

We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,900

Open access books available

185,000

International authors and editors

200M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com



COVID-19 and the Dynamic Role of Telemedicine

Grace Koehler, Saadiq F. El-Amin III and Ashim Gupta

Abstract

The COVID-19 pandemic brought never before seen changes in the use of telemedicine in healthcare. With a contagious and unfamiliar virus spreading worldwide, patients and physicians began to utilize contactless options of communication like telephone calls and video visits out of necessity. Prior to March 2020, telemedicine was in use, but on a markedly smaller and limited scale. As 2020 progressed, the use of telemedicine rapidly expanded, especially in the United States, presenting both positive aspects like safety and convenience as well as negative aspects like loss of patient physical contact/exam and concern for new socioeconomic inequities. The adaptation of greater telehealth use in primary care specifically appears to hold potential for long term sustainability and use with patients experiencing new ways to interact with the healthcare system. Going forward, addressing such challenges as payment models and quantifying patient long term outcomes are important to the viability of telemedicine. The future of telemedicine will certainly cause dynamic changes in healthcare far outlasting the pandemic, both for patient and provider.

Keywords: telehealth, telemedicine, COVID-19, primary care, public health

1. Introduction

The World Health Organization announced on March 11, 2020 that the coronavirus 2019 outbreak was a pandemic, sending healthcare systems across the world into overdrive to respond. Millions of infections were occurring worldwide and many health systems were overwhelmed by the volume and in need of a strategy to prevent further infections while still providing healthcare for the ailing [1].

The initial goals for mitigation of the spread of COVID-19 focused on triage. Steps of this triage were as follows: early identification and diagnosis of the virus, isolating the patient, monitoring contacts and quarantining as appropriate. Telemedicine emerged as the perfect tool for contactless triage and suddenly, everyone from clinical administration, nurses, medical assistants, resident doctors and physicians of all specialties were learning to use and exploit its benefits in an effort to slow the spread of COVID-19.

Overrun hospitals then looked to catalyze the implementation of telemedicine for everything from triage of coronavirus symptoms to off site-physician assessment in understaffed intensive care units and finally to the outpatient clinic setting for general health and specialist visits. Due to the acuity of the pandemic, non COVID related patient visits were threatened with disruption of routine care as in-person visits dropped rapidly. Thus, Telemedicine, which will here on be used

in this chapter interchangeably with telehealth, became a major focus in the outpatient, clinic setting to address this threat.

This text will focus on the history of telehealth prior to COVID-19, and the initial spike in telemedicine at the onset of the pandemic. The strengths and weaknesses of virtual visits will be outlined, and primary care physician specific considerations will be addressed along with financial and ethical concerns. Finally, deductions regarding the future of telemedicine will be considered.

2. Telehealth prior to Covid-19

Telehealth while more recently a “hot topic”, has long been discussed both globally and nationally since at least the 1980s. As early as the year 1996, Medicare was paying for rural telehealth visits, but buy in by both physician and patient was extremely poor. In the United States in 2019, only one percent of rural patients had partaken in telemedicine of any form [2, 3].

At times throughout global health history, the use of telehealth would increase for public health crises response such as during a Public Health Emergency of International Concern (PHEIC) for viruses such as Ebola, Zika and severe acute respiratory syndrome (SARS-CoV) and Middle East Respiratory Syndrome Coronavirus (MERS-CoV) [1]. Despite these signs of promise of telehealth as a helpful tool, global or national public health guidelines including ethical guidelines never solidified. Perhaps, the technological landscape was not quite right. In contrast, data from 2019, one year prior to COVID-19, showed that 89% of the US population had internet access and 77% were online daily [4].

While telemedicine has historically been on the horizon for several decades, its future value was undecided by both policy makers and patients until recently. The US department of Health and Human Services actually cut the budget of the Hospital Preparedness Program in half in 2018 from what it had been back in 2004. At that time, there had been no trial of a telehealth workforce that could respond rapidly to national emergencies such as a pandemic or a natural disaster. Conversely, also in 2018, the US government expanded telehealth services system wide for the Department of Defense and the Department of Veterans Affairs [5]. As late as January 2020, merely 24% of United States healthcare entities had telehealth programs [3] although their use was only a small percentage of visits.

Before discussing telehealth further, it is vital to define the term because since its use in the 1980s, the definition has expanded to include different modalities. The World Medical Association has refined its definition the past two decades several times and in 2020 defined telehealth as real-time audio and visual communication between providers and patients. Additionally, this recognized definition of telehealth also represented photo and data collection, remote patient monitoring capability, and virtual check in. Other organizations such as the World Health Organization defined telemedicine in 2007 more generally as a delivery of healthcare in which distance plays a role [6]. More recently, the Department of Health and Human Services released a broader definition of telehealth as, the use of electronic information and telecommunication technologies to support long distance clinical health care, patient and professional-related health care education, health administration and public health [7].

