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# Benefits of a Telepsychiatry Consultation Service for Rural Nursing Home Residents

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## Abstract

*Psychiatric care for nursing home residents is difficult to obtain, especially in rural areas, and this deficiency may lead to significant morbidity or death. Providing this service by videoconference may be a helpful, cost-effective, and acceptable alternative to face-to-face treatment. We analyzed data for 278 telepsychiatry encounters for 106 nursing home residents to estimate potential cost and time savings associated with this modality compared to in-person care. A total of 843.5 hours (105.4 8-hour work days) of travel time was saved compared to in-person consultation for each of the 278 encounters if they had occurred separately. If four resident visits were possible for each trip, the time saved would decrease to 26.4 workdays. Travel distance saved was 43,000 miles; 10,750 miles if four visits per trip occurred. More than \$3,700 would be spent on gasoline for 278 separate encounters; decreased to \$925 for four visits per roundtrip. Personnel cost savings estimates ranged from \$33,739 to \$67,477. Physician costs associated with additional travel time ranged from \$84,347 to \$253,040 for 278 encounters, or from \$21,087 to \$63,260 for four encounters per visit. The telepsychiatry approach was enthusiastically accepted by virtually all*

*residents, family members, and nursing home personnel, and led to successful patient management. Providing psychiatric care to rural nursing home residents by videoconference is cost effective and appears to be a medically acceptable alternative to face-to-face care. In addition, this approach will allow many nursing homes to provide essential care that would not otherwise be available.*

**Key words:** *nursing home residents, nursing homes, telemedicine, telepsychiatry, videoconference*

## Introduction

**C**ompared to their urban counterparts, rural nursing home residents are an underserved and vulnerable population<sup>1</sup> who have less access to appropriate mental healthcare providers or services,<sup>2</sup> lower rates of use of psychiatric services,<sup>1</sup> and higher suicide rates.<sup>3–5</sup> Moreover, programs to train and place mental health professionals in rural areas are often unavailable.<sup>5,6</sup> Thus, receiving and providing adequate psychiatric care in rural settings is often a significant challenge, with the greatest unmet needs occurring in small or rural nursing homes (NHs).<sup>7,8</sup> Most psychiatric treatment in rural NHs is provided by primary care physicians,<sup>9</sup> with supportive care by nursing staff, most of whom have little mental health training. Nursing home physicians identify only 15% of depressed residents and treat 25% of those identified, but believe they recognize and treat depression well.<sup>10</sup>

Although telemedicine applications for the general population are relatively widespread and numbers are increasing,<sup>11,12</sup> less has been accomplished specific to elders, though they are a major target group for telemedicine interventions<sup>13</sup> who appear to benefit from and to be accepting of a telemedicine approach to their needs. Elders' responses to telemedicine interventions were generally positive.<sup>14–16</sup> Hui et al.<sup>17</sup> found when a telemedicine service was gradually implemented for nursing home residents (NHRs), adequate care delivery occurred in 99%, more residents were served, and follow-up intervals

were shortened, and the intervention was associated with a 9% reduction in Emergency Department (ED) visits and an 11% reduction in admission to acute care hospitals, and Chae et al.<sup>15</sup> reported a high rate of patient satisfaction with telemedicine and that its use was associated with significantly fewer monthly clinic visits. Noel et al.<sup>18</sup> found that elders with complex comorbid medical conditions who received care via telemedicine had significantly lower rates of days in bed and urgent or ED visits and higher satisfaction rates. Tsuji et al.,<sup>19</sup> Jerant et al.,<sup>20</sup> and Brownsell et al.<sup>21</sup> suggest that telemedicine for elders has the potential to significantly reduce overall healthcare costs and morbidity.

Few reports describe psychiatric care for NHRs via telespsychiatry (TP). Johnston and Jones reported its successful use for 71 consultations to rural NHRs over a 2-year period.<sup>22</sup> Similarly, Tang et al. performed an analysis of 149 psychiatry visits conducted via telemedicine to 45 NH residents and found the telemedicine visits to be acceptable to residents and staff and cost effective,<sup>23</sup> and Yeung et al. reported feasibility and effectiveness of TP services for Chinese immigrants in a nursing home.<sup>24</sup>

Providing psychiatric services to underserved NHRs by video-conference may be a viable alternative to face-to-face consultations or, as is often the case, to no consultations at all. However, a larger database related to psychiatric treatment of NHRs by telemedicine is needed in order to develop the foundation for definitive studies to test its effectiveness. The purpose of this report is to describe the development and implementation of a nursing home TP consultation service and the benefits associated with its use.

