Home Dialysis Today: More than a Different Place for ESKD Care

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Although it has been available for many years, home dialysis has faced an uneven reception, with global adoption still low. Today, however, kidney patients are increasingly demanding the life-altering freedom, flexibility, and control that home dialysis provides. New home dialysis options and technologies also hold promise for addressing critical equity and sustainability issues that are inherent in the current one-size-fits-all dialysis delivery environment.

"You may not control life's circumstances, but getting to be the *author of your life* means getting to control what you do with them."

Atul Gawande
Being Mortal: Illness, Medicine and What Matters in the End, *2014, p. 210*

Kidney Disease and Healthcare Are Changing

An estimated 700 million people are affected by chronic kidney disease (CKD) worldwide. About 2.6 million people received kidney replacement therapy in 2010. Estimates project that this number will be more than 5 million by 2030. These staggering statistics do not even consider the millions of people without access to dialysis therapy and who suffer premature deaths.[1] Future projections will update the trajectory to assess the effects of access to new reno-protective drugs.

The triple aim[2] was introduced as a framework for healthcare improvement through better population health, patient care experience, and decreased costs. Addressing the burnout of healthcare professionals and the need to advance health equity led to the quintuple aim[3] (Figure 1).

Indeed, all criteria of the quintuple aim need to be tackled to address the rising global burden of kidney disease. Kidney replacement therapy for end-stage kidney disease (ESKD) calls for transformational systemic change. The sustainability of high-quality care in regions where universal dialysis care is available requires novel solutions, given the ever-rising patient numbers and, hence, costs. Above all, access to dialysis needs to increase to improve health equity, especially in lower- and middle-income countries. Home dialysis is key to providing solutions for caring for people with kidney disease.

Home Dialysis: A Story of Mixed Results

Inspiring pioneer efforts dominated the beginning of home dialysis. Born out of necessity 60 years ago, home hemodialysis (HD) helped a 15-year-old girl live longer at a time when ESKD was a fatal disease.[4] About 50 years ago, Popovich introduced the concept of a portable/wearable dialysis option launching continuous ambulatory peritoneal dialysis (CAPD) as an alternative home dialysis option.[5] Today, two modality options are available for home dialysis: peritoneal dialysis (PD) delivered as CAPD or Automated Peritoneal Dialysis (APD), and home HD, with a day or nighttime schedule ranging from conventional three times per week to more frequent dialysis therapy.

The global use of home dialysis is low and varies widely due to complex reasons and dependencies including public policy, healthcare systems, geography, costs, and incentives, as well as culture (Figure 2).[6]

Home dialysis in the U.S. has been on a roller coaster ride since its introduction. More recently, reimbursement changes through the bundled payment in 2010 and the Advancing American Kidney Health Initiative policy in 2019 increased the prevalence of home dialysis to about 14% by 2021, PD contributing 11.6% and home HD 2.1%.[7]

Clinical outcome comparisons are limited to mostly observational studies, making it difficult to support a generalizable superiority of one modality over another. The body of evidence rather emphasizes dialysis modality prescriptions being individualized to the specific person, their clinical and non-modifiable characteristics, and their life circumstances. The benefit of intense HD delivered either through more frequent or extended-hours dialysis including nocturnal dialysis has been highlighted repeatedly.[8,9,10]

Nephrologists consider most people needing dialysis eligible for home dialysis based on their medical condition.[11] Furthermore, nephrologists state that they would prefer home dialysis in the hypothetical situation of dialysis need, a telling data point in a clinical area where science and evidence are augmented by the "art of medicine."[12,13]

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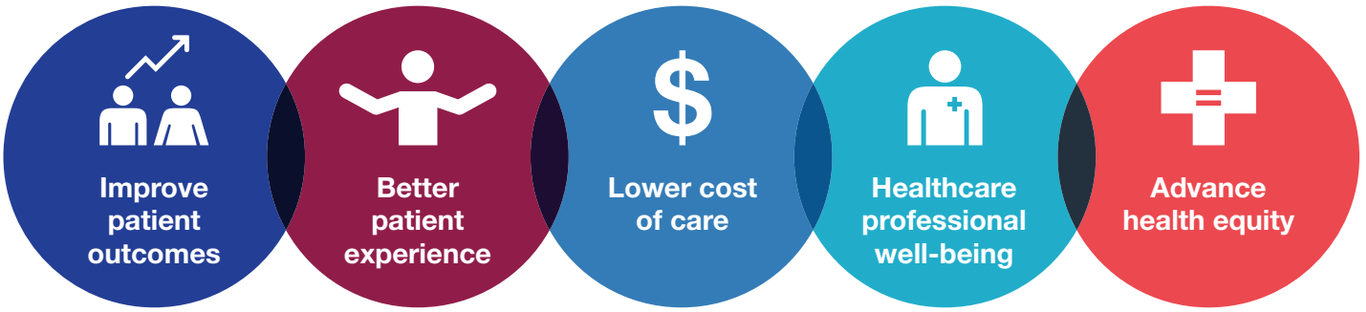
FIGURE 1 | QUINTUPLE AIM OF HEALTHCARE IMPROVEMENT (2022)



Home Dialysis | Afterthought No More!

