

Economic Benefits of Increased Home Dialysis Utilization and Innovation

By Alex Brill

MARCH 2016



1350 Connecticut Ave. NW | Suite 610 | Washington, DC 20036
www.matrixglobaladvisors.com

EXECUTIVE SUMMARY

Home dialysis—a treatment modality for patients with end stage renal disease (ESRD)—is severely underutilized in the United States. This underutilization has both short- and long-term adverse consequences. In the short term, more than one hundred thousand ESRD patients miss out on a treatment option that may be more clinically appropriate than in-center dialysis. Over the longer term, innovation in the home dialysis market may be deterred.

Despite the substantial benefits of home dialysis and a Congressional mandate to foster this modality, only 11.5 percent of dialysis patients in the United States dialyze at home. A confluence of factors inhibits home dialysis utilization, but given that Medicare is the primary payor for nearly three-quarters of all ESRD patients, the federal government’s policies have an outsized effect on the market.

It is incumbent on policymakers to support policies to achieve greater access to home dialysis. Doing so will help the market reach a tipping point at which the modality’s own momentum will foster accelerated growth. This growth will, in turn, send strong signals to innovators, who will be motivated by the larger market to develop new technologies that can further benefit patients.


To shed light on how to reach this point, this paper examines the spectrum of barriers to home dialysis utilization and potential policy solutions to mitigate or eliminate these barriers.

- **Patient-Level.** Research has shown that dialysis patients lack knowledge about

treatment options, and patients who are familiar with home dialysis may not have accurate information. Education is one of the key ways to help patients learn about home dialysis or overcome misgivings. In addition, some patients forgo home dialysis because they lack a care partner, an impediment that could be addressed through new policies.

- **Provider-Level.** Dialysis providers play an essential role in informing patients of their treatment options. Physicians often default their patients to in-center dialysis, in part due to lack of education around home dialysis. Nephrologists, primary care doctors, nephrology nurses, and social workers must become proficient in talking to patients about home dialysis and its benefits. Nephrologists’ self-reported lack of training in offering home dialysis must be rectified.

Facility-Level. Too many dialysis facilities are not certified to offer home dialysis. In some states, the time involved in obtaining certification has been identified as a barrier to facilities making home dialysis available to patients. In addition,



the socioeconomic and racial disparities in the distribution of facilities that offer home dialysis should be studied so that policy solutions can be properly crafted.

- **Reimbursement-Related.** There is a substantial discrepancy between the cost of training a home dialysis patient and the amount Medicare reimburses for this activity. In addition, Medicare should permit the use of telemedicine for home dialysis patients and encourage the use of new remote monitoring technologies, allowing patients to receive medical supervision at a distance if they choose when their physician deems it appropriate.

Enabling home dialysis to flourish does not require that all of these barriers be removed simultaneously. Rather, reaching the tipping point that yields increased utilization of and investment in this modality will help knock down remaining barriers. This momentum will not only help more patients receive the clinical, economic, and psychosocial benefits that home dialysis currently offers, but also open up possibilities for potentially unforeseen innovation in home dialysis.

INTRODUCTION

For individuals living with End Stage Renal Disease (ESRD), survival depends on either a kidney transplant or perpetual dialysis treatment to replace failed kidney function. In 1972, Congress established Medicare coverage for ESRD patients, regardless of age, because of the high cost of treatment. Today, for the majority of the nearly 450,000 Americans on dialysis, the federal government assumes some or all financial responsibility for these services.

Given its position as the dominant payor for ESRD treatment, Medicare has an outsized influence with regard to dialysis technology, standards of care, and patient choice. Decisions by the Centers for Medicare and Medicaid Services (CMS) affect the availability and quality of treatment options—home dialysis, in-center care, or transplantation—for all patients. And though Congress established a clear directive to CMS that patients well suited for home dialysis should be so treated, this treatment modality has not reached its potential market share.

The ability to receive home dialysis offers many patients treatment flexibility and improved quality of life, and the underutilization of this modality has adverse consequences for the system. In the short term, many ESRD patients miss out on a treatment option that could offer them improved survival, as well as health and lifestyle advantages. In the long term, the relatively small home dialysis market and limited growth weakens the incentive for additional investment and innovation in this important modality.

A confluence of factors causes this underutilization. This report, after examining new evidence regarding the disparities in access to home dialysis, identifies barriers to greater home dialysis utilization and proposes a

variety of reforms. The report concludes that changes by stakeholders and policymakers could create a “tipping point” that leads to greater home dialysis utilization and invigorates an otherwise stagnant market.

