

Virtual neurology survey: Factors influencing virtual care use among Ontario neurologists

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Sabrina Campbell^{1,2}, Monish Ahluwalia^{1,2}, Jamsheed Desai³,
Houman Khosravani^{1,4,5*}, Sara B Mitchell^{1,4,5,6*}
and Charles D Kassardjian^{1,5,7,8*} 

Abstract

Background and objectives: Current virtual care guidance lacks specialty-specific considerations. Neurological care is unique due to its reliance on physical examination and complex patient population. Our aim was to determine which factors impact virtual care suitability in neurology, virtual care adoption patterns, and satisfaction with virtual care among neurologists.

Methods: Surveys were sent to Ontario neurologists through a shared email from September to November 2021. The survey consisted of four parts: demographics, virtual care adoption patterns, factors influencing virtual care use, and physician satisfaction with virtual care.

Results: Sixty-six of 380 (17.4%) neurologists completed the survey. The pandemic resulted in a substantial increase in virtual care use, from 1.6% of all ambulatory visits in 2019 to 70.6% in 2020. Video conferencing was considered more appropriate across a broader range of presentations than phone visits, with both methods more suited to follow-ups. Neurologists were largely satisfied with virtual care except for the virtual neurological examination. The neurological presentations identified as least amenable to virtual consultation were movement disorders, limb weakness, gait/balance changes, and vision changes. Four presentations were felt to be most amenable to virtual care: sleep disorders, seizure, headache, and dizziness/syncope. Factors that were felt to reduce virtual care suitability included discussion of sensitive topics and acute presentations.

Conclusion: Neurologists were satisfied with virtual care as a means of providing outpatient care, though the specific reason for referral influenced perceived appropriateness. These results can inform the basis of the development of consensus guidelines for virtual care provision in neurology.

Keywords

Telehealth, telemedicine, neurology, virtual care

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Introduction

Virtual care consists of any interaction between patients and their circle of care occurring remotely through any technological mode of communication.¹ The COVID-19 pandemic necessitated a swift shift to virtual care to maintain public health recommendations.^{1,2} Neurology practice has unique considerations in the use of virtual care due to its reliance on a detailed physical examination and relatively complex patient population.^{3–5}

Current virtual care appropriateness recommendations are broad and lack specialty-specific consensus, without detailed guidance on the appropriateness of virtual care across different neurological diseases.^{6,7} For example, the American Association of Neurology⁸ telehealth position statement states “the appropriateness of a telehealth

¹Department of Medicine, University of Toronto, Toronto, ON, Canada

²Institute of Health Policy, Management, and Evaluation, University of Toronto, Toronto, ON, Canada

³The Mississauga Institute for Neurological Disorders and Stroke, Mississauga, ON, Canada

⁴Division of Neurology, Department of Medicine, Sunnybrook Health Sciences Center, Toronto, ON, Canada

⁵Neurology Quality and Innovation Lab, Toronto, ON, Canada

⁶Sunnybrook Research Institute, Sunnybrook Health Sciences Center, Toronto, ON, Canada

⁷Division of Neurology, Department of Medicine, St. Michael's Hospital, Toronto, ON, Canada

⁸Li Ka Shing Knowledge Institute, St Michael's Hospital, Toronto, ON, Canada

*Co-Primary authors.

Corresponding author:

SB Mitchell, Sunnybrook Health Sciences Center, 2075 Bayview Ave., Room A455, Toronto, ON M4N 3M5, Canada.

Email: sara.mitchell@sunnybrook.ca



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evaluation (should be determined) on a case-by-case basis by the provider and the patient.” The Canadian Medical Association Virtual Care Playbook states that “most neurologic symptoms” are “not amenable to virtual care.”⁹ The literature on virtual care appropriateness in ambulatory neurology is sparse,^{6,7} with little known about the specific factors that influence virtual care success or adoption.

We investigated factors that impacted the appropriateness of virtual care in ambulatory neurology and the suitability of specific symptom presentations, patient factors, and facilitators and barriers to virtual care. We gauged current and anticipated future rates of virtual care adoption along with neurologist satisfaction.

