

# An Overview of Telehealth and Its Implications for Health Disparities

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# An Overview of Telehealth and Its Implications for Health Disparities

## ABSTRACT

Race and insurance is one of seven key initiatives of the National Association of Insurance Commissioners (NAIC). One of the five workstreams within this initiative is devoted to measures to advance health equity through lowering the cost of healthcare and promoting access to care and insurance coverage for historically disadvantaged and marginalized groups. A charge from the workstream to the NAIC's Health Innovations Working Group is to examine the potential for telehealth to ameliorate or exacerbate health disparities in these groups, particularly racial and ethnic minorities. This review engages that directive by reviewing research literature and analyzing data on telehealth and its implications for health disparities.

Disparities in health outcomes and healthcare provision across minority racial and ethnic groups, those with lower incomes and socioeconomic status, older adults, and those who live in rural areas are well-documented. The accelerated development and substantial increase in the utilization of telehealth technologies during the COVID-19 pandemic have sparked considerable interest in telehealth, and along with that interest, questions about the implications of increased utilization of telehealth for existing socioeconomic and demographic health disparities.

We find the greatest potential for telehealth to reduce health disparities is by surmounting barriers to access to care. Unfortunately, the potential for telehealth technologies to increase parity in access to care and health outcomes is limited by access to broadband internet and digital literacy. We show marked disparities in broadband internet access across population groups, particularly in rural areas and among racial and ethnic minorities, especially Native Americans. Even with access to broadband, many in these same groups lack sufficient digital literacy to leverage digital technology to improve health. Older adults also are limited by insufficient digital literacy.

Our overall assessment is that limitations in broadband access and digital literacy likely would hamper efforts to increase access to care for disadvantaged and underserved Americans through telehealth. While digital inequities may not exacerbate *existing* socioeconomic and demographic health disparities, they may create a new one. Still, reducing disparities is a bottom-up process with the goal of alleviating the burden of disease in disadvantaged populations. While disparities could widen in some sense, telehealth is likely to improve access to care, and ostensibly, health outcomes, for some disadvantaged populations.

We suggest that for telehealth to effectively bridge gaps in access to care, healthcare professionals and patients must be provided a reliable guarantee of coverage and parity. Further, to reach the critical mass of telehealth utilization to make it cost-effective, sufficient infrastructure must be put in place and both providers and patients adequately trained. Finally, to be equitable, and indeed, to make significant progress in reducing gaps in access to care, technology and digital literacy must be better diffused across socioeconomic and demographic groups.

# **An Overview of Telehealth and Its Implications for Health Disparities**

## **EXECUTIVE SUMMARY**

Race and insurance is a key initiative of the National Association of Insurance Commissioners (NAIC). The effort is led by a Special (Executive) Committee on Race and Insurance. The Health Innovations Working Group (HIWG) was charged by the special committee to “evaluate mechanisms to resolve disparities through improving access to care, including the *efficacy of telehealth as a mechanism for addressing access issues*” in “historically underserved communities” (emphasis added). This report was prepared to assist (HIWG) in their fulfillment of this directive. The purpose of the report is to document recent developments and trends in telehealth and implications for regulators and to address potential implications for disparities in health and healthcare.

### **Socioeconomic and Demographic Disparities in Health and Healthcare**

Health disparities across socioeconomic strata, race, ethnicity, and geography in the United States are well-documented in health statistics and the research literature. Life expectancy at birth is 3.5 years shorter for Blacks than for Whites, and, per 100,000 population (adjusted for age distribution), there are 127.5 more Black deaths annually than non-Hispanic White deaths. Native Americans have a lower life expectancy than Black individuals. Across 27 specific health measures, Black health outcomes are worse than those for Whites for 19, or roughly 70 percent. Health outcomes also are worse for Hispanics and Native Americans across most measures. In addition, those with low incomes or, more generally, low socioeconomic status (SES), have worse outcomes than those with higher SES, and the rural population is less healthy than the urban and suburban populations.

While disparities in *healthcare* have declined over time, they persist across numerous domains within the healthcare system. For about 40 percent of 250 healthcare quality measures tracked by the U.S. Agency for Healthcare Research and Quality, Black patients received “worse care” than White patients. Hispanics received worse care than Whites for more than one-third of quality measures and Asians for nearly 30 percent.

### **Trends and Developments in Telehealth**

In general terms, “telehealth” refers to “the use of medical information exchanged via electronic communications to support and provide health care.” Broadly defined, examples include direct provider-to-patient interactions via videoconferencing (virtual visits), chat-based interactions, remote patient monitoring, physician-to-physician consultations, patient education, data transmission and interpretation, and digital diagnostics alone or in combination with conventional modalities. The key characteristics of telehealth are that it involves the use of information and communications technologies (ICTs) and is delivered outside of traditional facilities. In this report, the alternative term, “telemedicine” means specifically direct provider-to-patient interaction using ICT.

Technology has always played a critical role in medicine and healthcare, and technological change is pervasive in healthcare. But the challenges of integrating telehealth technology are significant, and telehealth has not seen the rapid take-up characteristic of most medical innovations. The pace of expansion in telehealth accelerated rapidly with the onset of the COVID-19 pandemic. There was a spike in telehealth utilization across all specialties from a negligible amount in January and February 2020 to over 32 percent of outpatient visits in April 2020. While utilization of telehealth has since moderated, it remains exceptionally high compared with pre-pandemic levels, approaching 17 percent of all outpatient evaluation and management visits. It remains to be seen if these trends in expanded utilization of telehealth continue. The latest data at writing show telehealth accounted for 4.4 percent of claims in September 2021, up 0.2 percentage point from July 2021's post-pandemic low.

Issues around licensure, insurance, privacy, and legal liability are challenging and often have limited growth in the utilization of telehealth technologies, particularly in provider-patient interactions. Much progress has been made, but these issues must be settled if telehealth is to remain a viable alternative or complement to traditional modes of medical practice.

Before the onset of the COVID-19 pandemic, limited reimbursement constrained the widespread use of telehealth. Given the importance of and increased demand for telehealth services during the pandemic, state insurance regulators were obliged to address policies on the insurability of telehealth services. The scope of these actions varied by state. Before the pandemic, 35 states required state-regulated individual and group health insurers to cover telehealth visits. Five additional states added the requirement after the pandemic's onset (*maps in the main document show policy actions by specific states*). Half of the states required parity in policyholder cost-sharing before the pandemic, but since 3 additional states added parity requirements, and 4 prohibited cost-sharing altogether. Only 3 states required insurers to cover audio-only telemedicine visits at the pandemic's onset, but 18 states have added the requirement. Half of the states require parity in reimbursement of providers: 15 before the pandemic and 10 additional since. We document recent developments (16) as well. In most cases, new orders extended states of emergency and related telehealth regulations, but there have also been rescindments, and there are several near-term sunsets.

### **How Could Telehealth Reduce Health Disparities?**

While there are many barriers to health equity, we find physical access to care to be the most substantial and pervasive obstacle that could be alleviated with the increased use of telehealth. Additionally, telehealth could provide access to culturally competent care that may not otherwise be accessible for those with needs for this care.

A critical problem facing rural areas is an insufficient supply of physicians and other healthcare professionals. Large areas with sparse populations lack the capacity to support many healthcare services. In particular, the overall distribution of physicians in the United States is exceedingly uneven. Physicians are highly concentrated in urban areas, and some rural places have proportionately very few—and in some, none. The problem of low physician supply in rural areas is compounded by physician mobility because physicians located in areas with a low supply of physicians are more likely to move. Further, physicians often are located close to hospitals where they have privileges, and much of the population of a large county could be

many miles away from a physician, even if the physician density in the county is acceptably high. We also find substantially lower concentrations of physicians in areas with high Black and Hispanic populations.

The problem of a dearth of physicians and other healthcare professionals in rural and high-minority-concentrated areas is significantly exacerbated by transportation deficits in the same areas, particularly access to private vehicles. Multiple research studies that associate inadequate transportation with lack of access to healthcare define transportation as access to a private vehicle. Lack of vehicle access corresponds closely with race and ethnicity. Our analysis of Census microdata (individuals) reveals that over 18 percent of Black households do not have access to any vehicle. In addition, 11 percent of Hispanics, 13 percent of Native Americans, and 11 percent of Asians lack access to any vehicle. By comparison, just over 6 percent of White non-Hispanic households lack access to a vehicle. Less than 5 percent of households in urban areas lack access to any vehicle, compared with 14 percent of households in rural areas. Lack of vehicle access is especially troublesome in rural areas because of a lack of public transit options.

Arguably, telehealth has great potential to bridge the gap in access to care by connecting isolated people with health practitioners and reducing the need for transportation to receive care. Unfortunately, those who would likely benefit the most from telehealth are also the ones with the greatest obstacles in using it.

### **How Could Telehealth Exacerbate Health Disparities?**

One of the most pressing concerns in the evolution of the digital economy, which has persisted throughout the internet's history, is that of a digital divide, or a gap in computer and Internet access across economic, demographic, or social lines. The term encompasses multiple disparities, including the lack of access to technology and low levels of digital literacy, or the ability to navigate, evaluate, and communicate information online or in a digital format. More advantaged individuals historically have been the first to adopt and benefit the most from the introduction of new technologies in health, including telehealth.

Access to *the internet* (at all) has diffused almost fully across racial and ethnic groups without substantial disparities, although it has not diffused as completely by age, income, and spatial population density. But access to the internet is not sufficient for telehealth. Users must have broad bandwidth for videoconferencing and also privacy, ideally broadband access at home.

Over 21 million Americans have limited or no access to broadband. Lack of broadband access is considerably more pronounced among vulnerable populations, including racial and ethnic minorities, lower-income individuals, and older adults. The communities likely to benefit the most from telehealth—these groups as well as those in rural areas—also are the least likely to have access to broadband internet.

About 80 percent of Whites have broadband access at home, which itself meaningfully limits access to telehealth services. But around one-third of Blacks (29 percent) and Hispanics (35 percent) lack broadband at home. The gap for seniors is especially pronounced. In 2021, more than 36 percent of seniors had no broadband at home. The gap in rural areas is 28 percent,

which is especially substantial when considering that those in rural areas are perhaps the most in need of telehealth to improve access to care.

While the penetration of broadband at home is inadequate for a widespread, equitable transition to telehealth, considerable progress has been made in the last five years. But while the number of new broadband subscribers continues to grow, in general, rural areas, have lagged behind urban and suburban areas in broadband deployment and the speed of service offered, especially in tribal areas. In 2019, the latest date at which data are available, 99 percent of urban residents had access to fixed terrestrial broadband, compared with less than 83 percent in rural areas and 79 percent in tribal areas.

Insufficient digital literacy for vulnerable populations also stands in the way of more universal access to care through telehealth. To have successful telehealth appointments, patients need to understand how telehealth platforms work, which is likely to pose difficulty for some patients, especially older adults. In addition to older adults, research finds disproportionately low digital literacy in the health context among the less educated and those who are members of racial or ethnic minority groups. Research also suggests that those with lower levels of digital literacy are less engaged and receive fewer psychological benefits from telehealth interactions even when they participate.

Inadequate digital literacy is not only a barrier for patients, but also for some health professionals. Some medical facilities are not prepared for a rapid transition to telehealth, and inadequate digital literacy is common among healthcare workers.

## **Assessment**

In investigating the potential for telehealth to reduce health disparities, we find the most significant obstacle to health parity that could be bettered by increased development and utilization of telehealth resources is likely access to care, including culturally competent care. These disparities in access to care are associated with disparities in health outcomes.

Our overall assessment is that telehealth has great potential to reduce problems of access to care for disadvantaged and underserved groups. However, limitations in broadband access and digital literacy will meaningfully limit efforts to increase access to care through telehealth. While digital inequities may not exacerbate existing socioeconomic and demographic health disparities, increased telehealth utilization may well create a new one. Nevertheless, most members of disadvantaged groups do have access to broadband internet at home and sufficient literacy to navigate the digital landscape. Reducing disparities is a bottom-up process with the goal of alleviating the burden of disease in disadvantaged populations. While disparities could widen in some sense, telehealth is likely to improve access to care, and ostensibly, health outcomes, for some in disadvantaged populations. Moreover, the technology and telehealth know-how developed since the pandemic have brought us to a place where telehealth has the potential to mitigate disparities in a meaningful way. We believe this reality is imminently doable.

## **An Overview of Telehealth and Its Implications for Health Disparities**

Disparities in health outcomes and healthcare provision across racial and ethnic minorities, those with lower incomes and socioeconomic status, older adults, and those who live in rural areas are well-documented. The accelerated development and substantial increase in the utilization of telehealth during the COVID-19 pandemic; that is, the use of information and communications technologies (ICTs) in the delivery of healthcare, have sparked considerable interest in telehealth, and along with that interest, questions about the implications of increased telehealth utilization for existing socioeconomic and demographic health disparities (see, e.g., Timmermans and Kaufman, 2020).

The World Health Organization (WHO) describes health technologies generally as the “application of organized knowledge and skills in the form of devices, medicines, vaccines, procedures, and systems developed to *solve a health problem and improve quality of lives*” (2007, p. 106, emphasis added). The most salient development in the use of technology in the COVID-19 era is certainly the rapidly increasing utilization of telehealth. Telehealth has doubtlessly contributed to solving a health problem—provision of care at a distance during a pandemic—but has it improved quality of life? We suggest that it has, but perhaps for some people more than others.

We begin with a review of disparities in health outcomes across conventionally disadvantaged and underserved populations and an examination of disparities in the provision and quality of healthcare. We focus largely on race and ethnicity, but we also consider disparities by socioeconomic status and among rural populations. In the next section, we discuss the concept of telehealth in general and telemedicine (direct provider-to-patient interactions) in particular. Specifically, we provide a detailed overview of trends in telehealth utilization, telehealth perceptions of patients and healthcare providers, and issues around insurance coverage and licensure. In the following two sections we evaluate opportunities for telehealth to reduce health disparities and its limits in doing so. Finally, we give an overall assessment of the intersection between telehealth and health disparities. We conclude that telehealth has great potential to increase access to care for disadvantaged populations but is unlikely to reach its full potential in the near term due to structural barriers. Indeed, the potential exists for telehealth to add another layer of socioeconomic and demographic disparity.

