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Telehealth and Public Health Practice in the United States — Before, During, and After the COVID-19 Pandemic

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Abstract

Telehealth is the use of electronic information and telecommunication technologies to provide care when the patient and provider are not in the same room at the same time. Telehealth accounted for less than 1% of all Medicare Fee-for-Service outpatient visits in the United States in 2019 but grew to account for 46% of all visits in April 2020. Changes in reimbursement and licensure policies during the COVID-19 pandemic appeared to greatly facilitate this increased use. Telehealth will continue to account for a substantial portion of care provided in the United States and globally. A better understanding of telehealth approaches and their evidence basis by public health practitioners may help improve their ability to collaborate with healthcare organizations to improve population health. The article summarizes the Centers for Disease Control and Prevention's (CDC's) approach to understanding the evidence basis for telehealth in public health practice, possible applications for telehealth in public health practice, and CDC's use of telehealth to improve population health.

Keywords

Telemedicine; Policy; Population Health

Introduction:

Efforts to decrease transmission of the SARS-CoV-2 virus coupled with policy changes related to healthcare reimbursement and medical licensure rapidly accelerated movement to a virtual healthcare environment in place of traditional in-person encounters in the United States (US). Telehealth is the use of electronic information and telecommunication technologies to provide care when the patient and provider are not in the same room at the same time. Telehealth modalities include synchronous (i.e., "live" interaction) and asynchronous (e.g., store and forward) approaches, as well as the ability of care providers to monitor patient clinical information remotely. This article includes the use of guidance provided by automated or semi-automated software (i.e., "apps" or "bots") as telehealth approaches — due to their likely impact on population wellness and health — but recognizes that there is ongoing discussion about whether these approaches should be recognized as telehealth. Rapid increases in telehealth usage during the COVID-19 pandemic was, in part, possible due to growing access to new technologies, as well as increased availability of mobile phones, computers, and broadband internet.[1,2] Yet, it is important to note that access to technology and internet accessibility is not universal and that a digital divide still exists.[3]

A growing body of research focuses on the use and impact of telehealth approaches on population health. Claims data from one private insurance company indicates that telehealth usage in outpatient settings increased nearly four-fold between 2010 and 2015 (from 3,023 to 11,890 claims), with significantly greater increases in states that reimbursed telehealth visits for Medicaid patients at or near parity to in-person visits.[4] Despite these increases, the use of telehealth remained low when compared to in-person care across the US. Before 2020, Medicare only reimbursed providers for a telehealth visit if the care was provided while a patient was in-person at a select clinic, hospital, or other medical facility.[5] These policies may have contributed to telehealth accounting for less than 1% of all Medicare

primary care visits in the US by 2019, a usage that was comparable to prior years.[6] Yet, the enactment of the Centers for Medicare and Medicaid Services (CMS) 1135 waivers on March 1, 2020 allowed for reimbursement of patient visits in their home, a policy shift that was soon followed by most major health insurance providers. These changes, coupled with flexibilities for interstate healthcare provider licensing requirements, appear to have been significant factors contributing to a substantial increase in telehealth usage during the COVID-19 pandemic.[7]

Few nationally-representative databases of healthcare-related information and only one of the Centers for Disease Control and Prevention's (CDC's) nationally-representative surveys, the National Electronic Health Records Survey, captured information about telehealth usage prior to 2020. However, all published scientific studies that were able to distinguish telehealth visits in large datasets in 2020 reported significant increases in the use of telehealth modalities. Between January and April 2020, telehealth went from accounting for less than 1% of Medicare primary care visits to 46%, and increased from near-zero to 641.6/10,000 people among employees of self-insured businesses in the US.[8,9] Telehealth also accounted for 35% of all primary care visits in another sample of privately-insured individuals, and the number of individual telehealth visits increased 154% among four large telehealth providers in the US.[10,11] While telehealth usage decreased to constitute 18% of all Medicare visits by June 2020, it still accounted for an 18-fold increase from near-zero use in previous years.[7] While there is uncertainty in the continued support for reimbursement for some telehealth services by public and private insurance providers, it appears that adoption of telehealth approaches will continue to both expand the care continuum and lead to greater use of telehealth.[11–14]

Public health and healthcare systems have long-standing partnerships that include activities related to individual- and population-level health promotion and disease prevention, disease surveillance, healthcare quality promotion, and emergency preparedness. Telehealth has a demonstrated or potential impact on many of these activities. This article describes CDC's efforts to map its current work related to telehealth, identify strengths and gaps in the evidence base as they relate to public health practice, present possible applications for telehealth in public health practice, and discusses CDC's telehealth-related activities to address these gaps.