Methods

Setting and participants

We initially included all neurologists practicing in Ontario. An email invitation was sent by the Ontario Medical Association (OMA) to Ontario neurologists on 29 September 2021. The OMA has a list of all practicing neurologists in the province. At the time of the survey, there were 380 practicing neurologists in Ontario.¹⁰ The survey was closed on 30 November 2021. Respondents could only answer the survey once, and unique survey responses were tracked by internet protocol addresses. Participation was voluntary and participants provided informed consent. Incomplete surveys and neurologists with less than 20% of their practice consisting of ambulatory clinics were excluded. The study was approved by the Sunnybrook Research Ethics Board (REB #5502).

Study type and design

A cross-sectional online survey (see Appendix A) was created on the Qualtrics XM online platform (Qualtrics, Provo, UT) and consisted of 25 questions. Data was collected on demographics, virtual care adoption, and factors influencing virtual care appropriateness and satisfaction. The questions were based on two studies that also classified virtual care adoption in this manner.^{11,12} Barriers and facilitators to virtual care were determined based on a survey study of neurologists at one North American Hospital.¹³ Questions pertaining to satisfaction were based on a literature review of studies on previous physician satisfaction in virtual care.^{12,14–18} The survey was piloted by two neurologists external to the study team. Telestroke was excluded from our definition of virtual care. Descriptive statistics were performed. Due to the small sample size, further statistical analysis was not performed.

Table 1. Demographics.

Subgroup	Number (%)
Practitioner type	
Generalist	12 (18.2%)
Subspecialist	34 (51.5%)
Both	20 (30.3%)
Subspecialty type*	
Behavioral	5 (7.4%)
Epilepsy	4 (5.9%)
Generalist	12 (17.6%)
Headache	5 (7.4%)
Movement disorders	1 (1.5%)
Multiple sclerosis	6 (8.8%)
Neuromuscular/EMG	15 (22.1%)
Neuro-oncology	2 (2.9%)
Neuro-ophthalmology	1 (1.5%)
Pediatrics	3 (4.4%)
Stroke	10 (14.7%)
Unspecified	4 (5.9%)
Primary clinic setting	
Academic	41 (62.1%)
Community	6 (9.1%)
Private practice	17 (25.8%)
Other	2 (3.0%)
Percent outpatient practice	
20%–30%	9 (13.6%)
31%–50%	9 (13.6%)
51%–70%	18 (27.3%)
71%–100%	30 (45.5%)
Region of practice	
Large population (>100k)	66 (100%)
Medium population	0
Rural population (<30k)	0
Age	
<35	5 (7.6%)
35–44	21 (31.8%)
45–54	15 (22.7%)
55–64	16 (24.2%)
>65	9 (13.6%)
Gender	
Male	39 (59.1%)
Female	27 (40.9%)
Gender diverse	0

*Two neurologists responded with two subspecialties, increasing the sample size to 68 in this subgroup.

Results

Demographics

Of the 380 neurologists practicing in Ontario, 99 (26.1%) initiated the survey, and 66 (17.4%) completed the survey. Of the 66 respondents, there was a representative spread among age, gender, and subspecialties (Table 1).

