



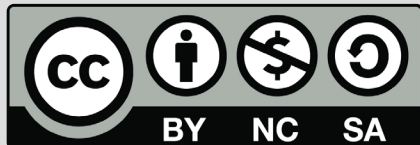
Increased Wellness and Economic Return of Universal Broadband Infrastructure

A Telehealth Case Study of Ten Southern Rural Counties

By Ry Marcattilio and Christopher Mitchell

April 2023





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The Southern Rural Black Women's Initiative for Economic and Social Justice (SRBWI) was founded in 2001 to promote the first human rights agenda in the United States aimed at eradicating historical race, class, cultural, religious, and gender barriers experienced by southern rural Black women. Over the past 20 years, SRBWI has engaged over 3,000 women in 77 counties across the Blackbelt of Alabama and Georgia, and the Mississippi Delta in countering the generational impact of unrelenting systemic, institutionalized discrimination and abuse faced by rural Black women in the US South. SRBWI's programs range from policy and advocacy reform to intergenerational leadership, asset building, and economic empowerment. SRBWI believes that the battle against poverty and inequity cannot be fought or won without the voice and participation of southern rural Black women, who are trying desperately to provide for their families in under-resourced, economically distressed, and persistently poor counties. For more information, please visit our website: srbwi.org

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Executive Summary

This project examines 10 counties in rural Alabama, Georgia, and Mississippi to explore how the costs of achieving true digital equity - by extending robust broadband infrastructure into areas missing it - can be offset by utilizing the potential of telehealth to improve healthcare delivery.

To do so, this report first identifies the most common health issues affecting residents in these 10 counties, and draws on academic scholarship to demonstrate the benefits that could come from effective telehealth interventions for each. These conditions include diabetes, chronic respiratory disease (including asthma, chronic obstructive pulmonary disease, and emphysema), heart disease and heart failure, cancer, obesity, and mental health conditions associated with other health conditions, resulting in high overall costs and adverse effects on people's quality of life, like depression and PTSD.

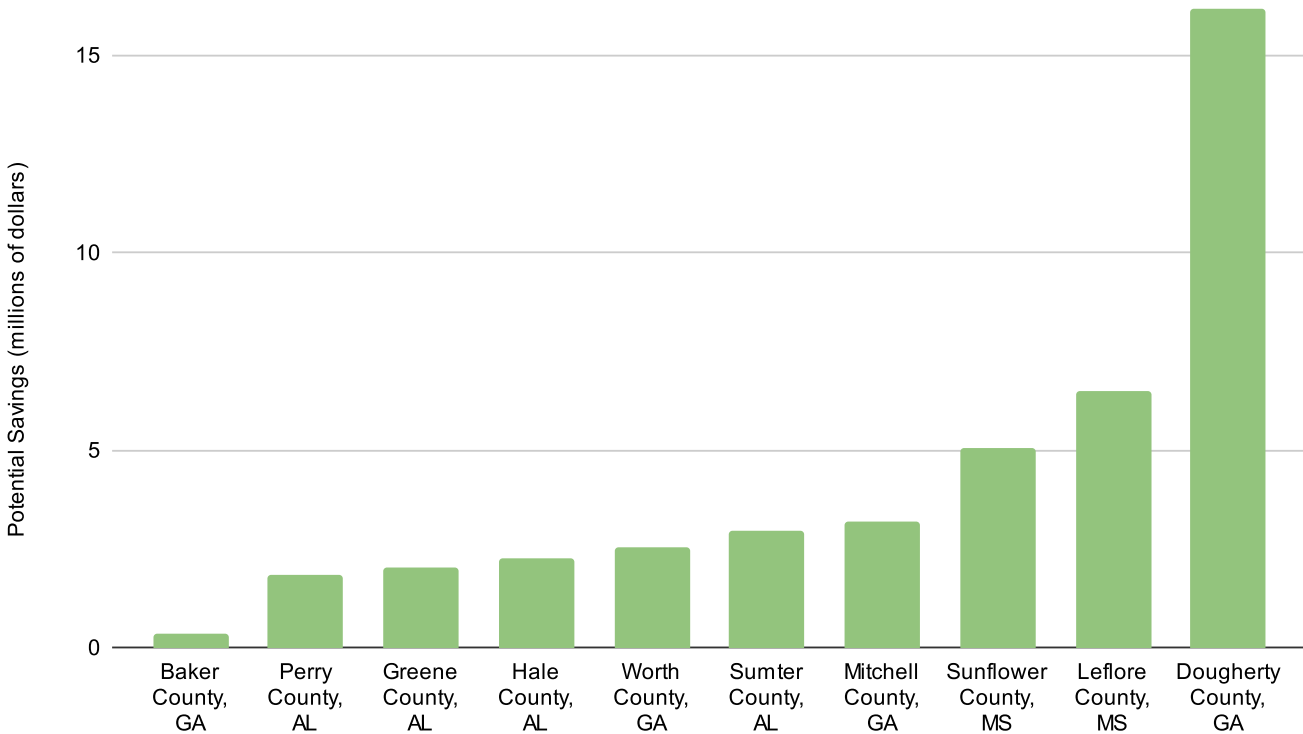
Second, it models the cost savings that can be gained from telehealth interventions in reducing the cost of services that are driving the highest costs today. These include preventable hospital admissions, preventable hospital readmissions, and preventable emergency department visits. It also calculates other recapturable savings that would benefit these communities at large, including the lost economic productivity that goes along with missed work, the avoidable transportation costs that come from being able to visit the doctor remotely, and the avoidable carbon emissions that come from driving to in-person doctor visits.

TABLE 1. ANNUAL POTENTIAL SAVINGS BY COUNTY

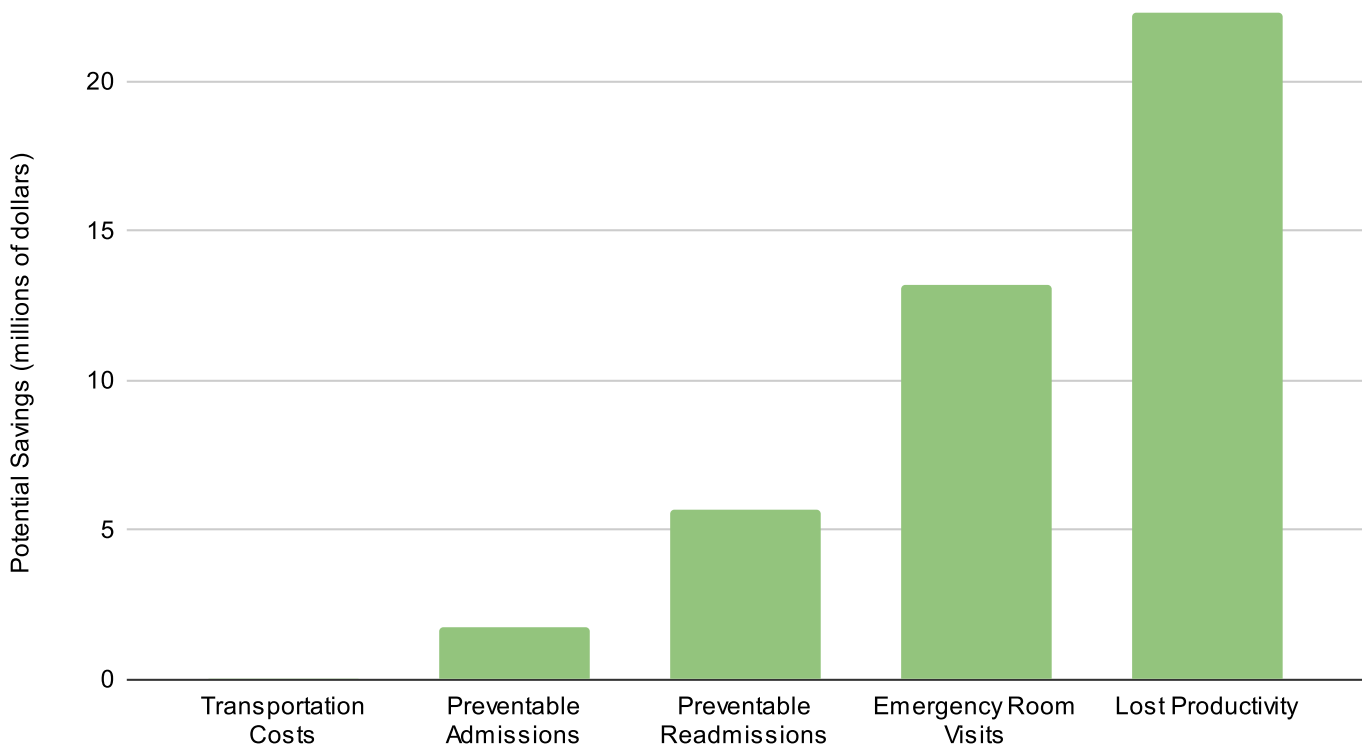
County	Annual Savings Across All Variables
Sunflower County, Mississippi	\$5,039,273
Leflore County, Mississippi	\$6,492,721
Greene County, Alabama	\$2,016,891
Sumter County, Alabama	\$2,963,790
Hale County, Alabama	\$2,277,231
Perry County, Alabama	\$1,832,666
Baker County, Georgia	\$350,391
Dougherty County, Georgia	\$16,179,393
Mitchell County, Georgia	\$3,179,561
Worth County, Georgia	\$2,562,451
Total	\$42,894,368

