

Preoperative virtual video visits only: a convenient option that should be offered to caregivers beyond the pandemic

Danielle Dougherty ¹, Allison R Thompson,² Karen Elizabeth Speck,¹ Erin E Perrone¹

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ABSTRACT

Objective During the COVID-19 pandemic, our group implemented preoperative video visits (VVs) to limit physical contact. The aim of this study was to determine caregivers' and providers' perceptions of this practice and to determine feasibility for continuation.

Methods All patients who had only a preoperative VV prior to an elective surgery were identified from March–October 2020. Caregivers, surgeons, and clinic staff were surveyed about their experiences.

Results Thirty-four preoperative VVs were followed by an elective surgery without a preceding in-person visit. Of the 31 caregiver surveys completed, the majority strongly agreed that the VV was more convenient (87%, n=27). Eighty-one percent (n=25) strongly agreed or agreed that the VV saved them money. Ninety-four percent (n=29) strongly agreed or agreed that they would choose the VV option again. Caregivers saved an average travel distance of 60.3 miles one way (range 6.1–480). Of the 13/17 providers who responded, 77% (n=10) expressed that the practice should continue.

Conclusions Virtual health became a necessity during the pandemic, and caregivers were overwhelmingly satisfied. Continuing VVs as an option beyond the pandemic may be a reasonable and effective way to help eliminate some of the hurdles that impede healthcare-seeking behavior and should be offered.



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¹Section of Pediatric Surgery, Department of Surgery, University of Michigan Health System, Ann Arbor, Michigan, USA

²Department of Health Behavior and Health Education, University of Michigan School of Public Health, Ann Arbor, MI, USA

Correspondence to

Dr Danielle Dougherty;
danjdou@med.umich.edu

INTRODUCTION

Telehealth in the form of video visits (VVs) has been an emerging endeavor in healthcare during the past several decades. The main goals traditionally have included improvement of healthcare access and efficiency of healthcare delivery. Telemedicine has been implemented and evaluated at very different levels within a wide variety of medical fields, from genetics to neurology and pathology.¹ Within the field of pediatric surgery, it is in relatively early developmental stages.² During the COVID-19 pandemic, telehealth services afforded the additional benefit of limiting face-to-face contact, and its rapid growth was seen throughout the medical field. Several

Key messages

What is already known about this subject

- ⇒ The use of telemedicine has expanded during the last several decades.
- ⇒ Telemedicine's suggested benefits for a patient include decreased travel time, fewer missed work hours, and lower overall cost compared to in-person visits.
- ⇒ Telemedicine's increased implementation during the COVID-19 pandemic has the additional benefit of limiting face-to-face contact.
- ⇒ There are few robust studies that report how telemedicine is perceived by the patients, families, and healthcare providers within the field of pediatric surgery.

What are the new findings

- ⇒ The majority (>80%) of the caregivers of pediatric patients who underwent preoperative video visits at one institution reported that they missed less work and spent less money compared to in-person visits.
- ⇒ More than 90% of the patients' caregivers were satisfied with their child's care and would choose the video visit option again if offered. The average travel time saved per video visit was 60.3 miles one way.
- ⇒ Among healthcare workers surveyed at the same institution, 69% would recommend a video visit option to their own family members, and 77% expressed that the practice should continue.

How might it impact on clinical practice in the near future

- ⇒ Video visits are a convenient and feasible option for preoperative pediatric surgical consultations, and they should continue to be offered beyond the pandemic.
- ⇒ As more preoperative video visits are performed, further studies can be done to help delineate which diagnoses are most suited for a video visit only option.

medical groups advocated for an accelerated transition to telehealth for the urgent necessity of improved safety.^{3 4} Other institutions augmented aspects of virtual care that had

already been present in their practice.⁵ Multiple groups carried out thorough evaluations of their expedited virtual set-ups, deducing that these rapid changes in care may have continued benefits even after the pandemic is over.^{6,7}

Overall, the COVID-19 pandemic provided an opportunity for many healthcare centers to quickly implement telehealth measurements on a larger scale than previously had existed. In doing so, this provided the chance for centers to evaluate this form of medical care and to establish improved parameters of implementation.

In the present study, we attempted to evaluate the pilot telemedicine program implemented in our academic pediatric surgical practice during the COVID-19 pandemic. Our aim was to determine whether the telemedicine program was effective in providing preoperative care that was deemed safe, accessible, and satisfactory to the patients. We further aimed to determine whether it is feasible to continue this telehealth offer in the form of preoperative VVs without an in-person visit beyond the pandemic.