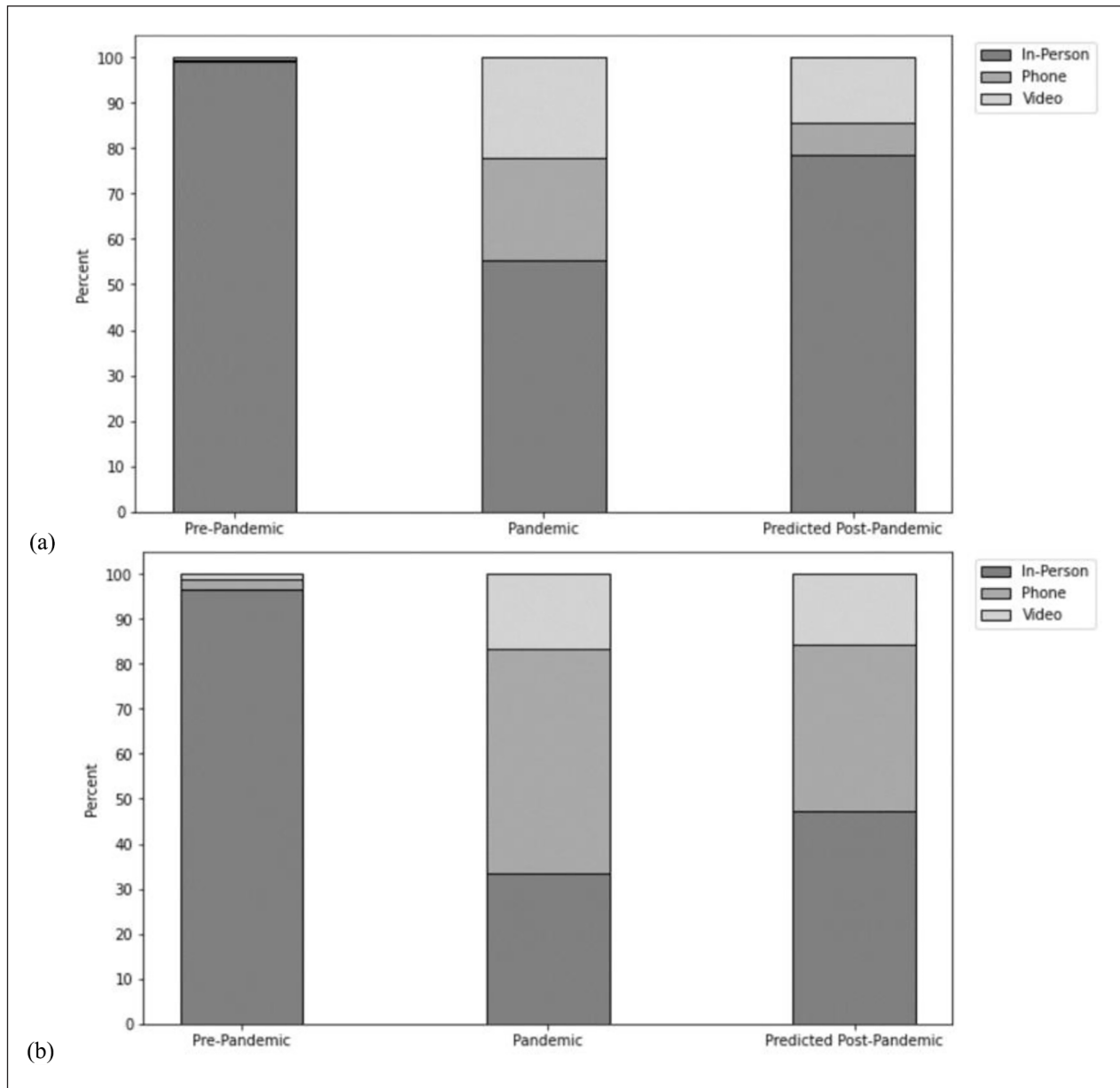


Figure 1. Reported percent of visits that were in-person, phone, or video pre-pandemic, during the pandemic, and predicted post-pandemic for new consults (a) and follow-up visits (b).

Virtual care adoption

Pre-pandemic, nearly all new patient consults (99.0%) and follow-ups (96.6%) were conducted in-person (Figure 1). During the pandemic, the percentage of reported new consults and follow-ups seen in-person dropped to 55.4% (44.6% virtual: phone 22.6%, video 22.0%) and 33.3% (66.7% virtual: phone 49.9%, video 16.8%), respectively. Post-pandemic new consults were anticipated by respondents to be 78.6% in-person and 21.4% virtual (phone: 6.9%, video: 14.5%), while follow-up visits

post-pandemic were anticipated by respondents to be 47.3% in-person and 52.7% virtual (phone: 37.1%, video: 15.6%).