### **I. IMPETUS AND SCOPE**

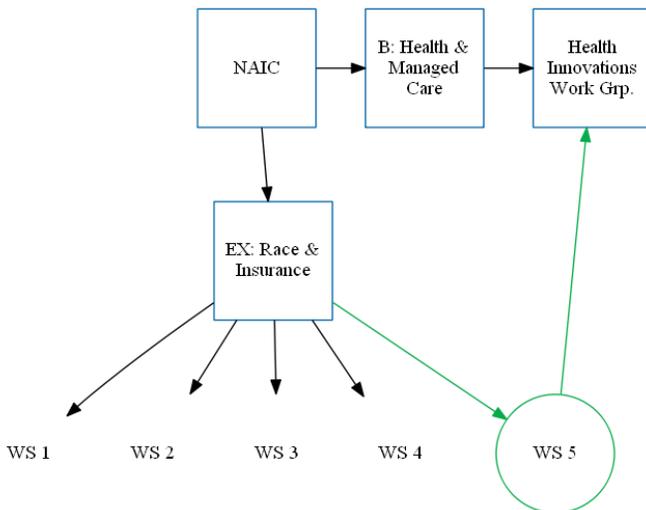
#### **Impetus for the Study**

The intersection of race and insurance has been a key initiative of the [National Association of Insurance Commissioners](#) (NAIC) since 2020. The effort is led by a [Special \(Executive\) Committee on Race and Insurance](#). The initiative is coordinated through five workstreams (Figure 1). Workstream 5 within this initiative is devoted to measures to advance health equity through lowering the cost of healthcare and promoting access to care and insurance coverage for historically disadvantaged and marginalized groups. A charge from Workstream 5 came to the [Health Innovations Working Group](#) (HIWG) to “evaluate mechanisms to resolve disparities

through improving access to care, including the *efficacy of telehealth as a mechanism for addressing access issues*” in “historically underserved communities” (emphasis added).<sup>3</sup> This paper arose from an effort to assist the HIWG in fulfilling this directive.

**Figure 1**

**Structure of Relevant NAIC Committees and Working Groups**



Source: CIPR. Rendered with GraphViz 2.38.

**Scope of the Study**

There is a voluminous literature on disparities in health and healthcare across socioeconomic and demographic groups in the United States and mounds of data to support it. A search of “health AND disparities” on PubMed (National Library of Medicine database) yields just under 65,000 results when limited to the last ten years. There is also a sizeable literature on the use of information and communications technologies (ICTs) in health (telehealth) that has exploded in the last few years, particularly since the onset of the COVID-19 pandemic. A PubMed search yields over 25,000 results on “telehealth” when limited to the last five years. Moreover, there is a growing literature at the intersection of telehealth and health and healthcare disparities. Most of this literature, however, addresses disparities in access to or utilization of telehealth itself (see, e.g., Julien et al., 2020; Darrat et al., 2021; Jaffe et al., 2020; Rodriguez et al., 2021), and much of it is centered on specific implementations (see, e.g., Tong et al., 2020; Lattimore et al., 2021).

While we address disparities in access to and utilization of telehealth as an important and relevant concern, the overall objective of our study is to explore *disparities in health and healthcare* and the potential of expanded telehealth utilization to reduce them, or, potentially, to exacerbate them. There is little literature to date and no consensus on this question. The lack

<sup>3</sup>NAIC, Special (EX) Committee on Race and Insurance, Virtual Meeting, July 21, 2021, Attachment One. The Health Innovations Working Group operates under the umbrella of the NAIC’s [Health Insurance and Managed Care \(B\) Committee](#).

of a definitive conclusion on telehealth and health and healthcare disparities owes largely to the complexity of technology and the complexity of measuring disparities.

Weiss et al. (2018) review 33 papers addressing the intersection of health technologies (generally) and health disparities. They conclude: “Although the studies included in our results generally suggest that the implementation and adoption of new technologies (re)produce [socioeconomic] and class-based social inequalities in health, some results indicate that these technologies can, in fact, reduce inequalities over time” (p. 16). They propose that additional research is needed to “reliably establish these conclusions.” Our goal is to pursue this line of research further, looking specifically at telehealth. We review and analyze a large quantity of research literature and analyze relevant data on health disparities, the development of telehealth, and the nexus between them.

### **Organization**

We construct an outline of key questions and use data analyses and research literature (and some grey literature) to fill in the gaps.<sup>4</sup> We are careful to select research literature that presents alternative viewpoints and conclusions when relevant to provide as comprehensive coverage of the issues as possible. Most of the research literature we cite to unravel the intersection of telehealth and disparities in health and healthcare is itself compendiums of other research, such as narrative or systematic literature reviews. This approach allows us to maximize our leverage of the state of knowledge.<sup>5</sup>

We also have access to interesting and informative data that we exploit for further analysis. The data analysis allows us to gain additional and deeper insights that could not be drawn from the literature alone and to update existing analyses of telehealth and health disparities, as the literature is especially fluid in the era of COVID-19. As we demonstrate in the paper, the use of telehealth has increased dramatically since the onset of the COVID-19 pandemic.

We begin our study by briefly documenting and analyzing health and healthcare disparities generally in section II. In section III, we explore telehealth, including secular and recent trends in its development and use. In section IV, we ask “what problems associated with health and healthcare disparities could potentially be ameliorated by telehealth?” In section V, we ask the parallel question, “in what ways might telehealth exacerbate existing health and healthcare disparities? Finally, we pull these sections together to assess their nexus in section VI. In the end, does it seem more likely that telehealth will ameliorate disparities, exacerbate disparities, or does it have the potential to do both?

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<sup>4</sup>“Grey literature” is reliable research produced outside of traditional scholarly research outlets such as academic journals or research center papers and briefs, generally by nonprofit institutions or commercial enterprises.

<sup>5</sup>We do not seek to conduct a complete literature review as part of our analysis. A traditional literature review requires a fairly narrow question to be feasible, especially if the literature is dense (see Snyder, 2019; Machi and McEvoy, 2016). Given our charge, our research question is necessarily very broad.

## II. HEALTH AND HEALTHCARE DISPARITIES

Health disparities across socioeconomic strata, race, ethnicity, and geography in the United States are well-documented (see, e.g., Barr, 2019).<sup>6</sup> Few other areas of health research have received more attention in recent years (Williams and Cooper, 2019), and disparities evident during the COVID-19 pandemic have served to magnify the issue in the last two years (Webb et al., 2020; Laurencin and McClinton, 2020). We first analyze data and review the research literature on health disparities to provide a foundation for engaging the issue in the context of telehealth.

### Definitions

By health disparities, we mean “differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups in the United States” (National Institutes of Health, 2002). By *healthcare* disparities, we mean inequities in access to healthcare or the delivery of healthcare across specific population groups.

“Race” and “ethnicity” have multiple meanings, and sometimes ethnicity is embodied in the definition of race, particularly if that definition is based on common ancestry. In the Census, race and ethnicity are separate questions with categories based on guidelines of the U.S. Office of Management and Budget (OMB) [62 Fed. Reg. 58782 (October 30, 1997)]. However, the “Some Other Race” category, intended to be a small residual category, is the third-largest race group, overwhelmingly due to reporting by Hispanics who do not identify with the more specific OMB race categories (U.S. Census Bureau). In the data we provide and in our review of the research literature, we use the definition of race and ethnicity used by the source and do not generally specify what that definition is. To be inclusive, we generally use the term “Black” rather than “African-American.” We refer to the indigenous people of the continental United States as “American Indians” but use the term “Native Americans” when the context includes native Hawaiians and Alaskan natives. We generally employ the more commonly used and gender-neutral term “Hispanic” rather than Latino and Latina.

Socioeconomic status (SES) refers broadly to “an individual’s rank or status in a social hierarchy” (Krieger et al., 1997), but has traditionally been defined as a combination of income, education, and occupational prestige (Glymour et al. 2014). Numerous studies have examined the pathways by which SES can influence health (see, e.g., Adler and Newman, 2002; Braveman et al., 2011).<sup>7</sup>

### Racial and Ethnic Disparities in Health Outcomes

Data and research are consistent and clear: all else equal, the White population is healthier than the Black population (see, e.g., Williams and Rucker, 2000). Hispanics and American Indians have poorer health outcomes than non-Hispanic Whites.

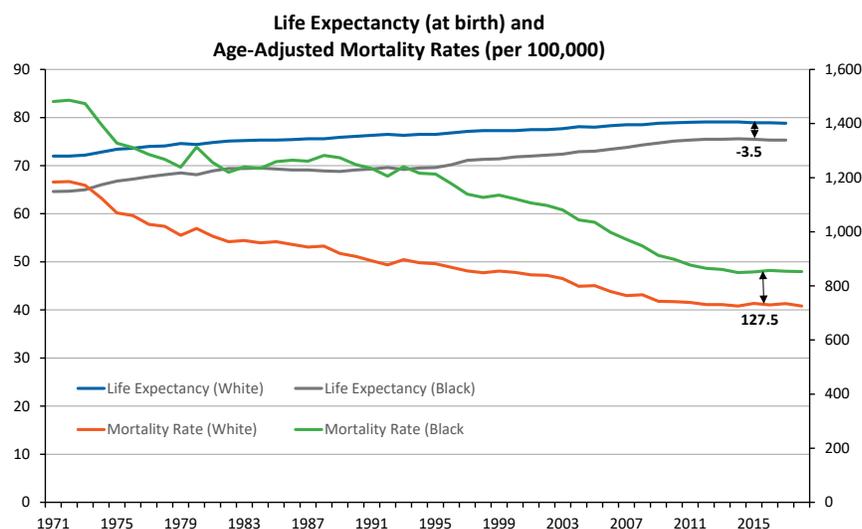
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<sup>6</sup>Similar disparities are found internationally. See Arcaya et al. (2015).

<sup>7</sup>Link and Phelan (1995) go further to assert that SES is also a “fundamental cause” of health status; that is, it has a causal relation to health outside of its influence on proximate risk factors.

The broadest evidence of these health disparities is found in life expectancy and age-adjusted mortality rates.<sup>8</sup> Life expectancy (at birth) and age-adjusted mortality rates vary significantly between the Black and White populations (Figure 2). There has been significant progress in reducing racial disparities as measured by these data, but convergence has slowed. In the last five decades, the Black-White differential in life expectancy at birth has declined (in magnitude) from  $-7.4$  years to  $-3.5$  years. The Black-White differential in age-adjusted mortality rate had declined from 297.5 deaths per 100,000 to 127.5 deaths per 100,000. Although these data are available for the White and Black populations only, other data show that Native Americans have a lower life expectancy than Black individuals (Arias et al., 2014).

**Figure 2**



Data Sources: NCHS, [National Vital Statistics System](#), historical data, 1900-1998; NCHS, National Vital Statistics System, mortality data; and the [CDC WONDER](#) database. [datafiles]

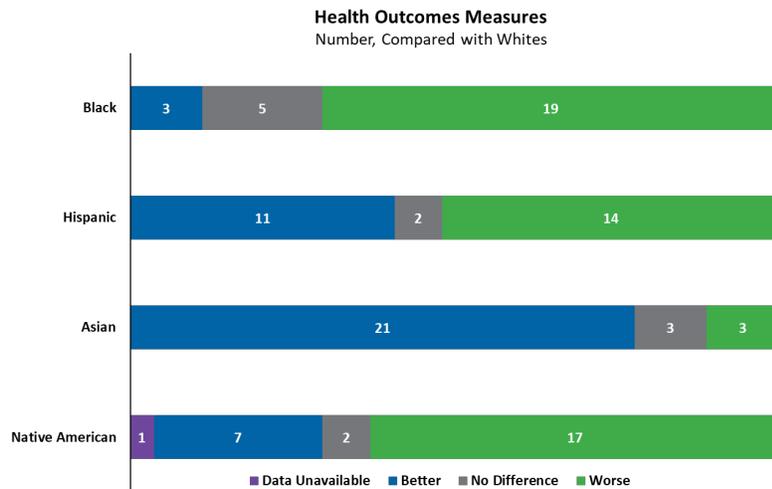
Differentials in mortality rates between races are especially pronounced for young people. Data from the [CDC’s Multiple Causes of Death Files](#) show that death rates for non-Hispanic Black youth are twice that of young, non-Hispanic Whites (Harper et al., 2021). The most striking statistic is the difference in rates of death by homicide, which is 5.7 times higher for Black youth than for White youth. Indeed, the dramatic decline in homicide rates since the 1990s (although they are now ticking up) is a significant factor in the reduced Black-White differential in life expectancy (Harper et al. 2007).

<sup>8</sup>Data are aggregated by the source only for Black and White and by gender. The data here are for both genders identified in the data (that is, male and female). An age-adjusted mortality rate is a weighted average of age-specific crude death rates, where the weights are the proportions of persons in the corresponding age groups of a standard population. This adjustment makes death rates more comparable across population groups. Life expectancy is at birth. Data are from the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC), National Vital Statistics System, [historical data](#), 1900-1998; NCHS, National Vital Statistics System, [mortality data](#); and the [CDC WONDER](#) database. Data are shown through the latest available compiled data at the time of writing.

The incidence of specific diseases also varies significantly across races. Black individuals have higher mortality rates than Whites for 10 of the 15 leading causes of death, while mortality rates are not consistently higher than Whites for other racial minorities and, in many cases, are lower (Williams, 2012). Disparities in the severity and progression of illness are significant even for outcomes that are less prevalent in the Black population, such as breast cancer.

Across 27 specific health measures, Black health outcomes are worse than those for Whites for 19, or roughly 70 percent (Figure 3) (KFF, 2019). For Hispanics and Native Americans, outcomes are worse than those of Whites across 14 and 17 measures, respectively.

**Figure 3**



Data Source: KFF, [Key Facts on Health and Health Care by Race and Ethnicity](#)

The research literature suggests that “structural racism” is an important if underappreciated, factor in explaining health disparities. The key distinction is that structural racism has a cumulative impact. Bailey et al. (2017) define structural racism as “the totality of ways in which societies foster racial discrimination” (p. 1453). They cite several research articles that have “established multiple pathways by which racism harms health” (p. 1456). Among these are economic injustices; environmental and occupational health inequities; psychosocial trauma; inadequate access to care, including health insurance and health facilities; maladaptive coping behaviors; and stereotype threats (such as a stigma of inferiority and impaired patient-provider relationships). Lukachko et al. (2014) find that Blacks living in states with higher levels of structural racism were more likely to report past-year myocardial infarction (heart attack) than Blacks living in low-structural racism states, while there was no corresponding result for Whites.

