PERITONEAL DIALYSIS AND
TELEMEDICINE: HOW TO GET
CONNECTED

Jennifer Woodmansee, RN BSN
Rady Children’s Hospital
San Diego, CA
In April 1924

A vision of the future
## Evolution of Telecommunication

<table>
<thead>
<tr>
<th>Period</th>
<th>Type of communication</th>
<th>Application</th>
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<tbody>
<tr>
<td>Ancient times</td>
<td>human messengers, smoke signals, light reflection, drums, horns</td>
<td>communicate medical outbreak to distant places</td>
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<td>1844</td>
<td>intercity public telegraph services</td>
<td>During the Civil War, the military ordered medical supplies and transmitted casualty lists by telegraph</td>
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<td>1876</td>
<td>telephone</td>
<td>Graham Bell developed for voice communication. About 30 years later used to transit EEG and ECG</td>
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<td>1960’s</td>
<td>Video/Television</td>
<td>University of Nebraska First interactive video system to provide healthcare across 112 miles</td>
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<td>Television is broadcast in color!</td>
<td>NASA invested money and resources to fund research</td>
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<td>1980’s</td>
<td>Invention of the World wide web!</td>
<td>Expanded possibilities for video conferencing and tele health</td>
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| 1990’s   | Reimbursement and legislation        | CMS provides reimbursement for patients in Rural areas  
American telemedicine association is created to push for better resources, standards and legislation for telemedicine |
| 2000’s   | Video chat programs and apps         | Skype takes off                                                             |
| 2010’s   | Rapid expansion of telemedicine      | Telemedicine is focused on a means of cutting cost, improve satisfaction and provide more convenient care |
|          |                                      | 2/3 of Americans have a smartphone and are using them to access health information, tools and resources |

2020 Telemedicine is expected to be a $34 billion industry and a major part of modern Healthcare delivery.
Telemedicine versus Telehealth

The use of electronic information and telecommunications technologies to support and promote long-distance clinical health care, patient and professional health-related education and public health and health administration.

U.S. Department of Health and Human Services

According to World Health Organization:

- Telemedicine and telehealth are synonymous and terms can be used interchangeably.

- Some distinguish telemedicine as being restricted to service delivery by physicians only.

- Telehealth more of a global term describing services provided by health professionals in general, including nurses, pharmacists, and others.
Remote Clinic to Larger Medical Center

- **Telepresence robots** used by Remote Emergency Departments, intensive care units to access specialists
- “Store-and-forward communications” sending digital images to be evaluated
- Live-interactive video communications provider to provider
Remote video healthcare to Home/School/Workplace

- **Online services and applications** choices at schools, at home and place of work

- **Telemedicine Kiosk:** Interactive care with NP or MD ability to measure basic vitals signs
Telemedicine for Outpatient Clinic Visits

- Ideal for specialties that have complex treatment plans that require frequent adjustments.
- Reduces travel time, travel cost, and improves adherence.
Technical Aspects

• Technical logistics depends on the type of EMR and IT capabilities

• Using Zoom in a secure network and documenting in the EMR simultaneously, vs video capability being embedded directly into the EMR

• Gathering a team: IT, health administrator, Nurse

• Patient signing up for Mychart access—only way to conduct the video visit
The Most important questions:

Are clinical outcomes as good with video based visits as compared with in-clinic visits?

Is it cost effective?
Example of Success – Goedeke, J et al, J Pediatric Surgery 2019

Pediatric patients discharged from a surgical procedure randomized equally to telemedical or onsite follow-up. Study ran for almost 2 years and involved 224 patients

- Caregivers pleased with use of telemedicine, data transmission and quality were acceptable for follow up
- no clinical findings missed/adverse events in the telemedical group.
- Quality of interaction rated by the parent scored higher in the telemedical group versus onsite group (77.8% vs. 48%, p<0.001) as did caregiver satisfaction (5.4 vs. 5.1, p<0.03)
- Travel investment, time required, loss of earnings and days off from work and school were all significantly lower in the telemedical group (p<0.001)
Examples of Cost Benefit

A Urology clinic conducted weekly virtual patient follow-up over a continuous 4-month period, 409 patients enrolled:
- Patient satisfaction 90.1%, no adverse events,
- Calculated total cost savings $24,462.00 with a annual predicted cost savings of $73,387.

