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Making Connections: Rural Health and Technology

Georgia Health Policy Center

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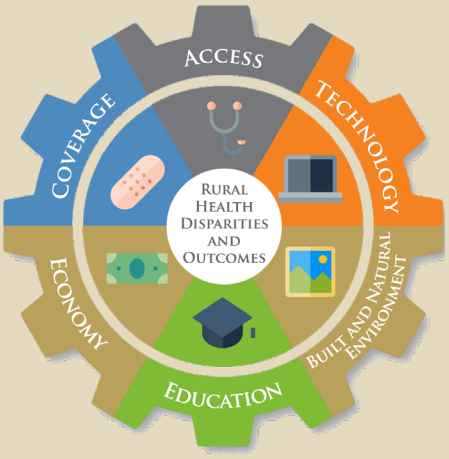
There are a number of troubling population health trends that present challenges to rural health today. Persistent issues like higher rates of risky health behaviors, lower rates of health insurance coverage, and physician shortages are creating pressure on rural health systems to intervene in order to improve care, enhance quality of life, and decrease costs.



These trends weave together to tell a story based on the interplay of multiple factors and the resulting outcomes they produce. To better understand the big picture, it is important to recognize the relationships that exist between well-being and contributing factors both inside and outside of the traditional health care system.

The Georgia Health Policy Center (GHPC) has long-standing expertise in assisting rural communities to improve health and health care delivery in an effective and sustainable manner. GHPC created this series as a supplement to its *Understanding the Rural Landscape* learning module. This series explores the range of elements that influence rural health, with special emphasis on the unique challenges and innovative solutions emerging in rural communities. This installment of the series will specifically examine the relationship between rural health and technology.

The 21st century can be characterized, in part, by the extensive influence and use of technology in daily life. Many people rely on technology to make their lives easier and more efficient. Despite technology's ubiquity and widespread adoption in the United States, there are significant disparities in usage between rural and urban settings. The primary reason for this technology gap is the lack of broadband access in rural areas. This "digital divide" has had a substantial impact on the quality of life in rural areas, affecting education, the economy, and health care access.

Since its advent in 1990, the Internet has grown exponentially in popularity and usage. In 2016, the Federal Communications Commission officially defined the Internet as a public utility, affirming the view of the Internet as an essential service available to all Americans.[1]

The most common Internet connections are dial-up and broadband. Dial-up service is connection to the Internet through a standard telephone line. Its performance is typically slow or intermittent, and performance is often inadequate to support the content of today's websites. In contrast, broadband service is a high-speed service that offers connection to the Internet via a number of mediums (cable modem, fiber optic, wireless, satellite) at speeds that are adequate to stream video and participate in other high-traffic, online activities, such as shopping and online education. According to the 2016 Broadband Progress Report adopted by the Federal Communications Commission, 39% of rural Americans, or 23 million people, lack broadband access, versus only 4% of urban Americans.[2]

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[1] Kang, C. (2016 June 14). Court Backs Rules Treating Internet As Utility, Not Luxury. *The New York Times*. Retrieved from https://www.nytimes.com/2016/06/15/technology/net-neutrality-fcc-appeals-court-ruling.html

[2] Federal Communications Commission (FCC) (2016 January 29). *2016 broadband progress report*. Washington, DC. Retrieved from https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2016-broadband-progress-report

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CHALLENGES IN BROADBAND IMPLEMENTATION IN RURAL

There are several explanations for the lack of broadband connectivity in rural areas, including rural geography, the lack of infrastructure, and high costs. Broadband infrastructure can take, on average, up to five years to build out in rural areas and has tremendous up-front deployment costs.

Once a broadband network is built, the marginal costs of adding new customers are relatively low. However, unlike in urban areas, where populations are located close together, the initial costs per subscriber in rural areas can be expensive, and, due to the fact that revenue is largely based on population density, many broadband service providers consider these rural areas to be risky from a business perspective. In other words, there is often not a significant enough number of rural broadband users to support the costs necessary for maintaining broadband service, even once established.