The results are striking by themselves, but even more so together. By the most reasonable conservative estimates, we show that preventable emergency department visits, preventable hospital admissions and readmissions, and lost economic productivity offer huge savings opportunities for these ten counties, totaling almost \$43 million each year (see table above).

Graph 1. Annual Potential Savings by County



Graph 2. Annual Potential Savings by Category



The potential to reduce the amount spent on healthcare across the United States by expanding robust, affordable, universally accessible broadband infrastructure towers in comparison to the amount those networks would cost to build and operate. Furthermore, once in place, those networks would last a minimum of twenty years; in practice, the lifespan of modern fiber optic infrastructure is often twice that.

For instance, studies show that the Department of Veterans Affairs could save tens of millions of dollars a year alone in avoided transportation expenses by underwriting the costs of broadband infrastructure and/or subscriptions for the populations it serves.

In addition, the data show that for just one condition - heart failure - hospital readmission rates after surgery will lead to a nationwide cost of \$70 billion every year to the healthcare system by the year 2030. Telehealth programs can significantly reduce these rates - in the case of one Pennsylvania healthcare system initiative, from 19 percent to 5 percent. The savings from every preventable readmission exceed \$14,000. Preventable hospital readmissions cost the ten counties in this report over \$56 million per year. A 10 percent reduction would lead to tens of millions of avoided costs over a 20-year period.¹

In order to realize these savings, however, patients must have access to robust broadband infrastructure capable of letting them meet with their doctors over the Internet, access discharge instructions or educational materials, or participate in device-assisted programs remotely. But more than 62,000 residents across almost 32,000 households in the study region lack home connections capable of doing so. These households remain fundamentally unserved by basic broadband service capable of meeting the needs of the twenty-first century.

Using cost estimates from Conexon, a leading consultant working with electric cooperatives to build fiber optic networks in rural regions, we estimate the one-time cost of building a fiber network to every unserved household in these 10 counties to be approximately \$100 million. In addition to those build costs, we estimate the costs of annual connection subsidies to be about \$19 million.²

So for example, even after disregarding Dougherty County, which is an outlier in having much greater savings potential and lower cost of building a network due to its density and the majority of its residents already having some level of broadband service, the conservative savings of approximately \$30 million per year still offers a rapid payback on the needed digital equity investments.

Even more encouraging is that we believe these calculations represent the most conservative estimates based on a review of pilot studies and the academic literature on telehealth interventions. Where scholars or industry studies suggest a range of savings possible according to the above variables, we have taken the lowest estimate.

The telehealth savings modeled in this report certainly do not all go to one place. Some flow to the hospitals in the form of avoidance of the Medicare penalties that come from high readmission rates. Others flow to patients by preventing missed, unpaid work days and the travel costs it takes to drive to the nearby clinic for an emergency visit, or a faraway clinic for specialty care. Still others go to the communities themselves in the form of increased economic productivity for the region at large.

TABLE 2.

Avoided cost	Annual Saving Across All Counties
Emergency Department Visits	\$13,182,983
Lost Productivity	\$22,328,472
Preventable Admissions	\$1,719,578
Preventable Readmissions	\$5,636,357
Transportation Costs	\$26,978
Total	\$42,894,368

We take some space below to untangle these potential savings in more detail, but any argument that public dollars should not be invested to save hospital systems money holds little water. This is for two reasons. The first is that South Sunflower County Hospital, North Sunflower Medical Center, Greenwood Leflore Hospital, Greene County Hospital, Hill Hospital of Sumter County, and Hale County Hospital are public hospitals supported by county money. Reducing costs will directly and indirectly save taxpayers money. The second is that annual healthcare spending constitutes nearly 20 percent of the United States' Gross National Product, totaling about \$4 trillion every single year.

New broadband infrastructure enabling increased use of telehealth not only benefits the entire economy, but affords the array of other benefits that make broadband a social determinant of health. It unlocks workforce opportunities, makes independent businesses more competitive, and opens the door to microbusiness, all of which lead to higher area wages. It lets citizens connect with existing community resources and educational opportunities, improving community resiliency and leading to long-term benefits. And it offers the chance to reshape healthcare delivery to meet people where they are, facilitating cheaper preventative care while also reducing the cost of chronic and acute conditions systemwide.

Ultimately, this project shows that the cost savings from having true digital equity to support telehealth interventions is significantly greater than the cost of building network infrastructure and investing in skills training, especially over 10 and 20 years. Federal, state, and local governments should make the investments necessary to achieve digital equity and rapidly expand telehealth opportunities.

Introduction

The average broadband bill in the United States costs about \$68/month per month, or a little more than \$800 per year.³ Millions of families around the country today are unable to afford even the lowest-cost Internet access plans, despite help from federal subsidy initiatives like the Lifeline Program or the Affordable Connectivity Program. While these programs can dramatically lower the cost of connections - by as much as \$40 under the right circumstances - it's simply not enough. This is especially true in rural areas, where the cost to build and operate infrastructure costs more per subscriber than it does in cities. This reality is already well understood by member-owned electric cooperatives, which have been creative and persistent in bringing essential services to some of the most remote parts of the country over the last hundred years.

Millions of households do connect, but continually struggle to pay for access. Millions and millions of Americans lack basic access at all, and are stuck choosing between unreliable, expensive, and slow satellite Internet access, or no connection whatsoever. These realities have led policy experts everywhere to agree that smart local, state, and federal policies need to "promote competition, increase billing transparency, and make Internet service more affordable" for everyone.⁴

And yet, the high cost of deploying infrastructure to improve Internet access in the United States pales in comparison to healthcare costs, which top \$4 trillion every year.⁵ Industry numbers show that primary care through a physician's office or an urgent care clinic costs, on average, \$167 and \$193 per visit, respectively, and the numbers quickly rise from there. The average emergency department visit clocks in at more than \$2,000 per visit, with the extra costs driven by facility fees and lab, radiology, and pathology work, which costs many times more to perform in an emergency department setting than at a physician's office.⁶

Admission for chronic or acute care gets even more expensive. The average inpatient hospital admission costs \$11,700 per stay, or between \$2,150 and \$2,544 per day. Readmissions - whether because of complications following surgery or a complicating condition - cost even more, at \$14,400 each.⁷

Comparatively then, from emergency department visits to readmissions, avoiding a single hospital stay could pay for 2.3 to 17.6 years of broadband access at current subscriber rates.

Researchers, equity advocates, and elected leaders at all levels of government are increasingly acknowledging what those who have lived without quality Internet access for a generation already know: that broadband is a strong social determinant of health. It contributes to the strength of community and family connections, access to education, access to community services, and access to telehealth services.⁸

Social Determinants of Health

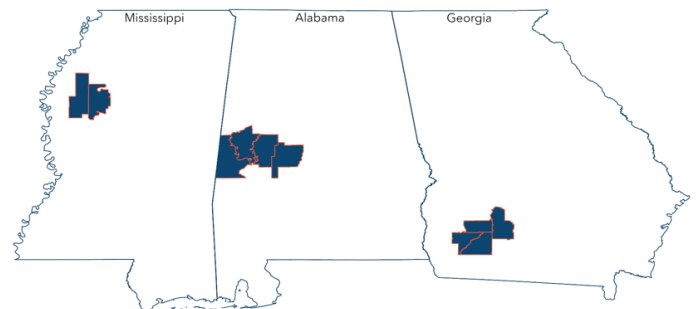


Social Determinants of Health
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This reality suggests a solution that has the potential to simultaneously solve the connectivity crisis and ensure that millions of American families that need it most can lead healthier lives. Building and subsidizing access to robust broadband networks capable of delivering telehealth services will return massive community savings for decades, even if just a small fraction of the costs that industry, scholars, and policy experts say is possible with interventions are recovered.