3. The start of the pandemic and telehealth

Telemedicine has been nothing if not crucial to support the strains put on healthcare since the abrupt onset of the COVID-19 pandemic. As discussed, the

surge in the need for telemedicine appeared to occur overnight and healthcare systems including physicians, clinic and hospital staff, and payment systems had to move rapidly in response. Congress passed The Telehealth Services During Certain Emergency Periods Act of 2020 which allowed for a temporary waiving of previous Medicare restrictions surrounding telehealth [8].

Many general practice offices decided to close their physical spaces temporarily to limit staff exposure [9]. In-person office based visits dropped by over 100 million visits in the second quarter of 2020 when compared to the first quarter of 2020 [10]. Leading up to March 2020, less than 10,000 telehealth visits were submitted to the National Health Institute (NHI) in the United States. By the end of that same month, in the midst of the pandemic, more than 400,000 calls were being submitted to the NHI each week [1].

The initial increase in use of telemedicine very clearly pertained to triaging for COVID-19 infections. This served a dual purpose: to mitigate transmission and also to assist in gate-keeping of increasingly overwhelmed emergency departments. Primary care centers quickly adopted these telehealth visits into their practice as the first line of a COVID-triage framework. Symptomatic patients were given a questionnaire by clinical staff and if appropriate, spoke with a physician via telephone or video service. General practitioners would then assess for severity of illness and whether the patient required monitoring, hospital care, or even intensive care [1].

Telemedicine was soon employed to address non-COVID related concerns that were accumulating and unable to be addressed in-person. Initial vital roles of telehealth included blood pressure and cholesterol checks and most notably for increased psychiatric concerns encountered across the United States population in 2020 [10].

4. Strengths and weaknesses

As the COVID-19 pandemic continues on and more time passes, multiple benefits of increased telemedicine use have emerged. Working adults, caregivers and frequent travelers who previously were lost to follow up or in need of a timely appointment with their primary care physician may more easily be triaged virtually without missing work. Overall, the time and resources patients have to commit to a telemedicine visit is substantially lower than the time it takes for most patients to drive, park and visit their doctor. Even more importantly, telehealth is associated with decreased financial costs to patients [11].

One analysis of patient's response to a telemedicine visit showed a majority of patients reported being satisfied with their televisit. This analysis also concluded that a majority of patients would choose a televisit over an in-person visit in the future and there was no difference in satisfaction between telephone and video groups [11]. Another strong point for telemedicine is it does not exclude a person from in person services. Telehealth calls or videos can easily be converted to in-person visits as deemed necessary by the physician.

Telemedicine has emerged at seemingly the perfect moment in time as cell phones are more ubiquitous. In the United States especially, telehealth video calls support the technologically saturated culture and provide new opportunities to educate via email, phone call, video, or social media.

A new modality of care will always bring with it various problems and the same has been proven with the increased use of telemedicine. Telehealth visits more often than not do not include lab work, blood pressure or other vital checks, and screening tests as frequently as in-person visits. Patients may not feel like enough was done for them at their visit if there is not in-person physician interaction and/or an intervention of some kind.

Another concern is the barriers created for certain socio-economic populations. An extensive review of telehealth visits across the year 2020 showed that older age was independently associated with decreased telemedicine use as well as decreased video use. Non-English speaking patients are also significantly less likely to complete a telemedicine visit. Patients with Medicaid, of black race, of Latino ethnicity, of female sex or with a lower median income were less engaged with video use as well. Interestingly, patients with increased risk of morbidity had higher rates of telemedicine completion rates [12]. These patients however, may be the population most in need of more regular in-person services.

Studies that support the safety and efficacy of managing multiple chronic conditions via telehealth and what amount and frequency of in-person follow up are necessary for good outcomes have yet to be done. This ambiguity leaves room for a large range of physician judgment calls which has the potential for missing an opportunity for intervention on a condition like uncontrolled blood pressure. Primary physicians will also find it difficult to be certain of patient compliance. In-person medication refill follow-up visits are often a way in primary care medicine to make sure the patient is on track and to check vital signs and draw periodic labs. Patients in the future will still need assessment of their vital signs and labs. A potential negative effect of telemedicine on the patient is that they may end up having to set up a telemedicine visit and then after evaluation have to travel to a lab or office for a lab draw. This could negate the efficiency of a telemedicine visit when in person office visits can provide all of those services under one roof.

