence RRT countries (\( P = 0.02 \)). According to 13% of the nephrologists, the preference of the patients never changed their decision not to start RRT.

This percentage was significantly different between nephrologists from for-profit centres (20%) and those from not-for-profit centres (11%), \( P = 0.04 \).

### DISCUSSION

In 2009, European nephrologists estimated to have offered conservative care to 10% of their patients. Additionally, of the 90% of patients in whom nephrologists intended to start RRT, 5% refused RRT and opted for conservative care themselves.

Conservative care was therefore estimated to be provided to up to 15% of the patients in 2009. From the nephrologists’ perspective, important factors in this decision were patient preference, the presence of severe clinical conditions, vascular dementia and a low physical functional status.

### Occurrence of conservative care

For ESRD patients with a poor prognosis, i.e. elderly patients and those with multiple comorbidities, chances of
receiving a kidney transplant are low and dialysis may not necessarily confer a survival benefit or improve the quality of life. Treating such patients conservatively may be an acceptable alternative for dialysis, as it causes less distress for the patient and is less costly. However, only few studies have examined differences in survival between patients treated with RRT and conservative care appropriately using multivariable models adjusting for (potential) confounders. Crude results generally favoured dialysis over conservative care in terms of patient survival [12, 13], but adjustment for relevant confounders caused differences to become less prominent or became non-significant [2, 14, 15]. Carson et al. [12] concluded that there are survival benefits for dialysis patients, but that this gain in survival time mostly comes together with an increase in hospitalization days. For elderly or frail patients, the quality of life is potentially more important than survival. De Biase et al. compared the quality of life between older patients (age >75 years) receiving conservative care and those who were recommended for conservative care, but opted for haemodialysis (HD) themselves. Despite having more comorbidities and a lower functional status, patients receiving conservative care maintained a satisfactory quality of life that was not different from the patients receiving HD [16].

Our data show that nephrologists estimated to have decided to offer conservative care to 10% of their patients in 2009. Using data from the UK, Smith et al. showed that after multidisciplinary assessment, 20% of the patients were recommended for conservative care, but 4% opted for RRT. Results of a study by Morton et al. showed that of all incident CKD stage 5 patients, 15% were treated conservatively [17]. We found the same result for the respondents from the UK, as they indeed estimated to have offered conservative care to 15% of their patients in 2009. In a Canadian setting, 25% of the referred patients were not treated with dialysis as a result of a poor prognosis and poor quality of life [18]. A potential explanation for this difference may be that in the Canadian study, the actual rate of referral to conservative care programmes was assessed, while in our study respondents had to estimate the percentage of patients who were offered conservative care one year earlier [18].

**The patient’s role in the decision-making by nephrologists**

Seventy-five percent of the nephrologists considered patient preference as extremely important in the decision-making and only 13% said that patients’ preferences never changed their decision to provide conservative care. The latter finding may not by definition imply that for 13% of the nephrologists patient preference is not considered in the decision making. It is also possible that in the far majority of cases, there is no need to change the initial intention not to start RRT because there is simply no difference in opinion between the patient and the nephrologist. These findings show that nephrologists consider shared decision-making as important. Adequate pre-dialysis patient education about treatment options, including conservative care, is necessary to enable patients to make informed decisions. This was confirmed by a study by Russ et al. in which patients indicated to desire more information about how long they can expect to survive on dialysis and what the impact of the treatment will be on their daily lives [19]. Although patient preference is considered to be one of the most important factors in the decision-making by nephrologists, only few studies have examined patient preference in detail. In the previous studies, patients opting for conservative care were older, more often had diabetes or a higher comorbidity score in general, and were more functionally impaired than the patients preferring dialysis treatment [9, 20, 21]. The most important reasons for these elderly patients to choose conservative treatment over dialysis included the speculated loss of autonomy, the patients’ older age and the related decrease of vitality, the distance from a dialysis centre or travel limitations to reach this centre. Also, some patients indicated that they did not want to think about the future or did not want to be a burden for their loved ones [9, 19–21].