Graph 3. Modeling Telehealth Savings in Ten Southern Counties



To demonstrate the potential of telehealth savings compared to the cost of broadband deployment, this project looks at 10 counties in rural Alabama, Georgia, and Mississippi. These include Sunflower and LeFlore counties in Mississippi; Greene, Sumter, Hale, and Perry Counties in Alabama; and Baker, Dougherty, Mitchell, and Worth counties in Georgia. Major cities and population centers in the study region include Albany, Georgia (pop. 74,000); Greenwood, Mississippi (pop. 14,040); Indianola, Mississippi (pop. 9,450); Sylvester, GA (pop. 5,865); Livingston, Alabama (pop. 5,821); Camilla, Georgia (pop. 5,126); Eutaw, Alabama (pop. 4,012); and Marion, Alabama (pop. 3,275).

The goal of this report is to model the return on investment that would come from the construction of universal, robust broadband infrastructure. To accomplish this goal, we evaluated the financial benefit of affordable Internet access in these counties by estimating costs that arise from chronic and acute health conditions that may be avoided through telehealth interventions. Electric cooperatives are particularly well-positioned to do this, given their history of not just bringing an essential service to rural areas, but democratizing modern technology to the benefit of the entire community

These counties face some of the biggest connectivity challenges in the region, which directly impacts the potential impact of telehealth programs which could save significant money. To make a two-way video call and adequately plan for the demands of a quickly evolving telehealth landscape, households need to have connections capable of delivering at least 100/20 Megabits per second (Mbps). Unfortunately, as we can see in the table below, in many of these counties much of the population lacks even 25/3 Mbps service. In two counties - Greene County, Alabama and Baker County, Georgia - not a single household has access to a 100/20 Mbps connection.

TABLE 3. NUMBER OF HOUSEHOLDS BY INTERNET ACCESS SPEEDS IN STUDY AREA COUNTIES

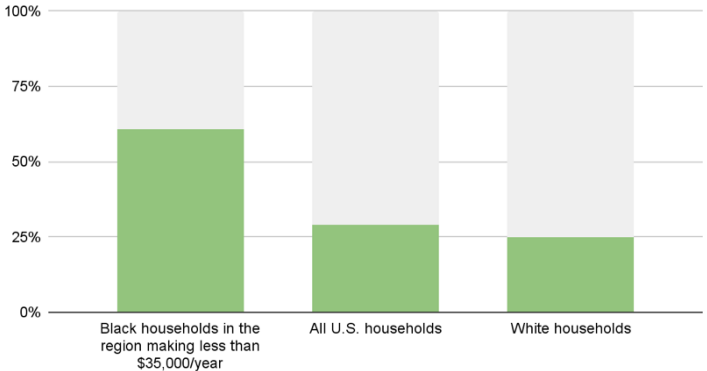
Number of households by Internet access speed					
State	County	Less than 25/3 Mbps		Less than 100/20 Mbps	
		Households	Percentage	Households	Percentage
Alabama	Greene	1,451	37 percent	3,867	100 percent
Alabama	Hale	2,227	34 percent	3,197	49 percent
Alabama	Perry	2,135	53 percent	3,656	92 percent
Alabama	Sumter	1,654	28 percent	3,277	56 percent
Georgia	Baker	857	63 percent	1,366	100 percent
Georgia	Dougherty	785	2 percent	847	2 percent
Georgia	Mitchell	2,162	27 percent	3,779	46 percent
Georgia	Worth	1,117	13 percent	2,411	29 percent
Mississippi	LeFlore	1,042	9 percent	9,302	81 percent
Mississippi	Sunflower	1,756	20 percent	6,160	70 percent
Data source: FCC Form 477 (Dec 2020)					
Author: Christine Parker - ILSR					



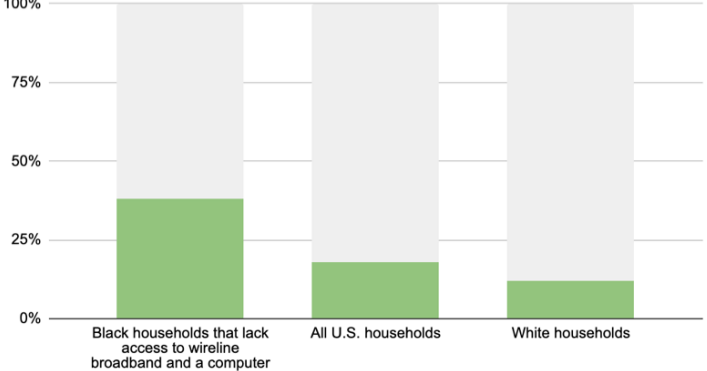
In addition to the following report, this project includes an interactive website that provides the details of the case studies and potential benefits of telehealth, along with manipulatable variables so end users can change and see the benefits for their own communities wherever they live, and a spreadsheet of the data we used to compute these potential benefits. Visit the [Modeling Telehealth Savings Calculator](#).

A recently released report by the Joint Center for Political and Economic Studies outlines the particular challenges faced by communities of color across the Black rural south, a region spanning 152 counties across ten states where the population is at least 35 percent African American (which includes the study region).⁹ The report, for instance, points out the high rate of Black homes that lack access to wireline broadband and a computer when compared to both the United States as a whole and white households across the country.

Graph 4. Households Making Less than \$35,000 per Year, by Race ¹⁰



Graph 5. Access to a Wireline Broadband and a Computer, by Race ¹¹



Our own summary of data describing household income, and access to wireline broadband and a computer supports findings in the Joint Center for Political and Economic Studies report.

The result, the report argues, is increasing income, education, and health disparities that will continue to stack additional inequities on the shoulders of those families for generations to come.

We are currently living at a nexus - a once-in-a-generation moment to solve the digital divide. This moment also offers the chance to revolutionize not only how we deliver health care services across the United States, but how we think about them as well. Overcoming the persistent challenges of our underbuilt national telecommunications infrastructure would unlock untold economic and educational benefits. And the expense could be offset by the savings it would bring to our health care system today.

WHAT'S THE PROBLEM?

Up-front construction costs represent the most significant challenge to deliver broadband service, especially in lower than average population densities. While the initial amount required to connect a new rural household may exceed \$4,000, the cost to operate that connection once it has been made can be as little as \$10 to \$20 per month.¹² Well-built fiber networks are both resilient and cost comparatively little to run. Electric cooperatives that have embarked on broadband projects demonstrate they often already have most of the ingredients necessary to succeed in operating as Internet Service Providers (ISPs).

As of 2022, there are opportunities to use federal broadband funds to unlock grant money and lower the barrier to begin construction. The Coronavirus Capital Projects Fund (\$10 billion) and the Coronavirus Local Fiscal Recovery Fund (\$130 billion), both administered by the United States Treasury, as well as the \$42.5 billion NTIA-administered Infrastructure Investment and Jobs Act broadband fund, all offer states, counties, and cities a landmark opportunity to invest in new broadband infrastructure.¹³

And so, with more than 20 years of research showing that telehealth interventions can save far more money than it will cost to ensure every American has robust, affordable broadband, and an unprecedented amount of money about to become available to ensure that nearly every household can have future-proof connectivity, only one question that remains is: will communities seize this opportunity before the moment has passed?

WHAT IS TELEHEALTH?

Telehealth is the use of information technology to provide health care services over vast distances. For the purposes of this study, we focus on the economic benefits of providing remote delivery of clinical services, distance consultations, and in-home monitoring devices and education efforts with tablets. However, telehealth also broadly includes continuing education, conferences, doctor training, the review of imaging by specialists far from where scans were taken, accessing electronic health records, and e-prescription services.¹⁴ Additionally, telehealth is widely used to provide specialized health care access to underserved communities with physician shortages.¹⁵ Sometimes, the term "telemedicine" is used to describe the clinical delivery side of the health care industry, and "telehealth" the broader application of digital tools to medicine in all of its facets. However, given the wider use of the term "telehealth" in the mainstream media, in

this report we use the term "telehealth."

