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Surgery Provider Perceptions on Telehealth Visits During the COVID-19 Pandemic: Room for Improvement

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ABSTRACT

Background: COVID-19 has mandated rapid adoption of telehealth for surgical care. However, many surgical providers may be unfamiliar with telehealth. This study evaluates the perspectives of surgical providers practicing telehealth care during COVID-19 to help identify targets for surgical telehealth optimization.

Materials and methods: At a single tertiary care center with telehealth capabilities, all department of surgery providers (attending surgeons, residents, fellows, and advanced practice providers) were emailed a voluntary survey focused on telehealth during the pandemic. Descriptive statistics and Mann—Whitney U analyses were performed as appropriate on responses. Text responses were thematically coded to identify key concepts.

Results: The completion rate was 41.3% (145/351). Providers reported increased telehealth usage relative to the pandemic (P < 0.001). Of respondents, 80% (116/145) had no formal telehealth training. Providers estimated that new patient video visits required less time than traditional visits (P = 0.001). Satisfaction was high for several aspects of video visits. Comparatively lower satisfaction scores were reported for the ability to perform physical exams (sensitive and nonsensitive) and to break bad news. The largest barriers to effective video visits were limited physical exams (55.6%; 45/81) and lack of provider or patient internet access/equipment/connection (34.6%; 28/81). Other barriers included ineffective communication and difficulty with fostering rapport. Concerns regarding video-to-telephone visit conversion were loss of physical exam/visual cues (34.3%; 24/70), less personal interactions (18.6%; 13/70), and reduced efficiency (18.6%; 13/70).

Conclusions: Telehealth remains a new experience for surgical providers despite its expansion. Optimization strategies should target technology barriers and include specialized virtual exam and communication training.

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Background

Telehealth is a term that encompasses a wide variety of remote physician and nonphysician health services.[1] In the wake of the COVID-19 pandemic, telehealth has emerged as a strategy to provide care to patients, while complying with the "stay-at-home" orders and the recommendations for "social distancing."[2,3] The rapid growth of telehealth utilization was aided by efforts to implement and expand telehealth before COVID-19.[4] The potential benefits of telehealth have been described previously. These benefits include high patient and provider satisfaction, ability to provide specialized care to areas lacking resources, remote mentorship of health professionals, improved efficiency, and cost savings for patients.[1,5-10] Furthermore, we have demonstrated that with appropriate patient selection, postoperative surgical care in a virtual setting has a safety profile that is similar to the traditional (in-person) visit.[11]

Before the COVID-19 pandemic, telehealth was used in various aspects of surgical care, often dictated by patient and provider preference and comfort with telehealth. As COVID-19 emerged, both providers and patients, regardless of their prior training or comfort with telehealth, have been forced to provide or receive care remotely whenever possible. Sorensen et al.[12] recently conducted a public survey to understand current perceptions on virtual care during the COVID-19 pandemic. The authors identified a high degree of public satisfaction with telehealth visits but noted that the current elevated preference for virtual care would decrease once social-distancing guidelines loosen.[12] The ongoing pandemic also offers a unique opportunity to further explore provider perceptions regarding telehealth given that many providers have had few other options to care for surgical patients. Understanding provider perceptions on telehealth in conjunction with patient perceptions will highlight opportunities for improvement and allow for targeted interventions to improve surgical telehealth care.

In this study, we obtained the perspectives of surgical providers in our department regarding various aspects of our telehealth program to understand its current use and to aid in making sustainable changes for a more effective surgical telehealth program. We hypothesized that many of our surgical providers would be new to offering virtual care and that their input would identify current limitations in surgical telehealth care.

Materials and methods

Institutional review board approval

This study was approved by the University of Michigan Institutional Review Board. Subject consent was implied by completion of the voluntary survey.

