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Healthcare Economics: Financial Impact and Limitations of Telemedicine

Aneesh Sharma*

Weston, Florida, USA

***Corresponding author:** Aneesh Sharma, Florida, USA.

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Abstract

In 2020, the US government spent over 4 trillion dollars on healthcare, accounting for over 17 percent of the nation's gross domestic product (GDP) [1]. Despite this spending, the United States has the lowest life expectancy of the eleven developed nations in the Organization for Economic Co-operation and Development (OECD), and over 30 million Americans remain uninsured [2,3]. There have been significant efforts by healthcare policymakers and administrators, politicians, and insurance companies to try and reduce national healthcare expenditure. One area that has received significant attention (especially during the COVID-19 pandemic) has been the increase in the utilization of telemedicine in hospitals and medical practices across the US. Telemedicine is the use of remote video conferencing to communicate and distribute medical services, interventions, education, and health administration to patients [4]. Research has found these methods to be cost-effective in several medical settings and specialties. Additionally, telehealth can expand healthcare coverage to rural Americans who are otherwise effectively excluded from regular health services. With the potential to improve costs, efficiency, and access, telemedicine is integral to the future of the US healthcare system. There are, however, important roadblocks and limitations of telemedicine that need to be addressed before a digitalized future of patient-provider interactions can become a reality.

Keywords: Telemedicine; Healthcare; Economics; Healthcare management; Public Health; Healthcare policy

Introduction

Telemedicine seemingly has the ability to transform the United States healthcare system in regard to consumer and provider efficiency and cost-effectiveness (which is especially important given America's rapidly increasing healthcare expenditure). In 2020, the federal government spent an estimated four trillion dollars on healthcare alone - a number that accounted for over 17 percent of the nation's total GDP [1]. Additionally, the United States spends by far the most amount of money per capita on healthcare of any country, an estimated $10,586 in 2018, which is approximately 40 percent more than the next closest country (Switzerland) and nearly double that of other developed countries that have far fewer uninsured citizens (Canada, France, etc) [5]. It is clear that the US spends far too much on healthcare, especially considering the US has the lowest life-expectancy among OECD nations, and has over 30 million uninsured citizens [2,3]. This overspending exemplifies the impact that telemedicine can have on the nation's economy. If implemented correctly, minor improvements in cost and efficiency of the healthcare system, through telemedicine, can have major financial benefits for the US government, taxpayers, and healthcare consumers. For the most part, telemedicine was untested in large scale healthcare settings until the COVID-19 pandemic. Prior to the pandemic, many regulations and restrictions prevented telemedicine from being used in hospitals as often as it should. However, most states lifted those restrictions shortly after the pandemic started. As a result of hospitals needing to reduce face-to-face interactions, telemedicine became a necessity for nearly all

hospital visits, excluding those that absolutely require in-person services (blood tests, imaging studies, emergency & trauma care, and of course, COVID-related visits). For example, the NYU Langone Hospital saw a 683 percent increase in telemedicine visits in just the first month of the pandemic [6].

While it is hard for scholars to determine exactly how successful telemedicine was during this unexpected surge in demand, the NYU Langone Hospital recorded similar levels of satisfaction among telemedicine users during the pandemic than before it [6]. This suggests that extensive use of telemedicine in US healthcare can be sustainable and satisfactory for both the provider and the patient. The case of NYU Langone is even more promising considering the hospital did not have ample time to train their employees, meaning virtual services could be further improved in the future. The COVID-19 pandemic served as a case study for the efficiency and practicality of telemedicine. It sheds light on a future where telemedicine is the preferred form of medical visits that do not require in-person services. The many benefits of telemedicine - concerning efficiency and cost-effectiveness - are soon to be discussed. Like any new technology or medical practice, there are important limitations to discuss as well.

