

CKJ REVIEW

The integrated care model: facilitating initiation of or transition to home dialysis

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ABSTRACT

A proportion of end-stage kidney disease (ESKD) patients require kidney replacement therapy to maintain clinical stability. Home dialysis therapies offer convenience, autonomy and potential quality of life improvements, all of which were heightened during the COVID-19 pandemic. While the superiority of specific modalities remains uncertain, patient choice and informed decision-making remain crucial. Missed opportunities for home therapies arise from systemic, programmatic and patient-level barriers. This paper introduces the integrated care model which prioritizes the safe and effective uptake of home therapies while also emphasizing patient-centered care, informed decision-making, and comprehensive support. The integrated care framework addresses challenges in patient identification, assessment, eligibility determination, education and modality transitions. Special considerations for urgent dialysis starts are discussed, acknowledging the unique barriers faced by this population. Continuous quality improvement is emphasized, with the understanding that local challenges may require tailored solutions. Overall, the integrated care model aims to create a seamless and beneficial transition to home dialysis therapies, promoting flexibility and improved quality of life for ESKD patients globally.

Keywords: home hemodialysis, home therapies, modality education, peritoneal dialysis, transitions

INTRODUCTION

End-stage kidney disease (ESKD) patients can choose to pursue either a form of life-sustaining kidney replacement therapy (KRT) or a more conservative approach focused on symptom management. While transplantation is the preferred option for those who choose a KRT, initiation on a dialysis modality occurs in many patients due to the scarcity of organs [1]. Dialysis modalities include peritoneal dialysis (PD), home hemodialysis (HHD) and facility-based hemodialysis (HD), with the latter being the most common form of KRT in most jurisdictions [1, 2].

The existing body of evidence indicates that no dialysis method exhibits outright superiority, but suggests that informed patients thrive when the modality chosen reflects their treatment preferences [2, 3]. Attempts aimed at comparing outcomes by modality are made complex by divergent practices and the absence of randomized trials [2, 4]. However, some studies highlight the cost-effectiveness and diminished environmental impact linked with the adoption of home-based therapies [5]. Moreover, a consistent undercurrent in these studies is the emphasis on patient choice and the need to reevaluate how home therapies are presented to patients throughout their kidney

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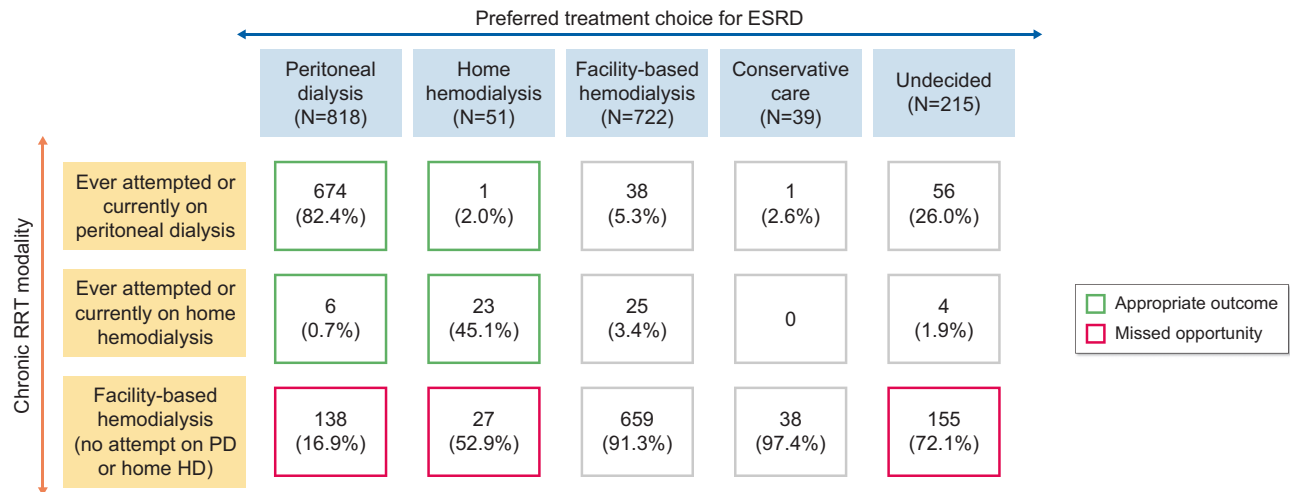