Pediatric Psychiatry Clinic, 132 patients in rural Kansas, telemedicine visit with provider at the Major medical center:
- Calculated cost saving $137 per visit for the patient (considering travel cost, time off from work)
Benefits of using telemedicine

Additional studies show that the use of telemedicine for patients with chronic illness has been associated with:

- Reductions in hospitalization, readmissions, lengths of stay, and costs
- Higher rates of satisfaction, better adherence to medication
- Greater access to care for rural areas and urban suburbs
- Cost savings for the patient (less travel costs, parking, less work missed).
- Better attendance at school for patients.
Our Experience: Outpatient Peritoneal Dialysis

- Our population began to grow and was more vulnerable due to age and distance from the hospital
  - 13 total outpatients: (5) younger than 2 years, (6) 6 years or less, (2) preteen
  - Of the 13 patients, 4 of them live 40-85 miles from the hospital

- How do we lessen the care burden on our Families?

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Telehealth Appointment Types in PD

- **Vulnerability**: Visits during gaps of care or times of medical vulnerability

- **Ad hoc**: Patient or Nurse initiated concern that needed added visual assessment to triage

- **10 day**: Routine check in every 10 days to promote adherence

- **Home visit**: Annual or return home visit for the stable patient on PD
Vulnerability Visit Type

WHEN:
- 48-72-hour window post D/C from the hospital
- Post procedure follow up (medication and treatment reconciliation)
- Initial treatment days of PD related infections
- First couple of weeks post initial PD training

Care needs:
- Medication Reconciliation
- Post procedure treatment recommendations
- Fluid balance assessment
AD hoc Visit type

• When:
  • Patient/family concern for assessment abnormality (suspected exit site infection, g-tube site abnormality, illness
  • Equipment dysfunction/performance/application
  • Procedural help (identify syringe volumes, medication concentrations/interpreting labels, cycler programming, blood pressure machines
  • Inventory of dialysis supplies

• Care needs
  • Education
  • Visual assessment of the RN if the patient needs to come to the hospital for treatment.
10-Day Routine follow-up

• WHEN:
  • Every 10-day check in with the family. Routine, automatic check in by video

• Care needs:
  • Medication reconciliation
  • Weight, BP and total UF evaluation
  • Questions concern of patient health status
  • Patient education
  • Coordination of Care
Home Visit Type

• When:
  • Annual visits or return home visits for patients who are stable

• Care needs:
  • Same home care requirements as in home visits
  • Cycler set up procedure is performed at the clinic visit
## Program Outcomes

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1. Overall Positive outcomes
2. Improvement in overall care
   - Medication reconciliation: concentrations and volumes in particular
   - More efficient than in clinic visits
3. Discovery of new care needs
4. Overall positive outcomes
5. Overall feeling of lightened care burden
6. Overall feeling confidence in delivering care
Pros and Cons of the Program

**Benefits**

- **Time efficiency** vs Clinic visits and home visits.
- Avoid ED and clinic triage visits
- Reinforce Patient education
- School Attendance
- Nurse Safety

**Challenges**

- **Resolution of the video** depending on:
  - Patient device
  - Lighting
  - Motion/age of child
- **Video connection** in the patient home was variable
- **EMR patient registration**
- 10-day video visit was eliminated
Why adopt telemedicine into your program

• Financial Benefit for patient and hospital
• Eliminated Burden associated with travel times
• Increased access to care/on site education which can include demonstration
• Symptom management/ triage
• Patient satisfaction
• Decreasing patient vulnerability during periods of care transitions or period of gap in care
• Improve school attendance
• Environmental implications