In addition to the lack of infrastructure and cost challenges associated with establishing broadband services in rural communities, rural residents are less likely to have and adopt technology in their daily lives. According to Pew research, rural Americans are 7% to 12% less likely to own a smartphone, traditional computer, or tablet computer.[3] In addition, they also go online less frequently, with six in 10 rural-dwelling adults saying they use the Internet on at least a daily basis and one in five rural-dwelling adults saying they never go online.[3] In what may be a catch-22, these low levels of technology adoption are likely related to the substantial segment of rural America that still lacks the infrastructure needed for high-speed Internet, making Internet access in these areas much slower than that in nonrural areas.[3]

INNOVATION: STEMMOBILE

Schools in the Upper Cumberland Area of rural Tennessee are bringing state-of-the-art science, technology, engineering, and math (STEM) technologies to their students in an innovative way. In response to a lack of adequate school Internet access and classroom equipment within the district, the Upper Cumberland Rural STEM Initiative (UCRSI) designed a mobile learning experience called the STEMmobile. This learning "box" brings STEM technologies directly to students in grades pre-K–8, for a one-of-a-kind experience. The STEMmobile, a 53-foot traveling tractor-trailer, is equipped with self-contained power, its own HVAC system, a satellite uplink for Internet connectivity, iPads, laptops, and other standard STEM tools. It has adjustable-height workstations to accommodate 24 students at a time. Teachers at the UCRSI STEM Hub Schools, who are members of the Oakley STEM Center Users Group, are able to reserve the unit for use at their school, and the STEMmobile will spend one week at a time at each location. This classroom on wheels currently visits 21 rural districts with 7,000 students, providing hands-on learning opportunities that promote problem-solving skills.[8]

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Education

Rural schools are faced with a host of challenges related to broadband access and lack of adequate technology infrastructure. Oftentimes, rural school districts are "called to do more with less," occupying older buildings plagued with multiple problems that include lack of climate control, adequate space, and necessary wiring. In addition, within these districts, it is usually difficult to find the leadership and skills needed to provide technology expertise, create an appropriate technology plan, and manage and maintain building and system infrastructures.[4]

There are nearly 9 million students in rural schools, representing 187% of K–12 students in the country.[5] Almost one-third of the country's roughly 100,000 public schools are located in rural areas.[6] EducationSuperhighway, a nonprofit focused on upgrading Internet access in public school classrooms across the country, reports that currently 2,049 schools in the United States still need high-speed fiber connections, and 77% of these schools are located in rural communities.[7]

As a result of the need to access resources not available in rural communities, rural schools have had to become leaders in distance-learning and online education. Statistics from the National Center for Education Statistics show that rural areas are the biggest users of distance education. When broadband and high-speed Internet are installed in rural communities, it provides quality distance education opportunities for students.

Given that one-fourth of all U.S. students attend a rural school, and, in recent years, rural enrollment growth outpaced all other schools, lack of adequate Internet for rural students will be a problem for the foreseeable future, causing rural schools and their students to be left behind.

Innovation: Phone cooperative installs broadband services in rural Tennessee

The state of Tennessee recognizes the importance and value of virtually connecting rural residents through the use of broadband technology. New state broadband legislation helped to address this issue by providing nearly $10 million to rural cooperatives to install broadband services in remote areas of the state.[13] Ben Lomand Rural Telephone Cooperative is one of the recipients of this funding. This company received a $1 million grant to install high-speed Internet in rural Coffee County. As a result of this collaboration, along with matching funds, a total investment of over $2 million was made in this rural community to expand connectivity. Through these funds the local provider helped 416 businesses across the county to connect to Internet service.[14]