Economic Benefits

Telemedicine has the potential to reduce opportunity costs for healthcare facilities, saving money for patients, medical providers, and the government. Although implementing telemedicine into medical practices can require an ample upfront cost, medical providers have reason to believe it will be a cost saving investment over time [7]. One way that telemedicine can save practices money is by reducing the time that each visit takes. Studies have found that telemedicine visits take 20 percent less time than a standard in-person one [8]. By reducing the time that each visit takes, practitioners can see more patients on a daily basis, resulting in more revenue for the medical practice. As a result, payors may be able to save money by decreasing the reimbursement associated with healthcare services - effectively reducing the cost of healthcare per capita and overall. Another way that telemedicine can cut opportunity costs for healthcare providers is by reducing the number of patients who skip their appointment - knowingly or unknowingly. Patients are far less likely to miss an appointment if they are not required to miss as much time from work, or waste time driving to the health center and sitting in the waiting-room. Online patient-provider communication is far less time consuming than an in-person visit. When a patient misses an appointment, medical providers cannot bill Medicare (although they can bill a patient a small amount). This means that medical providers miss an opportunity to generate revenue for their practice every time a patient misses an appointment. For this reason, methods that can reduce these time and money wasting "no-shows" can be quite valuable.

Since young Americans (35 and under) are the least likely population to have healthcare coverage and are also the most likely group to neglect healthcare appointments and services due to time and cost concerns, telemedicine shows great potential because it appeals to this age group, specifically [9]. This is because young Americans are more likely to be comfortable with digital forms of communication. Another way that healthcare providers can save money through telemedicine is by having a lower overhead cost. In theory, if a majority of primary care visits were done virtually, medical centers would be able to occupy a smaller (less expensive) office space to operate within. Providers would be able to reduce the size of their waiting room, and even decrease the number of exam rooms necessary. Although a medical provider would have to be fully committed to telemedicine before making such sweeping changes, this serves as an example of how healthcare costs can be reduced in a future of digital medicine (through lower overhead expenses: real estate, electrical bills, etc). There are also variable costs (patient care supplies) that can be reduced with telemedicine and fewer in-person patient visits. Additionally, this change may give medical providers the opportunity to save money on personnel costs.

A long-term benefit of telemedicine that could reduce healthcare expenditure is having fewer undiagnosed illnesses. If patients are more enticed to attend medical visits when given a virtual option, it may lead to more Americans getting checked for conditions, such as cancer, diabetes, hypertension, etc. This will help avoid late-diagnoses that, in most cases, cost the government, and patients, far more. For example, diagnosing cancers at an earlier stage would save healthcare costs because the cost of treatment and therapy is far greater for more advanced cancer. If Americans are encouraged to undergo screening - by making medical care cheaper and less time-consuming through telemedicine - the chances of diagnosing illnesses like cancer earlier in its development are exceedingly higher. This is one of the main ways that healthcare costs can diminish over time with the adoption of telemedicine.

Additionally, Telemedicine has the ability to expand healthcare access across the country. Healthcare services are inconvenient (or out of reach entirely) for many Americans living in rural areas, so the ability to conduct healthcare appointments in their homes can reduce travel times and provide extended care in remote areas. It is essential for medical providers or the government to increase equity and access to healthcare services in rural towns by expanding telehealth availability. This would improve the health of individuals living in such areas, and (potentially) reduce future healthcare costs by having fewer illnesses go undiagnosed in these remote areas, as previously discussed. Such changes would "improve monitoring, timeliness, and communications within the healthcare system" by "reducing the burdens that patients encounter" [10]. Additionally, this change would be cost-effective for medical providers by reducing the readmission rate [10]. Readmissions are costly for medical providers because they are forced to spend more time and resources on a patient, but they cannot charge additional fees. Telemedicine can help this issue because a virtual follow-up visit is far less expensive than an in-person readmission. Additionally,

physicians would be able to check in with their patients more often with virtual telehealth visits, allowing them to prevent unnecessary readmissions by evaluating a patient's complaint prior to an (expensive) emergency room visit.

