


Twenty-first century house calls: a survey of ambulatory care providers to inform organisational telehealth strategy

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ABSTRACT

Objectives While patient interest in telehealth increases, clinicians' perspectives may influence longer-term adoption. We sought to identify facilitators and barriers to continued clinician incorporation of telehealth into practice.

Methods A cross-sectional 24-item web-based survey was emailed to 491 providers with ≥50 video visits (VVs) within an academic health system between 1 March 2020 and 31 December 2020. We quantitatively summarised the characteristics and perceptions of respondents by using descriptive and test statistics. We used systematic content analysis to qualitatively code open-ended responses, double coding at least 25%.

Results 247 providers (50.3%) responded to the survey. Seventy-nine per cent were confident in their ability to deliver excellent clinical care through VV. In comparison, 48% were confident in their ability to troubleshoot technical issues. Most clinicians (87%) expressed various concerns about VV. Providers across specialties generally agreed that VV reduced infection risk (71%) and transportation barriers (71%). Three overarching themes in the qualitative data included infrastructure and training, usefulness and expectation setting for patients and providers.

Discussion As healthcare systems plan for future delivery directions, they must address the tension between patients' and providers' expectations of care within the digital space. Telehealth creates new friction, one where the healthcare system must fit into the patient's life rather than the usual dynamic of the patient fitting into the healthcare system.

Conclusion Telehealth infrastructure and patient and clinician technological acumen continue to evolve. Clinicians in this survey offered valuable insights into the directions healthcare organisations can take to right-size this healthcare delivery modality.

BACKGROUND

Despite the exponential growth in telehealth services and surge in telehealth research during the public health emergency (PHE) related to the COVID-19 pandemic, the challenges of telehealth persist, limiting

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The delivery of telehealthcare rose exponentially during the COVID-19 pandemic. However, providers' preparedness to deliver telehealthcare was uneven.

WHAT THIS STUDY ADDS

⇒ We identified variations in the experience and expectations of video visits of cross-specialty providers along with three main themes from qualitative analysis: infrastructure and training, usefulness and expectations.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ These findings have implications for how healthcare systems, clinicians and patients can best move forward with organising and delivering care augmented by technology.

its adoption into routine care.¹ A recent industry report² highlighted an enthusiasm gap between patients and clinicians concerning ongoing telehealth usage, with patients reporting higher convenience, satisfaction and desire for continued telehealth usage than physicians.²⁻³ Patients are also more interested in expanding virtual care to include more digital-first healthcare services.⁴ Cost savings, ease of use and previsit training were top drivers of patients' satisfaction with telehealth.^{4,5}

When surveyed, specialty clinicians' perceptions of telehealth are mixed concerning clinical efficacy, patient satisfaction, access to care and financial sustainability.^{6,7} While previous literature recognises important considerations for the future of telehealth, including specifying appropriate services, identifying needed operational changes and technical infrastructure,^{1,4,8} few studies have

incorporated cross-specialty clinicians' perspectives for moving forward in telehealth services.⁹

Like others,¹⁰ our health system rapidly implemented telehealth capabilities in 2020 out of necessity for providing care. Clinicians received instruction through prerecorded videos walking through workflows and ti sheets. The failure rate for video visits (VVs), defined by either a shift to audio-only phone calls or a same-day cancellation, was tracked, and additional technical options and support were provided. Towards the end of 2020, platform stability had improved, and workflows matured, having both an electronic health record (EHR)-connected option (patient self-arrives through the patient portal) and an EHR-agnostic option (medical assistant calls patient for virtual rooming, and a text link is sent to the patient to join the visit) that clinics could opt to use.¹¹ Access to care from a health equity lens was monitored, and audio-only visits were scheduled with those patients unable to access the video.¹²

This study aimed to assess ambulatory care clinicians' perspectives of telehealth services in a health network during the COVID-19 pandemic to understand what factors led to relative success with adopting telehealth. We sought to understand clinicians' preferences, self-assessed capabilities and concerns and to identify salient themes of the clinician experience for future improvement work.

METHODS

Design, setting and study participants

We conducted a mixed-method deductive simultaneously designed study¹³ using data from the survey combined with provider credentialing information. Qualitative survey data contextualised these quantitative data to understand clinicians' insights into telehealth's unique benefits and challenges and forecast the future of telehealth. Telehealth (ie, video-based and audio-based) visits were introduced at the academic-community health network in 2018. The network provides 1.5 million ambulatory visits and cares for 55 000 hospitalised patients annually. The health network operates 45 clinic locations in the southeastern Wisconsin. During the PHE (approximately 1 March 2020), video-based visits expanded quickly to all specialties, clinics and providers. VVs were encouraged as the primary means; audio visits occurred if patients had a strong preference or could not access VV. During the rapid expansion of telehealth visits, providers experienced a wide variation in VV's success and failure rates.¹¹ After stay-at-home orders were lifted in June 2020, patients and clinicians scheduled VVs at their mutual discretion.

