

Brief Communication

Vanderbilt University Medical Center Ambulatory Teleneurology COVID-19 Experience

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Abstract

Background: Telehealth has proliferated since the 1950s, but adoption and coverage of telehealth services for the U.S. public have been slow. In response to the coronavirus disease 2019 (COVID-19) pandemic, the federal government has implemented temporary policy changes that removed barriers and catalyzed the unprecedented adoption of telehealth.

Methods: To assess ambulatory teleneurology satisfaction, we analyzed postvisit questionnaire data from patients and clinicians who completed teleneurology visits during the COVID-19 pandemic at Vanderbilt University Medical Center Department of Neurology (VUMC).

Results: From March 18 to May 8, 2020, VUMC completed 3,935 teleneurology visits. More than 97% of patients were very highly or highly confident in the telehealth care they received, whereas almost 99% of clinicians were very likely or somewhat likely to recommend telehealth to other clinicians.

Conclusions: Teleneurology satisfaction at VUMC has been positive, and going forward, we must advance upon this unprecedented adoption of telehealth and never revert to former restrictive policies.

Keywords: telehealth, teleneurology, telemedicine, COVID-19, pandemic

Background

Telehealth is the use of two-way real-time audiovisual technology to provide patient care without an in-person office visit.¹ Since the 1950s, telehealth has proliferated and been utilized by most medical spe-

cialties.²⁻⁵ For the past few years, the U.S. Department of Veteran Affairs and the U.S. Department of Defense have increased successful adoption and expansion of telehealth.^{6,7} Despite the successful implementation of telehealth by these departments, and the availability of sufficient technology to conduct telehealth services, the adoption of telehealth for the general U.S. public has been slow.⁸⁻¹⁰ Barriers to the adoption of telehealth have included limitations set by the Centers for Medicare and Medicaid Services (CMS) and commercial insurance payers on eligible providers and services, site of service restrictions that require patients be located in health professional shortage areas or rural settings, and state law and medical licensure regulations.¹¹⁻¹⁵

Despite these barriers, Vanderbilt University Medical Center Department of Neurology (VUMC) has had a keen interest in utilizing telehealth to enhance specialty neurology care in community settings for years. Since 2014, VUMC neurologists have provided “system-to-system” teleneurology services to 11 community hospitals. VUMC neurologists use a Health Insurance Portability and Accountability Act (HIPAA)-compliant connection through FaceTime on iPads to provide care to patients in community hospitals’ emergency departments, in-patient wards, and intensive care units. Since the program’s inception, 8,725 consults have been completed, and patient and community physician satisfaction are remarkably high.⁵ Importantly, after receiving a VUMC teleneurology consult, only 12% of patients require transfer to another facility for a higher level of specialty care. Eighty-eight percent of patients seen through teleneurology are managed at their community hospital, allowing patients to receive specialty neurology care close to their home and family.

In recent years, CMS and commercial insurance payers have made incremental policy changes that promote greater adoption and coverage of telehealth, yet only a small minority of patients are eligible for telehealth care. Notwithstanding these barriers, VUMC worked to develop an ambulatory teleneurology service in the year before the coronavirus disease 2019

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(COVID-19) pandemic. Results from an ongoing quality improvement project show that two providers completed tele-neurology services for 20 patients.

In response to the COVID-19 pandemic and in an attempt to reduce the spread of the virus, the federal government implemented temporary telehealth policy changes that removed long-standing barriers, which in turn led to a much broader adoption of telehealth at an unprecedented rate. The Coronavirus Preparedness and Response Supplemental Appropriations Act on March 6, 2020 lifted site of service and geographic restrictions to expand coverage to Medicare beneficiaries in their homes and outside of rural areas.¹⁶ The national state of emergency announced on March 13, 2020 permitted the Department of Health and Human Services (HHS) to waive state licensure restrictions allowing clinicians to provide care across state borders.¹⁷ The Social Security Act 1834 Waiver announced that CMS would cover telehealth services at an amount equal to in-person visits and thus mitigating financial risk. The HHS Office for Civil Rights (OCR) issued the Notification of Enforcement Discretion that relaxed HIPAA and privacy concerns related to the use of telehealth audiovisual platforms beginning March 17, 2020.¹⁸ The federal government named several audiovisual platforms that were acceptable for telehealth visits during the crisis, including Zoom and FaceTime. Public-facing audiovisual platforms were not authorized for use.