METHODS

This retrospective chart review and survey study evaluated all preoperative VVs at CS Mott Children's Hospital that took place between March and October 2020.

Patient demographics and caregiver survey

After identifying all patients who underwent only a VV prior to an elective operation, their charts were evaluated for eligibility. Patients were included if they were aged 18 or younger at the time of the operation and if their preoperative visit was carried out entirely via video. They were excluded if they underwent a subsequent in-person visit with any surgeon prior to the operation. Once eligibility was confirmed, their charts were reviewed for pertinent details regarding their care including diagnosis, type of operation performed, time between VV and operation, distance traveled from the hospital, and whether the same surgeon participated in the VV and the operation itself. The caregivers were contacted by telephone and explained the nature of the research. After providing verbal consent, caregivers were asked a series of Likert scale questions regarding their experience with the preoperative VV. The questions were based on a previously published questionnaire evaluating caregiver satisfaction of a same-day surgery clinic visit option.⁸ If they were not reached by telephone the first time, further attempts were made (max 4). The phone survey responses were recorded on Qualtrics (Qualtrics Software: Provo, Utah) and were matched to the deidentified chart data.

Provider data collection

All providers in the Pediatric Surgery office, including 13 surgeons, 3 nurses, and 1 scheduler (n=17), were emailed a survey through Qualtrics with simple multiple-choice questions that sought to detail their perception

of preoperative VVs from a provider standpoint. The questions also were based on the aforementioned survey used to evaluate our provider satisfaction with a previous program in which surgical procedures were performed on the same day as a clinic visit.⁸ The email explained the purpose of the study and provided the link to the survey. After deidentification, answers were saved anonymously on Qualtrics.

Data analysis

The Kruskal-Wallis test was used to examine differences between surgery type and overall satisfaction. Spearman's rank correlation was used to assess the relationship between distance from home to clinic and overall satisfaction. All analyses were conducted in Excel (Microsoft: Redmond, Washington) and STATA V.15 (StataCorp. 2017. *Stata Statistical Software: Release 15*. College Station, Texas: StataCorp) and significance was set at $p < 0.05$.

RESULTS

Patient selection and VV set-up

The patients were referred by their primary care providers to the pediatric surgery clinic. A list of diagnoses was identified for VV suitability, and caregivers were then offered this as an option. Once the family elected to proceed with a VV, they were given detailed information about how to prepare for the visit, how to check in, what equipment they needed, and what to expect. They were told that they need either a smartphone, tablet, or computer with a camera and microphone. The VVs ultimately were done through EPIC MiChart (2021, Epic Systems, Verona, Wisconsin), and any documentation or imaging available in the system would be accessible via electronic medical record in the same way that it is accessible for in-person visits.

Demographics

A total of 38 preoperative VVs took place between March and October 2020. Of these, four were excluded from the study. Three of the four were admitted as inpatients and therefore underwent an in-person evaluation by a surgeon at least 1 day prior to surgery. The other patient was excluded because she was over the age of 18 when the procedure was performed. The remaining 34 patients successfully participated in a preoperative VV followed by an elective operation. The majority were hernia repairs (41%; n=14), followed by feeding tube placement (18%; n=6) and skin or soft tissue procedures (15%; n=5). Inguinal hernias were diagnosed on history, supplemented with physical examination, and pictures when available. When there was not an obvious bulge seen on the screen or in a picture, the decision was made to offer an operation based on strong history alone or to defer operative decision-making to either an in-person visit or to a picture sent in from the family. Of note, one patient was diagnosed with a hydrocele and the caregiver was instructed that a laparoscopic inguinal hernia repair was

Table 1 Operations performed after preoperative VVs

Category	Operation	Number
Hernia repair	Inguinal hernia repair	11
	Umbilical hernia repair	1
	Epigastric hernia repair	2
Feeding tube placement	Gastrostomy	5
	Gastrojejunostomy	1
Superficial soft tissue	Gomco circumcision	2
	Pilonidal cyst	1
	Spitz nevus removal	1
	Excisional biopsy of lymph node	1
Thoracic	Thoracoscopic lung biopsy	1
	Nuss pectus excavatum repair	1
	Thoracoscopic right lower lung resection	1
Abdominal	Laparoscopic cholecystectomy	1
	Laparoscopic Ladd's procedure	1
	Laparoscopic Nissen fundoplication	1
Miscellaneous	Anal sphincter Botox injection	1
	Removal of foreign body of ear	1
	Esophagogastroduodenoscopy (EGD) with dilation	1

