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Abstract

The COVID-19 pandemic prompted the rapid uptake of Virtual Care (VC). Positive patient outcomes with VC are previously reported but little is known about the experiences of patients and providers using VC during the pandemic. We aimed to describe patient and primary care provider experiences, satisfaction, perceptions, and attitudes to VC during the COVID-19 pandemic that might explain adoption of VC across the continuum of care and inform sustained uptake. We conducted a sequential explanatory mixed methods study using online surveys and virtual interviews with a convenience sample of primary care providers and patients in a Canadian province (July – December 2020). Eligible participants included patients and primary care providers using VC during the COVID-19 pandemic. Survey responses and interviews were analyzed using descriptive statistics and thematic analysis, respectively. Overall satisfaction was compared using the Mann-Whitney U test. Eighty-five patients and 94 primary care providers responded to the surveys. Patients reported higher overall satisfaction with VC than primary care providers (median [interquartile range]: 4.4 [4.0-4.7] and 3.7 [3.4-3.9] $p < 0.001$). Ten patients and 11 primary care providers were interviewed. Both groups strongly appreciated VC's increased access and convenience, identified the lack of compensation as a pre-pandemic barrier to providing VC, and reported willingness to continue VC post-COVID-19 pandemic. The COVID-19 pandemic provided an opportunity for patients and primary care providers to rapidly adopt VC with high satisfaction. Patients and primary care providers viewed VC positively due to its convenience and accessibility; both intend to continue using VC post-pandemic.

Keywords

Patient experience, patient satisfaction, patient-centered care, patient engagement, measurement, quality of care, virtual care, telehealth, COVID-19

Introduction

The impact of the COVID-19 pandemic on patients, providers, and healthcare systems have been widespread and dramatic. Government emphasis on physical

distancing restricted many aspects of medical care.¹ Subsequently, many healthcare organizations and providers offered Virtual Care (VC),² defined as “any interaction between patients and their providers occurring remotely, using any forms of communication or

information technologies to facilitate or maximize the quality and effectiveness of patient care.²³ Despite positive patient outcomes and experiences reported under many health conditions,^{4,5} VC's adoption in Canada has been slow. Inadequate compensation mechanisms, licensure restrictions, and internet connectivity limitations have been cited as implementation barriers.⁶ Little is known about the experiences of patients and primary care providers (PCPs) who participated in VC during the pandemic, or how the uptake can be sustained post-pandemic.

A sustained and increased use of VC likely depends in part on patient and PCP experiences using VC during the COVID-19 pandemic. Patient experience is a key component of quality patient care and is consistently associated with other quality outcomes including patient safety, adherence, and clinical effectiveness.⁷⁻¹¹ Studies assessing quality of care often rely on patient satisfaction as an indicator.^{8,9} Patients' and PCPs' perceptions influence their attitudes, which in turn influence behaviours across the continuum of care.^{9,12} Therefore, describing patient and PCP experiences may provide a more comprehensive understanding of the adoption and quality of VC during the COVID-19 pandemic, and could guide efforts to sustain VC usage post-pandemic.

The objective of this study was to describe how the COVID-19 pandemic affected patient and PCP experiences, satisfaction, perceptions, and attitudes towards VC to inform adoption across the continuum of care. Additionally, we aimed to investigate the willingness of patients and providers to use VC post-pandemic, and describe VC advantages, challenges, and improvements that can be implemented during and after the pandemic.

Methods

Following institutional Research Ethics Board approval (BEH-1970, July 13th, 2020), we conducted a prospective observational mixed methods study. A sequential explanatory mixed methods design was chosen to evaluate, describe, and understand both patients' and PCPs' experiences, satisfaction, perceptions, and attitudes towards VC across the continuum of care during the COVID-19 pandemic from a multidisciplinary perspective.¹³ Informed consent was obtained from participants. Online questionnaires measured satisfaction with VC followed by semi-structured interviews (conducted virtually) using a basic descriptive and interpretive approach¹⁴ to further understand *how* and *why* participants described their experiences and satisfaction with VC. We engaged a patient partner (HD) in the development of the interview questions, data analysis, and manuscript production as guided by the GRIPP2-SF¹⁵ guidelines. The survey and interview protocols adhered to the CHERRIES¹⁶ and COREQ¹⁷ guidelines, respectively.

