

# Telehealth in Peritoneal Dialysis: Review of Patient Management

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*Telehealth encompasses a broad variety of technologies and tactics to deliver virtual medical, health, and education services. Telemedicine is the use of electronic communications for the exchange of medical information from one site to another to improve a patient's clinical health status.*

*Several studies show that, by providing better patient oversight and communication, telehealth in PD enhances patient care, outcomes, quality of care, and satisfaction. Associated benefits include increased patient retention to home dialysis, reduced use of hospital services, and reduced costs of care.*

*The sustainability of telehealth had been limited by reimbursement and regulatory restrictions. The Centers for Medicare and Medicaid Services (CMS) limited services related to end-stage renal disease by providing reimbursement for telehealth only in rural areas or counties outside of a metropolitan statistical area. Moreover, the dialysis facility and the patient's home were not approved as originating sites. However, effective January 1, 2019, those restrictions will be lifted. Telehealth will require that home dialysis patients be established with 3 initial face-to-face monthly clinical assessments without the use of telehealth; after those initial 3 months, a face-to-face visit at least once every 3 consecutive months will be required. Claims can be submitted using designated Current Procedural Terminology codes and modifiers.*

*The actual extension of telehealth to home dialysis patients will depend on the details of forthcoming CMS regulations.*

## **Key words**

Telehealth, telemedicine, remote monitoring, end-stage renal disease

## **Introduction**

Telehealth encompasses a broad variety of technologies and processes that deliver virtual medical, health, and education services (1).

Telemedicine uses electronic communications for the exchange of medical information between sites to improve a patient's clinical health status (2). The "originating site" is, by the definition of the Centers for Medicare and Medicaid Services (CMS), the patient's location; the "distant site" is the remote practitioner's location.

Telehealth encompasses four distinct domains of applications (1):

- *Asynchronous store-and-forward technology*  
This domain allows for the electronic transmission of medical information such as digital images, documents, and prerecorded videos by secure transmission from an originating site to the health care provider at a distant site without the presence of the patient.
- *Remote patient monitoring.*  
This domain uses digital technologies to collect medical and other forms of health data from individuals in one location (the originating site) and to electronically transmit that information securely to health care providers in a distant location for assessment and recommendations.
- *Synchronous video conferencing.*  
This domain uses two-way interactive audiovisual technology to connect users for live face-to-face interactions.
- *Mobile health*  
This domain, a relatively new and rapidly evolving aspect of technology-enabled health care, concerns the provision of health care services and personal health data using mobile devices.

The aims of telehealth are to create quality and value for payers, patients, and providers (3). The payers would like to see reductions in hospitalizations, hospital readmissions, emergency department visits, and hospital length of stay. The patients would like to see improvements in quality of life and satisfaction, decreased travel, and increased access to care. Providers aim to enhance the reach of health care services, to provide better quality of care, and to increase operational efficiencies. All stakeholders also have an interest in cost control.

### Methods

Several studies have shown that telehealth in peritoneal dialysis (PD) aligns with the aims discussed in the Introduction—most specifically, to retain patients on PD, reduce the use of hospital services, improve communication, enhance patient supervision, improve patient satisfaction and quality of life, and reduce costs.

### Results

During a 3-month period, Cargill and Watson (4) installed ISDN (Integrated Services Data Networks) 2E lines in the homes of adult and pediatric patients for use at the discretion of the patient or a family member. The providers were able to deliver both personal care and instructional and educational support. The upfront cost to install the videophones and ISDN lines was substantial.

In Japan, Nakamoto and colleagues used automated PD cyclers and cellular telephone-based platforms to remotely monitor cycler data and patient biometric data (5,6). They showed reduced visits to the outpatient clinic and demonstrated successful real-time data collection.

In Spain, Gallar *et al.* used alternate-month telemedicine and hospital consultations (7). Teleconsultations were effective, were conducted in a shorter average period of time (22 minutes vs. 33 minutes), and significantly lowered mean hospitalization rates; however, when compared with hospital consultations, the teleconsultations were slightly more expensive (€198 vs. €177).

Chand and Bednarz showed that PD cycler information and biometric information entered by the patient could be forwarded to the dialysis unit using a modem that connects the telephone to the cycler (8). Using that technique, health care providers could achieve digital data accuracy, as well as better patient monitoring and care.

