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Experiences and Attitudes Regarding the Availability and Usage of Telemedicine Services Among Providers During a Pandemic

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Abstract

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MBA/MHA, Pfeiffer University, 2013

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Doctoral Study Submitted in Partial Fulfillment

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Abstract

Telehealth became a prominent fixture in the way healthcare was delivered during COVID-19. Providers were forced to offer telehealth as an optional mode of care. Although little research was available, studies about the experiences and attitudes of providers regarding their intention and willingness to use telemedicine before the pandemic was exiguous. The purpose of this study was to understand providers perception and use behavior patterns regarding the acceptance and adoption of telemedicine during the pandemic. Data collected from the COVID-19 Healthcare Coalition Telehealth Impact Survey was used to help characterize the experiences and attitudes of providers regarding telehealth utilization during COVID-19. The unified theory of acceptance and use technology and the adaptive structuration theory were used to form the study's theoretical framework. Findings showed the average age group with the highest adoption rate (35%) was age 51 to 64. Early adopters of telehealth were found to be mostly female (47%) and were of a white/Caucasian background (p=.014). The geographic location proved statistically significant as providers in the west region of the United States (p=.018) were more likely to adopt telehealth than in any other area, and 60.5% (962/1,594) indicated they had been doing so for 4 to 6 months (n=885) to deliver quality care during the pandemic. The modality of remote patient monitoring proved statistically significant (p = .009). Results indicated that sociodemographic and socioeconomic characteristics impacted providers' willingness to implement telehealth. The most significant implication of this study's findings was for positive social change regarding health equity and access to care among all populations to eliminate any existing health disparities for rural and underserved populations during COVID-19.

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Table of Contents

List of Tables

List of Figures

Section 1: Foundation of the Study and Literature Review

Introduction

With the recent rise and surge in telemedicine, the experiences and attitudes of providers regarding the availability and usage of telehealth services have begun to shift as physician telehealth adoption is up 340%, according to a 2019 survey of 800 physicians (American Well, n.d.). Researchers consider the sudden rise in telemedicine to be linked to the COVID-19 pandemic, which has forced clinicians to reconsider how to safely deliver care (Schinasi et al., 2021). As a result, healthcare professionals and administrators consider telemedicine a disruptor in the healthcare space, forcing providers to look for new ways to overcome barriers and challenges faced by telemedicine to provide adequate quality care to their patient populations. According to the American Well Telehealth Index: 2019 Physician Survey (n.d.), by 2022, between 340,000 and 590,000 physicians were expected to be using telehealth despite telehealth being around for many years. The lack of interest and investment over the years by providers to adopt telemedicine to deliver quality care has been plagued with the misconception that telemedicine and telehealth lacked continuity of care. Providers' perception of telehealth has led to the belief that it will not yield improved patient outcomes compared to face-to-face or in-person care delivery. Consequently, this belief in the lack of improved patient outcomes as a result in using telehealth has contributed to physicians' and providers' low adoption rates of telehealth over the years.

As the healthcare landscape for care delivery continues to change and expand, providers are beginning to understand the importance of telemedicine and how their

efforts to drive positive social change in the clinical space can help revolutionize healthcare delivery. Throughout the pandemic, providers learned that overcoming challenges associated with reimbursement rates, technology adaptation, clinical workflow, and informed consent and privacy will provide them with the flexibility needed to deliver telehealth services, ensuring care is available and accessible to all patient populations (Ftouni et al., 2022). The American College of Physicians (ACP; 2020), a prominent organization consisting of 159,000 members, covers a broad spectrum of physicians by size of practice, rural versus nonrural locations, and specialty, conducted a 2020 telehealth survey titled "2020 ACP Member Survey about Telehealth Implementation." The survey results suggested the expansion of telehealth has posed financial and structural concerns as primary barriers to adoption, not lack of interest (ACP, 2020). According to ACP , their survey results show variation in the adoption of telemedicine, whether as a result of technology availability or as a result of usage variations among those with the technologies. Additionally, they reported that their results indicate an increase in use by physicians and providers since last year, with more room to grow (ACP, 2020).

With this study, I aimed to examine and investigate the unique role of providers as they look to provide care in a virtual setting amid a pandemic. I evaluated and provided context around the theoretical framework associated with technology adaptation behaviors of providers as they begin to engage more with telehealth. I looked at the statistically significant relationship between provider telehealth adoption and provider age, gender, ethnicity/age, and geographic location. I also sought to determine if there is a

statistically significant difference in the average number of telehealth visits per week for the period prior to March 11, 2020, and the period after March 11, 2020, by provider location. The third facet that I examined is the statistically significant difference between the modality of telehealth visits among provider types and medical specialty during the COVID-19 pandemic. Additionally, I evaluated the statistically significant relationship between provider telehealth adoption and provider experience regarding ease of use and the impact of financial health to provider practice during the COVID-19 pandemic.

Advances in telehealth technology will continue to alter or transform the way providers perceive and accept telehealth. According to Shachar et al. (2020), the future of telehealth post pandemic will pose important implications regarding payment parity changes, patient privacy regulations, and changes in licensing requirements. These implications could lead to meaningful positive social change towards the cost of health care services and the availability of health care providers in remote or rural areas. Hah et al. (2019) suggested that understanding providers' technology habits and adaptation can inform health care policy and further provide a better view of the design of telehealth technology for online communication for both providers and consumers. When providers are less reluctant and more willing to engage and adopt telehealth technology, it allows for flexible attitudes and behaviors to use various telehealth-related technology features, changing the outcome of virtual care services and leading to positive social change (Hah et al., 2019). According to a Deloitte 2018 national survey of U.S. physicians (Moses et al., 2018), physicians' attitudes towards telemedicine continue to shift as they agree that virtual care supports the goals of patient-centricity. The survey conducted by Moses et al.

also suggested that of the 624 U.S. primary care and specialty physicians surveyed, the top three benefits from their perspective in using telemedicine is that it improves patient access to care (66%), it improves patient satisfaction (52%), and its ability to help with staying connected with patients and their caregivers (45 %). Additionally, the Centers for Disease Control and Prevention (CDC, 2020) suggested that before the COVID-19 pandemic, trends showed increased interest in telehealth services by both healthcare personnel and patients. Due to recent policy changes resulting from the pandemic, it has reduced some known barriers to telehealth access and has promoted the use of telehealth to deliver acute, chronic, primary, and specialty care (CDC, 2020).

In this study, I addressed the overarching issue surrounding telemedicine's vast adoption and implementation among providers during a pandemic. The goal was to provide awareness and understanding of providers' willingness to use the technology despite known obstacles that have presented resistance to change in the way they deliver care. The problem prompted this research and serves as the primary basis or purpose for the study, as well as the research questions and the related hypotheses. I also addressed the significance of this study, including the research design and rationale; the theoretical framework of unified theory of acceptance and use of technology (UTAUT) and adaptative structuration theory (AST) as they relate to the experiences and attitudes of providers regarding the availability and usage of telemedicine during a pandemic.

Overall, this study was needed to explore the benefits of telehealth use for both providers and patients. This study revealed that providers and patients have perceived high levels of satisfaction and expectations to continue to use telehealth in the future, post

the COVID-19 pandemic. This research study and future studies can make way for the emergence of telehealth best practices, creating a more effective and resilient system of care delivery (Campion et al., 2021).

Problem Statement

Provider adoption of telehealth during the pandemic was confronted with challenges and barriers due to constraints on access and availability of telemedicine services delivered as a method of providing quality care in a nontraditional healthcare environment. Before COVID-19 proved to be a major health crisis and escalated to the pandemic level in the United States, providers found themselves unavailable for and inaccessible to consumers of healthcare that reside in rural and remote areas (Shaver, 2022). Studies have shown the progression of telemedicine usage has garnered popularity in becoming a forerunner and leader in the evolution and diffusion of healthcare technology, as suggested by Broderick et al. (2017). Seivert and Badowski (2021) suggested prior to the COVID-19 pandemic, many barriers to the widespread implementation and use of telemedicine existed.

I aimed to address the gap in existing literature and provide insight into providers' willingness to adopt telemedicine practices with regard to the known challenges surrounding their lack of technological literacy, lack of significant reimbursement, and issues concerning resistance to change during a pandemic. Moses et al. (2018) suggested that physicians' low interest in virtual care technologies and slowness of adoption result from a lack of reimbursement, complex licensing requirements, and high cost of the technologies. A study performed by the Mayo Clinic indicated that one of the leading

concerns regarding telemedicine adoption amongst providers is the potential disparities in quality of care compared with in-person visits (Malouff et al., 2021). According to Malouff et al. (2021) there is a paucity of more extensive studies on the perception and attitude of telemedicine regarding patient-physician interactions, satisfaction with services, and the ease and comfort of using telemedicine, preference for face-to-face communication, technology infrastructure support, and insurance coverage. Additionally, more studies are being conducted to evaluate whether physician burnout or their well-being is affected by the implementation of telemedicine practice as it provides for more flexibility in their workload and can create a sense of family work-life balance. Telemedicine is also being considered a means to address issues with access and workforce shortages among physicians and providers. Malouff et al. stated that 80% of providers perceived telemedicine as cost-effective, 76% of physicians felt that telemedicine increased flexibility and control over patient care activities, 36% reported improved work-life balance, 30% reported improved burnout symptoms, and 42% preferred using telemedicine over in-person visits when possible.

Although researchers have investigated this issue, there is very little literature on the impact of provider telehealth usage on serving the clinical needs of patients during a pandemic. With the progression in research to provide awareness around physicians' and providers' perceptions of telemedicine during COVID-19 and post-COVID-19, I explored the relationship that exists between variables. I discussed the access, levels of use, and types of telehealth services provided by providers.

Purpose of Study

The purpose of this quantitative study was to examine the relationship between telemedicine as the dependent variable and the access/availability of telemedicine services, the levels of use of telemedicine, and the types of telehealth services offered as the independent variables. In discussing the access/availability of telemedicine, the levels of use of telemedicine, and the types of telemedicine services provided, these elements are critical in exploring provider perception of telemedicine during a national pandemic. It gave further clarity to understand the levels of engagement by providers in using telemedicine. Understanding the variables explored in this research study and the correlation to providers' willingness to use telemedicine helped ease the uncertainty of providers, payers, and government regulators to accept a new normal for providing a different model of clinical care using telemedicine across the healthcare spectrum. According to Campion et al. (2021), relying on the experiences and perceptions of providers and other qualified health care professionals regarding rapid telehealth adoption during the COVID-19 pandemic can guide us to enlightened policy decisions for a “new normal” of medical practice.

By exploring providers' perception of telemedicine and telemedicine adoption, I aimed to capture not only the benefits of using such technology but the barriers to using telehealth related to resistance to change and financial and economic hardships presented with making such a dramatic change over a short period of time. According to Corlette et al. (2021), early on, the pandemic forced many primary care practices to close their doors or significantly reduce services, leading to financial shortfalls that threatened their

viability. As a result, this has contributed to the way providers perceive telemedicine. It has created mixed feelings concerning their attitudes and experiences towards telemedicine as a viable, sustainable mode or model of providing quality care.

Research Questions and Hypotheses

RQ1: As reported during the COVID-19 pandemic, what relationship exists between provider telehealth adoption and provider age, gender, ethnicity/race, and geographic location?

$H_0$1: There is no statistically significant relationship between provider telehealth adoption and provider age, gender, ethnicity/race, and geographic location?

$H_1$1: There is a statistically significant relationship between provider telehealth adoption and provider age, gender, ethnicity/race, and geographic location.

RQ2: Considering challenges in telehealth adoption, is there a significant difference in the average number of telehealth visits per week for the period prior to March 11, 2020, and after March 11, 2020, by provider location (urban/suburban/rural)?

$H_0$2: There is no statistically significant difference in the average number of telehealth visits per week for the period prior to March 11, 2020, and after March 11, 2020, by provider location (urban/suburban/rural).

$H_1$2: There is a statistically significant difference in the average number of telehealth visits per week for the period prior to March 11, 2020, and after March 11, 2020, by provider location (urban/suburban/rural).

RQ3: As reported during the COVID-19 pandemic, what relationship exists between the modality of telehealth visits among provider types and medical specialty during the COVID-19 pandemic?

$H_0$3: There is no statistically significant difference between the modality of telehealth visits among provider types and medical specialty during the COVID-19 pandemic.

$H_1$3: There is a statistically significant difference between the modality of telehealth visits among provider types and medical specialty during the COVID-19 pandemic.

RQ4: What relationship exists between provider telehealth adoption and provider experience regarding ease of use and the impact of financial health to provider practice during the COVID-19 pandemic?

$H_0$4: There is no statistically significant relationship between provider telehealth adoption and provider experience regarding ease of use and the impact of financial health to provider practice during the COVID-19 pandemic?

$H_1$4: There is a statistically significant relationship between provider telehealth adoption and provider experience regarding ease of use and the impact of financial health to provider practice during the COVID-19 pandemic?

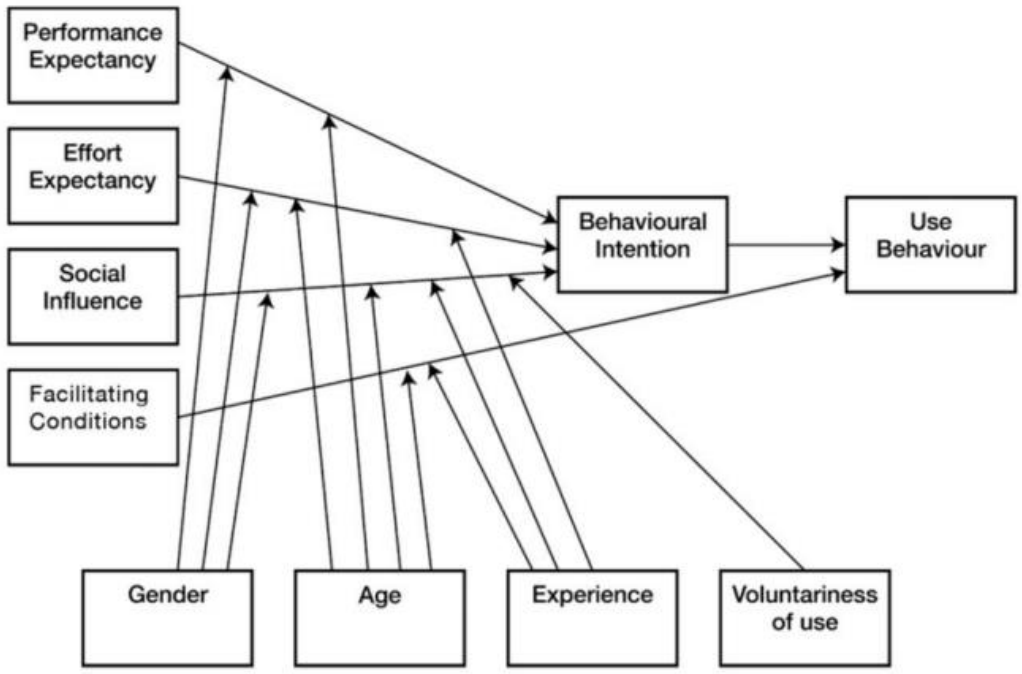
Theoretical Framework

The theoretical framework that grounds this study included the work of Venkatesh et al.'s (2003) UTAUT and DeSanctis and Poole's (1994) AST, focusing specifically on one's perception and use behavior regarding the acceptance and adoption

of telemedicine technology to improve access to care. Founded on the effectiveness of the research model of Venkatesh et al. (2003) is the conceptual or theoretical framework of UTAUT. According to Venkatesh et al., this research model consists of four core elements or determinants of intention and usage: performance expectancy, effort expectancy, social influence, and facilitating conditions. These four core elements are considered mechanisms or gateways that can help determine a user's intentions or behaviors towards the use of technology. This research model also comprises four key moderating variables: gender, age, experience, and voluntariness of use that greatly influence the four determinants of intention and usage (Venkatesh et al., 2003). Figure 1 describes the framework of the UTAUT research model.

Figure 1

Unified Theory of Acceptance and Use of Technology (UTAUT) Research Model



Note. Each determinant of intention and the four moderators of key relationships comprise the UTAUT research model by Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, *27*(3), 425–478. https://doi.org/10.2307/30036540

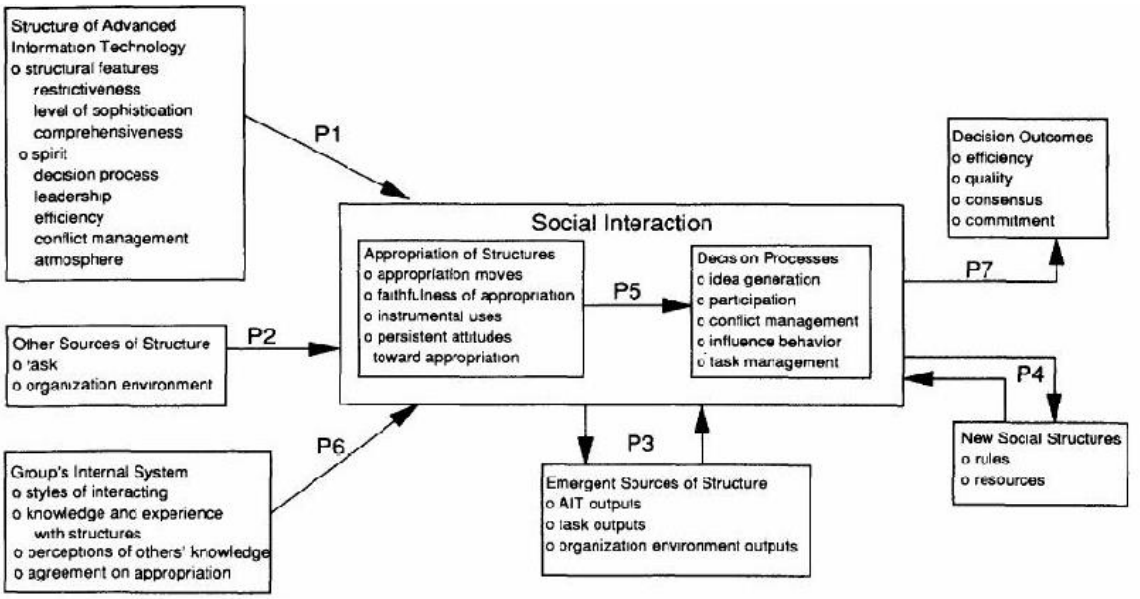
Furthermore, this theory also lends itself to the conceptualization and theoretical background of technology acceptance related to telemedicine adoption, which providers and other health service organizations need to transform healthcare to improve access to care and patient outcomes and promote quality improvement. UTAUT is defined as *use behavior*, according to Venkatesh et al. (2003). With this research study in mind, use of this theory considers the provider, patient, or consumer as the end-user, which requires

the provider and patient to agree to the acceptance or use of telemedicine. Adopting telehealth technology fosters an environment that allows for process changes and improvements in patient-provider communications, patient assessment, and patient and provider engagement, resulting in the end-user's behavior change. According to Harst et al. (2019), it is important to understand the factors influencing end-user acceptance of telemedicine, as acceptance is a prerequisite for the adoption of an innovation and, therefore, its diffusion.