One might say that home dialysis has been for many years an afterthought in the provision of kidney replacement therapy. This appears most evident in countries where center HD is by far the most common modality. Considering the astounding rise of CKD, the ensuing human burden, and increased cost in healthcare spending, novel approaches are called for. Home dialysis is ready for its moment in the limelight.

The embrace of home dialysis as an alternative kidney replacement therapy is fueled by several converging events that have given rise to a sense of crisis and created a moment of opportunity.

1. The Voice of the Patient

The most important driver towards home dialysis is the increasingly confident and insistent voice of the people needing dialysis. The one-size-fits-all approach prevalent for far too long must be reassessed through the lens of those who matter most in this community: the patients and families living with dialysis. Their request for therapies that enable a functioning life requires new answers. Life participation, the ability to participate in activities that are meaningful to patients, joins the rank of clinical outcome measures like survival, cardiovascular disease, and infection, highlighting people's expectations for life with dialysis.[14]

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There should be no surprise about this development. For the past 10 years quality improvement efforts have shifted from basic clinical parameters and care processes to more complex aspects of healthcare delivery including lowering mortality, reducing hospitalizations, and improving the patient experience. The most important goal is to advance people's quality of life, the metric that matters.[15]

A useful example is the 2020 ISPD practice recommendation for PD, which set forth a new mindset for a comprehensive, intuitive way of PD prescribing by promoting high-quality, **person-centered, goal-directed dialysis care** individualized to the person's clinical and personal needs to allow for a life with activity, purpose, and hope.[16]

Individualized home dialysis therapy allows more people to become the authors of their lives.

Humanizing dialysis is at the core of this necessary and welcome transformation for the complex realities of life with ESKD.

Home dialysis becomes more than dialysis in a different place, provides more than simply dialysis at home. It imparts control, flexibility, and autonomy by incorporating dialysis into lifestyle preferences. Humanizing dialysis is at the core of this necessary and welcome transformation to deal with the complex realities of life with ESKD.

This is consistent with the transformation of healthcare in general responding to expectations of a more person-centered care delivery system.

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2. Sustainability

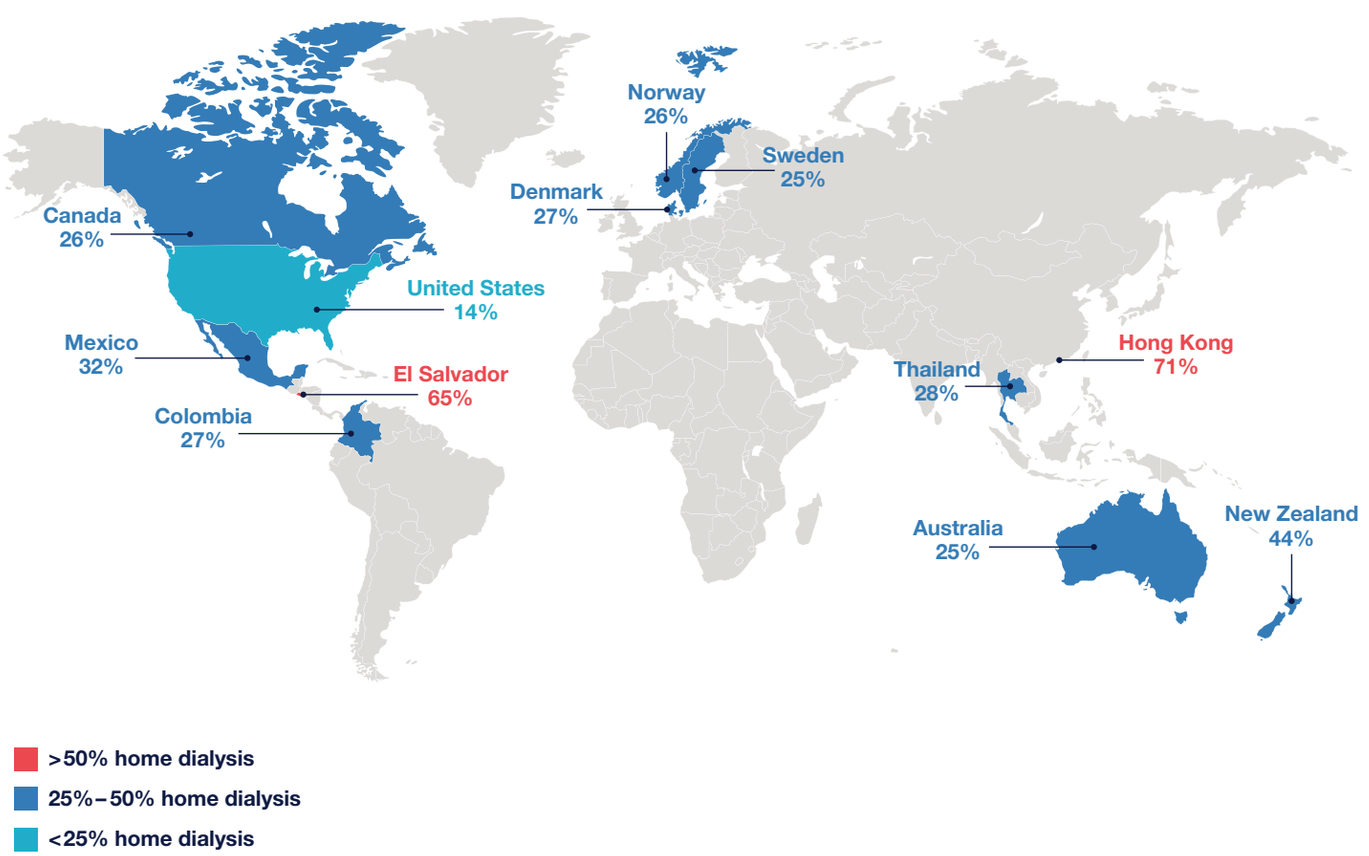
The sustainability of the current system is called into question for three different reasons: economic resources, climate change, and the healthcare workforce crisis. These realities affecting the status quo are global with country-/region-specific differences.[17]

