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The Webcam Will See You Now: A Review of Telemedicine During the COVID-19 Era

By Jake Spiegel, Employee Benefit Research Institute

AT A GLANCE

Telemedicine has evolved from its humble roots as a means of transmitting radiological images over telephone wires to a sophisticated videoconferencing experience for patients. Most recently, the COVID-19 pandemic has contributed to telemedicine usage spiking, as patients sought to avoid hospitals and doctors' offices. Still, there is scant literature evaluating outcomes for patients using synchronous videoconferencing telemedicine platforms. In a review of current literature on videoconferencing telemedicine as popularly practiced during the COVID-19 pandemic, the Employee Benefit Research Institute (EBRI) examines the factors that could influence wider adoption of telemedicine as well as its effectiveness in affecting patient outcomes. This review finds:

- Evidence that telemedicine can be effective: One state's telemedicine system contributed to a reduction in 60-day infant mortality rates and has helped adolescent asthmatics better manage their symptoms. Telemedicine can be as effective as in-person visits, at least for certain types of care, such as managing diabetes or allergies.
- Evidence that patients found the telemedicine experience compelling. That is, they found telemedicine platforms easy to use, and enjoyed the convenience and time savings that telemedicine offers.
- Signs that the pandemic has affected usage patterns: One recent study found that since the onset of the pandemic, telemedicine visits increased twenty-three-fold relative to pre-pandemic times.
- Evidence that some benefits executives at large corporations saw telemedicine as a cost-savings tool, although others wondered whether their workers used telemedicine as a substitute for in-person care or for care that would not have been sought in-person.
- Two important questions that EBRI aims to answer in future research. To what extent did telemedicine impact outcomes for patients who pivoted to using it to receive care during the COVID-19 pandemic? And will patients continue to use telemedicine as they have during the pandemic, or will they prefer to return to primarily in-person visits?

Telemedicine is a promising means for health care providers to connect with their patients in a way that is more flexible and cost-effective. Patients do not need to travel to receive health care services, which is a boon to many patients, including the elderly and those in rural areas who may live far away from their health care provider. However, as with futuristic innovations like self-driving cars, realizing the full benefits of telemedicine has long been prognosticated to be "just around the corner." It is now, however, that a confluence of factors have created conditions in which telemedicine is well-positioned to succeed. Reluctance to visit hospitals and doctors' offices, lower barriers to technology and increasingly prevalent video communication software, reduced regulatory barriers, and buy-in from employers have finally thrust telemedicine into a prominent role in the United States' health care system.

Still, the extant literature on the impact of telemedicine on outcomes — in particular, telemedicine visits that substituted in-person visits during the COVID-19 pandemic — remains relatively scant. This is not particularly surprising; telemedicine as practiced and popularized during the COVID-19 pandemic is a relatively new phenomenon. In a review of current literature on telemedicine as practiced during the COVID-19 pandemic, EBRI examines the factors that could influence wider adoption and effectiveness of telemedicine in affecting patient outcomes and reducing health care costs.

This study was conducted through the EBRI Center for Research on Health Benefits Innovation (EBRI CRHBI), with the funding support of the following organizations: **Aon Hewitt**, **Blue Cross Blue Shield Association**, **ICUBA**, **JP Morgan Chase**, **Pfizer**, and **PhRMA**.

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A Brief History of Telemedicine

The focus of this paper is on telemedicine as it has come to be understood in the context of the COVID-19 pandemic. The scope is therefore limited to telemedicine defined as the synchronous provision of health care and services via videoconferencing platforms which are enabled by high-speed broadband internet. However, it is useful to summarize the humble beginnings of telemedicine so that we can better understand its evolution over time and conceptualize the role it could play in the future.

An early paper operationalizes telemedicine as a system in which patients engage in remote communication with health care providers using information technology (Bashshur et al. 2000). Indeed, the impetus of developing telemedicine capabilities was for telemedicine to act as an effective substitute for in-person care (Bashshur et al. 2005). Technological innovations often move at a breakneck pace, and telemedicine is no exception. In the past few decades, the telemedicine landscape has already shifted considerably. Perhaps the first implementation of telemedicine occurred in 1948, when two hospitals in Pennsylvania transmitted radiological images over telephone wires (Zundel 1996). In 1967, Massachusetts General Hospital linked with the medical station at Boston's Logan International Airport using microwave relays to allow doctors to remotely interact with patients and conduct primary care and emergency services (Bashshur et al. 2005). These systems did not widely proliferate beyond their initial applications thanks to a lack of government funding, but they did establish the feasibility of telemedicine systems.