For this analysis, we recruited via email practising providers (physicians, physician assistants, and advanced practice registered nurses) who performed ≥ 50 telehealth encounters (93% of the eligible clinicians), including medical and counselling services, from 1 January 2019 to 31 December 2020. Up to three reminders were sent to

non-respondents. Clinician responses were linked to their provider record and then deidentified to analyse how clinicians' characteristics (eg, age, gender and specialty) influenced perspectives. There was a lottery for a nominal gift card, approximately 1/10, for a maximum of \$50.

Survey

We developed a 24-item web-based survey assessing provider characteristics and sociotechnical aspects of healthcare delivery through telehealth. The survey was derived from the Consolidated Framework for Implementation Research (CFIR).¹⁴ CFIR provides a practical guide for systematically assessing constructs associated with effective implementation.¹⁴ We assessed the domains of intervention characteristics, outer setting, inner setting and individual characteristics using multiple choice, multiple selections and open-ended text responses (online supplemental material).

Statistical methods and data analysis

We summarised respondents' demographic and clinical characteristics using descriptive statistics and Fisher's exact test for categorical variables because more than 20% of the cell expected numbers were less than 5. The proportion of missing data was small enough (0.4%) that we analysed complete data only. We completed a systematic content analysis¹² to code open-ended survey responses qualitatively to enhance quantitative findings. Trained research team members (JMH, RC, NM and NW) independently coded the qualitative data with at least 25% double coding. The research team frequently met to create the codebook, ensure coding agreement, discuss discrepancies and reach a group consensus on final themes.

RESULTS

Eligible providers (n=491) were contacted by email to participate; 247 (50.3% response rate) completed the electronic survey. Most respondents were female (59%, n=136), non-Hispanic (96%, n=215) and white (81%, n=186), with an average age of 46 years (SD=10, range: 21–90; see [table 1](#)).

Quantitative results

Seventy-six per cent of respondents were at least moderately confident in their clinical ability to perform VV. However, less than half (48%) were at least moderately confident in their skills to troubleshoot technical VV challenges. Confidence in troubleshooting technical challenges varied by age, with younger clinicians (28–39 years) being more confident in troubleshooting technical challenges than older clinicians (60–78) (63% vs 41%, $p=0.044$).

While 90.1% of respondents expressed concerns about VV, the concerns varied by specialty. For example, internal medicine and primary care providers' top concern was the inability to complete a physical exam,

Table 1 Characteristics of respondents (total N=247)*

Characteristics	N (%)
Age (years)	
28–39	63 (26)
40–49	77 (31)
50–59	46 (19)
60–78	27 (11)
Unknown	34 (14)
Race	
White	186 (75)
Asian	23 (9.3)
Black/African–American	5 (2.0)
Other	18 (7.3)
Unknown	15 (6.1%)
Gender	
Female	136 (55)
Male	84 (34)
Other	12 (4.9)
Unknown	15 (6.1)
Provider role	
DO/MD/DPM	169 (68)
APNP/PA/PA-C	78 (32)
Provider specialty	
Anaesthesia and pain management	4 (1.6)
Behavioural health	17 (6.9)
Dermatology	4 (1.6)
Gynaecology	15 (6.1)
Internal medicine subspecialty	80 (33)
Neurology	15 (6.1)
Primary care	48 (20)
Radiology	2 (0.8)
Rehabilitation	3 (1.2)
Surgery	58 (24)
Unknown	1 (0.4)*

*1 missing observation.
 APNP, Advanced Practice Nurse Prescriber; DO, Doctor of Osteopathic Medicine; DPM, Doctor of Podiatric Medicine; MD, Doctor of Medicine; PA, Physician's Assistant-Certified; PA, Physician's Assistant.

whereas behavioural health providers' chief concern was reimbursement. The top three concerns across specialties were the inability to complete a physical exam, failure to diagnose and fitting telehealth visits into the workflow (figure 1).

Ninety-six per cent of clinicians agreed that training offered by the organisation was useful, with a tip sheet being the highest endorsed learning tool (38%). Fifty-six per cent of respondents estimated that they could effectively care for up to 39% of their panel via VV. This varied

