NARRATIVE REVIEW

J. Heal Ethics Admin
Volume 10 | Number 3 (Fall 2024)
www.jheaonline.org
ISSN 2474-2309 | doi:10.22461/jhea.9.7170
https://doi.org/10.22461/jhea.9.7170
Published Oct 21, 2024

Narrative Review: Telemedicine Quality after the COVID-19 Public Health Emergency: Time to Reevaluate?

Daniel C. Eisner, DMSc, MHA, PA-C, CPHQ

email.eisner@gmail.com

Abstract:

OBJECTIVE: This narrative review explores concerns and potential solutions for improving the quality of synchronous telemedicine visits for high utilizers like primary care, particularly after the COVID-19 pandemic. METHODS: A literature review identified studies published within the past 10 years focusing on telemedicine quality, primary care, and related aspects like liability, virtual exams, and patient safety. RESULTS: Despite the surge in popularity of telemedicine visits, concerns regarding their quality linger. These concerns encompass various aspects of the patient experience, administrative processes, and potential safety risks. Limitations in physical exam capabilities and the lack of readily available vital signs during telemedicine visits raise concerns about the accuracy of diagnoses. This is particularly true for situations requiring a more comprehensive physical assessment. Incomplete documentation due to abbreviated patient histories, missing physical exam findings, and the reliance on generic templates pose liability risks. This lack of thorough information makes it challenging to accurately capture the patient's condition and raises concerns about the quality of care provided. Patients themselves have expressed concerns about accuracy of a virtual visit, thus raising questions about the effectiveness of telemedicine in building rapport and ensuring clear communication. From an administrative standpoint, fears of misdiagnosis due to the limitations of virtual exams, inconsistencies in insurance coverage for telemedicine services, and unclear reimbursement standards for thorough visits continue to pose challenges. These uncertainties create ambiguity and make it difficult for healthcare providers to fully embrace telemedicine as a viable option. Finally, although mirroring in-person visit protocols for patient safety is considered crucial, many organizations currently lack standardized measures to ensure safety throughout the entire telemedicine journey. This includes potential risks during scheduling, appointment execution, and post-visit follow-up, highlighting the need for more robust safety protocols specifically designed for the telemedicine setting. Addressing these concerns is essential for ensuring the quality and sustainability of telemedicine integration. CONCLUSION: While telemedicine offers significant benefits, improving quality is essential for its sustainable integration into primary care. Standardizing protocols, educating clinicians and patients, implementing comprehensive physical exam procedures, and ensuring patient safety throughout the visit are key areas for improvement. Continuous monitoring and data analysis are crucial for identifying and addressing weaknesses and ensuring quality telemedicine care.

Keywords: *Public Health Emergency (PHE), Telemedicine, Quality, Triage, Virtual Physical Exam, Patient Safety.*

*Address correspondence to: Daniel C. Eisner, DMSc, MHA, PA-C, CPHQ. Email: email.eisner@gmail.com

+To cite this article: Eisner, Daniel C. "*Narrative Review: Telemedicine Quality after the COVID-19 Public Health Emergency: Time to Reevaluate?"*. The Journal of Healthcare Ethics & Administration Vol. 10, no. 3 (Fall 2024): 17-25, https://doi.org/10.22461/jhea.9.7170

INTRODUCTION

Before the COVID-19 pandemic, synchronous telemedicine visits with primary care providers (PCP) and other specialists were on a slow trajectory of growth. A sample of outpatient health insurance claims from enrollees in large employer health plans found 2.4% had used at least one telemedicine service in 2018, up from 0.8% in 2016 (Ramaswamy et. al., 2021). Utilization of the modality by Medicare beneficiaries for primary care was less than 0.1% in February 2020, but within two months of the declaration of the public health emergency (PHE), it increased to 43.5% (Department of Health and Human Services, 2020). The Veterans Administration reported a 1700% increase by March 2020 (Veterans Administration, 2021) and among US adults overall, numbers were as high as 37% mid-pandemic (Lucas & Villarroel, 2022). Current telemedicine use by US adults' hovers just above 20%, down from the mid-PHE levels of 37% but still a significant increase compared to the pre-PHE days (Lucas & Villarroel; Lee et. al., 2023). By 2030, 50% of healthcare services are predicted to be consumed virtually and the market size is projected to have a value of over $140 billion (American Telemedicine Association, 2019; Bettencourt et. al., 2023). Due primarily to the pandemic, telemedicine created a new channel of care for those previously unwilling to use it, especially the underserved (Fischer et. al., 2022). For many, it is now the primary source of interaction with their healthcare provider and, in turn, has become a necessity to most healthcare organizations, resulting in predictions of exponential growth over the next decade.