Sample Size, Recruitment, and Participant Population

A convenience sample of 100 patients and 100 Family Physicians, Nurse Practitioners, and Pharmacists (PCP) were sought to complete the surveys. Patients were principally recruited from three primary care clinics. PCPs were recruited using several mechanisms: all family physicians on the Provincial Head of Academic Family Medicine and pharmacists on the Provincial Pharmacy Association email distribution lists were emailed a survey invitation; several primary clinics throughout the province were directly contacted; the Provincial Registered Nurse Association, Provincial Union of Nurses, and Provincial Association of Nurse Practitioners distributed survey invitations on social media platforms. However, recruitment was open to any patient or PCP using VC in the province during the study period. Patients who completed a VC consult were invited to participate in the voluntary online open survey through an email invitation explaining the survey details. The context of this invitation may have preselected participants who had a strong view either for or against VC. We aimed for 10 patients and 10 providers to participate in semi-structured 30-minute interviews (20 interviews total); we expected this sample adequate to reach thematic saturation (i.e., the point where no new codes arise from the data). Interview participants indicated willingness to be contacted for follow-up interviews in the survey. No incentives were offered for completing the survey and/or interview. Data collection occurred from July to December 2020.

The sample was drawn from a single Canadian province with a geographic area of 651,900 km² and a population of 1,180,867. Most (58.1%) of the population resides in rural areas or population centers <100,000 people; 41.9% of the population lives in one of two urban centers in the province ≥100,000 people. We used the 2016 Canadian census definitions of population centers: small population centers (population between 1,000 and 29,999), medium population centers (30,000 to 99,999), large urban population centers (100,000 or more), and rural areas (all territory lying outside population centers).^{18,19}

Data Collection

The online platform, *SurveyMonkey*, was used to host and collect data for online surveys. Separate patient and PCP surveys were adapted from previously published satisfaction surveys.²⁰⁻²³ Participant satisfaction and attitudes towards VC were measured using a 5-point Likert Scale (1 – Strongly Disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly Agree). Questionnaire items pertained to domains of satisfaction including Scheduling, Technology, Provider, Personal, General as well as domains of attitude including Intention to Recommend or Reuse VC as a complement or replacement to in-person care. The patient survey was adapted from Pflugeisen²⁰ and McGrail²¹ by rewording questions for relevance and adding open-ended questions ([eSupplement 1](#)). The PCP

survey was adapted from Donelan²² and Schubert²³ by rewording questions for relevance, organizing questions into the 5 domains, and adding open-ended questions ([eSupplement 2](#)). Participants were able to change their answers. Completeness check was not done. The number of questionnaire items per page varied between 1 – 10 items across 7 pages (Patient) and 1 – 14 items across 4 pages (Provider). Questions were non-randomized and non-adaptive. IP addresses and cookies were not collected to maintain participant anonymity and allow multiple participants through the same device. Other techniques to analyze log file for identification of multiple entries were not used. Survey usability and technical functionality were pre-tested by co-investigators.

The semi-structured interview questions were adapted from a previously published interview guide ([eSupplement 3](#))²⁴ by rewording questions for relevance and applicability surrounding COVID-19 and pilot tested. A Patient Partner ensured interview questions were meaningful to patients. The 30-minute interviews were conducted individually and privately via video call or phone call at the interviewees' and interviewers' homes, audio-recorded, and transcribed by medical students (HE, MZ). Field notes were made during the interviews. Repeat interviews were not carried out. Transcripts were returned to participants within 2 weeks via email for editing opportunities. Participants did not provide feedback on findings. All data were stored in a password-protected research folder on an institutional server (OneDrive).

Semi-structured Interviewer Characteristics

Two male medical student researchers (HE, MZ) conducted the semi-structured interviews following an introduction to qualitative interviews and a workshop delivered by an experienced interviewer (JO). Interviewers had no pre-existing relationship with interviewees. Qualitative thematic analysis was performed by the two interviewers, a female research associate (JO), and a female Patient Partner with two decades of experience with VC as a patient and caregiver (HD) to ensure the outcomes and findings were relevant to patients and their families.