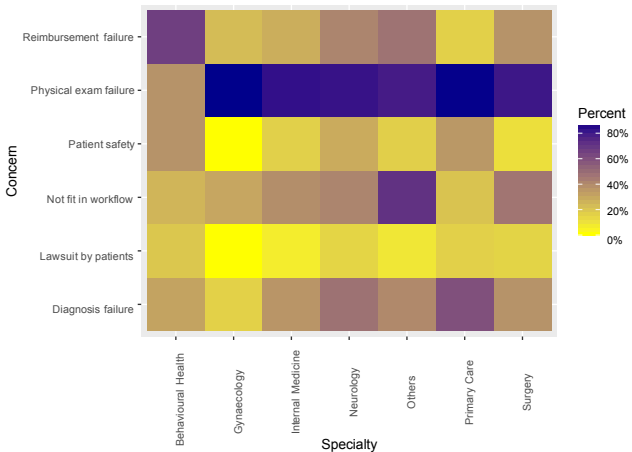


Figure 1. Heatmap of Video Visit Concerns by Specialty

Figure 1 Heatmap of VV concerns by specialty in response to the survey question 'What concerns do you have regarding VVs? Check all that apply' (unable to complete a physical exam, malpractice lawsuit, patient safety, state liability, failure to diagnose, reimbursement, fitting into workflow, other (open text response), I do not have any concerns). Most (90.1%) respondents expressed concerns about VVs; the concerns varied by specialty. The purple colour represents a higher percentage of respondents that expressed a particular concern by specialty. The yellow colour represents a lower percentage of respondents that expressed a specific concern by specialty. For example, most specialty providers' top concern was the inability to complete a physical exam (81.5%), except for behavioural health providers whose chief concern was reimbursement (65%). The top three concerns across all specialties were the inability to complete a physical exam (74.9%), failure to diagnose (36.7%) and fitting telehealth visits into the workflow (37.6%). VV, video visit.

by specialty ($p < 0.001$), with 71% of behavioural health clinicians endorsing that they can effectively care for 60%–100%. Clinicians across specialties generally agreed on the benefits of VV, including reducing infection risk (71%), travel time (70%), travel distance (78%) and transportation barriers (71%) (see table 2).

Qualitative results

Of the 247 respondents, 218 provided responses to at least one of the 11 open-ended response options. We inductively developed 55 unique codes, which were used 1512 times. Different themes emerged based on the question, with three significant themes overarching the qualitative data, including (1) infrastructure and training, (2) usefulness, and (3) expectation setting for patients and providers. We matched each quote to the respondent's primary department affiliation (see table 3).

Infrastructure and training

The qualitative data aligned with the connection challenges that clinicians reported quantitatively, such as 'having to troubleshoot on both sides and not connecting, which takes up over half of the visit' (primary care). Respondents offered solutions to this frequent problem,

Table 2 Clinician survey responses by specialty

Characteristics*	Primary care n=48	Internal medicine subspecialty n=80	Behavioural health n=17	Surgery n=58	Gynaecology n=15	Neurology n=15	Others n=13	P value*
Confidence caring for patients via VV, n (%)								0.156
≥Moderately confident	33 (70)†	63 (79)	16 (94)	40 (74)	14 (93)	12 (80)	10 (77)	
Confidence troubleshooting technical challenges, n (%)								0.155
≥Moderately confident	19 (40)	38 (48)	8 (47)	27 (47)	12 (80)	8 (53)	4 (31)	
Percentage of encounters effective via VV, n (%)								0.005
0%–19%	15 (31)	24 (30)	0 (0)	6 (46)	10 (67)	3 (20)	18 (31)	
20%–59%	28 (58)	37 (46)	5 (29)	30 (52)	5 (33)	7 (47)	4 (31)	
60%–100%	5 (10)	19 (24)	12 (71)	10 (17)	0 (0)	5 (33)	3 (23)	
Percentage of encounters effective via audio visit, n (%)								0.093
0%–19%	37 (77)	50 (62)	8 (47)	31 (53)	12 (80)	10 (67)	8 (62)	
20%–59%	8 (17)	24 (30)	6 (35)	25 (43)	3 (20)	3 (20)	3 (23)	
60%–100%	3 (6.2)	6 (7.5)	3 (18)	2 (3.4)	0 (0)	2 (13)	2 (15)	
Desire more VV training, n (%)								NA‡
Any training	43 (90)	76 (95)	17 (100)	51 (88)	15 (100)	13 (87)	13 (100)	
Troubleshooting	32 (67)	53 (66)	11 (65)	38 (66)	9 (60)	6 (40)	9 (69)	
Web etiquette	6 (12)	12 (15)	6 (35)	8 (14)	4 (27)	3 (20)	2 (15)	
EHR navigation	6 (12)	3 (3.8)	6 (35)	5 (8.6)	1 (6.7)	1 (6.7)	1 (7.7)	
VV clinical practice	13 (27)	11 (14)	3 (18)	7 (12)	2 (13)	3 (20)	6 (46)	

*Fisher's exact test.^{31 32}
†n (%).
‡Note that the response was multiple choice.
NA, not available; VV, video visit.

suggesting that 'patients need some sort of practice environment to try out the visit prior to the visit' (internal medicine subspecialty). Clinicians also cited the impact of network connectivity. An internal medicine subspecialist stated that 'WiFi signal's somewhat spotty in my clinic space, choppy audio at times, and videos would sometimes freeze'. However, clinicians from other specialties shared alternative experiences that 'having access to reliable internet, my practice, actually helping some people follow-up regularly' (behavioural health).