HEALTHCARE AND TELEHEALTH CHALLENGES IN RURAL AMERICA

Health care services are not uniformly available across the United States. To remedy this, communities experiencing shortages of health care services can receive a "medically underserved areas" (MUAs) or "medically underserved populations" (MUPs) designation by the federal Health Resources and Services Administration (HRSA), which helps funnel expertise and financial resources in those directions. Rural counties in Alabama, Georgia and Mississippi are almost all categorized as MUAs due to physician and hospital shortages.¹⁶

Compared to their urban counterparts, rural communities are much less likely to have access to physician specialties and emergency physicians, which results in more travel time and other logistical obstacles for those needing specialized care.¹⁷ 20 percent of Americans live in rural communities, yet only 11 percent of physicians practice medicine in rural communities.¹⁸

Rural regions, in addition, face comparatively greater health care challenges from other social determinants of health, including median older ages, lower incomes, increasingly fewer hospitals, trauma centers, and specialty clinics, higher rates of chronic diseases and other leading causes of death, and increased rates of smoking and obesity.¹⁹

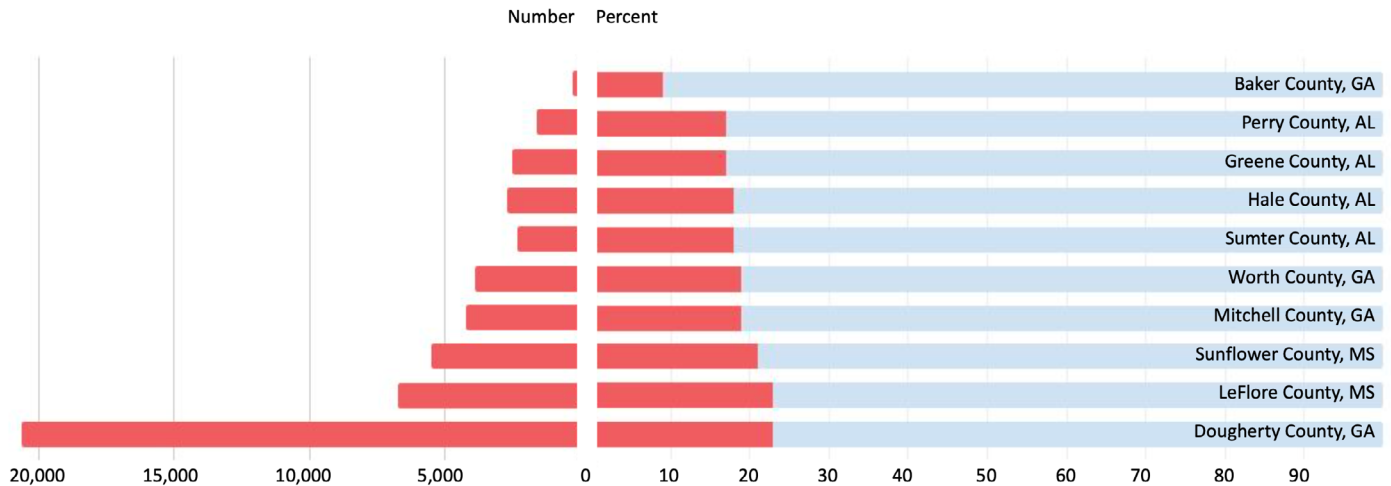
People in rural and medically underserved communities can benefit greatly from telehealth. The Centers for Disease Control and Prevention reports that populations in rural America are older and more likely to suffer from preventable chronic diseases than their urban counterparts. Rural communities have a higher rate of uninsured residents with limited health care access. Additionally, rural residents are more likely to have a sedentary lifestyle, have higher rates of hypertension, cigarette smoking and obesity, which all are risk factors for chronic illnesses such as cancer and heart disease.²⁰

Our analysis shows that these ten counties in particular would benefit from interventions like telehealth, which provide low-cost, low-barrier avenues towards better care. This is in part because of the relatively high rate of residents who both make under \$25,000 per year and who have no health coverage today (see graph below).

METHODS

This report brings together a wide array of source material to try and imagine what access to universal broadband infrastructure and telehealth could save in healthcare costs in ten counties across Mississippi, Alabama, and Georgia. It uses academic studies, industry reports, and federal agency reports to calculate the costs of some of the most expensive chronic and acute conditions affecting residents, as well as come up with figures to model the potential savings. Specific data were pulled from the following:

Graph 6. Residents Who Both Make Under \$25,000 and Do not Have Health Insurance



The **ACS 5-Year Estimates** offer a broad summary of social, economic, demographic, and housing data across the country every five years. The **CMS National Health Expenditures Projected** estimates future health expenditure and trends over the next 10 years. **Dignity Health** indexes the health needs of each county nationwide. The **Kaiser Family Foundation** releases emergency department rates by hospital ownership type. UnitedHealth Group released a **fact sheet** outlining the annual aggregate cost of avoidable hospital emergency department visits to the healthcare system. The **Centers for Medicare & Medicaid Services (CMS)** releases health-related data to the public and the **CMS Office of Minority Health** maps Medicare disparities by population. The **County Health Rankings & Roadmaps** supported by the **Robert Wood Johnson Foundation (RWJF)** of the University of Wisconsin Population Health Institute releases data that highlights health disparities between communities and demonstrates how health factors influence community outcomes. The **U.S. Department of Labor Minimum Wage page** outlines the federal minimum wage. The U.S. Bureau of Labor Statistics Occupational Employment and Wage Statistics page outlines **median wages by multiple parameters including county and state**, as well as **metropolitan and nonmetropolitan area definitions**. Bill Siwicki's **2019 article in Healthcare IT News** explains healthcare organization Cigna's decision to introduce digital care services in order to reduce emergency department visits. FRED Economic Data releases **annual rates of preventable hospital admissions** by state and county. The State of Mississippi produced **an audit in 2017 assessing the financial health of Mississippi's independent county-owned rural hospitals**. The EPA estimates **greenhouse gas emissions per mile**. The BTS releases **average fuel efficiency of U.S. light duty vehicles**.

This report also uses interview and survey data from residents living across these ten counties. Trained community organizers conducted one-on-one interviews over several months in the fall of 2021, pulling together qualitative experiences related to Internet use, cost, and healthcare. Scattered throughout this report are Resident Testimonials reflecting those interviews. At the same time, ILSR conducted a Facebook survey directed at residents of the county study area to ask similar questions and

assemble a snapshot of current use, hesitations, and challenges to general Internet access and telehealth.

A NOTE ON TELEHEALTH USE AND SAVINGS

We sit at something of a turning point in the delivery of health care in this country. No one who has experienced it - from the patient or provider side - doubts the capability of the additional tools, insight, and flexibility offered by the telehealth of today and tomorrow to drive a radical paradigm shift. If we manage that shift thoughtfully and boldly, healthcare a half-century from now will be powerfully predictive, more holistic, and more equitable by many orders of magnitude than it is today.

And yet, as some veteran researchers of healthcare in the United States have shown, much of the explosion of telehealth use during the pandemic seems to be receding (except for telemental health visits).²¹ Further, they say, some of the savings that we actually see from telehealth today comes from audio-only usage over phone, which is at least in part enabled by the comparatively lower reimbursement rates paid for such visits as compared to in-person appointments, or the fact that audio-only telehealth allows patients to expand the scope of their care statewide and make use of the lower rates offered by some providers because of geography or size.

Finally, some research suggests that telehealth initiatives don't save money, but either cost the same as in-person care, or even more.²²

Finally, researchers also argue that the tools of remote monitoring and instant access to physician care will mean that in the future we will spend more on the system when they are fully implemented, not less.²³ A more pressing concern than broadband infrastructure to enable two-way video calling and remote monitoring, they argue, are obstructionist licensing laws and a lack of parity for reimbursement.

We acknowledge these existing challenges and likely realities, and agree that there is much to be learned, and proceed with a handful of things firmly in mind. First, we (along with many experts) recognize that studies of telehealth utilization - which represented less than one percent of all health care delivery prior to the pandemic - have so far captured only the earliest adopters and a scale a fraction of the size it will be in another generation. Second, we are joined by many in believing that higher-touch, more individualized care will make for healthier populations and lead to less expensive healthcare for the chronic and acute conditions of today and in the long run. Third, scattered throughout this report are the outcomes of a wide array of clinic- and hospital-led telehealth programs which are documenting significant savings today and over the last few years. As they have demonstrated, the avoided costs from telehealth programs depend heavily on a host of factors, from how the intervention is structured, to the target population and the stage of care at which their costs are being imputed, to the type of health plan, etc. Fourth and finally, broadband advocates have for years written and talked about all of the ways that Internet access is a super social determinant of health.