I. BACKGROUND

Economics of Dialysis Treatment

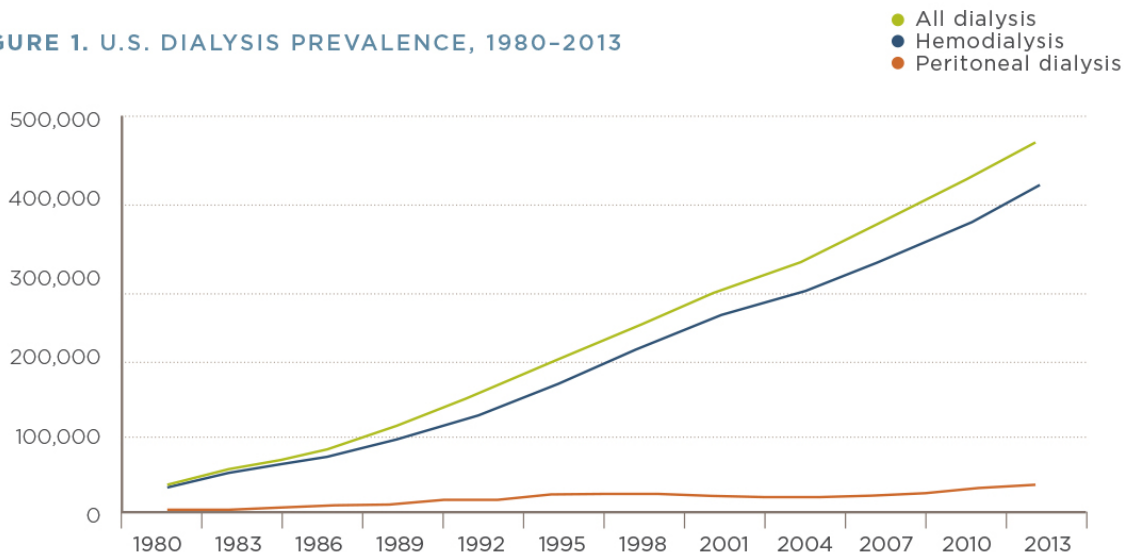
U.S. Dialysis Market

Dialysis performs the vital kidney function of removing waste from the blood. It is available in two forms: hemodialysis, which cycles a person’s blood through a machine outside the body for cleaning, and peritoneal dialysis (PD), which cleans a person’s blood using the abdominal lining. Dialysis demand in the United

States has increased dramatically in the last few decades. In 1980, roughly 45,000 people received dialysis, but by 2013, more than

465,000 did, with 90 percent on hemodialysis.¹ (See Figure 1.)

FIGURE 1. U.S. DIALYSIS PREVALENCE, 1980–2013



Source: USRDS, 2014 and 2015 Annual Data Reports.

The marketplace for ESRD patients consists of dialysis facilities, companies manufacturing dialysis equipment, health care providers, and a payor mix dominated by Medicare. Among U.S. dialysis patients in 2012, 84 percent receive some level of Medicare coverage: 44.1 percent are covered only by Medicare, 13.3 percent have Medicare and Medicaid coverage, 17.2 percent are covered by Medicare Advantage, and 9.4 percent have secondary coverage from Medicare.² Total Medicare expenditures on ESRD patients totaled \$30.9 billion in 2013.³ While these patients represented less than 1 percent of the total Medicare population, they accounted for more than 7 percent of total Medicare spending.⁴

As can occur elsewhere in the health care system, dialysis patients can face information

asymmetry regarding appropriate treatment modalities and best care options. In dialysis, this asymmetry results in the vast majority of patients missing out on the great benefits that dialyzing at home offers. Both home-based modalities—PD and home hemodialysis (HHD)—are viable options for many, but most dialysis patients instead drive to a dialysis center three times a week for treatments that take three to five hours each.

Impact of Information Asymmetry on Home Dialysis Utilization

In 2013, only 1.8 percent of U.S. adult dialysis patients received HHD, and 9.7 percent received PD.⁵ While home dialysis is not the best option for all dialysis patients, it would be a beneficial modality for many more people

than are currently using it. Nephrologists have indicated that roughly 12 percent of U.S. patients are well suited for HHD and 33 percent for PD.⁶ Among nephrologists asked about personal dialysis preference if they required dialysis themselves, 45 percent preferred PD; 25 percent, daily HHD; 18 percent, nocturnal HHD; and 3 percent, standard HHD.⁷ Only 9 percent chose in-center hemodialysis.⁸

Indeed, the United States lags behind other countries in both HHD and PD, ranking 13th in the world in the use of HHD (see Table 1) and 28th in the use of PD (see Table 2) in 2013.⁹ (Among the pediatric ESRD population in the United States, utilization of PD is far higher than it is among U.S. adults. The majority of children with ESRD receive kidney transplants, but of those on dialysis, nearly 40 percent receive PD.¹⁰)

While other countries have different policies governing dialysis utilization, international comparisons at a minimum illustrate that substantially higher rates of home dialysis utilization are possible.

TABLE 1. % DIALYSIS PATIENTS RECEIVING HOME HEMODIALYSIS, BY COUNTRY (2013)

Rank	Country	Percentage
1	New Zealand	18.4
2	Australia	9.3
3	Denmark	5.9
4	Finland	5.7
5	Canada	4.3
6	United Kingdom	4.2
7	Sweden	3.7
8	Netherlands	3.3
9	Hong Kong	2.6
10	Scotland	2.6
11	Ireland	2.4
12	Belgium, Dutch sp.	2.2
13	United States	1.8

Source: USRDS, 2015 Annual Data Report.

TABLE 2. % DIALYSIS PATIENTS RECEIVING PERITONEAL DIALYSIS, BY COUNTRY (2013)

Rank	Country	Percentage	Rank	Country	Percentage
1	Hong Kong	71.8	15	Estonia	14.8
2	Mexico	44.8	16	Netherlands	14.2
3	Iceland	34.2	17	Hungary	13.9
4	New Zealand	32.2	18	United Kingdom	13.8
5	Colombia	30.1	19	Rep. of Korea	12.6
6	Thailand	24.8	20	Singapore	12.3
7	Qatar	23.0	21	Spain	11.4
8	Sweden	21.7	22	Ireland	11.3
9	Denmark	21.2	23	Scotland	11.0
10	Australia	19.6	24	Kuwait	10.5
11	Finland	19.6	25	Romania	10.1
12	Canada	17.6	26	Serbia	9.7
13	South Africa	16.4	27	Austria	9.6
14	Norway	15.5	28	United States	9.5

Source: USRDS, 2015 Annual Data Report.