Figure 1: Missed opportunities for home therapies transitions [12]. From Poinen et al. Figure 2, 'Cross-classification of patients' chosen dialysis modality and their destination modality'. This provincial retrospective review of incident chronic dialysis patients in British Columbia ($n = 1845$), Canada found that 17% ($n = 320$) were deemed to be missed opportunities for recruitment to home therapies. This group of missed opportunities included 165 (8.9%) who had initially chosen a home therapy and 155 (8.4%) who were undecided about their preferred modality. The study did find that of the 39 patients who chose a conservative pathway, 1 ended up on PD and 38 on Facility based hemodialysis during the study period.

journeys [6]. Creating a knowledgeable and empowering environment for patients to make informed decisions regarding their kidney replacement therapy is a priority [6].

Home therapies offer individuals with ESKD the flexibility and convenience of receiving treatment in the comfort of their own homes, affording greater autonomy and empowerment [2, 7]. Furthermore, the COVID-19 pandemic has underscored the potential advantages of receiving care in the patients' home environment, particularly when conventional hospital-based care is difficult or undesirable to access [8]. Home therapies, especially with PD, have been associated with reduce systemic cost in developed countries leading to widespread interest in maximizing the use of home therapies [5].

While the traditional approach is to think of individual treatments in isolation, the 'integrated care' model encourages patients and providers to instead consider a more comprehensive treatment plan where different therapies may play a role at different times in their journey [9–12]. Initial and subsequent modality decisions are important, impacting both clinical outcomes and quality of life [9]. In this paper, we will propose a framework for incorporating the promotion of home therapies into an integrated care model for the treatment of kidney failure [13].

INTEGRATED CARE MODEL AND THE ROLE OF HOME THERAPIES

The pursuit of increased home dialysis utilization in the ESKD population faces persistent challenges, leading to missed opportunities in transitioning to these modalities [12]. The variation in the use of home therapies between and within countries highlights the numerous barriers at the patient, provider and system level that are often unique to local environments, and must be addressed. This highlights the fact that maximizing the safe and effective use of home dialysis is a complex problem with many moving parts, and having a systematic approach that can be applied anywhere is helpful to organize care delivery and quality and process improvement initiatives.

A retrospective review of incident chronic dialysis patients in the province of British Columbia, Canada found that 17% were deemed to be missed opportunities for recruitment to home therapies (Fig. 1) [12]. Utilizing the framework of a previously proposed 6-step model (Fig. 2) for recruitment to home therapies, this study also mapped the patient's journey through pre-dialysis care through to dialysis initiation which allowed for identification of points that could be optimized [14]. For those who were deemed missed opportunities, a lack of home therapy-specific education and appropriate suitability assessment were found to be significant barriers [12, 15]. The term integrative care was used by Van Biesen et al. in 2000 when they reported the outcomes of PD patients who transferred to HD during follow-up compared with individuals that remained on PD or started on HD [16]. However, integrated care has come to refer to a model whereby patients and their healthcare providers collaboratively creating a comprehensive care plan. This plan would then serve as a roadmap for making crucial decisions regarding initial and subsequent modalities, impacting clinical outcomes and overall quality of life [9]. Patients should be initially assessed for transplant eligibility, and if this is not a timely or feasible option, then they are reviewed for home therapies options as the next step. This framework would aim to have patients efficiently identified, assessed for home dialysis eligibility, educated about and offered their treatment options in a timely way, and allowed to make an informed decision at each transition between treatments (e.g. kidney failure to KRT; failure of kidney transplant, transition from PD or HHD therapy). Throughout this process, a knowledgeable and empowering environment for patients to make shared, informed decisions regarding their kidney replacement therapy features prominently.