Clinicians also remarked on discrepancies and gaps in the telehealth workflow versus in-person visits. For example, one clinician commented that their clinic lacked a 'clear role of nursing and support staff in virtual visits' (internal medicine subspecialty). Another clinician extended their recommendation to the previsit space, expressing, 'We need more effective clinic support including pre-visit effort to confirm technology and update information' (internal medicine subspecialty).

Usefulness

Clinicians endorsed various uses of telehealth in the quantitative portion of the survey that was supported and

contextualised by the qualitative data. A clinician offered, 'Patients love the flexibility and convenience of VV. While we bring them in for particular needs, we can accommodate many follow-up visits of diagnostic testing review virtually' (surgery). They also valued the patient's support system, remarking, 'VV have made it possible to include family/relatives into visits that may have been unable to attend otherwise' (gynaecology). One clinician noted the resolution of scepticism about the usability of telehealth, stating, 'Overall, the experience has been good. I have learnt that many of my patient visits can be done effectively over video' (internal medicine subspecialty).

Clinicians across specialties shared examples of their VV that they deemed appropriate. For example, VVs are 'wonderful for follow-up of patients on a stable medication regimen who live far away and just need a check-in periodically to review treatment' (primary care). A clinician from an internal medicine subspecialty suggested 'establishing new patients (which always requires a lot of talking), then being able to set up labs and have them come back for part two physical exam and follow up. [The] second in-person visit goes much more efficiently'.

Table 3 Representative quotes for qualitative analysis

Infrastructure and training	
What was the most difficult part of implementing virtual care (telephone or video)?	Please share your best experience with VVs.
<ul style="list-style-type: none"> ▶ Lack of support from staff/IT when problems arise. I do not believe clinicians should have to do more than basic troubleshooting. (Primary care) ▶ Patient familiarity and ability to use technology. (Internal medicine subspecialty) ▶ Schedulers not being sure when to offer a virtual visit to established patients. (Surgery) 	<ul style="list-style-type: none"> ▶ Clear video and audio. [VV are] more efficient visit than in a clinic [visit]. (Primary care) ▶ Honestly when technology works on both sides without any troubleshooting. (Primary care) ▶ Talking to a 72-year-old [patient] through to getting on [the platform] and the joy of him talking with me (via video). (Internal medicine subspecialty)
Usefulness	
What was the most difficult part of implementing virtual care (telephone or video)?	Please share your best experience with VVs.
<ul style="list-style-type: none"> ▶ It is exhausting to maintain alliances and interpersonal connections virtually. (Behavioural health) ▶ A limited number of issues are to be addressed without an office visit. (Primary care) ▶ We know that we are missing something in not having in-person contact. (Behavioural health) 	<ul style="list-style-type: none"> ▶ [Telehealth] allowed me to connect with patients in different ways than when they come to the clinic: seeing their pets, their homes, and other family members. They also saw me in a different light, more human, more approachable, and facing the same challenges. The video visit levels the playing field in terms of hierarchy compared to a clinic visit. (Internal medicine subspecialty) ▶ During a VV for obesity the patient was checking out at a grocery store and I asked to see what was in his cart. (Surgery)
Expectation setting for providers and patients	
Please share your worst experience with VVs.	Please share your best experience with VVs.
<ul style="list-style-type: none"> ▶ Typically, when patients don't respect the visit as an actual doctor's visit. I've had patients driving, in Walmart, at the barber. In all of those instances, we had to reschedule the visits. (Surgery) ▶ Patients need help with setting up virtual visits and virtual visit etiquette, for example, choosing the proper location, lighting, etc. (Internal medicine subspecialty) ▶ Somehow get patients to understand and accept that a video visit cannot be conducted while other competing activities are going on at the same time. (Primary care) 	<ul style="list-style-type: none"> ▶ Often patients are "pleasantly surprised" with the ease of a VV visit and happy with the care/outcome of the visit. (Surgery) ▶ Multiple patients who initially expressed skepticism at the efficacy of a virtual visit commented that it met their needs at end of the visit. (Primary care) ▶ The feedback I receive from patients is that it's so convenient and my satisfaction with working from home when I have back-to-back virtual visits. (Surgery)
VV, video visit.	

Changes in the model of care delivery also benefited patients, 'by far, in dermatology, this has streamlined acne, rosacea, chronic med visits when physical exam doesn't rely on magnified exam of particular lesions' (dermatology). Clinicians also reported excellent patient satisfaction especially around the elimination of travel and transportation, 'patients are satisfied by not having to come to the hospital, especially those with transportation or mobility issues' (internal medicine subspecialty).