Economic limitations in maintaining care for an increasingly older and medically complex population are a worldwide reality. The projected rise in CKD, already resulting in unanticipated demands for dialysis, will further worsen the imbalance of requirements and resources. Low- and middle-income countries are unable to provide access to all in need, a reality likely to worsen.

Climate change is associated with increasing risks for droughts, making water a prime resource that dialysis requires in large amounts. PD and low-flow home HD utilize less water and thus present a more sustainable therapy. Carbon footprint favors home dialysis with its fewer transportation requirements. Reducing waste products and point-of-care preparation for solutions needs to be addressed to extend the sustainability advantage of home therapies.

The third element threatening the sustainability of kidney replacement therapy is the overwhelming gap of healthcare professionals. The limitations are both in the number of people as well as in the expertise needed for high-quality care. A shortage of nurses in the ESKD community has long been anticipated, but the "great resignation" around the COVID-19 pandemic accelerated the crisis faster than expected. Similar trends exist for nephrologists and other members of the healthcare team. Home dialysis aided by technology to supplement human capabilities is needed to help mitigate this reality.

FIGURE 2 | INTERNATIONAL HOME DIALYSIS DISTRIBUTION, adapted from Perl J (6) 2023, page 847



3. Equity – Access to Care
Global access to healthcare varies, with the greatest disparities among historically disadvantaged populations. Access to dialysis is not a guarantee everywhere and demands progress.[18]

As affordability, sustainability, and scaling of dialysis care need to be considered to broaden access worldwide, home dialysis and foremost PD offer themselves as the most pragmatic opportunity.[19] High-income countries' equity challenges are evident in the uneven distribution of the use of home dialysis.

Home Dialysis | The Guiding Light to Address Unmet Needs. How to Get There?

Home dialysis emerging as a guiding principle to solve for improvement of the pivotal issues in ESKD care around the world requires a clear vision, disciplined approach, and alignment of all members of the kidney care community.

