Telemedicine: The Future of Office Visits

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Telemedicine is touted as an accessible, affordable, efficient, and convenient health care solution. Makhni and colleagues[1] describe telemedicine as a technology-driven health care solution that combines elements of affordability, accessibility, and convenience to connect remotely located patients with qualified physicians. Telemedicine falls into 3 broad models: synchronous, asynchronous, and remote patient monitoring. The synchronous model facilitates real-time communication between patients and physicians within the stipulations of the Health Insurance Portability and Accountability Act of 1996 (HIPAA), whereas the asynchronous model allows physicians to capture and share patient information with physician peers.[2] The remote patient monitoring model allows physicians to monitor patients using modern equipment and tools.[3] Each of these models suits specific patient needs.

While telemedicine gained traction in the 1950s, there has been rudimentary remote delivery of health care services dating back to the 19th century. The 19th century telemedicine used radios, telegraphs, and telephones, while the 20th century used televisions, telephones, and robotics.[4] Today, advanced communication and monitoring devices, such as smartphones and computers, have transformed telemedicine services.[5] Contemporary telemedicine services are focused on giving remotely located patients and older adults access to health care services without leaving the comfort of their homes.

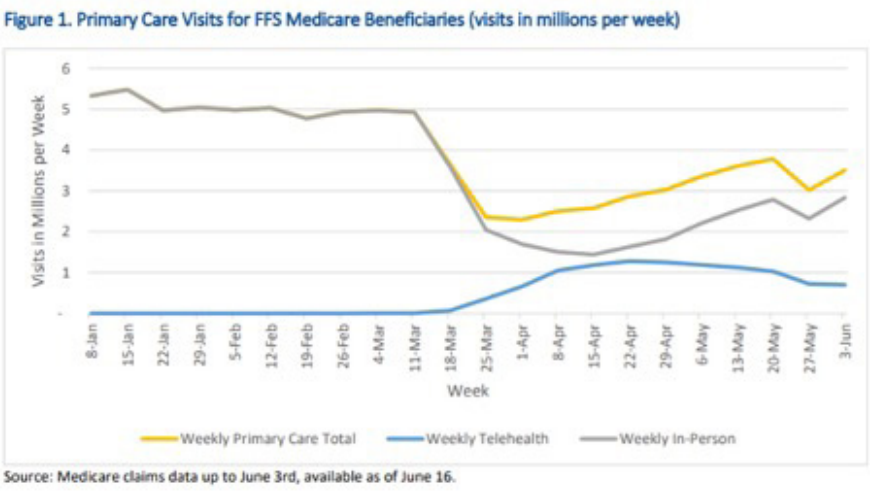

Figure 1. Primary care visits for fee-for-service Medicare beneficiaries (visits in millions per week).

2.0 Current Telemedicine Trends in the United States

Telemedicine is a popular health care solution in the United States. According to Hyder and Razzak,[6] telemedicine is an integral part of the US health care system, while North America holds the world's largest telemedicine market in the world. A recent study carried out by Statista[7] shows that the American telemedicine market alone will reach about $35 billion by 2025, at a time when the global market is projected reach about $175 billion. The study shows that a combination of supporting factors such as expensive traditional health care services, growing funding for telemedicine, a large tech-

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savvy population, the evolution of mobile health services, affordable computing devices, reliable telecommunications infrastructure, and an aging population have contributed to the growing popularity of telemedicine in the United States.[7] The ongoing COVID-19 pandemic has also tremendously increased the demand for telemedicine in the United States.[6] With the pandemic making more patients apprehensive of making unnecessary hospital visits, it is likely that telemedicine will continue to gain traction across the United States. As shown in **Figure 1**, the number of telemedicine visits has been increasing, and routine visits have decreased. **Figure 2** shows that the number of Americans using telemedicine has increased by 21% during the pandemic period compared with those who plan or do not plan to use the service.[8] It appears that more Americans are using telemedicine now than ever before.