Hospital location and surgical department

The University of Michigan is a 1000-bed tertiary care hospital and high-volume surgical center with inpatient and outpatient surgical services for patients at the primary and associated satellite locations. The department of surgery houses the following subspecialties: acute care surgery, colorectal surgery, endocrine surgery, hepatobiliary surgery, minimally invasive surgery, oral & maxillofacial surgery, pediatric surgery, plastic surgery, surgical oncology, thoracic surgery, transplant surgery, and vascular surgery.

Surgical virtual clinic definition

In our department, providers have the option to schedule patients for a telehealth visit. A visit with video assistance is the preferred telehealth modality; however, a telephone visit may be substituted if the patient does not have video capabilities. Remote assistant providers have not been incorporated into our telehealth visits.

Voluntary survey

All department of surgery attending faculty, advanced practice providers (APPs), fellows, and residents (351 potential respondents) at a single institution were sent a voluntary electronic survey which consisted of 22 questions focusing on telehealth, video visits, and telephone visits (Table A.1). Before distribution, the survey was piloted with a small group of attending surgeons. The survey entailed a combination of question styles including multiple choice, scales, modified-Likert scales (possible selection of "not applicable"), and free text response. Not all questions were required to complete the survey; therefore, a variable number of responses for each question was expected. The survey was open to respondents to complete over a 2-wk period (May 5-May 20, 2020).

Data analysis

All data were collected anonymously. Any survey which did not reach greater than 50% completion was removed from subsequent analysis to ensure quality. Data were compiled from the completed surveys, and descriptive statistics of survey data were calculated when appropriate. To identify significant differences between the groups (e.g. estimation of telehealth visits by month, time required for visit completion, etc.), analyses with Mann−Whitney U tests were completed with GraphPad Prism v7 (Graphpad Software, San Diego, CA). Free-text responses provided in the study were thematically coded based on recurring themes (e.g. physical exam limitations, inefficient workflow, etc.) and involved three study team members who agreed on themes (M.K., D.L., A.W.). Frequencies of recurrent themes were then calculated for quantitative presentation.

Results

Survey completion and telehealth providers

41.3% of potential respondents (145/351) took the survey and completed at least 50% of it. More than 75% (110/145) of completed surveys were done by attendings or APPs (Table 1). There was a broad representation from each of our

department's 12 surgical sections. Of those who completed the survey, 63.4% (92/145) indicated that they were caring for patients via telehealth (Table). Of these 92 respondents caring for patients via telehealth, 95.7% (88/92) were attendings or APPs. The other four respondents were trainees (2 fellows and 2 residents). Furthermore, 80% (116/145) responded that they had no formal telehealth training (Table).

Table – Survey respondent information.	
Respondent characteristics	**N = 145**
Roles	n (% of 145)
Attendings	58 (40)
Advanced practice provider	52 (35.8)
Fellow	2 (1.3)
Resident	33 (22.7)
Surgical section	
Acute care	18 (12.4)
Colorectal	8 (5.5)
Endocrine	7 (4.8)
Hepatobiliary	4 (2.8)
Minimally invasive	9 (6.2)
Oral & maxillofacial	2 (1.4)
Pediatric	8 (5.5)
Plastic	13 (8.9)
Surgical oncology	8 (5.5)
Thoracic	5 (3.4)
Transplant	12 (8.3)
Vascular	10 (6.9)
Other	8 (5.5)
Resident	33 (22.7)
Formal telehealth training?	
Yes	29 (20.0)
No	116 (80.0)
Seeing patients in telehealth setting?	
Yes	92 (63.4)
No	53 (36.5)
Telehealth provider location and use	**N = 92**
Location	n (% of 92)
Home	71 (77.2)
Work office	66 (72.0)
Clinic room	28 (30.4)
Shared workspace/team room	18 (19.6)
Other	1 (1.1)
How do you use telehealth?	
New patient/preoperative visits	71 (77.2)
Return/postoperative visits	83 (90.2)
Interprofessional discussions	21 (22.8)
Delivering diagnoses and/or diagnostic findings	43 (46.7)
Collaboration with providers at other sites to provide education or consults	16 (17.4)
Other	21 (22.8)