II. HOME DIALYSIS: BENEFITS, TRENDS, AND DISPARITIES

Home dialysis offers substantial benefits to patients, including the potential for improved clinical outcomes, improved quality of life, and increased employment. The modality also provides indirect benefits, such as increased facility capacity and increased incentives for technological innovation. Recognizing this, Congress mandated that home dialysis be incentivized. The Social Security Act states, “It is the intent of the Congress that the maximum practical number of patients who are medically, socially, and psychologically suitable candidates for home dialysis or transplantation should be so treated,” and requires the Secretary of Health and Human Services to “provide an incentive for the efficient delivery of home dialysis.”¹¹

Patient, clinician, industry, and academic stakeholders are also invested in promoting home modalities. In March 2012, a group of stakeholders held a National Summit on Home Dialysis Policy and subsequently formed the Alliance for Home Dialysis (the sponsor of this report) to continue pursuing ways to increase home dialysis utilization.¹²

Home dialysis offers substantial benefits to patients. Recognizing this, Congress mandated that home dialysis be incentivized.

Despite the fact that policymakers, patient advocates, nephrologists, dialysis providers, equipment manufacturers, and others recognize the benefits of home dialysis and encourage utilization, many dialysis patients in the U.S. are still not realizing these benefits.

Benefits of Home Dialysis

Home dialysis significantly increases quality of life for ESRD patients. A patient receiving hemodialysis at a facility usually spends three to five hours three days a week doing so, not including time spent driving to and from the facility. Among other drawbacks of spending so much time at a dialysis facility, this schedule makes it difficult for a dialysis patient to remain employed. Six months after starting in-center dialysis, only 43 percent of people are able to maintain the same level of employment.¹³ When a patient is able to dialyze at home, his or her quality of life improves, particularly in terms of increased independence and the ability to work. Being able to work gives dialysis patients greater financial freedom and psychological well-being—a significant benefit especially for the nearly half of new ESRD patients that are working age.¹⁴

Home dialysis can also offer clinical benefits by allowing dialysis patients to dialyze more frequently than the conventional three days per week. According to the U.S. Renal Data System, “Thrice-weekly treatment may be inadequate for addressing the critical problems of persistent fluid overload, hypertension, and left ventricular hypertrophy.”¹⁵ Many studies have shown the health benefits of more frequent dialysis. For example, patients in a

randomized controlled trial who switched from hemodialysis three times per week to HHD overnight five to six times per week showed improvements in left ventricular mass, blood pressure, and mineral metabolism.¹⁶ Another study found that short daily hemodialysis is better than conventional (three days per week) hemodialysis at regulating blood pressure and reversing left ventricular hypertrophy.¹⁷

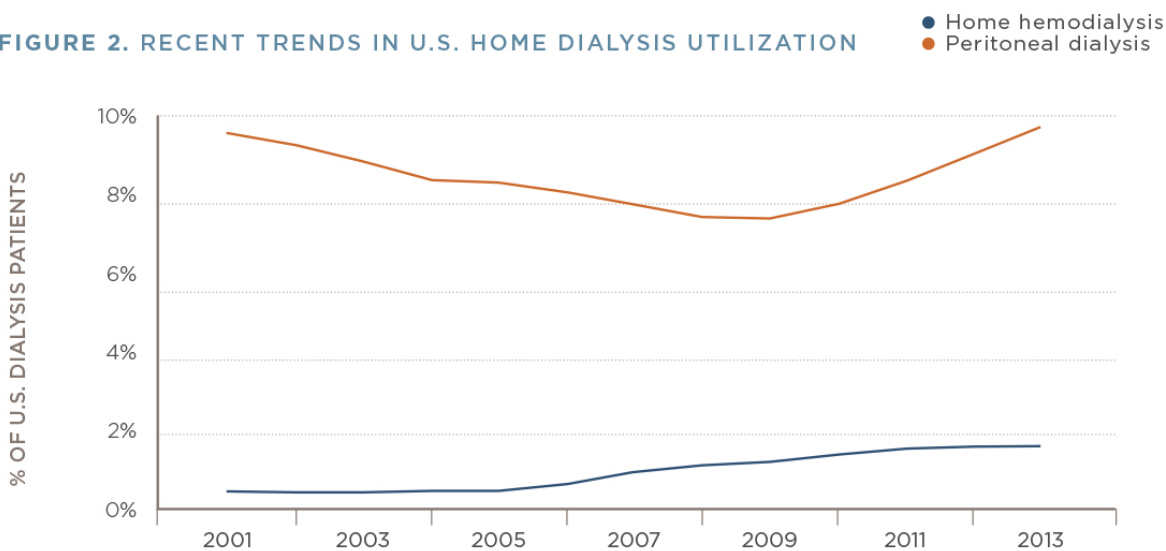
Another benefit of home dialysis is its effect on facilities' capacity. Because home dialysis patients receive supervision from a facility but do not need to use the facility's machines, home dialysis allows facilities to serve more patients. As mentioned above, dialysis demand has increased tenfold since 1980 without a concurrent increase in facility capacity. To prevent patient deferral of care, facilities' efficiency is critical.

U.S. Home Dialysis Trends

Home dialysis utilization has trended up slightly in recent years, but this growth has been relatively small. (See Figure 2.) As mentioned above, not even 2 percent of U.S. dialysis patients received HHD in 2013, while 9.7 percent received PD. PD utilization has shown more variability than HHD, declining steadily until 2009 before increasing in the last several years.¹⁸ Recent survey data indicate that PD utilization as a share of all modalities has plateaued.¹⁹ A shortage of PD solution that began in August 2014 likely impeded growth during this period.²⁰

In addition to being incremental, the increase in home dialysis utilization has not been evenly distributed. There is substantial racial and geographic variation. On average, Hispanic patients are 13 percent less likely to receive PD

FIGURE 2. RECENT TRENDS IN U.S. HOME DIALYSIS UTILIZATION



Source: USRDS, 2015 Annual Data Report.

and 37 percent less likely to receive HHD, while black patients are 29 percent less likely to receive PD and 17 percent less likely to receive HHD.²¹ Among states, the District of Columbia had the lowest rate of PD utilization in 2013, at 3.2 percent of dialysis patients, and Puerto Rico

had the lowest rate of HHD utilization, at 0.5 percent. Alaska and Illinois had the highest rates for PD and HHD, respectively, with 23.9 percent of dialysis patients in Alaska receiving PD in 2013, and 11.6 percent of patients in Illinois receiving HHD.²² (See Figures 3 and 4.)