Clinicians' qualitative comments aligned with the concerns they endorsed in the quantitative portion of the survey, often citing that the inability to complete a physical exam hindered care. One clinician remarked, 'inappropriate patients being scheduled for VV when (they) needed an exam in-clinic to diagnose [the] condition' (surgery). Another shared how virtual care lacks elements of their values as a provider, 'I still believe the "touch and

feel" is very important in caring for patients in most situations' (primary care).

Expectation setting for patients and providers

Clinicians identified examples of the types of inappropriate visits to conduct virtually. Several clinicians asked for organisational guidance regarding suitable visit types: exemplars include 'clear guidelines of appropriate patient type to use Virtual Care' (primary care); 'specific diagnoses [and] complaints allowed or disallowed for VV' (dermatology); and 'notify the patients what situations, VV would not be appropriate' (primary care).

A subset of clinicians expressed frustration with how patients engaged during VVs, noting the incongruent expectations of patients and providers. A clinician remarked, 'patients driving during the visit and when asked to pull over or get to a secure position due to risk of distracted driving, [the] patient became enraged. This was



on more than one occasion' (surgery). Another clinician expressed concern regarding the 'decreased control over environment and boundaries such as trying to connect with an elderly patient while a husband with dementia calling out loudly in the background and daughters interrupting every few minutes' (internal medicine subspecialty). However, some clinicians offered suggestions to improve patient-provider expectations as an example there should be 'standard messaging about safe practice during video visits - that is, no driving, need to be in a private space' (surgery).

DISCUSSION

In this survey-based study of 247 providers who had used telehealth in 2020, we identified variations in the experience and expectations of VV along with three main themes from qualitative analysis: infrastructure and training, usefulness and expectations. These findings could have implications for how healthcare systems, clinicians and patients can best move forward with organising and delivering care augmented by technology. A key question also emerges: if patients desire the convenience of virtual care but there are drawbacks, how should those decisions be adjudicated? We reflect on patient-centred care, how care may be organised differently and infrastructure changes encouraged by clinicians. Lastly, we briefly reflect on how our clinical organisation is moving forward with embracing virtual care while enabling clinical departments to determine how best to proceed.

Patient-centred care

Overall, clinicians generally felt comfortable with telehealth, signalling more could be done virtually with the appropriate and proper support. Clinical confidence was high among respondents, and 56% noted that they could see 39% of their patients virtually. This supports the growing trend of new modalities of care to continue to be built around the patient, wherever they are. However, not all clinicians agreed with the usability of telehealth and the ability to use technology to accomplish visits with effectiveness, efficiency and satisfaction in a care context. Undoubtedly, context is critical; facilitating the selection of the ideal medium of a visit—either in-person or mediated by technology—for patients and providers alike will ultimately be a key factor in integrating technology. The nuanced data indicate that organisations must take a customised approach to deploy telehealth across ambulatory care. Not all patients, clinical departments or diagnoses are appropriate for telehealth. For example, telehealth may be inappropriate for encounters when a hands-on physical examination is necessary to manage care.¹⁵ Deciphering optimal telehealthcare will depend on the specialty,^{16–18} making a one-size-fits-all approach untenable.

Clinicians lauded the insight gained via telehealth into a patient's life circumstances. Prior work¹⁹ highlighted similar insights that previously *invisible* patient contextual

factors came to light during telehealth visits. This was, however, at times uncomfortable. Clinicians reported patients taking telehealth visits in inappropriate settings (eg, while driving, in public) and at times citing that patients do not respect a VV as much as a doctor's in-person visit. Some ended the VV when patients refused to stop driving or were shopping. While this may be prudent for safety and privacy reasons, we reflect on the patient perspective. Patients may perceive the convenience of having a visit while completing other tasks as appealing, though we acknowledge that privacy within shared spaces may limit what can be shared. Telehealth creates new friction, one where the healthcare system must fit into the patient's life, rather than the usual dynamic of the patient fitting into the physician's office. Therefore, telehealth is pushing the boundaries of patient-centred care, and new improved measures of education on safety and training of practitioners to handle those non-traditional situations will be important.

Clinical care organisation

Telehealth creates several opportunities to change the care model. For example, clinicians identified how initial encounters, mostly history-taking and data review, could be done virtually and then shift to gaining objective data in subsequent in-person visits. Patient needs may be more effectively triaged using video, ensuring that patients present to the most appropriate level of care. Pharmacists, nurses and other care team members may leverage video to better relate to patients, reconcile medications and identify additional needs. Clinical organisations could optimise the unique benefits of telehealth to further their value-based care work or more appropriately use in-person care in fee-for-service contracts where access to providers is limited.