The expansion of telemedicine capabilities by healthcare organizations occurred rapidly during the PHE and infrastructure improvements were made seemingly overnight to accommodate this "new" adjunct to patient care. US Policymakers responded in kind with the $2.2 trillion Coronavirus Aid, Relief, and Economic Security (CARES) Act, passed on March 27th, 2020, to provide economic aid to all those in the US that had been impacted by the PHE (US Department of Education, 2023; Lee et. al.). Reimbursement parity laws were passed by numerous states after gaps were noted between in-person visit reimbursement and telemedicine visit reimbursement, and Medicare has since extended its own parity reimbursement rules to December, 2024. (National Consortium of Telehealth Resource Centers, 2023; Department of Health and Human Services, 2023). New legislation continues to be introduced: The Creating Opportunities Now for Necessary and Effective Care Technologies for Health Act of 2021 (CONNECT) and the Protecting Rural Telemedicine Access Act are two bills currently in Congress that seek to both create new laws and make the current temporary measures permanent, all for the benefit of telemedicine. (CONNECT Act, 2021; Protecting Rural Telemedicine Access Act, 2021).

Unfortunately, this projected increase in the availability of telemedicine services may not be enough for the number of potential patients, especially the retired and elderly. Over 11,000 people a day age into Medicare and by 2030, when every Baby Boomer will be over age 65, the number of beneficiaries is expected to increase by 60% (Health Leadership Council, 2023). Further, with ongoing technological advances in medicine and healthcare overall, life expectancies are expected to increase significantly over the next 30 years (Swagel, 2023). The clinician environment will change as well. Close to 25% of physicians are currently 65 or older and by 2033, there is an expected physician shortage of 139,000 (Handzel, 2023). A large portion of that shortage will be primary care physicians, one of the highest utilizers of telemedicine. A major reason cited for this is medical students shying away from primary care in favor of specialties due to poor compensation, high student loan debt, administrative burden, and a lack of available primary care residency programs (Handzel; Boyle, 2020). Advanced Practice Providers will be there to shoulder some of the burden, but restrictive state laws will continue to limit patient access to them if not changed soon (Nastasi, 2021).

The fact remains — telemedicine is needed, badly. Understaffed PCP and specialty practices will desperately need alternatives to the traditional office visit in the near future. Most organizations watched telemedicine progress from a cost center to a profit center during the PHE and responded by making these departments permanent fixtures within primary care divisions. This rapid expansion inevitably involved some level of tradeoffs in quality but the question now is, what is the current level of quality for these new, permanent departments (Khoong et. al., 2022)? Have they thoroughly reevaluated protocols hastily created during the evolution of the PHE and incorporated guidelines suggested by numerous professional organizations? Have elements of the patient visit such as triage, vital signs acquisition, and the physical exam been improved upon?

This review will explore literature involving concerns of both clinicians and payors regarding telemedicine visit quality, followed by a few simple solutions that can easily be incorporated into everyday workflow.

METHODS

Approximately 160 abstracts were selected from searches on PubMed, Google Scholar, and Cochrane Database of Systematic Review. In addition, a small percentage of the references are professional organization publications and respected news sources which were used to provide mainly information such as statistics and expert opinion. The level of evidence for journal articles and publications where data was analyzed ranged from level II to level VII. Using a publication date range of January 2014 to January 2024 and Boolean operators for certain phrases, the search criteria included *telemedicine quality AND primary care, telemedicine liability, virtual visit quality, virtual physical exam, telemedicine patient safety, and telemedicine technology.* The abstracts were analyzed for relevance to the topic of quality in telemedicine, primarily in primary care, and those selected are listed in the references.

RESULTS

Concerns for quality in telemedicine among all stakeholders existed before the PHE, especially among clinicians. A pre-PHE survey in 2019 of 1449 physicians from the American College of Physicians, when telemedicine accounted for less than 1% of telemedicine visits, found almost 30% were concerned for potential medical errors (Frieden, 2019; Weiner et. al., 2021). Exam quality for visits that require some form of physical exam (i.e., sick visits, post-operative follow-up, cardiologist follow-up) has been one of these concerns (Houser et. al., 2023). One reason cited is the lack of a full set of vital signs and the inability to auscultate lungs and heart, both being critical to decision making for some visits (Weigel et. al., 2020). This loss of the in-person physical exam can be difficult to comprehend for both patient and clinician — how can one diagnose vertigo or otitis media from a distance (Hyman, 2020)? Although these concerns are well-substantiated, a 2022 systematic review by Yao et. al. of 74 studies involving synchronous telemedicine exams had encouraging results: 89% of telemedicine physical exams were equivalent to in-person physical exams (Yao et. al., 2022). It should be noted that a significant amount of these exams were performed in outpatient offices or non-clinical settings, where patients were supplied with equipment needed (i.e., thermometer, blood pressure machine, otoscope) for a more through exam.