A concern of telehealth expansion, especially whilst the pandemic continues to affect in-person interaction is the loss of new patient pickup. Currently, the recommend use of telehealth is for established patients only. Telehealth therefore may encroach on the opportunity for providers to have availability to accept new patients. However, for those patients that are established with a primary care provider, virtual visits have shown promise for similar clinical effectiveness with less patient cost [4].

Overall, the benefits of telemedicine to keep healthcare running especially in the midst of a pandemic outweigh difficulties that must be addressed along the way. As medicine continue to accept and explore the capabilities of phone and video visits, telemedicine will become a way to make medicine a more efficient and meaningful experience for physician and patient.

5. Telemedicine and the primary care physician

The most acutely attuned group of providers to the dramatic shifts in virtual care arguably is the primary care physicians. Since March 2020, outpatient primary clinicians, as well as behavioral health care have accommodated the majority of telehealth calls in the country. Understandably, a large proportion of adults initially postponed routine care as many parts of the country went into lockdown in 2020 and primary care clinics temporarily shut down as well. Chronic conditions therefore went unchecked for prolonged periods of time, creating a longer and more uncontrolled list of ailments when patients returned to the care of their doctor [13]. Primary care physicians, also carry a responsibility to educate on the COVID-19 virus itself and promote vaccination with each encounter, including telehealth. This adds another layer of both time and complexity to each visit.

This demand on the primary care physician for change of practice has sparked new utility of telemedicine and continues to create innovative physician-patient experiences. For example, primary care has implemented a wide spectrum of routine telehealth visits now for things such as chronic condition monitoring, medication reconciliations and management, patient counseling, acute visits and

triage. A noticeable gap with telemedicine is that it does not appear to offer much practicality for annual preventative exams [10].

Primary care physicians do have their own concerns as well. While providing further reaching care to the population is advantageous, providers are already expressing concerns about an ever revolving door of new tasks expected of them, a potential extension of office hours cutting into their lifestyle, and diminution of the patient-physician relationship. Specifically, there is concern around an already formidable threat to the working doctor: physician burnout. With an ever changing workflow adapting to new COVID-19 policies, physicians now have to or will have to navigate a schedule with both in-person and telehealth visits and the increased risk of schedules running behind. Another concern voiced from seasoned physicians, is that many nuanced non-verbal cues cannot be picked up by the physician during a telemedicine telephone visit. Even telehealth visits using video do not replace the vital role of the physical examination in the completeness of an assessment of a patient. Providers trained to examine the body are now limited by the resolution of a screen to extract clues around disease process.

However, physicians interviewed did report greater convenience overall for their patients which ultimately, could result in better compliance. Other positives reported included more time for counseling and the capability of evaluating patient home environments via video calls [14].

6. Ethical concerns and financial strains

The American Medical Association makes clear in their Code of Ethics that telemedicine should occur when there is a pre-existing and real patient-physician relationship with the exception being in emergencies and extenuating circumstances [3]. As the initial shock of the pandemic subsides, it is important to assess the quality of the telehealth services being provided to the general population. There is certainly a risk of COVID-19 education, assessment, and prevention overshadowing the pivotal pillar of medicine: preventative health care. Many primary care physicians are now juggling yet another piece of an already complex puzzle comprised of treating chronic conditions, acute conditions, preventative screening, labs, and immunizations.

Privacy is another ethical concern expressed by patients. Many people cannot secure a private place to talk confidentially to their provider without interruption at home. Patients may not trust a telephone or video visit to be as secure as a face-to-face interaction.

Perhaps an even bigger concern for healthcare as a whole is the compensation models surrounding telemedicine. Historically, payment rules have dampened many health care provider's efforts to implement telemedicine as payment for telemedicine visits did not compete with in-person visits. At the onset of the pandemic, in the spring and summer of 2020, temporary changes in payer rules suddenly allowed reimbursement for providers who administered telemedicine visits equal to in-person visit reimbursement [2]. This benefitted both the healthcare system as an overarching structure to ease the case load burden of the emergency department, but additionally, helped keep many outpatient practices in business. Of note, during this time period, many clinics were not able to have in-person visits at all.

Currently in 2021, further away from the initial shock of the pandemic, the fee-for-service model of payment is causing some physicians to back track on the initial shift toward telemedicine. The pressure from health care systems to move back toward more, if not all, in-person visits stems from the uncertainty of digital service reimbursement. There continues to be too much "red-tape" for some health care providers to remain trusting that virtual visits will financially be at parity with in-person visits. Some experts are pushing for a move toward capitation as the ideal payment model for telemedicine.