THE GOALS OF AN INTEGRATED CARE MODEL

An integrated care model should have the following goals:

- To prioritize the use of kidney transplantation, if applicable
- To maximize the safe and effective uptake of home therapies where feasible

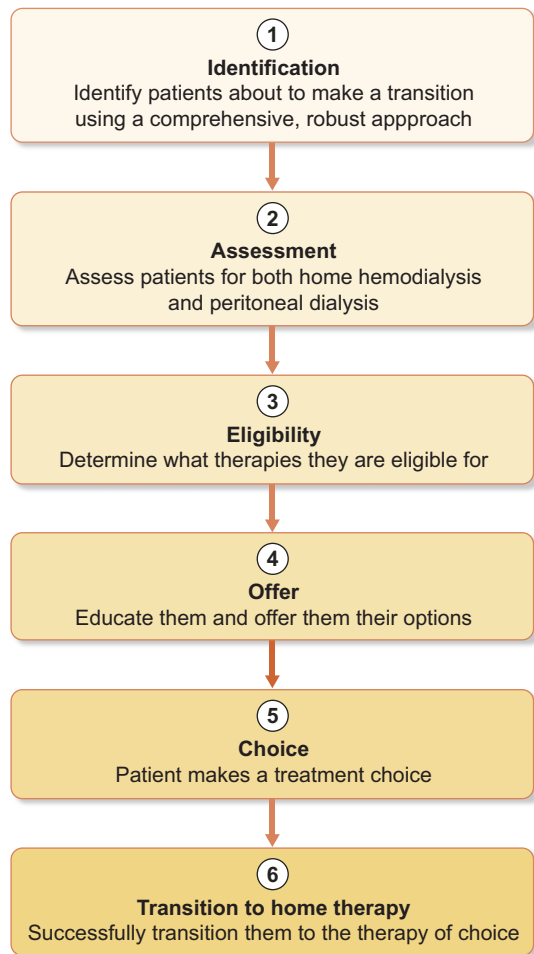


Figure 2: Proposed 6-step approach to maximizing the number of patients treated with home therapies [14]. Adapted from Blake et al. (2013), 'Pathway to peritoneal dialysis (PD) for the patient'.

- To preserve patient choice with engagement in shared decision-making processes

A FRAMEWORK FOR NAVIGATING MODALITY TRANSITIONS

Unfortunately, the path from initial modality selection to maintenance dialysis and the transition between modalities has not been clearly described in the literature. Recruitment pathways to home therapies have not yet been established, but there have been proposed frameworks to guide programmes [13, 15]. As patients will be treated with multiple modalities along their renal journey, newer models place emphasis on the fluidity of movement between modalities and the importance of the transition period itself (Fig. 3) [9]. There will be times when patients cannot continue home dialysis or fail to thrive on these treatments when a transition to facility-based treatment may be the most appropriate course. The immediate period following transitions between modalities exposes patients to greater vulnerability and is accompanied by higher mortality rates and demands heightened support and guidance for patients [17–19]. During modality transitions, patients are faced with a myriad of changes from both a global health perspective (e.g. acute illness/infections, additional comorbidities, anxiety associated

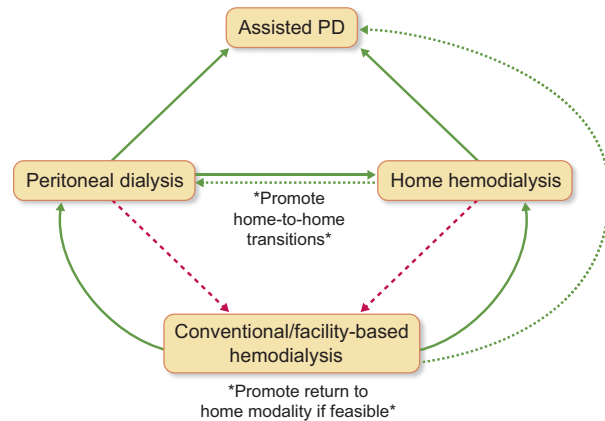


Figure 3: Transition opportunities during dialysis life course [14]. Adapted from Imbeault et al. (2019), Figure 1: 'Proposed optimal pathway for initiating home dialysis'.

with change in status, and social impacts) as well as related to modality (e.g. procedures to create dialysis access, biochemical and haemodynamic adjustments, impacts of lifestyle and autonomy) which may ultimately lead to negative outcomes.