We also recognize that physiological differences across race could contribute to health disparities. For example, physiological differences have been identified as factors in cardiovascular and cerebrovascular diseases (Wolf et al., 2020; LaBounty et al., 2019), renal

function (Powe, 2020), perinatal outcomes (Snowden et al., 2016), and skin hydration (Mayrovitz et al., 2017) (see also Kaplan and Bennet, 2003).<sup>9</sup>

### **Racial and Ethnic Disparities in Healthcare**

While disparities in *healthcare* have declined over time, they persist across numerous domains within the healthcare system. For about 40 percent of 250 healthcare quality measures tracked by the U.S. Agency for Healthcare Research and Quality (AHRQ), Black patients received “worse care” than White patients (U.S. Agency for Healthcare Research and Quality, 2020). Hispanics received worse care than Whites for more than one-third of quality measures and Asians for nearly 30 percent.

The quality differential in healthcare among races is pervasive [Fiscella et al. (2000) and references therein]. Elderly Black individuals, compared with Whites, are seen less often by specialists, receive less appropriate preventive care, experience lower-quality hospital care, and receive fewer expensive technological procedures. A voluminous research literature shows that hospitalized Black patients receive less intensive care across numerous procedures and have been reported to receive less aggressive treatment, for example, of cancer and HIV. Healthcare disparities in other racial and ethnic minorities are significant as well. There are also marked disparities in healthcare *utilization* by racial and ethnic minorities, which invariably leads to worse health outcomes.<sup>10</sup>

Using fictitious patient histories (including patient pictures), Shulman et al. (1999) provide evidence that physicians were significantly more likely to recommend cardiac catheterization for White patients with angina (clinically diagnosed chest pain) (and men) than Black patients (and women). Shulman et al. do not differentiate their results by race and gender of the physician but note they were “overwhelmingly” White.

### **Socioeconomic Disparities**

The research is clear and consistent that, all else equal, those with low incomes or, more generally, low socioeconomic status (SES), have worse outcomes than those with higher SES (Barr, 2019). SES and race and ethnicity are closely intertwined in a complex relationship (Barr; Navarro, 1990). The link between race and SES, and the complexity of it, is evident in Phelan and Link (2015), who find that “racial inequalities in health endure primarily because racism is a fundamental cause of racial differences in SES and because SES is a fundamental cause of health inequalities” (p. 311).

Most social epidemiologists and other authorities on the social determinants of health distinguish disparities across socioeconomic strata from those along racial and ethnic lines (Williams et al., 2010). An important reason for this dichotomy is that racial and ethnic

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<sup>9</sup>We neither assert nor suggest that physiological differences between races are a primary or significant cause of racial health disparities. Moreover, we recognize that physiological differences are not necessarily genetic. For example, environmental factors and stress responses can account for physiological differences across race (Thomas et al., 2019; Kim, 2014; Lepore et al.; 2006, Williams, 1999). In general, we concur that “[u]nderstanding the purpose of race in medicine should be guided by appropriate evidence and agreement on how it is to be used and not used,” as “race may inform practice of better medical care and lead to improved health” (Powe, 2020).

<sup>10</sup>Fiscella et al. assert that SES often is a more powerful determinant of healthcare use than race and ethnicity.

disparities in health status and outcomes appear even after controlling for socioeconomic status (SES). For example, except for men who did not complete high school, statistically significant differences in all-cause mortality are present between non-Hispanic Black and non-Hispanic White men with the same level of education (Gilmore et al., 2019). Similarly, socioeconomic variance in health status and outcomes exists within racial and ethnic groups.

### **Disparities During the COVID-19 Pandemic**

Racial, ethnic, and socioeconomic health disparities have increased in prominence during the COVID-19 pandemic. Disparities in infection rates, hospitalization rates, and mortality have been well-documented (Price-Haywood, 2020; Shiels, 2021; Yang et al., 2021). Previous work at the NAIC demonstrates significant disparities in vaccination rates across races and ethnicity (Edmiston et al., 2021). Much of the research suggests inequities in morbidity and mortality associated with COVID-19 was due to an exacerbation of existing socioeconomic and demographic disparities (see, e.g., Bambra et al., 2020). Kirksey et al. (2021) argue that COVID-19 is a “pandemic superimposed on an epidemic of racial health inequities and healthcare disparities” (p.39). Among other factors, they attribute COVID-19 disparities to existing chronic disease and structural racism.

### **Urban-Rural Disparities**

All else equal, people in urban areas are healthier than those in rural areas, and the urban-rural disparity is widening over time (Millar and Vasan, 2021; Singh and Siahpush, 2014). Disparate rates of educational attainment, increased poverty and unemployment, and fewer economic opportunities generally all contribute to the divide. Gomez-Vidal and Gomez (2021) find that the lack of municipal status is a significant determinant of health due to social conditions that generate cumulative health risks for residents. Lack of access to care is a mammoth concern. As we document below, many rural areas suffer from a paucity of medical professionals in the region. The problem is compounded by the dire financial straits of rural hospitals, which have been closing at alarming rates (Kauffman et al., 2016; McCarthy et al., 2021).

The COVID-19 pandemic underscores these disparities. Although Abedi et al. (2021) find lower rates of SARS-CoV-2 infection in less populated counties, death rates from COVID-19 are higher. Also evident is synchronicity in urban-rural and socioeconomic and demographic disparities. Dixon et al. (2021) note that “Black and Brown populations” and rural populations experienced “unequal burden and hospitalization due to COVID-19 at the same time” (p. 8) [see also, Abedi et al. (2021)].

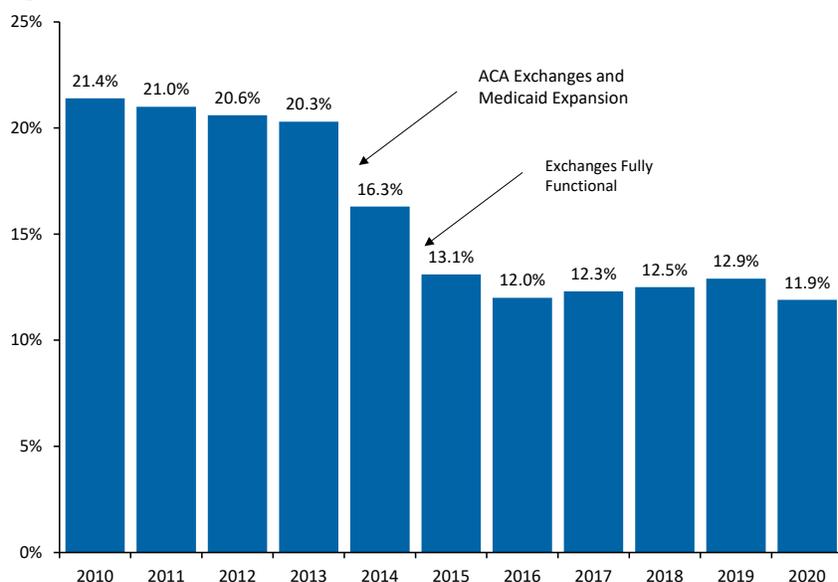
### **The Role of Insurance in Health and Healthcare Disparities**

The compendium of health services research makes a convincing case that health outcomes are strongly associated with health insurance coverage. A landmark 2002 Institute of Medicine (IOM) report on the effects of health insurance coverage on health outcomes of working-age (18-64) adults provides volumes of compelling evidence that the uninsured are more likely to suffer from adverse health outcomes or die prematurely than their insured counterparts (IOM, 2002). The report argues that “the *ultimate result* [of health insurance coverage] is improved health outcomes” (p. 6, emphasis added). The study further suggests that “increased health insurance coverage would likely reduce racial and ethnic disparities in the use of appropriate

health care services and may also reduce disparities in morbidity and mortality among ethnic groups” (p. 7). In a review of the research literature, Woolhandler and Himmelstein (2017) find that the accumulated evidence since “supports and strengthens” the conclusions of the original IOM report (p. 429).

The Patient Protection and Affordable Care Act of 2010 (ACA) made significant progress in increasing insurance rates, particularly once the individual exchanges were implemented in 2014 and increasing numbers of states expanded their Medicaid programs.<sup>11</sup> Between 2013, the year before implementation (of most components), and 2016 the uninsurance rate for working-age adults fell from 20.3 percent to 12 percent (Figure 4). Nevertheless, millions of Americans remain without health insurance, and stark disparities in health insurance coverage persist across socioeconomic and demographic groups.

**Figure 4**



Data Sources: U.S. Census Bureau, American Community Survey, 1-Yr Estimates; Keisler-Starkey and Burch (2021)  
 Notes: Percent of adults 18-64 without health insurance coverage (19-64 after 2016). The 2020 estimate is from Keisler-Starkey and Burch (2021).

The ACA has reduced racial and ethnic disparities in health insurance coverage, but not markedly (Buchmueller et al., 2016). In 2020, 14.3 percent of Black working-age adults were uninsured, up significantly from 13.5 percent in 2018 (Keisler-Starkey and Burch, 2021). The uninsurance rate for Hispanic working-age adults in 2020 was 24.9 percent (24.6 percent in 2018). By comparison, the uninsurance rate for working-age adults who are White, non-Hispanic was 7.7 percent (7.6 percent in 2018).

Despite the availability of Medicaid, for which coverage has been significantly expanded under the ACA in most states, 17.2 percent of the population in poverty (including children) were uninsured in 2020, compared to 3.4 percent of the population with incomes greater than 400

<sup>11</sup>To further reduce the number of uninsured, ACA was revised in 2014 to facilitate insurance coverage of individuals after losing employment (Mojtabai, 2019).

percent of the federal poverty line (FPL).<sup>12</sup> A significant problem in non-expansion states is a coverage gap for those who do not qualify for Medicaid; that is, they exceed the income eligibility threshold for Medicaid in their states but have incomes less than 100 percent of the FPL, which makes them ineligible for subsidies on the individual health insurance exchanges.<sup>13</sup> Roughly 2.2 million Americans, of whom a disproportionate number are Black, fell in this coverage gap in 2021 (Garfield et al., 2021). An analysis of the ACA's impact on minority uninsurance rates by Lines et al. (2021) reveals that in some states, "more than one-quarter of Black, one half of Hispanic, and approaching one-half of low-income adults remained uninsured after full implementation of the ACA" (p. 493).

### III. TELEHEALTH AND TELEMEDICINE

Before turning to the intersection of telehealth and health disparities, we define and describe telehealth and review trends in its use. In addition, we briefly explore some issues critical to the viability and longevity of telehealth. Based on our assessment of trends, quality of care and cost, licensure, and insurability, we expect telehealth to remain a viable alternative and complement to traditional modes of care. While the use of telehealth has diminished in recent months as the intensity of the pandemic has waned, we anticipate expanded use of these technologies to remain over the longer term, including direct provider-to-patient interactions. There is a marked disparity in access to and utilization of telehealth across race and geography. This issue will need to be addressed before telehealth is successfully mainstreamed as a mode of healthcare delivery.

#### What Is Telehealth?

In general terms, "telehealth" refers to "the use of medical information exchanged *via* electronic communications to support and provide health care" (Rosenthal, 2021). Broadly defined, examples include direct provider-to-patient interactions via videoconferencing (virtual visits), chat-based interactions, remote patient monitoring, physician-to-physician consultations, patient education, data transmission and interpretation, and digital diagnostics (algorithm-based support), whether alone or in combination with conventional modalities ([American Telemedicine Association](#) [ATA]). The key characteristics of telehealth are that it involves the use of information and communications technologies (ICTs) and is delivered outside of traditional facilities. Distance is often a factor that promotes the use of telehealth (World Health Organization, 2010; Hyder and Razzak, 2020) but is not a necessary factor in the decision to exploit telehealth resources.

In this overview, we focus chiefly on "telemedicine," or live encounters that involve real-time, synchronous, bi-directional audio and videoconferencing between patients and their healthcare

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<sup>12</sup>As of November 2021, 12 states has not expanded Medicaid under the ACA, mostly in the southeast (KFF, [Status of State Action on the Medicaid Expansion Decision](#)).

<sup>13</sup>Because the ACA, as originally passed, provided low-income people with coverage through Medicaid, it does not provide financial assistance to people below poverty for other coverage. The median income eligibility threshold for Medicaid in nonexpansion states is 41 percent of the FPL.

providers, which is often distinguished from other forms of telehealth (Doraiswamy et al., 2020).

### **Trends in the Utilization of Telehealth**

Technology has always played a critical role in medicine and healthcare, and technological change is pervasive in healthcare. Indeed, physicians were among the first to adopt the telephone as a tool of the trade (Baumann and Scales, 2016). But the challenges of integrating telehealth technology are significant, and telehealth has not seen the rapid take-up characteristic of most medical innovations.

One problem is simply technological know-how. Although much of the output of the healthcare sector is processed information, relatively few healthcare workers are highly skilled in the associated technologies (Lee, 2019). A recent review of telehealth training in allied health, for example, argues that education programs have “been slow to catch up and adapt the curriculum to ensure graduates are equipped with the knowledge and skills to implement telehealth in the workplace” (Hui et al., 2021). Further, communication competency requirements are unique in the telehealth sphere, but most telehealth training does not develop these competencies (van Galen et al., 2019). Nevertheless, experience with the transition to electronic health records (EHR) suggests the problem is undoubtedly tractable. In 2004 the take-up rate for EHR was 18 percent, but by 2013 almost 80 percent of office-based physicians were using some type of EHR system (DeSalvo, 2014). By 2018 EHR penetration was 92 percent (CDC, [National Electronic Health Records Survey](#)).

Historically, outside of mental health (see Brenes et al., 2015), the application of telehealth to chronic conditions has been largely limited to asynchronous monitoring or telephone support (Dorsey and Topol, 2016). As recently as 2012, a review of 141 randomized controlled trials of 148 telehealth interventions for chronic conditions included only 10 that incorporated videoconferencing with a clinician (Wootton).<sup>14</sup> Only 0.24 percent of January 2020 medical claims were for provider-to-patient telehealth services, the bulk of which were for psychiatry or colds and flu (FAIRHealth, 2020). Still, the use of telehealth, particularly video visits, has expanded significantly in the last few years. Even before the COVID-19 pandemic ensued, the National Health Service in the United Kingdom had committed to providing every constituent the right to be offered digital primary care by 2023-24, and that all patients would have the right to video consultations by April 2021 (Macwilliam, 2021).