CDC's efforts to map and expand its work related to telehealth

CDC was involved in telehealth-related activities prior to the COVID-19 pandemic, particularly in the areas of sexually transmitted disease and HIV prevention, with some exploratory efforts related to chronic disease management.[15,16] During the COVID-19 pandemic, the sudden patient surge warranted changes in the way that health care was delivered to reduce staff exposure to ill persons, preserve personal protective equipment, and minimize the impact of patient surges on facilities. Telehealth services helped to provide necessary care to patients while minimizing the transmission risk of SARS-CoV-2, the virus that causes COVID-19, to healthcare personnel and patients in the US and abroad. It became clear in early 2020 that the agency needed to dedicate more resources to focus on telehealth as a part of its pandemic response while it mapped work underway at CDC. To this end,

in April 2020 CDC initiated an iterative review of the currently-available peer-reviewed and grey literature available in English to identify strengths and weaknesses in the current telehealth research as they relate to public health practice. This effort identified more than 1,000 relevant publications and articles in the grey literature up to March 2022.

CDC created a telehealth-focused unit for its COVID-19 emergency response in early 2020 as well as an agency-wide telehealth workgroup in late 2020 to better identify and address telehealth-related issues. These groups worked to identify the evidence basis for telehealth in public health practice, promote and evaluate telehealth, help address health disparities and inequities, harmonize telehealth-related activities, monitor trends in telehealth usage, and work with partners to identify and disseminate lessons learned regarding telehealth. The response telehealth unit focused on developing partnerships, coordinating efforts within the response, and disseminating promising practices; which were then absorbed into the agency-wide workgroup.

The agency-wide telehealth workgroup continues to serve as an internal forum to foster discussion and understanding of CDC's activities; identify areas of overlap and synergy; and to help CDC be a more effective partner with public, private, and academic agencies. The focus areas of the workgroup are to evaluate how telehealth practices affect equity, identify policies and practices to promote and expand access to telehealth, identify data needs, and identify/develop metrics. Collectively, these endeavors identified strengths and gaps in the evidence basis for telehealth in public health practice that then informed CDC's efforts in this area of telehealth.

Understanding the evidence basis for telehealth in US public health practice

CDC's assessment of the literature identified that telehealth affects the core functions of US public health practice in the key areas of equity; wellness, health promotion and disease prevention, control, and management; as well as triage and remotely-provided care. The evidence around each of these topics is covered in separate sections and this is followed by a discussion of CDC's telehealth-related work.

Equity

Healthcare access has a profound influence on everyone's ability to attain their highest level of health. Socioeconomic factors and regional availability of healthcare providers and services are primary factors contributing to disparities in healthcare access and use in the US.[17,18] Inconsistent or lack of health insurance coverage, unreliable transportation, stigmatizing language in medical practices and materials, and impaired access to medical information also affect access to healthcare; many of which can be addressed through strategic policy, public health, and healthcare system interventions.[19]

Telehealth can improve health equity by increasing healthcare access to populations that have traditionally faced barriers to accessing care.[20] Telehealth approaches have been shown to reduce patient surges in healthcare facilities, expand access to specialty healthcare providers for underserved regions and populations, enhance patient education, augment the

expansion of mental health services, and decrease wait times for specialty care during the pandemic for racial and ethnic minority populations as well as among patients with lower incomes in the US.[21–24]

Despite these improvements, telehealth has also been shown to exacerbate existing health disparities among varying racial, socioeconomic, cultural, and geographic populations across the country during the pandemic.[25,26] Older adults, people with limited English proficiency, persons living with disabilities, populations with limited access to technology and the internet, as well as those with low technological and health literacy could see worsening inequities with increased adoption of telehealth.[3,23,27] Digital health literacy, broadband access, healthcare facility resources, telehealth platform usability, and lack of patient trust can potentially restrict optimal access and use of telehealth services.[28] Thus, it will be important to understand population-level capacities for digital engagement and factors that will improve access to and use of healthcare.