Telehealth surge during COVID-19

Providers were asked to estimate their relative clinical volume of telehealth visits as a percentage of all of their clinic visits for three separate time periods: October-December 2019 (pre-COVID-19), January-March 2020 (early COVID-19), and April-May 2020 (peak COVID-19). Providers indicated significant sequential increases in telehealth clinical volume when compared with the preceding time period ($P < 0.001$) with an estimated several-fold increase in this volume during the peak COVID-19 period (Fig. 1).

Telehealth workspace and clinical use of telehealth

A majority of these visits were completed either at home or in the provider's office (Table). Additionally, 90.2% (83/92) of providers answered that they used telehealth for return/postoperative visits, and 77.2% (71/92) of providers used it for new patient/preoperative visits (Table). Fewer providers indicated that they used telehealth for interprofessional discussions, delivering diagnoses or diagnostic findings, and collaboration with providers at other sites (Table).

Telehealth technology: used and provided

When asked about the equipment used, 68.4% (63/92) of respondents indicated that their employer provided at least some type of necessary equipment for a telehealth visit (Figure A.1), whereas others were provided no equipment. Additionally, a majority of respondents indicated that they use personal smartphones, and none of the survey takers indicated these were provided by their employer (Figure A.1). Other responses indicated the use of other personal equipment such as tablets, laptop computers, desktop computers, or telephones.

Provider satisfaction and video visit efficiency

Providers were surveyed on their satisfaction with various aspects of video visits (Fig. 2). Median values with interquartile ranges (IQRs) are presented (Fig. 2). Most providers reported that they were either extremely satisfied or somewhat satisfied with the following aspects of video visits: video visits in general (76.5%; 65/85), their ability to use the technology platform (83.7%; 72/86), and their ability to elicit the necessary health history (84.9%; 73/86). Most providers indicated that they were somewhat satisfied with their ability to develop a plan (59.3%; 51/86). With regard to breaking bad news, providers more often reported they were either somewhat satisfied (38.3%; 23/60) or neutral (25%; 15/60). Providers reported even less satisfaction with their ability to perform physical exams of sensitive or nonsensitive areas. Owing to variation in practices, definitions of what constituted sensitive *versus* nonsensitive areas was left to the interpretation of the survey respondent. With regard to performing sensitive exams, 68.6% (35/51) of providers reported that they were either extremely dissatisfied, somewhat dissatisfied, or neutral. Similarly, 65.8% (54/82) of providers classified their satisfaction with the ability to perform nonsensitive exams as either extremely dissatisfied, somewhat dissatisfied, or neutral.
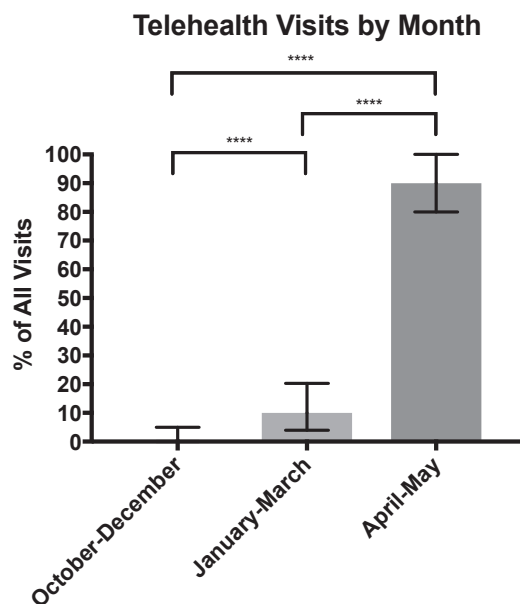
Telehealth Visits by Month

