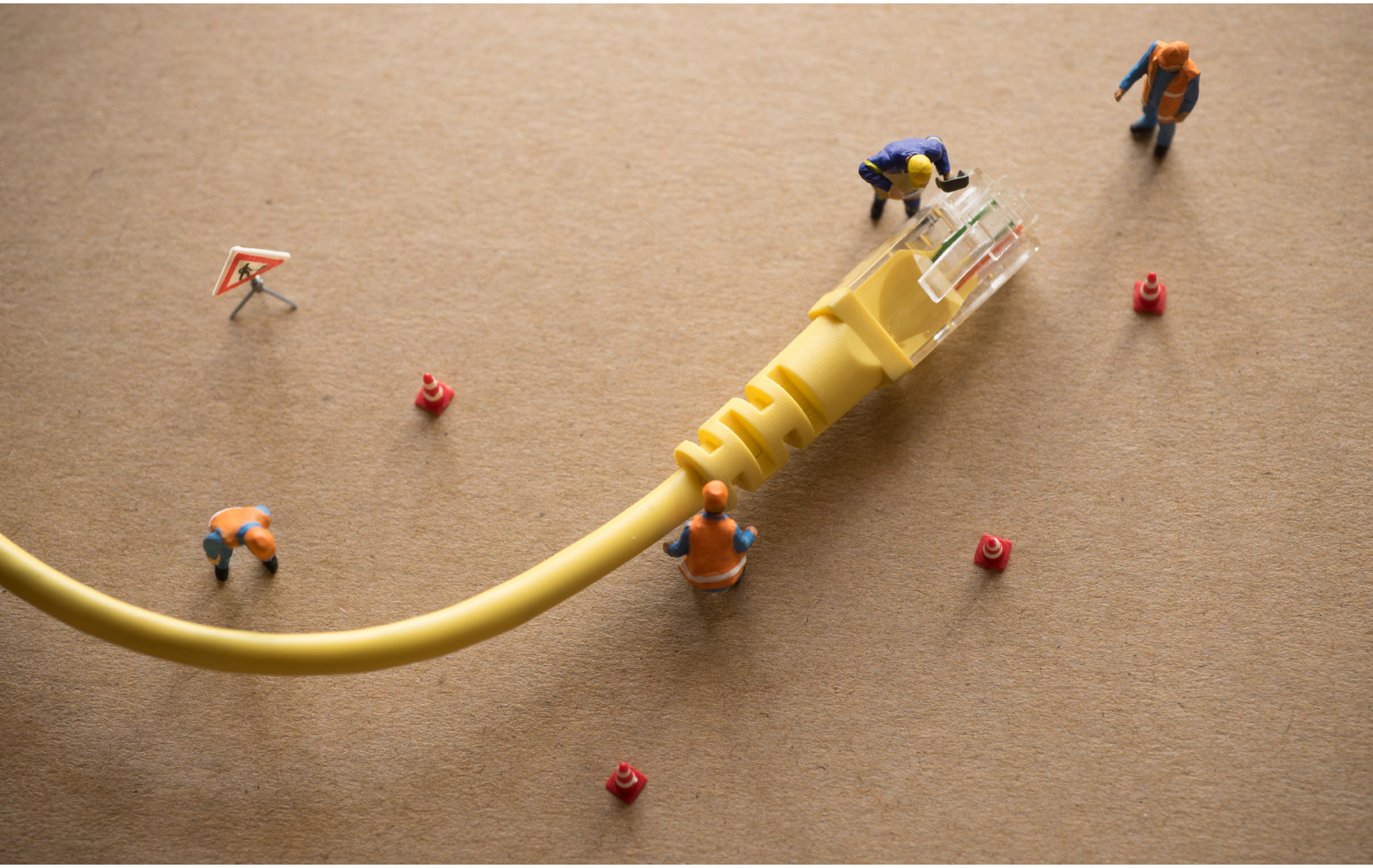
RESEARCH BRIEF

Digital Prosperity: HOW BROADBAND CAN DELIVER HEALTH AND EQUITY TO ALL COMMUNITIES