VV, video visit.

recommended. At the time of surgery, a communicating hydrocele as well as a patent processus was identified, and a laparoscopic inguinal hernia repair was performed, as planned from the VV. Other operations included

thoracic procedures, such as lung biopsy, abdominal procedures including laparoscopic cholecystectomy and laparoscopic Ladd's procedure for intestinal malrotation, and miscellaneous procedures, such as esophagogastroduodenoscopy (EGD) with dilation and removal of a foreign body (table 1). The average time between VV and surgery was 31 days (range: 2–94), and the average distance patients traveled to the hospital was 60.3 miles one way (range: 6.1–480). In 24 cases (71%), the same surgeon participated in the VV and the operation.

Caregiver questionnaire

Of the 34 eligible patients, a successful phone interview was completed with 31 of the caregivers who participated in the VVs. Two were unable to be reached after four attempts, and a single caregiver requested the interview questions be sent via email; however, the survey was never returned. Likert scale answers demonstrated that on average, caregivers felt the VV experience included instructions that were easy to understand, saved them time and money, was not stressful, and was more convenient. They also responded on average that they were overall satisfied with their child's care and that, if offered, they would choose the VV option again (average Likert ranking 4.74 and 4.77, respectively). The survey questions and the average Likert answers for each question are outlined in table 2. Of the 31 caregivers successfully surveyed, 94% (n=29) strongly agreed or agreed that the preoperative instructions were easy to understand. The majority strongly agreed or agreed that they missed less work (80%; n=24 out of the 30 total answers) and spent less money (81%; n=25) than if the preoperative appointment was conducted in person. Answers to free response questions indicated that money was saved on parking,

Table 2 Caregiver questionnaire

On a scale of 1–5 with 1 being strongly disagree and 5 being strongly agree, how much do you agree with the following statements? n=31	Mean	Range	SD
The preoperative instructions were easy to understand.	4.77	3–5	0.56
I missed less work than if the preoperative appointment was conducted in person.*	4.43	1–5	1.01
I spent less money than if the preoperative appointment was conducted in person.	4.29	1–5	1.32
It was difficult to access and use a device that could be used for the VV.	1.45	1–5	0.96
It was stressful making a decision about surgery using a VV.	1.77	1–5	1.36
The stress of making a decision about surgery would have been lessened with an in-person visit.	1.90	1–5	1.42
I would choose to participate in a VV again if offered.	4.77	3–5	0.56
The VV instead of an in-person preoperative appointment was more convenient for me.	4.74	3–5	0.68
I am overall satisfied with my child's care.	4.74	1–5	0.82

*For this question, one caregiver preferred not to answer (n=30 for this question only).
SD, Standard deviation; VV, video visit.