Moreover, many American patients prefer to communicate with their physicians via smartphones and computers. A recent study carried out by Kane and Gillis[9] found that up to 76% of all American hospitals use some form of telemedicine to connect with their patients. The American Hospital Association (AHA) supports this finding by showing that telemedicine acceptance among American hospitals grew from 35% in 2010 to about 76% in 2017, as shown in **Figure 3**.[10] Kane and Gillis[9] also established that radiology practitioners top the list of telemedicine users at 39.5%, followed by psychiatry practitioners at 27.8%, and cardiology practitioners trailing closely behind at 24.1%. Further, the authors found that 38.8% of specialists from emergency medicine, 30.4% from pathology, and 25.5% from radiology departments use telemedicine to communicate with one another.[9] These statistics imply that there is a high uptake of telemedicine in the United States.

Telemedicine has been shown to enhance patient satisfaction. According to Gupta,[8] more than 50% of American health care facilities using telemedicine indicated that the service has improved the quality of health care services provided to patients. The data also show that more than 90% of the remaining health care facilities that do not offer telemedicine are planning to do so soon, while more than 55% of patients indicate that telemedicine has improved their health-seeking behaviors. Finally, Gupta cites a recent McKinsey study showing that the number of Americans planning to use telemedicine increased from 11% in 2019 to 76% in 2020.[8] Overall, these statistics imply that telemedicine is not only useful in connecting physicians and patients in the United States but also a crucial networking tool between physicians themselves, as well as with other stakeholders, such as caregivers, insurers, and regulators. Considering the World Health Organization's emphasis on the importance of multidisciplinary approaches toward holistic health care services, it is arguable that telemedicine has made it easier for physicians to collaborate on research and patient treatment.[5] Such collaboration enhances health care services delivered to Americans.

Telemedicine is versatile, as it can also be used outside hospital settings. For example, the National Aeronautics and Space Association (NASA) used telemedicine to monitor astronauts' medical wellbeing while inflight.[6] Hyder and Razzak[6] argue that NASA was the pioneering entity to embrace telemedicine in the 1960s, with the launch of dedicated medical monitors to study the effects of the environment on astronauts' bodies in space. The designated medical monitors kept a round-the-clock watch over astronauts during their missions.[6] With such monitoring offering real-time advice and evaluating varying medical conditions, it is arguable that NASA—as well as other nonhospital entities such as the military, police, and firefighting departments—continue to use telemedicine throughout the United States. In their study, for instance, Hwang and colleagues[11] posit that the US military forces use telemedicine to monitor and offer consultation services for dermatology-related cases among its troops stationed overseas. The study shows that up to 98% of teledermatology consultation requests were responded to within 24 hours, while 23% were responded to within one hour. Arguably, this swift response implies that, like NASA, the US military forces prioritize telemedicine.

3.0 Benefits and Limitations of Telemedicine

3.1 Benefits

Easy diagnosis and treatment. Hyder and Razzak[6] attest that telemedicine cuts out unnecessary movement and expenditure by connecting patients directly with physicians through phone calls, video calls, and even text messages. For example,

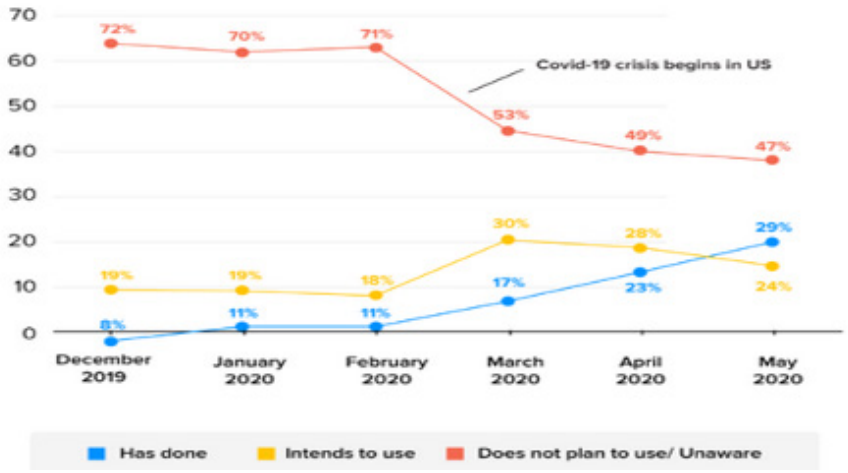

Figure 2. Telemedicine use during the COVID-19 pandemic.[8]