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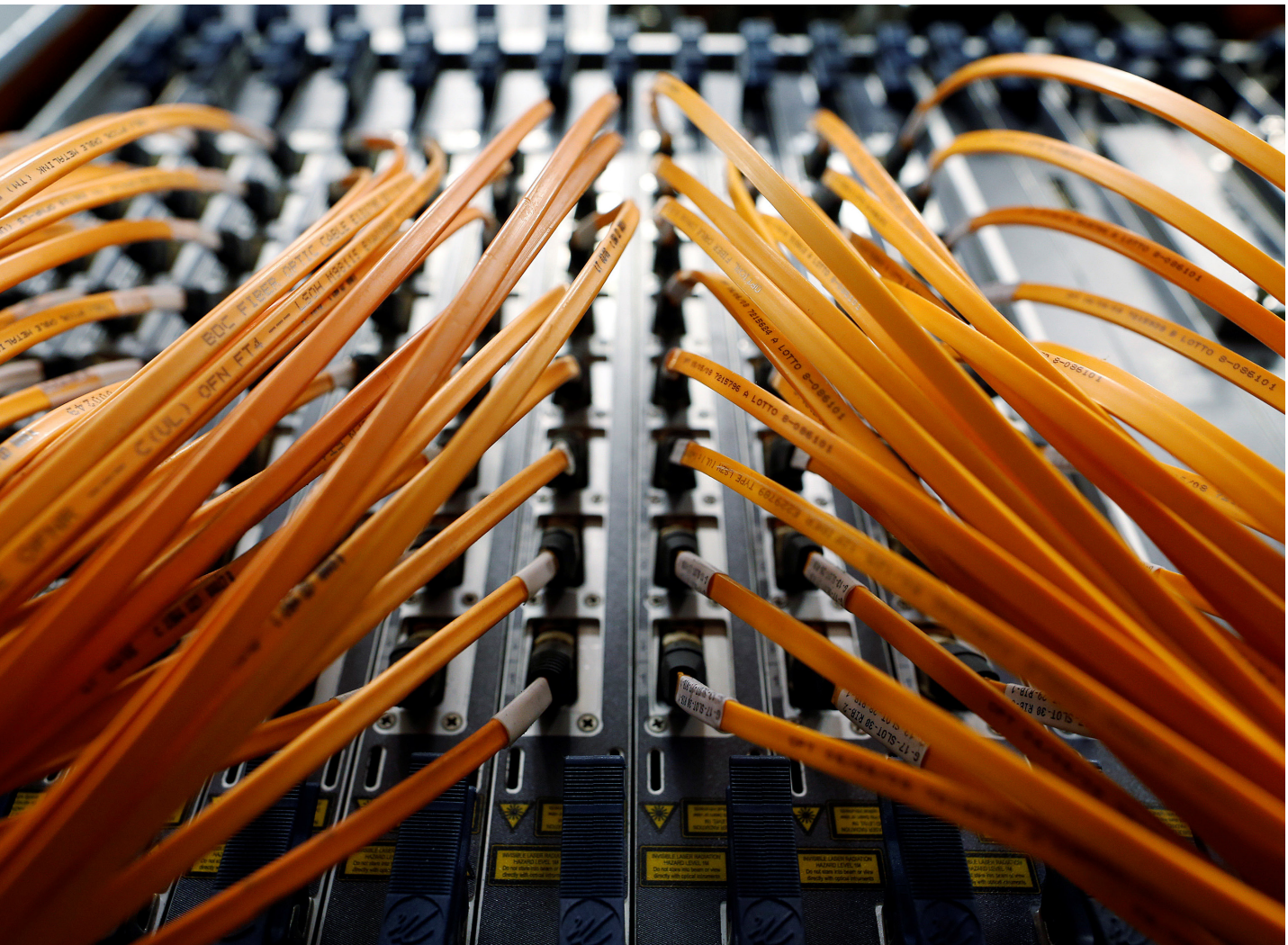
Introduction

Two decades into the new millennium, the digitalization of American life is no longer striking—it is ordinary. Every industry relies on computing, cloud storage, or other digital equipment to sell goods and services. Employers increasingly demand more advanced digital skills from the labor force. Meanwhile people's individual lives often orbit around the internet, whether at home, at work, or on the move. Even decades-old infrastructure—from roads and rails to water pipes and the energy grid—now relies on digital equipment for construction, operation, and modernization.

Broadband is the connective tissue behind such sweeping digitalization. Combining the capabilities of telephone, radio, television, and print communications, broadband uses digital telecommunications to allow people and businesses to rapidly exchange data between devices and through the internet. Much like electricity in the 20th century, broadband is the platform on which much of modern life takes place.

Broadband is so influential on society that we would now call it essential infrastructure. That means affordable subscription prices, universal access to connected devices, and a population equipped with digital skills are now all vital characteristics of a healthy neighborhood, city, state, or country. Broadband's applications are so far-reaching that these physical networks directly and indirectly affect a wide range of conditions that impact health and life outcomes, known as social determinants of health (SDOH).

Despite its importance, broadband is still far from ubiquitous. Millions of households do not have access to high-speed wireline or wireless services,



and many more lack the digital skills or income to use online services. These gaps persist across all kinds of places: in every single state, regardless of density levels, from small towns to urban neighborhoods, and among demographic groups of all races, educational attainments, and income levels.

These gaps create systemic barriers to healthy outcomes and equitable economic opportunity. They not only impact households without broadband subscriptions, but they also limit the economic and social potential of the entire country. Just as a community is impacted by a contaminated water system or extensive electricity blackout, broadband gaps represent a shared challenge that individuals alone cannot overcome.

Moving forward, the country's public officials and their private and civic sector peers face a critical choice. If broadband is essential infrastructure, then regulation and public policy should support every American community having equitable access to broadband and the skills necessary to use it.

Over the past year, Brookings Metro and the National Digital Inclusion Alliance pursued research to understand the connections between broadband and health and equity, assess the gaps in broadband access and adoption, the market and policy barriers that lead to those gaps, and promising points of intervention for local, state, and federal leaders to deliver shared value to individuals and entire communities.

For more information, read the full version of the report.

Why broadband matters

For most Americans, broadband is commonplace in professional, personal, and social interactions. Yet even with this ubiquity, the extent of broadband's health and equity benefits aren't fully understood. In part, this is because broadband's physical presence is not an exact parallel to other infrastructure systems—in the transportation sector, for example, unsafe roads and transit systems pose a physical risk. In the water sector, a contaminated water supply can lead to disease or infection.

Broadband's physical networks do not physically impact health and equity outcomes in the way these other systems do. Instead, broadband serves as a platform on which a range of different applications operate and impact individuals. Just having an internet connection does not boost someone's health outcomes—but using the internet to access remote health care providers, services, and information can serve as a conduit to improved physical and mental health. Put simply: Broadband is the means; digital services deliver the ends.