The pace of expansion in telehealth accelerated rapidly with the onset of the COVID-19 pandemic as healthcare providers made efforts to ensure safety for medical staff and patients. In February 2020, the Centers for Disease Control and Prevention (CDC) issued guidelines suggesting that healthcare facilities and providers offer services through virtual means (Koonin et al., 2020). Using data from health data purveyor [Compile](#), McKinsey & Company reported a subsequent spike in telemedicine utilization across all specialties from a negligible amount in

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<sup>14</sup>The overall assessment was that the telemedicine interventions were equally effective, although the median duration for the studies was six months, and the authors note an intervention for a chronic condition likely could not have much effect unless applied for “a long period.” The authors also highlight the well-known bias against publication of null findings (no effect of the intervention) in the literature.

January and February 2020 to over 32 percent of outpatient visits in April 2020 (Bestsenny et al., 2020 [May]). While utilization of telemedicine has since moderated, a July 2021 update to the McKinsey & Company report shows that utilization of telemedical visits remains exceptionally high when compared with pre-pandemic levels, approaching 17 percent of all outpatient evaluation and management visits. This number of outpatient visits amounts to about two-thirds of the number of *potential* visits McKinsey & Company projected *could be* virtualized in their May 2020 report.

Some suppliers of telehealth services saw dramatic increases in the use of their products, suggesting there was significant development of telehealth infrastructure concurrently. The enhancement of telehealth infrastructure has significant implications for future use by increasing the capacity of healthcare systems to provide it. Amwell, a major telehealth company headquartered in Boston, saw its provider usage jump from 5,000 to 72,000 in less than a year and is now launching an open architecture platform that can enable further connectivity between healthcare stakeholders and potentially foster additional innovation and integration (Schoenberg and Deetjen, 2021).

The updated McKinsey & Company report (July 2021) shows that in February 2021, at which time many social distancing orders and recommendations had been relaxed, uptake in virtual visits remained as high as 50 percent of all visits for psychiatry, 30 percent of all visits for substance use disorder treatment, and 17 percent for endocrinology and rheumatology. This finding is unsurprising given that these practice areas often do not require a physical exam of the patient. Northern California physician Leah Rothman, DO stated in a recent interview, “It’s about having a dialogue and the clinician asking probing questions around it and then coming up with what the plan is. In a number of instances, the exam is not the highest-value item for that discussion” (McCray-Ruiz-Esparza, 2021).

In 2018, the most common users of telehealth for physician-to-patient interactions were radiologists (39.5%) and psychiatrists (27.8%) (Kane and Gillis, 2018) (radiology is not included among the specialties analyzed in the McKinsey & Company report). As late as June 2021, according to a separate McKinsey & Company survey, only 37 percent of respondents reported their last visit with a psychologist or psychiatrist was in person, the remainder occasioned virtually by video conference (40 percent) or by telephone (23 percent) (Bestsenny et al., 2021 [July update]). Latest pediatric visits were 70 percent in person, and last urgent care visits were 79 percent in person.

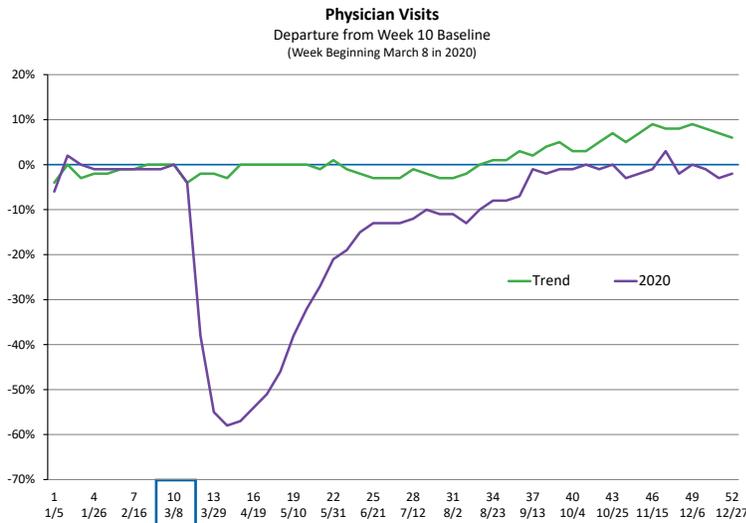
Data from Phreesia, a health technology company, show a precipitous decline of in-person physician visits concurrent with the sharp rise in telemedicine visits (Mehrotra et al., 2021).<sup>15</sup> The data were collected from 50,000 provider-clients. As the number of telemedicine visits surged during the early-pandemic period, the Phreesia data show the number of in-person visits declining precipitously, down 58 percent by April 2020 from the early-March 2020 baseline (Figure 5). The decline of in-person visits was likely due in large part to deferments of

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<sup>15</sup>The data were collected from Phreesia’s 50,000 provider-clients and analyzed by researchers from Harvard University. There were just over 1 million licensed physicians in the United States in 2020 (Young et al., 2021).

care, but telemedicine accounts for a significant portion of the decline of in-person visits.<sup>16</sup> By early May 2020, telemedicine accounted for 12.5 percent of all outpatient visits according to the Phreesia data (Figure 6).

**Figure 5**

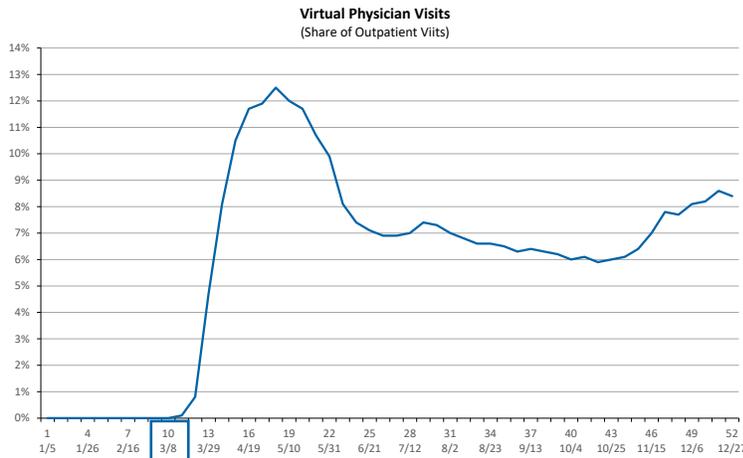


Data Source: The Commonwealth Fund (February 22, 2021) [datafile]

Note: All figures represent percentage departures from the baseline, which is week 10 of the year, or for 2020, the week beginning March 8. In week 52, the *trend* (green line) is for in-person visits to be 6 percent higher than the week 10 baseline (highlighted with a blue box); that is, *in a typical year*, visits in late December are about 6 percent higher than in early March. In *2020* (purple line), however, week 52 visits were 2 percentage points below the week 10 baseline. Therefore, the net difference in 2020 in-person visits in the last week of the year was 6% – (– 2%) = 8 *percentage points*. The 2020 census of physicians from the Federation of State Medical Boards was 1,018,776 in the United States and District of Columbia (Young et al., 2021).

<sup>16</sup>Deferments represent medical care that was delayed, but some care was eliminated. Examples of delayed care would include elective surgeries or well-patient visits. Examples of eliminated care would be emergency department visits and hospice care.

Figure 6



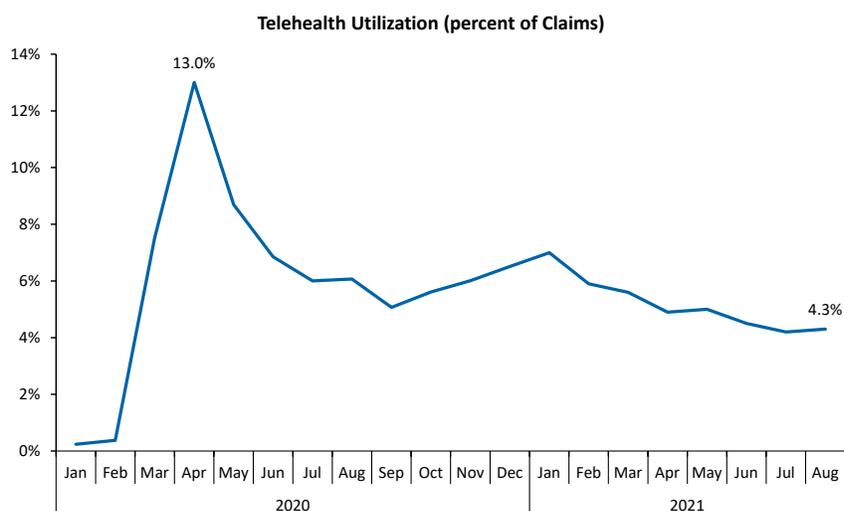
Data Source: The Commonwealth Fund (February 22, 2021) [datafile]

Note: These data are differently sourced than the McKinsey & Company data, and therefore results are not directly comparable. Data were collected from 50,000 provider-clients of Phreesia, a health technology company and analyzed by researchers at Harvard University. The 2020 census of physicians from the Federation of State Medical Boards was 1,018,776 in the United States and District of Columbia (Young et al., 2021).

In-person visits rebounded shortly after the spring 2020 entrenchment, but by the end of 2020 remained about 8 percentage points below their typical level for that time of the year (see chart notes, Figure 5). Some Americans continue to defer care, but much of the decline is likely due to telehealth alternatives. Regarding the former, continued deferment is most pronounced in pediatrics. For example, by the last week of 2020, for children ages 3-5, in-person physician visits were 48 percentage points below where they would be for that week prior to the COVID-19 pandemic (Mehrotra et al., 2021).

It remains to be seen if these trends in expanded utilization of telehealth continue. For example, despite significant customer adoption of online tools for filing claims in the pandemic era, consumers began to “revert to in-person ways to file insurance claims” as the pandemic was waning in late 2021 (French, 2021). The latest data at writing from FAIRHealth show telehealth to have accounted for 4.3 percent of claims in August 2021, a tick up from the previous month’s post-pandemic low (Figure 7).

**Figure 7**



Data Source: FAIRHealth, [Monthly Telehealth Regional Tracker](#)

Issues around licensure, insurance, privacy, and legal liability are challenging and often have stymied growth in the utilization of telehealth technologies, particularly in provider-patient interactions (Breen and Matusitz, 2010; Baumann and Scales, 2016). The COVID-19 pandemic forced healthcare professionals, consumers, industry, and policymakers to address these issues, and much progress has been made. But these issues must be settled, and quality and cost-effectiveness ensured, if telehealth is to remain a viable alternative to or complement to traditional modes of medical practice.

### **Quality of Care and Cost-Effectiveness**

Our discussion of the implications of telehealth for health and healthcare disparities presumes a future for telehealth. That future will depend on the quality of care telehealth can provide and its comparative cost. Because telehealth encompasses numerous modalities that can be used for diverse conditions and patient populations and it can either substitute for or supplement in-person visits, a blanket assessment of telehealth’s efficacy is untenable, as the efficacy varies by application and modality (Shigekawa et al., 2018). However, to provide some perspective, we highlight a sample of reviews of studies that address issues of quality and cost of care, recognizing that telehealth technology is continuously evolving, and with that evolution is an evolution in telehealth’s cost-effectiveness.

#### *Quality of Care*

Evaluations of quality of care in telehealth generally compare telehealth modalities with “usual care,” which most typically is traditional in-person care, rather than to absolute standards. Most studies we reviewed find that, in the majority of use cases, telehealth modalities are as effective or more effective than usual care, although there is variance across use cases and the specific modalities implemented.

In a systematic review of meta-analyses on the clinical effectiveness of telehealth modalities, Snoswell et al. (2021) conclude that telehealth can be as clinically effective or more clinically effective than usual care.<sup>17</sup> They are careful to note that the studies they examined are discipline-specific, which again underscores the likely variance in the efficacy of telehealth applications across uses. In another review of reviews, Eze et al. (2020) find that in 83 percent of the studies they evaluated, “telemedicine was found to be at least as effective as face-to-face care” (p. 1).

Flodgren et al. (2016) reviewed 93 clinical trials evaluating the effectiveness of telehealth interventions delivered in addition to (32 percent of included studies), as an alternative to (57 percent), or partly substituted for (11 percent) usual care, as compared to usual care alone. Interventions provided remote monitoring (55 studies), or real-time videoconferencing (38 studies), which was used either alone or in combination with remote monitoring. They find no difference in all-cause mortality. Results for specific use cases, however, show promise for telehealth gains in some diagnostic areas and reinforce the view that efficacy is likely to vary by modality and application.

For studies recruiting participants with diabetes, Flodgren et al. find lower A1c (a persistent measure of glucose concentration in the blood; lower is better) levels for those allocated to telehealth. They also find “some evidence” for a decrease in LDL (“bad cholesterol”; lower is better) and blood pressure for those allocated to telehealth to address those maladies. The findings of lower blood pressure in the telehealth group by Flodgren et al. are consistent with a volume of evidence that suggests home blood pressure monitoring provides greater accuracy and prognostic value than in-clinic readings (George and MacDonald, 2015). George and MacDonald find home blood pressure monitoring to be especially efficacious when a healthcare professional observes and provides feedback on the patients’ routine over videoconferencing.

### *Cost-Effectiveness*

Although a 1997 article declared that house calls were a “vanishing practice” (Meyer and Gibbons), Landers et al. (2005) document a reversal, at least for the Medicare beneficiaries they studied. Home visits for outpatient evaluation and management increased 118 percent between 1998 and 2004 (although remaining below 1 percent of all visits). They attribute this reversal to several factors, among them information technology. But cost seems to have played a significant role. In particular, they attribute increased house calls partly in response to Medicare’s early hospital discharge program, which (ostensibly) was for cost-saving, and significant increases in house call volume came from (ostensibly) cost-saving use of nurse practitioners. These results suggest that “house calls” in the form of remote monitoring or videoconferencing have significant potential for cost savings.