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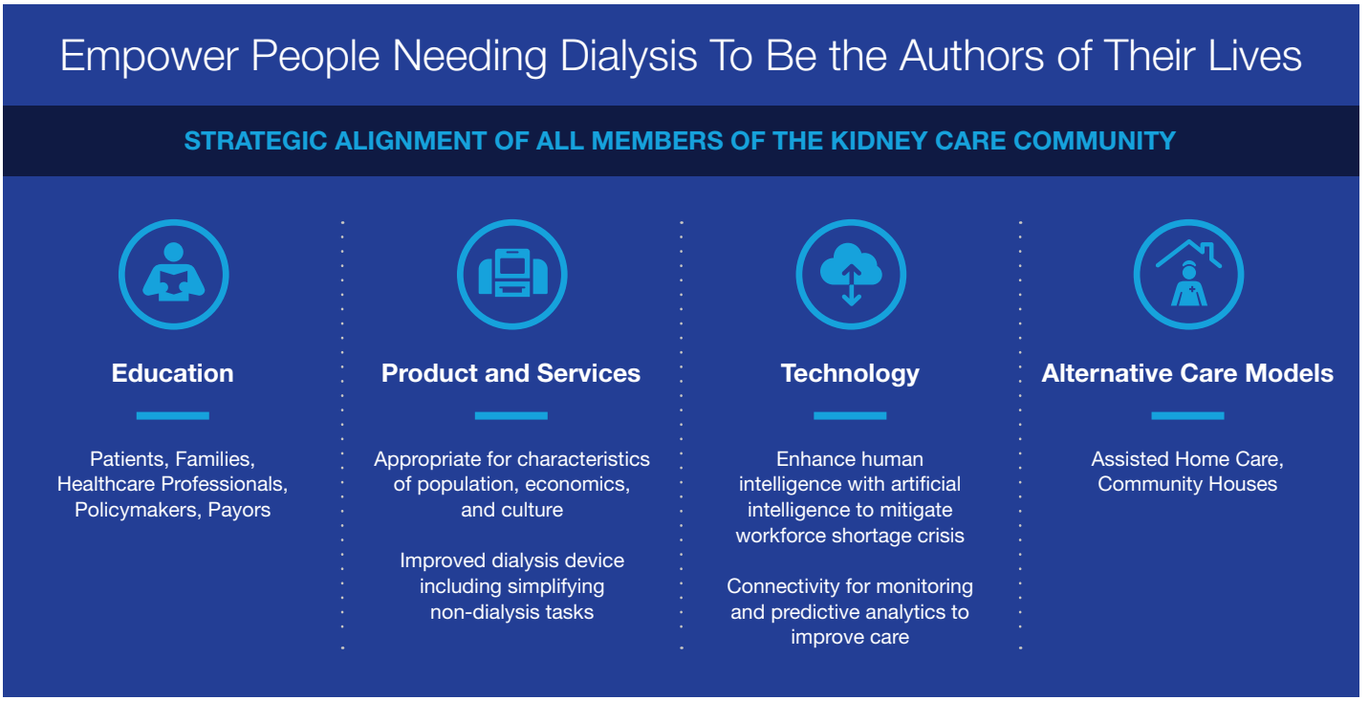
The goal is to create an environment to empower people needing dialysis. As home dialysis fosters control, autonomy, and flexibility to adapt dialysis to personal goals and choices in life, efforts to create a system that enables more people to take advantage of home therapies will center on education, products and services, technology, and alternative care models (Figure 3).

Education continues to be a foundational requirement for home dialysis starting with those needing dialysis and their families. High priority needs to center on the "how to" of home dialysis for healthcare professionals, policymakers, and payors. The success of home dialysis depends on creating the ecosystem that allows all participants to partner around the shared goal.[20,21]

Products for home dialysis need to be reliable, safe, and easy to use at home as well as for the professionals responsible for training and monitoring care. Advances in technology can deliver on these demands better than ever before. To solve known barriers, device improvements will also address non-dialysis-associated tasks like supply management, preparation of solutions, storage, and documentation.

Technology creates multiple opportunities. Smarter devices facilitating care delivery will mitigate the gaps created by the workforce shortage and the associated deficit of expertise. Remote therapy monitoring can deliver data for earlier detection of complications. The hope is that, in the future, AI will generate the basis for clinical algorithms supporting standardized and improved practice and risk prediction to alert the healthcare team of potential complications early.

FIGURE 3 | HOME DIALYSIS



A variety of alternative care delivery models exist in countries known for their successful implementation of home dialysis. Among these programs is assisted home dialysis, where support with the therapy is added at the start of home therapy and/or at challenging times of the journey like hospitalization or care partner issues.[22] Assisted support can also come in the form of financial support for care partners and costs for utilities at home. Lastly, a wider definition for "home dialysis" like community houses adds options. People perform dialysis therapy independently in a community place accounting for socioeconomic and cultural barriers.[23]

With shifting population characteristics, unrealized capability for global dialysis needs, sustainability concerns, and inequities in healthcare, medical and business leadership and policymakers are asked to listen to the concerns of patients, healthcare providers, economists, and climate scientists.

Home dialysis arises as a central answer addressing multiple issues as the right therapy, at the right time—and the right place—for many more people.

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Humanizing Dialysis:

Enabling people to live the life they hope for. Providing dialysis so people can do what matters most to them, such as:

"I'd like to have more energy to play with my grandchildren."

"I would like to be more active again to not burden my family."

"I would like to be more independent and travel."

Dr. Brigitte Schiller
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Global Medical Office

Dr. Schiller is a nephrologist with experience in direct patient care in private practice and academic institutions, research, quality improvement and physician leadership in administrative roles. She joined Fresenius Medical Care in January 2023 as SVP, Medical Officer, Home Therapies.

Dr. Schiller is passionate about contributing to the transformation of the care for patients with ESKD through patient advocacy, quality improvement and innovation including alternative care models. Dr. Schiller serves as an Adjunct Lecturer in the Division of Nephrology at Stanford University and is a member of the USRDS Contract Management Board.

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