

VIEWPOINT

The Coronavirus Disease 2019 Crisis as Catalyst for Telemedicine for Chronic Neurological Disorders

Bastiaan R. Bloem, MD, PhD

Radboud University Medical Centre, Department of Neurology, Centre of Expertise for Parkinson & Movement Disorders, Nijmegen, the Netherlands; and Radboud University Medical Centre, Donders Institute for Brain, Cognition and Behaviour, Nijmegen, the Netherlands.

E. Ray Dorsey, MD

Center for Health + Technology, Department of Neurology, University of Rochester Medical Center, Rochester, New York.

Michael S. Okun, MD

Fixel Institute for Neurological Diseases, Program for Movement Disorders and Neurorestoration, Department of Neurology, University of Florida, Gainesville.

Corresponding

Author: Bastiaan R. Bloem, MD, PhD, Radboud University Medical Centre, Department of Neurology, Centre of Expertise for Parkinson & Movement Disorders, PO Box 9101 (947) 6500 HB Nijmegen, the Netherlands (bas.bloem@radboudumc.nl).

The unfolding coronavirus disease 2019 (COVID-19) pandemic is transforming neurological care more than any other crisis in modern history. Social distancing and quarantine have cut off access to routine medical care for numerous individuals with neurological diseases. Many are at increased risk when coinfecting with COVID-19 because of their advanced age (eg, those with Alzheimer disease), comorbid conditions (eg, those with respiratory impairment in amyotrophic lateral sclerosis), or immunosuppressive treatments (eg, those with multiple sclerosis). The current COVID-19 crisis is catalyzing the use of telemedicine and remote home monitoring to ascertain a continuation of care for these vulnerable populations.

To mitigate the risk of becoming infected, patients with neurological conditions should avoid traditional outpatient visits if possible, especially in crowded hospitals. There are unavoidable situations for hospital visits, such as a need for thrombolysis in acute stroke. There are also less critical indications that require physical contact, such as continued chemotherapy infusions or (less urgently) botulinum toxin treatment for dystonia or headache. Elective in-house treatments have been postponed, sometimes leading to extended disability (eg, delayed surgery for painful radiculopathies) and precipitating anxiety (eg, evaluation of new-onset seizures).

The silver lining of this crisis is that it accelerates delivery of remote care for those with chronic neurological conditions. Awareness has grown that chronic neurological care may be best delivered as close to the patient's home as possible for several reasons. First, relevant disease complications, such as falls or seizures, occur only sporadically; asking about such rare events is notoriously unreliable, particularly in patients with cognitive decline. Second, treatment responses can be challenging to capture during episodic outpatient visits, particularly when treatment outcomes fluctuate over time. Third, observations in clinical settings often provide an unrealistic perspective of the patient's actual functioning, as with patients with Parkinson disease who can move well when observed by clinicians despite having debilitating freezing of gait at home. Fourth, home visits provide new insights into a patient's natural environment. Fifth, home-based consultations offer greater confidentiality (and this is useful because visits to psychiatry clinics can be associated with stigma). Finally, outpatient visits are inefficient and often unsafe. Individuals may require long travels to hospitals, which in thinly populated areas can take hours. Following long commutes, they sit in crowded waiting rooms, only to see a clinician for 10 to 15 minutes. Consider also that driving a car is unsafe for many patients with neurological conditions, while entering and exiting the car can cause

falls and fractures. Others have referred to these considerations as the 4 C's: better access to care, greater convenience, enhanced patient comfort, and better confidentiality.¹ We now propose that the COVID-19 crisis is adding a fifth C, namely that of contagion.

These insights have motivated researchers to evaluate the merits of telemedicine approaches, including videoconferencing for remote consultations. The evidence to support the feasibility and effectiveness of such remote care delivery has grown steadily. For example, remote care by a neurologist via videoconferencing was associated with outcomes comparable with regular outpatient visits, but with much greater efficiency.¹ Others showed that telemedicine can be used to deliver home-based interventions, such as activity-based training for survivors of stroke, which was as effective when delivered via telemedicine as through in-clinic programs.²

Other forms of telemedicine include remote monitoring using sensors,³ which can be attached to the patient, activated on their watch or telephone, incorporated into their clothes, or embedded in their home environment. Specific symptoms, such as tremor, gait, and falls, appear very measurable. Monitoring can be passive (occurring in the background) or active, such as asking patients to complete scheduled tasks at fixed intervals. A successful example of passive monitoring was provided for patients with Parkinson disease, showing that body-worn sensors could reliably monitor falls in the home environment.⁴ Finally, e-diaries can remotely screen for development or progression of nonmotor symptoms, such as pain or constipation. Paroxysmal events (eg, migraine, seizures) can also be monitored remotely using e-diaries.^{5,6} These examples collectively illustrate how neurological diseases have emerged as good candidates for telemedicine approaches, although other fields of medicine noted similar benefits.⁷ Importantly, these remote monitoring options, by offering reliable insights into issues that matter most to patients, will empower clinicians in delivering tailored counseling to patients via videoconferencing, because such counseling remains the largest component of the neurology services that we offer.