Although it seems like a natural progression to transition from one home therapy to another (e.g. PD to HHD), this seems to happen in only a minority of cases [19, 20]. A study based on the ANZDATA (Australia and New Zealand Dialysis and Transplant) registry suggested that there was similar survival between individuals who transitioned from PD to HHD and those who started directly on HHD [20, 21]. Conversely, those who transition from PD to conventional HD have higher rates of negative outcomes, including return to PD, after prolonged exposure to facility-based treatments [22].

While the integrated care model focuses on those who wish to continue KRT, patients retain the ability to stop treatment and pursue a more conservative approach at any time.

THE CHALLENGES OF OPTIMIZING HOME THERAPIES UTILIZATION WITHIN AN INTEGRATED CARE MODEL

It is instructive to return to the 6-step approach to optimizing home dialysis utilization to frame the challenges faced when adopting an integrated care model [14].

Identification

The accurate and timely identification of appropriate home dialysis patients is a critical first step.

A comprehensive and robust approach for patient identification will be required and should include new kidney failure patients, patients on PD or HHD who are transitioning off therapy, patients with failing kidney transplants and prevalent facility-based HD patients who transfer in from other programmes.

A fluid process requires comprehensive communication and coordination among renal care team members from all areas. Renal care team perceptions shape patient journeys, necessitating consistency and targeted education. Education around home therapies will be required for the entire care team to facilitate a common level of knowledge and awareness and to build comfort with PD and HHD.

Initiatives to modify care team perceptions and navigator roles also have potential. Renal staff members consistently express a willingness to receive more education on home therapies, indicating a perceived gap in knowledge [4, 23]. Educational initiatives targeting HD nurses have been shown to reduce the perception that potential barriers to home dialysis were insurmountable [24].

Assessment

Once patients are appropriately identified, they will be assessed by the renal care team for candidacy for home therapies, and those without clear barriers will be targeted for additional modality education. Those that are not deemed candidates could be re-evaluated if their clinical situations change.

The assessment component will need to be timely, standardized and easily accessed in order to achieve success. The proposed approach will require flexibility to ensure that it can be applied to acute/urgent and elective starts, as well as in both the inpatient and outpatient settings.

To facilitate the timeliness and comprehensiveness of these assessments, a coordinated multidisciplinary care team approach is required [25]. Several proposed interventions have been attempted, including that of navigator roles and transitional units (TUs). Having a navigator as part of the renal care team may help to alleviate gaps and better guide patients through this difficult time. Another approach involves the establishment of TUs designed to provide support to patients undergoing facility-based treatments while also promoting the transition to home therapies [26, 27]. TUs are constructed to allow for enhanced engagement with both patients and their families, provide flexible learning environments and peer mentoring, and to be integrated into home therapy programmes [27]. This allows for a standardized, but malleable, pathway for patients to learn about home therapies [26, 27]. These units, present in different regions and programmes, create a specific physical space where patients receive positive reinforcement for home therapies and have easy access to further education from knowledgeable renal staff. Studies have suggested that this approach improves patients' willingness to embrace home therapies [26, 27]. A curriculum-based approach (standardized education modules, timely candidacy assessments and comprehensive documentation processes) has been trialled locally in British Columbia to assess feasibility in a pragmatic environment [28]. Preliminary results indicate encouraging trends towards increased uptake of home therapies among the acute start population—a population often lacking proper pre-dialysis care [28].