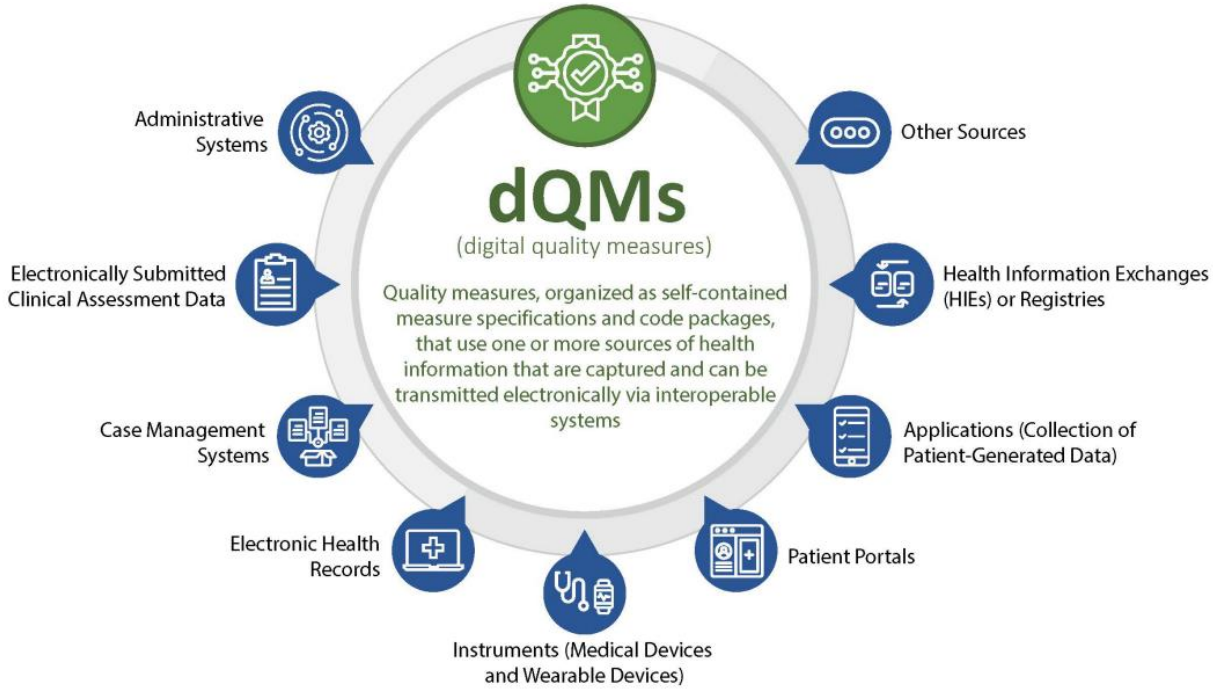
Documentation quality can suffer without the same information gathered during an in-person visit. A lack of vital signs, limited HPI, and little to no physical exam, especially for complaints such as headache, chest pain, shortness of breath, or abdominal pain, can make a telemedicine visit with a clinician appear as nothing more than a glorified triage note. There are only so many pre-written templates an EMR can provide, and cutting/pasting templates designed for in-person visits can create a liability risk (i.e., “regular heart rate and rhythm”) (Hoaglin et. al., 2021). The Centers for Medicare and Medicaid Services (CMS) continues to stress the importance of a relevant HPI, pertinent clinical exam findings, and accurate total time spent on the telemedicine visit, and the Office of Inspector General continues to audit Medicare Part B telemedicine services for these and other requirements (Bell, 2020; Houser et. al.). Patients, too, are concerned about the accuracy of the virtual visit, as well as the ability to communicate their symptoms. Gordon et. al. interviewed patients enrolled in Veteran Affairs Health Care about their experiences with telemedicine and, while satisfied with their previous visits, they also listed concerns such as errors in the exam, clinicians paying less attention, barriers to asking questions, and difficulty in connecting to the clinician on a human level (Gordon et. al., 2020).

With an average cost savings between $147 and $186 per patient, administrators have gradually realized the financial value of telemedicine to the organization, but fears of misdiagnosis and variable coverage by third-party payors due to a lack of standardization in legal statutory clauses linger (Nittari et. al, 2020; Patel et. al, 2023). Further, imposing new rules and guidelines may only create more ambiguity in the requirements for a thorough telemedicine visit. For example, if a full set of vital signs become a requirement for full reimbursement, who will pay for these devices (i.e., thermometer, pulse oximeter, blood pressure monitor, scale), the patient, the third-party payor, or the health system (Weigel et. al.)? Telemedicine has obviously become a mainstay in many organizations, but its rapid increase in popularity has done little to quell the misgivings found among administrators who continue to question if more needs to be done to protect against liability for both clinicians and the organization. A 2023 survey of healthcare professionals and administrators found that respondents continued to express a need for strategies to address data governance, reimbursements, evidence-based guidelines for the use of telemedicine, and patient-centered training for clinicians (Antonacci et. al., 2023).