As an example, Grustam et al. (2017) assessed the cost-effectiveness of home telemonitoring in the management of patients with chronic heart failure from a third-party payer perspective. They compared this modality with nurse telephone support and “usual care.” They find both

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<sup>17</sup>A meta-analysis is a systematic, quantitative assessment of a body of literature intended to draw conclusions about that body of literature. It is the quantitative cousin to the (systematic) literature review. See Haidich (2010).

home telemonitoring and nurse telephone support to be cost-effective alternatives to usual care, with incremental costs (the measure of cost-effectiveness) being lower for home telemonitoring than for nurse telephone support.

Research suggests that telehealth can be less costly in a variety of applications, but the evidence is mixed. Critical to cost-effectiveness are the cost of implementing telehealth and the degree to which that cost can be spread. Unsurprisingly, some threshold level of use must be met for the technology to be cost-effective. For example, Buvik et al. (2019) showed that the use of videoconferencing for orthopedic consultations in a remote clinic cost less than standard outpatient consultations at the specialist hospital as long as the total number of patient consultations exceeded 151 per year (183 visits from a “health sector perspective”). Echoing the importance of the costs of implementing telehealth, Snoswell et al. (2021) argue that telehealth “does not routinely reduce costs for the health system and can actually increase costs at both implementation *and* ongoing service delivery stages” (p. 763, emphasis added). In their relatively large review of published telehealth effectiveness studies, which crosses several disciplinary boundaries, Eze et al. (2020) report that 39 percent of studies that measured cost-effectiveness found “telemedicine” to be cost-saving or cost-effective.

Rather than focus on cost, Snoswell et al. argue that health services considering the implementation of telehealth “should be motivated by benefits other than cost reduction such as improved accessibility, greater patient-centricity, and societal cost-benefit” (p. 763).

### **Perceptions of Telehealth**

McKinsey & Company’s August 2021 [Consumer Health Insights](#) poll finds that consumers have become increasingly focused on their health and wellness during the pandemic period, labeling those categories with increased importance compared to before the pandemic (Cordina et al, 2021). Among consumers who were surveyed, between 40 and 60 percent “expressed interest” in a set of “broader virtual health solutions,” such as digital check-ins and a lower-cost virtual health plan. Important, however, is that there has been a historic gap in interest in telehealth solutions and actual usage.

In pre-pandemic research by Powell et al. (2017), most of the patients interviewed expressed overall satisfaction with (primary care) video visits and were interested in continuing to use the telemedicine alternatives to in-person visits. The primary benefits cited were convenience and decreased costs.<sup>18</sup> Important domains for the consideration of primary care video visits were convenience, efficiency, communication, privacy, and comfort.

Many physicians who had been reluctant to use new health technologies embraced telemedicine as a way to limit patient exposure during the COVID-19 pandemic. Shiferaw et al. (2021) consider numerous factors that could potentially affect physicians’ acceptance of telehealth technologies, broadly defined. Among them, the expectancy of the effort required on the part of the physicians, ease of use, and expectations of performance were significant. The authors note that during the time of their survey, amidst the COVID-19 pandemic, intentions toward telehealth were “amplified” (p. 11). Physicians also have expressed financial

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<sup>18</sup>Decreased costs for patients are far from universal, as currently, most physicians are compensated commensurate with an in-person visit.

concerns (Heyer et al., 2021). Still 57 percent of physicians view telehealth more favorably than they did before the COVID-19 pandemic, and 64 percent are more comfortable using it (Bestsennyy et al., 2001 [July update]). During the early months of the COVID-19 pandemic, an important determinant of telehealth utilization by physicians was pre-pandemic telehealth utilization (Patel et al., 2021b).

Research suggests privacy is a pervasive concern, which could limit the acceptance of telemedicine alternatives to in-person care, especially in sensitive interactions like psychiatry and in the wearing of digital devices that store large amounts of information accessible to third parties “without user consent” (Cowan et al., 2019; Anaya et al., 2018). Informed consent may alleviate some concerns regarding the latter. Physicians and medical students also report privacy concerns, particularly data security (Wernhart et al., 2019). In particular, physicians have pointed to the Health Insurance Portability and Accountability Act’s (HIPAA) privacy regulations as an impediment to their use of telemedicine (Keesara et al., 2020) [the U.S. Department of Health and Human Services Office for Civil Rights issued a [Notification of Enforcement Discretion](#) to empower healthcare providers to use telehealth applications without the risk of penalties for violations of HIPAA rules for the good faith provision of telehealth services]. An additional concern, both from the perspective of patients and physicians, is physician-patient relationships (Heyer et al., 2021; Wernhart et al.), including the limited ability of physicians to comfort patients in a virtual setting (Heyer et al.).

A sheer volume of research papers on telehealth perceptions in health literature databases such as PubMed and MEDLINE provide mixed results on acceptance of telehealth by patients and providers, depending in large part on the specific specialty, but the consensus seems to be that most patients and healthcare providers are interested in and welcoming of telehealth. This sentiment is echoed particularly in recent work by Connolly et al. (2020), who find that, at least in psychiatry, which is the dominant specialty in telemedicine, “the relative advantages of [telemental health conducted via videoconferencing], such as its ability to increase access to care, may outweigh its disadvantages” (p. 2510).

## Licensure

Early in the COVID-19 pandemic, all 50 states and the District of Columbia used emergency authority to waive some licensure requirements to facilitate patient access to care and continuity of care via telehealth (Alliance for Connected Care). States differ widely in how they define and regulate telehealth. While there are similarities in language, noticeable differences also can exist. These differences can create a confusing environment to navigate when a health system or practitioner provides services in multiple states.

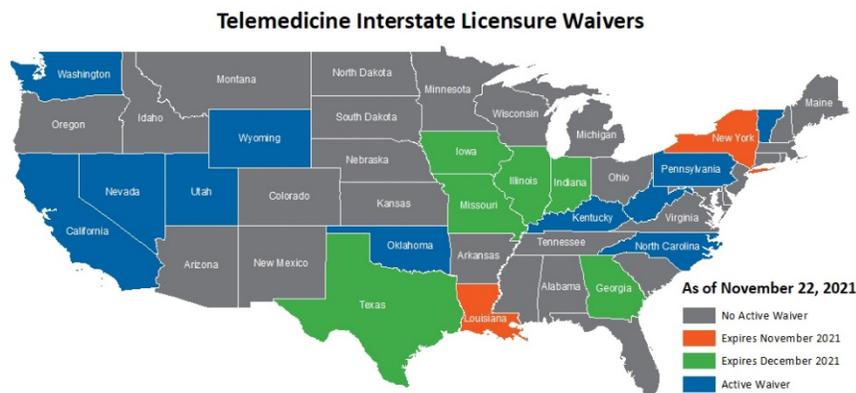
Some states have since lifted emergency waivers or let them expire. As of November 22, 2021, 18 states had waivers in force (Federation of State Medical Boards) (Figure 8).<sup>19</sup> The remaining 32 states and the District of Columbia do not have waivers (or closed waivers). Finally, many states have been granted the flexibility to use telehealth for Medicaid services (Medicaid

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<sup>19</sup>The Federation of State Medical Boards maintains an [up-to-date list](#) of waivers and requirements that includes legislative citations. The Alliance for Connected Care has a similar [dashboard](#). See also U.S. Department of Health and Human Services, [Telehealth Licensing Requirements and Interstate Compacts](#).

Section 1135 Waiver). The blanket waivers allow healthcare providers to use telehealth platforms that are not HIPAA-compliant (e.g., Skype, FaceTime, WhatsApp). According to The Alliance for Connected Care (2021), CMS has approved 53 state waivers under Section 1135.

**Figure 8**



Data Source: Federation of State Medical Boards

Notes: Alaska has no waiver in place. A waiver in Hawaii is due to expire November 30, 2021.

### Insurance and Reimbursement Policies and Regulation

Before the onset of the COVID-19 pandemic, limited reimbursement constrained the widespread use of telehealth, although reimbursement regimes were changing (Dorsey and Topol, 2016). In 2016, 29 states had regulations requiring private insurers to provide coverage for telehealth services, which was about twice the number of states with coverage requirements three years before. Medicaid covered telehealth in 48 states. Medicare coverage of telehealth was highly restrictive, however. Medicare reimbursed for telehealth services only in clinical facilities in areas with a shortage of health professionals.

Given the importance of and increased demand for telehealth services during the pandemic, state insurance regulators were obliged to address policies on the insurability of telehealth services. As the COVID-19 pandemic began to unfold, the NAIC urgently took up potentially problematic issues around health insurance coverage and access to care. On March 20, 2020, the NAIC held a special session of its Spring National Meeting to address prospects for the pandemic itself, but more specifically, the likely impact of the pandemic on health insurance markets.<sup>20</sup> One outcome was the NAIC's [Coronavirus Resource Center](#), which provides a detailed summary of the actions taken by states in response to the COVID-19 pandemic (through December 2020). These actions include requirements, regulations, and advisories on telehealth coverage, including reimbursement parity and consumer cost-sharing (deductibles, copayments, and coinsurance).

The scope of these actions varied by state and were in the form of orders, requests, and notices. Orders *require* or *direct* insurers to take an action, requests *encourage* insurers to take an action, and notices advise insurers. Aggregating data from the NAIC Coronavirus Resource

<sup>20</sup>Videos of the session are available on the [NAIC's YouTube channel](#).

Center, Frederick and Karl (2021) write that, through the end-of-year 2020, 45 states had taken regulatory action on telehealth and health insurance. In the aggregate, 46 orders had been issued, 21 requests had been made, and 14 notices had been given related to telehealth. Many of these actions directed carriers to cover telemedicine visits.

Most state actions covering telehealth have been orders requiring coverage of services provided through telemedicine. For example, the [Arizona Telehealth Order \(Executive Order 2020-07\)](#) requires that insurance plans provide coverage for telemedicine services, including short-term limited duration plans and limited-benefit plans, and that coverage must be provided for all health care services. Further, insurers can not place additional requirements on telehealth providers that are more restrictive or less consumer-friendly than in-person requirements, and insurers are required to reimburse telehealth services at the same level as in-person services (parity).

As an additional example, Colorado's [Emergency Regulation 20-E-05](#) orders individual, small group, large group, and student health plans to cover (appropriate) telehealth services, even if technologies are not HIPAA-compliant (many HIPAA requirements were relaxed during the pandemic). Insurers also must pay no less than the typical payment for in-person care and are prohibited from mandating an existing patient-provider relationship. Further, the order requires coverage of in-network telehealth services that are pandemic-related without cost-sharing.

In Figure 9, we update a broad set of telehealth regulations through March 15, 2021, as enumerated by Volk et al. (2021). There are numerous components of telehealth regulation, and there are many nuances in state policies. As a result, there are some inconsistencies in reports of rules and regulations by states across information sources. Moreover, many of the requirements are subject to interpretation. The reader is encouraged to contact the relevant department of insurance for specific, up-to-date regulations and requirements in any specific state. Finally, many states changed telehealth-related rules and regulations regarding aspects unrelated to insurance, such as licensure requirements or authority to prescribe controlled substances *via* telehealth.

Per Volk et al., 35 states required state-regulated individual and group health insurers to cover telemedicine visits before the pandemic (Panel A). Five additional states added the requirement after the pandemic commenced, either permanently or temporarily. Half of the states (25) required parity in policyholder cost-sharing (Panel B). Since the pandemic began, 3 additional states added parity requirements, and 4 prohibited cost-sharing altogether (2 of which required parity before the pandemic). Only 3 states required insurers to cover audio-only telemedicine visits at the pandemic's onset, but 18 states have added the requirement since, either permanently or temporarily (Panel C). Half of the states require parity in reimbursement of providers: 15 before the pandemic and 10 additional since (Panel D).

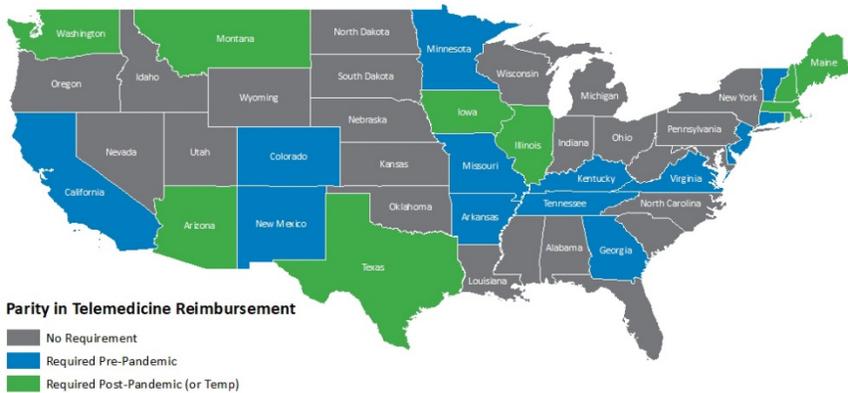


**Panel C: Coverage of Telemedicine Audio-Only Visits**



Note: Neither Alaska nor Hawaii has requirements in place for audio-only telemedicine visits. Some requirements have since expired or been rescinded.

**Panel D: Reimbursement Parity for Telemedicine Visits (Providers)**



Note: Alaska does not require parity in reimbursement. Hawaii required parity before the pandemic. Note: Some requirements have since expired or been rescinded.

Data Source: Center on Health Insurance Reforms, Georgetown University Health Policy Institute. Volk et al. (2021) [The Commonwealth Fund] [Data as of March 15, 2021]

Dress and Mitchell (2021, October 8) provide additional updates for 16 states. In most cases, the orders extended states of emergency and related telehealth regulations, although there are exceptions. Governor DeSantis of Florida issued an executive order to end the public health emergency on June 26. Audio-only was no longer considered an “acceptable platform to deliver telehealth services to non-Medicare patients,” and physicians can no longer prescribe controlled substances *via* telehealth. Virginia’s order was reported to have ended June 30. Governor Cuomo of New York rescinded that state’s emergency order but noted that consumers could receive coverage for telehealth services while the federal public health emergency order is still in place. Both Iowa and Wisconsin made telehealth flexibilities permanent, while Illinois extended flexibilities to 2027.

The status of telehealth rules and regulations across states is likely to remain fluid for some time, even after the COVID-19 pandemic wanes. For example, the Mississippi legislature is set to “revisit” telehealth regulations in its next legislative session (Sullivan, 2021). Variation across states likely will remain for an extended time.