Broadband is so wide-ranging in its applications that it can deliver services that touch every social determinant of health. From economic stability, to education, to social supports, to civic agency, broadband and the digital services it enables are today intrinsically tied to collective health and equity outcomes.

In terms of economic outcomes, broadband delivers benefits to both individuals and communities. Beginning with the labor market, a majority of job seekers now use the internet to search for jobs and apply to them. Research suggests that the lower cognitive lift associated with online job searches reduces labor market

discouragement. Further, early evidence suggests that high-speed internet availability may lead to job creation in some markets, opening up more opportunities for job seekers. In turn, businesses reap benefits from e-recruiting, which makes it less expensive to access a larger pool of candidates. And having a digitally fluent workforce brings productivity gains to firms, who can then reward employees with higher wages.

Taking a macro lens, research finds that broadband adoption leads to regional economic growth. Brian Whitacre, Roberto Gallardo, and Sharon Strover find that, across rural, nonmetropolitan counties in the United States, higher levels of broadband adoption positively impact income growth and stymie unemployment growth. Meanwhile, Saibal Ghosh finds that improvements in broadband penetration on a country-level increase economic growth through innovation and entrepreneurial activity.

Broadband also plays an important role in improving social outcomes.

First, broadband democratizes access to education, offering a wide supply of free and open education platforms, courses, and resources. Beyond the exponential growth of massive open online courses (MOOCs), there are non-formal educational opportunities such as YouTube tutorials, GitHub, and communication forums. However, with the benefits enabled by online education, there are also equity drawbacks. With an increasing number of class assignments and activities occurring online, students who lack home internet access are at risk of falling behind their peers within digital classrooms, or what's now called the "homework gap."

Broadband can also promote the development and maintenance of people's social support systems. There is empirical evidence that the internet can offer a platform to form new friendships. For traditionally marginalized groups who are prone to social isolation, access to the internet allows them to connect to others anonymously. And emerging evidence shows that even weak social ties can have positive health effects.

Though education and social support both have indirect health benefits, telehealth—the use of telecommunications to deliver health services and education—can directly improve health outcomes, especially for those who otherwise lack access to providers. These groups can include rural communities without proximate providers, low-income residents who cannot afford transportation, and mobility-limited adults. With the expanding range of telehealth technologies, providers can increasingly fill these service gaps, and patients can connect with doctors, manage chronic conditions, and get prescriptions from home. Live monitoring even allows doctors to detect irregularities before hospitalization is needed.

Digitalization also helps medical teams provide better service to patients, reduce errors, and make better, more informed, and accurate decisions. Online prescriptions reduce the likelihood that pharmacists will miss prescription details. Electronic medical record-keeping ensures that doctors have a comprehensive view of a patient's medical history, and can decrease overhead administrative costs and costs associated with potential errors.

Broadband's influence on these social determinants of health shows that it has the potential to have a profound impact across a wide range of equity and health outcomes for communities and individuals.

Broadband is the country's most inequitable infrastructure

The current state of American broadband access, adoption, and use is one of disparate outcomes. If the national goal is to ensure every household has a high-speed connection and the skills to use it, the current state of broadband infrastructure is inadequate.

According to the 2018 American Community Survey (ACS), 18.1 million—or 15%—of households do not have subscriptions to any form of "broadband" internet service (the Census Bureau defines broadband as anything faster than dial-up). Compare that to the 99.6% of households with complete plumbing, according to the ACS, or the effective 100% of households with access to electricity.

Topline broadband numbers obscure gaps within national broadband performance (Figure 2). Broadband works best for households when they have an in-home connection—for activities such as telework and entertainment streaming—and a wireless subscription. However, of those households with a broadband subscription, about 14 million only have a cellular data plan, and 12.3 million only have a wireline subscription.

Broadband gaps also infect every kind of community. The majority—13.6 million—of digitally disconnected households live in urban areas. Meanwhile, rural broadband gaps tend to garner a lot of attention because the overall adoption rate in rural areas (81%) is still five percentage points lower than that of urban areas (86%).

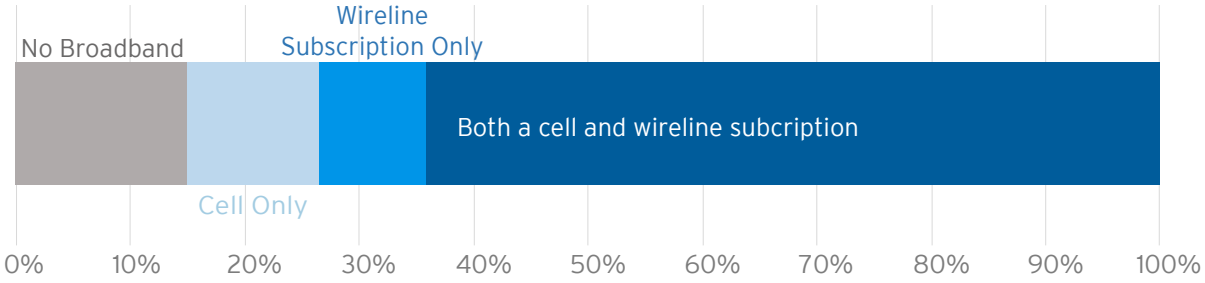
Comparing statewide broadband adoption underscores this geographic divide (Figure 2). In 2018, the average state had a broadband adoption rate of 84%, but there was still a nearly 15-percentage point difference between the states with the highest rate of adoption (Washington and Utah, at 90%) and the lowest (Mississippi, at 76.3%). These differences can largely be explained through social, economic,

and geographic contexts. The states with the lowest broadband adoption rates also had the lowest median incomes, highest shares of rural communities, and the highest shares of communities of color.