A massive stakeholder with an ongoing concern for quality in telemedicine is CMS. Medicare Quality Initiatives were launched in 2001 for the purpose of assuring quality health care through accountability and public disclosure and it continues to evolve annually (CMS, 2023). They recently introduced Digital Quality Measures (dQM), a new method of monitoring care quality with multiple sources of data (Figure 1). This new approach where channels are monitored for care quality and quality improvement in real time will raise the

bar for healthcare organizations. In reviewing figure 1, one can see how this will apply to telemedicine and where the weaknesses lie. If the data is poor, quality will suffer.

Figure 1.



Key factors of patient safety impacted in telemedicine are the same for those in ambulatory care — communication, care teams, and patient engagement (Khoong et. al., 2022). Indeed, patient safety in telemedicine should mirror in-person visit protocols, encompassing the entire patient journey from scheduling an appointment to the end of their visit with a clinician, but there is still little in the way of organizational measures being created, revised, implemented, and practiced (Haveland & Islam, 2022).

DISCUSSION

Considering the incoming physician shortage, increasing number of Medicare beneficiaries, and the hyperfocus on quality in telemedicine, it would be prudent to make improvements now, rather than be caught in another mass scramble for resources and direction that occurred at the beginning of the PHE. Many of the shortcomings are known and their solutions should be easily agreed upon, as seen by the overlapping recommendations by multiple professional organizations. Listed below are a few suggestions from the publications reviewed on how to improve telemedicine in the clinical setting.

Standardization and Quality. The Institute for Healthcare Improvement (IHI) recommends patients receive the same quality of care in telemedicine that they would receive in-person when treating telemedicine-appropriate conditions (Perry et. al., 2021). Multiple professional organizations such as IHI, the American Academy of Family Physicians, the American Medical Association, and the Joint Commission have all expressed a need for standardizing telemedicine practice (Kobeissi & Hickey, 2023). Standardized definitions and guidelines would create an unambiguous environment for all stakeholders and create a consistent standard of care (Rot et. al., 2022). This holds true especially for patient safety and should perhaps be the first area to address. Policymakers, in conjunction with patient safety professionals, should identify the minimum standards for assessing patient safety in telemedicine and integrate them into current safety standards without merely layering current policies in place for in-person visits (National Committee for Quality Assurance, 2023).

The Healthcare Effectiveness Data and Information Set (HEDIS®), a quality tool created in 1991 by the National Committee for Quality Assurance (NCQA) and used by more than 90 percent of U.S. health plans to measure performance on dimensions of care and service, recently added adjustments to 40 of its measures in response to the rapid uptick in telemedicine use during the PHE (Office of Disease Prevention and Health Promotion, n.d.; NCQA, 2020). The NCQA continues to focus on telemedicine quality, with its nine-part framework for patient-centered telemedicine and the three goals for its telemedicine value agenda: aligning policies to enhance telehealth, adapting to continuing changes in the telehealth environment, and innovating with new methods of monitoring telehealth quality (NCQA, 2023). The National Quality Forum, a large stakeholder consortium of industry leaders that includes many health insurers, endorses HEDIS® and the HEDIS® data is considered top-tier among researchers (Baughman et. al., 2022). In addition, CMS contracts with NCQA and uses the HEDIS® data for some of its plans to identify areas needing improvement, monitoring the success of quality improvement initiatives, tracking improvement measures, and providing a set of measurement standards that allow comparison with other plans (CMS, 2023). Considering these factors, reimbursement based on quality of telemedicine visits should be a key concern for healthcare administrators. Incorporating these measures in the form of guidelines directly into organizational telemedicine protocols could both further the cause for standardization and improve patient outcomes significantly.

Provider In Triage (PIT). When scheduling a patient for a telemedicine visit, they are often referred to a nurse for telephone triage (TT) to determine whether the visit is appropriate or if they need an in-person evaluation. This routinely complex step in the process of patient evaluation can be very effective for department workflow but some stakeholders have raised concerns about the accuracy of evaluation in this approach. A 2019 systematic study showed that, at best, a nurse-led TT led to either no change in emergency department traffic or, in one study, an actual increase in visits (Rushton et. al., 2019). With a physician-led TT, office and ED visits can be significantly less, as well as hospitalization rates (Li et. al., 2023). The American Association of Colleges of Nurses supports the use of telemedicine in nursing practice, but they have not mandated telemedicine be part of the nursing curriculums, thus resulting in poor preparation for nursing graduates (Rutledge & Gustin, 2021). This is concerning, considering that a recent survey of 18,000 nurses found that 30% plan on leaving the field permanently in the next year and 94% reported a moderate to severe shortage already (AMN Healthcare, 2023). This increases the potential of many newly graduated nurses being put into phone triage positions with little or no training. Burnout and higher turnover could inevitably result.