The second theoretical framework that contributed to grounding this research study was AST by DeSanctis and Poole (1994). Over the years, AST has been positioned as a viable approach or model described as the interplay between advanced information technologies, social structures, and human interactions. Figure 2 illustrates the construct of the AST model.

Figure 2

Summary of Major Constructs and Propositions of AST



Note. DeSanctis, G. & Poole, M. (1994). Capturing the Complexity in Advanced Technology Use: Adaptive Structuration Theory. *Organization Science*, 5(2), 121-147

The AST theory lends itself to the theoretical background of adaptive use of telehealth technology, whereas it can be used to describe the mechanisms through which constituents make sense of organizational, technology-driven changes by selecting, adapting, and altering existing social structures, all of which lead either to group decision outcomes or create new structures within the organizational context (Hah et al., 2019). The AST theory states that social interaction processes can occur through two structuration episodes, including technology adaptation and task adaptation, where adaptation can be in two modes: exploitative and exploratory adaptation(Hah et al., 2019). This theory is centered on telehealth technology at the individual user level as it can impact individual job performance and satisfaction, as implied by Hah et al. (2019).

The logical connections between the framework presented and the nature of this study include the theoretical work of both Venkatesh et al. (2003) and DeSanctis and Poole (1994) related to the acceptance and use of telemedicine services by both providers and the patients they serve. Their research imparts itself to the ideation that telemedicine services are driven by use behavior by the end-user, which results in a behavior change towards technology-driven innovations (Harst et al., 2019).

Nature of Study

The nature of this research study involved conducting a quantitative study through a cross-sectional research design. It included the review of survey and questionnaire responses. It allowed for the exploration of the dependent variable of telemedicine in association with the independent variables of access, levels of use of telemedicine services, and types of telehealth services offered. According to Creswell and Creswell (2018), once there is an understanding of the relationship between variables, further analysis could be done to compare the variables to determine the impact on another to help pinpoint the correlation between independent variables and the dependent variable.

The secondary dataset used for this quantitative study was obtained from the COVID-19 Healthcare Coalition. It was developed by members of the COVID-19 Telehealth Impact Study Work Group. This study workgroup consisted of the following organizations: American Medical Association (AMA), American Telemedicine Association (ATA), Digital Medical Society (DiMe), MassChallenge Health Tech, MAYO Clinic, and MITRE Corporation (Campion et al., 2021). The COVID-19 Healthcare Coalition surveyed 1,594 clinicians that provided needed insight into the

heightened use and expansion of telehealth services as a result of the COVID-19 pandemic. The survey findings reflected how telehealth can positively influence four important telehealth goals: clinical outcomes, patient experience, cost, and professional satisfaction (Campion et al., 2021). The survey results also provided data concerning the respondents' barriers and challenges regarding reimbursement, technology, and clinical workflow (Campion et al., 2021).

Through the development of this quantitative research study, limitations I considered involved the availability of current literature on the impact of telemedicine pre and post the COVID-19 pandemic. The general nature of this study presents the perception of providers and clinicians regarding the usage and availability of telehealth surrounding how well it worked and what challenges remain to be addressed.

Literature Search Strategy

As part of the literature search strategy for this research study, I searched peer-reviewed literary sources spanning across a period of the last 5 years from 2017 to 2021 regarding the usage and availability of telehealth and telemedicine services by physicians during a pandemic. The literature accessed through the Walden University online library using multi-database searches involved a Thoreau Multi-Database Search and a Cumulative Index to Nursing & Allied Health Literature (CINAHL) & Medline Combined Database Search. Additional online open access journals and resources and search engines such as Google, Google Scholar, PubMed, NIH Library of Medicine, DOAJ, and AHRQ were used to help find the most appropriate resources. Following is a list of specific keywords and search terms that can be associated with this literature

search strategy: telehealth or telemedicine, coronavirus or COVID-19, telemedicine reimbursement, provider telehealth access, telehealth barriers, telecommunication technology, telehealth technology, physician telehealth adoption or implementation, COVID-19 pandemic, and telehealth payment parity. Through this literary search strategy, a thorough literature review was conducted.

Literature Review Related to Key Variables and Concepts

This literature review supported this research study as it demonstrated the importance and timely nature of why this research is needed. It stands on the principle of promoting positive social change in healthcare regarding physicians' attitudes and experiences towards adopting telemedicine as a sound practice for delivering quality care, now that many of the barriers to using telehealth have been removed in wake of the recent pandemic. According to Brunet et al. (2021), many pre-existing barriers to telemedicine were lifted as the COVID-19 pandemic accelerated its use and enabled health professionals and health service organizations to rapidly introduce the technology as a part of their clinical workflow.

Provider Experiences and Attitudes Towards Telemedicine Adoption

Experiences and attitudes regarding telemedicine usage continue to change and evolve as it becomes widely accepted as a mode of care between providers and patients. As COVID-19 rapidly surged as a new global pandemic, providers' perceptions of telemedicine vastly changed as virtual care took precedence, according to Wosik et al. (2020). With virtual care becoming superior to in-person care delivery, physicians' willingness to adopt telemedicine is more about use behaviors and patterns and the

intentional desire to evolve with the latest telehealth technologies. According to Shiferaw et al. (2021), effort expectancy and attitude are significant predictors of healthcare professionals' acceptance of telemedicine. Shiferaw et al. also suggested that attitude toward using telemedicine systems is highly influenced by performance expectancy, self-efficacy, facilitating conditions, and social influence, which are associated with the proposed theoretical background of Shiferaw et al., extended UTAUT model. Pikkematt et al. (2021) conducted a survey to evaluate physician attitudes and intentions to use telemedicine in primary care, which revealed that perceived behavioral control is the most significant predictive value of behavioral intention. Additionally, Pikkematt et al. suggested that interventions aiming to increase the use of digital tools in primary care should focus on empowering physicians' self-efficacy towards using them. A key survey finding by Teladoc Health & Becker's Hospital Review (2020) suggested that experienced providers view securing physician buy-in, engaging leadership, and ensuring alignment between a telehealth program and the overall goals of an organization as crucial drivers to telehealth success within an HSO. American Well (n.d.) conducted a Telehealth Index 2019 Physician Survey which polled 800 physicians across the United States that reported physicians find value in using telehealth as it contributes to more efficient use of time for care delivery (77%), it helps to reduce healthcare costs (71%), it improves patients' access to care (93%), it enables high-quality communication with patients (71%), and it enhances doctor-patient relationship (60%). This same study suggested that physician telehealth is at an inflection point and estimates that out of 970,000 professionally active physicians, 341,000 to 591,000 could be using telehealth

technologies by 2022 (American Well, n.d.). As the healthcare landscape continues to change and evolve for providers and physicians, it's evident of the future pathway and trajectory telehealth adoption will take as healthcare organizations and the experiences and attitudes of providers using telehealth will play a lead role in the advancement of digital technology.

Impact of Organizational Culture on Provider Telemedicine Usage

Another facet to consider when evaluating experiences and attitudes towards telemedicine adoption is that of organizational culture. When it comes to health service organizations (HSOs), organizational culture can contribute to physicians' willingness to adopt new technology, according to Fowe (2021). Technological advances in health service organizations can be limited due to the organization's culture and unalignment with organizational objectives. Many organizations unknowingly impose limitations on adopting and accepting new technology into their organization. According to the 2020 Telehealth Benchmark Survey (Teladoc Health & Becker's Hospital Review, 2020), 74% of health systems are expanding their telehealth programs in light of the pandemic as they see the strategic importance of implementing telehealth to align to their near/long-term goals. The 2020 Telehealth Benchmark Survey (Teladoc Health & Becker's Hospital Review, 2020) also suggested that health system telehealth adoption and utilization will sustain rapid growth as health systems look to grow revenue, increase emergency room avoidance and expand chronic care management. To promote physician telehealth usage, American Well (n.d.) suggested health systems must (a) create integrated workflows, (b)

define clinical appropriateness, (c) leaders need to lead, and (d) find specialists champions.

The secondary dataset I used to aid in this research study suggested that among the 1,594 U.S. physicians and other qualified healthcare professionals surveyed, 34% of the physicians located in suburban areas felt that their organization's leadership is motivated to increase the use of telehealth in their practice as a result of COVID-19 pandemic, while at the same time, the sentiments were very similar for 33% of urban physicians and 24% of rural physicians surveyed (Campion et al., 2021). A research study conducted by Fowe (2021) indicated that organizational readiness for change (ORC) is key to organizations' ability to successfully adopt, implement, and sustain innovative technology solutions such as Telehealth and mHealth interventions. In justification of this thought process, Fowe (2021) implied that ORC is the degree to which members of an organization are psychologically and behaviorally prepared to implement organizational change, such as the change that comes with implementing telehealth and mHealth technologies. As a result of COVID-19, the use of telehealth has created a growing interest from healthcare and other key organizations forced to make immediate changes to adopting telehealth technology which is why ORC is important to changing the behaviors and mindsets of individuals to allow for the introduction of disruptive and innovative technology such as telehealth.

Telemedicine Adoption Among Provider Medical Specialty

Gauging the experiences and attitudes of providers among different medical specialties regarding telehealth adoption is intriguing as there seems to be a substantial

gap between willingness to use telehealth and actual telehealth usage, according to American Well (n.d.). A qualitative research study conducted in China to evaluate the engagement of physicians' regarding their attitudes and perspectives of telemedicine at the epitome peak of the COVID-19 pandemic polled 148 respondents from October 17, 2020, to October 25, 2020, from 57 hospitals and 16 provinces across 37 clinical specialties (Liu et al., 2021). The survey produced a response rate of 87.2% (129/148), for which respondents suggested their specialty was suitable for adopting telemedicine during COVID-19, with radiologists yielding the highest mean value and ophthalmologists yielding the lowest value mean for their willingness to adopt telemedicine (Liu et al., 2021).

According to Guiart et al. (2021), mental health providers' highly favor the use of telehealth, also known as telepsychiatry, in their field of medicine as 73% of providers using videoconferencing and 66% using the telephone rated their experience as excellent or good in a systemwide, multisite survey that was conducted during the Covid-19 pandemic amongst 18 centers across the United States and 819 mental health care providers. Many studies are reporting that mental health care providers are feeling positive and encouraged to continue using the different telehealth modalities after the pandemic subsides, although they are aware of the need for further implementation research regarding access, training, reimbursement, and regulatory statutes. The secondary data I used for this research study by Campion et al. (2021) provided data justifying the perception found in many studies as it suggests that 94.1% of providers would like to continue offering their patients mental health/behavioral health telehealth

services post-COVID-19 with the largest number of providers being in rural areas. The data also revealed that most providers, regardless of location, would prefer to continue providing telehealth services post the pandemic for the following medical specialties, chronic disease management (72.9%), medical management (64.3%), followed by care coordination (59.9%), and preventive care (52.9%; Campion et al., 2021). According to Rangachari et al. (2021), a 2018 U.S.-based weighted survey was conducted regarding the use of telehealth of any form by individual physicians in their practice that identified the following specialties with the lowest telehealth usage prior to COVID-19: allergy-immunology (6.1%), general surgery (9.7%), gastroenterology (7.9%), obstetrics/gynecology (9.3%), and family medicine (11.8%). This same survey reported that the following medical specialties yielded the highest usage of telehealth use: radiology (39.5%), cardiology (24.1%), psychiatry (27.8%), emergency medicine (22.3%), and pathology (23%). Based on existing literature surrounding telehealth usage among different medical specialties prior to the COVID-19 pandemic, many medical specialties are now engaging in telehealth due to the restrictions on reimbursement and other barriers being temporarily lifted or removed.

Urology is another specialty where the attitudes and experiences of urologists using telemedicine have begun to shift in the wake of the COVID-19 pandemic. Urologists are now in a place where they perceive telemedicine to be beneficial as it is said to account for the mass clinical, procedural, and operative cancellations, inadequate personal protective equipment, and shortage of personnel during the pandemic (Dubin et al., 2020). Dubin et al. (2020) conducted a cross-sectional survey that suggests urology is

one of the specialties with the lowest rates of telemedicine and videoconferencing usage prior to the start of the pandemic. The research study by Dublin et al. (2020) also alluded to the notion that urologists are beginning to evaluate the necessity of in-person clinic appointments compared to the usability of telemedicine in clinical practice as telemedicine in this specialty has nearly tripled.

Despite all medical specialties being affected by COVID-19 and being forced to integrate telehealth/telemedicine into clinical practice, it is important to note that telehealth will continue to experience exponential growth over time regardless of the associated barriers. This study will provide insight into the difference between telehealth visits/services provided and medical specialty as specialists opt to use telehealth to reduce physician burnout and ease access to care for patients with telehealth restrictions lessening.

Benefits & Advantages of Provider Telemedicine Usage

With healthcare delivery continuing to advance, the future of telemedicine adoption will prove beneficial to both providers and patients. It will aid in improving the delivery of rural care, solving staffing shortages, and lead to greater patient satisfaction. Telemedicine, sometimes called telehealth, is broadly defined as the use of electronic information and communications technologies to provide and support health care when distance separates participants, where the technologies include videoconferencing, the internet, store-and-forward imaging, streaming media, and terrestrial and wireless communications, according to Sisk et al. (2020).

As the utilization of telehealth grows and there continues to be global shakeup around this technology, many providers believe the benefits outweigh the barriers. Siwicki (2020) suggests that physicians and providers view the emergence of telemedicine as an effective and sustainable solution for precaution, prevention, and treatment to stem from the spread of COVID-19. According to Koonin et al. (2020), the increased availability of telehealth services during the COVID-19 pandemic may lead to reduced disease exposure for staff members and patients, preserved scarce supplies of personal protective equipment, and minimized patient surge on facilities. Another benefit to telemedicine's usability by providers is that it eliminates the gap associated with provider shortages. It increases access to care for rural families and provides physicians and providers with more flexibility. According to a study conducted by Guinart et al. (2021), mental health providers reported that telepsychiatry made way for flexible scheduling or rescheduling, followed by timely appointment start times and a reduction or elimination of no shows. Health service organizations such as hospitals find value in using telemedicine services as it improves quality of care, patient and staff safety, resource optimization, and humanization of care, according to Brunet et al. (2021).

This capstone study, discussed the critical nature of telemedicine usage among providers. Provider telemedicine usage has been the number one go-to solution in maintaining access and responding to the needs of patients with acute, chronic care management, or mental illness needs during the time of a major global pandemic or health crisis.

Barriers and Challenges to Provider Telemedicine Adoption

The intention of this capstone study was to provide awareness of physicians' perceptions of telemedicine related to the impact of telemedicine interventions and the effect it has on providers that causes administrative changes and modifications to provider and staff clinical workflows, training, education, provider-patient communications, and provider payment and reimbursement. Providers also encounter compliance concerns related to patient confidentiality, informed consent, and multistate licensure using telemedicine. As the health care environment is ever-changing and evolving, this technology depends upon systematic monitoring and ongoing improvement of key processes when it comes to measuring outcomes for clinical care and technical support, according to the Washington State Nurses Association (2018).

From a provider perspective, barriers to telemedicine adoption can range from upfront technological costs related to implementation to EMR integration and patient acceptance, according to Mercer (2020). According to Becker's Healthcare (2020), other significant quality improvement challenges to adopting and implementing TMH (telemedicine/telehealth) are administrative and physician engagement, infrastructure, and sustainability. Also, patients living in rural areas with chronic diseases not only face challenges but suffer from issues related to mental health issues, access to care, being uninsured or under-insured, cultural beliefs that prevent them from receiving quality care, and the ability to trust health care systems and providers. These reasons alone should change the perception of providers and health consumers to find benefit in utilizing

telemedicine as it's known to increase patient independence, improve outcomes, reduce healthcare spending, and improve patient experience, according to Mercer (2020).

In terms of measuring barriers to telemedicine regarding medical specialty, the field of pediatrics has identified reimbursement as the greatest barrier, followed by time investment, provider interest, state regulations, lack of training, cost of equipment, and potential liability issues, according to Sisk et al. (2020). The secondary data used for this research study by Campion et al. (2021) indicates that among the providers surveyed across multiple specialties, the following are the leading barriers and challenges in health service organizations pertaining to maintaining telehealth post COVID-19: low or no reimbursement (73.3%), technology challenges for patients (64.3%), liability (33.3%), integration with EHR technology (30.3%), integration with other technologies (27.9%), telehealth-specific workflows (25.7%), lack of technical support (25.3%), clinical dissatisfaction (22.6%), cost of telehealth implementation (21.0%), low patient engagement (18.4%), and licensure issues (18.3%).