Telemedicine has not been without its naysayers. Indeed, some prognosticators have taken a dim view of telemedicine, questioning its ability to be a cost-saving technology and instead considering telemedicine to be another cost burden for health care providers to shoulder (Burns 1999). Offices must adapt to new workflows to accommodate telemedicine platforms, which could require additional training. Additionally, there are licensing and privacy challenges. Telemedicine providers licensed in one state may not necessarily be allowed to perform consultations across state lines. And health care providers must adopt new protocols to ensure patient data is confidential and transmitted and stored securely.

Increasing digitization, along with higher internet penetration rates, ushered in a new era of telemedicine platforms. Asynchronous "store-and-send" methods, popularized during the 1990s, became a popular way for doctors to consult with their patients. In this method, patients upload the information necessary — such as x-rays, lab results, and so on — for a doctor to make their recommendations. Asynchronous methods therefore do not rely on face-to-face communications, but they do allow doctors to review patients' medical records on their own time as their workflow dictates. In the 1990s, telemedicine typically referred to patients talking to doctors over the telephone. This method allowed patients to describe symptoms with their health care providers and to get a determination as to whether an in-person visit would be necessary.

However, advances in processing power and broadband internet connectivity have led to the development of telemedicine platforms that have made patients' experiences much richer. Instead of conferring with a doctor over the phone or transmitting photographs over a dial-up internet connection, patients can interact with their doctors in real time. This gives the patient a more natural experience akin to face-to-face interaction. These synchronous video communication platforms have become how many conceptualize telemedicine.

Structural Impediments to Wider Adoption

While telemedicine has evolved from its humble beginnings to a much richer experience for patients and health care providers alike, there are some barriers to more widespread adoption. Some studies have highlighted difficulties surrounding access to telemedicine services, which can slow its adoption by patients and hamper its potentially beneficial effect on public health. An evaluation by the Center for Medicare and Medicaid Studies (CMS) found that 30

percent of older adults did not have regular access to a computer, thus precluding them from taking the fullest advantage of the telemedicine services offered by health care providers.

An estimate of telemedicine preparedness among older adults in the United States found that 13 million people may have difficulty taking full advantage of telemedicine services (Lam et al. 2020). The elderly (adults older than 85), older adults without a high school diploma, and older adults in the lowest income quintile were disproportionately ill-equipped to take advantage of telemedicine offerings. These barriers to access were owed to either inexperience with technology or disabilities that make communication difficult. Another study examining Medicare beneficiaries estimated that 41 percent did not own a computer or laptop with a broadband connection, and an additional 41 percent did not own a smartphone with a data plan (Roberts and Mehrota 2020). While these two studies focused on older Americans, they illustrate some of the structural impediments to wider adoption of telemedicine.

In addition to the geographic and socioeconomic barriers to telemedicine adoption, there are also regulatory barriers. Until recently, Medicare offered reimbursement for telemedicine services in limited circumstances, such as for patients in designated rural areas.[1] However, the CMS expanded access for Medicare beneficiaries in March 2020 by providing waivers for health care providers and reimbursing providers for telemedicine visits at the same rate as in-person visits.[2] This waiver will be in effect until the end of the public health emergency.[3] As such, it remains to be seen whether this barrier to receiving care through telemedicine has been permanently lowered.

Finally, not all types of care are well-suited for telemedicine. Telemedicine is well-suited to handle consultations, for example. Telemedicine is also well-positioned to enable doctors to remotely monitor patients via devices that transmit data through the internet, like blood pressure monitors or glucose monitors. But diagnostic tests that require specialized equipment like radiological scans cannot be performed using a telemedicine platform, nor can procedures like outpatient surgeries. While telemedicine can be a useful way to determine whether an in-person visit is necessary, it cannot act as a substitute for all types of in-person care.