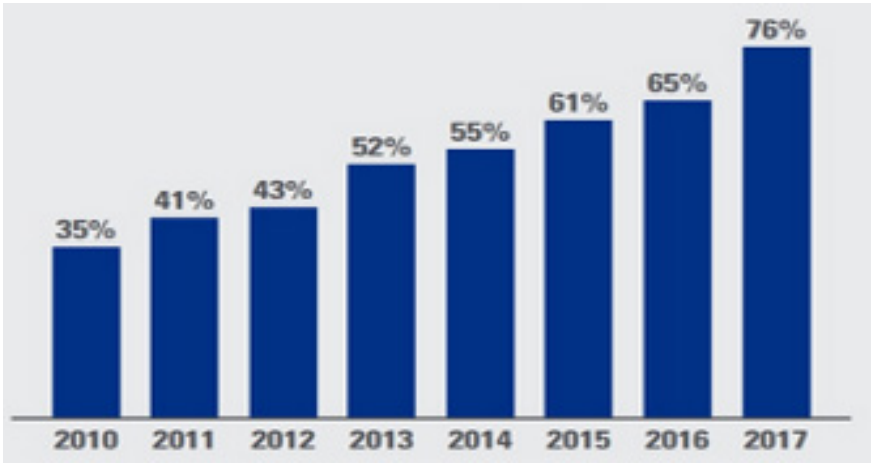

Figure 3. Telemedicine acceptance in American hospitals.[10]

psychiatric specialists can capture videos and images of patients in agitated states and use them to draw out treatment plans. To this end, physicians can easily rely on real-time videos and images of patients during videoconferencing to make an objective diagnosis and implement treatment plans.[12] Some diagnoses can also be performed easily by listening to patients' narration over an encrypted phone call.

The increased use of telemedicine services has allowed health care professionals in the United States to assess, diagnose, and treat clients at a distance by using telecommunications technology.[13] The strategy has gone through an extensive evolution over the last 2 years and is becoming an increasingly significant portion of the American health care infrastructure.[14] Telemedicine has succeeded in the United States because of its application of electronic communications and other software to offer citizens clinical services without an in-person visit. The technology has repeatedly been used for follow-up visits, medication management, chronic conditions management, and specialist consultation alongside other clinical services deemed possible for provision remotely through secure audio and video connections.[13] The use of telemedicine services offers privacy and less time away from one's work; telemedicine does not entail travel expenses, and it prevents exposure to other patients who may be potentially contagious. This clearly shows that it is an approach that is easy to use and makes conditions easy to diagnose and treat.

Ease of setup. It is straightforward to set up telemedicine equipment in hospitals and homes. Hyder and Razzak[6] report that the University of Rochester has a simple telepsychiatry unit that is accessible between 8:30AM and 5:00PM, where nurses use iPads to communicate with patients. The recorded communication, including patients' video and still images, is then sent to specialists for further follow-up.[1] Patients are required to have video cameras only on their smartphones or computers. Besides, setting up telemedicine software on patients' computers and smartphones is easy.

Usually, telemedicine is one of the most straightforward technological approaches in medicine for setup and use. The users need to have a secure web connection, a video platform, and technology support for the patients. When using this technology, the patient has their own secure virtual waiting room can and identify their peripheral devices, if applicable, to assist them during the visit.[14] With the increasing use of mobile phone technologies, 96% of adults own cell phones, of which 81% are smartphones.[3] There is a significant advancement in applying these devices in everyday life. The prevalence of such conditions creates multiple platforms upon which telemedicine has been used in the United States over the last 2 years.

In these times, when nothing seems certain, an advancement of telehealth laws countrywide could result in some certainty to many Americans.[15] Given that decision makers stand more aware of telemedicine's gains and are indulging in past un-had conversations on these gains, it remains hopeful telehealth parity is likely to become law countrywide. However, it is uncertain how long the Centers for Medicare & Medicaid Services (CMS) will uphold the changed payment policies that reimburse telehealth visits.[15] The restrictions loosened on HIPAA could also be reformed after the end of the pandemic, which does not give apparent certainty of the doctors' continuous communication to their patients' various devices of their choice.

Affordability and access. Telemedicine allows easy access to specialist physicians and treatment solutions that would otherwise be only accessible in established health care facilities.[16] Accessibility is more meaningful among older patients and their peers located in rural areas who have low access to specialized medical services. De Souza and colleagues[17] argue that virtual health care services save travel time, hospital bureaucracy, inefficiency, and costs by allowing remotely located patients to access specialist physicians in the comfort of their homes. Overall, these cost reductions are beneficial to patients, taxpayers, and insurers.