Respondents highly endorsed other important benefits of reducing infection risk, eliminating travel time and removing transportation challenges which can be very limiting for patients and providers.^{20 21} Removing transportation as a critical step to seeing the provider may reduce health inequities by granting individuals access to the healthcare system regardless of their ability to commute.²²

We identified through the survey areas where telehealth has opportunities to improve the work-life balance of clinicians. About half of our survey respondents identified that having clinic blocks where they could work from home was extremely important. Healthcare systems should find ways to organise care blocks to support flexibility, especially in current challenges facing healthcare workforce shortage,²³ and ensure that clinicians are adequately compensated for the telehealthcare they provide regardless of payment changes.

Infrastructure, workflow and training requirements

Telehealth infrastructure and patient and clinician technological acumen continue to evolve. Respondents noted technological hurdles (eg, unreliable platform and lack

of tech support) diminished the efficiency and effectiveness of care. In particular, clinicians had difficulties logging onto the VV platform and related technological issues. Many of the recent telehealth studies report similar technology-based challenges.^{16 19}

Future directions of telehealth should focus on improving the user experience and reliability of the telehealth platforms,²⁴ developing a consistent workflow tailored by specialty and creating training, support and knowledge resources. Visit experience will be improved if patients are screened for reliable connectivity, access to devices, expectations of telehealth and ability to navigate the telehealth platform, with the option to switch to other modalities if any issue arises.^{25 26} Other organisations have been using medical assistants and community health workers to conduct a previsit assessment before the first VV with a clinician to screen for digital literacy and subsequently improve the success of their VV.^{25 27}

Clinicians in our study and elsewhere^{9 17 19} reported they could benefit from additional telehealth training to understand what care works best in a virtual delivery format. Clinicians are used to being supported in the clinical setting by a multidisciplinary team (eg, medical assistants, nurses and social workers) but often lack such support in the virtual setting. The adjustments caused frustration among clinicians citing inefficiencies in the digital prearrival, check-in and rooming processes. Healthcare systems must create clinic protocols that incorporate a team to be effective and efficient in the virtual space.²⁸ Supporting patients capable of self-check-in may create inefficiencies and waste resources, however. Instead, there needs to be an adaptive process that enables patients to complete a self-check-in while ‘catching’ patients who need help getting connected.

Future directions

In our healthcare system, these data and the qualitative analysis have informed our planning, goal setting and investments in telehealth. For infrastructure, we have invested in redesigning the experience of VV to enable patients to complete the prearrival process independently when possible, making it more efficient for clinicians to conduct visits without needing an assistant. However, a core requirement was the ability to send a patient a direct link by text message for patients who need extra support. Workflows were redesigned to support these use cases.

We have set a practice target to increase our VV to meet patient expectations at the department level. A practice committee developed a playbook for departments to review and determine how they may best use telehealth. Importantly, we committed within the practice that if the reimbursement landscape changes, strategies and targets would be adjusted accordingly.

Limitations

Although this study provided telehealth insights from clinicians across ambulatory care specialties, limitations exist. We asked clinicians to reflect on their perceptions

and experiences with virtual visits during the PHE. They may have recall bias,²⁹ where respondents’ memories deteriorated and their ability to recall their perceptions and experiences diminished. The clinician population recruited was limited to one academic-community health network in the Midwest. However, the network includes clinicians practising in academic and community settings and rural and urban locations. Furthermore, most respondents identified as middle-aged white women, limiting the generalisability to more diverse clinician populations. In addition, the survey had a 50% response rate, which is at or better than typical clinician surveys;³⁰ however, we could not discern the characteristics of the non-respondents to evaluate for differences between them and the respondents. Moreover, the quantitative findings are unweighted frequencies which may introduce response bias. Additionally, the survey was not validated as part of this study, although the questions were derived from a well-established implementation science framework.¹⁴ Finally, the clinicians’ insights reflect interactions with patients who accessed telehealthcare. We acknowledge that this is a subset of the patient population.¹²

CONCLUSIONS

Telehealth reached a new level of prominence during the PHE. It is a delivery model that has tremendous benefits for patients.^{4 7 18} However, there continue to be infrastructure, usefulness and patient–provider expectation friction points that require a more sophisticated design of the digital care experience. Clinicians in this survey offered valuable insights into the directions healthcare organisations can take to right-size this healthcare delivery modality.

