Telemedicine and Home Dialysis
Our Future Together

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Agenda

➢ Introduction
➢ Technologies
➢ Areas in end stage renal disease (ESRD) care—home dialysis
➢ Clinical data
➢ Barriers to implementation
➢ Reimbursements
➢ Lessons learned
Telemedicine: The use of technologies to remotely diagnose, monitor, and treat patients

Telehealth: The application of technologies to help patients manage their own illnesses through improved self-care and access to education and support systems
Customer Satisfaction in Healthcare

➢ Patients more discerning in health care spending and convenience

➢ Non-traditional opportunities to access care address consumers’ preferences (i.e. retail clinics and virtual care platforms)

➢ Various studies have demonstrated high patient satisfaction

➢ *Journal of General Internal Medicine* patient satisfaction study (March 2016):

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>98%</td>
<td>“Very satisfied” patients with telehealth visit</td>
<td></td>
</tr>
<tr>
<td>95%</td>
<td>Patients who would use telehealth again</td>
<td></td>
</tr>
<tr>
<td>95%</td>
<td>Patients who would recommend telehealth visit to friend</td>
<td></td>
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</table>
Available Telehealth Utilization, Relevant Modalities, and Investment Required

- **Professional Consultation**
  - Need software, secure internet access for patients
  - Home and hospital-based technology

- **Diagnosis & Treatment**
  - Need additional bandwidth, storage space
  - Can replace non-urgent phone calls and visits
  - More expensive hardware investment
  - Used for high-risk patients in non-hospital site

- **Education & Engagement**
  - Little tech investment, requires proper staffing
  - Used for pre-visit triage
  - High security needs require significant investment
  - Must integrate EHR

- **Ongoing Monitoring & Care Coordination**
  - Minimal hardware investment for providers
  - Complex security and data storage issues

**Videoconference**
- Asynchronous Store-and-Forward
- Remote Device
- Telephone
- Patient Portal
- Mobile App

**Professional Consultation**
- Diagnosis & Treatment
- Education & Engagement
- Ongoing Monitoring & Care Coordination

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The American Medical Association (AMA), American College of Physicians (ACP), and American Telemedicine Association (ATA) have policy statements on telemedicine.

Overarching principles for policies include:
- Establishment of valid patient-provider relationship.
- Professional judgment in appropriateness for telemedicine in clinical setting.
- Continuity of care/shared medical record.
- Use of evidence-based clinical guidelines for telemedicine.
- Telemedicine held to same standard as in-person visit.
Advancements in Technology

- Remote monitoring devices with cellular or fixed-line modems enabling data transmission without computer or smartphone
- Expanded memory and processing capabilities
- Geospatial tracking
- Movement tracking
- Touch-screen technologies

Increased Population

- 100% US population covered by mobile network
- Health information fastest-growing content accessed by U.S. mobile users, up 134% between 2010–2011

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Some Interesting Facts

➢ An average of 20 days to secure a 20-minute appointment with a physician that with travel and wait time consumes two hours.

➢ It is estimated that 3 billion dollars a year are spent in the ambulance transfer of patients with ESRD to and from dialysis units.

Source: Merritt Hawkins Survey 2010
Increased Uptake and Acceptance of Home-Based Dialysis Modalities

- Overcoming fear of being alone
- Studies have shown equivalent or superior outcomes and strong patient and family preferences for home-based dialysis therapies
- Uptake is slow as per the U.S. Renal Data System report 2016
- Two-way communication (including video capability), offers patients the ability to access their care team
- It can provide a safety net allowing patients to have questions answered, concerns addressed, and feelings of solitude potentially alleviated