To make sure patients are safely directed in the most equitable and efficient way possible, a clinician (i.e., physician, NP, and/or PA) should be part of the TT process. Protocols can be developed so that, if a nurse has questions as to whether a patient is appropriate for telemedicine versus an office or ED visit, they can direct the call to a clinician for further evaluation and determination of the best place for care. This additional step, approached with a different manner of questioning that may encompass medical history, consultation, and diagnosis, rather than a pure focus on current symptoms (Meyer et. al., 2013), can provide more information on the patient's current condition and allow the triage nurse to fluidly move on to other tasks without being burdened with deciding on matters outside of the established practice protocols or beyond their scope of practice.

Wearables and Vital Signs Kits. One of the dQM's in figure 1 that Medicare will be focused on is the use of instruments (Medical Devices and Wearable Devices) in patient care. Just as every home should have a first aid kit, so should they have a vital signs kit, or some other way to measure the full set of vital signs. The foundation for almost every interaction a patient will have with a healthcare provider, vital signs provide the data needed for risk stratification and critical decision making — not having this data puts both patient and provider at a disadvantage (Orton, 2023). Without the ability to conduct an in-person physical exam, outcomes rely heavily on the patient's ability to report symptoms and their use of digital tools to measure vital signs (Khoong). Telemonitoring is a rapidly expanding subcategory in this sector and one of the factors it relies on is the patient having the tools necessary for vital sign tracking. This can be done through wearable devices such as smartwatches, cuffs, and rings. In such cases where technology can elicit anxiety, the age group does not allow for wearables, or because of financial constraints, vital signs kits can be easily obtained at a reasonable price from many retail sources (Mohammadzadeh et. al., 2023; Di Giacomo et. al., 2019).

Clinicians should be seizing on this opportunity to advise patients about the need for clinical data much like they do with encouragement to quit smoking or wear seatbelts. Using the Health Belief Model, clinicians can be the cue-to-action in educating patients about the benefits of having more data available for their telemedicine visits (Parwati et. al., 2021). For the underserved, policymakers and third-party payors should consider providing vital signs kits at no cost. In addition to thermometers, blood pressure monitors, and pulse oximeters, some kits include telemedicine peripherals such as electronic otoscopes, electronic stethoscopes, and teleopthalomoscopes. Electronic otoscopes have been proven to be especially beneficial for pediatric visits and to be worthy of clinical application (Dai et. al., 2021). As of this writing, very few telemedicine providers use any of these peripherals or encourage their use. It

should be noted that the FDA has not approved some of these peripherals for actual diagnosis of disease so providers should use sound clinical judgement (C.F.R. § 870, 2013).

Physical Exam. Besides the encouragement of a full set of vital signs, providers should be teaching their patients how to conduct a simple physical exam on themselves for those visits that require them (Health Resources and Services Administration, 2023). Combining patient education with technological advances, physical exam capabilities that mirror an in-person visit will increase the utility of telemedicine among all specialties that require one (Carpenter et. al., 2021). While technical jargon should be avoided (i.e., say liver rather than hepatic), using common terms such as cardiopulmonary and neurological is acceptable (Moawad, 2020; Gotlieb et. al., 2022). Some vital signs kits contain electronic otoscopes so advise patients that they should practice using them, as well as the other devices, before their visits. In time, electronic stethoscopes may be another tool within these kits. Increasing the amount of clinical data will ultimately lead to better outcomes for all stakeholders.

CONCLUSION

We are well aware of what lies on the horizon for healthcare. The population will continue to grow and the expanding shortage of healthcare providers is unlikely to change. As a result, telemedicine utilization will increase exponentially and, to accommodate this, laws will gradually loosen to increase availability. Every healthcare organization involved in telemedicine should consider an audit of quality and safety measures within their protocols and make changes where needed. By standardizing patient visits, documentation, and other forms of data, outcomes will improve and both costs and errors will likely decline. Organizations would also do well with implementing a strategy that educates both provider and patient on how to improve data collection in telemedicine visits. This would include a comparison of current protocols to guidelines and recommendations offered by various professional organizations.