FIGURE 3. MEDICARE PERITONEAL DIALYSIS PATIENTS IN 2013

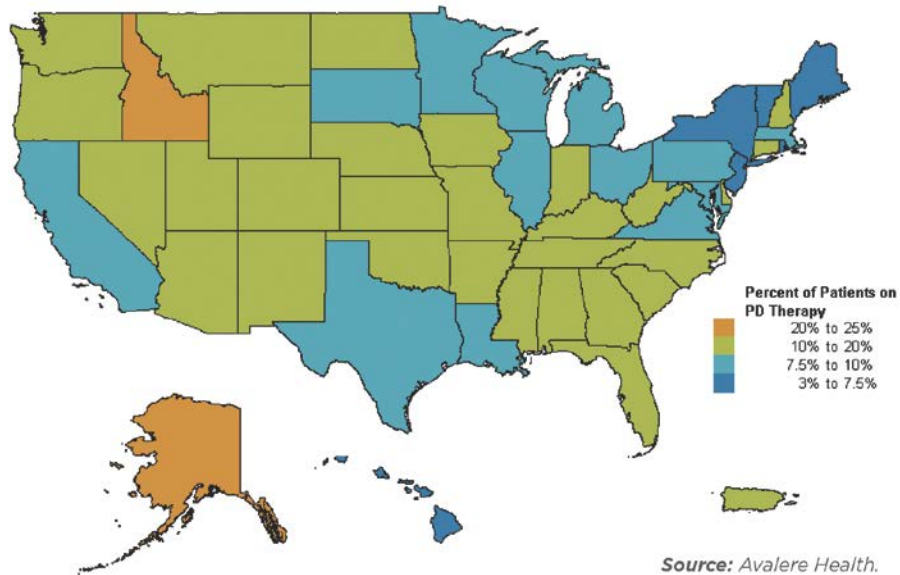
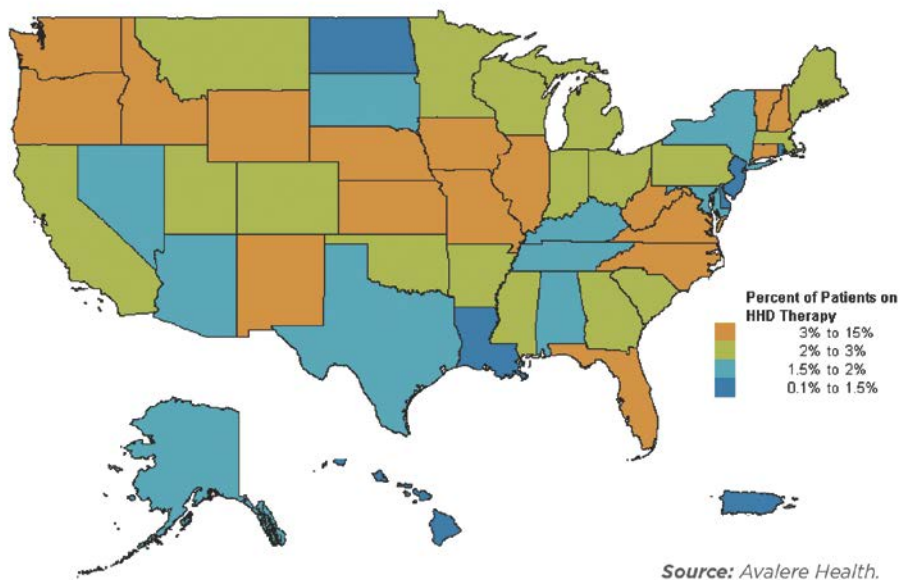


FIGURE 4. MEDICARE HOME HEMODIALYSIS PATIENTS IN 2013



Socioeconomic Disparities in Home Dialysis Access

Given the variation in home dialysis utilization by state and race, I posited that there might be disparity in access to home dialysis. To examine whether access varied by socioeconomic status, I constructed a dataset that combines modality data from ESRD Network annual reports; facility-level data from the Dialysis Facility Report dataset; DFC star-rating data; and U.S. Census Bureau data on race, median income, and other demographic factors. Only counties with more than 10 dialysis facilities, which totaled 125 counties, were considered. The data reported whether a facility offered HHD but did not include information about PD.