Virtual care suitability

Some neurologic presentations (6 of 13) were reported to be unsuitable for new consults via video while most presentations (10 of 13) were felt to be unsuitable to phone. However, all neurologic presentations were generally felt to be suitable for video follow-ups and all neurologic presentations

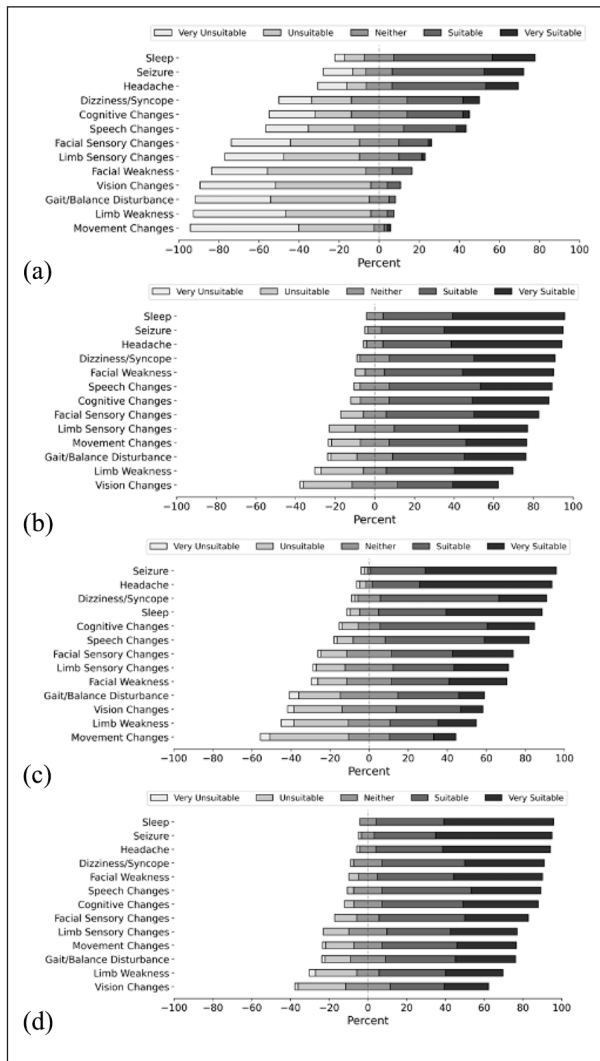


Figure 2. Suitability of outpatient neurology symptom presentations to new consults and follow-up appointments by phone or video, ordered from most suitable to least suitable. Figures illustrate the suitability of presentation to (a) new consults by phone, (b) new consults by video, (c) follow-up visits by phone, and (d) follow-up visits by video.

(excluding movement disorders) were generally felt to be suitable for phone follow-ups (Figure 2).

Factors influencing virtual care

Factors that reduced virtual care suitability included the discussion of sensitive topics and acute neurologic presentations. Factors reported to increase virtual care suitability included education and counseling visits, previously known patients, previously confirmed diagnoses, complete baseline investigations, and a recent neurologic exam conducted by another physician (Figure 3).

The top barriers to virtual care were the requirement for an in-person physical exam, high clinical complexity, and poor technological access or literacy. Privacy was not a common concern (Figure 4(a)). The top facilitators of virtual care were reducing travel, increasing access for vulnerable populations, and connecting with caregivers (Figure 4(b)).

Neurologist satisfaction

Most neurologists were satisfied with virtual care overall (very satisfied 7.6% and satisfied 47.0%) and with each component of virtual care, except for the ease of physical examination (very unsatisfied 22.7% and unsatisfied 45.5%) (Figure 5). While there was general satisfaction with virtual care, only 21.2% of neurologists preferred virtual care over in-person visits, 37.9% had no preference, and 40.9% preferred in-person visits (Figure 5).

Discussion

We report the results of a comprehensive survey that investigates the opinion of neurologists regarding virtual care. Respondents indicated that video was the preferred modality over phone across neurological presentations. The perceived suitability of virtual care varied greatly with symptom presentation, symptom acuity, appointment type (new consultation vs follow-ups), and the need for a sensitive discussion. The factors identified by respondents that influenced their comfort with virtual assessment may provide foundational information for future virtual care guidelines in neurology. Overall, our results suggest that neurologists were satisfied with virtual care across multiple neurological presentations and plan to continue to incorporate virtual visits into future ambulatory practices.