At this moment in time, payers are struggling with how to reimburse these multiple new digital options. The question of what will be compensated now extends to telephone visits, video visits, digital monitoring, patient portals and lab and imaging result phone calls and more. Services that once were complimentary with many practices like digital monitoring, may now carry a fee that could deter patients used to a free service. Increased digital modalities will then present new coding and billing challenges as well [15] and with that increased administrative costs. Despite these financial concerns, it is clear that long-term clinic cost could be reduced by keeping telemedicine as a viable part of a practice, but efficiency and payment models will need to catch up.

7. The future of telemedicine

As the world shifts to digital communication in every sector and the pandemic continues on, telemedicine appears to be here to stay in a more substantial and meaningful way than prior to the COVID-19 pandemic. Improved internet access and increased access to technologies like smart phones and web cameras should be addressed to ensure widespread adaptation and “buy-in” to telemedicine. Many countries, in fact, do not have the frameworks or the funding in place for public health emergencies much less for telemedicine to thrive long term. To implement telemedicine effectively, there must be adequate access to technology and sufficient technological and business related support. Vital to its success is restructuring the payment model to include systems like capitation. However, a cohort study evaluating Medicare Advantage health maintenance organization (HMO) plan beneficiaries continuously enrolled from the beginning of 2019 through 2020 found that the use of telemedicine increased at a greater rate and overall volume for organizations using value-based payment models versus fee-for-service payment models. This result bolsters the idea that a strong infrastructure may in fact hold more importance for actualization of telemedicine than a stronger reimbursement incentive [16].

Physicians, especially primary physicians and behavioral health care providers need structured guidelines and education on telemedicine technology and its proper use. There is currently a lack of formal training for physicians in telemedicine as well as lack of literature to support this learning [17]. Further, coordination of care amongst primary care office staff to determine the appropriateness of a telehealth visit and the necessity of length of that visit are vital to ensure a physician can incorporate both virtual and in-person visits into the same work day.

Regarding the future of telemedicine and patient experience and compliance, socioeconomic inequities must be addressed. Non-English speaking patients cannot be left behind as telemedicine continues on; translation services are an essential component of a long-lasting telehealth system. Additionally, distinct and innovative user-friendly telehealth for the elderly population and other populations with audio, motor and visual impairments could help connect a large percentage of healthcare consumers to the benefits of telemedicine [12].

8. Conclusion

The COVID-19 pandemic shook up all of healthcare and with it sparked a new surge in telemedicine use. Telehealth implementation has protected thousands of healthcare workers and countless patients from excessive and unnecessary virus exposure. Due to its increased use during the pandemic, telemedicine now has been tested by a large population of patients as a supplement or replacement for normal

in-person visits. Benefits of having telehealth as an additional way to reach patients appears to outweigh the growing pains that its adaptation presents. Primary care physicians, alongside behavior health care providers, are amongst the top torch bearers of telehealth and must commit to advocating for payer systems that make sense to both a health care practice and their patients.

Ultimately, further quantitative research needs to be carried out to assess the effectiveness of telemedicine's use alongside traditional clinic visits versus only in-person clinic visits to ensure similar long term health outcomes. Currently, retrospective studies, qualitative studies, and meta-analysis studies exist, but very few if any randomized controlled trials were found in the literature review. Other areas of study that need further investigation include comparison of compliance, patient satisfaction, patient cost and provider compensation.

Without a doubt, the realized and potential benefits of telemedicine if imagined correctly, will open new opportunities for physicians to reach previously underserved or unserved populations [18]. While the Covid-19 pandemic has limited traditional health care models, necessity has driven health care systems and policy makers toward innovation that could benefit all consumers while simultaneously protecting vulnerable patient populations from unnecessary risk.

Conflict of interest

The author declares no conflict of interest.

Author details

Grace Koehler^{1,2}, Saadiq F. El-Amin III^{3,4,5} and Ashim Gupta^{5,6,7*}

1 Northside Gwinnett Family Medicine Residency, Lawrenceville, GA, USA

2 Faculty of Medicine, University of Queensland, Brisbane, QLD, Australia

3 El-Amin Orthopaedic and Sports Medicine Institute, Lawrenceville, GA, USA

4 Regenerative Sports Medicine, Lawrenceville, GA, USA


5 BioIntegrate, Lawrenceville, GA, USA

6 South Texas Orthopedic Research Institute (STORI Inc), Laredo, TX, USA

7 Future Biologics, Lawrenceville, GA, USA

*Address all correspondence to: ashim6786@gmail.com

IntechOpen

© 2021 The Author(s). Licensee IntechOpen. This chapter is distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. 