### TABLE 2
Survey Results

<table>
<thead>
<tr>
<th>Survey question</th>
<th>Response [n (%)]</th>
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</thead>
<tbody>
<tr>
<td>Own a computer</td>
<td>46 (88)</td>
</tr>
<tr>
<td>Know how to use a computer</td>
<td>49 (94)</td>
</tr>
<tr>
<td>Have Internet service</td>
<td>47 (90)</td>
</tr>
<tr>
<td>Have an e-mail address</td>
<td>46 (88)</td>
</tr>
<tr>
<td>Have a computer with a webcam</td>
<td>21 (40)</td>
</tr>
<tr>
<td>Willing to purchase a webcam (of 31 responding)</td>
<td>21 (68)</td>
</tr>
<tr>
<td>Willing to use telemedicine</td>
<td>48 (92)</td>
</tr>
<tr>
<td>Have a land-line</td>
<td>40 (77)</td>
</tr>
<tr>
<td>Own a cell phone</td>
<td>49 (94)</td>
</tr>
<tr>
<td>Interested in participating in telemedicine</td>
<td>43 (83)</td>
</tr>
<tr>
<td>Believe there will be a reduction in clinic visits</td>
<td>44 (85)</td>
</tr>
<tr>
<td>Believe there will be a reduction in emergency department visits</td>
<td>40 (77)</td>
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Ongoing Training, Counseling, and Education Opportunities

- Telehealth may allow the care team to monitor patients while they perform self-care, provide feedback on patient techniques, and institute continuous education programs.
  - This ensures survivability of the home dialysis technique through avoidance of complications such as peritonitis, catheter exit site infections, or needle-stick injuries.
- Patients using this system reported high degrees of satisfaction with these features.
- Six continuous ambulatory peritoneal dialysis patients were enrolled in this pilot study.
- A total of 1,172 exchanges were recorded over a period of 251 days.
  - Compliance with the applications ranged from 58-92%.
Treatment Monitoring (Safety and Compliance) in the Home Environment

- Number of treatments completed/week
- Fill and drain volumes
- Fill and drain times
- Vitals
- Time/duration of treatment dwell
- Number of exchanges/prescription of dialysis (% dextrose or icodextrin use)
- Symptoms during therapy
- Alarms and patient response to alarms
- Activity monitoring
- Access monitoring
- Trouble shooting to decrease hospitalization

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Potential for Cost Savings

➢ More patients selecting home therapies with a lower cost structure, decreased complication rates, and improved outcomes.

➢ Lower hospitalization rates have been correlated with increased contact with physicians, which can be facilitated by telemedicine encounters.

➢ It also should allow a reduction of time spent by the team on fragmented patient care, thus improving efficiency and communication.

➢ Future demonstration projects of telehealth must include cost analytics and address whether the potential cost savings are in fact realized.
Home telehealth in high-risk dialysis patients: a 3-year study.

Minatodani DE¹, Berman SJ.

Abstract

OBJECTIVE: This study is a continuation of a previous pilot project that demonstrated improved health outcomes and significant cost savings using home telehealth with nurse oversight in patients with end-stage renal disease undergoing chronic dialysis. We are reporting the results of a larger sample size over a 3-year study period to test the validity of our original observations.

SUBJECTS AND METHODS: Ninety-nine patients were included in this study; 43 (18 females, 25 males) with a mean age of 58.6 years were enrolled in the remote technology (RT) group, and 56 (26 females, 30 males) with a mean age of 63.1 years were enrolled in the usual-care (UC) group. Health resource outcome measures included hospitalizations, emergency room (ER) visits, and number of days hospitalized. Economic analysis was conducted on hospital and ER charges.

RESULTS: Hospitalizations (RT, 1.8; UC, 3.0), hospital days (RT, 11.6; UC, 25.0), and hospital and ER charges (RT, $66,000; UC, $157,000) were significantly lower in the RT group, as were hospital and ER charges per study day (RT, $159; UC, $317).