Sociodemographic Influence on Provider Telemedicine Usage

Other key variables considered in this research study that played a vital role in understanding the experiences and attitudes of providers regarding the usage of telemedicine during the COVID-19 pandemic is the socio-demographic characteristics of the provider population surveyed, including the age of providers, their ethnicity/race, their gender, the region/U.S. territory of their clinical/medical practice, the area/setting of their clinical/medical practice as well as their clinical specialty, physician practice designation and past experience with telemedicine. Understanding the association between the socio-

demographics of providers and the usage of telemedicine provided clarity around the adoption and implementation of telemedicine services going forward.

Definitions

Coronavirus (COVID-19): An infectious disease caused by the SARS-CoV-2 virus that can spread from an infected person's mouth or nose in small liquid particles when they cough, sneeze, speak, sing, or breathe (World Health Organization, 2021).

Electronic Health Record (EHR) Data: EHRs are supported under the Health Information Technology for Economic and Clinical Health Act (HITECH) and are considered to offer coordinated care and communications among providers (Downes et al., 2019). Shu et al. (2021) suggested that EHRs can either be generated directly by medical devices or lab and examination reports, prescriptions and images or created by medical staff based on their professional knowledge or clinical experiences, including discharge summary and diagnosis.

Organizational Readiness for Change (ORC): A multilevel and multifaceted construct that involves organizational members' shared resolve and commitment to implement a specific change or a set of changes and their shared belief in their collective capability for which members of an organization are prepared psychologically and behaviorally to implement organizational change.

Remote Sensor Technologies: Young and Schneider (2020) suggested that biosensors, wearable and non-wearing devices, and remote sensing devices can assist with clinical care, especially in settings where remote patient monitoring of behaviors, vital signs, and other clinical outcomes is needed.

Rural Areas: Encompasses all populations, housing, and territory not included within an urban area (U.S. Census Bureau, 2021).

Sociodemographic: A group defined by its sociological and demographic characteristics. Sociodemographic groups are used for analyses in the social sciences and marketing, and medical studies (Reference, 2020). In this study, an example of the term sociodemographic is associated with providers' age, gender, location, race, etc.

Suburban Areas: Refers to lower-density areas that separate residential and commercial areas from one another as they are either a part of a city or urban area or exist as a separate residential community within commuting distance of a city (Tennessee Department of Health, n.d.).

Telehealth: The delivery and facilitation of health and health-related services, including medical care, provider and patient education, health information services, and self-care via telecommunications and digital communication technologies (NEJM Catalyst, 2018).

Telemedicine: The delivery of healthcare services remotely using telecommunication technologies for the exchange of medical information, diagnosis, consultation, and treatment (Shiferaw et al., 2021).

Urban Areas: According to the U.S. Census Bureau (2021), urban areas represent densely developed territory and encompass residential, commercial, and other non-residential urban land issues. In relation to this research study, clinicians reported the location of their clinical practice as urban, suburban, or rural.

Study Alignment

In this study, I sought to answer four research questions regarding provider telehealth adoption/usage, provider experience with telehealth concerning ease of use and financial implications to provider practice, the average number of telehealth visits pre- and post- COVID-19 pandemic, and the modality of telehealth visits/services provided during the COVID-19 pandemic. The following table illustrates the alignment between the research questions and the study's data points that correlate with the provider survey questions. Located in the appendix is the Telehealth Impact Provider Survey developed by the COVID-19 Healthcare Coalition in response to the COVID-19 pandemic.

Table 1

Alignment of Research Questions and Data Points

	Research Questions	Data Points
RQ1	As reported during the COVID-19 pandemic, what relationship exists between provider telehealth adoption and provider age, gender, ethnicity/race, and geographic location?	Provider Survey Q2: How long have you been using telehealth? (ACCESS) Provider Survey Q23: Please indicate your age. (DEMOGRAPHIC) Provider Survey Q24: Please indicate your ethnicity/race. (DEMOGRAPHIC) Provider Survey Q25: Please specify your gender. (DEMOGRAPHIC) Provider Survey Q26: Please indicate the state in which you practice medicine. (DEMOGRAPHIC)
RQ2	Considering challenges in telehealth adoption, is there a significant difference in the average number of telehealth visits per week for the period prior to March 11, 2020, and after March 11, 2020, by provider location (urban/suburban/rural)?	Provider Survey Q10: How many telehealth visits were you averaging per week prior to March 11, 2020 when the World Health Organization declared the COVID-19 outbreak to be a pandemic? (LEVELS OF USE) Provider Survey Q11: How many telehealth visits were you averaging per week post March 11, 2020 when the World Health Organization declared the COVID-19 outbreak to be a pandemic? (LEVELS OF USE)

		Provider Survey Q29: In what setting had you spent the majority of your time (in general) prior to March 11, 2020? (DEMOGRAPHIC)
RQ3	As reported during the COVID-19 pandemic, what relationship exists between the modality of telehealth visits among provider types and medical specialty during the COVID-19 pandemic?	Provider Survey Q9: Which of the following types of telehealth are you using to provide clinical care? (ACCESS/TYPES OF SERVICES) Provider Survey Q27: Which of the following describes you? (DEMOGRAPHIC) Provider Survey Q28: Please indicate which one of the following best describes your medical specialty? (DEMOGRAPHIC)
RQ4	What relationship exists between provider telehealth adoption and provider experience regarding ease of use and the impact of financial health to provider practice during the COVID-19 pandemic?	Provider Survey Q2: How long have you been using telehealth? (ACCESS) Provider Survey Q19-5: Telehealth has improved the financial health of my practice? (SENTIMENT) Provider Survey Q22-3: It has been simple for me to use telehealth in my practice? (SENTIMENT)

Note. This table illustrates alignment between the research questions and data points that correspond to the provider survey questions.

Assumptions

Research assumptions are essentially issues, ideas, or positions found anywhere from the beginning of the study design to the final report that are taken for granted and viewed as reasonable and widely accepted (Theofanidis & Fountouki, 2018). Assumptions in research can also be subjective or objective as they are viewed in the context of being true or plausible by some. One of the many assumptions related to telemedicine usage is that it will approve overall access to care (Xiong et al., 2021). Another assumption considered within this research study is that when regulatory policies and barriers to telehealth are removed or temporarily eliminated, providers will widely use variations of telehealth post the COVID-19 pandemic on a more frequent basis. Other important assumptions to this research study considered is as follows:

- Barriers to telehealth adoption amongst providers are linked to financial and structural concerns, not lack of interest (American College of Physicians, 2020).
- The COVID-19 pandemic has accelerated the utilization and adoption of telemedicine by providers (Brunet et al., 2021)
- Telemedicine usage can improve provider satisfaction by reducing physician burnout, improving work-life balance, and providing more flexibility in caring for patients (Malouff et al., 2021).

These assumptions proved necessary in the context of this research study as telehealth usage during the pandemic proved to be a way for providers to deliver quality care to patients that is safe and allows for social distancing as needed (Campion et al., 2021).

Scope, Generalizability, and Delimitations

Scope

The specific focus of this study drew upon existing literature and research as I explored the relationship between the dependent variable (telemedicine) and the independent variables (access/availability, levels of use, and types of telehealth services) that was used in part of the COVID-19 Healthcare Coalition research to document the expansion of telehealth during the pandemic. I also looked to address the correlation between the theoretical frameworks of Venkatesh et al. (2003), UTAUT, and DeSanctis and Poole (1994) AST as they relate to the concepts associated with user acceptance of technology and the role of intention as a predictor to behavior. I conducted a quantitative study to evaluate the widespread adoption or dramatic increase in telehealth/telemedicine usage among providers during a pandemic. The trends, outcomes, and measures used to support this research are based on the secondary dataset provided by the COVID-19 Healthcare Coalition founded by the leadership of the MITRE Corporation and Mayo Clinic (Campion et al., 2021). The population of this study includes 1,594 surveyed respondents, 87% physicians, and 13% other qualified health care providers from thirty states representing all regions of the United States (Campion et al., 2021). This study also supports the context surrounding internal validity. The results of this study are representative of the true findings amongst the population of providers and health clinicians surveyed. According to Patino and Ferreira (2018), internal validity is best defined as the extent to which the observed results represent the truth in the population being studied.

Generalizability

This study should allow for the potential generalizability of some of the findings regarding the measures of central tendency and measures of covariation (Fisher et al., 2018). In connection to this study, the measures of central tendency relate to the variables associated with the independent variable of levels of use. In analyzing the categories and questions that fall under levels of use within the dataset, the findings of the research yielded the average, mean, or median based on the average telehealth visits per week prior to March 11, 2020, and post-March 11, 2020, when the COVID-19 outbreak was declared as a pandemic. This provides additional clarity surrounding providers' perceptions, experiences, and attitudes regarding the adoption and use of telemedicine during a pandemic. Osbeck and Antczak (2021) implied that the degree of generalization or generalizability in quantitative research refers to numerical representations such as proportions or ratios of a target population. Simply put, generalizability in this study can be applied to the ideation that the adoption and willingness of providers to use telemedicine during a global outbreak or post a global health outbreak will be dependent upon lifting of barriers and ease of adoption and implementation felt amongst the provider community. Lastly, based on the generalizability of this research study, there proves to be external validity as generalizations concerning the results and outcome of this research can be extended to a broader population as the perception of provider willingness to adopt telemedicine during a pandemic mirror the same of many providers and qualified healthcare professionals outside of the study (Patino & Ferreira, 2018).

Delimitations

According to Theofanidis and Fountouki (2018), delimitations are not positive or negative but rather a detailed account of reasoning, which enlightens the scope of the study's core interest related to the research design and underpinning philosophical framework. Delimitations are also concerned with the study's theoretical background, objectives, research questions, variables under study, and study sample (Theofanidis & Fountouki, 2018). Based on this thought concept, the delimitation of this research study acknowledged other influences associated with the perception of providers relating to their experiences and attitudes regarding the availability and usage of telemedicine during a pandemic that is not at the forefront or the focal point of this research. These other influences, such as issues with licensure, concerns with privacy and informed consent, payment parity apprehensions, lack of technological literacy, and overall financial health of the clinical practice and other social influences, have a significant impact on provider satisfaction regarding a providers' experience and attitude pertaining to the usage of telemedicine during a pandemic.

Limitations

This research study adds to the growing body of knowledge concerning the experiences and attitudes of providers regarding the availability and usage of telemedicine during a pandemic. As with any survey-based research involving the usage of secondary data, this study had several limitations surrounding the subjectiveness of the surveyed respondents based on their experience and attitudes towards using telemedicine. According to the COVID-19 Healthcare Coalition (2020), surveyed respondents were

allowed to leave individual questions unanswered, which caused response volumes to vary from question to question. This limitation lead to potential subjective bias in the questions presented in the research study. According to Pannucci and Wilkins (2010), bias is defined in research as any tendency which prevents unprejudiced consideration of a question.

Another limitation of this research was that study respondents were limited to only healthcare system members of the COVID-19 Healthcare Coalition, the AMA, ATA, MHQP, MassChallenge, and the federation of state medical societies (COVID-19 Healthcare Coalition, 2020). This research survey was limited to these member groups and associations and failed to touch a broader population of physicians and qualified healthcare professionals. Biases can be linked to this limitation regarding the selection of the surveyed respondents. Additionally, among these member groups and associations, clinical specialties were collected through structured and open text responses, which allowed for bias in the survey's findings (Campion et al., 2021). An added limitation considered in this research study was in cases where a provider did not report their specialty or provide rural designation, which allowed for the data not to be reported under that reporting time frame (Campion et al., 2021).

Another significant limitation considered with this study was the methodology used to conduct this research which may have additional built-in bias due to data supplier coverage (Campion et al., 2021). Campion et al. (2021) stated that provider surveys used for this research are convenience samples taken of respondents from across the United States and were offered only in English. The convenience sampling methodology or

approach can derive subjective conclusions about providers' perceptions of telehealth usage, which can limit the research.

Significance of Study

This study was significant because it added to the growing body of knowledge on how a pandemic can impact the level of care provided by physicians and other qualified healthcare professionals related to telehealth barriers and challenges surrounding access, levels of use, and types of telehealth services offered. Conclusions drawn from the study provided justification to healthcare leaders and government officials to lead the charge of implementing initiatives to support the accessibility and usage of telemedicine by providers. This can lead to social change in managing care delivery to patients and patient acceptance of telemedicine technology to ensure sustainability in delivering quality care that is accessible to all patient populations.

Summary and Conclusion

At present, the experiences and attitudes towards the usage of telemedicine among providers and qualified healthcare professionals have been widely received both positively and negatively amongst different medical specialties as efforts continue to provide uninterrupted care to patients. With continuous efforts to promote care delivery using telehealth/telemedicine services, providers were confronted with both benefits and challenges since this technology has rapidly emerged. Many clinical experts have viewed telehealth/telemedicine technologies as a sustainable form of care delivery in the wake of a global health crisis. Across the world, providers from different countries, clinical

backgrounds, and professional expertise had to quickly figure out how to overcome many of the existing barriers in their clinical practice related to telemedicine.

In terms of what is known and what is not known or implied in the discipline of doctor of healthcare administration (DHA) study related to the experiences and attitudes of providers being willing to adopt telemedicine, it is imperative to understand the theoretical concepts used in this research and how they are associated with the study's variables. The theoretical framework presented in this research study can be applied to the discipline of DHA study as it speaks to the desire and level of engagement by providers regarding their intention and willingness to adopt and implement telehealth into medical practice. Through the emergence of this innovative technology an environment where providers feel a level of comfort and understanding from their peers regarding their hesitation and resistance to adopting telemedicine should be fostered. Eliminating existing barriers and nuisances that impede the experiences and perceptions of providers being open and willing to use telehealth/telemedicine services in clinical practice as the new normal can create social change.

Throughout this research study, my aim was to seek opportunities to address existing gaps in the literature that spoke to social change related to the adoption and infrastructure surrounding the implementation of telemedicine by providers. It will demonstrates the need for the institution of public policy to reflect telemedicine as a sustainable method and approach to system-wide care delivery. As innovative technologies progress, it will be important to develop future research studies or surveys to track the rate of provider telemedicine adoption; to examine if providers will continue to

use telehealth once the COVID-19 healthcare crisis has passed and to evaluate the persistence of barriers to telehealth use by providers (Sisk et al., 2020).

Section 2: Research Design and Data Collection

Introduction

Experiences and attitudes regarding the availability and usage of telemedicine services among providers continue to be a trending topic as the current COVID-19 pandemic is prevalent today. With providers and clinicians alike beginning to adjust to delivering care through a virtual setting, their experiences and attitudes towards using telemedicine are still jarred by barriers not limited to the resistance to change but other factors regarding low reimbursement, workflow challenges, and integration with electronic health records. Additionally, as research continues to develop regarding telemedicine usage among providers, I conducted a quantitative analysis based on secondary data that examined the relationship between the dependent and independent variables that will aid in addressing the four research questions brought forth in this study.

Section 2 is imperative to this research study as it previews the research design and rationale used for the study. This section also highlighted and justified the research methodology used, including defining the targeted population and describing the sampling procedures used to collect the data. This section discussed ethical considerations and procedures and describe any internal and external threats to validity and reliability. Lastly, I described the applied instrumentation and measures used as part of the study.

Research Design and Rationale

The COVID-19 Healthcare Coalition used a cross-sectional research design approach to explore the relationship between the dependent variable of telemedicine in correlation to the independent variables of access, levels of use of telemedicine services, and types of telehealth services offered. Spector (2019) described a cross-sectional research design as a basic tool for conducting research that is most used with self-reported surveys where data is collected for a particular population during a specific point in time. Research presented by Setia (2016) also described a cross-sectional research design as a type of observational study design where researchers measured the outcome and the exposures in the study participants simultaneously. Setia (2016) suggested that participants in a cross-sectional study are unlike those in case-control studies and cohort studies, as they are selected based on the inclusion and exclusion criteria set for the study.

This research study derived from secondary data collected through the COVID-19 Healthcare Coalition in survey format completed electronically online as a cross-sectional research design to characterize the experiences and attitudes of physicians and other frontline clinicians during the COVID-19 pandemic. According to Campion et al. (2021), the survey examined the widespread implementation of telehealth during the first year of the COVID-19 pandemic to understand the vital role telehealth may play in new normal for the delivery of clinical care in the United States. In addition, the researchers behind this secondary dataset suggested that the primary focus of the COVID-19 Telehealth Impact Study was on the trends in telehealth and non-telehealth activity between January 1, 2019, and December 31, 2020. The researchers of this study detected the trends in

telehealth and nontelehealth activity through de-identified claims data that was refreshed monthly from June 2020 to March 2021 to allow for a complete collection of claims data through the end of the reporting period (COVID-19 Healthcare Coalition, 2020). According to Campion et al., the provider survey results provide clarity while addressing the benefits and challenges of using telehealth services to deliver quality care.

Additionally, this research design was relative to the four research questions presented in this study. It aided in making the connection between the dependent and independent variables to rule out any potential causal inference among the relationship of variables. It also eliminated any possible alternative explanations for the relationships between the variables (Spector, 2019).