Fig. 1 — **Provider estimates on proportion of clinical visits that are telehealth visits relative to COVID-19. Median values with interquartile ranges are presented. Most providers had a low telehealth clinical volume in October-December which was well before the COVID-19 pandemic. Providers reported a significant increase (P < 0.001; denoted by **** in figure) in telehealth clinical volume in the period just before the pandemic (January-March). Finally, in the height of the COVID-19 pandemic at our institution, providers had a significant increase in telehealth clinical volume several fold greater than prior months (P < 0.001; denoted by **** in the figure).**

Provider Satisfaction

Fig. 2 — **Reported provider satisfaction with various aspects of video clinic visits. Median values with interquartile ranges are presented. Providers reported the highest degrees of satisfaction for the following aspects of video clinic visits: overall general ability to use the platform, and ability to elicit necessary history. Providers reported most often that they were somewhat satisfied with their ability to develop a plan. Comparatively, providers were less satisfied with their ability to break bad news to patients. The lowest satisfaction scores were reported for the ability to perform nonsensitive exams and the ability to perform sensitive exams.**

Provider perspective regarding visit efficiency relative to type (New Patient or Return) and modality (traditional or video) was obtained by asking providers to estimate the time required to complete the visit, not including documentation. Providers estimated that new patient video visits required less time as compared with new patient traditional visits (median time of 25 [IQR 18.5-30] *versus* 30 min [IQR 20.5-45]; P = 0.001; Fig. 3). No statistically significant differences were appreciated between the time estimates for return encounters in the video visit setting as compared with a traditional visit setting (Fig. 3).

Provider perception on the largest barriers to effective video visits

Providers were asked to elaborate on the largest barriers to effective video visits. After identifying recurrent themes for quantitative analysis, several barriers were noted. More than half of providers who answered the question (55.6%; 45/81) indicated that the limitations associated with the physical exam was a large barrier (Fig. 4). Another frequently reported barrier was either provider or patient lack of internet access, appropriate equipment, or quality connection (34.6%; 28/81; Fig. 4). Providers also mentioned that a lack of appropriate technology education or platform familiarity (17.3%; 14/81) as well as other technology issues (3.7%; 3/81) were barriers to
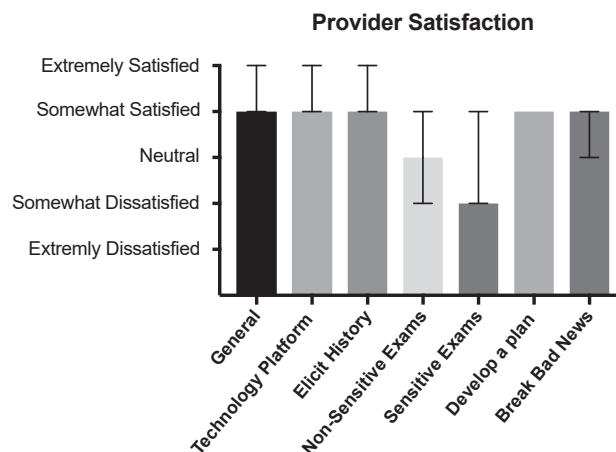
effective video visits (Fig. 4). Other important themes highlighted communication and the physician-patient relationship as several providers described ineffective communication issues and difficulty with fostering rapport in
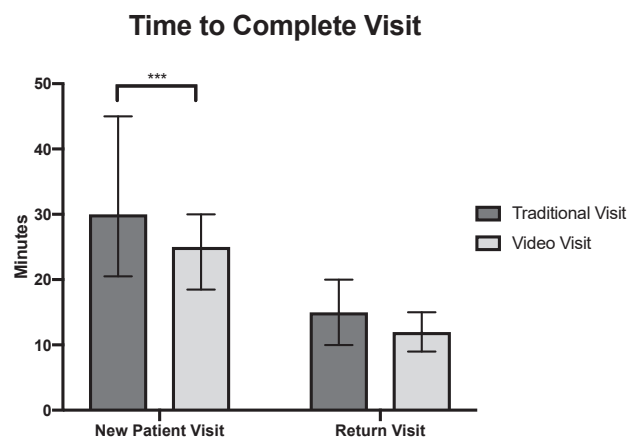
Time to Complete Visit