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REFERENCES

- Shachar C, Engel J, Elwyn G. Implications for telehealth in a Postpandemic future: regulatory and privacy issues. *JAMA* 2020;323:2375–6.
- Cordina J, Fowkes J, Malani R, et al. Patients love telehealth—physicians are not so sure, 2022. Available: <https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/patients-love-telehealth-physicians-are-not-so-sure> [Accessed 04 May 2022].
- Barkai G, Gadot M, Amir H, et al. Patient and clinician experience with a rapidly implemented large-scale video consultation program during COVID-19. *Int J Qual Health Care* 2021;33:mzaa165.
- Almathami HKY, Win KT, Vlahu-Gjorgievska E. Barriers and facilitators that influence Telemedicine-Based, real-time, online consultation at patients' homes: systematic literature review. *J Med Internet Res* 2020;22:e16407.
- Donelan K, Barreto EA, Sossong S, et al. Patient and clinician experiences with telehealth for patient follow-up care. *Am J Manag Care* 2019;25:40–4.
- Heyer A, Granberg RE, Rising KL, et al. Medical oncology professionals' perceptions of telehealth video visits. *JAMA Netw Open* 2021;4:e2033967.
- Dhaliwal JK, Hall TD, LaRue JL, et al. Expansion of telehealth in primary care during the COVID-19 pandemic: benefits and barriers. *J Am Assoc Nurse Pract* 2021;34:224–9.
- Federal Communications Commission. Broadband data collection, 2021. Available: <https://www.fcc.gov/BroadbandData> [Accessed 14 Nov 2021].
- Haque SN. Telehealth beyond COVID-19. *Psychiatr Serv* 2021;72:100–3.
- Ftouni R, AlJardali B, Hamdanieh M, et al. Challenges of telemedicine during the COVID-19 pandemic: a systematic review. *BMC Med Inform Decis Mak* 2022;22:207.
- Crotty BH, Hyun N, Polovneff A, et al. Analysis of clinician and patient factors and completion of telemedicine appointments using video. *JAMA Netw Open* 2021;4:e2132917.
- Luo J, Tong L, Crotty BH, et al. Telemedicine adoption during the COVID-19 pandemic: gaps and inequalities. *Appl Clin Inform* 2021;12:836–44.
- Schoonenboom J, Johnson RB. How to Construct a Mixed Methods Research Design. *Kolner Z Soz Sozpsychol* 2017;69:107–31.
- Damschroder LJ, Aron DC, Keith RE, et al. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci* 2009;4:50.
- Chaet D, Clearfield R, Sabin JE, et al. Ethical practice in telehealth and telemedicine. *J Gen Intern Med* 2017;32:1136–40.
- Conway J, Krieger P, Hasanaj L, et al. Telemedicine evaluations in neuro-ophthalmology during the COVID-19 pandemic: patient and physician surveys. *J Neuroophthalmol* 2021;41:356–61.
- Matsumoto RA, England BR, Mastarone G, et al. Rheumatology clinicians' perceptions of Telerheumatology within the Veterans health administration: a national survey study. *Mil Med* 2020;185:e2082–7.
- Chang PJ, Jay GM, Kalpakjian C, et al. Patient and Provider-Reported satisfaction of cancer rehabilitation telemedicine visits during the COVID-19 pandemic. *Pm R* 2021;13:1362–8.
- Wilhite JA, Altshuler L, Fisher H, et al. The telemedicine takeover: lessons learned during an emerging pandemic. *Telemed J E Health* 2022;28:353–61.
- Jacobs JC, Hu J, Slightam C, et al. Virtual savings: patient-reported time and money savings from a Va national telehealth tablet initiative. *Telemed J E Health* 2020;26:1178–83.
- Solomon DL, Dirlikov B, Shem KL, et al. The time burden of specialty clinic visits in persons with neurologic disease: a case for universal telemedicine coverage. *Front Neurol* 2021;12:559024.
- Tierney WM, Harris LE, Gaskins DL, et al. Restricting Medicaid payments for transportation: effects on inner-city patients' health care. *Am J Med Sci* 2000;319:326–33.
- Abbasi J. Pushed to their limits, 1 in 5 physicians Intends to leave practice. *JAMA* 2022;327:1435–7.
- Miner H, Fatehi A, Ring D, et al. Clinician telemedicine perceptions during the COVID-19 pandemic. *Telemed J E Health* 2021;27:508–12.
- Ikram U, Gallani S, Figueroa JF. 4 Strategies to Make Telehealth Work for Elderly Patients. *Harvard Business Review*, 2020. Available: <https://hbr.org/2020/11/4-strategies-to-make-telehealth-work-for-elderly-patients> [Accessed 08 Nov 2021].
- Lopez AM, Lam K, Thota R. Barriers and facilitators to telemedicine: can you hear me now? *Am Soc Clin Oncol Educ Book* 2021;41:25–36.
- Lieu TA, Warton EM, Levan C, et al. Association of medical Assistant-Supported virtual Rooming with successful video visit connections. *JAMA Intern Med* 2022;182:680–2.
- Talal AH, Sofikitou EM, Jaanimägi U, et al. A framework for patient-centered telemedicine: application and lessons learned from vulnerable populations. *J Biomed Inform* 2020;112:103622.
- Bell A, Ward P, Tamal MEH, et al. Assessing recall bias and measurement error in high-frequency social data collection for human-environment research. *Popul Environ* 2019;40:325–45.
- Meyer VM, Benjamens S, Moumni ME, et al. Global overview of response rates in patient and health care professional surveys in surgery: a systematic review. *Ann Surg* 2022;275:e75–81.
- Agresti A. *Categorical data analysis*. 2nd edn. New York: Wiley, 2002: 91–101.
- Clarkson DB, Fan Y, Joe H. A Remark on Algorithm 643: FEXACT: An Algorithm for Performing Fisher's Exact Test in r \times cr \times c Contingency Tables. *ACM Transactions on Mathematical Software* 1993;19:484–8.