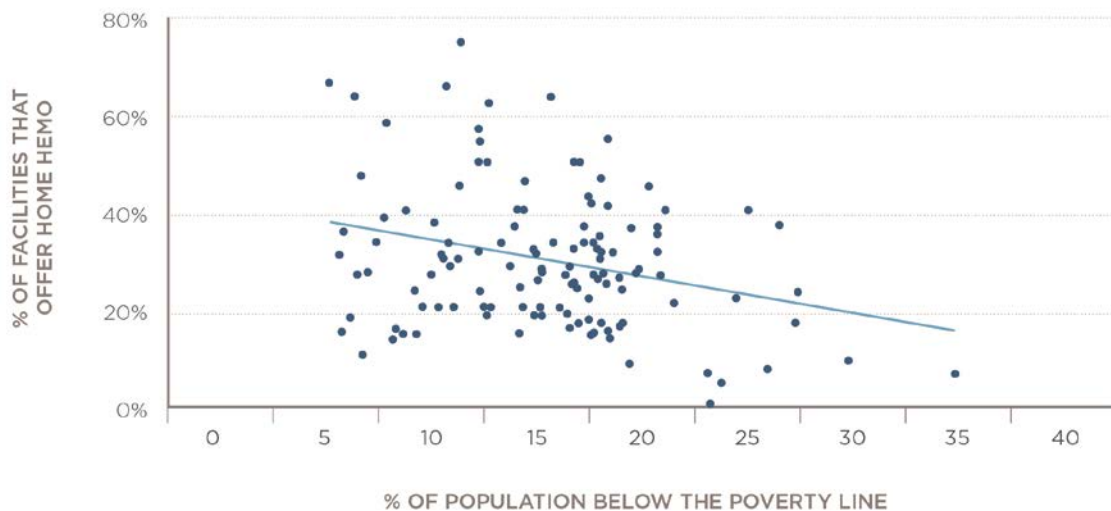
Dialysis facilities were matched to the county-level Census data using zip codes. This allowed me to determine the share of dialysis facilities

offering HHD in a county and examine the demographic features of each county. In particular, I was interested in whether race and income were related to the availability of HHD.

The primary results are presented in **Figures 5 and 6**. In both scatter plots, each dot represents a county, and the y-axis represents the share of dialysis facilities in a county offering HHD. In Figure 5, the x-axis represents the percentage of people in the county below the poverty line. In Figure 6, the x-axis represents the percentage of the people in the county who are white. The lines through the data are determined using a least squares regression analysis and indicate the best-fit linear trend in the data.

In Figure 5, the fitted trend line indicates that counties with a higher share of people below the poverty line have a lower share of dialysis facilities offering HHD.

FIGURE 5. POORER COUNTIES OFFER LESS HOME HEMODIALYSIS

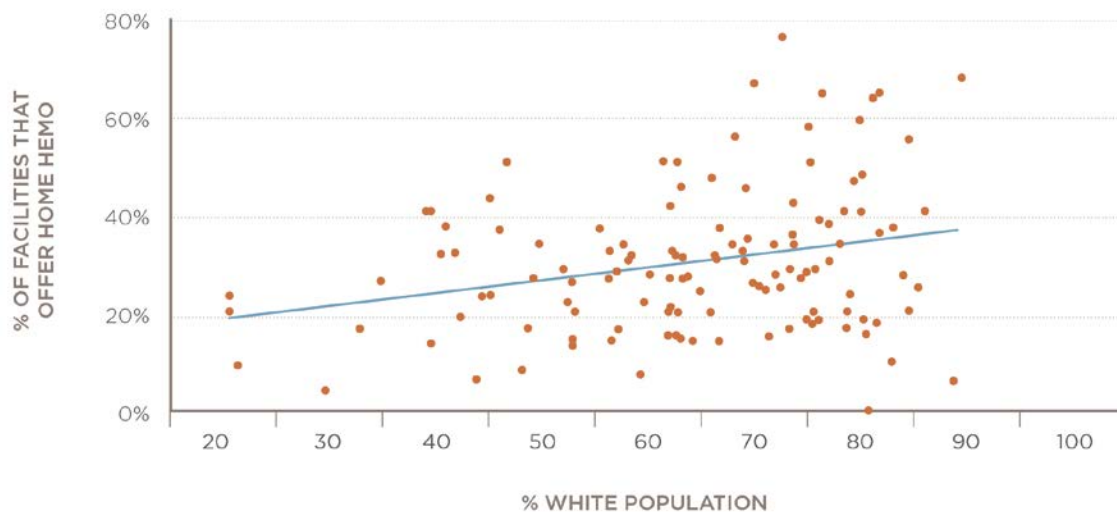


Source: Author's calculations.

In Figure 6, the trend line indicates that counties with a higher share of white people have a higher share of facilities offering HHD.

These results indicate that access to home dialysis is related to race and income and suggest that further research is warranted.

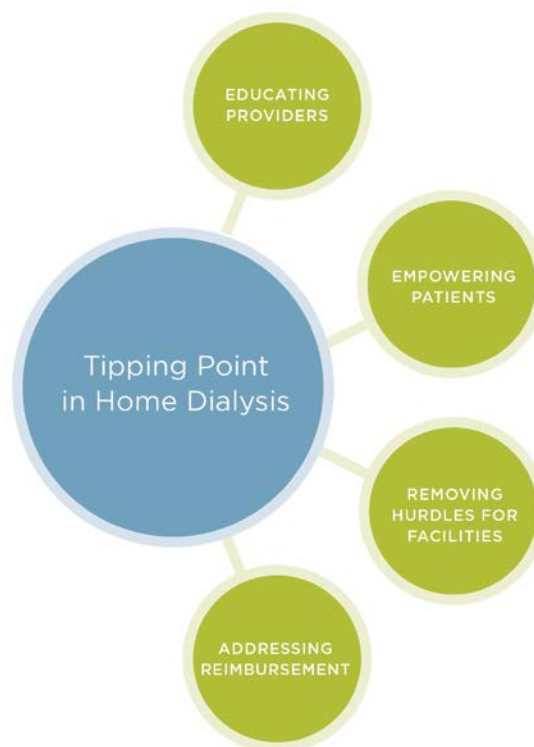
FIGURE 6. COUNTIES WITH FEWER MINORITIES OFFER MORE HOME HEMODIALYSIS



Source: Author's calculations.