Looking further at how broadband adoption intersects with communities of color at the national level, white, Asian American, and Latino or Hispanic households all have broadband adoption rates above the national average (at

FIGURE 1

Household broadband adoption by subscription type
United States, 2018



Source: Brookings analysis of 1-year American Community Survey data.

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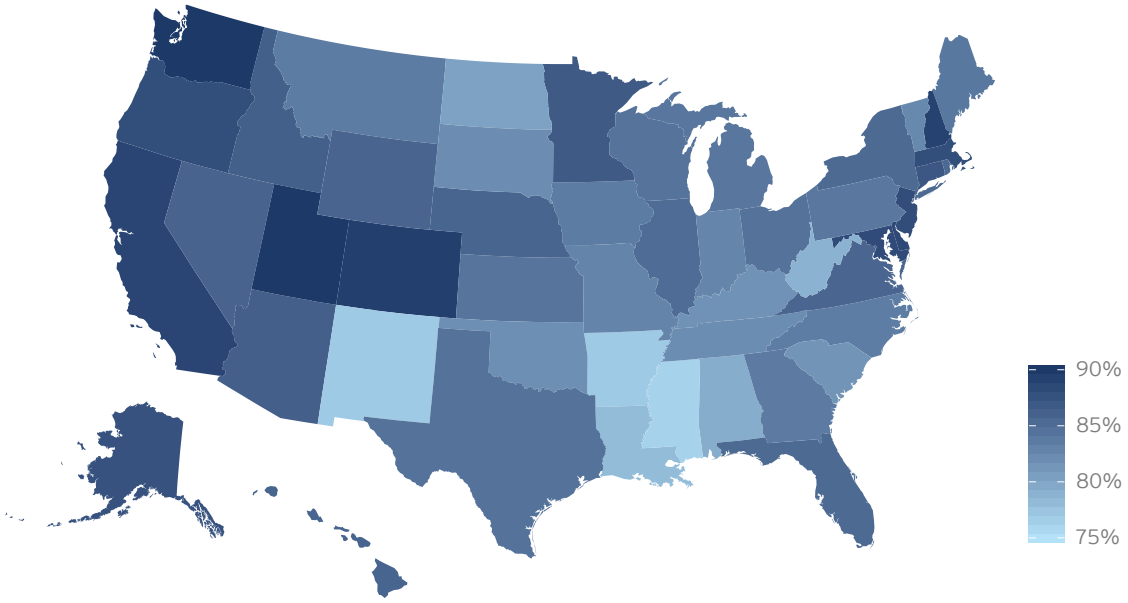
FIGURE 2

Household broadband adoption rate across the United States
2018, 1-year estimates



Source: Brookings analysis of American Community Survey data

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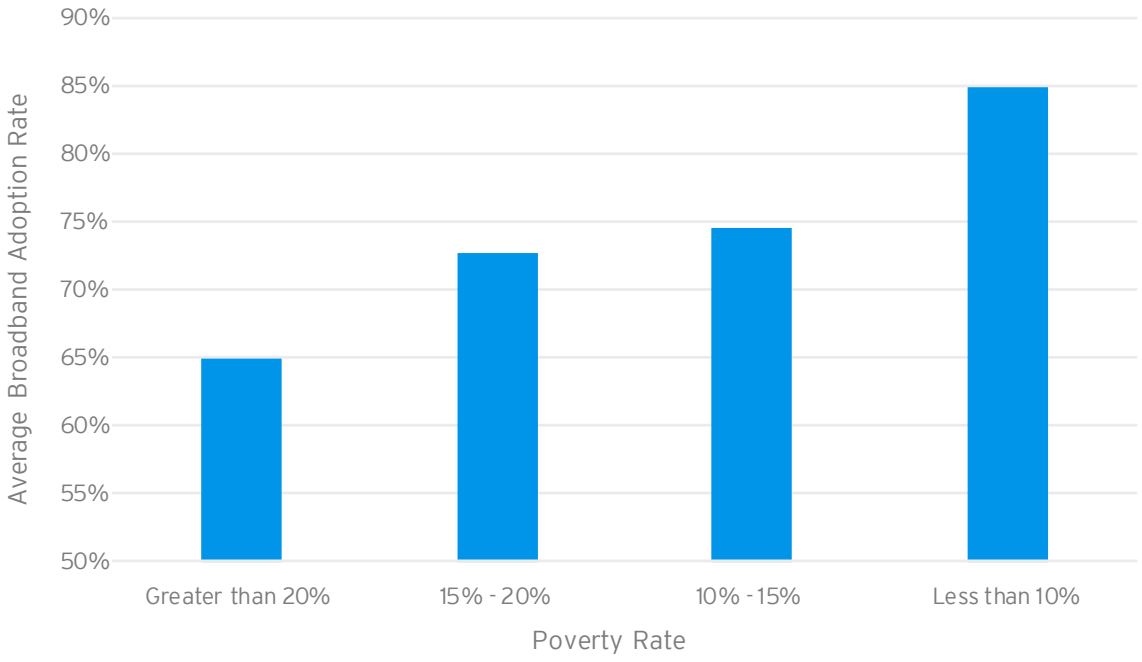
90%, 94%, and 86%, respectively), but Black households have a lower adoption rate, at 82%. A neighborhood-level analysis revealed even starker differences. While the average majority-white tract had an average broadband adoption rate of 83.7%, the average majority-Black tract (more than 50% Black residents) had a broadband adoption rate of just 67.4%.