Fig. 3 — **Provider estimates on the time required to complete the visit categorized by type. The median values with interquartile ranges are presented. Comparisons were performed between traditional clinic and video clinic for each respective visit type. According to providers, new patient visits in the video clinic take significantly less time to complete as compared with new patient visits in the traditional clinic (P = 0.001; denoted by *** in the figure). No difference was identified between comparisons of the time estimates for return visits.**
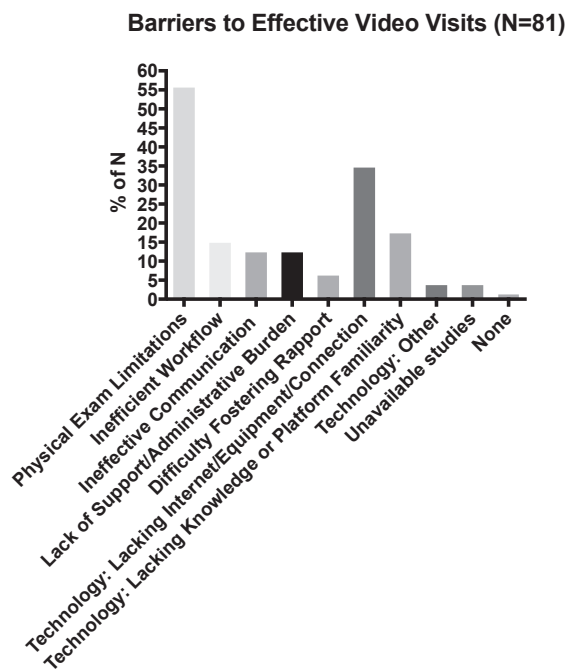
Fig. 4 – Provider perceptions of the largest barriers to effective video visits. Of telehealth providers, 81 provided some codable information in free text form. After identifying themes, all free-text responses were coded. The most frequently reported barriers were limitations with physical exam, lack of patient/provider internet access, technology equipment, or appropriate connection, and lack of patient technology knowledge or platform familiarity.

a video setting. (Fig. 4). Finally, others highlighted inefficient workflows and lack of administrative support or increased administrative burden as contributing factors to less effective video-based care (Fig. 4).

Frequency of technical difficulties and conversion of visits from video to phone

Providers were asked about the frequency in which they experienced technical difficulties and how often these technical difficulties resulted in the need to convert from a video to telephone visit. Based on a Likert-scale (Table A.1), a majority of providers (72.7%; 64/88) indicated that they experienced a technical difficulty sometimes. A majority of providers (75%; 66/88) also reported that these technical difficulties required conversion to phone visit sometimes.

When asked to elaborate on the effects that converting to a phone visit has on the patient encounter, additional recurring themes were identified among these responses ($n = 70$; Figure A.2). Approximately, 25% (18/70) of providers suggested that conversion to a phone visit had no effect (Figure A.2). The highest reported concerns related to conversion were the loss of the physical exam or visual cues (34.3%; 24/70), reduced efficiency of the visit, (18.6%; 13/70) and less personal nature of the visit (18.6%; 13/70; Figure A.2). Other identified themes include the following: overall decreased quality of visit,

reduced decision-making ability, and reduced ability to effectively communicate (Figure A.2).

Discussion

During the COVID-19 pandemic, adoption of telehealth has increased substantially and abruptly.[2,3,13] Our department of surgery has observed increases in its use as a means to continue providing care. Importantly, this study was conducted in a pandemic context in which providers seemingly had fewer options available for outpatient care and our institution pivoted toward telehealth care as much as possible. Therefore, this study highlights the perspectives of providers who were forced to use telehealth to some extent independent of their prior experience and bias. In fact, the data presented in this study indicate that a majority of providers have little to no experience with providing care in a virtual setting or any formal training in telehealth. This may be a phenomenon of our rapid institutional expansion and highlights that other institutions may need to conduct similar assessments of their own staff and create formalized telehealth curricula for providers.