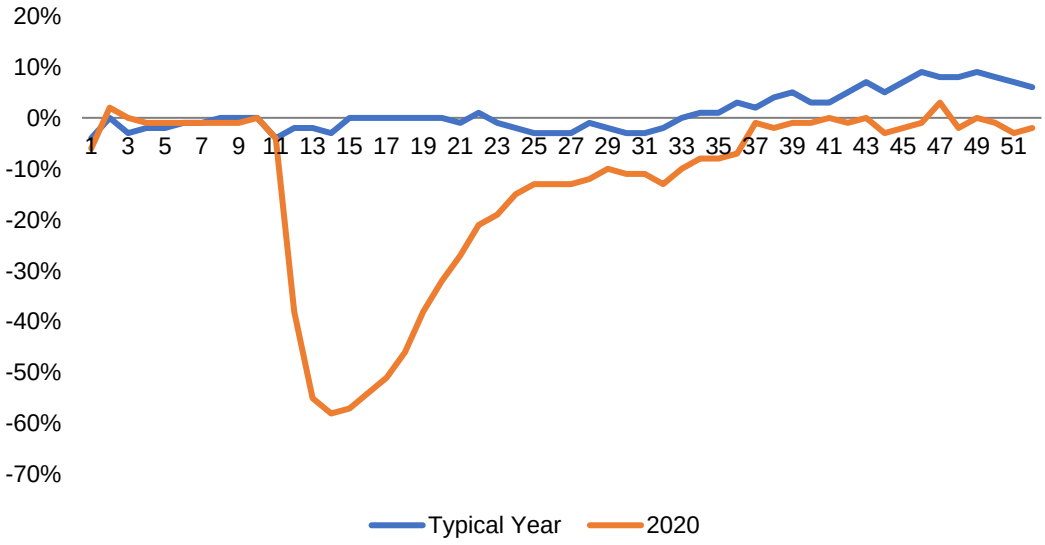
Some of the barriers telemedicine faces to wider adoption are not insurmountable, however. Broadband internet penetration continues to increase, as do smartphones with data plans. Additional policy proscriptions, such as using Medicare funds to subsidize or pay for telecommunications equipment that can only be used for telemedicine visits could also reduce barriers to telemedicine. Furthermore, while older patients may struggle with the technological savvy to navigate telemedicine platforms, younger patients are less likely to have such qualms. Additionally, given sufficient motivation, policymakers and insurance companies could make permanent the provisions that temporarily dismantled the regulatory barriers to wider telemedicine adoption.

Telemedicine in the Time of COVID-19

The COVID-19 pandemic has played a significant role in advancing telemedicine. Indeed, many patients have put off or avoided in-person health care as a result of the pandemic. In particular, many states in the United States imposed lockdowns in early April, resulting in the closure of restaurants, schools, and businesses, as well as the postponement of all non-essential medical care. Indeed, elective procedures have been halted several times in many states in an effort to ease the strain put on hospitals amid spikes in COVID-19 caseloads.[4]

However, the pandemic also created a situation in which patients who needed medical care put off visiting hospitals and doctors' offices for fear of contracting COVID-19. As a result, hospitals saw fewer patients enter their doors seeking care. A cross-sectional analysis found that across five states, visits to emergency departments fell between 42 percent and 64 percent at the onset of the pandemic, and another analysis found visits to ambulatory care providers were nearly 60 percent lower in April 2020 than pre-pandemic levels, as shown in Figure 1 (Jeffrey et al. 2020 and Mehrota et al. 2021). Another analysis found that hospitals evaluated 39 percent fewer patients for acute ischemic strokes in late March 2020 compared with late February 2020 (Sofat 2020). This comes as little surprise, as patients have commonly struggled with differentiating high-value necessary care from low-value elective care (Brook et al. 1984 and Fronstin et al. 2020).