Similarly, there are drastic differences across income groups, particularly for low-income communities and communities with high levels of poverty. At the national level, households earning less than $20,000 have a broadband adoption rate of 62%, those earning $20,000 to $74,999 have an adoption rate of 83%, and households earning more than $75,000 have an adoption rate of 85%. Similarly, the average tract with a poverty rate lower than 20% had an 81.8% broadband adoption rate, while the average tract with a poverty rate over 20%—or what qualifies as concentrated poverty—had an average broadband adoption of 64.9%.

Time and again, researchers confirm these findings: those least likely to have broadband in America are communities of color and low-income communities, suggesting that systemic barriers remain in place.

FIGURE 3

Tracts with the highest levels of poverty have the lowest levels of broadband adoption
2018, 5-year estimates



Source: Brookings analysis of American Community Survey data.

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Systemic barriers to universal broadband

Broadband may be essential, but it's not hard to find reasons Americans choose not to subscribe. According to the Pew Research Center, the most common reasons cited for not having home broadband is that the monthly cost of a home subscription is too expensive (50%), that a smartphone does everything they need (45%), and that there are other options for internet outside of the home (43%). But this is just a partial list. As John B. Horrigan pointed out, these Pew figures simply confirm that the barriers to universal broadband adoption are sizable and systemic.

Price

Pricing is one of the clearest structural barriers to adoption. Unfortunately, due to a lack of federal reporting requirements and the practice of bundling broadband services with television and telephone service, there is a lack of clear data on consumer broadband pricing. However, targeted reporting does offer evidence of pricing challenges for disadvantaged American households.

First, American pricing exceeds global developed-economy averages when compared on consistent data usage. According to the FCC's sixth International Broadband Data Report, comparing average unweighted prices, the United States ranks 18th out of 23 countries that offer fixed standalone broadband plans with download speeds of at least 25 Mbps and less than 100 Mbps , and 26th out of 28 countries that have fixed standalone plans with download speeds of 100 Mbps or greater.

There are also wide pricing inconsistencies between cities in the United States, which might help explain inconsistent adoption rates. For example, according to New America's 2014 Cost of Connectivity report, while the average price of a 25 to 50 Mbps plan is $46.65 in Kansas City, Kan./Mo., the average price is $66.66 in Washington, D.C. and $69.98 in Los Angeles.

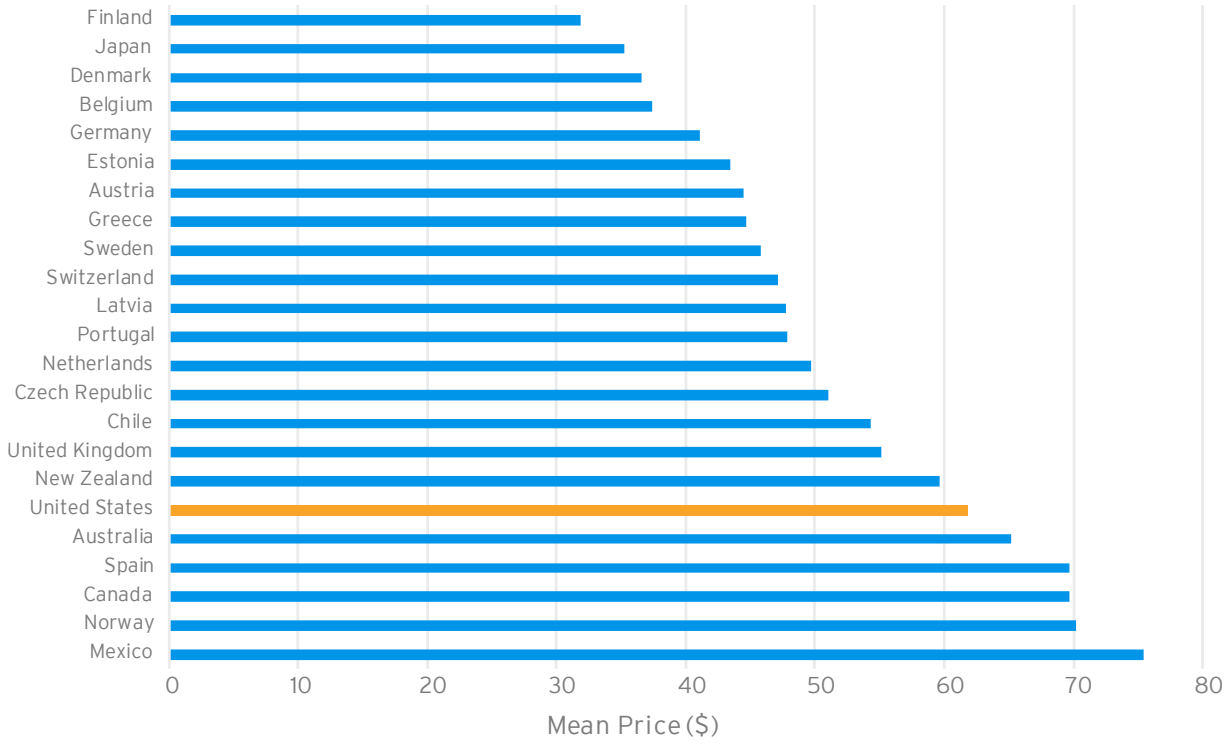
This begs the question of why American broadband is both more expensive than peer countries and slower at any given price point. Thomas Philippon argues that it is largely the result of the United States ceasing to enforce pro-competition policies. He frames the issue as not just a lack of antitrust enforcement, but also a host of regulations that prevent new firms from entering the market.