Data Analysis

Survey

All data were analyzed, regardless of completion. Likert items and scales were described by medians and interquartile ranges. Categorical values were expressed as counts and percentages. The data were not normally distributed when analyzed according to each question, the sum of responses, or the domain means. Therefore, we used the Mann-Whitney U test for independent data and the Wilcoxon signed rank test for dependent data. A Kruskal-Wallis test was used to test independent data with more than two groups. A $P < 0.05$ was considered significant. Statistical analysis was performed with *Microsoft Excel* (Microsoft, Redmond, WA, USA) and *IBM SPSS*

Statistics for Windows, version 26 (IBM Corp., Armonk, N.Y., USA).

Semi-structured Interviews

Based on previously described methodology,²⁵ interview transcripts were analyzed pragmatically through a general inductive approach²⁶ using thematic analysis to describe the subjective experiences and perceptions of patients and PCP pertaining to VC during the COVID-19 pandemic.^{27,28} Thematic analysis is appropriate for situations that examine ways that patients and providers make meaning out of their experiences.²⁵ Interviews were analyzed inductively using open coding in *NVivo12* (QSR International, Melbourne, Vic, Australia), then codes were collapsed into themes. Four researchers read the transcripts several times, using open coding to identify concepts and patterns, then collapsed these codes into themes. A Patient Partner contributed to interview analysis to ensure it was meaningful to patients. Themes were determined primarily based on their contribution to answering the research questions, rather than their frequency across the dataset. The thematic framework was then triangulated with survey comments analyzed deductively for confirmability and completeness.

Validity and Trustworthiness

We confirmed the thematic framework using analytical triangulation with open-ended survey comments to confirm presence and completeness of codes and themes. Survey comments converged with thematic analysis findings. No new concepts were identified through analytical triangulation.

Results

Eighty-five patients and 94 PCP (completion rates: 78% and 84%, respectively) including Family Physicians, Nurse Practitioners, and Pharmacists participated in the survey. Ten patients and 11 PCP participated in and completed the interviews. Participant characteristics are reported in Table 1.

Surveys

Patient and PCP survey results are presented in Table 2. Patients reported higher overall satisfaction with VC than PCP (4.4 [4.0-4.7] vs (3.7 [3.4-3.9]) ($p < 0.001$). However, both patients and providers had generally positive attitudes towards VC across all measured domains (Scheduling, Technology, Provider, Personal, General) (Table 2). Both groups preferred VC as a complement (4.0 [3.0-4.5]) vs (3.0 [2.5-4.0]) rather than as a replacement (4.0 [4.0-5.0]) vs (2.0 [1.0-3.0]) to in-person care ($p < 0.001$ for both intragroup comparisons). Physicians (3.8 [3.6-4.2]) were more satisfied than nurse practitioners (3.3 [3.0-3.9]) ($p = 0.012$) and pharmacists (3.5 [2.9-3.7]) ($p = 0.001$); while nurse practitioners and pharmacists were similarly satisfied ($p = 0.660$) (Figure 1).

Table 1. Characteristics of Study Participants

	Survey		Interview	
	Patients (N = 85*)	Providers (N = 94*)	Patients (N = 10*)	Providers (N = 11*)
Residence***				
Large urban center	71/85 (83.5%)	51/94 (54.3%)	5/10 (50%)	10/11 (90.9%)
Medium urban center	2/85 (2.4%)	10/94 (10.6%)	1/10 (10%)	1/11 (9.1%)
Small urban center/rural areas	12/85 (14.1%)	33/94 (35.1%)	4/10 (40%)	0/11 (0%)
Provider Consulted/Type				
Physician	80/81 (98.8%)	50/94 (53.2%)	10/10 (100%)	10/11 (90.9%)
Pharmacist	3/81 (3.7%)	25/94 (26.6%)	--	1/11 (9.1%)
Nurse Practitioner	3/81 (3.7%)	19/94 (20.2%)	--	--
Virtual Care Method Utilized				
Phone Call	80/82 (97.6%)	89/94 (94.7%)	9/10 (90%)	10/11 (90.9%)**
Videoconference	10/82 (12.2%)	27/94 (28.7%)	5/10 (50%)	1/11 (9.1%)**
Email	11/82 (13.4%)	46/94 (48.9%)	0/10 (0%)	0/11 (0%)
Used VC prior to COVID-19	16/84 (19.1%)	59/93 (63.4%)	1/10 (10%)	5/11 (45.4%)
Using VC due to COVID-19	75/85 (88.2%)	86/94 (91.5%)	10/10 (100%)	11/11 (100%)

*The reported N represents the total number of survey respondents. Not all respondents answered all survey questions

**Reported as method used for majority of provider's VC visits

***Classified according to the 2016 Canadian census: Small population centers (1,000 to 29,999), Medium population centers (30,000 and 99,999), Large urban population centers (100,000 or more), and Rural Areas (RAs) include all territory lying outside population centers.