The preference for video in our study may relate to the capacity to perform a virtual neurological examination, given that the inability to perform an examination was noted by respondents to be a barrier to virtual care. This finding is in line with existing literature on virtual care suitability in other physical exam-based specialties.^{19,20} Multiple studies have now outlined practical approaches to performing a neurological examination virtually, which serve to increase the clinician's confidence in conducting these novel exam skills.^{21,22} Despite the advantages afforded by video, phone visits may be advantageous in the presence of certain barriers, including technical difficulties and limited access to technologies among certain populations. Ultimately, clinicians will likely use a combination of both modalities depending on clinical circumstances and the needs of their patients.²³

Four presentations were felt by respondents to be most amenable to virtual care: sleep disorders, seizure, headache, and dizziness/syncope. Common features of these presentations are that they are often chronic conditions and their

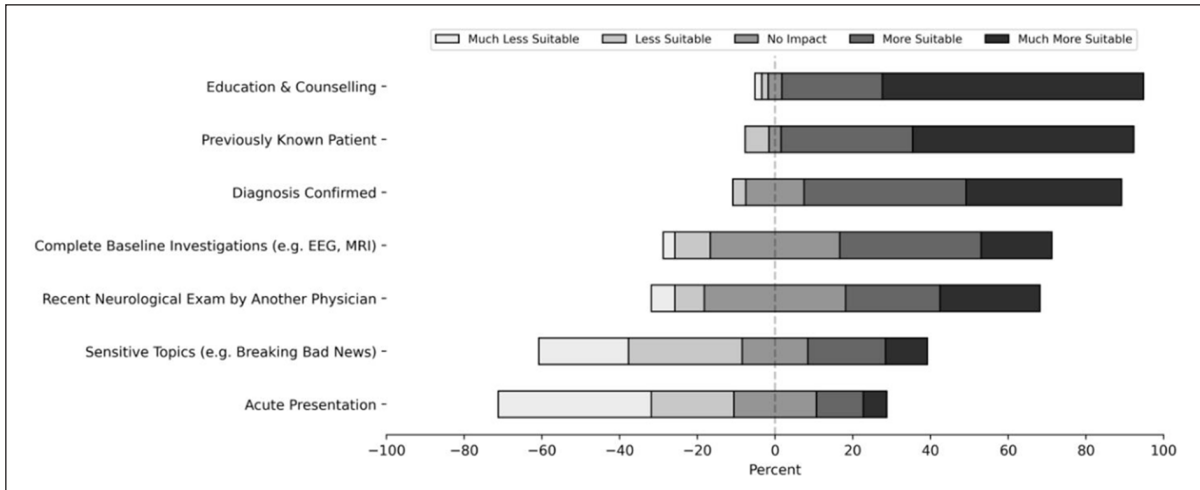


Figure 3. Impact of patient factors on the suitability of virtual care.