Figure 1
Visits to Ambulatory Providers, Relative to Pre-Pandemic Levels, by Week Number

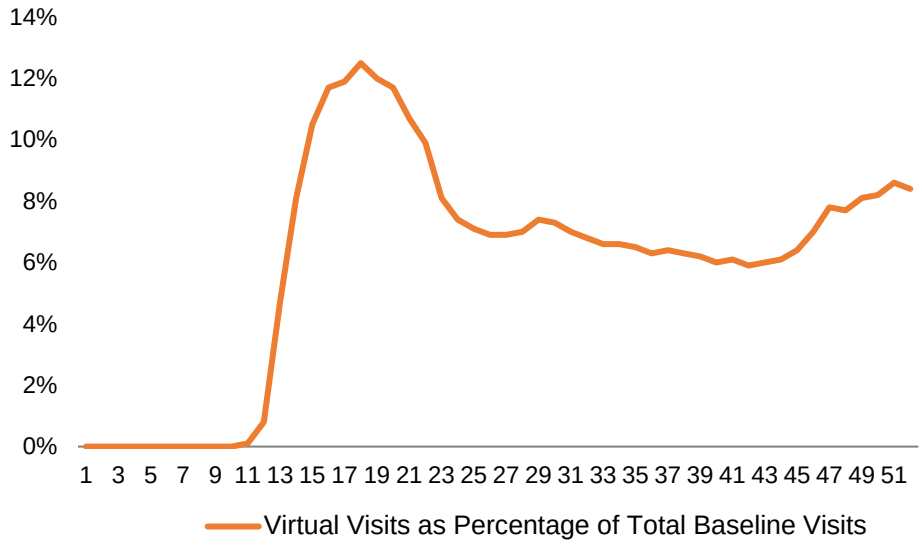


Source: Ateev Mehrotra et al., The Impact of COVID-19 on Outpatient Visits in 2020: Visits Remained Stable, Despite a Late Surge in Cases (Commonwealth Fund, Feb. 2021). https://doi.org/10.26099/bvhf-e411

While care sought at hospitals rebounded after stay-at-home orders were lifted, researchers have documented a "deficit" of health care visits relative to pre-pandemic levels. Outpatient visits have recovered from their lows in March but were still 8 percentage points lower than outpatient visits during a typical year (Mehrota et al. 2021). Many visits for types of specialty care, as of December 2020, are still lower than their pre-pandemic levels, such as pulmonology visits (down 11 percent), behavioral health visits (down 10 percent), and cardiology visits (down 6 percent). Thus, at least some care has not been addressed during the pandemic.

While some patients delayed seeking care (or did not seek care at all), others did end up seeking care from health care providers via telemedicine. One recent study found that telemedicine visits increased 23-fold relative to pre-pandemic times (Patel et al. 2021). The study, which examined a database of commercially insured patients and Medicare Advantage enrollees, found that telemedicine accounted for over 30 percent of all visits during the early stages of the pandemic and demonstrates that telemedicine substituted for at least some portion of in-person care. Additionally, the shift to telemedicine has persisted beyond the initial lockdown orders. As of December 2020, telemedicine visits were more than 8 percent higher than pre-pandemic levels, as shown in Figure 2, although some of this can be attributed to the fact that some doctors have not yet reopened their practices and are only seeing patients remotely (Mehrota et al. 2021).

Figure 2
Telemedicine Visits During Pandemic Relative to Pre-Pandemic, by Week



The rise in visits was aided in part by efforts to lower regulatory barriers to telemedicine. On March 17 2020, shortly before states begin issuing lockdown requests, the White House announced an effort to expand access to telehealth in the face of the COVID-19 pandemic. The CMS announced a waiver that expanded the conditions under which Medicare would reimburse health care providers for care delivered via telemedicine. The waiver aimed to foster adoption of telemedicine and enabled more patients to safely receive care while simultaneously helping to reduce the spread of COVID-19.

Telemedicine visits were also incentivized by insurance providers at the outset of the pandemic. Aetna, a health insurance firm, instituted a policy to reimburse all health care providers for care delivered via telemedicine at the same rates as care delivered in person.[5] Anthem similarly waived cost sharing for telemedicine visits during the first 90 days of the pandemic, as did many members of the Blue Cross Blue Shield Association. Furthermore, in a bid to encourage patients to seek care via telemedicine, the Coronavirus Aid, Relief, and Economic Security (CARES) Act contained provisions that allowed high-deductible plans to cover expenses prior to the patient meeting their plan's deductible.[6]

But Does It Work?