Methodology

Population

The target population for this research study came from a physician survey created by the COVID-19 Telehealth Impact Study Work Group of the COVID-19 Healthcare Coalition. The survey was inclusive of 1,594 (87%) physicians and other qualified non-physician healthcare professionals (13%) from 30 states representing all regions of the United States (Campion et al., 2021). The physicians and other qualified healthcare professionals surveyed crossed several clinical subspecialties (e.g., behavioral & mental health, medicine, obstetrics & gynecology, pediatrics, radiology/radiation oncology, and surgery an anesthesia). Data collected was gathered through structured open text responses. In some instances, the researchers noted that respondents could leave individual questions unanswered, which led to varying response volumes from question

to question (Campion et al., 2021). Also, if surveyed respondents chose not to report or include their specialty or rurality designation, the data was not included under that reporting frame. Also, if surveyed respondents chose not to report or include their specialty or rurality designation, the data was not included under that reporting frame.

Both gender and race were critical components to consider in the survey results. Of the survey respondents, it was noted that 49.5% of respondents identified as female while 47.2 % identified as male. Regarding race amongst the surveyed respondents, the population was disproportionately high for White/Caucasian (76%) physicians and low for Asian/Pacific Islander (10%), Black/African American (2.7%), and Hispanic/LatinX (3.7%) respondents (Campion et al., 2021). Also noted was that out of all the providers surveyed, only a small percentage reported not using telehealth for patient care relative to the 79.4% of providers reporting they started using telehealth since the start of the pandemic and 15.9% reporting they had used telehealth before the pandemic (Campion et al., 2021).

Sampling Strategy and Procedures

When it comes to sampling procedures used to collect data for this research study, it was important to understand the types of data sources used to evaluate the objective and subjective facets of telehealth growth and usage during the pandemic. It is also essential to understand the usage of the provider and patient surveys and de-identified claims data where claims were grouped by diagnosis code as part of the collected data sources. Concerning the grouping of diagnosis codes, the researchers used the Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software for ICD-10-

PCS (beta version) which was developed as part of the Healthcare Cost and Utilization Project (HCUP; (COVID-19 Healthcare Coalition, 2020). By assessing these data sources, I drew conclusions pertaining to the value and relevance of implementing telehealth in healthcare delivery based on the experiences and attitudes of physicians and other qualified healthcare professionals represented in the study.

In terms of sampling strategy and sampling types to be considered, two major categories of sampling methods are used in research. The first category is probability sampling. This sampling method consists of four different sampling types: simple random sampling, stratified random sampling, systematic random sampling (internal sampling), and cluster sampling (multistage sampling), according to Elfill & Negida, 2017. The use of probability sampling calls for subjects in a target population to have equal chances to be selected in a sample (Elfill & Negida, 2017). The second category is nonprobability sampling which consists of convenience sampling, judgmental sampling, and snow-ball sampling methods (Elfill & Negida, 2017). Using nonprobability sampling methods allows the selection of the sample population in a nonsystematic process that does not guarantee equal chances for each subject in the target population (Elfill & Negida, 2017). For this research study, a convenience sample seemed best suited for use with the obtained de-identified claims dataset, which was subject to potential built-in bias due to supplier coverage (Campion et al., 2021). The de-identified claims dataset provided by Change Healthcare was representative of more than 2 billion claims for more than 1.50 million individuals, which represented more than 50% of private insurance claims in the united states, (Campion et al., 2021). Both the provider and patient surveys were offered

in English and were convenience samples of respondents from across the United States. According to Frey (2018), convenience sampling, also known as availability sampling, is a form of nonprobability sampling that relies on readily available data collection from a population of members.

I faced few challenges when accessing and collecting data for this research study. On October 5, 2021, I sent a data release request to the principal lead of the research group. The data release request was to obtain access to the COVID-19 Healthcare Coalition Telehealth Impact: Physician Survey Analysis. Upon release of the data, the principal lead supplied the datasets for the provider survey via email along with the final version of the Telehealth Impact Provider Survey Questionnaire, which included 36 questions.

Sample Size

When performing a sample size calculation and power analysis, it is important to consider three main factors: effect size, which is known to be the difference between two groups, the significance level, and the type of statistical analysis (Kang, 2021). Additionally, determining an appropriate sample size and power analysis to be used can be faced with complexity and difficulty when it comes to research and analysis. According to Kang (2021), G*Power is a prime choice for determining the approximate number of study participants/sample size and power calculations for various statistical methods because of its ease of use and free access. G*Power is depicted as a tool to compute statistical power analysis for statistical tests commonly used in social science (Faul et al., 2009). Kang suggested that the null and alternative hypothesis, effect size,

power, alpha, Type I error, and Type II error should be detailed when calculating the sample size or conducting a power analysis.

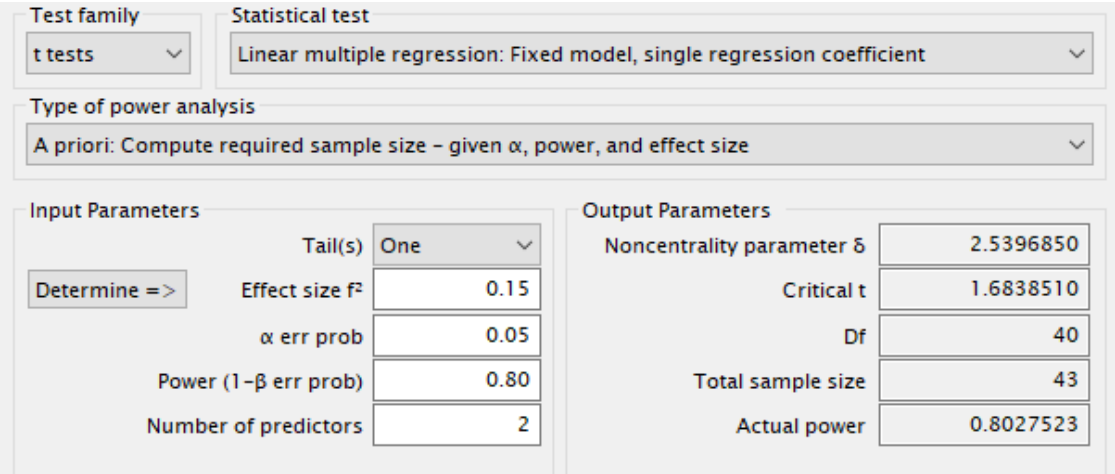
As stated by Serdar et al.(2021), performing statistical analysis is vital to research study and design and aids in justifying the effect size, alpha level, and power level. Serdar et al. (2021) suggested that researchers should have a certain level of understanding and interpretation regarding sample size, power analysis, effect size, and *p* value. When researchers reach this level of understanding and interpretation regarding sample size, it provides additional clarity when determining how the hypothesis of a study forms to best evaluate the research study for Type I and Type II errors. Serdar et al. stated that when there is a low sample size and a small effect size, it can reduce the power in a study, indicating the sample size can significantly impact the hypothesis and design of a research study. In terms of the alpha level or level of significance, the most common alpha level chosen by researchers is 0.05, which alludes to the ideation that researchers are willing to take a 5% chance that a result supporting the hypothesis will be untrue in the full population (Serdar et al., 2021).

To justify the effect size, alpha level, and power level chosen for this research study, the effect size was set to 0.5 to represent a medium effect sizing convention. The alpha level was placed at 0.05, while the power level was set to 0.8, which is common in research design as it means there is a 20% probability of the research encountering a Type II error. According to Rudestam and Newton (2015), expressing the level of power as a probability lets researchers know how likely they are to avoid type II errors. Rudestam and Newton also suggested that when the probability of a Type II error

increases, the power of the study will decrease, possibly leading to nonsignificant findings. RQ1 and RQ3 involved conducting a linear multiple regression test for this research study, as shown in Figure 3.

Figure 3

*G*Power Sample Calculation for RQ1 and RQ3*

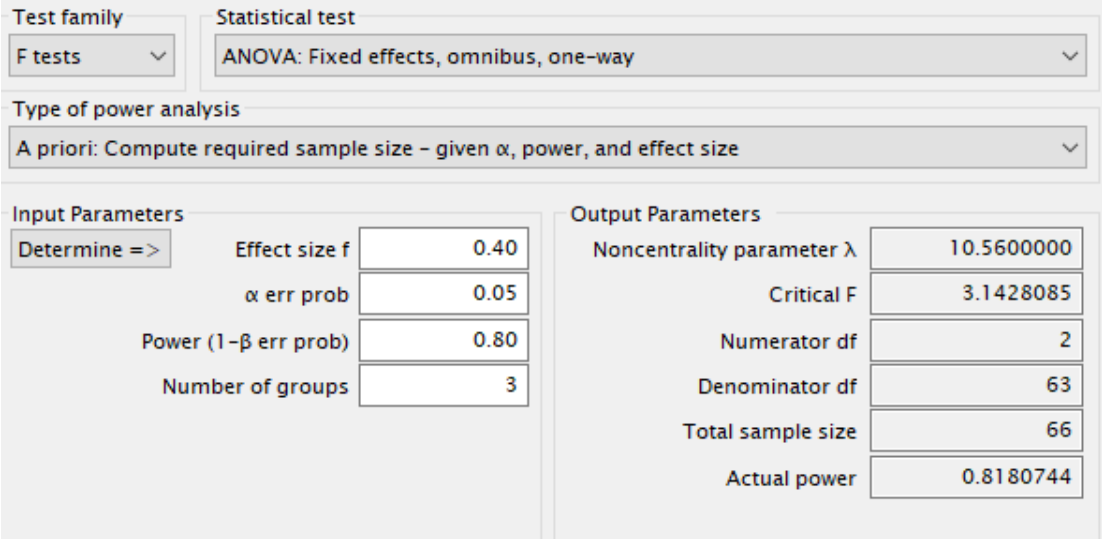


Note. Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41,* 1149-1160.

The results of this test revealed a minimum sample size of 43 surveyed participants. RQ2 involved conducting an ANOVA to test whether there is a significant difference between urban, suburban, and rural provider locations regarding the average number of telehealth visits conducted prior to March 11, 2020, and after March 11, 2020, surveyed participants, as shown in Figure 4.

Figure 4

*G*Power Sample Calculation for RQ2*

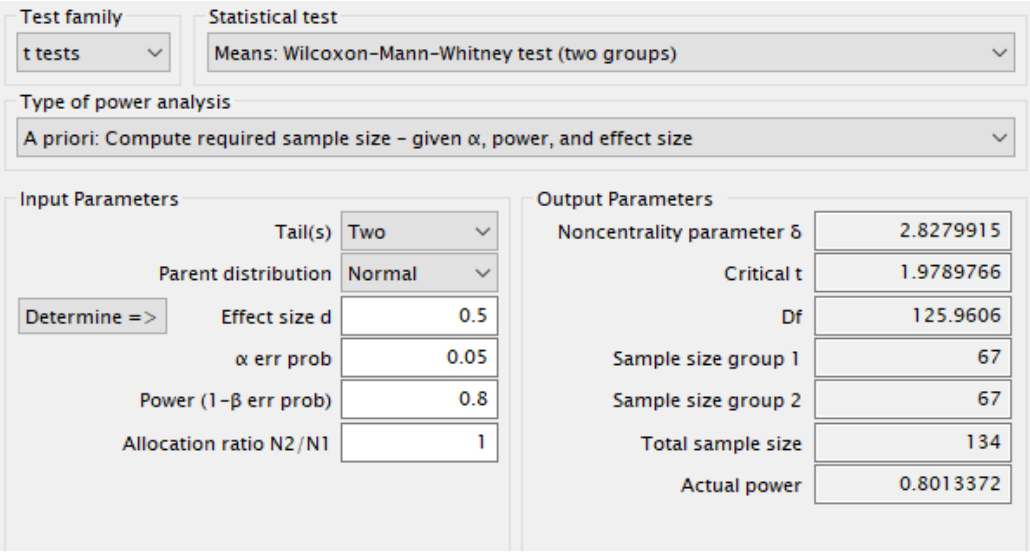


Note. Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41,* 1149-1160.

The result of the ANOVA test revealed a sample size of 66 surveyed participants. In other words, the results of the G*Power analysis showed that there is 81.8% chance of correctly rejecting the null hypothesis of no difference between provider location for providers in urban, suburban, and rural locations with a total of 66 providers, or 22 providers per designated location. For RQ4, a paired sample Wilcoxon test, also known as a nonparametric test for comparing two independent groups, was used in G*Power to determine the sample size, as shown in Figure 5.

Figure 5

*G*Power Sample Calculation for RQ4*



Note. Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*, 1149-1160.

With the input parameters set accordingly, the results of the sample size calculation using the G*Power analysis software revealed that the lowest possible sample size to be used in RQ4 was 134 surveyed participants. Between both sample groups, a sample size of 67 surveyed participants was allotted to Group 1, and another sample size of 67 surveyed participants allotted to Group 2.

Instrumentation

The instrumentation used in this research study for the purpose of data collection, data measurement, and data analysis comes from two separate sources. The instruments used were to measure and analyze the dependent and independent variables presented in

the research questions related to the experience and attitudes of physicians regarding the availability and usage of telemedicine during a pandemic.

The researchers of the secondary data set used a survey instrument to collect data on providers. Campion et al. (2021) suggest that the provider survey used to help produce the secondary dataset was informed by prior work, including surveys developed by the American Medical Association (AMA), Massachusetts Health Quality Partners (MHQP), and the National Committee on Quality Assurance (NCQA). The survey was managed through the Mayo Clinic health services research team using the Qualtrics Online Survey Platform and was open from July 13-August 15, 2020, according to Campion et al. (2021). Creswell and Creswell (2018) state there have been an increase in the use of instruments through online survey products (e.g., Qualtrics) to help facilitate and improve the data collection and survey research process. Creswell & Creswell (2018) also suggest that survey instruments can reduce data entry errors in the data collection phase of the study and accelerate hypothesis testing. Additionally, the provider survey was distributed by members of the COVID-19 Healthcare Coalition, AMA, American Telemedicine Association (ATA), MHQP, Mass Challenge, and state medical societies, according to Campion et al. (2021).

The second research instrument used in this study comes from the statistical software platform also known as IBM SPSS (Statistical Package for Social Sciences) Statistics. The software platform uses multiple statistical tests to measure the relationship between variables and covariates, leading to the instrument's appropriateness.

The survey instrument used is appropriate to this research study as the primary goal was to characterize the experiences and attitudes of providers regarding the usage and availability of telemedicine. The provider responses of the survey were also rooted and deeply connected to the theoretical framework of Unified Theory of Acceptance and Use Technology. Both theories related to this study as the focus was on providers' perception and use behaviors regarding their acceptance and willingness to adopt telemedicine technology to improve access to care. The research questions presented in the study descended from three major areas or categories across the provider survey, such as access, levels of use, and types of services. Using both instrumentation sources allowed us to look at descriptive statistics within the research questions and measure and analyze the relationship between variables.

This study allowed for reliability and validity in the survey responses as meaningful and useful inferences can be derived to show relation to what we know and think of providers' perception and willingness to adopt and use telemedicine services during a pandemic. Evaluating the relationship between reliability and validity using the instruments can be accomplished by measuring provider satisfaction and their willingness to adopt telemedicine services into their practice. The reliability of these results referred to the survey's consistency and how it was administered to the population of participants to yield similar or the same results to provider satisfaction. The ease of access, levels of use, and the types of telemedicine services offered are linked to the validity of these results.

Operationalization of Variables & Covariates

For this study, operationalization of variables was performed, which involved measuring and defining specific variables and concepts used in the study. The variables and covariates were measurable factors contributing to this research study. The variables operationalized were (a) provider telehealth experience, (b) provider telehealth usage, (c) type of provider telehealth visits, (d) provider medical specialty, and (e) provider remote sensor technologies offered. The covariates of this research study were (a) provider gender, (b) provider age, (c) # of provider telehealth visits, (d) provider location (urban/suburban/rural), and (e) provider ethnicity/race.

Table 2

Operationalization of Variables and Covariates

Variable/covariate name	Variable type	Measurement level	Measure/scale score
Variable – provider telehealth experience	Dependent	Categorical/ordinal	Scored based on a 6-pt Likert scale (strongly disagree, disagree, neutral, agree, strongly agree, don't know)
Variable – Provider telehealth usage	Dependent	Categorical/ordinal	4 groups listed: (3 or fewer months, 4 to 6 months, 7 to 12 months, more than 12 months)
Variable – type of provider telehealth visits	Independent	Categorical/nominal	3 groups listed: (live interactive video, asynchronous telehealth, remote patient monitoring)

Variable/covariate name	Variable type	Measurement level	Measure/scale score
Variable – provider medical specialty	Independent	Categorical/nominal	7 groups listed: (internal medicine, emergency medicine, physical medicine, other, surgery related specialty, non-surgery related specialty)
Covariate – provider geographic location	Independent	Categorical/nominal	5 groups listed: (Northeast, Midwest, South, West, outside U.S.)
Covariate – provider gender	Independent	Categorical/nominal	2 groups listed as "0", "1" (male, female)
Covariate – provider age	Independent	Continuous/ratio	6 groups listed as "1", "2", "3", "4", "5", "6" (18-30, 31-40, 41-50, 51-64, 65 or more, prefer not to answer)
Covariate – # of provider telehealth visits	Independent	Categorial/ordinal	4 groups listed as "1", "2", "3", "4" (0 to 5, 6 to 10, 11 to 20, more than 20)
Covariate – provider location (urban/suburban/rural)	Independent	Categorical/nominal	3 groups listed as "1", "2", "3" (urban, suburban, rural)
Covariate – provider ethnicity/race	Independent	Categorical/nominal	2 groups listed as "1", "2" (white/Caucasian, non-white)

Note. This table describes the variables and covariates in the study including the variable type, measurement level, and applied measure/scale score.