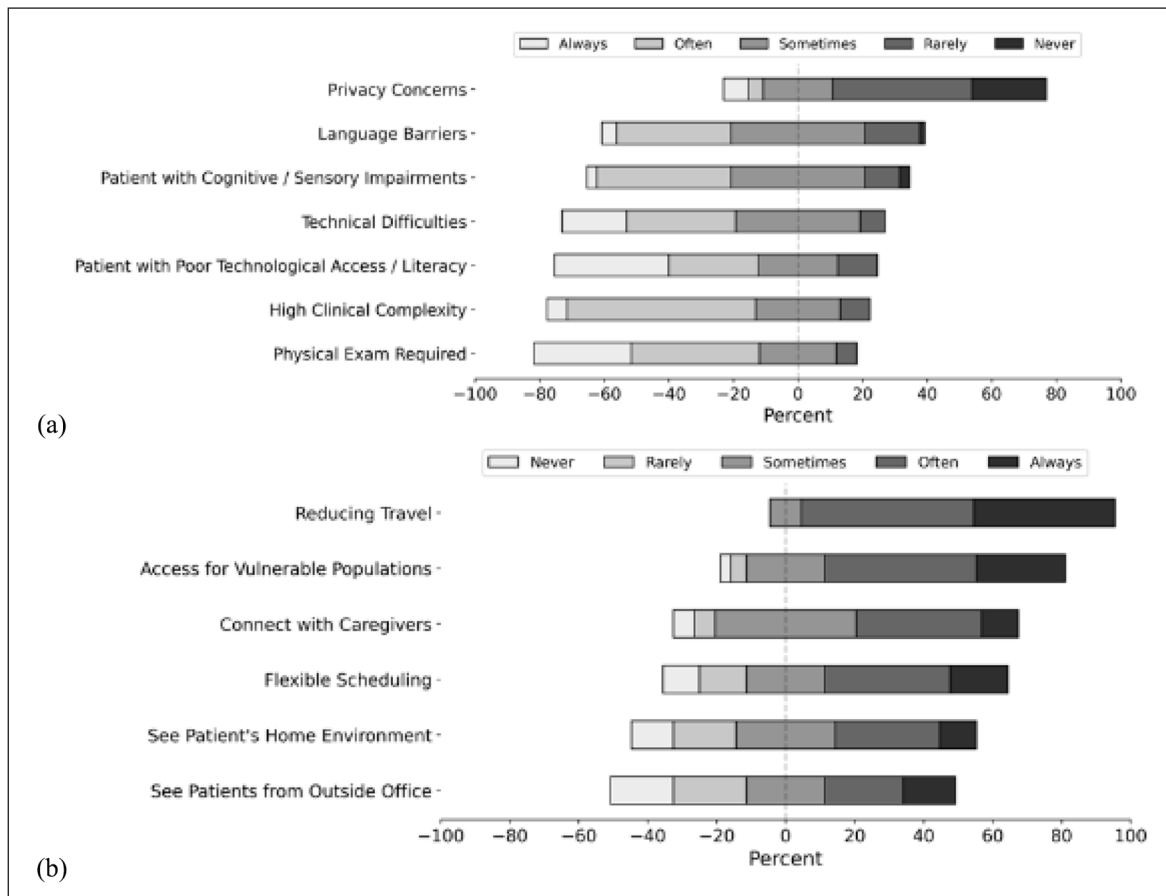


Figure 4. (a) Frequency of barriers to virtual care and (b) frequency of facilitators to virtual care.

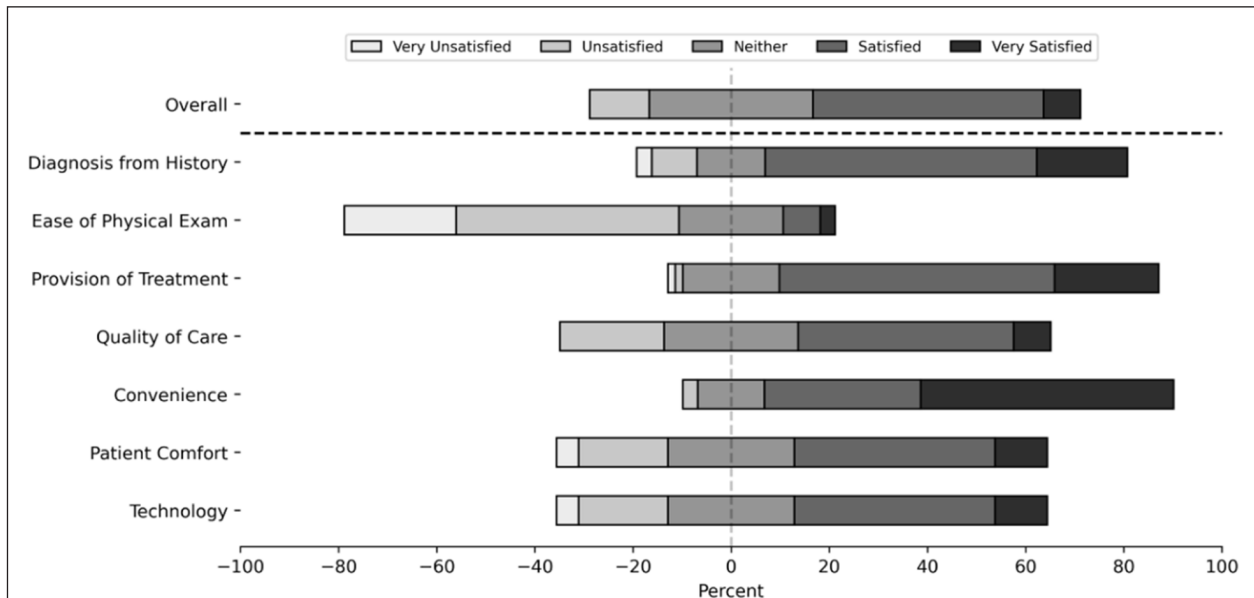


Figure 5. Neurologist satisfaction with components of virtual care.