Most commercial insurance payers have taken similar steps to remove restrictions on the implementation of telehealth during the COVID-19 pandemic.¹⁹ However, federal and private payers announced that these telehealth policy changes will only remain in effect for the remainder of the pandemic.

Methods

After the implementation of these COVID-19 pandemic telehealth policies, VUMC urgently updated the electronic health record telehealth capabilities and, over 1 week, activated the ability of all physicians to provide telehealth services. VUMC developed ambulatory telehealth education modules and rapidly trained 3,224 clinicians and staff in the deployment of telehealth. Similarly, VUMC developed educational materials for patients on accessing and participating in telehealth visits. Vanderbilt medical student volunteers supported this rapid deployment of telehealth by contacting 5,500 patients before their telehealth appointment to help them set up their devices for the visit.

To assess ambulatory teleneurology satisfaction, we analyzed data from an ongoing IRB-approved quality improvement initiative. Patients who completed a telehealth visit between March 18 and May 8, 2020 received an invitation by e-mail to complete a postvisit survey. Patients were asked if they (1) could see and hear the provider clearly, (2) felt they

were treated with courtesy and respect, (3) felt the provider explained things in a way they could understand, (4) felt confident in the telehealth care they received, (5) felt comfortable participating in a telehealth visit, (6) felt the telehealth visit met their medical needs, and (7) would be likely to recommend telehealth to others. Study data were collected and managed using REDCap (Research Electronic Data Capture) electronic data capture tools. REDCap is a secure web-based application designed to support data capture for research studies, providing (1) an intuitive interface for validated data entry, (2) audit trails for tracking data manipulation and export procedures, (3) automated export procedures for seamless data downloads to common statistical packages, and (4) procedures for importing data from external sources.²⁰

Participant characteristics were compared using Mann-Whitney *U* tests for continuous measures and Pearson chi-square tests for categorical measures. The relationship between patient satisfaction and patient status as a new or returning patient was assessed using proportional odds models with the Likert-like satisfaction score as the outcome; gender, age, and the relationship between the patient and person completing the survey as covariates; and the patient's status as "New" or "Returning" as the predictor. To account for multiple comparisons, a false discovery rate of 0.05 was used to determine statistical significance. All analyses were conducted using R version 3.5.0 or later.

Patient ZIP codes were used to estimate travel time saved by utilizing telehealth services. In addition, Vanderbilt clinicians who provided telehealth care were invited through e-mail to complete a questionnaire in REDCap regarding their experience.

Results

Between March 18 and May 8, 2020, VUMC conducted 3,935 teleneurology encounters. The postvisit survey response rate was 40% (1,558/3,935). More than 97% of patients were very highly (83%) or highly (14.3%) confident in the telehealth care they received. Returning patients had 1.8 times greater odds than new patients to report greater confidence in the telehealth care provided (odds ratio [OR] = 1.8, 95% confidence interval [CI] = 1.3–2.5, $p < 0.001$, *Fig. 1A*). In addition, 89.2% of patients rated the telehealth visit as excellent (68.7%) or very good (20.5%) for meeting their medical needs. Compared with new patients, returning patients had 1.9 times greater odds to report greater satisfaction with the telehealth visit meeting their medical needs (*Fig. 1B*) and 1.5 times greater odds to recommend telehealth to their friends or family (OR = 1.9, 95% CI = 1.5–2.5, $p = 0.000$; OR = 1.5, 95% CI = 1.1–2.1, $p = 0.03$, respectively). Furthermore, patients avoided an average of 185.08 km, or 2.08 h, of round-trip travel by utilizing teleneurology services.