The effects on competition have been striking. In 1998, there were 4,500 ISPs in North America, and customers could potentially choose between hundreds of providers. Two decades later, there are just a handful of major ISPs across the country, and most consumers can only choose between one or two who have control of the local market. As consolidation continues, basic economics suggests prices will continue to rise without targeted public intervention.

In response to FCC deal-making during merger approvals, several major cable and telecom ISPs created special discounted rate programs for low-income customers between 2009 and 2014.

FIGURE 4

Fixed unweighted monthly prices for standalone broadband
25 - 100 Mbps



Source: Brookings analysis data from the Federal Communication Commission's International Bureau's sixth International Broadband Data Report.

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Comcast's program has attracted several million households; other programs have been less well-marketed and successful. But as of April 2020, all remaining low-cost programs will be voluntary, and some could disappear depending on the company's interests. Already, nearly 150 million people across the country do not have access to a low-price wired broadband plan.

The only federal subsidy for qualifying low-income households is the FCC's Lifeline program. Originally launched as a reduced-cost phone service program in 1985, since 2017 the Lifeline program required participating wireless phone providers to offer smartphones, a capped amount of data usage per month, and a $9.25 monthly discount for each household using the program. However, there is uncertainty around the future of Lifeline.

Digital readiness

Just having a broadband subscription is not enough to access the technology's full potential. Being an engaged and active participant in the digital era requires navigating digital space to find information, share content, and determine the trustworthiness of sources.

However, according to the Pew Research Center's most recent report on Digital Readiness Gaps, the slight majority (52%) of U.S. adults are

still "relatively hesitant" when it comes to new technologies and digital skills. Pew subdivides these adults into three groups: the unprepared (who have lower levels of digital skills and limited trust in online information), traditional learners (who are active learners with technology but don't often turn to the internet), and the reluctant (who have higher levels of digital skills but lower levels of digital awareness).

Pew notes that while these classifications are flexible, they still serve as a useful framework for understanding the challenges to building a more digitally prepared population. The report's national numbers illustrate the depth of the challenge: 60% of adults find it difficult to know whether the information they find online is trustworthy, and 40% usually need help setting up or navigating new devices. Moreover, lack of digital skills creates a self-reinforcing cycle wherein the less digitally ready are less likely to use technology to learn or build digital skills.

Physical geography

Though access to broadband is not often cited as a barrier to broadband adoption, the problem still persists, especially in rural areas. Constructing rural broadband infrastructure is financially challenging, often demanding significant capital investment relative to a limited number of potential customers. Consequently, rural households—and their business peers—have difficulty attracting private broadband investment.

Increasing infrastructure build-out in rural areas is an active public policy issue, as evidenced by multiple congressional hearings and public FCC statements since 2016. Last year, the FCC chairman identified "fixing the rural digital divide" as his highest priority. (By "divide," he meant the absence of high-speed Internet infrastructure in many rural areas.1) Multiple members of Congress and 2020 Democratic presidential candidates are currently calling for big investments in broadband infrastructure.2 At the state level, governors and legislators introduced similar proposals, and multiple state agencies publicly promote rural broadband expansion. But even with consistent political support, there is still disagreement on what technologies would be supported, the range of eligible providers, and the role of competition.

Geography is also challenging for urban and suburban neighborhoods due to the potential for broadband network owners to skip over or underserve specific areas—a practice that's come to be called "digital redlining." Current federal regulations do not require ISPs to service every resident or business within their service geography. Federal law also doesn't require ISPs to bring faster speed tiers to every neighborhood equally. As seen in Cleveland and Dallas, this regulatory architecture permits market failures even within otherwise well-served metropolitan geographies.

Combined, the lack of regulatory controls requiring service to specific neighborhoods and the higher cost to deliver broadband infrastructure to lower-density areas creates structural barriers to equitable broadband outcomes. This is especially threatening for rural communities, isolated smaller cities, and any lower-income neighborhood.

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1 Alternate uses of the term "digital divide" may refer to lack of access and use of information communication technologies including not subscribing to existing broadband services, not having the appropriate device, and/or not having adequate digital literacy skills.
2 At time of publication, no less than five presidential candidates published policy proposals calling for greater rural broadband investment. Members introduced multiple bills in the 116th Congress calling for greater rural broadband investment.