Growth in home therapies likely requires a culture that promotes them, as well as local home dialysis champions. Enhancing education and candidacy assessments can drive home therapy adoption [29, 30]. That said, a balanced representation of the benefits and drawbacks of home therapies is important to ensure patients have realistic expectations. Increased recruitment rates may be required to combat high rates of turnover from multifaceted sources of attrition leading to truncated tenures on home therapies [31].

Eligibility

To increase successful transitions to home therapies, identified patients will be reviewed for any potential barriers or contraindications to home therapies. Contraindications are medical or social factors that make it impossible for a patient to do a therapy. Barriers make a therapy more difficult or challenging to

deliver, but may potentially be overcome with assistance. True contraindications are relatively rare and what is considered a contraindication to therapy can vary from centre to centre, and may depend on available resources to some extent. For example, the presence of an ostomy or obesity may be perceived as contraindications to PD in some centres, but not in others. Eligibility for PD can be upwards of 70%–80% of patients in high-performing centres [2, 4]. Conversely, HHD has much lower eligibility rates with current technology and as a result, prevalent rates of HHD, even in countries with the highest utilization, only reach 17% [32].

A varying level of knowledge with home therapies among the renal staff remains a barrier, especially when it comes to assessing the eligibility for these modalities. It is imperative for a programme to provide further education and support to ensure a baseline level of comfort for home therapies and equitable access [24]. As advocates for their patients, nephrologists' comfort with home therapies should be enhanced through early exposure at the trainee level and continuous education when in practice, to be able to provide unbiased comprehensive guidance [4]. In order to promote home therapies, programmes should strive to find an optimal balance in incentivization and remuneration models that fit best for their local practice environment [4]. As home therapies-specific literature and technologies evolve, ongoing education will be required to ensure an up-to-date application of the evidence. Educational focus should also allow for the revisitation of traditional barriers (e.g. obesity, ascites, diabetes, previous abdominal surgeries) and learning from successful cases of overcoming these potential contraindications. Expanding the technical and procedural experience of the care team with novel approaches (e.g. pre-sternal catheter, high-abdominal catheters) may also allow for a larger potential pool of candidates. Staff should also be made aware of available resources such as assisted PD programmes which utilize external help to overcome physical barriers and allow additional patients to pursue PD when they would previously have been deemed ineligible. That said, programmes will need to assess the cost-effectiveness of each of these measures for their individual population and which is most likely to lead to sustainability.

Education and offer

When helping patients choose the right modality for them, they require the necessary education and tailored resources, and should be empowered throughout the process.

A fundamental paradigm shift in how patient education is delivered will be needed to fulfill the needs of a diverse patient population with evolving priorities and clinical situations. Modality education should be available to everyone regardless of clinical situation (e.g. whether it is an urgent inpatient start or an elective outpatient start) and adaptable to their needs and learning styles. This accounts for clinical situations that afford patients a longer period to make a modality decision, or where the choice is required urgently. For the latter, HD is commonly the default option, yet having the capacity for urgent start PD or expedited HHD transitions may expand options for patients in the future. Fostering a shared-care decision-making environment will only enhance engagement, mitigate anxiety and ultimately lead patients to the modality that suits their needs best [33]. Studies have shown that patients are more likely to be satisfied and maintain a modality if they started on their preferred modality [34].

The ability to guide patients in these crucial periods of transition will require timely coordination of care from a well-educated and experienced multidisciplinary renal care team. The staff will need to have a certain baseline of comfort with home therapies and a willingness to adapt to patient needs when delivering specific education. First, staff should have a fund of knowledge to be able to answer patient questions about the practicalities of home therapies and its impact on their lives. Although staff have traditionally focused on clinical outcomes, patients have repeatedly stated their interest in a modality's impact on their daily activities, preferences and quality of life, overall [11, 33]. Second, staff should understand that patients learn in different ways, and that using a variety of educational forms may be needed to ensure successful communication. A variety of strategies to overcome diverse language barriers, education levels and learning styles have been implemented, including online resources, use of decision tools, videos and peer support as adjuncts [29, 34]. The inclusion of caregivers and family in the educational process may also enhance the retention and understanding for patients. Third, staff may be encouraging of home therapies, but not lose sight of building realistic expectations for patients for both positive and negative impacts. The messaging should ideally be similar among staff members and should be honest and unbiased.