REFERENCES

American Telemedicine Association (2019). Health Care Consumerization. https://info.americantelemed.org/ata-action-briefs_healthcare-consumerization

AMN Healthcare (2023, May 1). *2023 AMN Healthcare Survey of Registered Nurses.* https://www.amnhealthcare.com/amn-insights/nursing/surveys/2023

Baughman, D. J., Jabbarpour, Y., Westfall, J. M., Jetty, A., Zain, A., Baughman, K., Pollak, B., & Waheed, A. (2022). Comparison of Quality Performance Measures for Patients Receiving In-Person vs Telemedicine Primary Care in a Large Integrated Health System. *JAMA network open*, 5(9), e2233267. https://doi.org/10.1001/jamanetworkopen.2022.33267

Bell, Jennifer. 2020. "Telehealth vs. In-Person Documentation - the Same, Only Different." *Journal of Orthopaedic Experience & Innovation* 1 (2). https://doi.org/10.60118/001c.14538

Bettencourt, N., Wilson, C. J., Johnson, P. J., & D'Souza, F. (2023). A Rebalancing of Financial Valuations and Expectations Moving Forward in the Telehealth Sector as the United States Moves Toward a Post-COVID-19 Reality. *Journal of medical Internet research,* 25, e35857. https://doi.org/10.2196/35857

Boyle, P. (2020, September 3rd). Medical school enrollments grow, but residency slots haven't kept pace. Association of American Medical colleges. https://www.aamc.org/news/medical-school-enrollments-grow-residency-slots-haven-t-kept-pace

Carpenter, A. B., Sheppard, E., Atabaki, S., Shur, N., Tigranyan, A., Benchoff, T., Snyder, A., Fisher, A., & Cleary, K. (2021). A Symposium on the Clinic of the Future and Telehealth: Highlights and Future Directions. *Cureus*. https://doi.org/10.7759/cureus.15234

CMS (2023, September 6). Healthcare Effectiveness Data and Information Set (HEDIS®). https://www.cms.gov/medicare/enrollment-renewal/special-needs-plans/data-information-set

CMS (2023, September 6). Quality Initiatives - General Information. https://www.cms.gov/medicare/quality/initiatives

CONNECT for Health Act of 2021, S.1512, 117th Congress (2021). https://www.congress.gov/bill/117th-congress/senate-bill/1512/text?format=txt

Dai, Z., Wang, Y., Hang, C., Zhu, K., & Meng, X. (2021). Telemedicine for ear diseases with the smartphone otoscopes via WeChat in the COVID-19 era. *American Journal of Otolaryngology*. https://doi.org/10.1016/j.amjoto.2021.102997

Department of Health and Human Services (2023, February 9th). Fact Sheet: COVID-19 Public Health Emergency Transition Roadmap US. https://www.hhs.gov/about/news/2023/02/09/fact-sheet-covid-19-public-health-emergency-transition-roadmap.html

Department of Health and Human Services Assistant Secretary for Planning and Evaluation (2020, July 28th). MEDICARE BENEFICIARY USE OF TELEHEALTH VISITS: EARLY DATA FROM THE START OF THE COVID-19 PANDEMIC. https://aspe.hhs.gov/sites/default/files/private/pdf/263866/hp-issue-brief-medicare-telehealth.pdf

Di Giacomo, D., Ranieri, J., D'Amico, M., Guerra, F., & Passafiume, D. (2019). Psychological Barriers to Digital Living in Older Adults: Computer Anxiety as Predictive Mechanism for Technophobia. *Behavioral Sciences*. https://doi.org/10.3390/bs9090096

Fischer, S. H., Predmore, Z., Roth, E., Uscher-Pines, L., Baird, M., & Breslau, J. (2022). Use Of And Willingness To Use Video Telehealth Through The COVID-19 Pandemic. *Health affairs* (Project Hope), 41(11), 1645–1651. https://doi.org/10.1377/hlthaff.2022.00118

Frieden, J. (2019). Barriers to Telehealth Adoption Remain, Survey Finds. *MedPage Today*. https://www.medpagetoday.com/meetingcoverage/acp/79180

Gordon, H. S., Solanki, P., Bokhour, B. G., & Gopal, R. K. (2020). "I'm Not Feeling Like I'm Part of the Conversation" Patients' Perspectives on Communicating in Clinical Video Telehealth Visits. *Journal of general internal medicine,* 35(6), 1751–1758. https://doi.org/10.1007/s11606-020-05673-w

Gotlieb R, Praska C, Hendrickson MA, et al. (2022, November 30th). Accuracy in Patient Understanding of Common Medical Phrases. *JAMA Netw Open*. doi:10.1001/jamanetworkopen.2022.42972

Handzel, S. (2023, March 19th). Why US medical students are shunning primary care. MDLinx. https://www.mdlinx.com/article/why-us-medical-students-are-shunning-primary-care/2JDUr3eZh4MIcLex1XomEE