Almost all patients (88.2%, n = 75) and PCP (91.5%, n = 94) used VC because of COVID-19 pandemic restrictions. Both (4.0 [4.0-5.0]) would recommend VC to others.

Interviews

Interview themes are summarized in Figure 2 and illustrative quotations displayed in Table 3. Findings revealed that the pandemic strongly influenced both

patients and PCP to use VC. Both patients and PCP stated their willingness to use VC prior to the pandemic, and both groups identified the lack of PCP compensation for VC as a barrier to interaction. Both groups reported increased convenience and improved access with VC compared to in-person care but described limitations to the appropriateness of VC for certain patients and encounters. Specifically, patients felt in-person care was

Table 2. Patient and Provider 5-point Likert Scores of Satisfaction Statements to VC

Themes	Domain	Patient (Median [IQR])	Provider (Median [IQR])
Experience	Familiarity with Technology	4.4 [4.0-5.0]	4.0 [5.0-4.0]
Perception	Scheduling	4.3 [3.8-5.0]	4.0 [3.3-4.3]
	Technology	5.0 [4.0-5.0]	3.4 [3.2-4.1]
	Provider	4.8 [4.3-5.0]	--
	Personal	4.3 [4.0-5.0]	3.6 [3.3-3.8]
	General	4.0 [3.3-4.5]	3.7 [3.4-4.1]
	Overall Satisfaction*	4.3 [4.0-4.7]	4.0 [3.3-4.3]
Continuum of Care	Intend to use VC as a complement to IP	4.0 [3.0-4.5]	3.0 [2.0-4.0]
	Intend to use VC as a replacement for IP	3.0 [2.5-4.0]	2.0 [1.0-3.0]
	VC as good as IP	4.0 [3.0-4.0]	3.0 [2.0-4.0]
	Likely to recommend VC to other patients	4.0 [4.0-5.0]	4.0 [4.0-5.0]

*All scores in each categorical measure of satisfaction (Scheduling, Technology, Provider, Personal, General).

IQR – interquartile range; VC – virtual care; IP – in-person.

Table 3. Themes, Subthemes, and Illustrative Quotations

Themes	Subthemes	Illustrative Quotations	
		Patients	Providers
Perceptions	Provider compensation increased virtual care	“I would have always been okay with doing virtual [care], now it's allowed it to happen and I guess they're getting compensated for it so that's good” (Patient 4)	“I have always been willing to do it [virtual care]... there was no fee code... there's not the infrastructure to do it” (Provider 3)
	Increased convenience	“a 15-minute conversation would normally be a good hour-and-a-half of my time otherwise, had I had to travel, park, sit in a waiting room, and wait and go through the whole process, so I mean you can't beat that” (Patient 5)	“patients don't have to travel to my clinic, wait in the waiting room, get put into a room, wait to see me, all for a 10-minute interaction they can sit at home” (Provider 3)
	Improved access	“I see virtual care being a really important mechanism of supporting vulnerable populations including frail elderly, including rural people” (Patient 1)	“People who have difficulty getting into the clinic. We have patients in rural communities who do not have a lot of money for gas so they cannot come into the clinic. Some seniors and physically disadvantaged. I have some patients who are unreliable and cannot get on a ride. Those patients are likely to pick up the phones than showing up in an appointment. There is definitely a large group of patients that this works better.” (Provider 7)
	Universal usage is not appropriate	“If I think about my parents – their ability to be able to describe possibly what they might be experiencing might be more difficult for them. Or if there's any technology involved like with the <i>Zoom</i> session, I don't think that they would be able to manage that so I don't think that it would be as good for everybody... challenges would vary from person to person.” (Patient 5)	“Virtual care can only do virtual care... it's not replacing the physical exam, for example. So there still needs in-person visits.” (Provider 4)
	Better integration into the healthcare system	“[Virtual Care] needs more collaboration in all aspects of what care experiences is” (Patient 1)	“general clinic standards to how we do virtual care... who we should be seeing in person” (Provider 3)
Continuum of Care	Utilize alongside in-person care	“I have control; I can take personal responsibility because I can have virtual care and that means I'm dependent only on myself... so let's get on with virtual care” (Patient 1)	“If I can continue providing virtual care, I certainly will. But not exclusively. I will use a mix depending on what is needed. You cannot do it all without seeing people in-person. That takes away from the Art of Medicine.” (Provider 9)