III. BARRIERS TO HOME DIALYSIS AND WAYS TO INCREASE UTILIZATION

Disproportionately low rates of home dialysis utilization in the United States cannot be attributed to one single cause. Rather, a confluence of factors—related to patients, physicians, facilities, and reimbursement—inhibits utilization. As such, there is no panacea to expand the home dialysis market. But it is possible to reach a tipping point that will lead to a more balanced dialysis market and increased utilization of home dialysis. The benefits of this improvement are twofold. In the short term, it will increase patient health and well-being; in the longer term, it will send strong signals to innovators to develop new technologies for home dialysis delivery.



To reach this tipping point, it is essential for policymakers to pursue strategies to remove barriers to home dialysis utilization. Below, I identify the most prominent barriers as well as key solutions to surmounting these barriers and allowing greater access to home dialysis and the benefits it offers.

There is no panacea to expand the home dialysis market. But it is possible to reach a tipping point that will lead to a more balanced dialysis market and increased utilization of home dialysis.

Patient-Level Barriers and Solutions

Research has shown that dialysis patients lack education about modality options²³—the information asymmetry discussed above. And patients who are familiar with home dialysis may lack accurate information about it. A recent survey of dialysis patients showed that 72 percent of respondents prefer not to do HHD, while 86 percent prefer not to do PD.²⁴ For both modalities, patients indicated feeling “safer” at a clinic than at home.²⁵ If patients understood what home dialysis entails and the benefits it offers, more patients would likely feel comfortable with dialyzing at home.

One of the key ways to help patients learn about home dialysis or overcome misgivings is through patient education. Providers—from primary care physicians and nephrologists to nurses and social workers at chronic kidney

disease (CKD) treatment programs—should be prepared to discuss home dialysis with patients before dialysis is required so that patients have time to make an informed decision. At the same time, there is potential for improvement among patients with unplanned dialysis starts, who are typically much more likely to remain on in-center hemodialysis but have proven capable of transitioning to home dialysis. For example, an in-hospital education program in Toronto specifically for CKD patients with unplanned dialysis starts has seen great success in moving patients to home dialysis.²⁶ Before the program began, 87 percent of patients with unplanned starts stayed on in-center dialysis; in the five years following initiation of the program, only 58 percent of patients chose to remain in-center.²⁷

However, even if a patient feels prepared to dialyze at home, barriers still exist. For example, 17 percent of patients report that they lack the space for PD equipment and supplies, and 21 percent for HHD equipment and supplies.²⁸ In addition, home dialysis patients are required to have a trained partner, which can be prohibitive for many. Nineteen percent of patients report that they would not consider PD for lack of a partner, while 37 percent cite this reason for not considering HHD.²⁹

Physicians or providers should be able to waive the trained partner requirement for patients who are able and would like to dialyze at home but lack a care partner. These care partners are often unpaid, but their time providing assistance with home dialysis may result in lost wages and lost productivity. For patients who lack a care partner but are unprepared or unable to dialyze on their own, outside assistance could be

offered, perhaps initially via a demonstration in order to gauge efficacy. For example, after a successful trial, the Ontario Renal Network recently launched a pilot program for Personal Support Workers (non-nurses) to provide assistance to HHD patients.³⁰

Finally, home dialysis patients are required to make a monthly visit to their nephrologist. While it is obviously of great importance for home dialysis patients to remain under medical care, many patients, particularly those who have been dialyzing at home for years, may not need to make a trip to see their nephrologist with this kind of frequency. Therefore, telemedicine services such as video chat or remote patient monitoring should be allowed as an alternative to the in-person visit when a physician deems it appropriate for a patient.

Provider-Level Barriers and Solutions

Dialysis providers play an integral role in patients' treatment decisions. For many physicians, the default choice is in-center dialysis. As a recent study notes, "The evidence clearly shows that local practices can greatly influence the uptake of home dialysis modalities."³¹ Many dialysis providers are ill-equipped to advise on or offer home dialysis. A survey of U.S. nephrologists showed that 44 percent of recent graduates "did not feel well-trained and competent to provide care to PD patients," and 84 percent reported feeling this way about caring for HHD patients.³²

Physicians, both nephrologists and primary care doctors, must become proficient in talking to patients about home dialysis and its benefits,

and nephrologists' self-reported lack of training and competency in offering home dialysis must be rectified. The American Society of Nephrology (ASN) Dialysis Advisory Group developed the "ASN Virtual Mentor Dialysis Curriculum" for trainees and nephrologists, and this online curriculum includes a component on HHD.³³ This curriculum is an excellent start, but it must be promoted and disseminated, and additional efforts to develop this type of education are critical.

Provider education will be much more effective if it is not limited to physicians. Nephrology nurses often have the most contact with patients throughout the course of their dialysis treatment and are typically responsible for training patients for home dialysis. Dialysis nurses must meet certain criteria to train patients to dialyze at home, so an increase in home dialysis utilization could require more qualified nurses to meet this demand. Social workers can also have a profound impact on patient education and can help guide patients toward making more informed choices. Indeed, in many cases, home dialysis may be a way to help address other issues affecting patients, such as underemployment, transportation barriers, and poor adherence.

Facility-Level Barriers and Solutions

Even if patient and provider demand for home dialysis were to increase, patients can still face barriers in locating a facility that offers home dialysis. Many facilities are not certified by CMS to offer home dialysis, particularly HHD. Only approximately one-quarter of dialysis facilities offer HHD.³⁴ Furthermore, in some states, the time involved in obtaining CMS certification has

been identified as a barrier to facilities making home dialysis available to patients.³⁵ To encourage facilities to offer home dialysis, it is essential to reduce the time and uncertainty involved in obtaining certification.

Another barrier at the facility level seems to arise from the socioeconomic status of the community in which a dialysis facility operates. As described above, counties that are poorer or whose population comprises a greater share of minorities have a lower share of facilities that offer HHD. The socioeconomic and racial disparity should be studied further so that policy solutions to address these particular barriers can be properly crafted, but economic incentives for facilities to start and maintain home dialysis training programs could be effective in combating this disparity.