Data Analysis Plan

The secondary dataset chosen for this quantitative study used a cross-sectional survey design approach. This research design enabled gathering information through a survey format that focuses on providers' experiences with telemedicine, their attitudes toward telemedicine, and their intentions to continue delivering care via telemedicine post the COVID-19 pandemic (Schinasi et al., 2021).

This research study used IBM SPSS Version 27 to perform thorough data analysis. Conducting the analytical process for this study was accomplished by reviewing the thirty-six questions provided in the questionnaire to identify trends and themes in telehealth and non-telehealth activity amongst providers within a defined period (Campion et al., 2021). Next was a review of the dataset to clean the data before importing it into SPSS from Microsoft Excel. Once the data was imported into SPSS, descriptive statistics, including the mean, was calculated for questions pertaining to access and types of telehealth used.

The following research questions and hypotheses steered this research study:

RQ1: As reported during the COVID-19 pandemic, what relationship exists between provider telehealth adoption and provider age, gender, ethnicity/race, and geographic location?

$H_0$1: There is no statistically significant relationship between provider telehealth adoption and provider age, gender, ethnicity/race, and geographic location?

$H_1$1: There is a statistically significant relationship between provider telehealth

adoption and provider age, gender, ethnicity/race, and geographic location.

RQ2: Considering challenges in telehealth adoption, is there a significant difference in the average number of telehealth visits per week for the period prior to March 11, 2020, and after March 11, 2020, by provider location (urban/suburban/rural)?

$H_0$2: There is no statistically significant difference in the average number of telehealth visits per week for the period prior to March 11, 2020, and after March 11, 2020, by provider location (urban/suburban/rural).

$H_1$2: There is a statistically significant difference in the average number of Telehealth visits per week for the period prior to March 11, 2020, and after March 11, 2020, by provider location (urban/suburban/rural).

RQ3: As reported during the COVID-19 pandemic, what relationship exists between the modality of telehealth visits among provider types and medical specialty during the COVID-19 pandemic?

$H_0$3: – There is no statistically significant difference between the modality of telehealth visits among provider types and medical specialty during COVID-19.

$H_1$3: There is a statistically significant difference between the modality of telehealth visits among provider types and medical specialty during COVID-19.

RQ4: What relationship exists between provider telehealth adoption and provider experience regarding ease of use and the impact of financial health to provider practice during the COVID-19 pandemic?

$H_0$4: There is no statistically significant relationship between provider telehealth

adoption and provider experience regarding ease of use and the impact of financial health to provider practice during the COVID-19 pandemic?

$H_1$4: There is a statistically significant relationship between provider telehealth adoption and provider experience regarding ease of use and the impact of financial health to provider practice during the COVID-19 pandemic?

An ordinal regression statistical test was used with RQ1 to evaluate the relationship between a provider's age, gender, ethnicity, and geographic location and how long a provider had used telehealth as it relates to having access to telehealth technology. The result of this test provided an in-depth look to determine whether a provider's age, gender, ethnicity/race and geographic location was related to their willingness to use telehealth. RQ2 used a Wilcoxon Signed Ranks test which is a nonparametric test to compare means between the average number of telehealth visits per week for the period prior to March 11, 2020, and the period after March 11, 2020, by provider location. The one-way ANOVA was used to determine the statistically significant difference between the means of provider medical specialty in RQ3. Liu et al. (2021) suggest that the *P*-values should be calculated for each clinical specialty to determine the statistical significance of the differences between scores of usability and willingness. An ordinal regression statistical test was used in RQ4 to evaluate the statistically significant relationship between provider telehealth usage and provider experience during the COVID-19 pandemic.

Regarding the variables and covariates addressed in this study, Liu et al. (2021) suggest responses to Likert Scale-based statements were analyzed quantitatively by

expressing whole numbers. As a result, the sum of the responses of neutral, agree, strongly agree, and don't know was divided by the total number of responses to the particular statement in question. For questions using a Likert Scale and questions that collected numerical demographic information, the mean values were reported with standard deviations; and two-sided *P*-values of .01 or less were deemed to meet statistical significance (Liu et al., 2021).

Threats to Validity

Acknowledging internal and external threats to validity is vital in research study as it allows for assessing cause-and-effect relationships. According to Patino and Ferreira (2018), when a research study denotes validity in its findings, it signifies how well the results among the study participants represent true outcomes or discoveries among similar individuals outside the study. The establishment of generalizability holds true with both internal and external validity. In terms of internal validity, it acknowledges or allows judgment made regarding the truth found in a research study. In contrast, external validity acknowledges or allows judgment regarding the truth found in real life.

In research, external threats to validity examine whether the results from a study can be generalized or applied to other situations, groups, or populations (Andrade, 2018). According to Bhandari (2020), external validity presents itself through two different forms, population validity, and ecological validity. External validity is also linked to factors that may threaten or harm a research study, such as testing, sampling bias, history, experimenter effect, aptitude-treatment, situation effect, and the Hawthorne effect, according to Bhandari (2020). One major threat to external validity that concerned this

research study was the convenience sample taken from the secondary dataset involving the use of a substantial claims dataset as it possessed built-in bias due to data supplier coverage. Another external threat to validity surrounded a convenience sample taken from the provider survey of surveyed respondents from across the United States. According to Schinasi et al. (2021), surveys are subject to social desirability bias as this bias is minimized by allowing providers to provide anonymous survey responses. Overall, this study addressed external validity as it looked to demonstrate generalizability in its findings. Generalizability in the research findings or results can be linked to how a broader population of providers perceive the use of telemedicine as beneficial in their clinical practice related to their willingness to adopt telemedicine technology during a global pandemic.

According to Streefkerk (2019), internal threats to validity refer to the degree of confidence that the causal relationship tested is trustworthy and not influenced by other factors or variables. Andrade (2018) suggests that internal validity refers to whether the manner in which a study was designed, conducted, and analyzed allows trustworthy answers to research questions in a study. Internal validity also examines whether bias or a systematic error is present in a research study. Threats to internal validity can be linked or associated with eight main factors, history, maturation, testing, participant selection, mortality/attrition, regression towards mean, instrumentation, and social interaction, according to Streefkerk (2019). The most critical threat to internal validity related to this study involved the threat of selection as the surveyed provider population was disproportionately high for white physicians and low for Asian, Black/African American,

and Hispanics/LatinX (Campion et al., 2021). In addition to the provider's race, the provider's gender, geographic location, and other characteristics can contribute to their experiences and attitudes concerning their willingness to use and adopt telemedicine during a pandemic. Generally, internal validity is addressed in this research study as the findings of this study are based on the true perceptions of the population of providers and qualified health clinicians surveyed regarding their experiences and attitudes surrounding the availability and usage of telemedicine during a pandemic.

In terms of statistical conclusion validity, it refers to when researchers draw inaccurate inferences from the data because of inadequate statistical power or the violation of statistical assumptions and inadequate definitions and measures of variables (Creswell & Creswell, 2018). According to García-Pérez (2012), Type-I and Type-II error rates can affect the statistical conclusion of validity when a poor research design or a small sample size is used. In general, threats associated with statistical conclusion validity are linked to insufficient data collection, few measurement variables, too much variation in data or outliers in data, sample selection, and inaccurate measurement methods taken for analysis. In relation to this research study, the threat of statistical conclusion validity has high potential to be connected to the design of the provider survey used and as it is faced with subjectiveness regarding provider responses as some questions were left unanswered about their experiences and attitudes concerning the availability and usage of telemedicine.

Ethical Procedures

As mentioned previously, the secondary dataset presented in this study was developed voluntarily by a group of researchers from varying organizations without any grant funding applied. Upon obtaining the secondary dataset, no defined restrictions or requirements referred to having an official agreement in place for accessing the data.

Researchers and partnering organizational members of the COVID-19 Health Coalition were the researchers for the COVID-19 Telehealth Impact study, which was designed to characterize the experiences and attitudes of providers regarding telehealth during a pandemic. The goal was to inform healthcare leaders across the United States of the perceptions of providers and other qualified healthcare professionals as it relates to the widespread clinical adoption and usage of telehealth amongst providers during the pandemic.

Upon contacting the principal lead of the research group for access to the secondary dataset, a data release or request was required sent on Walden University Letterhead by a university advisor or program director with the inclusion of the research questions to be addressed through this study for the dataset to be released. The principal lead (personal communication, June 16, 2021) also advised that the following attribution statement must be included in this research study to give origin of the research questions to read as follows:

> "This questionnaire was developed by the COVID-19 Healthcare Coalition, a voluntary private sector response to the 2020 COVID-19 pandemic coordinated by MITRE Corporation and Mayo Clinic. Full reports of questionnaire responses

are available in the appendix as well as at https://c19hcc.org/telehealth/ the coalition website."

Performing an analysis of the data did not begin until official approval was received by Walden University's Institutional Review Board.

Although there was no formal agreement for accessing the secondary data, no ethical concerns were expressed regarding the recruitment of materials and processes or regarding the anonymity and security of the data related to the confidentiality of the data or data storage.

Summary

The primary focus of section 2 was to clearly define the chosen research design and rationale behind the study. This section also discussed the chosen methodology used in length, which included a description of the target population and the sampling procedures to include the power analysis used to determine the appropriate sample size of the study. In addition, this section of the research study also focused on operationalizing the variables and covariates and evaluating how the internal and external threats to validity impacted the study, including any statistical conclusion validity. Lastly, this section focused on ethical considerations and procedures that were accounted for related to recruitment materials, data collection efforts, institutional permissions and approvals, and the treatment of human participants as part of the secondary dataset provided by the COVID-19 Healthcare Coalition research group.

The next section of this research study was primarily focus on the data collection efforts of the secondary dataset related to its findings and results of the completed data analysis as it pertains to the research questions and hypothesis.

Section 3: Presentation of the Results and Findings

Introduction

The primary purpose of this quantitative study was to evaluate and examine the experiences and attitudes of providers and other qualified healthcare clinicians regarding their perception and willingness to use and rapidly adopt telehealth during the height of the COVID-19 pandemic. I found that telehealth played a significant role in care delivery during the pandemic as many providers and clinicians were reluctant to use or were naïve to using this technology for care delivery previously. My results showed how every clinical discipline or specialty saw a steep rise in the use of telehealth or telehealth adoption during the pandemic.

Further quantitative analysis of this study regarding telehealth usage among providers can add to growing discussions regarding the opportunity for using telehealth beyond Covid-19 as providers look for ways to expand or broaden access to quality care. Engaging in further analysis will provide understanding surrounding the effect and impact felt by providers as telehealth best practices begin to emerge. Engaging in further analysis will also allow for widespread telehealth innovations introduced to the provider community or healthcare space, allowing for a more robust and effective way to expand and deliver care during a pandemic and beyond. Additionally, the findings and results of this study may add further value to the practice of DHA study as cultural and social changes are applied to the way that care is delivered beyond the COVID-19 pandemic, so that policy changes are made, and an investment in resources are readily available to aid

the implementation and adoption efforts of telehealth services for providers limiting any potential barriers related to low reimbursement, training, and access.

As I sought to measure the relationship between the dependent variable of telemedicine and the independent variables of telehealth access/availability, levels of use of telemedicine, and the types of telehealth services offered, I was aware that additional analysis may be required for a closer look into the following research questions and hypothesis.

RQ1: What relationship exists between provider telehealth adoption and provider age, gender, ethnicity/race, and geographic location?

$H_0$1: There is no statistically significant relationship between provider telehealth adoption and provider age, gender, ethnicity/race, and geographic location?

$H_1$1: There is a statistically significant relationship between provider telehealth adoption and provider age, gender, ethnicity/race, and geographic location.

RQ2: Considering challenges in telehealth adoption, is there a significant difference in the average number of telehealth visits per week for the period prior to March 11, 2020, and after March 11, 2020, by provider location (urban/suburban/rural)?

$H_0$2: There is no statistically significant difference in the average number of telehealth visits per week for the period prior to March 11, 2020, and after March 11, 2020, by provider location (urban/suburban/rural).

$H_1$2: There is a statistically significant difference in the average number of telehealth visits per week for the period prior to March 11, 2020, and after March 11, 2020, by provider location (urban/suburban/rural).

RQ3: As reported during the COVID-19 pandemic, what relationship exists between the modality of telehealth visits and medical specialty during the COVID-19 pandemic?

$H_0$3: There is no statistically significant difference between the modality of telehealth visits and medical specialty during the COVID-19 pandemic.

$H_1$3: There is a statistically significant difference between the modality of telehealth visits and medical specialty during the COVID-19 pandemic.

RQ4: What relationship exists between provider telehealth adoption and provider experience regarding ease of use and the impact of financial health to provider practice during the COVID-19 pandemic?

$H_0$4: There is no statistically significant relationship between provider telehealth adoption and provider experience regarding ease of use and the impact of financial health to provider practice during the COVID-19 pandemic?

$H_1$4: There is a statistically significant relationship between provider telehealth adoption and provider experience regarding ease of use and the impact of financial health to provider practice during the COVID-19 pandemic?

Section 3 of this quantitative study highlighted the efforts surrounding the data collection of the secondary dataset, and the findings or results of the study. Shared throughout this section are descriptive statistics that appropriately characterized the study sample. In addition, a report out regarding applied statistical tests which included tables and figures to illustrate results as needed to answer the four research questions were presented in this section.

Data Collection

The secondary dataset used for this research study was obtained from the principal lead at MITRE Corporation. This dataset was cultivated as a result of using a combination of data sources to evaluate the growth of telehealth during the COVID-19 pandemic. The time frame for data collection of the provider survey was between July 15 – August 15, 2020. The survey was also administered to provider organizations across the United States. The provider survey also serves as one of three parts of the Telehealth Impact Study initiative of the COVID-19 Healthcare Coalition. Other key elements or parts of the Telehealth Impact Study are a patient survey which was conducted from November 2020 – February 2021, and a dataset consisting of over 2 billion de-identified healthcare claims focusing on trends in both telehealth and non-telehealth which covered over 50% of private insurance activity in the United States from January 2019 – December 2020 (Campion et al., 2021). According to Campion et al. (2021), the provider survey was apprised by prior work, including surveys developed by the AMA, MHQP, and NCQA. Additionally, the provider survey was distributed by members of the C19HCC, AMA, American Telemedicine Association, MHQP, MassChallenge, and state medical societies (Campion et al., 2021).

Regarding response rate, the provider survey comprised 1,594 respondents made up of physicians and other qualified healthcare professionals from across the United States. The provider survey was completed electronically, online, and managed through the Qualtrics Online Survey Platform. Of the 1,594 surveyed respondents, 87% were actual physicians, and the remaining 13% were classified as other qualified healthcare

providers (Campion et al., 2021). Another important factor regarding the provider survey is that clinical subspecialty responses were captured or collected through structured open-text responses. In some instances, providers did not report their specialty or rurality designation, so the data was not included in the reporting timeframe (Campion et al., 2021).

Descriptive and Demographic Characteristics of Population Sample

To further understand this secondary research study, accessing this population's baseline descriptive and demographic characteristics was imperative as it provided insight into which ethnicity, age group, and gender were the biggest adopters of telehealth during the COVID-19 pandemic. The demographic information also included the geographic location of providers. In addition, looking into the baseline descriptive characteristics for the most widely used telehealth modalities and medical specialties that used telehealth during COVID-19 is key.

Table 3 revealed that most of the providers and qualified healthcare clinicians surveyed were of White/Caucasian background and race. The interpretation gathered from this table signified that the population of the providers surveyed was disproportionately higher for providers from a White/Caucasian background regarding their willingness to adopt telehealth compared to providers from non-White ethnic backgrounds.

Results showed a uniform approach to telehealth adoption among providers as the responses fairly equally split between female and male, with a slight majority being female. Providers aged 51 to 64 were among the highest adopters to deliver care through

telehealth technology during the pandemic of the 1,590 surveyed. Providers and qualified health clinicians aged 18 to 30 were the lowest adopters. Most providers surveyed represented the Northeast (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Puerto Rico, Rhode Island, and Vermont) part of the country more than any other region in the United States. Most providers stated they opted to use or adopt telehealth and have been doing so for 4 to 6 months to deliver quality care during the pandemic. A small fraction of surveyed providers suggested their low rate of adopting telehealth during the COVID-19 pandemic was associated with their organization offering telehealth services to deliver healthcare and their choosing not to use them individually.

Table 3 also presents information on the categories of medical specialties to adopt telehealth during the COVID-19 pandemic. Three different telehealth modalities were evaluated during this research study: live interactive video, asynchronous telehealth, and remote patient monitoring. Compared to asynchronous telehealth and remote patient monitoring methods, live interactive video visits for hospitalized patients in a hospital ward, ICU, or long-term setting were most frequently used by providers.