Our study found many providers are conducting these visits in their own home and with their own personal devices. Some of these responses may be related to the context of the pandemic; however, owing to this survey, our group will be evaluating why smartphones were a preferred modality for conducting these telehealth visits at the time of this survey. Regardless, training for telehealth providers should emphasize principles of privacy and compliance with the Health Insurance Portability and Accountability Act in a virtual setting. For example, patient privacy and information security in telehealth has been previously described as an area of concern.[14] Owing to the massive increase in virtual care seen during COVID-19, it may be worth considering offering providers standardized institutional equipment to provide such care in a secure fashion. Not only could institutional equipment reduce the cost burden on providers in terms of data plans, but it would also guarantee that the device used is properly encrypted. Additionally, standardized equipment could limit any effect that variable provider software has on the remote care experience.

Institutional attention to technology should also consider addressing and anticipating technology-based barriers to virtual care. Several providers indicated that patient or provider access to internet, equipment, or an appropriate connection was a large barrier to delivering effective care. Additionally, these technological issues would, at least sometimes, lead to converting the video visit to a phone visit. Some indicated this further decreased the visit's efficacy. Furthermore, providers also referenced that patient lack of technological knowledge or platform familiarity inhibited care. While evaluating use of telehealth care via their institution's online portal system, Kummerow Broman et al.[15] found that although infrequent, some patients were unable to participate in this care due to technical difficulties. Similarly, a prior retrospective analysis from our group on barriers associated with failed-completion of telehealth visits suggested that some patients encounter technical issues and subsequently fail to complete their

telehealth visits.[16] Considering our data within the context of this literature, anticipating and addressing any technology-based barriers is clearly an important aspect to optimizing telehealth programs.[15,16] Importantly, given that millions of Americans do not have access to broadband internet, providers need to be well-versed in their own institutional and patient population-based trends with regard to access to internet or technology.[17] This will better prepare and even prime providers to appropriately survey patients on their available internet access and necessary equipment before scheduling them for telehealth visits. Certainly, patients who do not have the appropriate equipment or broadband connection would benefit from being seen in person, especially if a phone visit will not suffice. With respect to lack of technological knowledge or platform familiarity, it is possible that these issues may actually be related to the failings in the design of the telehealth delivery system. Therefore, when making improvements, institutions should also obtain patient input regarding how to improve their telehealth experience.

Understanding surgical provider satisfaction with virtual visits is necessary for the identification of areas for improvement. Based on the data, provider satisfaction for various aspects of video care were variable. Importantly, only one survey question pertained to the actual use of our institution's video visit platform, whereas the other aspects were more descriptive of video visits as a whole, independent of the actual technology or software used. Here, a majority of providers reported high satisfaction with video visits in general, their ability to use the platform, and their ability to elicit the necessary history. However, a greater proportion of reduced satisfaction scores were reported for other aspects of the video visit, including the ability to perform physical exams of sensitive and nonsensitive areas. These perspectives were further reflected in the free text responses offered by providers when asked for their opinion on the largest barriers to effective care in video visits. For example, more than half of providers mentioned limitations related to the physical exam. Interestingly, Endean et al.[6] reported high provider confidence in telehealth vascular physical exams, although these providers had onsite physician assistants to obtain blood pressure and doppler probe vascular signals. These onsite providers are not part of our video clinics and could explain provider concerns regarding the virtual exam and the relatively lower satisfaction scores for sensitive and nonsensitive exams. This further highlights the need for targeted education in this area of virtual exam techniques. A training program focused on virtual exam techniques that can be completed with or without an onsite assistant could prove beneficial to telehealth providers to increase the effectiveness of their visits, even outside the context of the pandemic.[18,19]