Another critical barrier to increasing home dialysis utilization is the simple economics of provider reimbursement and the difficulty facilities may face in breaking even.

Reimbursement-Related Barriers and Solutions

Another critical barrier to increasing home dialysis utilization is the simple economics of provider reimbursement and the difficulty dialysis facilities may face in breaking even on Medicare patients generally and home dialysis patients in particular. For facilities that train

patients to dialyze at home, Medicare includes an add-on payment to reimburse for the expense of training. In 2014, CMS increased this payment from \$33.44 to \$50.16 per training session, with a maximum number of 15 training sessions for PD and 25 sessions for HHD.³⁶ But there is evidence of a continued discrepancy between the add-on payment and the actual cost of training.³⁷

The impact of effective reimbursement policy in encouraging home dialysis is evident in recent trends in PD utilization. Medicare reimburses the same amount for all dialysis modalities. The cost of treating a PD, HHD, or in-center patient differs significantly, with PD being the least costly modality.³⁸ Following the introduction of the new payment system, PD utilization has seen significant increases, as noted above.

Another reimbursement-related barrier involves Medicare Administrative Contractors (MACs). In August 2014, a MAC operating in many western states said that it would not reimburse for more than three sessions of hemodialysis per week. This policy restricts access to home dialysis, as most home dialysis regimens include more frequent dialysis treatments, and providers offering such regimens would be doing so without full reimbursement.

Finally, Medicare does not reimburse for dialysis patients engaging in a telehealth encounter with their physicians. Permitting physicians to bill Medicare for telemedicine services would allow patients to receive necessary medical supervision without making as many trips to their nephrologist's office.

Increasing Home Dialysis Utilization and Innovation

A robust home dialysis industry relies on effective education, adequate reimbursement, and appropriate regulations from CMS. It is clear that home dialysis faces barriers on many fronts, but none is insurmountable. And the goal of bringing better quality of life to many while encouraging vital innovation makes working toward removing these barriers worthwhile.

The home dialysis market in the United States could experience meaningful growth as a result of policy reforms, as it offers ample investment opportunity for businesses driven to improve the quality of care for ESRD patients. Despite a stable payor mix and a predictable number of patients, new technologies and treatment solutions in home dialysis have been sparse. Over the long term, reaching the tipping point in home dialysis will address this dearth in innovation, as innovators will be motivated by the larger market to develop new technologies.

IV. CONCLUSION

Medicare, mandated by Congress to help those suffering from ESRD, should address the inequity in access to home dialysis. Many strategies exist, each of which can help push the home dialysis market toward a tipping point, at which the momentum for increasing utilization will further accelerate. As patients are educated about their treatment options and feel empowered to choose home dialysis, as physicians and nurses feel more comfortable treating home dialysis patients, and as facilities are adequately reimbursed and not unduly

hindered, the resulting increase in utilization will send strong signals to innovators.

Innovators in turn will be motivated by the larger market to develop new technologies.

In short, reaching the tipping point in home dialysis will not only help more patients receive the benefits that home dialysis currently offers, but also open up possibilities for potentially unforeseen innovation in home dialysis in the future. To reach this tipping point, a variety of barriers must be tackled, from lack of education among patients and providers to the inadequacy of the Medicare training add-on payment and the resulting difficulty that facilities face in breaking even on the treatment of home dialysis patients. But allowing home dialysis to flourish in the United States does not require that all barriers be removed simultaneously. Rather, the tipping point would occur well before optimal home dialysis utilization is realized and would signal the point at which the momentum of the market would help remove remaining barriers. The first step is for policy-makers to embrace the goal of making home dialysis a feasible option for more patients. The next is to bring energy and innovative policy ideas in pursuit of the tipping point.

Reaching the tipping point will not only help more patients receive the benefits that home dialysis offers, but also open up possibilities for unforeseen innovation in home dialysis.



ABOUT THE AUTHOR

Alex Brill is the CEO of Matrix Global Advisors, a boutique economic policy consulting firm. He is also a research fellow at the American Enterprise Institute and in 2010 served as an advisor to the Simpson-Bowles Commission. Previously, he was chief economist and policy director to the House Committee on Ways and Means. Prior to his time on the Hill, he served on the staff of the White House Council of Economic Advisers.

This report was sponsored by the Alliance for Home Dialysis. The author is solely responsible for the content. Any views expressed here represent only the views of the author.

ABOUT THE ALLIANCE FOR HOME DIALYSIS

The Alliance for Home Dialysis is a coalition of kidney dialysis stakeholders—representing patients, clinicians, providers, and industry—that promotes activities and policies that will facilitate treatment choice in dialysis care while identifying and addressing systematic barriers that limit access for patients and their families to the many benefits of home dialysis. The Alliance was launched to continue the work begun at the 2012 National Summit on Home Dialysis Policy, where leaders from the patient, clinician, industry, and academic communities identified a range of concerns that currently hinder, and policy opportunities that can increase, appropriate utilization of home dialysis.

More information about the Alliance and home dialysis is available at www.homedialysisalliance.org.