Patient and provider themes, subthemes, and illustrative quotations identified from thematic analysis of interviews

more suitable for certain patient demographics (e.g. cognitive/technological difficulties). Additionally, in-person care was reported to be preferred for appointments requiring in-person exams, first-time encounters with a

new patient or provider, and emotionally sensitive appointments (e.g. cancer diagnoses). Similarly, providers also expressed the importance of using VC for only appropriate patient demographics and emphasized that

appointments requiring physical exams need to be in-person.

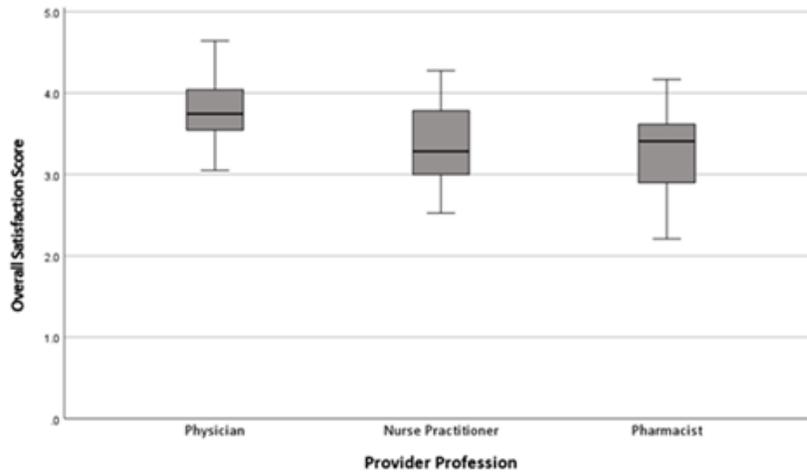
Both groups suggested improvements for integrating VC into the healthcare system. Patients wanted VC to encompass more than medical consults; they suggested email reminders with meeting and resource links, and electronic appointment summaries that could include follow-up recommendations. Providers wanted clear practice guidelines outlining VC vs in-person usage. Both expressed positive attitudes towards integrating VC into

the continuum of care after the pandemic; patients wanted to be empowered with the option to choose VC, while providers wanted to use it selectively for appropriate appointments.

Interpretation

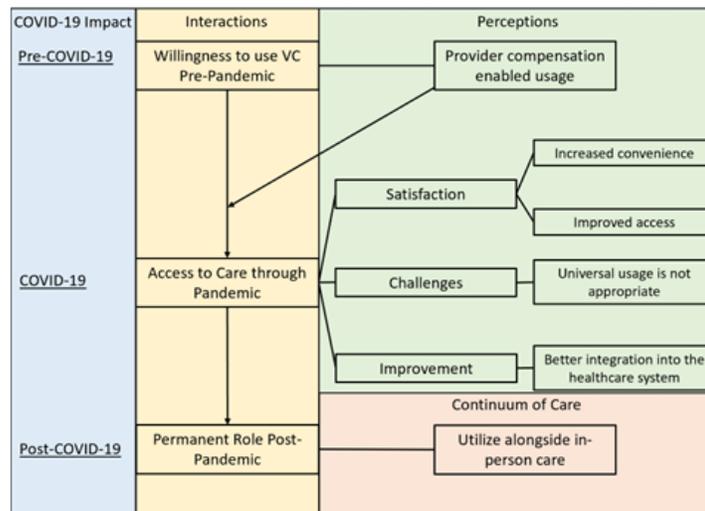
Our findings suggest patients and primary care providers are satisfied with VC, specifically as it relates to convenience and access to care in the province during the COVID-19 pandemic. Both groups recognized the lack of

Figure 1. Overall Satisfaction Scores by Provider Profession



Physicians had higher overall satisfaction scores than nurse practitioners ($p=0.012$) and pharmacists ($p=0.001$); nurse practitioners and pharmacists were similar ($p=0.660$).