It is counterintuitive that this persuasive evidence has not yet led to widespread adoption in everyday neurology care. It is a common truism that health care is particularly resilient to change; the expression "everybody wants to innovate, but nobody likes to change" resonates with many of us. It is remarkable, however, to appreciate how the current COVID-19 crisis has accelerated the introduction of telemedicine. Although formal evaluations of the current crisis are lacking, the general experience among clinician colleagues and across many care systems has been overwhelmingly positive. Pa-

tients and families now have an enhanced understanding of the need for remote visits. There are powerful anecdotes of care delivered remotely, including highly emotional issues, such as the delivery of bad news. Surprisingly, many patients prefer to receive such bad news in the safety of their own home, rather than in the more impersonal clinic environment.

The rapidly evolving new experience in daily practice has helped to alleviate many earlier objections against telemedicine. The idea that telemedicine only lends itself for interviewing is untrue; simple neurological assessments can be performed remotely, such as testing for dexterity. Another common concern was that telemedicine is largely restricted to young patients with high levels of education, leaving many other populations underserved. However, during this crisis, adoption of new technologies, although not straightforward, comfortable, or available for all patients and clinicians, has been surprisingly rapid. We must recognize that global society has changed, with many older adults now being customized to using smartphones or videoconferencing.

Lack of reimbursement mechanisms has also impeded a wider introduction of telemedicine services in recent years. We now witness health systems and payers that long struggled to lift the financial barriers quickly implementing critical steps to facilitate the delivery of telemedicine instead of in-person visits. For example, in the Netherlands, the Nederlandse Zorgautoriteit (Dutch Healthcare Authority) rapidly ruled that initial care visits for patients can now be reimbursed based on a telemedicine visit alone. In the US,

the COVID-19 crisis is now, at least temporarily, reimbursable for any condition through Medicare and through most supplemental insurance carriers. The US requirement that the patient and clinician must be in the same state has been lifted for Medicare and Medicaid but not for those with private or no insurance. Professional organizations, such as the American Academy of Neurology, have introduced new guidelines for telemedicine visits and addressed the critical legal issues and standards of care.

The rapid expansion of telemedicine into current daily practice also comes with challenges. One concern is about privacy and security. Not all publicly available tools for videoconferencing comply with internationally accepted standards to protect each participant's confidentiality; this applies as much to patients as it does to medical professionals delivering the new remote services. A disconcerting example is the phenomenon of Zoom-bombing, in which anonymous trolls can invade and disturb a teleconference. Clinicians considering offering remote services to patients must therefore take all necessary steps to safeguard the privacy of participants.

We hope that this current COVID-19 crisis will soon be resolved. However, it is as the old saying goes: "never waste a good crisis." We hope that the telemedicine and remote monitoring advances will persist after the crisis has passed. Telemedicine for chronic neurological disorders should become part of the new normal rather than the exception. Governments, health care systems, and payers should be encouraged to continue to embrace the new age of access from home, even after the pandemic passes.

ARTICLE INFORMATION

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Neurology; and has participated in continuing medical education and educational activities on movement disorders sponsored by the Academy for Healthcare Learning, PeerView, Prime, QuantiaMD, WebMD/Medscape, Medicus, MedNet, Einstein, MedNet, Henry Stewart, American Academy of Neurology, Movement Disorders Society, and Vanderbilt University. Dr Okun's institution receives grants from Medtronic, Abbvie, Abbott, and Allergan, and research projects at the University of Florida receive device and drug donations. Dr Dorsey is a medical advisor to and holds stock options in Grand Rounds; has received honoraria for speaking at American Academy of Neurology courses; has received compensation for consulting activities from 23andMe, Clintrex, GlaxoSmithKline, Lundbeck, MC10, MedAvante, Medico Legal services, the National Institute of Neurological Disorders and Stroke, Shire, Teva, and UCBand; and has received research support from AMC Health, Burroughs Wellcome Fund, Davis Phinney Foundation, Duke University, GlaxoSmithKline, Great Lakes Neurotechnologies, Greater Rochester Health Foundation, Huntington Study Group, Michael J. Fox Foundation, National Science Foundation, Patient-Centered Outcomes Research Institute, Prana Biotechnology, Raptor Pharmaceuticals, Roche, Saffra Foundation, and the University of California, Irvine. The Centre of Expertise for Parkinson & Movement Disorders was supported by a center of excellence grant from the Parkinson's Foundation.

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