NOTES

- ¹ United States Renal Data System (USRDS), *2015 Annual Data Report: Epidemiology of Kidney Disease in the United States*, available at www.usrds.org/2015/view/Default.aspx.
- ² USRDS, *2014 Annual Data Report: Epidemiology of Kidney Disease in the United States*, available at www.usrds.org/2014/view/Default.aspx.
- ³ USRDS, *2015 Annual Data Report*.
- ⁴ Ibid.
- ⁵ Ibid.
- ⁶ David C. Mendelssohn, Scott R. Mullaney, Beverley Jung, Peter G. Blake, and Ravindra L. Mehta, "What Do American Nephrologists Think about Dialysis Modality Selection?" *American Journal of Kidney Diseases* 37, no. 1 (January 2001): 22–29.
- ⁷ Joseph R. Merighi, Dorian R. Schatell, Jennifer L. Bragg-Gresham, Beth Witten, and Rajnish Mehrotra, "Insights into Nephrologist Training, Clinical Practice, and Dialysis Choice," *Hemodialysis International* 16, no. 2 (April 2012): 242–51.
- ⁸ Ibid.
- ⁹ USRDS, *2015 Annual Data Report*.
- ¹⁰ Ibid.
- ¹¹ Social Security Act, Section 1881(c)(1)(A)(i)(6) and Section 1881(b)(6)(C).
- ¹² Alliance for Home Dialysis, "About the Alliance," available at www.homedialysisalliance.org/page.asp?id=68.
- ¹³ Rebecca J. Muehrer, Dori Schatell, Beth Witten, Ronald Gangnon, Bryan N. Becker, and R. Michael Hofmann, "Factors Affecting Employment at Initiation of Dialysis," *Clinical Journal of the American Society of Nephrology* 6, no. 3 (March 2011): 489–96.
- ¹⁴ Ibid.
- ¹⁵ USRDS, *2012 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States*, available at www.usrds.org/atlas12.aspx.
- ¹⁶ Bruce F. Culleton, et al., "Effect of Frequent Nocturnal Hemodialysis vs Conventional Hemodialysis on Left Ventricular Mass and Quality of Life: A Randomized Controlled Trial," *The Journal of the American Medical Association* 298, no. 11 (September 19, 2007): 1291–99.
- ¹⁷ Riccardo Maria Fagugli, et al., "Short Daily Hemodialysis: Blood Pressure Control and Left Ventricular Mass Reduction in Hypertensive Hemodialysis Patients," *American Journal of Kidney Diseases* 38, no. 2 (August 2001): 371–76.
- ¹⁸ USRDS, *2015 Annual Data Report*.
- ¹⁹ Mark E. Neumann, "A Look Back, and Getting Positioned for the Future," *Nephrology News & Issues*, July 16, 2014; and Mark E. Neumann, "What's Next for Dialysis Providers?" *Nephrology News & Issues*, July 16, 2015.
- ²⁰ Mark E. Neumann, "Fluid Shortage Impacting Growth in the PD Patient Population," *Nephrology News & Issues*, August 11, 2015.
- ²¹ Avalere Health, "Distribution of Dialysis Patients Utilizing Home Modalities in 2013 by State."
- ²² Ibid.
- ²³ Mohammad Qamar, Filitsa Bender, Raymond Rault, and Beth Piraino, "The United States' Perspectives on Home Dialysis," *Advances in Chronic Kidney Disease* 16, no. 3 (May 2009): 189–97.
- ²⁴ Dialysis Patient Citizens (DPC) Patient Survey, August 2014.
- ²⁵ Ibid.
- ²⁶ Jean-Philippe Rioux, Harpaul Cheema, Joanne M. Bargman, Diane Watson, and Christopher T. Chan, "Effect of an In-Hospital Chronic Kidney Disease Education Program among Patients with Unplanned Urgent-Start Dialysis," *Clinical Journal of the American Society of Nephrology* 6, no. 4 (April 1, 2011): 799–804.
- ²⁷ Ibid.
- ²⁸ DPC Patient Survey.
- ²⁹ Ibid.

³⁰ Andreas Pierratos, “Personal Support Worker (PSW) Supported Home Hemodialysis,” presentation at “Shaping the Future of Patient Care,” Toronto, June 8–9, 2015, available at www.renalnetwork.on.ca/common/pages/UserFile.aspx?fileId=342850.

³¹ Paul Komenda and Manish M. Sood, “The Economics of Home Dialysis: Acting for the Individual While Planning Responsibly for the Population,” *Advances in Chronic Kidney Disease* 16, no. 3 (May 2009): 198–204.

³² Joseph R. Merighi, et al., “Insights into Nephrologist Training, Clinical Practice, and Dialysis Choice,” 243.

³³ American Society of Nephrology, “Online Curricula: Dialysis ‘Virtual Mentor’ Curriculum,” available through www.asn-online.org/education/distancelearning/curricula/dialysis.

³⁴ Centers for Medicare and Medicaid Services (CMS), Dialysis Facility Compare data.

³⁵ Thomas A. Golper, Anjali B. Saxena, Beth Piraino, Isaac Teitelbaum, John Burkart, Fredric O. Finkelstein, and Ali Abu-Alfa, “Systematic Barriers to the Effective Delivery of Home Dialysis in the United States: A Report from the Public Policy/Advocacy Committee of the North American Chapter of the International Society for Peritoneal Dialysis,” *American Journal of Kidney Diseases* 58, no. 6 (December 2011): 879–85.

³⁶ CMS, “Medicare Program; End-Stage Renal Disease Prospective Payment System, Quality Incentive Program, and Durable Medical Equipment, Prosthetics, Orthotics, and Supplies; Final Rule,” *Federal Register* 78, no. 231 (December 2, 2013), available at www.gpo.gov/fdsys/pkg/FR-2013-12-02/pdf/2013-28451.pdf.

³⁷ The Moran Company, “Home Dialysis Cost Study: 2012 Medicare Cost Report Analysis—Modality & Training Costs,” May 2014.

³⁸ Matthew B. Rivara and Rajnish Mehrotra, “The Changing Landscape of Home Dialysis in the United States,” *Current Opinion in Nephrology & Hypertension* 23, no. 6 (November 2014): 586–91.