#### **IV. HOW MIGHT DEVELOPMENTS AND INCREASED USE OF TELEHEALTH AMELIORATE HEALTH AND HEALTHCARE DISPARITIES**

To examine how increased availability and use of telehealth service services could reduce socioeconomic and demographic health disparities, we review the literature on barriers to healthcare for these populations generally and then associated them, as relevant, with telehealth. That is, for any known barriers to equitable care, which could potentially be reduced or eliminated with further developments and increased use of ICT-enabled healthcare?

The sheer number of obstacles that stand in the way of equitable healthcare make enumerating all of them quite impossible. However, we note that some of the more prominent among them are financial barriers; inadequate outreach; a lack of health literacy and opportunities for health education; language; lack of cultural competencies; systemic and structural racism; behavioral factors; and lack of physical access to care (see, e.g., Lion et al., 2020; Terui, 2017; White and Itzkowitz, 2020; Rask et al., 1994). While there are many barriers to health equity, we find physical access to care to be the most substantial and pervasive obstacle that could be alleviated with the increased utilization of telehealth.

##### **Inadequate Supply of Healthcare Professionals and Institutions**

A significant impediment to healthcare access is physical distance. There is a dearth of physicians and other healthcare practitioners in many areas of the United States. The paucity of healthcare professionals in some rural areas is not surprising, but the extent to which many rural areas lack reasonable physical access to care is astounding in some cases.

##### *Rural Areas*

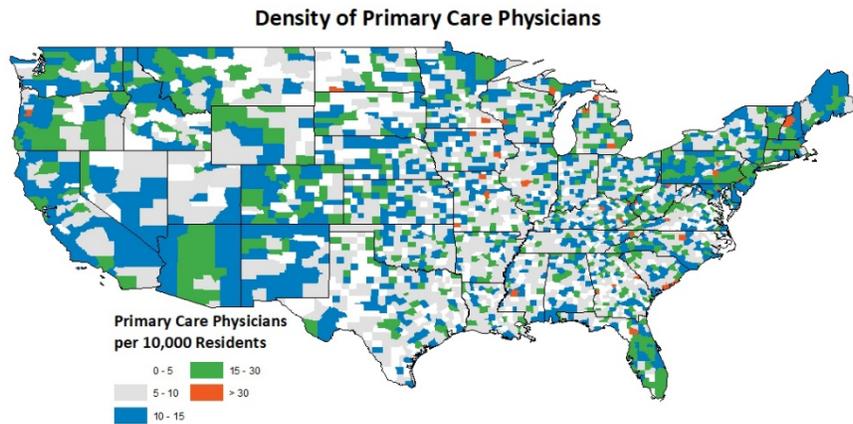
A critical problem facing rural areas is an insufficient supply of physicians and other healthcare professionals and staff. Large areas with sparse populations lack the capacity to support many healthcare services.

The overall distribution of physicians in the United States is exceedingly uneven. Physicians are highly concentrated in urban areas, and some rural places have proportionately very few (Ricketts, 2013). Moreover, physicians are also highly mobile compared with the general population, and they more often move from rural areas to metropolitan areas than the reverse. Rural populations consistently suffer from a (relative) shortage of physicians. The problem of low physician supply in rural areas is compounded by the mobility of physicians because physicians located in areas with a low supply of physicians are more likely to move (Ricketts).

Using data from Vericred, a large purveyor of data on health insurance and provider networks, we compute the number of primary care physicians (PCPs) per 10,000 residents by county

(Figure 10).<sup>21</sup> We note that specialists are more concentrated than PCPs, and thus accessing specialty care can be considerably more arduous.

**Figure 10**



Data Source: Vericred

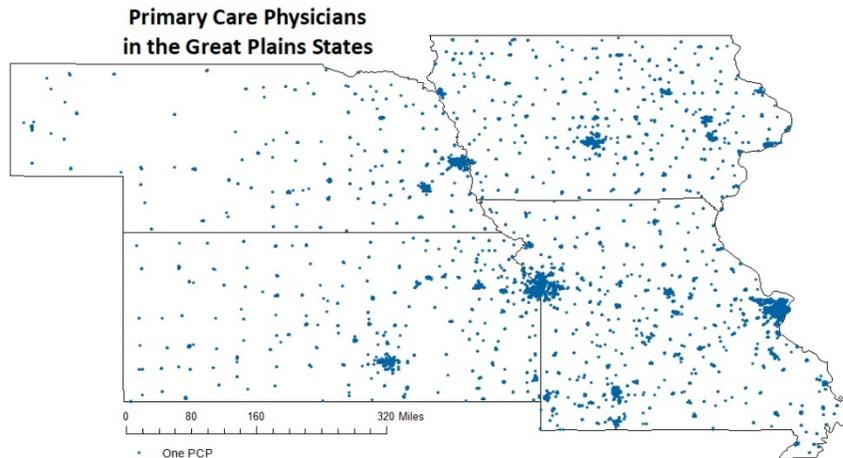
The median county has about 9.1 PCPs per 10,000 residents. Of all 3,142 counties, 121, or just under 4 percent, have no PCPs in the county, another 97 counties have only 1 PCP, and 102 counties have only 2 PCPs. Thus, more than 10 percent of counties have 2 or fewer PCPs located in the county. About 19 percent of counties have 5 or fewer PCPs in practice there. Over one-quarter of counties have less than 6 PCPs per 10,000 residents.

More telling of the paucity of PCPs in some areas is a visualization of the physical locations of the physicians. Often physicians are located close to hospitals where they have privileges, and thus much of the population of a large county could be many miles away from a PCP, even if the PCP density in the county is acceptably high. To make the visualization clearer, we map PCPs in a subset of states (Figure 11). Specifically, we map PCPs in the Great Plains states (Iowa, Missouri, Nebraska, and Kansas) to highlight the large swaths of areas without physicians one commonly finds in rural areas.

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<sup>21</sup>We classified physicians as PCPs if their stated specialty is family medicine, general practice, or internal medicine. The Vericred data may *overestimate* the number of physicians because we could not verify, they were still in practice. In total, we count roughly 534,000 PCPs in the United States.

**Figure 11**



Data Source: Vericred

### *Areas with High Minority Concentrations*

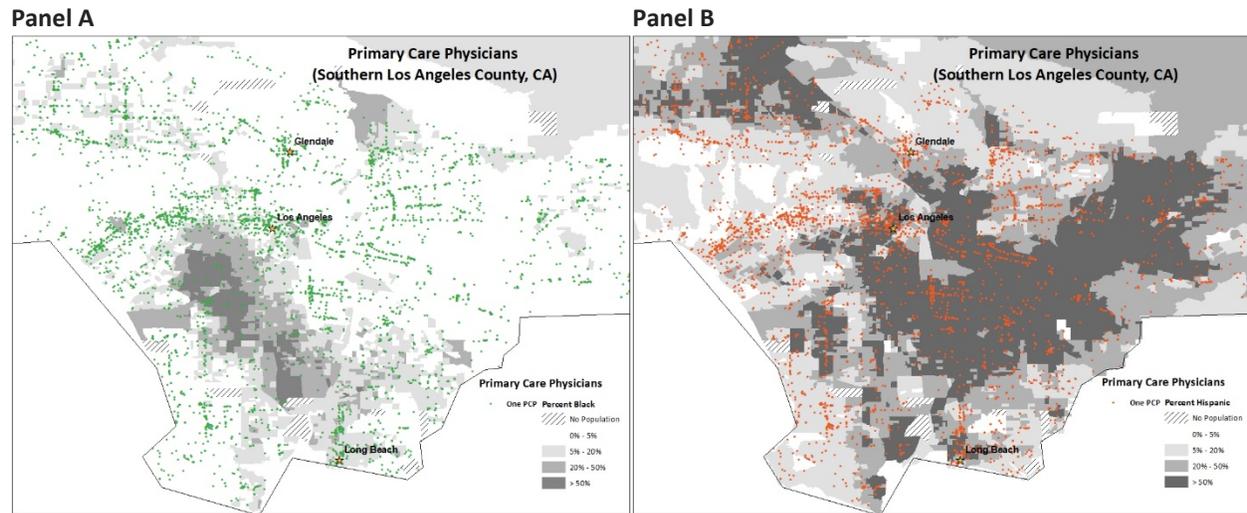
To examine the density of PCPs by racial and ethnic density, a national map is uninformative because the volume of information is too overwhelming to clearly visualize patterns. We, therefore, look specifically at southern Los Angeles County, CA. Los Angeles is the largest county in the United States by population, with more than 10.1 million residents (2020 Census).<sup>22</sup> It is also racially and ethnically diverse. About 26 percent of the population is White and non-Hispanic. Moreover, Los Angeles does not have a well-developed rail system and does not have the ease of transport that one might find in, say, New York City or Chicago, and therefore the location of physicians may have more bearing on access to care. The northern part of the county is relatively unpopulated (largely White, non-Hispanic), and the paucity of physicians there obscures the meaningful spatial relationship between PCP location and racial and ethnic density.

While there are PCPs located throughout southern Los Angeles County, they are substantially more concentrated in non-Black, non-Hispanic areas (Los Angeles County is 15.4 percent Asian) (Figure 12). Panel A shows a marked dearth of PCPs in areas with high concentrations of Black residents. Comparatively more PCPs are located in areas with high Hispanic population concentrations, however, almost 50 percent of the Los Angeles County population is ethnically Hispanic (2020 Census), and the density of physicians is still comparatively sparse.

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<sup>22</sup>The distribution of the PCP population differs from city-to-city. We looked at PCP concentration in several other cities, and the distribution is qualitatively the same as in southern Los Angeles County. That is, PCPs tend to be concentrated in non-minority areas. Southern Los Angeles County should be viewed as an example of what we see.

**Figure 12**  
**Primary Care Physicians in Southern Los Angeles County (by racial and ethnic density)**



Data Source: Vericred

Note: Densities are calculated at the census block group level.

### **Inadequate Access to Transportation**

Access to healthcare depends critically on transportation, and telehealth holds great promise as a means of alleviating the burden of disease by increasing access to care when physical presence is not feasible. Syed et al (2013) cite 31 research studies that associate inadequate transportation with reduced access to care. Access to regular health services is especially critical for chronically ill patients, who require not only regular visits with clinicians, which can involve changes in treatment plans but also access to acquire medications.

#### *Minority and Low-Income Populations*

Lack of adequate transportation is a significant impediment to acquiring healthcare services for many disadvantaged Americans, whether historically underserved racial and ethnic minorities, low-income individuals and families, or those living in rural areas. Rask et al. (1994) study obstacles to gaining access to care for several thousand low-SES Atlantans. They find that walking or using public transportation to receive healthcare is a significant, independent predictor of not having a regular source of care and that patients who do not use private transportation are significantly more likely to delay receiving healthcare, which is a recurring theme in the literature. Nine of the studies cited in Syed et al. (2013) that associate inadequate transportation with lack of access to healthcare define transportation as access to a private vehicle, whether through ownership or the assistance of family and friends. Particularly troubling from a social perspective is a finding by Hensley et al. (2018) that those without private vehicle access are more likely to leave prescriptions for their children unfilled.

Especially pertinent in the last year has been access to COVID-19 vaccinations. Kim (2021) finds differential access to have been a significant contributing factor to vaccination rate differentials at the time of his study (March 2021) (see also Edmiston et al., 2021). Dr. Alister Martin of

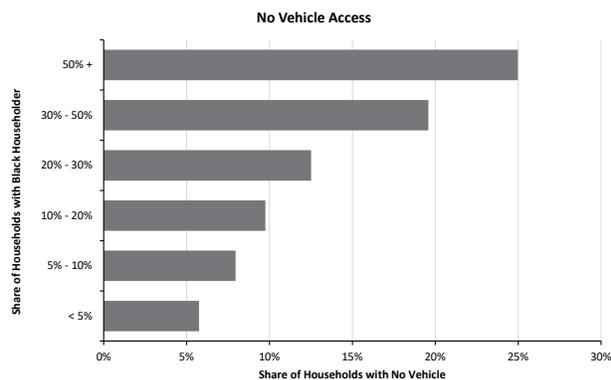
Massachusetts General Hospital suggests that the “number one barrier [to vaccination] is still access” (Garcia, 2021). Higher vaccination rates among Native Americans than non-Hispanic Whites are thought to be due in part to efforts by the Indian Health Service (HIS), an infrastructure that is lacking for other minority groups (Recht et al., 2021). According to survey evidence, Latinx individuals are the most eager of any group to get vaccinated, but numerous obstacles have kept vaccination rates low compared with non-Hispanic Whites, which includes transportation barriers (Almendrala, 2021; see also Reyes-Velarde, 2021). In states where access to HIS facilities is lacking, vaccination rates for Native Americans are lower than for non-Hispanic Whites. Black unvaccinated participants interviewed by Okoro et al. (2021) asserted that transportation is a major barrier preventing them from getting vaccinated.

Lack of vehicle access corresponds closely with race and ethnicity. We analyze data from the Census Bureau’s 2019 [Public Use Microdata Sample](#) (PUMS) and find that 18.3 percent of Black households do not have access to any vehicle. In addition, 10.7 percent of Hispanics, 13.1 percent of Native Americans, and 11 percent of Asians lack access to any vehicle. By comparison, 6.2 percent of White non-Hispanic households lack access to a vehicle.

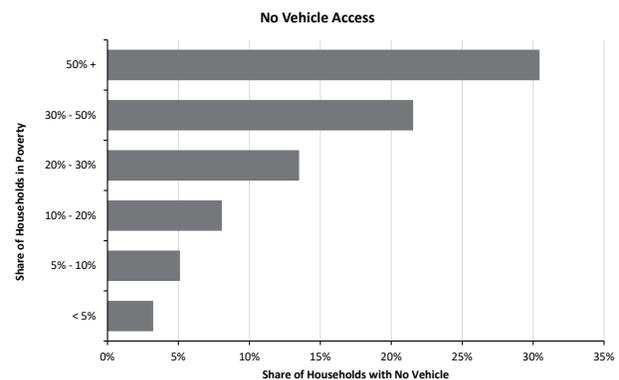
Figure 13 breaks down the relationship between race (Black) and vehicle access and also shows vehicle access by share of households living in poverty. In census tracts where the population is 50 percent or more Black, one-quarter of households lack access to a vehicle (Panel A). Comparatively, in areas where 5 percent or less of households is Black, just over 5 percent of households lack access to a vehicle. Given the overall rate of vehicle access for Black households (18.3 percent), these data make clear that most Black households without access to a vehicle live in areas where black households are most concentrated. Thus, many Black households suffer the dual problem of few healthcare professionals close-by *and* lack of access to a vehicle with which to travel to them.