diagnoses rely primarily on history, reducing the reliance on a detailed examination.^{24–27} Our results highlighted a few unexpected findings with respect to specific presentations. For example, while respondents rated dizziness among the top four most amenable presentations to virtual assessment, several guidelines suggest that a comprehensive vestibular exam is challenging to administer virtually.^{21,24} Dizziness may have been favored for virtual assessment by respondents due to its transient nature and often-predictable pattern of diagnosis by history alone. Conversely, respondents rated movement disorders and gait/balance changes as least amenable to virtual care despite the observational nature, which one might expect to be easily performed via video.²⁸ Inherent challenges of remote neurological examination such as variability in techniques, reliability of internet connection, technological literacy among patients, and the home environment may play significant limiting roles.²⁹ More evidence on the reliability of the virtual neurological examination across presentations and environments may mitigate these concerns.²⁵

Virtual care was rated as more suitable for follow-up appointments, non-acute presentations, and those with less clinical complexity. Each of these are situations where the neurologist may have already examined the patient, or there is a lack of urgency to the assessment. These findings are largely in keeping with other studies where low acuity presentations and follow-ups were reported as more suitable to virtual care^{20,25} and high acuity presentations as more suitable to in-person care.^{23,30,31}

Education and counseling were found to be highly suitable for virtual care, except in the context of sensitive topics (e.g., breaking bad news). Perhaps the unsuitability of breaking bad news via virtual care reflects neurologist or patient

discomfort with virtual platforms³² and indicates a need for further specialized research and education in this area.³³ While physicians are often trained in bedside manner during medical training, they may be less comfortable in “webside manner” which may require greater attention in medical training curriculums. Moreover, patient perceptions and responses to sensitive topic discussions by virtual means should be further investigated.

Overall, neurologists in our study were generally satisfied with virtual care, in keeping with existing literature.^{11,27,34,35} The most important facilitator identified for virtual care by respondents was reducing travel for patients and greater availability to caregiver participation in the appointment. These factors may be particularly important in chronic neurological diseases, as patients at later stages may experience mobility and cognitive impairments.³⁶

There are several limitations of this study, including a relatively low response rate, which is not uncommon for physician respondent web-based surveys.³⁷ More recent research suggests that during the COVID-19 pandemic, physicians were more likely to experience survey fatigue and reduced response rates.³⁸ In addition, the symptom presentations used to assess suitability are not exhaustive. The majority of respondents were based in an academic and urban setting, therefore limiting its generalizability to community-based neurologists or those working rurally. Additionally, we cannot rule out selection bias, as those interested in (or with polarized opinions of) virtual care are more likely to respond. A sample size calculation was not performed as we sought to describe the opinions of as many Ontario neurologists as possible. No formal statistical testing was pursued that would warrant a sample size or power calculation.

Conclusion

Our study outlines virtual care use practices and perceptions across neurologists in Ontario. The study supports that virtual care has a role in neurological ambulatory care, though this may vary across symptom presentation, visit type, and practitioner preference. These results suggest that current health care infrastructure and funding should expand to support the ongoing provision of virtual care in neurology. Future research should focus on developing evidence and consensus-based guidance for virtual care adoption and patient triage.

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Contributors

S Campbell, Kassardjian, H Khosravani, and SB Mitchell were involved in conceptualization, design, and analysis of the study and writing of the manuscript. M Ahluwalia was involved in the methodological design, statistical analysis, and writing of the manuscript. J Desai assisted in the design of the study and study review. All authors were involved in the review and editing of the manuscript.

Declaration of conflicting interests

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Ethics approval

Ethical approval for this study was obtained from the Sunnybrook Health Sciences Centre Research Ethics Board (REB #5502).

Informed consent

Participation in the survey was voluntary and written informed consent was obtained prior to survey completion. Written informed consent was obtained from all subjects before the study.

Trial registration

Not applicable.

ORCID iD

Charles D Kassardjian  <https://orcid.org/0000-0001-7117-8787>

Supplemental material

Supplemental material for this article is available online.

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