Systemwide interventions to address broadband gaps

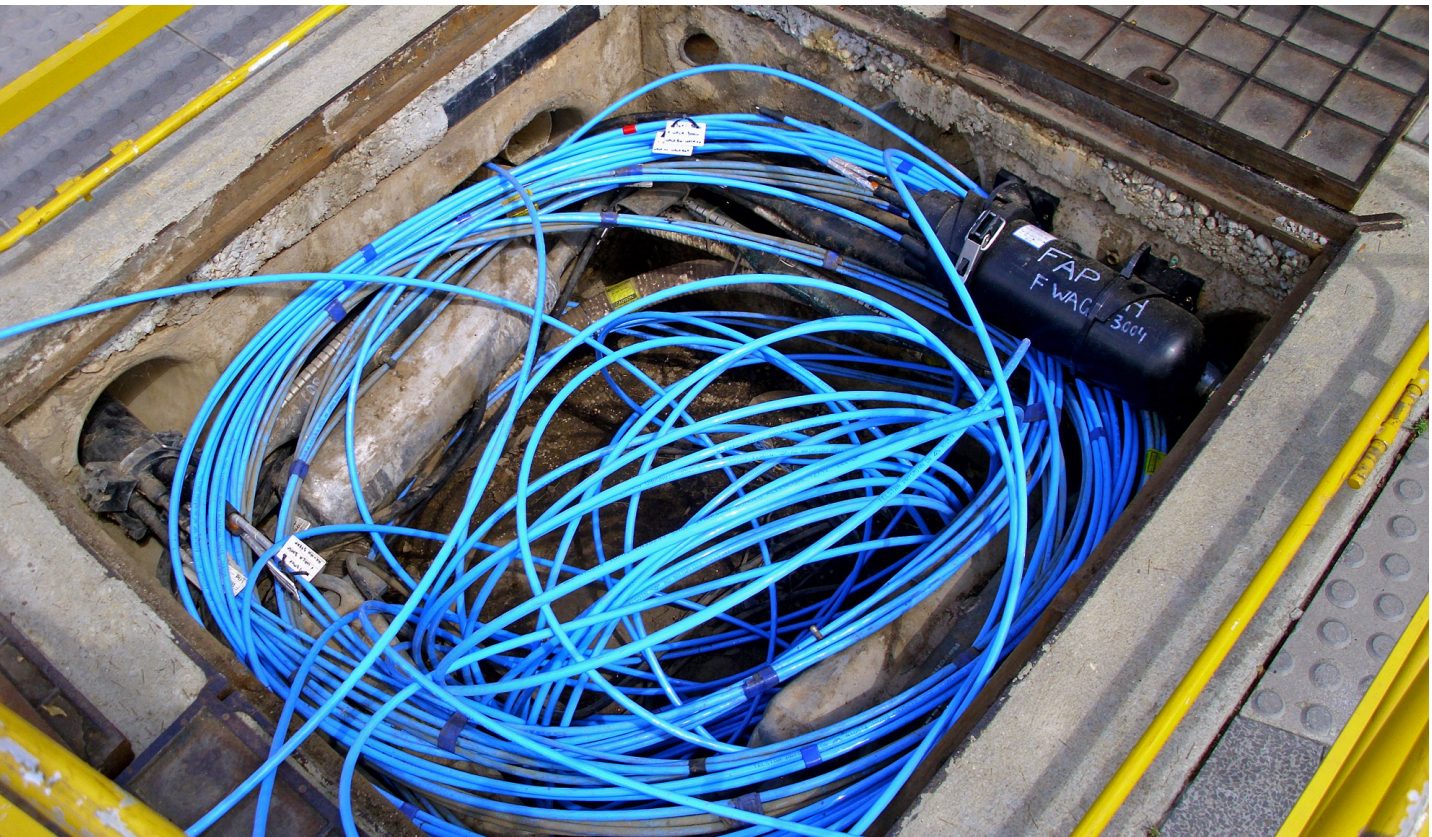
Broadband's ability to reach and positively impact households depends on three critical inputs: physical availability, affordability of services and equipment, and digital skill levels. These serve as a "three-legged stool," where deficits in any one of the three categories can restrict the larger goal to drive health or equity outcomes. Any system-level approach to improving broadband will include interventions that address all three inputs.

Extend broadband's physical reach

Broadband **availability** gaps are a natural offshoot of the privately owned and privately financed industry model prevalent across the country. Improving broadband's physical reach will require interventions that either incentivize private capital to invest in riskier geographies, allocate public funding to construct public networks, or some mix of the two.

Federal, state, and local governments each have capabilities to incentivize build-outs of private networks to connect difficult-to-reach places. Where possible, state and local governments can negotiate franchise agreements with cable providers to reach every neighborhood within a franchise area. These are especially valuable for small- and medium-sized cities in regions with cable networks, as well as in low-income neighborhoods or communities of color where digital redlining may be occurring. The federal government can also enact policies—whether through new legislation or current FCC funding—that offer direct financial incentives to adjust the risk profile for any network owner and operator.

Likewise, all governments can play a role in supporting publicly owned networks. The federal government and individual state governments maintain enormous sway over whether individual communities can launch publicly owned broadband networks, or what are commonly called "muni networks." As it stands, there are numerous states that use preemption to make publicly owned networks and even public-private partnerships either illegal or extremely difficult to establish. Working to eliminate these barriers can play an important role in communities where broadband isn't yet available.



State and local governments also have the option to use their current capital assets to fill network gaps via targeted wireless services. This includes: the use of libraries, schools, and other public buildings to broadcast accessible, 24-hour wireless networks; using vehicles such as school buses to create mobile hotspots, including during nonoperating hours; and installing wireless access points in public parks, light poles, and other public spaces. Though not a full substitute for an in-home broadband subscription, public access points play an important role in providing service where it may otherwise be unavailable, slow, or unreliable.

Make broadband subscriptions less expensive

Making broadband more **affordable** is another important intervention. Broadband service can consume a significant portion of a monthly household budget, especially when considering the need for both a household wireline subscription and a wireless subscription for each member of the household. Likewise, using broadband also requires up-front or monthly payments for desktops, laptops, and mobile devices. Addressing these financial barriers is important to improving broadband's reach and impact, especially in low income communities.