Choice

A patient's modality choice should be informed and supported, and made without pressure [35]. Their modality of choice may also not align with the renal team's perceived best option, leading to potential friction within the process. Yet, if the patient has come to their conclusion in an informed fashion, then the team should honour this decision while continuing to foster positive communication. The modality selection process itself is dynamic, whereby patients may alter their decision if changes to their medical or personal circumstances, or logistical factors dictate. Hence, there remains a chance for patients to circle back to the original modality choice in the future. Patients would also be seen as primarily accountable for performing their own treatments, and the presence of family or other assistance solely as a backup option in times of respite. Overall, both patients and renal staff should seek a modality that best suits the patient's preference at that time and be open to a shift to another modality if required.

Successfully transition to therapy of choice

The transitional pathway to any modality requires time, communication and coordination of multiple factors. When the process is not organized or is done in an *ad hoc* manner, the chance of failure is heightened, especially when done in the urgent setting. Hence, having a standardized process or pathway for key parts of these transitions may improve the timeliness and efficiency, and lead to higher rates of success.

Accessing critical resources, such as capacity for access creation and patient training, is important. For instance, once a potential new dialysis-start patient is identified, there needs to be a mechanism in place to activate a pathway for modality education, eligibility assessment and, once a decision is made, for access creation. The latter can be a major barrier in programmes with limited resources, and without careful consideration can greatly limit transitions to certain modalities. Hence, all established or developed PD programmes should evaluate

their internal capacities for surgical, interventional radiology (IR) and bedside PD catheter placement [36]. In contrast, obtaining vascular access for HD is typically more straightforward, as most programmes have nephrologists, IR physicians or surgeons to place venous catheters in a timely fashion. If a fistula/graft is chosen instead, these can also be arranged electively as an outpatient and is not usually a barrier to getting onto the modality of choice. Home therapies programmes continually strive to establish positive relationships with proceduralists and foster interest in placement, troubleshooting and revision of accesses.

To perform the selected therapy at home, the patient requires both extensive training sessions in the home therapies unit and preparation of their residence to carry out the therapies (electrical, water supply, etc.), as well as having the support of an experienced home therapies team to guide them. Programs should consider incorporating specific roles to help patients navigate transition in care and having specific protocols for patient population who may face more frequent barriers (e.g. acute starts, lower socioeconomic status or racial/ethnic groups). Focusing resources to identified gaps in the transition pathway to home therapies would lead more equitable access to these modalities.

THE CASE OF THE URGENT DIALYSIS START

Certain populations, like acute-start patients, encounter additional barriers to getting on home therapies [23, 24]. Research indicates that many acute-start patients are not informed about home therapies and that lack of education is a significant barrier. To address these issues, it is important to accurately identify acute-start patients and find creative methods to provide modality education and assess candidacy for home-based therapies early [23].

The framework outlined above works for urgent starts or elective planned starts, but the considerations are different and the challenges unique to urgent starts should be reviewed separately.

- **Identification:** programmes should have an established process to identify patients, regardless of in- or out-of-hospital settings, that require urgent initiation of dialysis. This would require coordination between chronic kidney disease staff, dialysis staff, operators (for access placement) and the inpatient units.
- **Assessment:** programmes should also have a robust process for urgent assessment of individuals with kidney failure that covers renal transplant, conservative pathways and dialysis options (including home therapies).
- **Eligibility:** equally, programmes must create avenues in which patients are vetted and screened for their home therapies candidacy in an accessible and efficient manner.
- **Education:** programmes will require careful coordination amongst the inpatient and outpatient setting to ensure seamless access to modality education in a timely way. The educational resources should be adaptable to individual patient needs and learning style, while also welcoming of their supports to be involved in the sessions. An avenue to ask questions and have further discussion with renal staff is vital. Peer support may be of benefit to some patients but challenging in the urgent-start scenario.
- **Choice:** not only are acute-start patients adapting to their new diagnosis, but they are tasked with making decisions about their treatment modality, which may be

overwhelming and heighten anxiety for some. This must be weighed against the fact that restricting patient choice by only presenting one option (typically, in-centre HD) runs counter to patient autonomy. Hence, renal programmes should strive to have all options presented in a pragmatic way to acute starts, ensure availability for urgent start PD or expedited HHD processes (e.g. TU), and have the supports in place for patients to be able to make such important decisions.