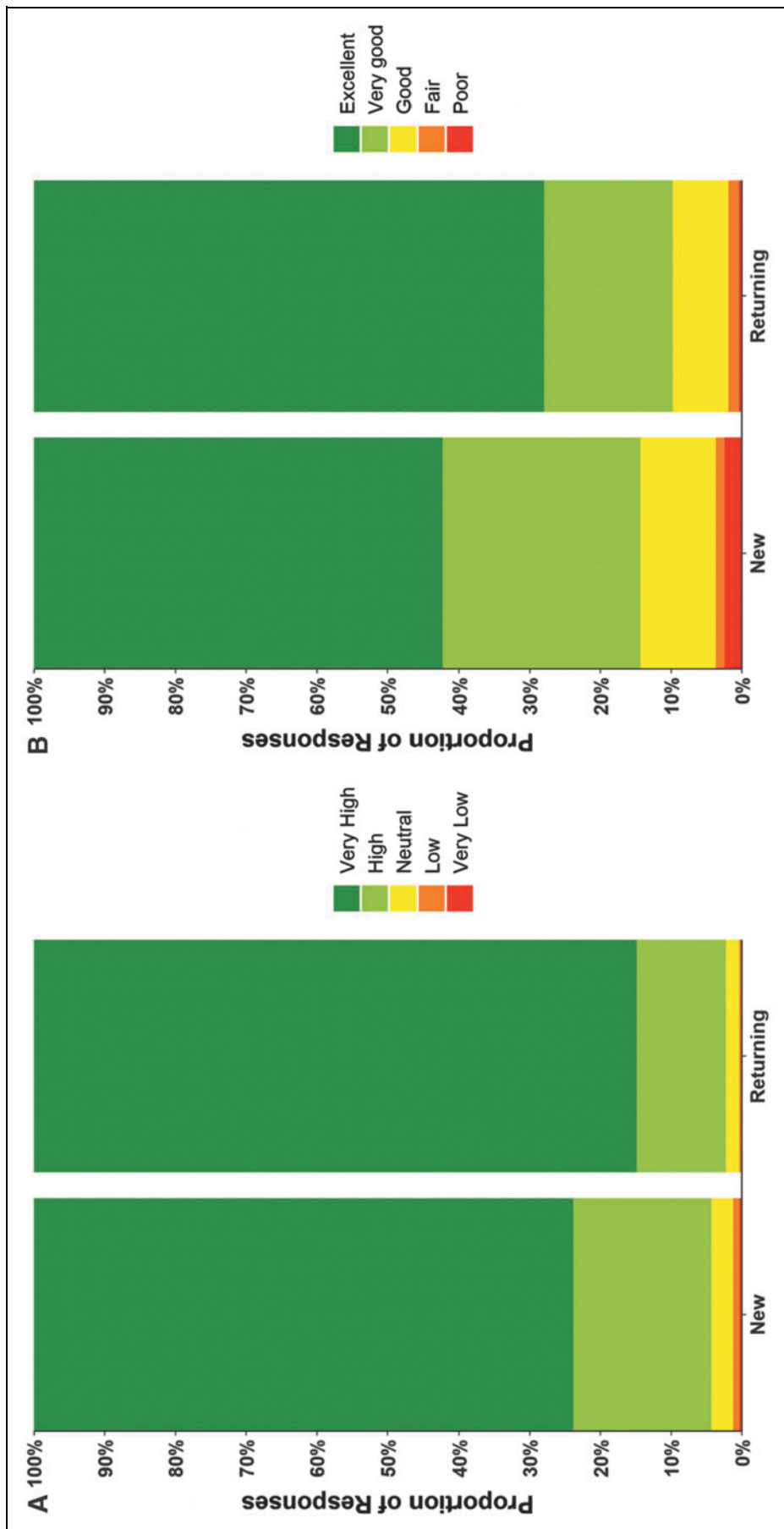


Fig. 1. New versus returning VUMC patient telehealth satisfaction. **(A)** The percentage of patients who had very high, high, neutral, low, or very low confidence in the telehealth care they received in new versus returning patients. **(B)** The percentage of patients who had excellent, very good, good, fair, or poor satisfaction that the telehealth appointment met their medical needs. ($M_{\text{returning}} = 4,076$; $M_{\text{new}} = 34$). VUMC, Vanderbilt University Medical Center Department of Neurology.