Healthcare systems and clinicians may consider addressing telehealth disparities in the US through provider training, considerations of equity in telehealth workflows, development of patient digital health advocacy programs, community engagement, messaging to promote telehealth use, and implementation of quality metrics to ensure equitable use of telehealth for appropriate medical conditions.[29] Measuring barriers and enablers to telehealth participation as well as appropriate uses and how these vary across places and populations may help address healthcare inequities. These healthcare and broadband infrastructure metrics may help provide the information needed to improve equity through telehealth.[30]

Health promotion and disease management

Telehealth approaches will continue to change disease prevention, control, and management practices that affect population health across the health spectrum from wellness and prevention to patient navigation and disease management. The evidence for many of these approaches still needs to be established or re-evaluated due to the relatively limited use of telehealth prior to the pandemic.

The use of telehealth approaches to improve wellness, disease prevention, awareness of treatment options, and disease management has increased with the availability of personal monitoring devices and a proliferation of software applications. This review found that much of the literature to date about wearable devices and applications for wellness in the United States focuses on availability and usage, rather than impact.[23,31] Similarly, other literature evaluates the use and impact of remote patient monitoring, which often includes the use of medical monitoring devices whose data are accessible to healthcare providers. These studies can generally be grouped into 1) safety and cost-effectiveness of using remote patient monitoring approaches for early hospital discharge, 2) mental health treatment, and 3) chronic disease management (e.g., hypertension, diabetes), but span the range of medical practice (including surgery and obstetrics).[32,33]

Triage and remotely-provided care

The use of telehealth has the potential to help provide appropriate pathways for people seeking healthcare guidance or care (reducing healthcare facility burden), and possibly decrease transmission of infectious disease by reducing in-person interactions between patients and providers. There is nascent but increasing evidence that semi- or fully-automated healthcare triage and guidance applications can help direct users to appropriate care and decrease the inquiry and emergency department visit volume to healthcare systems with some degree of accuracy.[34,35] In addition, remote patient monitoring and care approaches, such as the National Emergency Tele-Critical Care Network, have shown potential to offer specialty clinical expertise in medically-underserved locations while also decreasing usage of on-site resources to ensure patient and provider safety (e.g., personal protective equipment). [36]

CDC's efforts related to telehealth

Throughout the COVID-19 pandemic, CDC's COVID-19 telehealth unit participated in numerous meetings with representatives from healthcare payers and providers as well as companies that facilitated adoption of telehealth modalities who already had or were developing and implementing telehealth approaches. CDC helped disseminate the lessons learned from its response-related efforts and sessions by: developing a website about telehealth, providing multiple public presentations[28,37], and publishing journal articles describing telehealth usage.[11,14,38]CDC also was able to work with its partners to develop new and re-directed existing automated and semi-automated telehealth applications to help address the pandemic. These applications included the Coronavirus Self-Checker, V-safe, and the Text Illness Monitoring System (TIM).[39] The Coronavirus Self-Checker is a fully automated, online, mobile-friendly application based upon earlier work for pandemic influenza preparedness. CDC worked with external partners to revise, deploy, and promote the tool in March 2020 to help people guide users to the most appropriate care if they had COVID-19-like symptoms. This tool was available in English, Spanish, simplified Chinese, Korean, and Vietnamese. The Coronavirus Self-Checker page had 60 million visits between March 2020 and January 2022, making it one the most highly-used CDC-developed applications in the history of the agency. A preliminary evaluation of this tool indicates that nearly seventy percent of all completed conversations resulted in recommendations to users that there was no immediate need to see a care provider with more in-depth analyses underway. CDC also implemented V-safe, an after-vaccination health checker and 2nd dose reminder software in January 2021. V-safe is a smartphone-based tool that uses a semi-automated telehealth approach which can result in the user interacting with a healthcare provider if the reported symptoms appear to be more severe than expected. This tool had approximately 9 million uses between January and October 2021. CDC also scaled up usage of its Text illness Monitoring System, a free, semi-automated text-message based illness monitoring system during the pandemic. This system was intended to help public health organizations monitor for COVID-19-like illness among their staff. Between May 2020 and March 2021, TIM was used to monitor the health of more than 146,000 community members and public health staff.