Figure 2. Thematic Analysis of Patient and Provider Experiences of VC During COVID-19



Patients and providers were willing to use VC prior to the pandemic and were highly satisfied as it provided access to care through the pandemic with increased convenience and access over in-person care. Both groups felt it had a permanent role post-pandemic alongside in-person care.

PCP compensation as a barrier to VC pre-pandemic, intend to use VC post-pandemic, and identified a need for better integration into the healthcare system. Suggestions for better integration of VC into the healthcare system included the implementation of VC practice guidelines for all stakeholders, as well as expansion of VC use beyond appointments to include assistance with care coordination, appointment preparation, and summaries of information discussed at appointments.

Explanation of the Findings

Our data generally agree with pre-pandemic studies reporting positive patient and PCP satisfaction scores with VC, largely driven by improved convenience and access.^{4,5,29} Our semi-structured interviews are consistent with previous study examining VC satisfaction amongst patients and PCPs.³⁰ Our findings demonstrate both patients and PCPs indicated a pre-pandemic willingness to use VC, but a lack of PCP compensation was reported by both groups to be a key barrier to interaction, consistent with previous studies.^{6,31} The implementation of PCP billing codes during the pandemic³² in the province combined with pre-existing willingness to use VC likely facilitated increased VC interaction and will likely increase VC usage as part of the continuum of care after the COVID-19 pandemic.

This study's qualitative findings suggest that patients perceive great benefit in saving time and travel by avoiding physical clinic visits, benefits not directly relevant to PCPs; similar to previous reports.³⁰ This may explain why overall patient satisfaction was higher than PCP satisfaction. Our findings indicate that both groups intend to use VC post-pandemic as a compliment rather than replacement to in-person care and express limitations to VC, consistent with previous literature.³³ Both patients and PCPs view VC as a method to improve healthcare access and convenience for patients, particularly for those belonging to rural and remote communities for whom the burden of travel to appointments is amplified.^{34,35}

The generally positive satisfaction scores in both groups across all measures suggests VC is feasible with basic technological access and literacy. However, technological access and literacy represent a challenge to further VC employment.^{31,36} Patient and PCP perceptions of quality of care are not always aligned yet remain an important component of high-quality care.^{7,8} Not all PCPs were equally satisfied with VC (Figure 1); the reasons for these differences cannot be inferred from our data.

Strengths

Participation from both patients and a diverse group of providers including family physicians, nurse practitioners, and pharmacists provides a more thorough description of VC experiences during the pandemic from multiple perspectives. Additionally, the mixed-methods explanatory

design is well-suited for our study questions, to describe and explain the findings. By utilizing both surveys and interviews, we used analytic triangulation to confirm presence and completeness of codes and themes. Our qualitative findings provide further insight into the nature of the patient and provider experiences as they relate to VC. Collaborating with a Patient Partner (HD) with more than two decades of VC experience as both patient and caregiver helped ensure that the findings were pragmatic and meaningful to patients.

Future Directions

Important areas of future study include innovating to improve VC access through establishing VC centers in rural areas, enhancing accessibility for patients with technological and cognitive limitations, characterizing the type of medical encounter and patient best served by VC, and implementing initiatives such care coordination, appointment preparation and summaries.

Limitations

A limitation of the study includes potential lack of generalizability. Respondents were familiar with basic technology (Table 2); previous research demonstrated technological literacy to be strongly correlated with positive outcomes and satisfaction with VC.³⁶ Additionally, most participants were from urban areas (82.1%), potentially limiting transferability to a rural and remote population. Our recruitment strategy does not allow for the identification of a selection bias (respondents vs nonrespondents). Patients and PCPs who did not prefer VC may have chosen not to take part in the study. Finally, the differences in overall satisfaction between PCPs cannot be inferred from our data.

Conclusions

The COVID-19 pandemic required rapid adoption of Virtual Care, with both patients and healthcare providers reporting high satisfaction with this type of care delivery. The greatest advantages of VC were improved convenience and access to care. Although VC's widespread usage represented an effort to solve physical distancing problems throughout the pandemic, its positive reception suggests that VC is very likely to continue beyond the pandemic.

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