Technology advancements have offered additional improvements in patient care and outcome. iPad technology has been used for training and technique updates, allowing patients living in rural areas to be treated with PD (9,10). iPad technology has also been used to collect patient and cycler data and to provide video conferencing (11). The conferencing allowed for problem-solving, monthly clinic visits, technique monitoring, and training, resulting in increased patient independence and improved quality of life. When the iPad technology was used in a pediatric population to conduct 2 of 3 monthly visits, fewer appointments were cancelled, other caregivers were able to participate, family costs associated with face-to-face visits were reduced, and days absent from school for the patient and from work for the parents declined (12).

Remote monitoring in real-time to obtain daily biometric data such as weight and blood pressure (as well as glucose in patients with diabetes) resulted in the collection of reliable data, better patient oversight, and increased patient satisfaction (13,14).

The addition of a zoom camera and stethoscope capabilities to real-time two-way communication using audiovisual technology allowed a physician at a remote site (in excess of 80 km) to successfully complete a monthly visit with a patient at a health facility located near the individual's home (15). Dietitians and social workers also participated in the telehealth encounter. The patient's monthly blood work was performed at the local health facility. Quarterly visits were performed at the PD unit when adequacy studies were required. Using telehealth to replace the required comprehensive face-to-face visits for patients increases the availability of home dialysis to those living a long distance from the dialysis unit. Patients expressed increased satisfaction with the arrangement and saved the time and costs connected with transportation to and from the dialysis unit.

### Discussion

Most patients in the United States have access to a cell phone, computer or tablet, and Internet service (16). A few living in remote areas might have limited Internet service, thus restricting telehealth. As technology continues to advance, health care providers and patients aspire to incorporate telehealth with home dialysis to conduct remote monitoring and video conferencing with the aim of improving patient care and outcomes, and patient satisfaction (17).

Sustainability of telehealth had been limited by reimbursement and regulatory restrictions. Table I shows key facts about telehealth services as set out by the CMS (18). Reimbursement for telehealth is restricted to rural health-professional-shortage areas and counties outside metropolitan statistical areas. Originating sites are also limited to specific health facilities. The patient’s home and renal dialysis facilities are clearly not acceptable originating sites. Approved originating sites include medical facilities located in the rural health-professional-shortage area, in a rural census tract, or in a county outside of a metropolitan statistical area (Table I).

The CMS includes covered telehealth codes for the monthly capitated payment codes for home dialysis in its Telehealth Services Medicare Learning Network. Check for code modifier updates before submitting claims (18). Additional information can be found in the CMS *Telehealth Services* pamphlet (<https://www.cms.gov/Outreach-and-Education/Medicare-Learning-Network-MLN/MLNProducts/downloads/TelehealthSrvcsfctst.pdf>).

Practitioners should prepare for telehealth. The practitioner must have a license from the state of the originating site. The originating site must “credential” every remote practitioner. Most states require

TABLE I Medicare payment for Part B services: key points pertaining to peritoneal dialysis in the telehealth services coverage as set out by the Centers for Medicare and Medicaid Services (18,19)

<i>Service</i>	<i>Updated January 1, 2017</i>	<i>Effective January 1, 2019</i>
Geographic location eligibility	<ul style="list-style-type: none"> <li>• Rural health-professional-shortage area located either outside a metropolitan statistical area or in a rural census tract</li> <li>• County outside of a metropolitan statistical area</li> </ul>	<ul style="list-style-type: none"> <li>• Geographic requirements no longer apply</li> </ul>
Originating sites	<ul style="list-style-type: none"> <li>• Office of physicians or practitioners</li> <li>• Hospitals</li> <li>• Critical access hospitals</li> <li>• Rural health clinics</li> <li>• Federally qualified health centers</li> <li>• Hospital-based or critical access hospital-based renal dialysis centers</li> <li>• Skilled nursing facilities</li> <li>• Community mental health centers</li> </ul>	<ul style="list-style-type: none"> <li>• The current originating sites</li> <li>• Renal dialysis facilities</li> <li>• Home of patient</li> </ul>
Distant site practitioners	<ul style="list-style-type: none"> <li>• Physicians</li> <li>• Nurse practitioners</li> <li>• Physician assistants</li> <li>• Clinical nurse specialists</li> <li>• Clinical psychologists and clinical social workers</li> <li>• Registered dietitians or nutrition professionals</li> </ul>	<ul style="list-style-type: none"> <li>• Unchanged</li> </ul>
Telehealth services	<ul style="list-style-type: none"> <li>• Interactive audio and video telecommunications system that permits real-time communication between you, at the distant site, and the beneficiary, at the originating site</li> <li>• Asynchronous “store and forward” technology is permitted only in federal telemedicine demonstration programs in Alaska or Hawaii</li> </ul>	<ul style="list-style-type: none"> <li>• Individual with ESRD receives a face-to-face clinical assessment without the use of telehealth for the initial 3 months of home dialysis, at least monthly</li> <li>• After such an initial 3 months, a face-to-face clinical assessment occurs at least once every 3 consecutive months; the other assessments (2 of 3 months) can use telehealth</li> </ul>