CONCLUSIONS: The results support our previous findings, that is, home telehealth can contribute to improved health outcomes and cost of care in high-risk dialysis patients.
Relative risk of home hemodialysis attrition in patients using a telehealth platform

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1NxStage Medical, Inc., Lawrence, Massachusetts, USA; 2Department of Pharmaceutical Care and Health Systems; 3Department of Medicine, University of Minnesota, Minneapolis, Minnesota, USA

Abstract
Introduction: Home hemodialysis (HHD) facilitates increased treatment frequency, which may improve patient outcomes. However, attrition due to technique failure limits the clinical effectiveness of the modality. Nx2me Connected Health is a telehealth platform that enables ongoing assessment of HHD patients using NxStage equipment, and that may reduce patient burden. We aimed to assess whether use of Nx2me was associated with risk of HHD attrition.

Methods: We compared risks of all-cause attrition, dialysis cessation (i.e., death or transplant), and technique failure in Nx2me users and matched control patients, using a retrospective cohort study. We also compared the likelihood of HHD training graduation in patients who initiated use of Nx2me during training with the likelihood in matched control patients. Matching factors included date of HHD initiation, NxStage treatment duration at initiation of follow-up, and prescribed treatment frequency. We used stratified Fine-Gray and Cox regression to compare risks, with adjustment for demographic factors and vascular access modality, and stratification by matched cluster.

Findings: We identified 606 Nx2me users; 49.5% initiated use of Nx2me in < 3 months after initiation of HHD with NxStage equipment. Adjusted hazard ratios (AHRs) of all-cause attrition, dialysis cessation, and technique failure were 0.80 (95% confidence interval, 0.68–0.95), 1.10 (0.86–1.41), and 0.71 (0.57–0.87), respectively, for Nx2me users vs. matched controls. AHRs were similar in patients who initiated use of Nx2me in < 3 months after initiation of HHD. The AHR of HHD training graduation was 1.61 (1.10–2.36) in patients who initiated use of Nx2me within 2 weeks of training initiation vs. matched controls.

Discussion: Use of Nx2me was associated with lower risk of all-cause attrition, lower risk of technique failure, and higher likelihood of HHD training graduation. Further studies are needed to identify the mechanisms by which use of a telehealth platform may improve clinical outcomes and reduce patient burden.

Key words: Home hemodialysis, technique failure, telehealth, training
Elements of Monthly Telemedicine Visit

- Contact with care team by secure link
- Reviews past months dialysis records, technique and complains
- Review of specific vitals, blood work
- Review of general well being
- Goal setting
Secure Telemedicine Platform

Connecting with your care team is easy with the DaVita Care Connect application.
Potential Benefits of Telemedicine in Home Dialysis

- Improved outcomes
- Patient satisfaction
- Patient accepting home, decreased burden
- Greater patient independence
- Decrease in-person care team visits with time and cost savings
Barriers to Telemedicine Utilization

This figure graphically organizes the barriers listed for each country in order of frequency from the literature. The authors categorized these by country or continent. A preponderance of the literature stems from the United States (40%), followed by Europe (33%), Australia (10%), Africa (9%), the Middle East (6%), and India (3%).
Challenges of Telemedicine Visit

➢ Infrastructure – expenditure

➢ Patients may not be accepting of technologies in their home if they feel they are too intrusive and compromise their privacy

➢ Patient-specific capabilities for the use of applicable technologies need to be defined

➢ Interactions must be culturally sensitive, and perceived as providing value for patients to continue to actively employ their use

➢ Internet access may not be widely available in patients homes and thus may have to be provided for them

➢ Regulatory issues and reimbursement for services provided through telehealth will also have to be addressed
State by State Medicaid and Private Payer Coverage

MEDICAID AND PRIVATE PAYER COVERAGE AND REIMBURSEMENT POLICIES

Note: Not all private payer laws require coverage of telehealth.

Sources: American Telemedicine Association; Center for Connected Health Policy; NCSL

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Medicare provides limited telemedicine payment coverage.

To qualify:

- **Originating Site**—Shortage Area (HPSA) located either outside of a Metropolitan Statistical Area (MSA) or in a rural census tract; or a county outside of an MSA. Must also be one of 8 types of health care facilities (e.g., doctor’s office, hospital, etc.).
- **Distant Site**—location of an eligible provider. Must be one of 10 types of providers (e.g., physician, nurse practitioner, clinical psychologists, registered dieticians, etc.).
- **Covered Services**—limited to certain healthcare common procedure coding system/current procedural terminology codes.