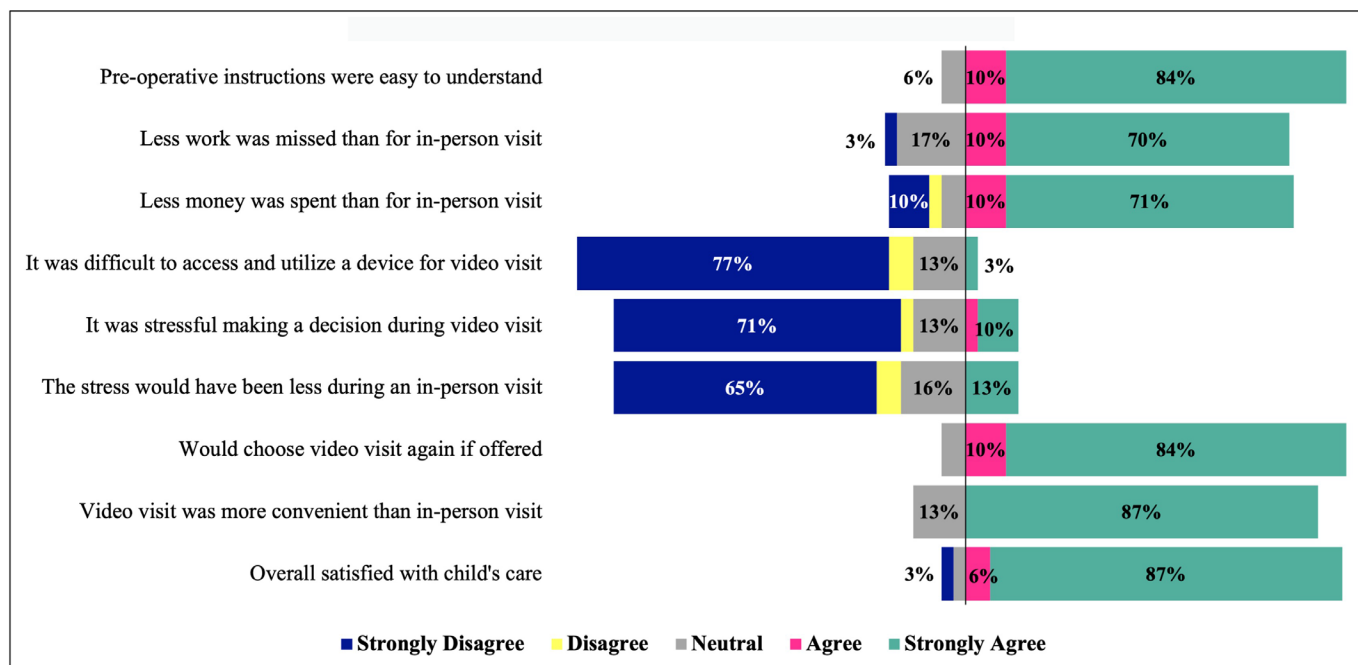


Figure 1 Visual Likert scale distribution of caregivers' opinions on their child's VV experience.

gasoline for travel, food for travel, and/or a caregiver for other children.

Only one person (3%) said it was difficult to access and use a device for the VV, and another 13% ($n=4$) gave a neutral response to this question. Explanations given for negative experiences included difficulties logging on, confusion regarding calling in or being called, a broken computer screen, and concerns with technology. Four of the caregivers (13%) either agreed or strongly agreed that it was stressful deciding about surgery using only a VV, and the same amount (13%, $n=4$) agreed or strongly agreed that the stress would have been less had it been an in-person visit. The majority of the caregiver respondents (94%; $n=29$) agreed or strongly agreed that they would choose to participate in a VV again if offered, and 87% ($n=27$) strongly agreed that the VV instead of an in-person preoperative appointment was more convenient for them. Twenty-nine of the caregivers (94%) agreed or strongly agreed that they were overall satisfied with their child's care (figure 1). Responses included '(the) flexibility part was the most convenient' and '(we) didn't have to drive there and back, get parking, find the office; it saved time and gas money'. Overall satisfaction did not differ significantly with type of surgery ($\chi^2=5.371$, $p=0.37$, $df=5$). Overall satisfaction also did not differ significantly by distance from home to clinic ($r_s=0.2$, $p=0.29$).

Healthcare provider questionnaire

For the healthcare provider questionnaire, a total of 17 surveys were distributed to 13 surgeons and four staff members of the Pediatric Surgery Outpatient Clinic at CS Mott Children's Hospital. Thirteen (76%) responses were completed and recorded with all questions answered, as shown in table 3. One person provided responses for the

first two questions only, totaling 14 responses for these questions. A majority (64%; $n=9$ out of 14) agreed that utilization of the VV provides better satisfaction to the patients and families. The amount of work providers felt was required to maintain VVs as part of the healthcare provision is summarized in the final question in table 3, with the majority stating it takes 3–5 hours or less. Most (69%; $n=9$ out of 13) reported that they would recommend this option to a family member; however, 50% ($n=7$ out of 14) did not feel confident that families preferred the VVs over the in-person visits. The majority expressed that they would like the VV option to continue, with 77% ($n=10$ out of 13) answering 'yes' to this option, 15% ($n=2$) answering 'no' and 8% ($n=1$) indicating that they preferred not to answer this particular question.

DISCUSSION

The realm of telemedicine has been developing during the last several decades as a method to improve healthcare provision and to increase efficiency and availability. Telemedicine for the pediatric population has the potential to expand the conveniences of remote care to the patients and to their caregivers and families. We had a practice change during the COVID-19 pandemic where we offered preoperative VVs for families to maximize social distancing for the safety of patients, caregivers, and providers. Our study found that overall, caregivers who participated in preoperative VVs identified these visits as convenient, easy, and helped them save time and money while obtaining satisfactory care. Providers were overall satisfied with the change in practice and thought it was something that should continue to be offered.