Hoaglin MC, Brenner LH, Teo W, Bal BS. Medicolegal Sidebar: Telemedicine-New Opportunities and New Risks. *Clin Orthop Relat Res*. 2021;479(8):1671-1673. doi:10.1097/CORR.0000000000001856

Haveland, S., & Islam, S. (2022). Key Considerations in Ensuring a Safe Regional Telehealth Care Model: A Systematic Review. Telemedicine journal and e-health : *the official journal of the American Telemedicine Association.* https://doi.org/10.1089/tmj.2020.0580

Health Leadership Council (2023). *Aetna CEO: New Math for Medicare.* https://www.hlc.org/post/aetna-ceo-new-math-for-medicare/

Health Resources and Services Administration (2023, July 27). Conduct a telehealth physical exam. https://telehealth.hhs.gov/providers/preparing-patients-for-telehealth/telehealth-physical-exam

Houser, S. H., Flite, C. A., & Foster, S. L. (2023). Privacy and Security Risk Factors Related to Telehealth Services - A Systematic Review. *Perspectives in health information management*, *20*(1), 1f.

Hyman P. (2020). The Disappearance of the Primary Care Physical Examination-Losing Touch. *JAMA internal medicine*. https://doi.org/10.1001/jamainternmed.2020.3546

Khoong, E. C., Sharma, A. E., Gupta, K., Adler-Milstein, J., & Sarkar, U. (2022). The Abrupt Expansion of Ambulatory Telemedicine: Implications for Patient Safety. *Journal of general internal medicine*. https://doi.org/10.1007/s11606-021-07329-9

Kobeissi, M. M., & Hickey, J. V. (2023). An Infrastructure to Provide Safer, Higher-Quality, and More Equitable Telehealth. *Joint Commission journal on quality and patient safety*. https://doi.org/10.1016/j.jcjq.2023.01.006

Lee, E., Grigorescu, V., Enogieru, I., Smith, S., Samson, L., Conmy, A., & De Lew, N. (2023, April 19th). Updated National Survey Trends in Telehealth Utilization and Modality (2021-2022) Department of Health and Human Services Assistant Secretary for Planning and Evaluation, Office of Health Policy. https://aspe.hhs.gov/sites/default/files/documents/7d6b4989431f4c70144f209622975116/household-pulse-survey-telehealth-covid-ib.pdf

Li, K. Y., Kim, P. S., Thariath, J., Wong, E. S., Barkham, J., & Kocher, K. E. (2023). Standard nurse phone triage versus tele-emergency care pilot on Veteran use of in-person acute care: An instrumental variable analysis. *Academic emergency medicine: official journal of the Society for Academic Emergency Medicine*. https://doi.org/10.1111/acem.14681

Lucas, J. & Villarroel, M. (2022, October). Telemedicine Use Among Adults: United States, 2021. Centers for Disease Control and Prevention. https://www.cdc.gov/nchs/products/databriefs/db445.htm

Medical Devices, 21, C.F.R. § 870. Updated June, 2023. https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?CFRPart=870

Meyer, A. N., Payne, V. L., Meeks, D. W., Rao, R., & Singh, H. (2013). Physicians' diagnostic accuracy, confidence, and resource requests: a vignette study. *JAMA internal medicine*. https://doi.org/10.1001/jamainternmed.2013.10081

Moawad, H. (2020, February 12th). Six strategies for discussing complex medical terms with patients. *Wolters Kluwer.* https://www.wolterskluwer.com/en/expert-insights/6-strategies-for-discussing-complex-medical-terms-with-patients

Mohammadzadeh, N., Gholamzadeh, M., Saeedi, S., & Rezayi, S. (2023). The application of wearable smart sensors for monitoring the vital signs of patients in epidemics: a systematic literature review. *Journal of ambient intelligence and humanized computing*. https://doi.org/10.1007/s12652-020-02656-x

Nastasi, V. (2021, April 5th). Physician Assistants and Advanced Practice Registered Nurses Could Offset Physician Shortage. Reason Foundation. https://reason.org/commentary/physician-assistants-and-advanced-practice-registered-nurses-could-offset-physician-shortage/

National Committee for Quality Assurance (2020, June 5). COVID-Driven Telehealth Surge Triggers Changes to Quality Measures. https://www.ncqa.org/programs/data-and-information-technology/telehealth/covid-driven-telehealth-surge-triggers-changes-to-quality-measures/

National Committee for Quality Assurance (2023). Findings and Recommendations: Patient Safety and Program Integrity. https://www.ncqa.org/programs/data-and-information-technology/telehealth/taskforce-on-telehealth-policy/taskforce-on-telehealth-policy-findings-and-recommendations/