3.2 Limitations

Limited coverage. The AHA[10] contends that while telemedicine surpasses geographical limitations, there is a significant limitation because many existing statutes restrict telemedicine to rural areas. Also, physicians are restricted to communicating with patients only when in formal settings such as hospitals, clinics, and offices. The AHA fact sheet shows that existing statutes under HIPAA

only cover a limited number of health care services. Further limitations emerge from the reliance on 2-way, real-time communication between physicians and patients.[18] Considering that most rural areas have limited broadband coverage, it is arguable that telemedicine is still limited in the United States.[19]

Patient information privacy. There are concerns that some telemedicine communication mediums are not secure and may pose privacy and security risks to patients' sensitive information.[4] While most telemedicine communication is conducted within HIPAA-compliant mediums and software, growing cybersecurity attacks pose significant risks to sensitive patient information.[20] Some mediums have poor information encryption solutions, making them more vulnerable to cyberattacks. Concerns emerge when patient information is stored or shared over unsecure platforms.

4.0 Use of Modern Technology

Technologies such as video and voice calls, smartphones, software, middleware, computers, and the internet have made it easy for medical practitioners to connect with patients securely and easily. Specifically, these technologies allow physicians to share graphical, textual, and video information with patients.[6] In turn, physicians can make a correct diagnosis, devise treatment plans, and undertake necessary follow-ups. As expected, such connection enhances the quality of health care services while increasing health-seeking behaviors among patients.

Computing devices. Hyder and Razzak[6] note that devices such as iPads come in handy when connecting physicians and patients via video, text, and phone call. Smartphones, laptops, and desktops play pivotal roles in facilitating video, call, and textual communication. Further, telemedicine relies heavily on wearables like smart bands and smartwatches that monitor and relay patient vitals, such as blood pressure, pulse rate, and body temperature in real time.[21] Physicians rely on such real-time patient information to make accurate diagnoses and treatment plans.

Software. HIPAA requires telemedicine service providers to use robust software that facilitates secure video, text, and call communication between physicians and patients.[6] For example, video software should allow for 360-degree zooming and tilting to thoroughly examine patients. However, such video communication must meet a high security and privacy threshold.[22] In addition to the dedicated communication solution, software solutions should facilitate virtual triage, clinics, emergency response, and payment just like in a brick-and-mortar hospital setting.[4] Also, mobile-based apps facilitate real-time communication between patients' monitoring devices and physicians' devices. Gupta[8] posits that artificial intelligence has improved communication via automated chatbots through which patients can get an instant personalized diagnosis and treatment plan.

5.0 Telemedicine Use in the COVID-19 Pandemic

5.1 Usefulness

Telemedicine has played a key role in combating the spread of COVID-19. Mann et al[23] and Hollander and Carr[24] contend that many health facilities and physicians have switched to telemedicine to offer nonessential medical appointments without compromising social distancing regulations. For example, a study carried out between March 2 and April 14, 2020, by NYU Langone Health found that in-person hospital visits declined by 80%, while telemedicine visits increased by 683%.[23] Patients preferred to call their physicians for diagnosis, treatment plans, and follow-up. Similarly, telemedicine played a considerable role in following up on quarantined people or those receiving home care.[16] On a good note, this arrangement also increased the number of persons under COVID-19 watch teams across the country without overwhelming health care facilities.[25] Considering that a significant number of American physicians were quarantined during this period, it is arguable that telemedicine played a significant role in managing other diseases while also lowering COVID-19 spread.[26] For example, Galiero and colleagues[27] show that telemedicine increased remote screening and monitoring of patients living with diabetic retinopathy. Such remote screening and monitoring lower the spread of the pandemic while also reducing its impact on medically vulnerable people.

5.2 Reimbursements

Medical insurers have supported telemedicine services through timely reimbursements during the pandemic. The Centers for Disease Control and Prevention shows that insurers have supported health care facilities that offer telemedicine services by making timely reimbursements.[16] Acting in collaboration with a blanket waiver declaration issued by CMS, insurers can now reimburse more health care facilities than were previously covered during the ongoing pandemic.[28] Also, Hyder and Razzak[6] assert that CMS blanket waiver broadened the scope of health care facilities as well as regions and services that are eligible for reimbursement. Chung[29] and Ladika[30] maintain that more than 31 states have already enacted parity laws that compel insurers to reimburse health care facilities that offer telemedicine services. **Figure 4** portrays a graphical illustration of which 31 states allow for reimbursement.[29] As expected, such blanket waivers and timely reimbursements allow states, health care facilities, and patients to embrace telemedicine as a practical way of combating the spread of the pandemic. Although blanket waivers are currently available, with time, specific requirements may be imposed to receive telemedicine compensation.