Table 1. Vanderbilt University Medical Center Department of Neurology Teleneurology Patient and Clinician Responses

REPRESENTATIVE PATIENT QUOTES	REPRESENTATIVE CLINICIAN QUOTES
(1) "I think TELEHEALTH is the best thing to happen to medicine. Personally, it's easier and more comfortable being home not fighting traffic or looking for parking. Definitely would love to keep this up."	(1) "Despite some occasional connection issues that were mostly easily resolved, I think telehealth is a critical resource for our patients that we need to offer going forward."
(2) "Comfort of being in your own home. Felt supported and secure with the interaction with the providers. Felt more present and focused. Well done."	(2) "Telehealth must become part of our regular form of care going forward."
(3) "Telehealth is such a blessing to people with a chronic disease that causes fatigue! I had hoped for a long time but this practice could offer it. I will use it happily in the future if offered."	(3) "Telehealth does not substitute face to face care but can LARGELY complement it."
(4) "I have an established history with the physician and I appreciate being able to stay safe at home and still get the care needed. Thank you"	(4) "Telehealth was of greatest utility for established patients and routine follow-up. For newer patients or returns with reported physical changes, the exam is more limited, which is why I answered the question about recommending telehealth as 'somewhat likely:'"
(5) "I loved it. I would like to have all my follow up visits this way. The actual time with the doctor was only 10–15 min which is appropriate. I didn't have to drive there, find parking, and all the way to the office, wasting an hour plus if time. This option would literally allow me to accept just about any appointment time as I can do it right from my office and get back to my day. AWESOME!!"	(5) "I feel that telehealth was extremely valuable during this difficult time. Patients were very appreciative. I feel that providing Telehealth options in the future would be beneficial, especially for patients who travel"
(6) "I am so glad you have this system, and hope that we can use it when appropriate even after the distancing discipline has ended. It is a most efficient use of everyone's time!"	

The Vanderbilt clinician survey response rate was 79%. When asked about their audiovisual connections, 88.5% of clinicians could always (13.5%) or most of the time (75%) see the patient without any difficulty, whereas 92.7% could always (19.8%) or most of the time (72.9%) hear the patient without any difficulty. In addition, 82.3% of clinicians had very high (37.5%) or high (44.8%) confidence in the care they provided through telehealth, whereas 98.9% of clinicians were very likely (70.8%) or somewhat likely (28.1%) to recommend telehealth to other clinicians.

Discussion

The COVID-19 pandemic has caused unprecedented disruption in many peoples' personal, social, and economic lives. One positive development arising from this otherwise devastating pandemic is the rapid expansion of telehealth service. Adoption of telehealth was borne out of a necessity to socially distance ourselves and limit the spread of the disease. Over all, patient and clinician experience with telehealth at Vanderbilt Neurology has been very positive as shown by our data. Although a telehealth visit is undoubtedly preferable to not receiving care, a few limitations were experienced during the COVID-19 rapid expansion of telehealth at VUMC. Early on, proper video connection in the electronic medical record had a failure rate of 19%. This was primarily due to difficulties launching and syncing the audiovisual platform within the

electronic health record from either the clinician or patient device. Internet connectivity and the availability of a suitable device for telehealth visits were additional issues. Despite these limitations, *Table 1* lists several typical patient and clinician responses related to their experience with telehealth.

Patients and clinicians have reported great success and high satisfaction with telehealth for several years, yet adoption of telehealth has been very slow due to cumbersome regulations and uncertainty of reimbursement. With the easing of regulations and promise of payment parity, telehealth has been rapidly implemented across the country during the COVID-19 pandemic.²¹ Importantly, VUMC patients cared for through teleneurology during the pandemic and the clinicians providing the care have expressed interest in continued telehealth services beyond the end of the pandemic. The telehealth visits saved patients time and were especially beneficial to patients with chronic conditions. Returning patients appear to have higher satisfaction with telehealth services than new patients, which could result from established patient–clinician trust. VUMC teleneurology satisfaction further suggests that specialty neurology care can be conducted remotely. Patients, caregivers, and clinicians now have a greater awareness and understanding of telehealth services, especially as a tool to lower geographical barrier for specialty care. To revert back to old restrictive telehealth policies and limiting access to care would be unethical and inappropriate.²²

Conclusions

Maxwell Maltz stated that “close scrutiny will show that most ‘crisis situations’ are opportunities to either advance, or stay where you are.” The COVID-19 pandemic created a crisis that has forced the United States to rapidly adopt telehealth for safety and continuity of care. Going forward, the United States must continue to advance upon this unprecedented acceptance of telehealth and never reimplement the policies that have made telehealth inaccessible to many Americans for the past several decades.

Authors’ Contributions

K.H. and D.C. designed and conceptualized the study, had a major role in the acquisition of data, and revised the article. M.R. drafted and revised the article. N.W., A.T., F.B., R.U., H.P., and B.E. revised the article. M.T. analyzed and interpreted the data, and revised the article.

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