21st Century House Calls: A Survey of Ambulatory Care Providers to Inform Organizational Telehealth Strategy Provider Survey

As a clinician who has conducted virtual visits (telemedicine), we are interested in learning about your perceptions and experiences with virtual visits to inform future training, use, and best practices.

The short survey is expected to take up to five minutes.

By participating in this survey, you are agreeing to allow the research to connect your survey responses with video visit data. Your information will be confidential, and results will not be able to be linked back to you. All results will be presented deidentified.

Your responses are important to understanding how to improve virtual visit training, materials, and best practices.

Thank you for your participation.

Do you agree to participate in this survey?

- I agree to participate. (1)
- I do not agree to participate. (2)

Skip To: End of Survey If Do you agree to participate in this survey? = I do not agree to participate.

Thinking about virtual visits (telemedicine) and how you practice now:

How confident are you in your ability to deliver excellent clinical care to appropriate patients through video visits?

- Not at all confident (1)
 - Slightly confident (2)
 - Somewhat confident (3)
 - Moderately confident (4)
 - Very confident (5)
-

How confident are you in your ability to troubleshoot technical issues that may arise in the course of video visits?

- Not at all confident (1)
- Slightly confident (2)
- Somewhat confident (3)
- Moderately confident (4)
- Very confident (5)

For virtual care, I would benefit from more education/training in the following areas. Check all that apply:

- Clinical practice (examination, medical decision-making) (1)
- Communication (2)
- Video Visit Troubleshooting (3)
- EHR navigation (4)
- Webside Manner (video visit etiquette) (5)
- Other (6) _____

The training I found most useful for virtual visit (telephone or video) success was: Check all that apply:

- Short Videos (1)
 - Tip Sheets (2)
 - Email with embedded information (3)
 - Email with reference links (4)
 - Clinical guidelines (5)
 - Other (6) _____
-

On average what percentage of **your** patient appointments can you care for effectively using **video visits**?

- 0-19% (1)
- 20-39% (2)
- 40-59% (3)
- 60-79% (4)
- 80-100% (5)

On average what percentage of your patient appointments can you care for effectively using **telephone visits**?

- 0-19% (1)
- 20-39% (2)
- 40-59% (3)
- 60-79% (4)
- 80-100% (5)

In my experience, video visits helped remove the following potential patient challenges:

	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
Traveling from long-distance areas (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transportation (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Travel Time (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Infection Risk (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In my experience, video visits created challenges to care for patients:

	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Somewhat agree (4)	Strongly agree (5)
Who cannot access technology (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Who do not have access to reliable internet (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Who have a low technology literacy (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Who do not speak English (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How frequently was privacy e.g., the patient not disclosing information because they lacked private space, a concern during your video visits?

- Always (1)
- Most of the time (2)
- About half the time (3)
- Sometimes (4)
- Never (5)

What concerns do you have regarding video visits? (check all that apply)

- Unable to complete a physical exam (1)
- Malpractice lawsuit (2)
- Patient safety (3)
- State liability (4)
- Failure to diagnose (5)
- Reimbursement (8)
- Fitting into workflow (9)
- Other (6) _____
- I do not have any concerns (7)
-

How important is it for you to be able to see patients through video visits from your home?

- Extremely important (1)
- Very important (2)
- Moderately important (3)
- Slightly important (4)
- Not at all important (5)
-

What 3 changes would you like to see [academic-community health network] make in Virtual Care?

1. (1) _____
2. (2) _____
3. (3) _____
-

What was the most difficult part of implementing virtual care (telephone or video)?

What made the adoption of virtual care (telephone or video) easiest for you?

Please share your best experience with video visits.

Please share your worst experience with video visits.

What is your birth year (YYYY)?

Are you of Hispanic, Latinx, or of Spanish origin?

- Yes (1)
- No (2)

How would you describe yourself? Check all that apply.

- American Indian or Alaskan Native (1)
- Asian (2)
- Black or African American (3)
- Native Hawaiian or Pacific Islander (4)
- White (5)
- Other (6) _____

To which gender identity do you most identify?

- Male (1)
- Female (2)
- Transgender male/female-to-male (3)
- Transgender female/male-to-female (4)
- Other (5) _____
- Choose not to disclose (6)

Year of professional school graduation (highest degree, e.g. MD, DNP) (YYYY)