The Future of Telemedicine

More American health care facilities and

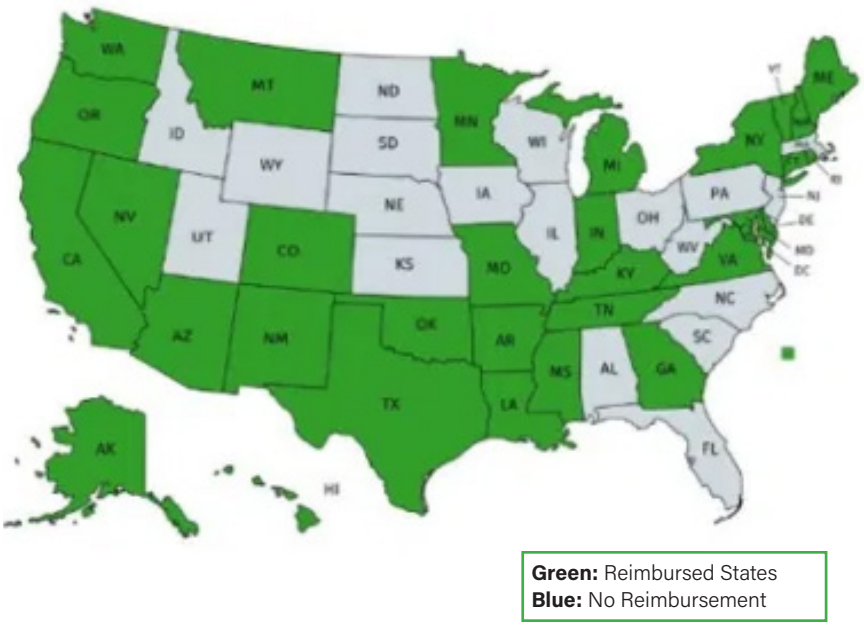

Figure 4. Telemedicine reimbursement policy in the United States.[29]

patients are likely to adopt telemedicine going into the future. As **Figure 1** shows, the number of telemedicine users in the United States grew to reach 29% by May 2020 from a low of 8% in December 2019.[8] Considering that this phenomenal growth occurred within a 6-month period and that there is still much uncertainty surrounding the ongoing pandemic, it is arguable that there will be more uptake in telemedicine services. This argument is supported by the reality that many physicians and patients still prefer to self-isolate and observe the set social distancing protocols to slow the spread of the pandemic.[31,32] It is likely that Americans will embrace any solution that minimizes direct physical contact between physicians and patients that at the same time guarantees continuous access to health care services. Besides, the increased blanket waivers and timely reimbursements will encourage more health care facilities and patients to embrace telemedicine. Finally, Grossman and colleagues[31] and VSee[4] agree that telemedicine uptake will grow significantly, courtesy of the increased access to affordable and robust telemedicine software tools that guarantee secure communication between physicians and patients. As new software breakthroughs and technology advancements lower cybersecurity concerns, more health care facilities and patients will willingly embrace telemedicine.

Conclusion

The many benefits of telemedicine have made it a popular option among Americans. A growing number of American health care facilities and patients have embraced or are planning to embrace telemedicine. Other state corporations including the military, firefighters, and police have embraced telemedicine too. Remotely located patients prefer to consult physicians in the comfort of their homes; remotely delivered health care services enhance patient satisfaction. Satisfaction is achieved through convenience, affordability, and accessibility. While telemedicine is prone to limitations related to cybersecurity concerns and limited coverage, it minimizes physical contact between physicians and patients while at the same time enhancing access to health care services. To this end, Americans will likely continue to embrace telemedicine going into the future. This projected trend will also be enhanced by the ease of reimbursement by insurers as well as technological breakthroughs. Modern technologies—such as video and voice calls, text and instant chatbots, smartphones, software, wearables, middleware, computers, and the internet—make it easy for medical practitioners to connect with patients securely.

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