Most Urban Health locations do not qualify.
# Core Eligibility Requirements for CMS Reimbursement

<table>
<thead>
<tr>
<th>Geographic Location of Receiving Site</th>
<th>Type of Health Provider Delivering Service</th>
<th>Type of Institution where services delivered</th>
</tr>
</thead>
</table>
| Must be provided to an eligible beneficiary in an eligible site | • Physician  
• Nurse practitioner  
• Physician assistant  
• Nurse midwife  
• Clinical nurse specialist  
• Clinical psychologist  
• Clinical social worker  
• Registered dietitian | • Office of a physician or practitioner  
• Hospital  
• Rural health clinic  
• FQHC  
• Skilled nursing facility  
• Hospital-based dialysis center  
• Community mental health center |
| Site must be located outside of a Metropolitan Statistical Area | Eligible sites do not include a patient’s home |
February 9, 2018, after a brief government shutdown, the Bipartisan Budget Act of 2018 was signed into law. This act contained key elements of the *Creating High-Quality Results and Outcomes Necessary to Improve Chronic (CHRONIC) Care* Act of 2017. Certain areas will be revisited such as what qualifies as telehealth visits. The mode of communication two way communication versus asynchronous communication. Once in three months face-to-face monthly visits.
Expand telehealth coverage to patients on home dialysis by allowing the home to serve as an originating site.

Provide continued access to Medicare Advantage Special Needs Plans for vulnerable populations, specifically designating ESRD, human immunodeficiency virus, and chronic and disabling mental illness as conditions that meet the definition of a severe or disabling chronic condition.

Allow independent accreditation of dialysis facilities.
Elements to be Assessed to Ensure Efficiency and Cost-effectiveness

➢ Preliminary assessment—maturity of the technology and the organizations using it are valued

➢ Multidisciplinary outcomes assessment of telehealth application conducted

➢ Specific health issues and application tool characteristics:
  ➢ Privacy, safety and data security
  ➢ Clinical appropriateness and effectiveness
  ➢ Patient adoption and value perspective
  ➢ Economic aspects of implementation
  ➢ Organizational aspects
  ➢ Sociocultural, ethical and legal aspects

➢ Transferability to local applications
Patient Selection

➢ Clinically Stable:
  ➢ No hospitalizations
  ➢ Laboratory data stable
  ➢ Dialysis access
  ➢ Adequate support system for visits
  ➢ Cognitively intact
  ➢ Not a candidate for first 90 days

➢ Infrastructure support at home
  ➢ Internet, computer/phone.

➢ Willingness to do it
Psychosocial Aspects of Telemedicine: Advantages

➢ Provides visual connection that enhances communication
➢ Provides access to all interdisciplinary team members regardless of their location
➢ Saves time and money for patient as well as staff
➢ Patients are in the comfort of their own home
➢ Observing home dialysis in home environment
➢ Decreasing clinic wait time
Psychosocial Aspects of Telemedicine: Challenges

- Communication may be very difficult with patients and/or staff with vision and hearing deficits
- Assessing a patient “up close” becomes difficult
- Cultural barriers
- A session may be interrupted by unwanted by family members, animals, etc.
- There is an increased medicalization of home environment
- Technology barriers
Future of Telemedicine

➢ Training the physicians
➢ Cost-effective analysis
➢ Infrastructure support
➢ Profit sharing amongst stakeholders
➢ Developing standards same as face-to-face care
➢ Patient and physician experience
➢ Improving nephrology fellow recruitment
Resources

➢ Medical Learning Network by CMS

➢ American Telemedicine Association
In the End…

Telehealth is merely a tool, no different than a scalpel, which follows the guidance of the one directing it. And like a scalpel, telehealth is useless without a person to keep it aligned with what is needed most. That, after all, is fundamental.