- Successfully transition to therapy of choice: after an acute-start patient expresses a choice of therapy, the programme should have the necessary processes in place to support them to that goal, especially when a home therapy is chosen. This can be more challenging for the acute-start population for the reasons mentioned above. If acute PD is available, patients would normally have a staff perform treatments for them either on the hospital ward or the home therapies unit until such time as they can be formally trained for independent treatments. If neither acute HHD nor acute PD resources are available, acute-start patients are often initiated on conventional HD via a catheter due to the ease of access and timeliness to treatment, while retaining hope that they can be converted to home therapies later in their journey, if appropriate. This may mean that patients undergo unnecessary access creation, exposure to another modality, delay in reaching a preferred modality and negative impact on quality of life, and incur higher costs to the system. It would be of benefit to shift the current model towards one that welcomes more options for acute-start patients and even consider having the physical infrastructure to promote these pathways. While some renal programmes have a single hub for patients throughout their renal journey, TUs may bridge gaps in systems where the care is more fragmented. TUs are designated home therapies focused areas within either the in-centre HD units or the home therapies clinics, and may play a role in facilitating these transitions. The TU staff would be well-versed in home therapies, and focused on providing individualized education and support to help patient navigate towards their chosen modality. TUs may be most impactful in renal programmes that novel approaches are under review, including empowering patients to take on certain HD task during their tenure on in-centre HD to enhance autonomy and confidence in transitions to HHD [37].

CONTINUOUS QUALITY IMPROVEMENT

As described in the preceding sections, the concept of an integrated care model is to prioritize the safe and effective use of home dialysis, while preserving patient autonomy throughout the process. This approach should be feasible in any jurisdiction globally, but the local issues and challenges may vary substantially [15]. Building and refining a local programme and processes requires high quality information about the steps in the process of care, where local challenges exist, and where one might want to focus their efforts to improve. This targeted approach to addressing local barriers is likely to be much higher yield than one that is not based on that framework. The solutions to local problems will often be unique to a given situation and require imagination, cooperation and coordination. Having a local quality improvement team with representatives from the impacted areas is critical to get buy-in and effect change. In growing programmes or those with little experience with home dialysis, reaching out to more experienced clinicians and programmes for support and advice may be beneficial. Application

and measurement of specific Quality Improvement metrics can be a powerful tool to help direct improvements in patient care [38]. A well-functioning programme with a robust home therapy population is built methodically, incrementally and intentionally over a length of time. As programmes mature, their goals may also adjust from growing their numbers (e.g. focusing efforts on recruitment) to maintaining patients on the chosen modality (e.g. attrition). It is important to bring along the patients, providers and decision-makers.

CONCLUSION

Home therapies offer convenience, autonomy and potential improvements in quality of life for patients with ESKD. Home therapies rates are lower than they could be due to multifaceted challenges and barriers within the current healthcare systems. Knowing that a proportion of patients experience multiple modalities during their journey, creation of a strategic treatment pathway that maintains flexibility and enhances the transitions between modalities is ideal. This paper describes the integrated care model which prioritizes the safe and effective uptake of home therapies while also emphasizing patient-centered care, informed decision-making and comprehensive support. By addressing systemic, programmatic and patient-level barriers, and by implementing strategies that empower patients and educate care teams, the transition to home dialysis therapies can become more accessible and seamless for patients worldwide.

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CONFLICT OF INTEREST STATEMENT

None declared.

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