Cost-Effectiveness by Specialty

It is crucial to consider the differences in telemedicine usefulness of various types of care. Studies have found telemedicine to be cost-effective for some types of treatment and healthcare, but not all. One study found that telemedicine delivery of cognitive behavioral therapy for bulimia nervosa was cost-effective when compared to face-to-face treatment, and the quality of care did not suffer [11]. Similarly, a study found that a "tele-intensive care unit program" could be cost-effective in an intensive care unit if it was only used for the "sickest patients in the hospital" [12]. The appropriate setting and application for telemedicine can vary. A study conducted in 2013 found that screening, specifically, could be cost-effective for medical providers to increase chances of "prenatal detection of congenital heart disease" [13]. Furthermore, telemedicine has been found to be cost-effective in delivering pulmonary care (specialty consultations) to rural populations in the United States [14]. Telemedicine can be cost-effective in ways other than patient-provider interaction. A study conducted in 2012 concluded that a "simple text-messaging intervention" that reminded healthcare workers in Kenya to adhere to malaria guidelines was both "effective and inexpensive" [15]. Although most of the research and literature in this field focuses on the large-scale cost-saving implications of telemedicine, there are other less extreme ways that it can reduce healthcare expenditure - as exemplified in the aforementioned study.

On the contrary, one study found that although telemedicine-based collaborative care for depression interventions could be highly effective for reaching rural patients, it was more expensive for medical providers [16]. It should be noted that while telemedicine can reduce healthcare costs in many different medical specialties, there are certain places where in-person care should remain the primary source of patient-provider interaction. As a result, healthcare administrators will have to tread carefully to avoid implementing telemedicine in unfit settings - subsequently reducing the quality or profits of healthcare systems. Telemedicine is far from a comprehensive replacement to in-person healthcare; it should only replace existing patient-provider interactions that are unnecessarily expensive or inefficient, and it obviously cannot replace physical treatments, examinations, or operations (blood pressure checks, physical therapy, cancer radiation treatments, etc). That being said, telemedicine can still save a substantial amount of money for patients, private payors, and the government, if applied appropriately.

Limitations of Telemedicine

Despite the promising future of telemedicine, there are important limitations that must be considered. The biggest issue facing telemedicine is the insufficient internet access across the country. As of 2021, it is estimated that 42 million Americans lack proper access to internet connection in their homes [17]. Transforming the nation's healthcare system to rely exclusively on telemedicine may not be a great idea. This would exclude a large portion of the country, many of which are low-income and minority individuals. This would not be an issue if in-person healthcare services were still provided, but it is important to understand that a healthcare system solely based on digital visits is both unrealistic and potentially dangerous. Efforts to alleviate internet access issues in the United States are being made. President Joe Biden's infrastructure bill includes improvements to the country's broadband internet [18]. Although exact details of the broadband reform have not yet been agreed upon, it is clear that this portion of the bill has bipartisan support and will likely be passed. The disagreement surrounds municipal broadband: government or city provided internet that avoids public sector involvement entirely. This type of internet has two main benefits. Municipal broadband is usually high-speed internet and is given to everyone living in the affected zone. This municipal broadband would, in theory, reduce the likelihood of Americans not having access to internet connection - something that is essential in today's society.

Although both political parties agree that there should be reform to expand access to internet connection, Democrats (more specifically Joe Biden) are in favor of municipal broadband, while Republicans oppose the change as it would put a dent in the corporate profits of internet providers. The outcome of this debate remains to be seen, but its impact on the future of telemedicine is certain. Expanding internet access has countless benefits, including allowing telemedicine to reach far more Americans than ever before. Another drawback to telemedicine is the reluctance that many providers may have in adopting new technology to treat and diagnose their patients. Like those in any other industry, many medical providers have grown accustomed to doing things the way they have always done them. The hesitancy of healthcare providers is well-documented. A survey conducted in 2018 found that 36 percent of medical providers are unenthusiastic about telemedicine because of privacy and data concerns [19]. At the time of this survey, only 14 percent of physicians offered virtual care, and most (approximately 82 percent) had no plans to add it in the next 24 months [19]. This does not mean that medical providers will never begin to accept this new form of care, but there is well-documented hesitancy from some physicians.