For example, enabling universal access to telehealth over robust broadband infrastructure will amplify the savings that come from better access to education, information, economic opportunities, and community connections. It also offers the potential to fundamentally reimagine health care delivery in the United States, replacing the current fee-for-service schema with one that maximizes real wellness outcomes. It is not a utopian dream to imagine that, when a trip to the emergency department can be avoided for the cost of having a nurse log into remote health monitoring devices to check his or her pulse and blood pressure, the cost of improving long-term, comprehensive wellness will dramatically change.²⁴ But none of it can take place until we have universally accessible, robust, affordable infrastructure over which to deliver those services. Here we model the potential return on investment from telehealth interventions, but whether it's telehealth, economic development, or education, one thing is certain: the comparative capital cost of broadband deployments is small, by comparison.

Part 1: Health Conditions and the Potential Telehealth Savings of Those Conditions

While telehealth offers the chance to reduce costs in a variety of settings and deployments, the potential savings are not uniform. Some conditions, for example, offer the chance to save more because they require repeated doctors visits, constant monitoring, or carry a high risk of rehospitalization if discharge instructions are not closely followed or patients experience complicating conditions. Other conditions require consultations by specialists who practice hundreds of miles away, which means repeated travel and loss of work. Below, we cover some of the health conditions that are the most prevalent in the study area, and how telehealth can reduce the costs of treating those conditions.

CONGENITAL HEART DISEASE AND CARDIOVASCULAR DISEASE

Congenital Heart Disease (CHD) is a birth defect that affects blood flow through the heart and throughout the body because of abnormal structures, with complications taking the form of irregular heartbeats, heart infection, pulmonary hypertension and stroke.

There is an increasing need for telehealth to address the lack of doctors with less common specialties in rural and medically underserved communities. These are called subspecialists, and include doctors and nurses who spend all of their time studying and treating the hyper-specific disease progressions which are difficult to diagnose and become more difficult and expensive to treat if they go unnoticed. Unfortunately for these communities, subspecialists have been drawn to urban centers over the last thirty years for a variety of factors.

In these communities, limited access to pediatric subspecialists and the financial burden of traveling great distances for care often increases emergency department use for unnecessary pediatric care. Studies show, for instance, that clinicians in health facilities lacking subspecialty pediatric care systemically over-triage patients, which leads to unnecessary (and expensive) transportation in many cases to regional pediatric hospitals for inpatient treatment.²⁵ Emergency departments, ambulatory centers, health clinics and school-based clinics in rural communities can use telehealth to bring high-quality care for subspecialty treatment for mildly ill children.²⁶ In addition, patients in medically underserved and rural communities are more likely to maintain follow-up visits with their provider when telehealth is utilized for subspecialty consultations, reducing complications down the road.²⁷

The avoidable travel savings that come from implementing telehealth programs for pediatric congenital heart disease alone are significant. In one study, researchers tracked infants with critical congenital heart disease in a Level II Neonatal Intensive Care Unit (NICU) to determine whether one tele-echocardiography initiative was effective. Echocardiography helps clinicians determine

whether an infant needs to be immediately transported to a hospital serviced with a pediatric cardiologist. The institution's policy for transport stated that transport by air is required if the receiving hospital is greater than 45 miles. They found that:

- Only 5 out of 52 infants who received screenings actually needed air transportation.
- This resulted in a \$260,000 savings in transportation costs.²⁸

Another study which looked at worsening heart failure admissions found that by targeting the 20 percent of incoming heart failure patients who may not need to be admitted for long periods and successfully converting 90 percent of those from inpatient treatment to outpatient treatment, Medicare would save \$2.1 billion each year nationally.²⁹

Studies show that patients suffering from Congenital Heart Disease are at higher risk of developing Cardiovascular Disease (CVD).³⁰ CVD is the leading cause of death in the United States of most racial and ethnic groups, consisting of a variety of heart conditions such as coronary artery disease, arrhythmia and heart failure which collectively cost more than \$219 billion in the United States each year.³¹ High blood pressure, high blood cholesterol and smoking are leading causes, all of which are associated with poor diet and physical inactivity.³² CVD disproportionately affects residents of rural areas, with a 15-year life expectancy difference compared to residents in northern US states.³³

Hospitalization costs for heart failure patients:

- Total more than \$30 billion each year in the United States. Research suggests those costs will reach as high as \$70 billion by 2030.³⁴
- Six months after discharge, between 25 and 50 percent of heart failure patients are readmitted.
- Heart failure patients make up the largest percentage of the 30-day readmissions.³⁵

Readmission of Heart Failure Patients



Six months after discharge, between 25 and 50 percent of heart failure patients are readmitted

DIABETES

Diabetes is a condition in which the body doesn't produce enough insulin or doesn't effectively use available insulin. Insulin is a hormone needed to help glucose from the food we eat get into the cells where it's used for energy. Diabetes results in high blood glucose levels which, over time, can have many harmful effects including heart disease, kidney disease and vision loss.³⁶

More than 34 million Americans have diabetes, and their healthcare costs are 3.2 times greater annual than a person without diabetes. The disease has other significant costs associated with it including lost productivity and increased mortality.³⁷ Diabetes is an ideal medical condition for telehealth utilization because it requires close monitoring to prevent complications. It's not surprising then that telehealth has been a focus in diabetes care since the early 90s, as it improves healthcare outcomes by providing services and education, and overcoming geographic barriers to treatment.³⁸ For instance, the use of telehealth for retinal screening (Tele-ophthalmology) has been found to be beneficial and cost-effective for diabetes management.³⁹

One Atlanta-based telehealth program found that veterans with Type 1 diabetes needing specialty care in rural Alabama and Georgia saved almost three hours of travel time per visit by participating. This saved the Veterans Administration \$73 in reimbursement per visit. Compounding these savings many times over would lead to significant savings. Alabama, Mississippi, and Georgia have almost 1.2 million veterans between them, and almost 25 percent of veterans have diabetes.⁴⁰ At just one visit per year per veteran with diabetes, this means the potential to save \$22 million each year. Telehealth also offers the chance to save money in treating diabetes in other ways. For instance, it leads to fewer missed appointments, which can lead to complicating factors that require very expensive hospitalizations. Telehealth also offers the chance to save money in treating diabetes in other ways. For instance, it leads to fewer missed appointments, which can lead to complicating factors that require very expensive hospitalizations.⁴¹

CHRONIC RESPIRATORY DISEASE

Chronic Respiratory Diseases (CRDs) are long-term diseases that affect the airways and other structures of the lungs.

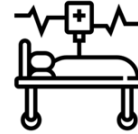
Chronic Respiratory Diseases like asthma, chronic obstructive pulmonary disease (COPD) and emphysema drive many hospital admissions, readmissions, and emergency department visits. COPD alone is projected to become the third-leading cause of death by 2030.⁴² COPD is a good candidate for avoiding costs, with one study following a telehealth project that reduced readmissions by as much as 56 percent.⁴³ With over fifteen million clinic visits, 1.5 million Emergency department visits, and 725,000 hospital visits caused by COPD each year, the potential for preventable costs is enormous.⁴⁴

COPD Footprint⁴⁵

Every year, COPD causes:



15 million clinic visits,



1.5 million Emergency Room visits,



and 725,000 hospital visits.

CANCER

After trauma-related disorders, cancer is the most expensive condition in the United States for non-elderly adults, with average costs per diagnosis in 2012 of more than \$8,000.⁴⁶ Using telehealth in the treatment of cancer can lead to tremendous cost savings. Looking at travel-related costs, a study of rural Veterans Health Administration patients showed that patients saved 28 hours of travel time and \$900 each by visiting with their doctors and specialists online.⁴⁷ Another study in Australia evaluated a telehealth program for cancer care and found that the program resulted in savings of over \$300,000 (over 56 months), mostly from avoided travel costs.⁴⁸

Cancer refers to a group of diseases that can affect any part of the body. Cancer occurs when abnormal cells grow uncontrollably, sometimes beyond their usual boundaries, potentially spreading to other parts of the body and the organs (WHO). In the US, cancer affects 1 in 3 people (ACS).