Here, too, the public sector has an opportunity to influence affordability. Direct subsidy programs can be run from any level of government, such as the FCC's Lifeline program. Federal law could also permit cable franchise agreements to begin including pricing components within their broader legal frameworks. Likewise, the public sector can operate equipment purchase or leasing programs. Any federal, state, or local capital grants could either require private companies to offer affordability policies as a condition of receiving a grant. Finally, the federal government could do more to promote transparency—which currently limits consumer knowledge and research opportunities—and set national affordability standards, like those used in the energy sector.

The private sector is already a national leader around affordability, and this is another area with the potential for deeper public-private-civic collaboration. Private ISPs, most notably Comcast, offer more total discounted internet subscriptions than discount programs offered by the public sector. Critically, these programs already tie into public efforts by using federal qualifications such as Electronic Benefits Transfer (EBT) status to enroll households. Similarly, many equipment manufacturers offer discounts to certain populations, including students, their families, and often entire school districts. For rural areas, the U.S. Department of Agriculture is well-positioned to use public-private partnerships to promote affordability via its e-Connectivity Pilot Program.

Design and fund digital skills programming

Boosting **digital skills** relies on a network of public, private, and civic actors. Primary schools, public libraries, and various nonprofit organizations can host digital literacy interventions. Workforce development agencies can survey employer needs and develop contemporary training modules. And ISPs can offer direct funding and expertise to support these efforts. Interviews and case studies also confirmed a growing recognition of the need for trusted actors—such as social workers, community health workers, and religious leaders—to track community deficits and design skills-focused interventions for targeted communities.

There are also multiple efforts underway at the federal level to repurpose current policies to advance digital skills development. One example is to ensure banks can use Community Reinvestment Act credit to financially support community digital inclusion programs serving Low and Moderate Income (LMI) households in their lending areas. Another is to allow the Department of Housing and Urban Development (HUD) to ensure that Community Development Block Grant (CDBG) funding applies to a broader

set of broadband access and digital literacy training for LMI households. The Department of Health and Human Services and the Department of Veterans Affairs can deploy multiple policy reforms to support digital health care inclusion efforts.

Educate decisionmakers, community members, and influencers

In addition to direct interventions related to availability, affordability, and skills development, communication techniques are essential to maximize effectiveness. Boosting broadband adoption requires **awareness** among disconnected populations. But just as importantly, reaching universal adoption requires decisionmakers and community members understanding the systemic barriers and committing to overcome them. From our research, interviews, and case studies, we have created a series of strategies that can improve efforts to reach key actors.

- **Build coalitions.** The most successful interventions from the local to national level consistently include a diverse set of interested parties—workforce organizations, libraries, elected offices, schools, and religious institutions are just some examples—whose members can coordinate their advocacy. Creating a unified voice creates a wider base to demonstrate the importance of broadband to a given community.

- **Target impacted institutions.** Many well-endowed civic institutions and public agencies rely on broadband adoption among their focus populations to maximize their effectiveness. The banking industry can reach far more individuals, for example, if their customers use online banking. The health care industry's push to digitize records, scheduling, and communications assumes patients have digital skills, computing equipment, and broadband access. The same logic extends to schools for the digital classroom, consumer affairs agencies to streamline resident engagement, and on.

- **Speak their language.** Across nearly every interview and case study we conducted, our colleagues mentioned the need to speak in concepts policymakers understand. In particular, "quality of life" and "workforce development" were prominent issues that impact every level of government. Placing broadband needs within the context of these goals can ease the learning curve.

- **Communicate measurable impact.** Using statistical reference points is one method of reinforcing broadband's relationship to health and equity goals. For many communities, this includes direct reporting on the neighborhoods without network service, the number of total households without in-home or mobile subscriptions, and other measures that can rely on public data inputs. Our research also indicated the importance of including measures related to other governance concerns. For example, reporting the change in patients using digital health services after digital skills training. These measurable outcomes can help make the case for broadband's overall utility and interconnection with other governance objectives.

Who delivers educational messages—and the communication channels they use—will impact the effectiveness of any communication strategy. Every messenger, every situation, and every audience will always be a little different. This limits the ability to recommend precise, cross-cutting interventions for every instance. But our research consistently pointed to a set of conditions that can positively impact the potential for effective communication: a high degree of trust between interested parties, a direct connection to the relevant circumstances, and taking advantage of both public and private communication channels.

Summary

Broadband is essential infrastructure, and the country's digital divide confirms the challenges to bringing its benefits to every person, regardless of demographics or geography. Tens of millions of people do not have an in-home broadband subscription, a mobile data subscription, or both. These gaps are especially wide among rural, low-income, and nonwhite households. While physical access to the internet is still a barrier for some households, many more struggle to afford services and devices and navigate digital spaces.

Because broadband affects nearly every social determinant of health, barriers to adoption and use represent significant challenges in individual and community-level outcomes.

Overcoming these barriers requires awareness of the continuing digital divides and collaboration across the private, public, and civic sectors. Fortunately, lessons from across the country confirm the potential success of interventions related to access, affordability, and digital skills. This work extends beyond larger financial investments, too. Building coalitions, adjusting communication techniques, and developing new statistical evidence can all accelerate trust between key actors, educate on the social impact broadband can deliver, and create opportunities to design new solutions.

Broadband is the connective tissue of this young digital millennium, a physical service that can benefit every person across social, economic, and physical health dimensions. Building more equitable broadband infrastructure will make good on that promise.

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