Some medical practitioners are concerned that telemedicine would break down the doctor-patient relationship that an in-person visit supports. Losing this personal aspect - according to some physicians - would have a number of consequences. Firstly, it may be harder for doctors to diagnose their patients and properly assess their concerns if they have not developed as close of a relationship. Without a face-to-face visit, the "nonverbal cues that contribute to establishing a patient-provider relationship" may be

lost entirely [20]. Patient compliance could be another issue with telemedicine. Some doctors fear that their patients are less likely to follow treatment or lifestyle suggestions if they are without an in-person conversation. Doctor's recommendations such as taking medications, altering eating and exercise habits, and undergoing certain treatment may go ignored if patients lack an established relationship with their doctor.

Additionally, medical practices may be reluctant to adopt telemedicine because of the initial cost of equipment. Although it is not a major deterrent, the cost of new hardware and software for the medical practices can be a source of hesitancy. Many hospitals have outdated computer systems and would need to invest in new hardware and software before they permanently integrate telemedicine into their practice. However, as previously discussed, the potential cost-saving benefits of telemedicine should change the minds of most medical practices. Another reason for physicians not being overly enthusiastic about a digital age of healthcare is that they are usually not paid the same amount for a digital visit compared to an in-person visit. For most of telemedicine's existence, the government only agreed to cover virtual care in healthcare plans if doctors were paid a reduced amount - leading to many medical practices refusing to offer telehealth care. However, during the COVID-19 pandemic the government was desperate to promote social distancing, so they decided to pay medical providers the same amount for telemedicine visits - ending the compensation discrepancy in telehealth services. These changes - at the time of this writing, at least - remain in effect and are actively encouraging medical practitioners to adopt telemedicine [21].

It is unknown if the government will allow these changes to persist but doing so would be beneficial for the future of telehealth. Although this change in policy may temporarily increase national healthcare spending, it will also serve as a continued test-run for telemedicine - giving healthcare management and policy experts more insight into its cost-effectiveness, patient-provider satisfaction, and overall long-term effectiveness.

Conclusion

Managing the cost of healthcare spending is one of the most urgent economic issues in the United States. Despite spending more than any other country on healthcare, the US still has 30 million uninsured citizens [2]. Countries such as France, Canada, and Germany spend far less on healthcare (overall and per capita) and have a much higher percentage of insured citizens [5]. The US healthcare system is expensive and inefficient - in desperate need of improvement. COVID-19 forced medical practitioners into implementing and experimenting with telemedicine practices without much warning. The pandemic also prompted state governments to lift their restrictions on telemedicine services surrounding Medicare - allowing healthcare providers to be paid equally for in-person and virtual care. Due to the sudden need for digital care, healthcare administrators did not have a great opportunity to refine their hospital's telemedicine use to maximize cost-effectiveness and efficiency. Despite this fact, studies have found that both the patients and providers remained satisfied with their care, suggesting that telemedicine has a promising future in healthcare systems across the country.

Telemedicine will reduce healthcare costs in a number of ways. Firstly, telehealth visits are quicker than in-person ones. In theory, this would allow physicians to treat more patients on a daily basis, thus increasing the revenue for medical providers. As such, these providers would likely be willing to accept lower reimbursements (through Medicare and private insurance) for their services. Although this would reduce revenue for each patient visit, practices could make up for this by increasing their volume. Depending on the extent of this reduction, telemedicine could save a substantial amount of money for payors (government and private insurance). Another way virtual healthcare can save money is by reducing overhead costs. With more patient-provider interactions occurring digitally, medical centers could operate in a smaller office space (by having less exam rooms and a smaller waiting room) to reduce their property expenses. This smaller office would likely come with a lower electric bill, less maintenance fees, and could even have fewer employees. Healthcare providers could save on variable expenses by adopting telemedicine and still treat the same number of patients or more.