One of the central public health issues in the US identified by CDC was the absence of telehealth identifiers in many datasets, including most of CDC's national surveillance datasets.[13] In addition, CDC found that while some commercially available large datasets did contain many identifiers for a telehealth visit, these datasets compiled information from multiple sources, many of which were not completely populated. This increasing volume and variety of data will pose new challenges related to data security, technical capacity, and networked analytic processing capability, potentially adding more challenges for under-resourced public health agencies.[40] To address these needs, CDC's National Center for Health Statistics quickly leveraged the Research and Development Survey (RANDS) during COVID-19 to focus on telemedicine access to provide timely interim experimental estimates of telemedicine usage.[13] The agency also continues to incorporate telehealth-related questions into its traditional core household and provider-based nationally representative surveys, like the National Health Interview Survey, National Post-acute and Long Term Care Study, and National Ambulatory Medical Care Survey.[13]

Conclusions

When viewed in its entirety, CDC's current efforts highlight four areas in the US: 1) an emerging understanding of telehealth applications and adoption of various approaches, 2) a rapid increase in telehealth usage in 2020 enabled by broadband availability and facilitated by public and private insurance changes in reimbursement and policies related to interstate credentialing, 3) the relative absence of nationally-representative datasets to assess telehealth usage coupled with increasing amounts of privately-owned information, and 4) little understanding about the population-level impact of various telehealth approaches. Finally, CDC's efforts to understand the evidence basis for telehealth in public health practice in addition to the agency's own efforts resulted in the agency identifying a number of potential gaps in the literature based on the priorities developed by the telehealth workgroup. (Table 1)

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Implications for Policy and Practice

- The increased use of telehealth played a prominent role during the COVID-19 pandemic and will continue to affect population health across the continuum from wellness and prevention to disease management. This increased use has the potential to help address inequities, but may also worsen existing inequities or even create new ones.
- CDC and its partners continue to work to improve the information collected in nationally-representative surveys to better understand the usage of telehealth by health-care providers as well as the past, present, and future impact of telehealth on population health.
- Public health and healthcare practitioners should consider improving their understanding of telehealth approaches while strengthening their relationships with healthcare organizations to better support the health of the populations they serve.

Table 1.

Potential gaps in telehealth research in public health practice

Focus area and sub-topic	Possible research questions
Understand how telehealth practices are used in ways that promote equity	
	- To what extent does improved broadband access lead to greater telehealth usage? - Have telehealth "hubs" in under-resourced settings improved healthcare access / health? - How has telehealth availability affected health equity and disparities during the pandemic? - Did telehealth availability reduced access barriers to disproportionately affected populations? - How did telehealth affect healthcare access for patients with physical disabilities? - How did telehealth change healthcare access for populations with geographic, physical, medical, or economic barriers in regard to accessing primary and specialty care? - How has telehealth change access to behavioral health services and treatment of substance use disorders?
Identify policies and practices related to telehealth that affect population health	
Wellness and disease prevention	- Have telehealth approaches affected wellness and prevention through wearable devices and more-accessible wellness visits?
Insurance reimbursement policies	- Were there changes in telehealth usage with policies requiring parity / near parity in reimbursing telehealth visits (public and private insurance)? - Did states with telehealth payment parity policies in-place before the pandemic have an improved ability to scale-up telehealth usage during the pandemic? - What was the impact of medical licensure policy waivers on telehealth usage?
Chronic disease management	- How has remote patient monitoring/telehealth affected the frequency of interaction with healthcare and how has it affected chronic disease management? - Did telehealth and mail-delivered medication affect prescribing practices, medication adherence, or change disease management?
Infectious disease control	- Did adoption of telehealth affect the risk of transmission of infectious diseases to healthcare personnel and patients prior to them receiving in-person care (e.g., using telehealth for triage)? - What are the population-level costs and benefits of using automated and semi-automated telehealth approaches to help ensure that patients receive the most appropriate of care? - Does early discharge with remote patient monitoring affect iatrogenic disease and quaternary prevention? - What is the impact of telehealth on access and use of sexual health services, as well as the control of communicable disease?
Conservation of medical equipment	- Does telehealth adoption affect the amount of medical equipment used (particularly personal protective equipment)?
Impact on the healthcare workforce	- What is the impact of telehealth usage on providers in regard to patient volume, scope of services provided, provider wellbeing, and leveraging the skills of an otherwise unavailable workforce (e.g. providers who are not able to see patients in-person)?
Identify data needs and metrics	
Surveillance for disease and health data	- How does telehealth use affect the ability for public health agencies to determine the location of a telehealth-diagnosed disease versus an in-person visit? - What types of information are available regarding telehealth, what populations do those data represent, and what is the quality and extent of the information being collected? - How does increased adoption of telehealth affect the volume and variety of healthcare data? - What workforce and infrastructure capacity will be needed in public, private, and academic institutions to analyze the larger amounts of healthcare data?