For all the promise of telemedicine, there have been precious few rigorous evaluations of patients' experiences and outcomes. Several studies have examined the effectiveness of telemedicine in helping patients to manage chronic asthma and allergies. In this paper, we focus on evaluations of patient outcomes of synchronous videoconferencing telemedicine platforms. Using Google Scholar, we identified seven accessible papers that fit this criterion.

Arkansas' system highlights telemedicine's potential to improve health outcomes. One systematic review examined patient outcomes across several different telemedicine platforms and medical specialties (Lowery et al. 2014). Started in 2003 with the goal of improving the state's poor track record on maternal health outcomes, the system grew over the years to serve other populations and focus on other medical areas, such as colposcopies, cardiology, mental health, pediatric asthma, and HIV/AIDS. The telemedicine system contributed to a reduction seen in the state's 60-day infant mortality rates and has helped adolescent asthmatics better manage their symptoms.

Indeed, telemedicine can be as effective as in-person visits, at least for certain types of care. A study examining outcomes for diabetes patients using telemedicine platforms found evidence to suggest that telemedicine had a positive impact on patients' abilities to self-manage their HbA1c levels (Borries et al. 2019). An evaluation of a telemedicine platform in Taiwan that examined outcomes for patients with cardiovascular disease found that those who received

care through a telemedicine program were less likely to be admitted to the emergency department (Ho et al. 2014). Similarly, evaluations of telemedicine consultations for children in rural emergency departments and acute care settings found evidence for improved mortality rates and higher quality of care (Dharmar et al. 2013 and Nadar et al. 2018). While more study of different medical specialties is needed, these studies provide some encouraging evidence that telemedicine can improve patient outcomes.

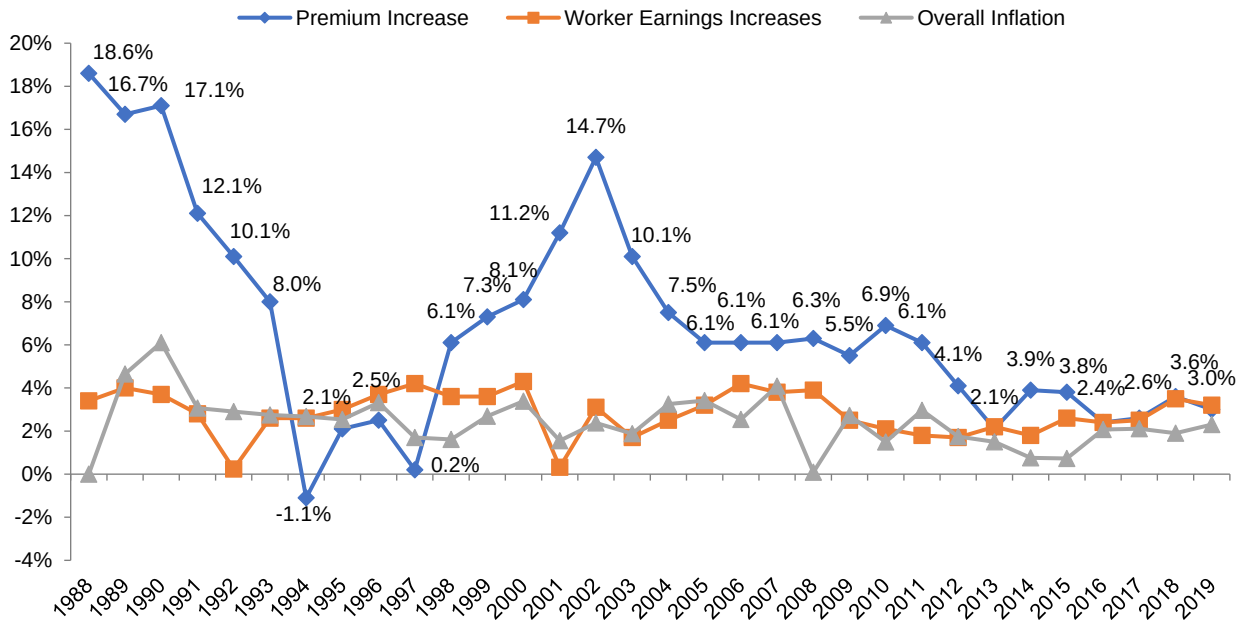
Another study examining rural asthma patients found that telemedicine visits were not inferior compared with in-person visits in helping patients manage their asthma (Portnoy et al. 2016). Furthermore, patients in the study who received care via telemedicine were asked to rate their experiences. Most patients agreed that the telemedicine platform was easy to use, appreciated the ability to interact with and ask questions of their doctors, and responded that the telemedicine appointments were as good as in-person visits. Another study found this when examining satisfaction for allergy patients using a telemedicine platform (Weibel 2016).