Table 3

Provider Baseline Descriptive and Demographic Characteristics

Characteristic	Frequency (n=1590)	Percent	Valid percent	Cumulative percent
Provider Race				
White	1142	71.8	71.8	71.8
Non-White	448	28.2	28.2	100.0
Provider Gender				
Male	713	44.8	48.8	48.8
Female	748	47.0	51.2	100.0
Missing	129	8.1		
Provider Age				
18 to 30	19	1.2	1.3	1.3
31 to 40	256	16.1	17.1	18.4
41 to 50	376	23.6	25.2	43.5
51 to 64	557	35.0	37.3	80.8
65 or more	287	18.1	19.2	100.0
Missing	95	6.0		
Provider Geographic Location				
Northeast	517	32.5	36.3	36.3
Midwest	214	13.5	15.0	51.3
South	375	23.6	26.3	77.6
West	295	18.6	20.7	98.3
Outside U.S.	24	1.5	1.7	100.0
Missing	165	10.4		
Provider Telehealth Adoption				
My organization offers telehealth services but I choose not to use them	33	2.1	2.1	2.1
3 or fewer months	300	18.9	18.9	20.9
4 to 6 months	962	60.5	60.5	81.4
7 to 12 months	46	2.9	2.9	84.3
More than 12 months	207	13.0	13.0	97.4
My organization does not offer telehealth services	42	2.6	2.6	100.0
Provider Medical Specialty				
Family Medicine	270	17.0	17.9	17.9
Internal Medicine	349	21.9	23.2	41.1
Emergency Medicine	26	1.6	1.7	42.8
Physical Medicine	21	1.3	1.4	44.2

Characteristic	Frequency (n=1590)	Percent	Valid percent	Cumulative percent
Other	261	16.4	17.3	61.6
Surgery Related Specialty	384	24.2	25.5	87.1
Non-Surgery Related Specialty	195	12.3	12.9	100.0
Missing	84	5.3		
Telehealth Modality – Live Interactive Video Visits				
0	172	10.8	10.8	10.8
1	1031	64.8	64.8	75.7
2	312	19.6	19.6	95.3
3	59	3.7	3.7	99.0
4	14	.9	.9	99.9
5	2	.1	.1	100.0
Telehealth Modality – Asynchronous Telehealth				
0	1266	79.6	79.6	79.6
1	183	11.5	11.5	91.1
2	57	3.6	3.6	94.7
3	84	5.3	5.3	100.0
Telehealth Modality – Remote Patient Monitoring				
0	1366	85.9	85.9	85.9
1	194	12.2	12.2	98.1
2	30	1.9	1.9	100.0

Note.

Data Analysis and Results

To further analyze this secondary dataset, I conducted several statistical tests to address the four research questions presented in this study. RQ1 involved using an ordinal regression statistical test, which is more of a predictive analysis to investigate the relationship between provider telehealth adoption and provider age, gender, ethnicity/race, and geographic location. For RQ2 I used a Wilcoxon Signed Ranks statistical test to evaluate the difference in the average number of telehealth visits per week for the period prior to March 11, 2020, and after March 11, 2020, by provider location (urban/suburban/rural). RQ3 was designed to identify if there was a difference between the modality of telehealth visits among provider types and medical specialties during the COVID-19 pandemic so I conducted a one-way ANOVA statistical analysis. For RQ4 I used an ordinal regression statistical test to evaluate the relationship between provider telehealth adoption and provider experience regarding ease of use and the impact of financial health on provider practice during the COVID-19 pandemic.

Research Question 1

Results for RQ1 were reported through an ordinal regression statistical analysis, as displayed below in table 4. For this research question, telehealth adoption was the dependent variable, with provider gender, race/ethnicity, and geographic location used as factors and provider age used as a covariate. The parameter estimates table provided three thresholds that represented the four levels of provider telehealth adoption regarding how long providers used telehealth. Threshold Q2=1 is located at -1.421 and signified the use level between 3 or fewer months (*n*=256) and 4 to 6 months (*n*=885). Threshold Q2=2

was at 1.661 and signified the use level between 4 to 6 months and 7 to 12 months (*n*=44). Threshold Q2=3 was located at 1.905 and signified the use level between 7 to 12 months and more than 12 months (*n*=194).

Reviewing the locations showed a statistically significant result for the value of Race_Recode=1, representing providers of a white/Caucasian background (*p*=.014). With non-whites serving as the baseline demographic characteristic, the results showed that white providers tend to be early adopters of telehealth compared to non-white providers. There was also a statistically significant result for the location of Geo_Recode=4.00 representing the West region (*p*=.018). In this result, the Northeast region served as the baseline demographic characteristic. The results indicated that providers in the West region were more likely to adopt telehealth than providers in the Northeast region. The remaining variables, such as age and gender, do not significantly impact the dependent variable of provider telehealth adoption. The value of the age (variable Q23) coefficient was negative (-.048), which suggests that the older providers were, the less likely they were to adopt telehealth. Reviewing the value of gender (Q25=0 [Male], Q25=1 [Female]), females showed as the baseline demographic characteristic, male providers were less likely to adopt telehealth compared to female providers.

Table 4

Provider Telehealth Adoption by Age, Gender, Race, and Geographic Location

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[Q2 = 1]	-1.421	0.235	36.625	1	0.000	-1.881	-0.961
	[Q2 = 2]	1.661	0.236	49.336	1	0.000	1.197	2.124
	[Q2 = 3]	1.905	0.238	63.837	1	0.000	1.438	2.372
Location	Q23	-0.048	0.056	0.724	1	0.395	-0.158	0.062
	[Q25=0]	-0.045	0.114	0.155	1	0.694	-0.269	0.179
	[Q25=1]	0[a]			0			
	[Race_Recode=1]	0.331	0.134	6.078	1	0.014	0.068	0.595
	[Race_Recode=2]	0[a]			0			
	[Geo_Recode=2.00]	-0.207	0.171	1.472	1	0.225	-0.541	0.127
	[Geo_Recode=3.00]	-0.133	0.141	0.895	1	0.344	-0.408	0.143
	[Geo_Recode=4.00]	0.360	0.152	5.631	1	0.018	0.063	0.657
	[Geo_Recode=5.00]	-0.026	0.426	0.004	1	0.952	-0.861	0.810
	[Geo_Recode=6.00]	0[a]			0			

a. This parameter is set to zero because it is redundant.

Note. This table was obtained as a result of an ordinal regression analysis conducted in SPSS v27 to describe provider telehealth adoption by age, gender, race, and geographic location.

Research Question 2

In using a Wilcoxon Signed Ranks test analysis to evaluate RQ2, the descriptive statistics table 5 suggests that for the location of urban, the sample size for visits prior to March 11, 2020, showed $n = 694$ with mean and standard deviation values of ($\mu = 1.14$, SD = .542) and the sample size for visits after March 11, 2020 showed $n = 693$ with a mean value and standard deviation value of ($\mu = 2.88$, SD = 1.063). For the suburban location, both sample sizes for visits prior to March 11, 2020, and after March 11, 2020,

showed n = 666. However, there is a difference in mean and standard deviation values. Visits prior to March 11, 2020, offer a mean and standard deviation value of (μ = 1.14, SD = .553). Visits after March 11, 2020, showed a mean and standard deviation value of (μ = 2.93, SD = 1.049). For the rural location, the sample sizes (n = 148) were the same for visits prior to March 11, 2020, and after March 11, 2020. The mean value and standard deviation value for visits prior to March 11, 2020, revealed (μ = 1.19, SD = .684), and for visits after March 11, 2020, the mean and standard deviation values revealed (μ = 2.84, SD = 1.141). The number of visits for all 3 locations for visits prior to March 11, 2020, showed a median rating of 1.00, and the number of visits for all 3 locations after March 11, 2020, showed a median rating of 3.00.

The final test statistics table was examined and indicated that the Asymp. Sig. (2-tailed) value for all 3 locations, urban, suburban, and rural, showed a statistically significant difference in visits after March 11, 2020, and before March 11, 2020, as the p = .039 and the Z statistic is Z = -2.060.

Table 5

Provider Telehealth Visits Prior to and After March 11, 2020

Descriptive Statistics

USR		N	Mean	Std. Deviation	Min	Max	Percentiles 25th	50th (Median)	75th
.	Visits prior to March	6	1.00	0.000	1	1	1.00	1.00	1.00
	Visits after March	6	2.67	1.033	1	4	1.75	3.00	3.25
Urban	Visits prior to March	694	1.14	0.542	1	4	1.00	1.00	1.00
	Visits after March	693	2.88	1.063	1	4	2.00	3.00	4.00
Suburban	Visits prior to March	666	1.14	0.553	1	4	1.00	1.00	1.00
	Visits after March	666	2.93	1.049	1	4	2.00	3.00	4.00
Rural	Visits prior to March	148	1.19	0.684	1	4	1.00	1.00	1.00
	Visits after March	148	2.84	1.141	1	4	2.00	3.00	4.00

Note. This descriptive statistics table was obtained through a Wilcoxon Signed Ranks test result using SPSS v27.

Research Question 3

In evaluating RQ3, a one-way ANOVA analysis was conducted using SPSS software version 27 using the Tukey HSD and Games-Howell tests to assess the differences between the means. RQ3 addressed three outcomes tied to the dependent variables: live interactive video visits, asynchronous telehealth, and remote patient monitoring. The group variables consisted of seven medical specialties, family medicine, internal medicine, emergency medicine, physical medicine, other, surgery-related specialty, and non-surgery related specialty.

For live interactive video visits, the ANOVA proved not to be statistically significant because the p-value was greater than 0.05 ($p > 0.05$), meaning the null hypotheses would be retained and not rejected. For the asynchronous telehealth modality,

the ANOVA analysis also proved not statistically significant due to the p-value being greater than 0.05 ($p > 0.05$), leading to the null hypothesis not being rejected. However, for remote patient monitoring, the ANOVA table shown in table 6 reflects that this modality of telehealth is statistically significant due to the $p = .009$. In this case, we would reject the null hypothesis. The homogeneity variance shown in table 7 for remote patient monitoring based on the mean was statistically significant due to the $p < .001$; therefore, the Games-Howell comparison is being reported. Of the Games-Howell comparison, the statistically significant difference, as shown in table 8, is between the internal medicine medical specialty with a sample size $n = 349$ with a mean value of ($\mu = .21$, SD = .492) with 95% CI [.16, .26] compared to the surgery related specialty with a sample size $n = 384$ and a mean value of ($\mu = .12$, SD = .353) with 95% C.I. [.08, .15].

Table 6

One-Way ANOVA test results of Types of Provider Telehealth Visits Offered

		Sum of Squares	df	Mean Square	F	Sig.
Live Interactive Video Visits	Between Groups	2.848	6	0.475	1.016	0.413
	Within Groups	700.257	1499	0.467		
	Total	703.105	1505			
Asynchronous Telehealth	Between Groups	2.607	6	0.434	0.675	0.670
	Within Groups	964.260	1499	0.643		
	Total	966.867	1505			
Remote Patient Monitoring	Between Groups	3.089	6	0.515	2.878	0.009
	Within Groups	268.072	1499	0.179		
	Total	271.161	1505			

Note. This ANOVA table was obtained through SPSS v27 to describe the type of provider telehealth visits offered by medical specialty during the COVID-19 pandemic.

Table 7

Homogeneity of Variances Test Results of Types of Provider Telehealth Visits Offered

		Levene Statistic	df1	df2	Sig.
Live Interactive Video Visits	Based on Mean	7.679	6	1499	0.000
	Based on Median	3.315	6	1499	0.003
	Based on Median and with adjusted df	3.315	6	1320.606	0.003
	Based on trimmed mean	6.198	6	1499	0.000
Asynchronous Telehealth	Based on Mean	1.523	6	1499	0.167
	Based on Median	0.675	6	1499	0.670
	Based on Median and with adjusted df	0.675	6	1486.725	0.670
	Based on trimmed mean	1.734	6	1499	0.109
Remote Patient Monitoring	Based on Mean	10.621	6	1499	0.000
	Based on Median	2.878	6	1499	0.009
	Based on Median and with adjusted df	2.878	6	1387.178	0.009
	Based on trimmed mean	8.516	6	1499	0.000

Note. This table details the Homogeneity of Variances test results obtained from SPSS v27 to describe the types of provider telehealth visits offered.

Table 8

One-Way ANOVA Descriptives Test Result of Types of Provider Telehealth Visits

						95% Confidence Interval for Mean			
		N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Min	Max
Live Interactive Video Visits	Family Medicine	270	1.18	0.550	0.033	1.11	1.24	0	4
	Internal Medicine	349	1.29	0.702	0.038	1.21	1.36	0	4
	Emergency Medicine	26	1.31	1.320	0.259	0.77	1.84	0	5
	Physical Medicine	21	1.38	0.669	0.146	1.08	1.69	0	3
	Other	261	1.25	0.621	0.038	1.17	1.32	0	4
	Surgery Related Specialty	384	1.25	0.736	0.038	1.17	1.32	0	4
	Non-Surgery Related Specialty	195	1.30	0.670	0.048	1.21	1.40	0	4
	Total	1506	1.25	0.684	0.018	1.22	1.29	0	5
Asynchronous Telehealth	Family Medicine	270	0.41	0.798	0.049	0.31	0.50	0	3
	Internal Medicine	349	0.36	0.792	0.042	0.28	0.44	0	3
	Emergency Medicine	26	0.31	0.838	0.164	-0.03	0.65	0	3
	Physical Medicine	21	0.33	0.913	0.199	-0.08	0.75	0	3
	Other	261	0.34	0.770	0.048	0.24	0.43	0	3
	Surgery Related Specialty	384	0.32	0.785	0.040	0.24	0.40	0	3
	Non-Surgery Related Specialty	195	0.44	0.880	0.063	0.32	0.57	0	3
	Total	1506	0.36	0.802	0.021	0.32	0.41	0	3
Remote Patient Monitoring	Family Medicine	270	0.15	0.380	0.023	0.11	0.20	0	2
	Internal Medicine	349	0.21	0.492	0.026	0.16	0.26	0	2
	Emergency Medicine	26	0.12	0.431	0.085	-0.06	0.29	0	2
	Physical Medicine	21	0.33	0.577	0.126	0.07	0.60	0	2
	Other	261	0.15	0.401	0.025	0.10	0.20	0	2
	Surgery Related Specialty	384	0.12	0.353	0.018	0.08	0.15	0	2
	Non-Surgery Related Specialty	195	0.23	0.477	0.034	0.16	0.29	0	2
	Total	1506	0.17	0.424	0.011	0.15	0.19	0	2

Note. This table was obtained from a one-way ANOVA analysis in SPSS v27 to describe the types of provider telehealth visits offered by medical specialty.

Research Question 4

An ordinal regression model was used to investigate RQ4 with telehealth adoption being the dependent variable and financial health and ease of use being the covariates or predictor variables. Both predictor variables use Likert-scale type data to measure providers experience regarding ease of use and the impact of financial health to provider practice regarding their willingness to adopt telehealth during the COVID-19 pandemic. What can be interpreted from the analysis of RQ4 is that as each surveyed provider increased their Likert response by 1 unit, the estimate moved in a positive direction by .135 regarding the impact of financial health to their provider practice. The same remains true for ease of use with the exception of as each surveyed provider increased their Likert response by 1 unit, the estimate moved in a positive direction by .124 for provider experience regarding ease of use.

As with RQ1, the parameter estimates table (table 9) provided three thresholds that showcased four different levels of provider telehealth adoption referencing how long providers have been using telehealth. Threshold Q2=1 was located at -.533 and signified the use level between 3 or fewer months (*n*=250) and 4 to 6 months (*n*=864). Threshold Q2=2 was at 2.632 and signified the use level between 4 to 6 months and 7 to 12 months (*n*=37). Threshold Q2=3 was located at 2.860 and signified the use level between 7 to 12 months and more than 12 months (*n*=174). The threshold estimates in this analysis revealed that the higher the estimate, which in this case is threshold Q2=3 the more likely the providers were to be early adopters of telehealth or have a higher adoption rate.

Reviewing the locations shows statistically significant results for provider experience regarding ease of use (p=.019) and the impact of financial health to provider practice (p=.004) during the COVID-19 pandemic, which allowed us to reject the null hypothesis. For the value of "Financial", it represented providers experience regarding the impact of financial health to their provider practice concerning telehealth usage. The value of "Easy" represented providers experience regarding ease of use pertaining to telehealth usage. Although the result is statistically significant for both variables and it showed in a positive direction, the magnitude of the change was very minimal.

Table 9

Provider Telehealth Experience Regarding Ease of Use and Financial Health to Practice

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[Q2 = 1]	-0.533	0.219	5.913	1	0.015	-0.962	-0.103
	[Q2 = 2]	2.632	0.235	125.551	1	0.000	2.172	3.093
	[Q2 = 3]	2.860	0.237	145.113	1	0.000	2.394	3.325
Location	Financial	0.135	0.047	8.172	1	0.004	0.043	0.228
	Easy	0.124	0.053	5.474	1	0.019	0.020	0.228

Note. This table was obtained from an ordinal regression analysis run in SPSS v27 to describe provider experience regarding ease of use and impact of financial health to provider practice.

Summary

To summarize, the results of the research questions presented in this secondary study were conducted using three different types of statistical tests. RQ1 and RQ4 both

used an ordinal regression analysis while RQ2 used a Wilcoxon Signed Ranks statistical analysis, and RQ3 used a one-way ANOVA test.

Through the ordinal regression analysis used with RQ1, it was shown statistically significant that providers located in the west region and of a white/Caucasian background were more likely to be early adopters of telehealth compared to other non-white ethnicities and other regions across the United States. Other factors, such as age and gender, proved not statistically significant, which does not support the alternate hypothesis regarding whether or not gender and age matter regarding providers' willingness to adopt telehealth during the COVID-19 pandemic.

The results of the statistical data analysis conducted for RQ2 suggested a statistically significant difference in the number of visits prior to March 11, 2020, and after March 11, 2020, for urban, suburban, and rural locations. The data analysis results for RQ3 revealed that of the three telehealth modalities evaluated, live interactive video visits and asynchronous telehealth proved not statistically significant. In contrast, remote patient monitoring proved statistically significant, allowing us to reject the null hypothesis and accept the alternative hypothesis.

Data analysis results for RQ4 suggest a financial reason alone will not change a providers' decision regarding telehealth adoption and the ease of use alone will not change a providers' decision of adopting telehealth but if you combine both variables or all variables that prove statistically significant it will increase the likelihood or make for a more compelling argument for a provider to change their decision or willingness to adopt telehealth.

Section 4 of this research study will provide a comprehensive review that will primarily focus on the interpretation of the study's findings, possible limitations of the study, study recommendations, and implications for professional DHA practice while promoting positive social change.