TABLE 1 Continued

<i>Service</i>	<i>Updated January 1, 2017</i>	<i>Effective January 1, 2019</i>
Service codes <sup>a</sup>		
CPT code 90963	<ul style="list-style-type: none"> <li>ESRD-related services for home dialysis per full month, for patients less than 2 years of age, to include monitoring for adequacy of nutrition, assessment of growth and development, and counseling parents</li> </ul>	
CPT code 90964	<ul style="list-style-type: none"> <li>ESRD-related services for home dialysis per full month, for patients 2–11 years of age, to include monitoring for adequacy of nutrition, assessment of growth and development, and counseling parents</li> </ul>	
CPT code 90965	<ul style="list-style-type: none"> <li>ESRD-related services for home dialysis per full month, for patients 12–19 years of age, to include monitoring for adequacy of nutrition, assessment of growth and development, and counseling parents</li> </ul>	
CPT code 90966	<ul style="list-style-type: none"> <li>ESRD-related services for home dialysis per full month, for patients 20 years of age and older</li> </ul>	
Facility fee		<ul style="list-style-type: none"> <li>No facility fee if the originating site for home dialysis therapy is the patient's home</li> </ul>
Payment under Medicare Part B	<ul style="list-style-type: none"> <li>To submit a claim, indicate that the professional service furnished on or after January 1, 2017, was a billed service furnished as a telehealth service from a distant site, using Place of Service 02: Telehealth</li> </ul>	<ul style="list-style-type: none"> <li>The telehealth technologies are not offered as part of any advertisement or solicitation</li> <li>The telehealth technologies are related to ESRD</li> <li>The telehealth technologies meet any other requirements set forth in regulations promulgated by the Secretary</li> </ul>

ESRD = end-stage renal disease; CPT = current procedural terminology.

<sup>a</sup> Check for telehealth modifier updates before submitting claims.

a physical examination of the patient to prescribe medication—in essence, to establish a doctor–patient relationship. Liability insurers (malpractice coverage) might have different coverage for telehealth services. Practitioners should become familiar with state laws providing governance for telehealth.

Other barriers to telehealth include limitations in health information exchange attributable to the use of different electronic health record systems, limited cost–benefit evidence, and patient adoption concerns. Telehealth infrastructure requires equipment, adequate bandwidth, and a screen resolution and frame rate

sufficient for 2-way video conferencing. Stakeholders have concerns about the possibilities for data breaches, privacy, intrusiveness, and cyber security.

The 115th Congress (2017 – 2018) approved the Bipartisan Budget Act of 2018, H.R. 1892, in which section 50302 contains language expanding access to home dialysis therapy (19). Effective January 1, 2019, individuals with end-stage renal disease receiving home dialysis can choose to receive monthly end-stage renal disease–related clinical assessments by telehealth if the individual receives a face-to-face clinical assessment without the use of telehealth at

least monthly in the initial 3 months of home dialysis and, after the initial 3 months, at least once every 3 consecutive months. In addition, the renal dialysis facility and the home of an individual can be the originating site for telehealth. Also stated is that no facility fee shall be paid by Medicare if the patient's home is the originating site. Finally, the geographic requirements for the originating site previously limiting telehealth will no longer apply. Medicare Part B will pay only if the telehealth technologies are not offered as part of any advertisement or solicitation, are provided for the purpose of furnishing telehealth services related to end-stage renal disease, and meet any other requirements set forth in regulations promulgated by the Secretary. Successful implementation will depend heavily on the forthcoming regulations.

### Summary

Advances in technology have resulted in incremental advances in telehealth for home dialysis patients. Telehealth has the potential to improve patient care and outcomes while reducing the cost of care. Real-time daily remote monitoring ofycler and patient biometric data provides accurate and timely information for greater patient oversight, allowing health care providers to initiate preventive measure before a clinical crisis occurs. Patient satisfaction and improvement in quality of life have been demonstrated. The use of telehealth has the potential to increase the number of home dialysis patients, because the technology allows for patient engagement in functions pertaining to education, monitoring, communication, assessment, and management.

### Disclosures

I understand that *Advances in Peritoneal Dialysis* requires disclosure of any conflicts of interest, and I declare that I have no conflicts to disclose.

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