Besides patient preference, other important factors in the decision-making were the presence of severe comorbidity,
vascular dementia, and a low physical functional status. Age was considered extremely or quite important by only half of all nephrologists, suggesting that they rely more on biological age than on calendar age.

Differences in nephrologist and facility characteristics

The importance of the reasons to provide conservative care instead of RRT did not differ by age, sex or experience of the nephrologist. However, differences were shown between countries, by profit status and between public versus private centres, suggesting that these factors are more important than the characteristics of individual nephrologists. Conversely, it is also possible that nephrologists with certain characteristics or attitude towards treatment choices are more inclined to work in a specific type of facility.

Eight percent of the nephrologists from low-incidence countries and 20% of those from high-incidence countries indicated to still always offer RRT even when they anticipated patient’s survival or quality of life gained by starting RRT was relatively low. This suggests that nephrologists in countries with a high incidence of RRT apply more liberal acceptance criteria for ESRD patients than nephrologists in low-incidence countries. A study by Couchoud et al. showed that each standard deviation increase in the proportion of nephrologists working in private practice (i.e. 26.3%) was associated with a 5% increase in RRT incidence [22]. This is in line with our study, in which the proportion of nephrologists working in private for-profit centres is higher in high-incidence RRT countries.

In a previous study based on this survey we found that not-for-profit and public centres more often experience a relative lack of capacity or a waiting list to start dialysis [10]. On the one hand, nephrologists in these centres possibly apply a stricter patient selection than those in centres where there is ample capacity; but on the other hand, nephrologists in for-profit centres may be influenced partly by financial considerations (overcapacity) in addition to expected patient benefit. This is in line with our finding that nephrologists from not-for-profit and public centres more often indicated that factors such as the presence of a low physical functional status (e.g. frailty) were extremely important in their decision not to start RRT. Another explanation for the different results by ownership status may be case-mix differences in patient populations. Public centres may treat more late-referred patients and may have a more developed palliative care unit than private centres. For-profit centres generally treat less severely ill patients, and the nephrologists in these centres may have less experience with the decision making on not to start RRT. In some countries, like in Croatia, FYR of Macedonia and Spain, nephrologists in for-profit centres only provide continuation of HD, and therefore they are not involved in pre-dialysis education and treatment, decision making and provision of conservative care.

Study limitations

There are potential limitations to this study. First, we were not able to assess the exact response rate of this survey. Based on the worst-case scenario, we estimated a low response rate. This raises the possibility of non-response bias [23], but since we lacked information on non-responders we could not determine whether and to what extent non-response bias influenced our results. We do acknowledge that volunteer bias may have affected our results, as nephrologists with a special interest or strong opinions on the subject may have been more eager to participate in our study. However, as the survey focussed both on reasons to start RRT and on conservative care, it is unlikely that the responses were biased by a high proportion of responses from nephrologists with a particular interest in conservative care. Since the subject of this survey addressed an extensively debated and highly sensitive topic, it is possible that the respondents gave socially acceptable answers. We tried to minimize this by emphasizing the anonymous nature of data collection. Furthermore, the survey was distributed in autumn 2010 and respondents were asked to recall their practice in 2009. As a result, recall bias may have affected the study results. Additionally, potentially relevant factors could not be taken into account. For example, the decision to start or not to start RRT requires shared decision-making—a process in which the patient’s views and preferences are elicited and taken into account in making a choice between two options. In this survey, we only obtained the nephrologists’ opinions, whereas especially the role of the patient is crucial. Also the available types of treatment were not taken into account. For example, if assisted (home) dialysis can be provided, this may be an option for patients whom otherwise would not be considered eligible for RRT. Finally, we examined differences in opinion by nephrologists’ and facility characteristics, but data on health care organization and dialysis facility practices were not available [24]. Additionally, previous studies showed that cultural and religious factors affect the end-of-life decision making by both the patients and their physicians [25]. This may especially be the case when it comes to the decision to provide conservative care instead of dialysis [26]. For example, in some cultures it is very uncommon to discuss death, which is inevitable when informing patients about conservative care [27]. Finally, differences in culture and religion may hamper extrapolation of our findings to non-European countries.