The effectiveness of a telemedicine platform relative to in-person visits is important, but so too is patient satisfaction. An effective system is unlikely to be well-utilized if its end users are frustrated by the experience, after all. A systematic review of patient experiences with telemedicine indicates that patients tended to be satisfied with the care they received through telemedicine (Kruse et al. 2017). Of the 44 studies examined, a plurality found that patients preferred using telemedicine over in-person visits, believed telemedicine offered an improved communication experience, or found telemedicine platforms easy to use.[7] It should be noted that these studies were conducted pre-pandemic, and so patients' perceptions of satisfaction were not affected by the fact that telemedicine was the *only* way they could receive care. Still, positive patient experiences can go a long way toward cementing future telemedicine habits.

And What Do Employers Think?

Employers can play a pivotal role in fostering even wider adoption of telemedicine. They are uniquely well-positioned to promote telemedicine usage, since they can incentivize their employees to use telemedicine services. They can, for instance, make telemedicine visits free (or alternatively, employers can institute disincentives for visiting urgent care or emergency departments by making those visits more expensive). Furthermore, since health care cost increases have outpaced general inflation for decades, as shown below in Figure 3, employers are constantly seeking to innovate and find ways to blunt those cost increases (Spiegel and Fronstin 2020). It stands to reason that telemedicine — if it proves to be an effective cost-saving tool — could play a role in helping employers who are seeking to manage health care costs.

Figure 3
Premium Increases Among Employers With 10 or More Employees, Worker Earnings, and Inflation, 1988–2019



Source: Mercer, *National Survey of Employer-Sponsored Health Plans*, and Bureau of Labor

A series of interviews conducted by EBRI with health benefits executives shed some light on corporate attitudes toward telemedicine. In general, the health benefits executives interviewed expressed positive opinions of telemedicine and expressed optimism about the role it might play in a post-pandemic world (Spiegel and Fronstin 2020). Several interviewees noticed large upticks in usage since the pandemic started, with one interviewee lamenting that their firm's telemedicine offering had been, up until the onset of the pandemic, an underutilized resource. Additionally, some interviewees were enticed by the possibility of realizing significant cost savings from their workers shifting care from in-person urgent care and emergency departments to virtual telemedicine visits. One interviewee estimated that an employee seeking care via telemedicine would save their company between $120 and $800 per visit, depending on whether the telemedicine visit acted as a substitute for an office visit or an emergency department visit, potentially saving their company nearly $1 million annually. Several interviewees also highlighted the benefits of delivering mental health care via telemedicine as well as consultations steering their workers away from unnecessary care.

Still, there is reason to temper expectations. Telemedicine visits were incentivized during the COVID-19 pandemic by some employers. For example, several employers interviewed in EBRI's study indicated that they had either reduced or eliminated cost sharing for their employees who were seeking care via telemedicine. Employers might not continue these policies indefinitely, which could affect how their workers seek care in the future. Furthermore, several benefits executives shared a perception that the market structure for telemedicine services could shift in the near future. In particular, they noted that third-party telemedicine consultations are significantly cheaper than in-person consultations and telemedicine consultations through their own doctor's telemedicine platform, a discrepancy that they thought would be unsustainable in the longer term. Indeed, more patients seeking care via telemedicine could push costs higher, which could, in turn, reduce utilization in the future.