**Figure 13**

**Panel A**



**Panel B**



Data Source: [Spatial Risk Systems](#)

Note: Data are for census tracts.

Unsurprising is that households located in areas with concentrated poverty are more likely to have no access to a vehicle (Panel B). Specifically, in areas where the majority of households

live in poverty, almost one-third of households lack access to a vehicle. In very low-poverty areas, few households lack a vehicle. Poverty is generally concentrated spatially, and most poor households live in dominantly poor neighborhoods (Shapiro et al., 2015). Moreover, poor Black or Hispanic families are more likely to live in concentrated poverty neighborhoods, 25.2 percent and 17.4 percent, respectively, than are poor white families (7.5 percent).<sup>23</sup>

### Rural Populations

Transportation issues are not limited to urban areas. Indeed, our analysis of data from the Bureau of Transportation Statistics’ Local Area Transportation Characteristics for Households ([LATCH Survey](#)) shows rural households to be much more likely to have no vehicle access (Table 1). Less than 5 percent of households in urban areas lack access to any vehicle, compared with 14 percent of households in rural areas.

**Table 1**  
**Household Vehicle Access in Urban, Suburban, and Rural Areas**

Urbanicity	No Vehicles	1 Vehicle	< 2 Vehicles	2+ Vehicles
Urban	4.9%	28.1%	33.0%	67.0%
Suburban	5.9%	33.0%	38.9%	61.1%
Rural	14.0%	38.0%	52.0%	48.0%

Source: CIPR calculations.

Data Source: Bureau of Transportation Statistics, [LATCH Survey](#)

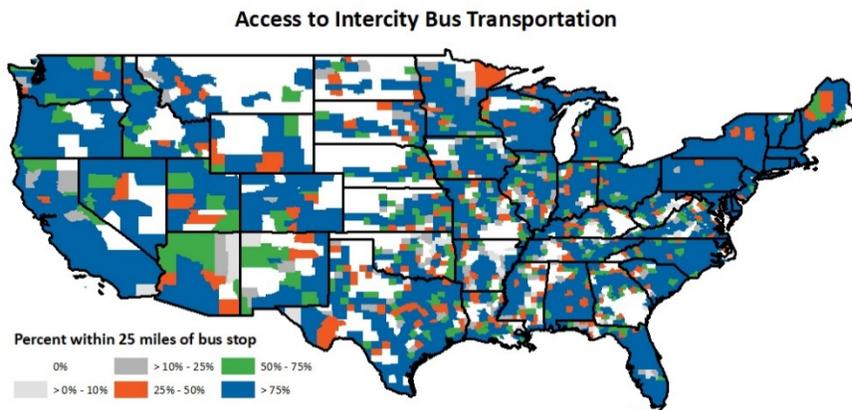
The implications for health of lacking personal vehicle travel are evident when looking at healthcare utilization among those who are unable to drive. In a study of rural residents in Appalachia, Arcury et al. (2005) estimated that rural residents who had a driver’s license had 2.29 times more health visits for chronic care and 1.92 times more visits for regular checkup visits than those who did not. Of those without a driver’s license, access to family or friends who could provide transportation led to 1.58 times more visits for chronic care than those who did not.

While access to public transportation can significantly increase visits for those without access to private transportation, public transportation networks are very thin in rural areas when compared to urban areas. Large swaths of the rural population, particularly in the country’s mid-section, have no access to intercity bus transit at all, as measured by living within 25 miles of an intercity transit bus stop (Figure 14). In many other rural areas, sizeable portions of the population do not live within 25 miles of an intercity transit bus stop. As with areas with high concentrations of minorities, millions of rural Americans suffer a dual problem of having few if any physicians and no vehicle with which to travel where they are located. The situation is made worse in rural areas due to the absence of alternative transportation modes.

In a study of veteran health in rural areas, Buzza et al. (2011) distance was identified by patients and healthcare providers as the *most important barrier* to access to healthcare.

<sup>23</sup>A neighborhood is considered to have concentrated poverty if 40 percent or more of households are in poverty.

Figure 14



Data Source: Bureau of Transportation Statistics, Access to Intercity Transportation in Rural Areas [shapefile]

Transportation research is clear and consistent in finding that quality transportation infrastructure produces multiplicative benefits, including increased economic output, productivity, income, employment; and most germane to this article, improved access to healthcare (Ingram et al. 2020; Bhatta, and Drennan 2003). Woolf and Braveman (2011) report that allocating less resources to transportation would increase medical costs and health disparities. If poor public transportation infrastructure would negatively influence individuals' access to healthcare, and evidence suggests that U.S. infrastructure is in dire need of repair and enhancement (Czajkowski et al. 2021), then relying on telehealth could potentially reduce health disparities; that is, by reducing the burden of poor public transportation in underserved areas.

Arguably, telehealth has great potential to bridge the gap in access to care by connecting isolated people with health practitioners and reducing the need for transportation to receive care. Indeed, some existing research asserts that lessening the necessity of physical transportation to access medical care would improve access to care and mitigate disparate health outcomes (see, e.g., Blumenshine et al., 2008; Almagro and Orane-Hutchinson, 2020). Kakolyris et al. (2020) argue that medical technologies such as telehealth, combined with public provision of social goods, could ameliorate the negative effects of an epidemic on disadvantaged populations.

## **V. HOW MIGHT DEVELOPMENTS AND INCREASED USE OF TELEHEALTH EXACERBATE HEALTH AND HEALTHCARE DISPARITIES?**

One of the most pressing concerns in the evolution of the digital economy, which has persisted throughout the internet's history, is that of a digital divide, or a gap in computer and Internet access across economic, demographic, or social lines (Edmiston, 2003). The term encompasses multiple disparities, including the lack of access to Information and Communications Technology (ICT) infrastructure, such as high-speed internet (i.e., broadband) and low levels of digital literacy. [Adobe Systems](#) defines digital literacy as "the ability to navigate, evaluate, and communicate information online or in a digital format."

The digital divide has been a consistent and pervasive roadblock in the diffusion of ICT-enabled services as they have evolved. For example, Edmiston (2003) elucidates serious consequences of a digital divide for the provision of ICT-enabled government services, both along access and literacy domains. “Innovations theory” shows that new technologies consistently diffuse through socioeconomic strata from high SES to low SES populations [Rodgers (1995); see Robinson (2009) for a summary of Rogers]. Consistent with this well-established theory, individuals of higher SES historically have been the first to adopt and benefit the most from the introduction of new technologies in health (Weiss et al., 2018 and references therein).

The diffusion of telehealth has followed a similar pattern both across and within countries. In the years before the onset of the COVID-19 pandemic, telemedicine, which was limited overall, was largely restricted to developed countries, and within those countries, to high-income individuals (Scott and Mars, 2015). This experience suggests the rapid transition to telehealth commensurate with the pandemic could exacerbate health disparities by limiting opportunities for vulnerable populations to take advantage of innovations. Indeed, in an early pandemic study of telemedicine utilization in New York City, Weber et al. (2020) estimated that, of any age group, patients 65 and older had the lowest odds of using telehealth versus other modalities. Black and Hispanic patients had higher (adjusted) odds of using either emergency department or clinical office visits versus telehealth than either Whites or Asians.

Evidence that minorities, low-income people, the less educated, and rural dwellers have less access to the Internet, and hence telemedicine, and are less technologically literate (on the whole) is a significant policy problem. The federal and state governments, by their nature (and in many places, constitutionally), must give adequate consideration to equity concerns in their policy decisions (Edmiston, 2003).

### **Access to Technology Infrastructure**

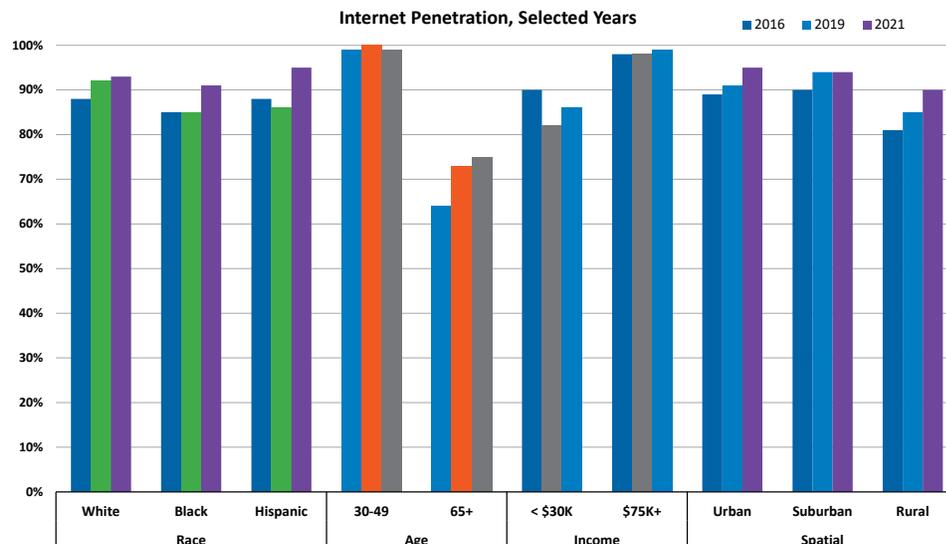
Eruchalu et al. (2021) report that over 21 million Americans have limited or no access to broadband. Lack of broadband access is more pronounced among the historically disadvantaged and underserved, including racial and ethnic minorities, lower-income people, and older adults. The communities likely to benefit the most from telemedicine and other forms of telehealth—these groups as well as those in rural areas—also are the least likely to have access to broadband internet, which is a necessity for telemedicine.

Lai and Widmar (2021) assert the digital divide has been “painful” during the COVID-19 pandemic because the availability of high-speed internet has been a necessity for most people to work effectively, and more germane, to have access to healthcare *via* ICT (p. 459). Indeed, in the very early stages of the COVID-19 pandemic, before healthcare providers and facilities were able to adapt to new norms, telehealth was the only way to receive certain types of care. Lai and Widmar argue that heavy reliance on digital technologies early in the pandemic exacerbated health disparities among older patients (over 65 years), Hispanics, Blacks, and other traditionally disadvantaged and underserved populations, such as those who reside in rural areas.

Pew Research Center, through their extensive survey operations, have been collecting data on broadband internet penetration and use since 2000. Data for 2021 show that the share of the population with any access to the internet has now diffused almost fully across racial groups without substantial disparities: 93 percent for Whites, 91 percent for Blacks, and 95 percent for Hispanics (Figure 15). Nevertheless, gaps clearly persist, and roughly 7 percent of Americans (of all races) do not have any internet access. While clearly the large majority of Americans have internet access, the internet has become so fundamental to everyday life that even a small gap is troubling.

Internet access has not diffused as completely by age, income, and spatial population density. Nevertheless, there have been significant gains. With respect to age, the share of seniors with internet access increased from 64 percent to 75 percent from 2016 to 2021 (penetration has been about 100 percent for younger Americans since 2016). For those with low incomes, internet penetration increased from 79 percent in 2016 to 86 percent in 2021. Rural areas have struggled to gain internet access compared with their urban and suburban counterparts, but as of 2021, 90 percent of rural Americans had internet access.

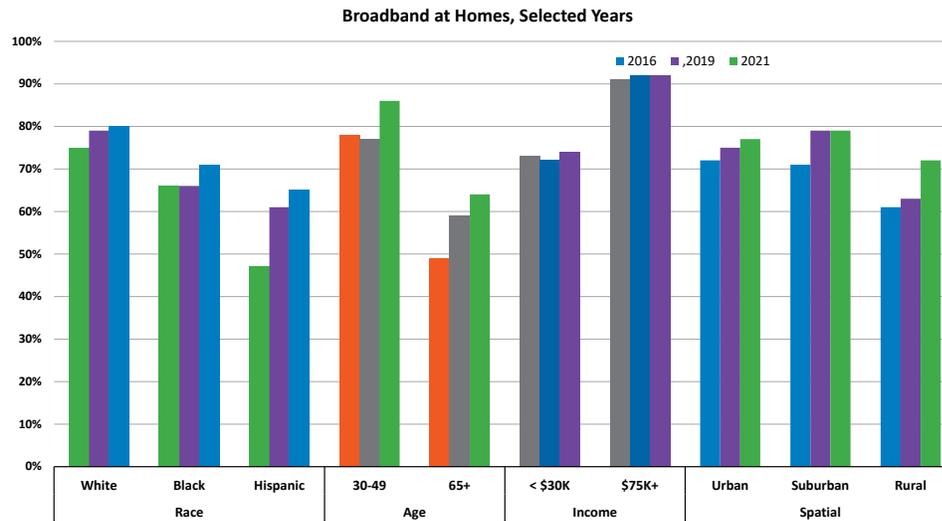
**Figure 15**



Source: Pew Research Center, Internet/Broadband Fact Sheet

The Pew survey question asks about any access to the internet, which presumably may not be at home for some. Adequate technology for telehealth purposes requires access at home (for privacy, or at least some access to the internet with sufficient privacy) and also broadband. Substantial gaps remain in broadband internet access at home, and disparities are clearly evident (Figure 16).

**Figure 16**

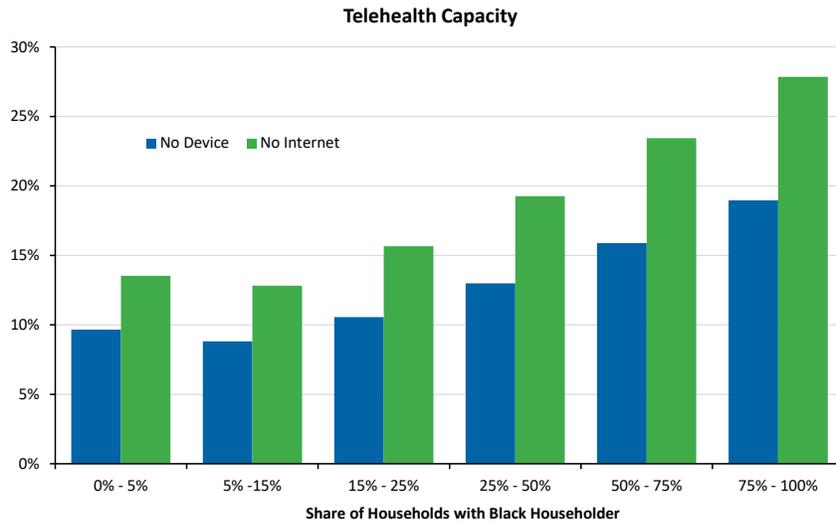


Source: Pew Research Center, Internet/Broadband Fact Sheet

About 80 percent of Whites have broadband access at home, which itself meaningfully limits access to telehealth services. But around one-third of Blacks (29 percent) and Hispanics (35 percent) lack broadband at home. The gap for seniors is especially pronounced, but access to broadband at home has increased significantly for seniors over the last five years. By 2021, almost two-thirds of seniors had broadband at home (64 percent), compared with less than half in 2016 (49 percent). There has also been rather dramatic penetration of broadband at home in rural areas, increasing from 61 percent in 2016 to 72 percent in 2021. But a 28 percent gap is substantial when considering that those in rural areas are perhaps the most in need of telehealth to improve access to care.