CONCLUSION

For some patient groups, conservative care may be an acceptable alternative for RRT. We showed that in 2009, nephrologists decided to offer conservative care in 10% of the patients and another 5% of the patients refused treatment with RRT themselves. In total, conservative care was estimated to be provided to up to 15% of patients. From the nephrologists’ perspective, important factors in the decision-making not to start RRT included patient preference, the presence of severe clinical conditions, vascular dementia and a low physical functional status.

Nephrologists in low-incidence RRT countries and respondents from public and not-for-profit centres more often scored these ‘contraindications’ as extremely important in the decision-making on not to start RRT. Overall, the patient’s preference was considered a very important factor which
confirms the importance of extensive patient education before the start of RRT and shared decision-making.

SUPPLEMENTARY DATA

Supplementary data are available online at http://ndt.oxfordjournals.org.

ACKNOWLEDGEMENTS

We would like to thank all the national renal registries and the national societies of nephrology for distributing the survey to their members or providing us with a list of e-mail addresses. We also very much appreciate the time and efforts from D. Ansell and L. Garneata who were involved in the development of the study and all nephrologists who participated in the study and all participants of the pilot study: M. Kessler, L. Frimat, F. Chantrel, G. Bobrie, V. Lemaître, J. Montoriol, G.P. Segoloni, A. Balducci, F.P. Schena, G.G. Battaglia, R.T. Krediet, R.T. Gansevoort, A.B. Geers, J. Hegarty, C. Farmer, G. Klawe, D. Throssell, F.J. Caskey and J. Nicholas.

CONFLICT OF INTEREST STATEMENT

None declared.

REFERENCES

11. ERA-EDTA Registry. ERA-EDTA Registry Annual Report 2008. Academic Medical Center, Department of Medical Informatics. Amsterdam, the Netherlands, 2010
Technique survival in home haemodialysis: a composite success rate and its risk predictors in a prospective longitudinal cohort from a tertiary renal network programme

Anuradha Jayanti¹, Milind Nikam¹, Leonard Ebah¹, Gill Dutton¹, Julie Morris² and Sandip Mitra¹

¹Manchester Royal Infirmary, Biomedical Research Centre, University of Manchester, Manchester, UK and ²Head of Medical Statistics, South Manchester University Hospitals, Manchester, UK

ABSTRACT

Background. Resurgence of interest in home haemodialysis (HHD) is, in part, due to emerging evidence of the benefits of extended HD regimens, which are most feasibly provided in the home setting. Although specific HHD therapy established at home such as nocturnal HD (NHD) has been reported from individual programmes, little is known about overall HHD success.

Methods. The study included 166 patients who were accepted in the Manchester (UK) HHD training programme through liberal selection criteria. All patients were followed up prospectively until a switch to alternative modality, to include 4528 patient-months of follow-up and about 81 508 HHD sessions during an 8-year period (January 2004–December 2011). Twenty-four patients switched to an alternative modality during the period. Combined technique survival (HHDc) as a composite of training (HHDtr) and at home (HHDhome) was analysed and clinical predictors of HHD modality failure since the commencement of the programme were calculated using Cox regression analysis. Technology-related interruptions to dialysis over a 12-month period and patient-reported reasons for quitting the programme were analysed.

Results. Technique survival at 1, 2 and 5 years was 90.2, 87.4, 81.5% (HHDc) and 98.4, 95.4 and 88.9% (HHDhome) when censored for training phase exits, death and transplantation. The combined HHDc modality switch rate is 1 in 192 patient-months of dialysis follow-up. Age >60 years, diabetes, cardiac failure, unit decrease in Hb and increasing score of age-adjusted Charlson-comorbidity index were significantly associated with technique failure. Significant clinical predictors of HHD technique failure in a multivariate model were diabetes (P = 0.002) and cardiac failure (P = 0.05). The majority (61%) switched to an alternative modality for non-medical reasons. The composite of operator error and mechanical breakdown resulting in temporary HHD technique failure was 0.7% per year.

Conclusions. HHD training and technique failure rate are low. Technical errors are infrequent too. Diabetes and cardiac failure are associated with significant risk of technique failure.