Table 3 Provider questionnaire

Survey question	Total responses with the following answers		Prefer not to answer
	Yes	No	
Do you think that the utilization of VVs provides better satisfaction for the patient families over all?	9	4	1
Do you think that families prefer the VVs over in-person preoperative visits?	6	7	1
Would you recommend this program to one of your family members?	9	4	0
Would you like the VVs to continue?	10	2	1
Please quantify the amount of work required per week to maintain the VVs:			
<1 hour	4		
1–2 hours	2		
3–5 hours	4		
6–10 hours	1		
≥10 hours	0		
Prefer not to answer	2		
VV, video visit.			

Telemedicine is broadly defined as the delivery of healthcare in a way that is not done in person, whether via text, audio or video technology.⁹ Reported aims of telehealth programs have included improving access for remote or underserved areas, and decreasing the burden of transportation, missed work, and cost that an in-person office visit incurs on a family.¹⁰ However, during the COVID-19 pandemic, telemedicine provided the additional benefit of providing medical care while limiting person-to-person contact. Telemedicine also has been suggested as a feasible tool for perioperative assessment; however, there are little data demonstrating its efficacy or guidelines outlining which patients or diagnoses are more or less appropriate for this type of visit.¹¹ Ultimately, despite the broad range in application during the last several decades, there are few robust assessments of individual telemedicine programs to determine if they truly accomplish the goals that they were designed to achieve. Of the evaluations that have been done, most focus on clinical outcomes, cost-effectiveness, or patient satisfaction, with only a few highlighting the aspects of

healthcare that are better suited to provide safe and sustainable telemedicine implementation.¹²

Within the pediatric population, studies are sparse. One systematic review reported 11 randomized controlled trials between 2010 and 2020 that assessed telemedicine in the pediatric population, with 10 out of 11 of these studies reporting moderate-quality to low-quality evidence and most involving chronic health conditions, such as obesity and asthma. While the impact of telemedicine on the management of these chronic conditions was modest or contradictory among the different studies, several studies did demonstrate an increase in caregivers' satisfaction and quality of life.¹³ Another integrative review found a total of 17 qualitative and quantitative studies evaluating the effects of telemedicine on pediatric patients with known complex chronic illnesses. Results demonstrated a decrease in unplanned hospitalizations and healthcare cost as well as an increase in caregiver satisfaction.¹⁴

There is a paucity of data on telemedicine as it pertains to pediatric surgery in particular, despite its recent increase in use.¹⁵ There were some studies done prior to the COVID-19 pandemic that attempted to increase ease of access in remote areas. One study done in Canada did report successful preoperative telehealth visits for pediatric patients living a great distance from the hospital, with confirmation of correct diagnoses in all patients and 21 operations performed.¹⁶ A hospital in Brisbane, Australia, implemented a telemedicine program for preoperative and postoperative pediatric surgery appointments, and while no statistics were reported on diagnostic accuracy or caregiver satisfaction, the program resulted in an overall increase in yearly consultations and a large amount of presumed saved travel time for all patients residing outside of Brisbane.¹⁷ Two Canadian programs reported that telehealth saved travel time and money. However, the majority of the pediatric surgery telehealth visits for one of the programs were described as postoperative and not as new consultations.¹⁸ The other report outlined the experience of a single provider who did provide preoperative visits for remote patients. The majority of these visits were for the diagnosis of chest wall deformities and it was ultimately decided by the provider based on VV comfort level that surgical decisions for this diagnosis would only be made after subsequent in-person visits.¹⁹

Our study attempted to describe the details around the successful implementation of a preoperative VV as well as measure caregiver and provider satisfaction with the experience. During our study period, the most common surgery was inguinal hernia repair, which is not surprising because inguinal hernia repair is one of the most common pediatric surgery operations performed each year.²⁰ Although some providers were initially leery, it has also been demonstrated to be a feasible diagnosis to correctly make via VV. One telemedicine program set up in Ecuador evaluated 54 surgeries performed after preoperative VV, with the most common diagnosis again being

inguinal hernia. They reported a 97% diagnostic accuracy after the surgery was performed.²¹ In our review, the patients who underwent inguinal hernia repair after a VV had the presence of hernia diagnosis confirmed at the time of surgery and repaired. Furthermore, the average response to the survey demonstrated that the caregivers in the hernia category (including inguinal hernias) were strongly satisfied with their child's care and would desire to use the VV again (Likert averages 5 and 4.83, respectively). The second most common surgery, feeding tube placement, was also very successful with regard to caregiver satisfaction of the experience, with a Likert average of 5, rendering the two most common surgeries very successful in terms of VV satisfaction.