National Committee for Quality Assurance (2023). Telehealth. https://www.ncqa.org/programs/data-and-information-technology/telehealth/

National Consortium of Telehealth Resource Centers (2023, May 15th). State Telehealth Laws & Reimbursement Policies – State Summary Chart. https://telehealthresourcecenter.org/resources/fact-sheets/state-telehealth-laws-reimbursement-policies-state-summary-chart/

Nittari, G., Khuman, R., Baldoni, S., Pallotta, G., Battineni, G., Sirignano, A., Amenta, F., & Ricci, G. (2020). Telemedicine Practice: Review of the Current Ethical and Legal Challenges. *Telemedicine journal and e-health : the official journal of the American Telemedicine Association*. https://doi.org/10.1089/tmj.2019.0158

Office of Disease Prevention and Health Promotion (n.d.). Healthcare Effectiveness Data and Information Set (HEDIS®). https://health.gov/healthypeople/objectives-and-data/data-sources-and-methods/data-sources/healthcare-effectiveness-data-and-information-set-HEDIS®

Orton, J. (2023, January 27). Biggest failure of Telemedicine. Primas. https://primas.net/biggest-failure-of-telemedicine/

Parwati, N. M., Bakta, I. M., Januraga, P. P., & Wirawan, I. M. A. (2021). A Health Belief Model-Based Motivational Interviewing for Medication Adherence and Treatment Success in Pulmonary Tuberculosis Patients. *International journal of environmental research and public health*. https://doi.org/10.3390/ijerph182413238

Perry, A., Federico, F., Huebner, J. (2021). Telemedicine: Ensuring Safe, Equitable, Person-Centered Virtual Care. *IHI.* https://www.ihi.org/resources/Pages/IHIWhitePapers/telemedicine-safe-equitable-person-centered-virtual-care.aspx

Protecting Rural Telehealth Access Act, S.1988, 117th Congress (2021). https://www.congress.gov/bill/117th-congress/senate-bill/1988

Ramaswamy, A., Weigel, G., Sobel, L., Salganicoff, A., Cubanski, J., Freed, M. (2021, March 17). Opportunities and barriers for telemedicine in the U.S.. during the COVID-19 emergency and beyond. *Kaiser Family Foundation*. https://www.kff.org/womens-health-policy/issue-brief/opportunities-and-barriers-for-telemedicine-in-the-u-s-during-the-covid-19-emergency-and-beyond

Roy, J., Levy, D. R., & Senathirajah, Y. (2022). Defining Telehealth for Research, Implementation, and Equity. *Journal of medical Internet research*. https://doi.org/10.2196/35037

Rushton, S., Boggan, J. C., Lewinski, A. A., Gordon, A. M., Shoup, J. P., Van Voorhees, E., Whited, J. D., Tabriz, A. A., Adam, S., Fulton, J., Kosinski, A. S., Van Noord, M. G., Williams, J. W., Jr., Goldstein, K. M., & Gierisch, J. M. (2019). Effectiveness of Remote Triage: A Systematic Review. *Department of Veterans Affairs (US).* https://www.ncbi.nlm.nih.gov/books/NBK49060

Rutledge, C., Gustin, T. (2021, January 31). Preparing Nurses for Roles in Telehealth: Now is the Time! *The Online Journal of Issues in Nursing.* https://ojin.nursingworld.org/table-of-contents/volume-26-2021/number-1-january-2021/preparing-nurses-for-roles-in-telehealth-now-is-the-time/

Swagel, P. (2023, January 26th). The Demographic Outlook: 2023 to 2053. *Congressional Budget Office.* https://www.cbo.gov/publication/58912

US Department of Education Office of Postsecondary Education. (2023, August 30th). CARES Act: Higher Education Emergency Relief Fund. https://www2.ed.gov/about/offices/list/ope/caresact.html

Veterans Administration (2021, January 22nd). How is the VA Doing with Access Nationally? Fiscal Year 2020. https://www.accesstocare.va.gov/pdf/ovac/2020%20VA%20Access%20to%20Care_11.18.21_508.pdf

Weigel, G., Ramaswamy, A., Sobel, L., Salganicoff, A., Cubanski, J., Freed, M. (2020, May 11th). Opportunities and Barriers for Telemedicine in the U.S. During the COVID-19 Emergency and Beyond. Kaiser Family Foundation. https://www.kff.org/womens-health-policy/issue-brief/opportunities-and-barriers-for-telemedicine-in-the-u-s-during-the-covid-19-emergency-and-beyond

Yao P, Adam M, Clark S, et al. A scoping review of the unassisted physical exam conducted over synchronous audio-video telemedicine. *Syst Rev*. 2022;11(1):219. Published 2022 Oct 13. doi:10.1186/s13643-022-02085-1