Telehealth usage is growing in the field of cancer care, and technology has quickly been adapted because of the COVID-19 pandemic. Cancer patients and survivors often have weakened immune systems, making them vulnerable to getting sick. By converting routine outpatient visits to telehealth, healthcare systems can reduce the risk of exposure to COVID-19 as well as other illnesses like the flu.⁴⁹

Telehealth can also save money and improve access to care by decreasing no-show rates for cancer programs and appointments, with some programs going so far as to triple attendance (and especially benefitting rural users).⁵⁰ These approaches have also been found to reduce usage of emergency services, improve control of symptoms for people in palliative care, and has come to be highly valued by family members for enhancing care and improving their confidence in the care provided.⁵¹

MENTAL HEALTH

Mental illnesses are health conditions that affect the way a person thinks, feels, and behaves. They can affect people of all ages, resulting in distress and difficulty functioning day-to-day. Examples of mental illnesses include Depression, Bipolar Disorder, and Post-Traumatic Stress Disorder. Mental illnesses are common with almost 1 in 5 US adults (or 19%) experiencing a mental illness in a given year (APA).

Using telehealth in the treatment and management of mental health conditions holds significant potential for improving access to care and reducing costs.

More than a third of Americans live in areas without adequate mental healthcare providers, which has a significant impact on their ability to access care when they need it. Telemental healthcare could meaningfully improve this situation, while also reducing the significant costs associated with traveling to seek specialty care.

In a study of more than 2,000 veterans participating in a VA national telehealth tablet initiative, 92 percent reported that they saved time or money. Among these:

- 41 percent said they saved \$25-50 per appointment
- 31 percent said they saved more than \$50 per appointment.⁵²
- This translates to hundreds of dollars per year, with up to four times the benefits for weekly therapy patients.

One consequence of the mental healthcare provider shortage is that the majority of patients with mental health disorders are being treated by primary care physicians, emergency departments (EDs) or in correctional facilities, the latter two of which are particularly ill-suited to providing the highest-quality, most appropriate, and most cost-effective care.⁵³

When the burden of delivering psychiatric care falls upon emergency department nurses and physicians in particular, unnecessary costs rise dramatically, with patients who have arrived to get help with a mental health issue having a higher chance of being admitted and staying more than three times longer than non-psychiatric patients. In addition to leading to unnecessary costs, this prevents more than two additional bed turnovers.⁵⁴ And yet, it is important to point out here the cost of no intervention at all for patients with serious mental health issues is not lower system costs, but rather the opposite. People facing serious mental health challenges that go untreated lead to higher system costs.

Faster access to mental health services offers the chance to reduce the costs associated with emergency department visits and in-patient admissions. The CaroMont Regional Medical Center in Gastonia, North Carolina initiated a telehealth program to deal with patients who showed up to the ED presenting with mental health issues when there was no on-staff psychiatrist

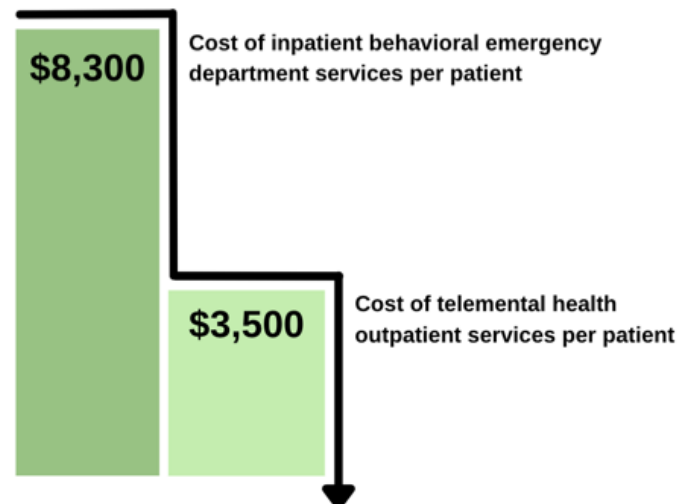
available. They suspected that without immediate access to that expertise, ED physicians were admitting patients unnecessarily. It proved them right. The program gave ED physicians quick access to a psychiatrist remotely, and put a nurse assessor in the room with doctors and patients to help translate. It not only reduced the average length of stay for psychiatric patients by 70 percent, but eliminated more than 90 percent of the department overflow hours.⁵⁵

The availability of telemental health services in ERs can also help to ensure patients receive the on-going care they need, reducing the likelihood that they will require hospitalization later on. A study of eighteen ERs in South Carolina showed that:⁵⁶

- People who sought mental health services at institutions with a telepsychiatry program were three times more likely to receive follow-up care as compared to those visiting ERs without one.
- As a result, they were half as likely to require hospital admission over a 30-day period.
- Inpatient cost savings totaled over \$2,000 per patient participating in the telepsychiatry program.
- It also lowered the total 30-day healthcare cost by almost \$1,400 per patient.

Telemental health services also decrease wait times for EDs in rural communities and reduce hospital admission rates for inpatient treatment by providing an outpatient treatment alternative. Compared to an inpatient behavioral emergency department cost of \$8,300 per visit, outpatient services using telemental health services cost just \$3,500, leading to savings of more than \$4,800 per patient.⁵⁷

Graph 7. Cost Savings from Telemental Health



TUBERCULOSIS

Tuberculosis (TB) is a bacterial infection that often affects the lungs, but can also impact the spine, brain, and kidneys. TB is spread through the air when someone with TB infection coughs or speaks. TB infection can lead to TB disease which can cause significant disability and be fatal if it is not treated (CDC).

In 2020 the United States registered, tracked, and treated around 7,200 tuberculosis (TB) cases.⁵⁸ The Centers for Disease Control and Prevention reports that instances of the disease have been steadily dropping by 2-3 percent each year since 1993, but remain a threat to the wellbeing of the country. A 2009 study argued that TB rates for the non-Hispanic Black population is as much as eight times higher than it is for non-Hispanic whites, making the disease one with particular racial disparities.⁵⁹

County public health officials serve on the front lines of the effort to eliminate TB, which requires individuals to take a prescribed medication regimen for 6 to 9 months. Public health regulations require the individual to be observed taking the medication (called Daily Observational Therapy (DOT)) for the initial 2 months of treatment, which means high costs for nurses who must travel around the county, particularly in rural areas. Alternative methods used to reduce costs include in-clinic DOT, live-video DOT, and recorded-video DOT. Medication adherence is very important to prevent treatment failure and drug resistance.

Field-based Daily Observational Therapy can cost thousands of dollars over the course of the 60-day regimen, but digital tools offer opportunities to reduce those by as much as 80 percent.⁶⁰ One study in Washington state found that live-video

DOT translated to a savings of almost \$2,550 per person, per year.⁶¹ Another study in New York City found that live-video DOT could reduce the costs by two-thirds.⁶² Considering that DOT can include 5 sessions a week over 2 months, this represents a saving of over \$500 per person per incidence.