Economy

Just as with education, broadband access and adoption is vital to the U.S. economy. According to a statement released by the White House, Feb. 23, 2018, "Inadequate broadband access is a barrier to rural prosperity. It stunts economic growth and prevents many rural Americans from engaging in the modern economy."[9] Research has shown rural areas with widespread broadband availability and use provide a significant contribution to the national economy. It is estimated that Internet-driven transactions account for nearly 50% of U.S. total gross domestic product, with rural consumers representing approximately 15% of all Internet-driven transactions annually.[10] Additionally, broadband companies have provided a significant boost to rural economies. The Foundation for Rural Service reported in 2015 that rural broadband companies contributed $24.1 billion to the U.S. economy.[11] This figure includes the nearly 70,000 jobs directly supported by the industry, as well as employment

[9] The White House. (2018, February 23). *What the president's infrastructure plan will do to expand rural broadband access.* Washington, DC. Retrieved from https://www.whitehouse.gov/briefings-statements/presidents-infrastructure-plan-will-expand-rural-broadband-access/

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Innovation:
University of Mississippi Medical Center for Telehealth

Mississippi's high rates of childhood poverty, obesity, and cigarette smoking contribute to it being the unhealthiest state in the country.[17] To make matters worse, the state has approximately 159 doctors per 100,000 people, which is one the lowest doctor-to-patient ratios in the nation. In an effort to address this issue, the University of Mississippi Medical Center launched an innovative telemedicine program. This pilot program connects physicians in Jackson, Miss., to rural hospitals within the state using telehealth technology. The Center for Telehealth now connects to 165 sites, covers 35 specialties, and provides 8,000 telemedicine visits per month, with services including diabetes counseling and robotic examination of premature infants.[18] As a result of this program, participating hospitals have experienced reductions in personnel costs and an increase in admissions.

related to purchases of goods and services generated by e-commerce.[11] That said, estimates are that more than one-third of rural Americans still lack broadband access, which hampers local economies.[12]

Health Care

Many rural residents struggle with access to health care as a result of geography and transportation barriers to reaching health care providers. Compounding these challenges in accessing care, gaps in rural broadband infrastructure negatively impact the ability of providers to serve community members. It is estimated that 7% of health care providers serving rural areas lack broadband access.[15] Furthermore, those providers who do have access to broadband can pay as much as three times what urban health systems pay.[15] The Centers for Medicare and Medicaid Services grants Electronic Health Record Incentive Program Waivers to some health systems that don't have the adequate broadband services to accomplish essential objectives.

Telemedicine is real-time, interactive communication between physicians and patients, often in remote locations.[16] Through this remote interaction, physicians, including specialists who are in short supply in rural areas, are more accessible to rural patients, by way of virtual technology. As a result, health care services can be expanded across rural areas, with the potential for improving health outcomes and driving down costs for both providers and patients. An American Hospital Association telemedicine study shows telemedicine results in decreases in rural patients' admittance rates and average lengths of stay. Telemedicine has also been shown to lower costs for both medical providers and rural patients, and to reduce transportation costs on average by $5,718, lost wages by $3,431, and hospital costs by $20,841, according to the Rural Broadband Association.[16] When coupled with the necessary broadband technology, telemedicine offers effective and efficient solutions to address health care access barriers, especially for those communities with a low patient-to-provider ratio like is seen in many rural communities.

IMPLICATIONS

In the 1930s and 1940s, the federal government established a system of loans and grants that continues to this day to ensure that all Americans have universal access to basic utilities, such as electricity and telephone services. These investments support the nation's long-term goal of prosperity by ensuring that rural communities have the infrastructure necessary to compete in the global economy. Access to the internet has been widely recognized as a necessity. It has revolutionized the way in which people interact and how people relay and receive information.[12]

Currently, the Internet is available in most urban areas, but gaps in broadband and Internet access persist across many rural areas. Studies have shown that this lack of access affects the quality of life in rural areas and limits opportunity. Broadband access offers near limitless potential for innovation and growth in the areas of education, economy, and health care. With the support of the federal government, communities are taking action to expand access to broadband to ensure that rural America benefits from these continuing advances in and application of technology.

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