Section 4: Application to Professional Practice and Implications for Social Change

Introduction

The purpose of this quantitative study was to examine the relationship between telemedicine, the access/availability of telemedicine services, the levels of use of telemedicine, and the types of telehealth services offered as it relates to providers' experiences and attitudes toward using telehealth during the COVID-19 pandemic. In determining the experiences and attitudes of telehealth usage among providers during the pandemic, it was vital to understand their perception and level of engagement with telehealth technology in providing clinical care. In addition, it was imperative to understand the relationship of the variables used in the study to depict the correlation of how those variables aligned with providers' willingness to use telemedicine. Furthermore, several key findings were evident in conducting this quantitative research study. Through identifying these key findings, it was important to have a thorough understanding of the demographic characteristics, such as providers' age, gender, ethnicity/race, and geographic location, regarding how they played a huge role in the findings of this study.

This research revealed that White/Caucasian providers tend to be early adopters of telehealth when compared to providers from other non-White ethnic backgrounds, while provider age and gender showed to have no significant impact on telehealth adoption among providers. The findings also revealed that providers that live in the West region of the United States, consisting of the following states: Alaska, Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming, were early adopters of

telehealth as well. Other key findings showed a significant difference in visits after March 11, 2020, and before March 11, 2020, for providers living in urban, suburban, and rural locations. Another key finding involved remote patient monitoring, the most favorable modality for delivering quality care for internal medicine specialties during the pandemic. The last key finding proved that for variables such as improved financial health of provider practice and ease of use of telehealth technology, these variables would need to be coupled with other statistically significant variables for there to be a large impact or a sizeable magnitude of change in a providers' willingness to adopt telehealth.

Interpretation of the Findings

The UTAUT model by Venkatesh et al. (2003) indicates that provider telehealth adoption is associated with four determinants of intention and usage: performance expectancy, effort expectancy, social influence, and facilitating conditions. These determinants of intention and usage can be used to determine a provider's behavior or intent to use digital or virtual technology for care delivery. As shared earlier in this research study, Shiferaw et al. (2021) suggested that providers' effort expectancy and attitude are significant predictors of their acceptance of telemedicine, while a provider's attitude towards using telemedicine is highly influenced by performance expectancy, self-efficacy, and facilitating conditions. That said, my primary aim with this study was to evaluate telehealth adoption among providers to understand better their willingness to use virtual or digital technology.

The study's findings extend knowledge to what has been outlined in Section 1 as the UTAUT model consists of four key variables (age, gender, experience, and

voluntariness) which are considered to influence a provider's behavioral patterns and intentions to use telemedicine (Venkatesh et al., 2003). The outcome of RQ1 suggested that age and gender do not significantly impact a provider's willingness to adopt telehealth. However, it implied that the older a provider is, the less likely they are to adopt telemedicine, and male providers or clinicians are less likely to adopt telemedicine than females.

The outcome of RQ2 indicated a significant difference in the number of visits prior to March 11, 2020, and after March 11, 2020, for urban, suburban, and rural locations, which coincides with the thoughts of Karimi et al. (2022) who found telehealth usage during the COVID-19 peak (March to April 2020) increased from 1% of visits to as much as 80% in places where the pandemic prevalence was high. This further confirms the prevalence of this research study.

The outcome of RQ3 can help extend knowledge in this discipline as live interactive video visits and asynchronous telehealth proved not significant when differential patterns and modalities of telehealth use were depicted among provider groups. Lastly, the outcome of RQ4 confirms and extends knowledge in this discipline as providers need to feel incentivized by multiple variables to use telemedicine in practice. The greater the benefit and advantages of using telehealth technology, the more likely providers are to adopt it into practice. This aligned with Harst et al. (2019), who stated that acceptance is most often predicted by perceived usefulness, social influences, and attitude.

Limitations of the Study

As with any quantitative research study that uses survey-based research, there were potential limitations to generalizability that coincided with key findings of a study. One of these is the results can be subject to respondent bias (Liu et al., 2021). For this study, there were three major limitations to generalizability identified. The first limitation was related to the subjectiveness of the surveyed providers and qualified health clinicians due to the allowable nature of individual questions left unanswered. This led to a fluctuation in response volumes from question to question. In return, this caused potential subjective bias in the questions regarding their experiences and attitudes toward using telehealth technology during a pandemic.

The second limitation I identified in this study was related to the limited number of healthcare system member groups and associations that gave access to their provider groups to participate in this research study. As a result, this study missed the opportunity to touch a broader population of providers and qualified clinicians, which can link to selection bias among the surveyed participants. Additionally, this study was only about providers in the United States and did not consider how providers' experiences and attitudes regarding telehealth usage during COVID-19 may differ in other countries due to cultural differences, as COVID-19 was a global pandemic. However, this did not significantly impact this study's findings, given that the survey results showed 1,594 respondents, 87% physicians, and 13% other qualified healthcare providers spanning several sizeable healthcare system member groups and associations (Campion et al.,

2021). The number of surveyed respondents proved to be an acceptable sample size for this study.

The third limitation identified in this study concerned the methodology used to conduct the COVID-19 Telehealth Impact Survey, as it was alluded to have built-in bias due to data supplier coverage, according to Campion et al. (2021). Lastly, these limitations reflect providers' experiences within a limited number of healthcare system member groups and associations and, therefore, may not be generalizable to other settings on a broader scale, such as internationally or globally.

Recommendations for Future Research

With the vast rise and surge in telehealth adoption during the COVID-19 pandemic, providers were faced with adjusting to the new normal of delivering quality care, which has required shifting their thoughts and attitudes toward telemedicine. In thinking forward, this research study was unique as it aimed to explore the relationship between provider telehealth adoption and their experiences and perspectives towards using such technology during a global pandemic. According to Pikkematt et al. (2021), future studies are necessary to explore whether increased telemedicine adoption due to the COVID-19 pandemic has altered primary care providers' intention to use telemedicine. Additionally, Pikkematt et al. (2021) suggested that perceived behavioral control had the largest predictive value of behavioral intention to use telemedicine. This indicated that interventions aimed to increase the adoption of such tools in primary care should focus on empowering physicians' self-efficacy toward using digital tools.

The theoretical framework brought forth by DeSanctis & Poole's (1994) Adaptive Structuration Theory (AST) relates to the ideation of Pikkematt et al. (2021) regarding how to best conceptualize the use of behavior patterns, intentions, and controls behind using digital technology. In addition, the theoretical framework presented by Venkatesh et al. (2003), the Unified Theory of Acceptance and Use of Technology (UTAUT), aligns with the thoughts and perceptions of Pikkematt et al. (2021) as well, in that to empower a providers' self-efficacy or self-confidence in using telehealth digital technology, they must understand the level of performance expectancy, effort expectancy, social influence, and facilitating conditions that are associated or required with using telehealth in provider practice.

As we look to recommendations for future research, it will be important to understand what will drive or, more so, encourage providers to have an adaptive use of digital telehealth technology as it can have a positive influence on their level of satisfaction and the health outcomes of their patients according to Hah et al. (2019). As suggested by Hodgkins et al. (2021), it will be critically important to promote collaboration amongst a diverse group of industry, clinical, and technology partners that will foster a collaborative way to integrate physician perspective to develop and scale the adoption of telehealth solutions to benefit both patients and providers as we look toward the future. Additionally, integrating the provider perspective into the development of telehealth technology eliminates any preconceived thoughts and barriers to adoption, according to Hodgkins et al. (2021).

As uncovered in the statistical analysis of RQ4, when we couple all the benefits and advantages of using telehealth technology or virtual platforms to deliver quality care, it is presumed that we're more likely to gain buy-in from providers to use the technology. In a post-pandemic era, future research should provide evidence-based guidance on how to implement telehealth into daily practice for providers where it promotes sustainability and continued growth and development for practices without the fear of being handicapped or compromised by social influences and barriers.

Future research will also be strategically important to examine the difference between providers trained and prepared to use telehealth technology versus those not trained or well-versed in utilizing such technology in critical moments such as the COVID-19 pandemic. Examining the difference in trained vs. non trained telehealth users will provide good insight into evaluating providers and clinicians alike regarding their experiences and attitudes towards using telehealth when they are equipped to act as opposed to being reactive to digital telehealth technology or virtual platforms to deliver quality care. This will increase the likelihood of providers' willingness to adopt telehealth, leading to a better experience regarding their perception of telehealth digital technology or virtual platforms. Lastly, recommendations for future research are needed to help providers understand and identify the right balance between providing virtual and in-person care and the long-term implications for their provider practice and the healthcare delivery system, according to Hodgkins et al. (2021).

Implications for Professional Practice and Social Change

As the need for telehealth services has accelerated due to the COVID-19 pandemic, physicians and other qualified healthcare clinicians have realized that telehealth is a viable platform for providers to deliver quality care. As a result, careful thought and consideration should be implied when addressing implications for professional practice and social change.

Implications for Professional Practice

Amid the COVID-19 pandemic, we saw the use of telehealth catapult in a direction that has driven change to professional practice as providers sought to overcome digital divides within their practice. Recognizing implications for professional practice was vital in understanding the appropriateness of using digital telehealth technology in provider practice. What can be learned from this study is that providers' willingness to adopt telemedicine technology was linked to their level of comfort regarding ease of use related to convenience, staff training, integration into clinicians and provider practice workflows, and patient safety. Combining these variables helped combat providers' resistance to change and willingness to adopt telehealth.

Considering the empirical implications of this study, it strengthened the theoretical framework in that what we know for sure was that providers' willingness to adopt telemedicine is the result of their self-efficacy centered around their performance expectancy, effort expectancy, social influences, and facilitating conditions as a part of the UTAUT model. Additionally, their intention to use telemedicine virtually is connected to behavioral patterns and controls associated with using digital technology

that correlates to the AST theoretical model, which involves the structure of telemedicine technology and the social interaction of providers and clinicians using the technology in a provider practice or health care organization to deliver quality care.

Implications for Social Change

When we begin to think of implications for positive social change, it is important to consider the influence of sociodemographic and socioeconomic characteristics and the role that these characteristics play in implementing telehealth into provider practice. By instituting positive social change by implementing telehealth technology, providers and clinicians must consider health equity and access to care for their entire patient population. According to Chang et al. (2021), without proactive efforts to address both patient and provider-related digital barriers associated with socioeconomic status, the broader need to implement telehealth amid the pandemic may reinforce disparities in health access in already marginalized and underserved communities. Providers must consider the location of their practice, their level of engagement with telemedicine, and how it will be used with their patients as they seek to enhance or improve their provider-patient relationships and patient health outcomes. For those provider practices willing to adopt telehealth in their practice amid the pandemic, it allowed them to connect remotely through video visits, telephone, or patient portals, which nevertheless allowed them to maintain a level of continuity of care in preserving or safeguarding their provider-patient relationships.

Other aspects of positive social change can be linked to regulatory or government policy changes and reimbursement parity or financial incentive for practices to adopt

telehealth. At the height of the COVID-19 pandemic, we saw policy changes regarding HIPPA flexibility, changes within the Centers for Medicare & Medicaid (CMS), licensure requirements, and the prescribing of controlled substances regardless of location to happen expeditiously to allow providers to provide remote care and to remove barriers related low reimbursement, provider licensing, and challenges with patient privacy. All of these changes are considered positive social changes.

Overall, implementing telemedicine into provider practice fosters an environment for meaningful positive social change to occur. It can reduce the cost of healthcare services and allow providers to deliver healthcare services remotely to patients in rural areas without proposed barriers that inhibit their practice.

Conclusion

This quantitative research study summarized providers' experiences and attitudes across the U.S. with telehealth usage during the COVID-19 pandemic. The telehealth care provided, comprised of live interactive video visits, asynchronous telehealth, and remote patient monitoring, which was well-received among providers, with remote patient monitoring proving to be statistically significant or the most favorable among providers. With that said, the endorsement of telehealth services among providers has started to increase as it has grown in popularity as a primary choice for delivering quality care virtually as a result of the COVID-19 pandemic. The findings revealed throughout this study provided important and notable contributions to understanding the perceptions of providers regarding their experiences, attitudes and willingness to adopt telehealth technology in their practice. As we continue to look post pandemic and identify ways to

incorporate telehealth technology into daily practice, future work considered should be aimed or developed in a manner that provides understanding for how to improve not only providers' experiences with telehealth but patients experience with telehealth usage as we seek to improve patient outcomes through the delivery of quality care using different modalities for the delivery of care.

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Appendix A: Telehealth Impact Provider Survey – July 2020

6430 SHAH - Telehealth Impact

"This questionnaire was developed by the COVID-19 Healthcare Coalition, a voluntary private sector response to the 2020 COVID-19 pandemic coordinated by MITRE Corporation and Mayo Clinic. Full reports of questionnaire responses are available at https://c19hcc.org/telehealth/ the coalition website."

Start of Block: Telehealth Research Questions

Q1
SURVEY OVERVIEW:

Survey Introduction:
Your experiences and insights on the uses of telehealth services offer opportunities and challenges that other providers can learn from as they may be earlier in the process for deploying similar types of services. The goal of this project is to learn more about your experiences with telehealth services.

Telehealth Definition:
Telehealth is the use of electronic information and telecommunication technologies to extend care when an individual and their provider are not in the same place at the same time. For purposes of this survey telehealth includes phone and video, chat messaging, email, secure messaging and secure file exchange, and remote patient monitoring. It includes all modalities of care and both synchronous (e.g., real-time communications such as use of video conversations) and asynchronous (e.g., not needing concurrent participation involvement such as email).

Please click "**NEXT**" to begin the survey.

Page Break

JS

Q2 **How long have you been using telehealth?**

- 3 or fewer months (1)
- 4 to 6 months (2)
- 7 to 12 months (3)
- More than 12 months (4)
- My organization offers telehealth services but I choose not to use them (5)
- My organization does not offer telehealth services (6)

Display This Question:
If How long have you been using telehealth? = My organization offers telehealth services but I choose not to use them

Q3 **Please describe why you choose not to use them.** (Check all that apply.)

- Not trained (1)
- Not conducive to my specialty (I can deliver care face-to-face) (2)
- Investments in technology not made (3)
- Other, please specify: (4) _____

Skip To: End of Block If Please describe why you choose not to use them. (Check all that apply.) , Not trained Is Displayed

Display This Question:
If How long have you been using telehealth? = My organization does not offer telehealth services

X→

Q4 **Please describe why your organization does not offer telehealth services.** (Check all that apply.)

- ☐ Financial barriers (1)
- ☐ Current products do not meet our needs (2)
- ☐ Privacy concerns (3)
- ☐ Provider preference (4)
- ☐ Lack of infrastructure (e.g., broadband, internet challenges, technology investments) (5)
- ☒ I don't know (6)
- ☐ Other, please specify: (7) _____

Skip To: End of Block If Please describe why your organization does not offer telehealth services. (Check all that apply.) , Financial barriers Is Displayed

Page Break

JS

Q5 **Are you able to access your telehealth technology directly from your Electronic Health Record (EHR)?**

- Yes (1)
- No (2)
- I do not know (3)

Display This Question:
If Are you able to access your telehealth technology directly from your Electronic Health Record (EHR)? = No

JS

Q6 **Would you like the option to access telehealth technology through your EHR?**

- Yes (1)
- No (2)

Q7 **How are you accessing telehealth in your practice?** (Check all that apply.)

- ☐ Telehealth vendor, please specify specific vendor such as Amwell, etc.: (1) _____
- ☐ Zoom (2)
- ☐ Skype (3)
- ☐ FaceTime (4)
- ☐ Doxy.me (5)
- ☐ Doximity Video (6)
- ☐ Microsoft Teams (7)
- ☐ EHR telehealth module/tools (8)
- ☐ Audio-only telephone visits (9)
- ☐ Other, please specify: (10) _____

Q8 **From where have you conducted your telehealth visits?** (Check all that apply.)

- ☐ Clinic (1)
- ☐ My home (2)
- ☐ Hospital (3)
- ☐ Other, please specify: (4) _____

Page Break

Q9 **Which of the following types of telehealth are you using to provide clinical care?** (Check all that apply.)

- ☐ Live, interactive video visits for a hospitalized patient (patient in hospital ward, ICU, or long-term care setting) (1)
- ☐ Live, interactive video visits for a patient in the emergency department (2)
- ☐ Live, interactive video visits for a patient in an outpatient clinic (3)
- ☐ Live, interactive video visits for a patient at a school or childcare facility (4)
- ☐ Live, interactive video visits for a patient at their home (5)
- ☐ Asynchronous telehealth to provide clinical care to a patient (store and forward, digital check-ins via portals and email, etc.) (6)
- ☐ Asynchronous telehealth to provide advice to another clinician (store and forward, digital check-ins via portals and email, etc.) (7)
- ☐ Asynchronous telehealth to receive advice from another clinician (store and forward, digital check-ins via portals and email, etc.) (8)
- ☐ Remote patient monitoring of a patient who is at a health care facility (9)
- ☐ Remote patient monitoring of a patient who is at home (10)
- ☐ Telephone/audio-only calls with patients (11)
- ☐ Other telehealth, please specify: (12) _____

Page Break

JS

Q10 **How many telehealth visits were you averaging per week prior to March 11, 2020 when the World Health Organization declared the COVID-19 outbreak to be a pandemic?**

- 0 to 5 (1)
- 6 to 10 (2)
- 11 to 20 (3)
- More than 20 (4)

JS

Q11 **How many telehealth visits have you been averaging per week post March 11, 2020 when the World Health Organization declared the COVID-19 outbreak to be a pandemic?**

- 0 to 5 (1)
- 6 to 10 (2)
- 11 to 20 (3)
- More than 20 (4)

JS

Q12 **Post March 11, 2020, when volume for delivery of telehealth services was at its highest point, what percentage of that volume would you estimate were visits with patients with whom you had an established patient/physician relationship?**

- 0 to 25% (1)
- 26 to 50% (2)
- 51 to 75% (3)
- More than 75% (4)

JS

Q13 **Currently, based on total volume of telehealth service delivery, what percent of your visits are with patients with whom you have an established patient/physician relationship?**

- 0 to 25% (1)
- 26 to 50% (2)
- 51 to 75% (3)
- More than 75% (4)

Page Break

JS

Q14 For each type of care listed below, please indicate to what extent you agree or disagree with the following statement about telehealth. If you do not deliver this type of care, please indicate Not Applicable.