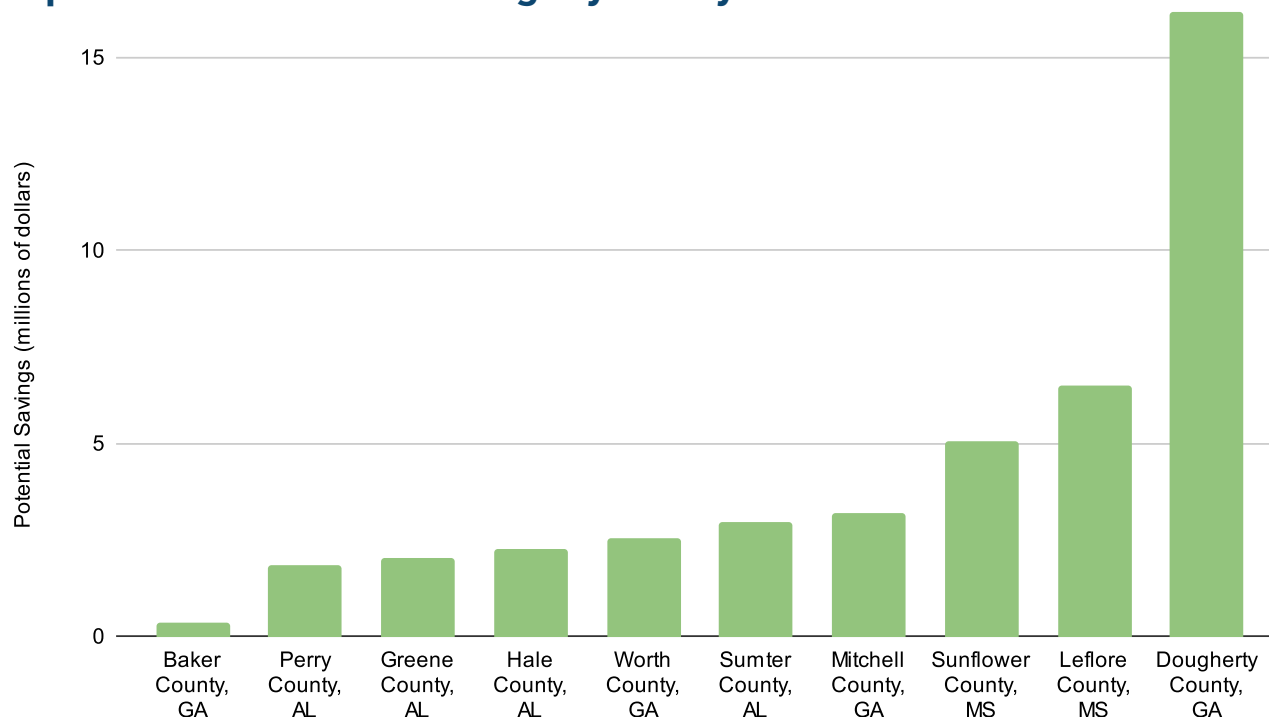
OBESITY

Obesity is a condition that results when a person's weight is higher than what is considered healthy for their height. In the US, 2 in 5 adults and 1 in 5 children and adolescents are considered obese.

Obesity is associated with many health problems, including Type 2 diabetes, heart disease, high blood pressure, stroke, cancer, and mental health problems. As a result, obesity is associated with much higher than average medical costs; in fact, one study found that medical care costs for adults with obesity was 100 percent (or \$2,500) higher per year than those with normal weight, and estimated the total medical costs of obesity to add up to more than \$260 billion annually.⁶³

Telehealth programs offer the chance to improve outcomes dramatically for people with obesity. For example, by pairing licensed nutritionists and the parents of children facing obesity challenges, and then giving those parents access to online educational materials and a social support group via a private Facebook room, studies show strong positive changes in diet that last.⁶⁴ A robust, long-lived telehealth program is key, the research showing that regular check-ins with providers for more than six months is what is needed to cement these changes.⁶⁵

Graph 8. Potential Annual Savings by County



Part 2: Modeling Health Savings

In order to help others estimate these savings or allow others to easily adjust our assumptions, we have created a [website calculator](#). Feel free to enter your own community and its characteristics, and the calculator will model the savings described in this report for you.⁶⁶

If telehealth has the potential to reduce what we spend on healthcare in the United States, the question follows: how much can we save in these counties?

TOTAL PROJECTED SAVINGS

In this study we model the potential savings for county-specific data across six variables: lost productivity, admissions, readmissions, emergency department visits, transportation costs, and carbon emissions. We base these savings on a most-conservative case scenario based on the academic literature and the results of pilot projects or existing telehealth interventions, wherever possible. We take the lowest reasonable amount of savings (ten percent of each) in order to demonstrate the potential of telehealth to avoid costs.

The potential savings is huge, totaling millions of dollars a year for the smallest counties and tens of millions for the largest counties in this study (Graph 9).

Lost productivity is the area where the most savings could be recaptured, with \$223 million per year lost due to poor health days - recovering even a small fraction of this would add up to tens of millions of dollars per year. These savings accrue not only to individuals, but small business owners and the community at large. However, even setting aside lost productivity, the probable savings that could be gotten from universal broadband coverage over which telehealth interventions could be delivered is more than \$22.3 million per year in these counties.

It's important to note here that we have made our best effort to render a good-faith representation of the likely costs which would be avoided based on the conclusions of the academic literature. Any econometrician or healthcare industry researcher will point out that uncomplicated readings of simple equations which show massive potential savings are bound to miss the messiness of complex human systems, of which the healthcare industry is surely one. We do not claim to be healthcare system experts, but merely attempt to show here: 1) the scale difference in cost between delivering health care in this country and building future-proof networks, and 2) how avoiding even a small percentage of high-cost interventions for one population can aggregate quickly over the course of a year.

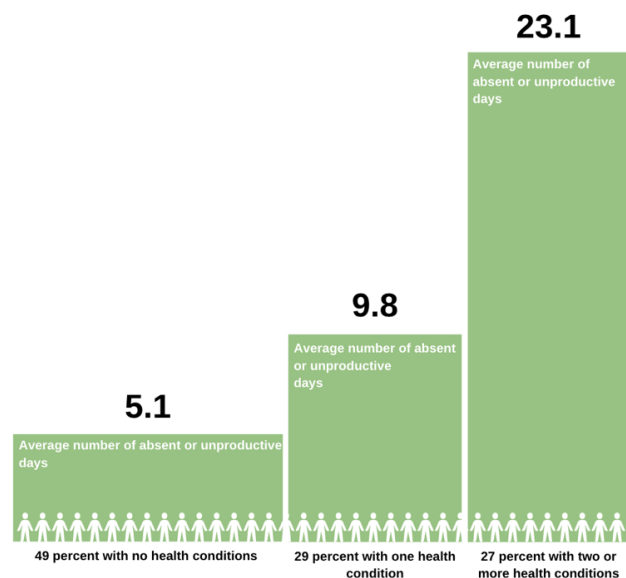
LOST PRODUCTIVITY

Health has a direct relationship to job performance, and lost productivity research has long looked at the impact of absenteeism (missed work) and presenteeism (working while sick) negatively impact the economy. These impacts are also compounded when workers are plagued by multiple health conditions. Research demonstrates that among the population

with a mean of 5.1 absent or unproductive days among the 45 percent of the population with no health conditions, compared to 9.8 absent or unproductive days for the 29 percent of workers with one health condition and as many as 23.1 absent or unproductive days for the 27 percent of the population with two or more health conditions.⁶⁷

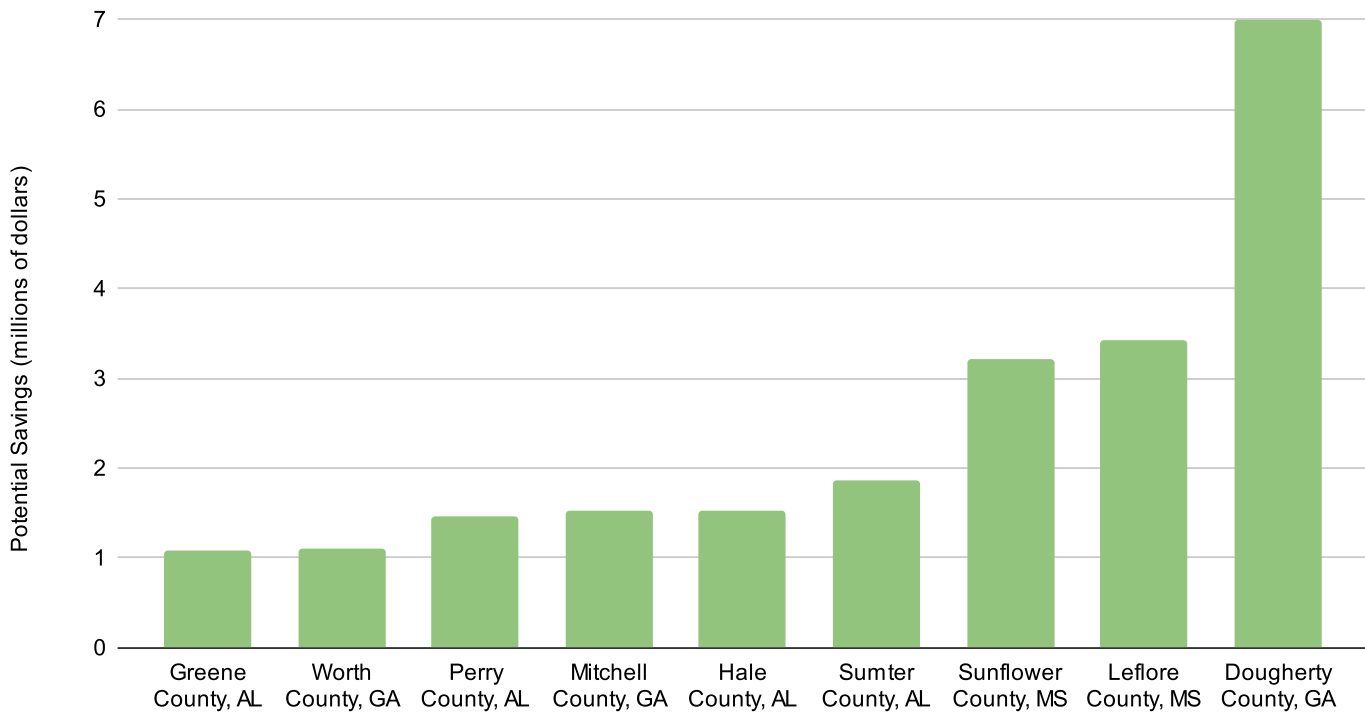
Chronic conditions with outsized impacts on productivity include obesity (with \$8.7 billion lost each year)⁶⁸ and cancer (especially those facing additional comorbidities), which suggests that telehealth initiatives aimed at chronic conditions would lead to compounded savings.⁶⁹