One significant barrier to healthcare that telemedicine is intended to overcome is the challenge of reliable transportation. According to data from the National Health Interview Survey, 1.8% of those surveyed from ages 18 and older reported that lack of transportation resulted in their delaying medical care, with those in the lowest socioeconomic brackets affected the most.²² Because a child's in-person clinic visit requires a caregiver's time and money, telemedicine has been proposed as a way to reach caregivers who live in more rural and/or underserved areas.²³ This is especially important for pediatric subspecialty care considering they are fewer in number, are rarely present in rural areas, and caregivers often face scheduling challenges, longer wait times, and increased travel.²⁴ One study evaluated 2014 Medicaid data and found that within pediatric subspecialties, the use of telemedicine provided increased access for patients who live farther away and also who were in the lowest median income.²⁵ This could suggest that telemedicine may be more enthusiastically championed by caregivers who live at a greater distance. In our experience, overall satisfaction did not differ by distance from home to clinic. Therefore, the perks of the VV offered at our clinic are just as applicable to caregivers living close by as they are at a distance.

Another important consideration was whether the patients had access to the proper technology for VVs. There has been an increasing concern for healthcare inequities to deepen with the increase in telemedicine, as many patients who are already marginalized may not have access to the proper technology needed for adequate provision of medical care.²⁶ In our experience, all but one of the caregivers did not identify a problem with regard to accessing a device for the VV. There were some issues reported in conversation during the survey, such as insecurities with their computer literacy and a broken computer screen that prompted the use of the phone instead of the computer. However, the VV option was overall easily accessible and affordable to our patient population.

Regarding healthcare providers' perceptions of the VVs, the majority (77%) felt that the VVs should be continued. However, free responses suggested that VVs were not appropriate for all patients or diagnoses,

highlighting the importance of continued research in this area. Guidelines need to be developed to delineate which procedures and diagnoses are most feasible for a telemedicine preoperative visit. Another important consideration is the added provider workload due to VVs. One study suggests that telemedicine has the potential to increase provider workload if increased access results in a higher demand and more patient visits, and if a high portion of the telemedicine visits require a supplemental in-person visit.²⁷ In our survey, providers were asked 'to quantify the amount of work required per week to maintain VVs'. We intended this question to estimate the weekly *additional* workload for VVs; however, it is unclear if all providers interpreted and answered the question the same way. More investigation is therefore warranted to better understand how much, if any, extra time is required to maintain VVs, and whether they can be condensed as the VV practice continues and as efficiency improves. Nevertheless, the majority of the providers in our study would like the VVs to continue.

Overall, this study reported positive provider and caregiver responses to the preoperative VV without an in-person visit, thus rendering it a feasible option for preoperative pediatric surgical consultations. Benefits include saving time and money while maintaining a high quality of satisfactory care, and this institution has continued to implement the option of VVs to this date. There are several limitations to this study, with one being its small sample size. Thirty-four patients are not enough to make vast conclusions about the practice of pediatric surgery in general. However, we do feel that such a significant change in practice warrants careful monitoring from the very beginning, and we do hope that the evaluation of these 34 patients is a good starting point as we continue to fine-tune our practice and to make improvements with this new development. As the practice continues, more robust conclusions can be made with future studies. Another limitation is the reality that caregivers and providers were asked about general benefits of a program implemented during a pandemic; it is not feasible to discern whether their answers would have been the same without COVID-19 posing increased risk to in-person visits. Furthermore, our study did not delve deeply into possible issues regarding access to adequate devices and internet that would be necessary for a satisfactory VV. While our survey did ask one question that addressed this, a larger sample size and further questions may be valuable in future studies about this topic. Also, with this being a single institution study, we only looked at one type of software set-up for providers and did not delve into provider training and ease of use. Further studies with a larger sample size are needed for a more robust analysis of which diagnoses are most appropriate for a VV-only option.

In conclusion, this study demonstrated that the preoperative VV is a reasonable option that helps caregivers to save money, travel time and time off from work, is satisfactory for providers, and should be continued after the

pandemic. It is an especially good option for common and non-complex surgeries, such as hernias and feeding tube placements. Further studies will be helpful to provide guidelines to ensure the right patient population and right diagnoses are established and deemed appropriate for this useful option.

Twitter Danielle Dougherty @DanielleJoanMD

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ORCID iD

Danielle Dougherty <http://orcid.org/0000-0003-2664-3592>

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