Statement: Telehealth enables me to deliver quality care for...

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)	Not applicable (6)
COVID-19 related care (1)	○	○	○	○	○	○
Acute care (2)	○	○	○	○	○	○
Chronic disease management (3)	○	○	○	○	○	○
Preventative care (4)	○	○	○	○	○	○
Perioperative/procedures (5)	○	○	○	○	○	○
Hospital or ED follow-up care (6)	○	○	○	○	○	○
Care coordination (7)	○	○	○	○	○	○
Mental/behavioral health (8)	○	○	○	○	○	○
Medication reconciliation (9)	○	○	○	○	○	○

Page Break

Q15 **What types of visits would you like to continue offering to your patients via telehealth after COVID-19?** (Check all that apply.)

- ☐ Acute care (1)
- ☐ Chronic disease management (2)
- ☐ Preventative care (3)
- ☐ Hospital or ED follow-up care (4)
- ☐ Care coordination (5)
- ☐ Medical management (6)
- ☐ Mental/behavioral health (7)
- ☐ Specialty care (8)
- ☐ Other, please specify: (9) _____

Page Break

Q16 **What, if any, remote sensor technologies are helping you provide better care for your patients via telehealth?** (Check all that apply.)

- [ ] Activity monitors (1)
- [ ] Body weight scale (2)
- [ ] Thermometer (3)
- [ ] Pulse oximeter (4)
- [ ] Blood pressure cuffs (5)
- [ ] Portable EKG (6)
- [ ] Home spirometer (7)
- [ ] Heart rate monitor (8)
- [ ] Continuous glucose monitor (9)
- [ ] Smartphone camera (photos) (10)
- [ ] Smartphone microphone (audio recordings) (11)
- [ ] ⊗ Not currently using any, but would like to start (12)
- [ ] ⊗ None (13)
- [ ] Other, please specify: (14) _____

Display This Question:
If What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Activity monitors
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Body weight scale
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Thermometer
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Pulse oximeter
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Blood pressure cuffs
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Portable EKG
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Home spirometer
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Heart rate monitor
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Continuous glucose monitor
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Smartphone camera (photos)
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Smartphone microphone (audio recordings)
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Other, please specify:

Q17 **How do you review data from the remote sensor technologies that you and your patients are using to support telehealth?** (Check all that apply.)

- ☐ Patient verbally shares their data with me during the visit (1)
- ☐ Patient shares data from their technology with me by email (2)
- ☐ Patient shares data from their technology via a dashboard or report (3)
- ☐ The technology feeds directly into our patient portal (4)
- ☐ The technology feeds directly into our EHR (5)
- ☐ Other, please specify: (6) _____

Display This Question:
If What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Activity monitors
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Body weight scale
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Thermometer
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Pulse oximeter
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Blood pressure cuffs
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Portable EKG
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Home spirometer
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Heart rate monitor
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Continuous glucose monitor
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Smartphone camera (photos)
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Smartphone microphone (audio recordings)
Or What, if any, remote sensor technologies are helping you provide better care for your patients vi... = Other, please specify:

JS

Q18 **Are remote monitoring technologies more valuable to patient care if they are connected to the internet?**

- ○ Yes (1)
- ○ No (2)
- ○ I don't know (3)

Page Break

JS

Q19 For each aspect of care, please identify to what extent you agree or disagree with the following statements.

Statement: Telehealth has improved the…

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)	Don't know (6)
Health of my patients (1)	○	○	○	○	○	○
Safety of my patients (2)	○	○	○	○	○	○
Timeliness of care for my patients (3)	○	○	○	○	○	○
Costs of care for my patients (4)	○	○	○	○	○	○
Financial health of my practice (5)	○	○	○	○	○	○
Satisfaction of my work (6)	○	○	○	○	○	○
Other, please specify: (7)	○	○	○	○	○	○

Page Break

Q20 **Which of the following, if any, do you anticipate being barriers and challenges in your organization related to maintaining telehealth after COVID-19?** (Check all that apply.)

- ☐ Low or no reimbursement (1)
- ☐ Licensure (2)
- ☐ Liability (3)
- ☐ Technology challenges for my patient population (i.e., access to smart phone, Wi-Fi, internet connection, etc.) (4)
- ☐ Telehealth-specific workflows (5)
- ☐ Integration with the EHR (6)
- ☐ Integration of additional technologies (such as BP cuffs and pulse oximeters) (7)
- ☐ Low patient engagement (8)
- ☐ Lack of technical support (9)
- ☐ Clinician dissatisfaction (10)
- ☐ Cost of implementing or maintaining telehealth platform (11)
- ☒ I do not anticipate any barriers or challenges (12)
- ☐ Other, please specify: (13) _____

Display This Question:

If Which of the following, if any, do you anticipate being barriers and challenges in your organizat... = Low or no reimbursement

Or Which of the following, if any, do you anticipate being barriers and challenges in your organizat... = Licensure

Or Which of the following, if any, do you anticipate being barriers and challenges in your organizat... = Liability

Or Which of the following, if any, do you anticipate being barriers and challenges in your organizat... = Technology challenges for my patient population (i.e. access to smart phone, Wi-Fi, internet connection, etc.)

Or Which of the following, if any, do you anticipate being barriers and challenges in your organizat... = Telehealth-specific workflows

Or Which of the following, if any, do you anticipate being barriers and challenges in your organizat... = Integration with the EHR

Or Which of the following, if any, do you anticipate being barriers and challenges in your organizat... = Integration of additional technologies (such as BP cuffs and pulse oximeters)

Or Which of the following, if any, do you anticipate being barriers and challenges in your organizat... = Low patient engagement

Or Which of the following, if any, do you anticipate being barriers and challenges in your organizat... = Lack of technical support

Or Which of the following, if any, do you anticipate being barriers and challenges in your organizat... = Clinician dissatisfaction

Or Which of the following, if any, do you anticipate being barriers and challenges in your organizat... = Cost of implementing or maintaining telehealth platform

Or Which of the following, if any, do you anticipate being barriers and challenges in your organizat... = Other, please specify:

Q21 **Which of the following, if any, do you perceive as barriers to your patients accessing telehealth?** (Check all that apply.)

- ☐ Lack of patient access to technology (computer, smartphone) (1)
- ☐ Lack of patient access to broadband/internet (2)
- ☐ Lack of patient access to data access (through their cellular plan) (3)
- ☐ Lack of digital literacy in patient mix (4)
- ☐ Lack of access to community-based resources (5)
- ☐ Lack of patient awareness/understanding of insurance coverage for telehealth (6)
- ☐ Lack of health insurance (7)
- ☐ Lack of patient awareness/understanding of telehealth offerings (8)
- ☐ Patient preference for in-person visits (9)
- ☒ All of the above (10)
- ☒ No barriers known (11)
- ☐ Other, please specify: (12) _____

Page Break

Display This Question:

If How long have you been using telehealth? = 3 or fewer months
Or How long have you been using telehealth? = 4 to 6 months
Or How long have you been using telehealth? = 7 to 12 months
Or How long have you been using telehealth? = More than 12 months

JS

Q22 **To what extent do you agree or disagree with the following statements?**

	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)	Don't know (6)
My patients have better access to care since our practice began using telehealth. (1)	○	○	○	○	○	○
It has been easy for me to learn to use telehealth in my practice. (2)	○	○	○	○	○	○
It has been simple for me to use telehealth in my practice. (3)	○	○	○	○	○	○
My patients have reacted favorably to leveraging telehealth for clinical care. (4)	○	○	○	○	○	○
By offering telehealth, I have helped to flatten the curve during this pandemic. (5)	○	○	○	○	○	○

It will be easy to continue using telehealth in a way that is financially viable for my practice. (6)	○	○	○	○	○	○
I am personally motivated to increase use of telehealth in my practice. (7)	○	○	○	○	○	○
My organization's leadership is motivated to increase use of telehealth in my practice. (8)	○	○	○	○	○	○

End of Block: Telehealth Research Questions

Start of Block: Demographic Questions

Display This Question:

If How long have you been using telehealth? != My organization offers telehealth services but I choose not to use them

And How long have you been using telehealth? != My organization does not offer telehealth services

JS

Q23 **Please indicate your age.**

- ○ 18 to 30 (1)
- ○ 31 to 40 (2)
- ○ 41 to 50 (3)
- ○ 51 to 64 (4)
- ○ 65 or more (5)
- ○ Prefer not to answer (6)

Display This Question:
If How long have you been using telehealth? != My organization offers telehealth services but I choose not to use them
And How long have you been using telehealth? != My organization does not offer telehealth services

Q24 **Please indicate your ethnicity/race.**
(Check all that apply.)

- ☐ White/Caucasian (1)
- ☐ Hispanic/LatinX (2)
- ☐ Black/African American (3)
- ☐ Native American, American Indian, or Alaska Native (4)
- ☐ Asian/Pacific Islander (5)
- ☒ Prefer not to answer (6)
- ☐ Other, please specify: (7) _____

Display This Question:
If How long have you been using telehealth? != My organization offers telehealth services but I choose not to use them
And How long have you been using telehealth? != My organization does not offer telehealth services

JS

Q25 **Please specify your gender.**

- Male (1)
- Female (2)
- Non-binary/Third gender (3)
- Prefer not to answer (4)
- Other, please specify: (5) _____

Page Break

Display This Question:

If How long have you been using telehealth? != My organization offers telehealth services but I choose not to use them

And How long have you been using telehealth? != My organization does not offer telehealth services

Q26 Please indicate the state in which your practice medicine.

- Alabama (1)
- Alaska (2)
- Arizona (3)
- Arkansas (4)
- California (5)
- Colorado (6)
- Connecticut (7)
- Delaware (8)
- District of Columbia (9)
- Florida (10)
- Georgia (11)
- Hawaii (12)
- Idaho (13)
- Illinois (14)
- Indiana (15)
- Iowa (16)
- Kansas (17)
- Kentucky (18)
- Louisiana (19)
- Maine (20)
- Maryland (21)
- Massachusetts (22)
- Michigan (23)
- Minnesota (24)

- Mississippi (25)
- Missouri (26)
- Montana (27)
- Nebraska (28)
- Nevada (29)
- New Hampshire (30)
- New Jersey (31)
- New Mexico (32)
- New York (33)
- North Carolina (34)
- North Dakota (35)
- Ohio (36)
- Oklahoma (37)
- Oregon (38)
- Pennsylvania (39)
- Puerto Rico (40)
- Rhode Island (41)
- South Carolina (42)
- South Dakota (43)
- Tennessee (44)
- Texas (45)
- Utah (46)
- Vermont (47)
- Virginia (48)
- Washington (49)

- ○ West Virginia (50)
- ○ Wisconsin (51)
- ○ Wyoming (52)
- ○ I do not reside in the United States (53)

Display This Question:
If How long have you been using telehealth? != My organization offers telehealth services but I choose not to use them
And How long have you been using telehealth? != My organization does not offer telehealth services

JS

Q27 **Which of the following best describes you?**

- ○ Physician (MD/DO/MBBS) (1)
- ○ Nurse practitioner (2)
- ○ Physician assistant (3)
- ○ Other advanced practice provider, please specify: (4) _____
- ○ Other, please specify: (5) _____

Display This Question:
If How long have you been using telehealth? != My organization offers telehealth services but I choose not to use them
And How long have you been using telehealth? != My organization does not offer telehealth services

JS X→

Q28 **Please indicate which one of the following best describes your medical specialty.**

- ○ Allergy & Immunology (1)
- ○ Anesthesiology (2)
- ○ Cardiac/Thoracic (3)
- ○ Cardiovascular Surgery (4)
- ○ Critical Diseases Care (5)
- ○ Dentistry Medicine/Oral Surgery (6)
- ○ Dermatology (7)
- ○ Emergency Medicine (8)
- ○ Family Medicine (9)
- ○ Gastroenterology (10)
- ○ General Practice (11)
- ○ Hematology/Oncology (12)
- ○ Hospitalist (13)
- ○ Infectious Disease (14)
- ○ Internal Medicine, General (15)
- ○ Internal Medicine, Primary Care (16)
- ○ Nephrology (17)
- ○ Neurological Surgery (18)
- ○ Neurology (19)
- ○ Obstetrics and Gynecology (20)
- ○ Oncology (21)
- ○ Ophthalmology (22)
- ○ Orthopedic Surgery (23)
- ○ Otolaryngology (24)

- ○ Palliative Care (25)
- ○ Pathology (26)
- ○ Pediatrics (27)
- ○ Physical and Occupational Therapy (28)
- ○ Physical Medicine and Rehabilitation (29)
- ○ Plastic Surgery (30)
- ○ Podiatry (31)
- ○ Psychiatry (32)
- ○ Pulmonary Disease (33)
- ○ Radiation Oncology (34)
- ○ Radiology (35)
- ○ Rheumatology (36)
- ○ Surgery, General (37)
- ○ Urological Surgery (38)
- ○ Vascular Surgery (39)
- ○ Other surgery-related specialty, please specify: (40)

_____

- ○ Other Non- surgery-related specialty, please specify: (41)

_____

Page Break

Display This Question:
If How long have you been using telehealth? != My organization offers telehealth services but I choose not to use them
And How long have you been using telehealth? != My organization does not offer telehealth services

JS

Q29 **In what setting had you spent the majority of your time (in general) prior to March 11, 2020?**

- Urban (1)
- Suburban (2)
- Rural (3)

Display This Question:
If How long have you been using telehealth? != My organization offers telehealth services but I choose not to use them
And How long have you been using telehealth? != My organization does not offer telehealth services

JS

Q30 **Which of the following best describes your main practice?**

- ○ Physician's office, solo practice (1)
- ○ Physician's office, single specialty group practice (2)
- ○ Multi-specialty group practice or clinic (3)
- ○ Hospital, teaching (4)
- ○ Hospital, non-teaching (5)
- ○ Skilled nursing facility (6)
- ○ Hospice (7)
- ○ Accountable Care Organization (ACO) (8)
- ○ Patient-Centered Medical Home (PCMH) (9)
- ○ Urgent care facility (10)
- ○ Home health agency (11)
- ○ Direct to consumer telehealth company (12)
- ○ Other, please specify: (13) _____

Display This Question:

If How long have you been using telehealth? != My organization offers telehealth services but I choose not to use them

And How long have you been using telehealth? != My organization does not offer telehealth services

JS

Q31 **Please indicate if you participate in any value-based care models or payment arrangements.**
(Check all that apply.)

- ☐ Accountable Care Organization (ACO) (1)
- ☐ Patient-Centered Medical Home (PCMH) (2)
- ☐ Alternative Payment Model (APM) Bundled Payment Models (3)
- ☐ Other Alternative Payment (AP) or Advanced APM (4)

_____

- ☐ ⊗ Do not participate (5)

Display This Question:
If How long have you been using telehealth? != My organization offers telehealth services but I choose not to use them
And How long have you been using telehealth? != My organization does not offer telehealth services

JS

Q32 **Which payers do you accept in your practice?**
(Check all that apply.)

- ☐ Medicare (1)
- ☐ Medicaid (2)
- ☐ Veterans Affairs (3)
- ☐ Private/commercial payer (4)
- ☐ Free care (5)
- ☐ ⊗ Do not accept insurance (6)

End of Block: Demographic Questions

Start of Block: SUBMIT

Display This Question:
If How long have you been using telehealth? != My organization offers telehealth services but I choose not to use them
And How long have you been using telehealth? != My organization does not offer telehealth services

Q33 **Thank you for participating in our survey.**

Please feel free to include any additional thoughts you have about the impact of telehealth on you or your practice (e.g., any additional information on improvements related to level of access or timeliness of access, or other).

_____
_____
_____
_____
_____

Q34 **Please provide your email.**
(Optional)

- Email: (1) _____

Q35 **Are you interested in any potential follow-up discussion?**

- Yes (1)
- No (2)

Q36 **Please click <u>SUBMIT</u> to record your answers.**

End of Block: SUBMIT

Appendix B: Telehealth Impact: Physician Survey Questions – Approval Email

Re: [EXT] Telehealth Impact: Physician Survey Analysis Question

Telehealth Impact <[redacted]>
Wed 6/16/2021 9:33 AM
To:Keya Brooks <[redacted]>

1 attachments (47 KB)
final version_Telehealth_Impact_Provider_Survey_July2020.docx;

Hello Keya:

Please send me a request for use of the data set on your university letter head, preferably by your adviser/program director. Include mention of your research questions. Once I receive this, I'll be able to release the dataset to you.

Attached is a copy of the Physician Survey questions so you can get started.

Please be sure to give attribution of the origin of the questions when you use them.

Attribution statement:
"This questionnaire was developed by the COVID-19 Healthcare Coalition, a voluntary private sector response to the 2020 COVID-19 pandemic coordinated by MITRE Corporation and Mayo Clinic. Full reports of questionnaire responses are available at https://cl9hcc.org/telehealth/ the coalition website."

We also expect online publication of a peer reviewed article in July 2021 in journal, "Telemedicine and Health Today" which may be of interest to you.

Best Regards,

[redacted]