Several benefits executives also wondered whether telemedicine could truly save money. For example, they questioned whether patients were seeking care for an issue via telemedicine that they might not have sought care for in person. This would imply telemedicine visits are additive and expand demand for health care services rather than acting as substitutes for in-person care. If telemedicine visits indeed represent additional demand for health care services, then

wider telemedicine adoption may actually *increase* costs for employers. An early study on the issue found that only 12 percent of telemedicine visits were direct substitutes for in-person care (Ashwood 2017). However, this may not be representative of the care sought during the pandemic and may not be representative of future care if the pandemic has actually changed patients' telemedicine habits.

As a result, employers in EBRI's study tended to be cautiously optimistic about telemedicine's future, even as they kept expectations about usage in a post-pandemic world in check. While telemedicine might be an appealing replacement for in-person health care when patients are seeking to minimize contact with the outside world, it remains to be seen whether the habits workers formed during the pandemic will carry over after it subsides. Also, employers will no doubt keep a close eye on whether telemedicine visits actually decrease the health care costs incurred by their workers, and will act accordingly to promote or eliminate telemedicine from the suite of tools they use to manage health care costs.

Conclusion

Telemedicine has evolved from utilizing rudimentary analog technology to a rich synchronous videoconferencing platform. No longer limited by technology to radiological images transmitted over telephone wires, patients can more naturally interact with their doctor in real time using videoconferencing platforms. Boosted by concerns about the risk of infection, telemedicine visits dramatically increased since March 2020, offsetting some of the large decline in in-person health care visits.

Still, there remain some structural barriers that will affect the further development of telemedicine. Though internet penetration rates have increased, and more people are toting smartphones with data plans, older and poorer people may not be able to access the synchronous telemedicine platforms that many have become familiar with during the pandemic. Also, regulatory barriers that had limited reimbursement for health care providers to designated rural zones have been lowered, and many private insurers similarly made it easier for patients to seek care via telemedicine, but it is unclear whether these policies will persist in a post-pandemic world. Should these regulatory barriers be reinstituted, patients may be nudged back toward in-person visits.

Though hardly numerous, there are evaluations that demonstrate telemedicine can be a viable replacement for in-person visits, at least for certain types of care. Moreover, patients tended to respond positively to the telemedicine experience, highlighting its ease of use. Additionally, some patients also responded positively to decreased waiting times as well as eliminating the need to travel.

Finally, employer buy-in may be critical for more widespread adoption of telemedicine. Employers can implement incentives for their workers to seek out care via telemedicine, or disincentives to nudge them away from high-cost in-person care. Previous work has shown that copayments and coinsurance can be tools that affect the types of care that patients seek, and employers may wish to implement these strategies for telemedicine as well (Fronstin and Roebuck 2020).

But two important and intertwined questions remain unanswered and await further research. To what extent has telemedicine impacted the health of patients who pivoted to using it during the pandemic? There exist some data on telemedicine usage during the COVID-19 pandemic, but at the time of this writing, there have been no evaluations on patient outcomes. And to what extent will patients continue to use telemedicine in a post-pandemic world? On one hand, there exists evidence that patients tended to be satisfied with their telemedicine experiences, and their health outcomes are generally comparable to in-person visits. However, patients may prefer a return to in-person visits after the conclusion of the pandemic. And it remains to be seen whether the regulatory barriers that were temporarily torn down on account of the pandemic will be erected again in a post-pandemic world. In the course of conducting this review, EBRI has worked to build a telemedicine claims database that will enable an empirical analysis of the impact telemedicine had on patients during the pandemic, and we anticipate further contributing to this important literature.

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Endnotes

[1] See https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet

[2] *Ibid*

[3] National emergencies can be declared using the National Emergencies Act of 1976 and/or the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988. Both acts were used to declare a national emergency on March 13, 2020. As of this writing, the end date of the national emergency has not been announced.

[4] See https://www.washingtonpost.com/politics/surge-in-virus-hospitalizations-strains-hospitals-in-several-states/2020/07/08/12855e5e-c135-11ea-864a-0dd31b9d6917_story.html

[5] See https://www.ahip.org/health-insurance-providers-respond-to-coronavirus-covid-19/

[6] See https://www.irs.gov/newsroom/irs-outlines-changes-to-health-care-spending-available-under-cares-act

[7] It should be noted that this review also found that the plurality of studies (though not all) found evidence of improved outcomes as well.

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