Other providers in this study highlighted concerns regarding difficulty with establishing rapport or barriers to effective communication during video visits. This could be why the satisfaction scores, as compared with some other aspects of video care, were lower for the ability to share bad news. In contrast to our findings, Agha et al.[20] randomized patients to receive either virtual or in-person care; they found similar patient satisfaction scores regarding patient-centered communication and the ability to develop rapport. The program in this particular study, however, incorporated an onsite nurse as an assistant; therefore, it is unclear how these results apply in the COVID-19 context when it is presumed that onsite assistants were not available for a majority of these visits throughout the country.[20] Nevertheless, in line with the data related to virtual exams, these results further highlight the need for dedicated virtual training for telehealth providers that extends beyond trial and error. For example, training on principles of effective virtual communication may improve a surgical provider's ability to connect with patients (i.e. enunciation, eye-contact, minimizing body gestures, etc.).[19]

Previously, it has been suggested that telehealth can be an efficient way to provide care.[7,9,10] We investigated the provider-estimated time spent on video visits for new patient and return visits, which are the two highest reported uses of telehealth in our institution's surgical practice. Interestingly, providers in our study estimated that, when excluding documentation, they save only 5 min with a new patient video visit as compared with a new patient traditional visit. In contrast, no difference in length of visit was appreciated for return patient visits between the two groups. Furthermore, a number of providers actually reported video visit concerns related to workflow inefficiencies and increased administrative burden or lack of administrative support. Considered together, if the estimated 5 min saved for new patient visits in a video setting is real, this is likely lost with the associated workflow inefficiencies and other contributing burdens. Additionally, as few trainees indicated that they were seeing patients in a telehealth setting, it is also conceivable that this difference will dissolve as trainees become better integrated into telehealth care and as attendings devote time to teaching their trainees during these encounters. Regardless, this study highlights that attempts should be made to optimize workflow by incorporating some administrative support (medical assistants, nursing, etc.). Furthermore, it is possible that this will have a positive impact on the cost-effectiveness of these clinics as providers will gain additional time to see more patients.

This study has several limitations. First, this study involved a single institution and department, making generalizability difficult. However, the institution represents one that was dramatically impacted by COVID-19 and essentially halted all unnecessary in-person clinic visits in favor of telehealth visits. Future studies may consider larger sample sizes across multiple institutions and provider types. Another limitation is that trainees represented a minority of those caring for patients in a telehealth setting. As telehealth care becomes further emphasized in training and as the acuity of the pandemic subsides, trainee perspectives and the effects that trainee involvement has on efficiency should be reevaluated. Additionally, we did not include cardiac, otolaryngology, urology, or neurosurgery as they are not considered part of our department of surgery. It is therefore unclear how these data apply to those specialties or even nonsurgical specialties. Another limitation is that there may be some inherent selection bias in our results as providers who either like or dislike telehealth may have been more or less likely to take the survey. Another limitation is we do not specifically assess the effects that remote care has on documentation practices and efficiency. Future studies should assess for possible effects. Finally, our survey highlights perspectives on telehealth

during the pandemic when there were several institutional changes occurring and providers had fewer options for outpatient care. Therefore, it is unclear if these perspectives will change as experience is gained or as the acuity of the pandemic subsides. These perspectives, including what is acceptable or unacceptable for telehealth care, should be reevaluated outside of the pandemic context.

Conclusions

Providing surgical care via telehealth significantly expanded during the COVID-19 pandemic and is a new experience for many providers. Although the patient's perspective on telehealth has been described within the context of this pandemic, here we offer the provider perspective.[12] Understanding opinions on telehealth in the current environment is vital to improving telehealth programs. The pitfalls and barriers to effective implementation of telehealth that we have described from the provider perspective can improve existing telehealth programs and streamline their adoption.

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Disclosure

All authors do not have any disclosures or conflicts of interest to report.

Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jss.2020.11.034.

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