Telehealth has the ability to expand healthcare coverage and reach citizens who otherwise would have gone untreated or unscreened. Many Americans in rural areas are either unwilling or unable to seek healthcare because of the significant distance to healthcare providers. As a result, many rural Americans do not get healthcare services as often as they should and can even go without them entirely. Studies have shown that telemedicine is beneficial to rural communities and allows them to seek care that was previously inconvenient or out of reach [16]. However, there are many rural Americans who do not have access to a stable internet connection - rendering telemedicine useless for them unless broadband internet is improved.

Telemedicine can also help to diagnose illnesses sooner, which can prevent expensive late-stage treatment. Patients would be far less likely to miss a medical appointment if they did not have to take extensive time off of work. Additionally, telemedicine allows for more frequent medical check-ups and screening, which would increase the chances of diagnosing an illness in its early stages when it is less expensive to treat. Healthcare providers can also expect their readmission rates to decrease if they adopt telemedicine. Since readmissions are expensive and essentially a waste of time (and money) for physicians, having frequent discussions with patients can help to prevent unnecessary in-person visits. There are numerous ways that telemedicine can be cost-beneficial for patients, providers, and the federal government. However, there are certain specialties that telemedicine should not be forced into.

While research is still being done on telemedicine as a whole, it is clear that some types of care should remain mostly in-person.

The primary limitation of telemedicine is internet access. Although Joe Biden is trying to pass an infrastructure bill (which includes improvements to broadband internet), the senate is currently unable to agree on exact terms. Both political parties are in favor of expanding internet access, but the issue of municipal broadband has stalled progress thus far. Another issue is that some physicians are reluctant to adopt telemedicine as their primary form of patient interaction and communication. Doctors are hesitant to move away from in-person care for a number of reasons. Firstly, many physicians fear that they will lose a personal connection to their patients if the majority of their interaction is done virtually. Some physicians fear that losing this face-to-face relationship will make it difficult to diagnose patients and holistically understand their circumstances. Furthermore, many physicians fear that patient compliance will worsen as a result of virtual communication. In lieu of an in-person conversation, patients may not feel as pressured to follow the advice of their physicians - whether it be diet changes, prescribed medication, or other medical suggestions. Although not as common, some providers express concerns about patient privacy and data in telehealth. While these are all legitimate concerns, the cost-saving potential of telemedicine far outweighs these disadvantages.

Not all medical practices are ready to fully embrace a future of telemedicine, partly due to upfront costs. Depending on the practice or hospital, they may need completely new hardware and software to sustain a system based on telemedicine. This can include new computers and related computer equipment, video chatting software, upgraded internet service, and more. The last limitation of telemedicine to consider is the reimbursement to practitioners. At the time of this writing (post-COVID), the government covers telemedicine in Medicare and Medicaid plans, and pays doctors equal fees for their services whether they are in-person or virtual. If state governments were to reverse these changes, the future of telemedicine could be in jeopardy. To convince the majority of medical providers to offer telemedicine services to their patients, the government would need to pay physicians' similar amounts for both in-person and telemedicine visits. Even if practices were reimbursed slightly less as a result of telemedicine's cost-effectiveness, it is important that payment parity laws persist so that medical practices are not incentivized to avoid the use of telehealth. Telemedicine has a promising future in the healthcare industry - one that costs far too much and provides far too little. While there are certainly some limitations to telemedicine, and cannot be considered a comprehensive solution, there is well-documented evidence suggesting telemedicine can greatly reduce healthcare costs in the United States.

Acknowledgement

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Conflict of Interests

No conflict of interest.

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