## Methods

### REQUEST FOR SERVICES

Included among the requirements for maintaining Centers for Medicare and Medicaid Services (CMS) certification, all U.S. NHs must provide mental healthcare services for their residents.<sup>25</sup> Failure to meet these obligations may lead to decertification, loss of reimbursement for resident care, and facility closure. Despite this mandate, many NHs have difficulty meeting or do not meet these requirements.<sup>26</sup>

To address this deficiency, the Fletcher Allen Health Care/University of Vermont (FAHC/UVM) Telemedicine (TM) program was asked to provide psychiatric consultation and treatment for some underserved rural NHRs in Vermont and upstate New York.

### Program Description

A full description of the program can be found elsewhere.<sup>27</sup> The TM Service has been in operation since 1993 and provides two-way

interactive video consultation/treatment in dermatology, trauma, pediatric and adult critical care, child and adolescent psychiatry, and nursing home psychiatry. The program serves a large, almost entirely rural population of Vermont and upstate New York, and provides services to 13 community hospitals as far as 150 miles away.

### TELEPSYCHIATRY CONSULTATION SERVICE

Because FAHC is a tertiary care facility and the only academic medical center in Vermont, it developed ongoing relationships with many of its affiliates by providing on-site medical and surgical care for patients whose complexity necessitated treatment away from the local facility. Over the years, many hospitals had patients treated by one or more FAHC/UVM TM services, leading to requests for more and different services including psychiatric care.

All TP consultations are performed using equipment installed at FAHC. Similar equipment is installed at each NH. Our current instrumentation comprises state-of-the-art videoconferencing equipment (Polycom; Pleasanton, CA) and large-screen monitors. These systems provide remote camera control and pan-tilt-zoom functionality as well as dynamic management of available bandwidth with an extremely low call failure rate. Many of these units are on wheeled carts, which can easily be moved about the hospital and used in any office with appropriate data ports. The telespsychiatrist has full control over the distant site's camera. In addition, the distant site's picture-in-picture functionality is disabled to help minimize patient confusion or distraction.

### Interactions

A TP consultation for a NHR requires 1 or more persons in addition to the patient. There is always a nurse facilitator who may assist with patient history, positioning, orientation, hearing and vision problems, and the occasional instrument malfunction. We have successfully used amplified headphones for some hearing-impaired patients. In addition, we have found it very helpful to have family members present, at least for a portion of the visit, as they have typically provided helpful supplemental information, especially in cases where a patient has chronic or acute cognitive impairment. We also routinely have a member of the Social Services Department to provide important family/background information.

Our TP program operates with real-time, interactive videoconferencing as the principal modality. Transmission for the period of this study was via three Basic Rate Interface Integrated Services Digital Network (ISDN) lines transmitting at a bandwidth of 384 kilobits per second. While this implementation used the older and highly

reliable ISDN network, our technical team has switched to Internet Protocol (IP) or network-based video to reduce costs and to increase the system's "user friendliness."

Technicians at FAHC visit all sites or coordinate maintenance and repair efforts via teleconference. Every facility provides a room for consultations that is comfortable, private, quiet, well lighted, and uncluttered, in order to avoid distraction. The data for this report were collected from two rural NHs, one in Vermont and one in upstate New York.

## Analyses

The following data were used to estimate the potential cost savings (in \$USD) associated with the TP consultations:

1. Round trip distance to NH
2. Estimated round trip travel time
3. Fuel costs (based on U.S. average yearly price per gallon of gasoline posted by the Bureau of Labor and Statistics (<http://www.bls.gov/ro3/apwb.htm>) in a vehicle that averages 30 miles/gallon)
4. Personnel costs (at least 2 attendants are required to transport a NHR; estimated @ \$20, \$30, and \$40/hour per attendant)—these rates were identified as reasonable estimates of the range of hourly compensation rates for NH attendants in our area
5. Physician visit costs (estimated at \$100, \$200, and \$300/hour)—we estimated these costs to represent a reasonable range of physician hourly charges in our area
6. TP costs per site:
  1. Videoconference unit: \$6,425
  2. Support hardware and software: \$800
  3. Three-year service contract (doubled, as the duration of this project was approximately 6 years): \$1,260
  4. Line (all ISDN) fees
    1. Vermont: \$6/45 min call
    2. NY: \$25/45 min call

NB: All determinations were performed *excluding* the cost of the actual patient encounter given that this charge would be the same whether performed face-to-face or via TP. The average time for each encounter was estimated at 45 minutes. Analyses were performed using Microsoft Excel 2003 (Microsoft, Redmond, WA) and Minitab version 15.1 (Minitab Inc., State College, PA).