References

- [1] Ohannessian R, Duong TA, Odone A. Global telemedicine implementation and integration within health systems to fight the COVID-19 pandemic: A call to action. *JMIR Public Health and Surveillance*. 2020;**6**(2):e18810. DOI: 10.2196/18810
- [2] Werner MD, Glied SA. Covid-induced changes in health care delivery-can they last? *New England Journal of Medicine*. 2021;**385**:868-870. DOI: 10.105/nejmp2110679
- [3] Revisiting KB, Ethical HIT. Legal and social issues and evaluation: Telehealth/telemedicine and covid-19. *International Journal of Medical Informatics*. 2020; **143**:104239. DOI: 10.1016/j.ijmedinf.2020.104239
- [4] Donelan K, Barreto EA, Sossong S, Michael C, Estrada JJ, Cohen AB, et al. Patient and clinician experiences with telehealth for patient follow up care. *The American Journal of Managed Care*. 2019;**25**(1):40-44
- [5] Lurie N, Carr BG. The role of telehealth in the medical response to disasters. *JAMA Internal Medicine*. 2018;**178**(6):745-746. DOI: 10.001/jamainternmed.2018.1314
- [6] Doraiswamy S, Abraham A, Mamtani R, Cheema S. Use of telehealth during the COVID-19 pandemic: Scoping review. *Journal of Medical Internet Research*. 2020;**22**(12):e24087. DOI: 10.2196/24087
- [7] Office for the Advancement of Telehealth [Internet]. 2021. Available from: <https://www.hrsa.gov/rural-health/telehealth> [Accessed: September 2, 2021]
- [8] Coronavirus preparedness and response supplemental appropriations act, 2020, HR 6074. Available from: <https://www.congress.gov>
- bill/116th-congress/house-bill/6074 [Accessed: September 1, 2021]
- [9] Silver SL, Lewis MN, CJW L. A stepwise transition to telemedicine in response to COVID-19. *The Journal of the American Board of Family Medicine*. 2021;**34**(Supplement):S152-S161. DOI: 10.3122/ jabfm.2021.S1.200358
- [10] Cortez C, Mansour O, Qato DM, Stafford RS, Alexander GC. Changes in short-term, long-term, and preventative care delivery in US Office-based and telemedicine visits during the COVID-10 pandemic. *JAMA Health Forum*. 2021;**2**(7):e211529. DOI: 10.1001/jamahealthforum.2021.1529
- [11] Allen AZ, Zhu D, Shin C, Glassman DT, Abraham N, Watts KL. Patient satisfaction with telephone versus video-televisits: A cross sectional survey of an urban, multiethnic population. *Urology*. 2021;**156**:110-116. DOI: 10.1016/j.urology.2021.05.096
- [12] Eberly LA, Kallan MJ, Julien HM, et al. Patient characteristics associated with telemedicine access for primary and specialty ambulatory care during the COVID-19 pandemic. *JAMA NetwOpen*. 202;**3**(12):e2031640. DOI: 10.1001/jamanetworkopen.open.2020.31640
- [13] Patel SY, Mehrotra A, Huskamp HA, Uscher-Pines L, Ganguli I, Barnett ML. Trends in outpatient care and delivery and telemedicine during the COVID-19 pandemic in the US. *JAMA Internal Medicine*. 2021;**181**(3):388-391. DOI: 10.1001/jamainternmed.2020.5928
- [14] Gomez T, Anaya YB, Anaya SKJ, Tarn DM. A qualitative study of primary care physicians' experience with telemedicine during Covid-19. *Journal of American Board of Family Medicine*. 2021;**34**(Suppl):S61-S70. DOI: 10.3122/ jabfm.2021.S1.200517

[15] Alder-Milstein J, Mehrotra A.
Paying for digital health care-problems
with the fee-for-service system.
New England Journal of Medicine.
2021;**385**:871-873. DOI: 10.1056/
nejmp2107879

[16] Powers BW, Drzayich AD, Zhao Y,
et al. Associations between primary
care payment model and telemedicine
use for medicare advantage enrollees
during the COVID-19 pandemic. JAMA
Health Forum. 2021;**2**(7):e211597.
DOI: 10.1001/jamahealthforum.2021.
1597

[17] Garattini L, Badinella Martini M,
Zanetti M. More room for telemedicine
after COVID-19: Lessons for primary
care? Eur J Health Econ Marc. 2021;
22(2):183-186. DOI: 10.1007/s10198-
020-01248-y

[18] Bhaskar S, Nurtazina A, Mittoo S,
Banach M, Wessiart R. Editorial:
Telemedicine during and beyond
COVID-19. Frontier Public Health.
2021;**9**:662617. DOI: 10.3389/
fpubh.2021.662617