Disparities in access to technology necessary for telehealth services are also evident spatially. Using data from Spatial Risk Systems, we show the proportion of households without access to a device (computer, tablet, or smartphone) and without access to the internet by race (percent Black) (Figure 17). In areas with a majority Black population, substantial shares of households have no access to a device and sizably more have no internet access. For census tracts that have 50-75 percent Black householders, almost 16 percent of households do not have access to any kind of device, and over 23 percent do not have any kind of internet access. For those with more than 75 percent Black householders, the rates are roughly 19 percent and 28 percent, respectively. By comparison, in census tracts with few Black householders, only a small fraction of households lacks a device and/or internet access.

**Figure 17**

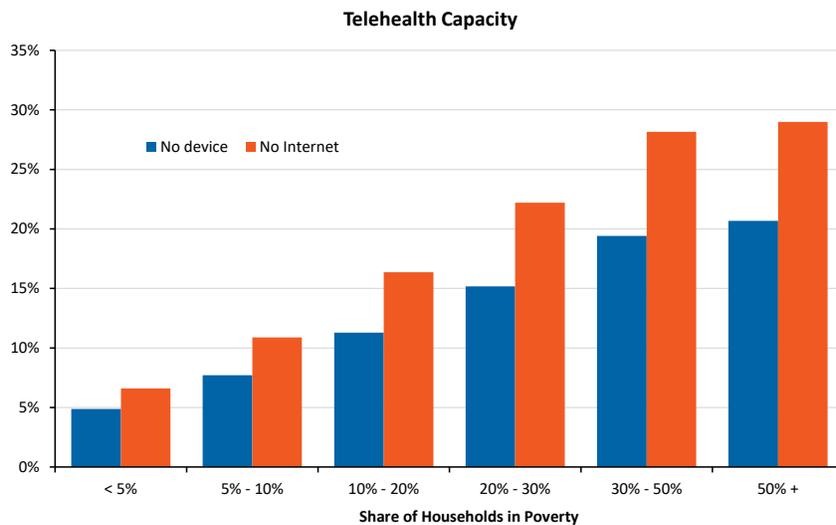


Source: CIPR calculations.

Data Source: Spatial Risk Systems.

We explore telehealth technology capacity by poverty status as well. In areas with 30 percent or more households in poverty, roughly 20 percent lack an internet-capable device and nearly 30 percent lack access to the internet.

**Figure 18**



Source: CIPR calculations.

Data Source: Spatial Risk Systems.

Telehealth disparities due to the digital divide also are pervasive among individuals who have limited English proficiency. English is the native language of 25.9 percent of internet users, compared with 19.6 percent of the entire population ([Internet World Stats](#)). More importantly, however, is that 60.4 percent of internet content is in English, compared with 4.0 percent for

Spanish, the second most common native language in the United States ([Visual Capitalist DataStream](#)).<sup>24</sup> Internet penetration among primary English speakers is 77.5 percent, compared with 58.8 percent for the world at large ([Internet World Stats](#)).

Rodriguez et al. (2021) examine the effect of English proficiency on telehealth use, and then the effect of telehealth on access to healthcare and utilization. They find substantially lower rates of telemedicine use among people with a language barrier compared with proficient speakers of English (4.8 percent and 12.3 percent, respectively). Rodriguez et al. conclude that telehealth has the potential to mitigate health disparities if and only if it meets patients' needs, such as accessible language and better, more diffused ICT infrastructure. They call on policymakers and providers "to pursue linguistically equitable care in emerging technologies' (p. 949).

Older Americans are a constituency where a digital divide could weigh heavily on telemedicine adoption as well. Contrary to conventional wisdom, Wu et al. (2015) found in a series of focus groups that older adults (mean age 77.1 years) generally are "fascinated by the potential of technologies," and indeed, those who "master technologies were considered empowered." Still, older adults are comparatively slower to adopt new technologies and tend to be more selective when doing so (Olson et al., 2011). Interestingly, an exception noted by Olson et al. was alternative modes of healthcare delivery, which older adults used more often than younger adults (largely telephony at the time).

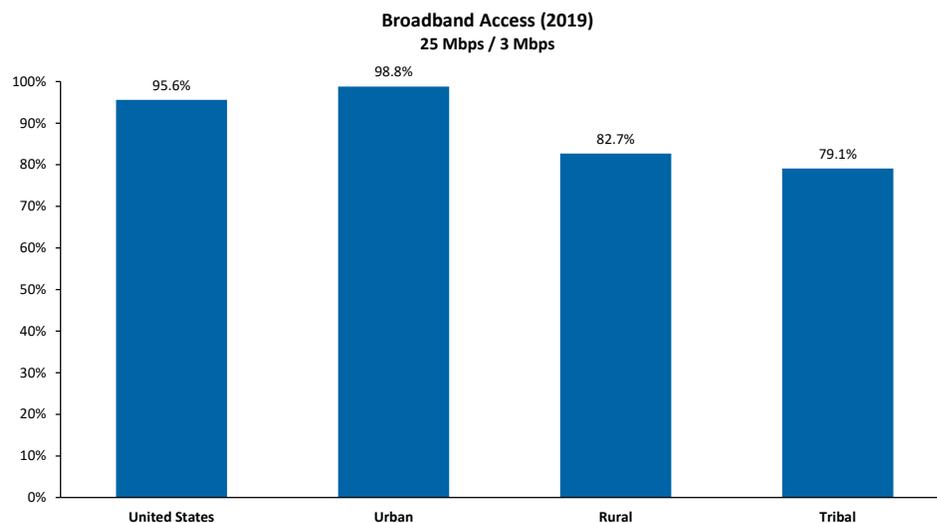
Post-pandemic research estimates that telemedicine use is 25-30 percent lower in rural areas than in urban areas (Patel et al. 2021a; Patel et al., 2021b). Consider mental health. As noted in the text, psychiatry is the medical specialty with the greatest penetration of telemedicine, currently at 50 percent of all outpatient visits. Historically, rural residents have been deprived of mental healthcare due to a lack of psychiatrists and other mental health professionals in rural areas. Telemedicine is seemingly the ideal solution to this problem. However, rural residents often lack the necessary internet bandwidth, or even the access to technology, to make this solution a reality (Patel and Mehrotra, 2021, October 7). Moreover, even after controlling for local health care resources, COVID-19 burden, broadband infrastructure, and indicators of socioeconomic status, rural residents still are less likely to use telehealth resources than their more urban counterparts (Patel and Mehrotra). Although why is unclear, we conjecture that visibility and digital literacy (see below) could be parts of the problem.

While the number of new broadband subscribers continues to grow, in general, rural areas, have lagged behind urban and suburban areas in broadband deployment and the speed of service offered, especially in tribal areas (Congressional Research Service). In 2019, the latest date at which data are available, 98.8 percent of urban residents had access to fixed terrestrial broadband (download speed of 25 Mbps or greater and upload speeds of 3 Mbps or greater) (not necessarily at home), compared with only 82.7 percent in rural areas and 79.1 percent in tribal areas (Figure 19).

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<sup>24</sup>[DailyWireless](#) reports a significantly lower number, but what they mean by English spoken on the internet is not clear on the website and may reflect primary language of users, which would be largely consistent with the data we report in the text.

**Figure 19**



Source: Congressional Research Service, 2021.

Heavy reliance on telehealth requires pervasive ICT infrastructure and access to related technology. However, this requirement is not met rural areas. According to the Federal Communications Commission (2020), 34 percent of Americans who live in rural areas do not have access to internet or lack access to the *high-speed* infrastructure that is needed for a successful telemedicine visit (see also Eberly et al., 2020). Hirko et al. (2020) report that that 40 percent of Michigan residents who live in rural areas do not have access to high-speed internet compared with Michigan residents who live in urban areas. Such digitally isolated people in rural areas—those with limited access to internet and related technology—tend to be financially burdened, less educated, and to suffer from serious diseases. According to Hirko et al., chronic diseases, diabetes, and obesity are more prevalent among digitally isolated people in the rural areas. The individuals who may have the highest need and with conditions that are amenable to telemedicine, appear to have the least access.

### **Digital Literacy**

Insufficient digital literacy for vulnerable populations also stands in the way of more universal ICT-enabled gains in access to care. In June 2021, American Medical Association (AMA) delegates added digital literacy to connected health programs and the AMA’s strategic plan for advancing health equity (Wicklund, 2021). Digital literacy also is a central objective of the [Healthy People 2030](#) program of the Office of Disease Prevention and Health Promotion at the U.S. Department of Health and Human Services.

To have successful telemedicine appointments, patients need to understand how telemedicine platforms work, which is likely to pose difficulty for some patients, especially older adults (Lam et al., 2020). Lai and Widmar (2021) also cite digital literacy as an especially significant concern about the elderly. In addition to older adults, Chesser et al. (2016) find disproportionately low digital literacy in the health context among the less educated and those who are members of racial or ethnic minority groups.

Research also suggests that those with lower levels of digital literacy are less engaged and receive fewer psychological benefits from telehealth interactions even when they participate. Lepore et al. (2019) find that population variance in digital literacy affects the value cancer patients receive from internet support groups.

Inadequate digital literacy is not only a barrier for patients, but also for many health professionals. Seifert and Smith (2020) examine the role of digital literacy on telehealth use by medical staff and residents in Long-Term Care Facilities (LTCFs). They argue that successful use of telehealth resources is not only dependent on the availability of telemedicine infrastructure but also the proficiency of using health technology by medical staff (as well as patients).

Some medical facilities are not prepared for a rapid transition to telehealth, and inadequate digital literacy is common among healthcare workers. Seifert and Smith assert that “innovative models of care that include telemedicine can be helpful, but organizational readiness to adopt telemedicine needs urgent attention” (p. 3). To ensure organizational readiness, they call for allocating more resources to educate medical staff using health technology platforms, and for the provision of better telemedicine infrastructure (telemedicine tools, and access to internet) in underserved areas.

Kemp et al (2021) argue that limited digital literacy among patients and some health professionals are major drivers of health disparities in Australia, which is similar to the United States in many important ways. About 87 percent of Australians use the internet, compared with 89 percent of the United States, and Australia has a significant disadvantaged and underserved indigenous population. Much like the United States, digital technology engagement is less common among older individuals and disadvantaged populations in underserved areas.

## **VI. SUMMARY, ASSESSMENT, AND CONCLUSIONS**

Voluminous research has documented disparities in health outcomes and healthcare provision across minority racial and ethnic groups, those with lower incomes and socioeconomic status, older adults, and those who live in rural areas. The accelerated development and substantial increase in utilization of telehealth resources during the COVID-19 pandemic has sparked considerable interest in telehealth, including at the NAIC, where the Health Innovations Working Group has been charged with investigating implications of increased telehealth availability for socioeconomic and demographic health disparities.

In investigating the potential for telehealth to reduce health disparities, we find the most significant obstacle to health parity that could be affected by increased development and utilization of telehealth resources is likely access to care. We document research that shows wide differences in densities of medical professionals across geographies and accessibility to transportation, particularly private transportation. Moreover, those most limited in these regards are historically disadvantaged and marginalized Americans. These disparities in access to care are associated with disparities health outcomes.

Unfortunately, the potential for telehealth technologies to increase parity in access to care and health outcomes is limited by access to broadband internet and digital literacy. We show marked disparities in broadband internet access across population groups. In particular, millions of households in rural areas lack access. Racial and ethnic minorities also disproportionately lack access to broadband infrastructure, particularly Native Americans. Even with access to broadband, many in these same groups lack sufficient digital literacy to leverage digital technology to improve health. Older adults also will be limited by insufficient digital literacy.

**Our overall assessment is that telehealth, and telemedicine in particular, have great potential to reduce problems of access to care for disadvantaged and underserved groups. However, limitations in broadband access and digital literacy will meaningfully limit efforts to increase access to care through telehealth. While digital inequities may not exacerbate existing socioeconomic and demographic health disparities, they may well have created a new one.**

To effectively address access to care through telehealth, we suggest that

- Rules and regulations that add flexibility for telehealth, including those around licensure and insurance parity, must be addressed in a way that makes them reliable. One way to ensure faith in this flexibility would be to codify pandemic era rules and regulations.
- Sufficient infrastructure must be in place, and healthcare professionals and patients sufficiently educated, to reach a critical mass of telehealth utilization to ensure cost-effectiveness.
- A concerted effort will be required to ensure that disadvantaged and marginalized groups have the necessary technology and digital literacy to take advantage of telehealth.

Research must also continue, as the need is great. Good policy is well-informed policy. In particular, there is a dire need for additional tracking of telehealth's utilization by socioeconomic and demographic stratum. The existing literature is exceedingly thin. Moreover, research on the effect of telehealth utilization on disparate health outcomes is nonexistent. Because telehealth came into "wide" use only since the onset of the COVID-19 pandemic, it will take time to generate this research, and doing so will be far from easy due to a tangled web of complexities. As Timmermans and Kaufman (2020) rightly note, "health technologies are not immutable black boxes having uniform effects on all users but that the kind of health technology, its origins, its adoption, and the *actual use of the technology* will produce a variety of intended and unintended effects on different kinds of users" (p. 588, emphasis added). Further, "[w]hile there is little doubt that digital health technologies are widely used, it is difficult to disentangle digital technologies' independent effects on social inequities, because these technologies are so intertwined with every aspect of wellness and health care, many of them take off quickly and widely, and they may have few observables, direct health effects" (p. 596).

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