## Results

Two hundred and seventy-eight TP encounters for 106 individual NHRs took place between November 2002 and July 2008—172 in New

York and 106 in Vermont. The mean age of the NHRs was  $77.5 \pm 13.6$  years (median = 81 years; range = 44–100 years), and 63 (59.4%) were female. The mean number of encounters per patient was  $2.6 \pm 2.0$  (range = 1–10). The mean number of encounters per year for the years 2003–2007 (all years for which data for a full 12 months was available) was  $45.6 \pm 12.8$  (range = 29–64).

The one-way distance to the nursing homes was 35 miles in Vermont and 104 miles in New York, and the one-way travel time was 44 minutes in Vermont and 120 minutes in New York (Table 1).

The five most common psychiatric conditions (number of cases/total encounters; %) identified at each encounter were: Major Depressive Disorder (86/278; 31%), Dementia (65/278; 23%), Adjustment Disorders (50/278; 18%), Cognitive Disorder Not Otherwise Specified (39/278; 14%), and Delirium (20/278; 7%) and together comprised 260/278 (94%) of the entire set of diagnosed psychiatric conditions. Stability of diagnosis was greater than 90%, that is, less than 10% of the other four most common psychiatric diagnoses changed to another diagnosis at subsequent encounters.

About 15% of the patients had vision or hearing problems severe enough to adversely affect the quality of the encounter or that were associated with a presumptive diagnosis of dementia by the referring physician. Most hearing problems were temporarily remedied by use of amplified headphones followed by more definitive treatment including a comprehensive audiological evaluation and use of hearing aids where indicated. In some cases, improved hearing led to improvement in cognitive function. Visual problems were more difficult to manage but were not a major impediment to the TP consultations.

A total of 50,608 minutes (35.1 full days; 105.4 8-hour workdays) of additional travel time would be required if each of the 278 encounters occurred independently. If four encounters could be scheduled for a single round trip, the extra time spent would have decreased to 26.4 workdays. The total extra distance traveled would be more than 43,000 miles; if four encounters could be "stacked" together for a single round trip, the extra mileage would decrease to 10,750 miles. More than \$3,700 would have been spent on gasoline for 278 separate encounters, decreased to \$925 if four took place during a single round trip. Personnel costs for patient transport to a physician's office were calculated assuming that at least 2 attendants (1 for direct patient supervision and 1 to drive) would be required for each trip. This led to an estimate of \$33,739, \$50,608, and \$67,477 in additional personnel costs charged at \$20, \$30, or \$40/hour respectively; the costs would decrease by a factor of four (i.e., cost range from \$8,435 to \$16,869) if the "four encounters per round trip" schema were followed. (NB: Even 2 patients transported at one time is a rare event; 3 or 4 patients transported at one time is exceedingly

**Table 1. Patient, Nursing Home, Encounter, and Charge Characteristics**

PATIENTS		
Total	106	
Sex		
F	63 (59.4%)	
M	43 (40.6%)	
Age (yrs)		
Mean (SD)	77.5 (13.6)	
Range	44–100	
Median	81	
NURSING HOMES		
Site	Distance <sup>a</sup> (mi)	Travel Time <sup>a</sup> (min)
NY	208	240
VT	70	88
ENCOUNTERS		
Total	278	
Mean encounters per patient (SD)	2.6 (2.0)	
Range	1–10	
Per year (2003–2007)		
Mean	45.6 (12.8)	
Range	29–64	
Per site		
NY	172	
VT	106	
CHARGES (USD)		
Submitted		
Total	65,982	
Mean (SD)	237 (99)	
Range	100–517	
Median	201	
Collected		
Total	21,484	

**Table 1. Continued**

CHARGES (USD)		
Mean (SD)	78 (51)	
Range	0–220	
Median	58	

<sup>a</sup>Round trip.  
SD, standard deviation.

rare. However, we included these projected estimates. Similarly, physician costs associated with extra travel time were estimated at \$84,347, \$126,520, and \$168,693 if generated at a rate of \$100, \$150, and \$200/hour respectively. These charges would decrease to \$21,087, \$31,630, and \$42,173 if an average of 4 resident encounters per round trip occurred (*Table 2*).

There were fewer than 10 significant technical problems, one of which led to an aborted encounter. The other problems were corrected quickly enough so that the visit could be completed during the scheduled appointment. The frequency of TP consultation requests has steadily increased at established NHs. In addition, other NHs regularly request this service, but physician availability and relatively poor CMS compensation rates have been major impediments to more widespread delivery of this service.

## Discussion

Our findings suggest that if NHRs were transported to a psychiatrist's office for consultation, a minimum of more than \$13,000 could be saved by providing the nursing home consultations by telepsychiatry. If the physician visited the patient, the maximum cost savings could be greater than \$232,000. In addition, more than 35 days of travel time could be avoided. By decreasing (or eliminating) physician travel time, TP makes it possible for a psychiatrist to see more patients (either by telepsychiatry or face-to-face) each day, an especially important advantage in locations where there are physician shortages. Greater cost savings would be possible in situations where other, more expensive types of medical specialty care (e.g., dermatology, postsurgical follow-up visits) could be provided by telemedicine, by helping to avoid higher hourly physician charges. In addition, greater cost savings are likely to occur as more telemedicine programs adopt IP-based connectivity and move away from more costly ISDN connections.

Many patients liked the technology and felt that it was an indication that special pains were taken to assure that they received

**Table 2. Cost (USD) Estimates for Face-to-Face Visits and Telepsychiatry Services for 278 Encounters for 106 Nursing Home Residents**

	YEAR						
	2002	2003	2004	2005	2006	2007	2008
Round trip travel time (hr)							
Yearly	28	106	154	177	133	134	111
Total	843 (35.1 days)						
Round trip travel distance (mi)							
Yearly	1,456	5,480	7,976	9,034	6,806	6,812	5,632
Total	43,196						
Fuel costs							
Yearly	73	286	526	709	691	684	778
Total	3,747						
Range of personnel costs (USD)							
Patient-to-physician travel <sup>a</sup>	33,739–67,477						
Physician-to-patient travel	84,347–253,040						
Telepsychiatry costs							
Videoconference unit, line charges, hardware, service contract							
New York	14,045						
Vermont	10,381						
Total	24,426						
Range of total potential cost savings							
Patient-to-physician travel	13,060–46,798						
Physician-to-patient travel	63,668–232,361						

<sup>a</sup>For 2 attendants per resident.

necessary psychiatric care; they were impressed by the apparent costs of the equipment, its “high-tech” appearance, the technical expertise required to use it, and the time the telepsychiatrist and nursing home personnel spent with them. Some patients who had training or careers in telecommunications or related fields found the videoconference approach interesting, and some were curious and asked technical questions. Family members also embraced the technology—none were opposed to its use, and many thought it was a creative solution to an otherwise insoluble problem. Nurse facilitators, social workers,

and other staff members were and continue to be strong advocates of the videoconference approach, with no changes in videoconference personnel occurring since the program began, other than those necessitated by a member of the staff leaving the facility.

There are limitations to this study. This was a single-hospital experience of a TP service designed and implemented by a telemedicine department with an established record of excellence and innovation, experienced technicians, and strong administrative support. A new TP program might not fare as well, nor would a TP service begun as

the first component of a nascent telemedicine program. Many telemedicine programs do fail, and the significant start-up costs<sup>28</sup> would pose a challenge to a rural nursing home trying to implement and sustain this service.<sup>29</sup>

On January 1, 2009, SEC. 149 of H.R. 6331, Medicare Improvements for Patients and Providers Act of 2008 took effect, allowing rural skilled nursing facilities, in-hospital dialysis centers, and community mental health centers to be originating sites for telemedicine services, in effect making these sites eligible for Medicare reimbursement.<sup>30</sup> This will lead to increased use of the technology for the long-term-care population, more questions about its effectiveness, applicability, and acceptance, and larger and better-designed investigations to answer these questions,<sup>31</sup> as well as to the development and implementation of improved videoconference instrumentation.<sup>32</sup> Because psychiatric consultation for NHRs is a rare event despite high rates of psychiatric disorders among this cohort,<sup>33</sup> we conclude that the most important benefit of the TP consultations is that, if not for this technology, many of the NHRs evaluated and treated would have received no psychiatric care at all. All residents had symptoms that triggered a request for psychiatric consultation. If a consultation were not performed, the standard-of-care would not have been met for that patient. A telemedicine alternative to face-to-face care seems a good way to correct this problem.

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## Disclosure Statement

No competing financial interests exist.

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