Graph 9. Effect of Health Conditions on Work Productivity



It might seem like the most straightforward way to calculate health-related lost productivity would be to multiply workers' wages by the number of days missed due to sickness each year, studies show that the impact is actually much greater. In 2006, researchers showed that jobs today - especially those that are part of the knowledge economy - necessitate high levels of coordination and communication among large teams, which means presenteeism and absenteeism due to illness have a larger economic impact than just the lost labor from the worker who becomes sick.⁷⁰ A study of 57 jobs across 12 industries, found that each hour of labor lost to illness costs companies 1.61 hours. This analysis accounted for many factors including the ease with which a worker could be replaced, whether work could be

Graph 10. Modeling Potential Telehealth Savings in Lost Productivity



postponed, whether workers performed tasks alone or were part of a team, and the cost of substitute labor, they concluded that each hour of labor lost due to illness actually costs companies 1.61 hours.⁷¹

Each hour of labor lost due to illness actually costs companies 1.61 hours of labor.

The University of Wisconsin Population Health Institute tracks two helpful measures that can help model the impact of lost productivity. First is the percent of adults who report being in poor or fair health. Across the study area, this ranges from a lower boundary of 20 percent in Worth and Baker Counties, Georgia to an upper bound of 35 percent in Perry County, Alabama. The mean percent of adults reporting poor or fair health status across the ten-county study area is 28 percent.

Second are the number of self-reported poor physical health days by county per month. Across the study area, this ranges from 3.7/month in Baker County, Georgia to 6.4/month in Perry County, Alabama. The average number of poor health days each month across the ten-county study area is 5.1/month.⁷²

If we multiply the subset of the population in poor health by the average number of poor health days per month, we can estimate a starting point for how much absenteeism and presenteeism costs in lost productivity.

At the federal minimum wage of \$7.25/hour, poor health days cost from \$1.5 million/year in Baker County to \$70 million/year

in Dougherty County, for a total across the ten counties of \$223 million/year.

Recovering just 10 percent of the lost productivity due to poor health days would save the ten counties in the study area \$22.3 million/year. These savings would accrue to the community at large, leading to higher productivity for retail, commercial, and manufacturing enterprises. More resilient local economies lead to more small businesses, a bigger tax base, and more choices for consumers.

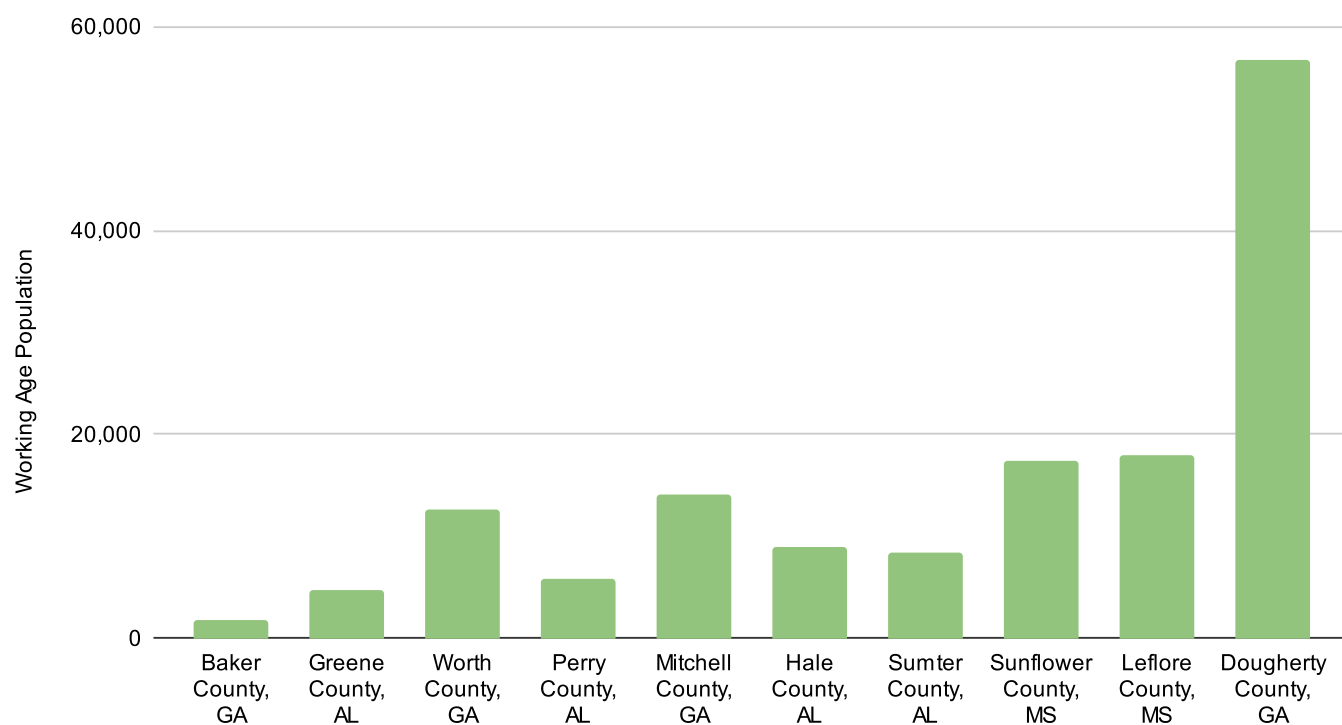
We believe this represents the most conservative estimate. Calculating the potential cost savings using the median area wage (ranging from \$14.54/hour in Sunflower and LeFlore counties, Mississippi to \$17.87/hour in Hale County, Alabama) instead of the federal minimum wage (\$7.25/hour) would more than double the potential of telehealth programs to boost economic output in these counties.

Lost productivity from absences and presenteeism can be calculated using the following equation:

EQUATION: Percentage of Population Reporting Poor Physical Health Days⁷³ * Working Age Population⁷⁴ * Poor Physical Health Days/Month * Average Daily Compensation * 1.61 * 12 *.1

To calculate Average Daily Compensation: (8*hourly wage)

Graph 11. Working Age Population, by County



PREVENTABLE ADMISSIONS

Each day spent in the hospital after admission costs thousands of dollars. Preventing unnecessary hospital admissions offers a significant opportunity to reduce costs systemwide. The average cost per hospital admission in 2016 was \$11,700, according to the Agency for Healthcare Research and Quality.⁷⁵ This means that the almost 25,000 admissions across the study region represent almost \$290 million in health care delivery costs.

Each year, the 25,000 hospital admissions across the study region represent almost \$290 million in healthcare delivery costs.

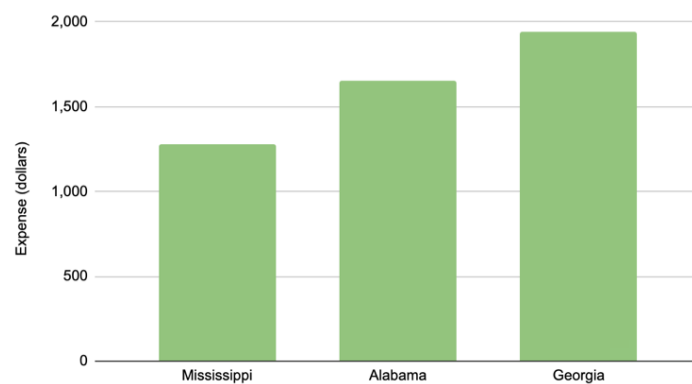
This is staggering, and a reality made all the worse by the fact that the rate of inpatient hospital stays is highest among the East South Central region of the U.S., which includes two of the three states we model savings for here (Alabama and Mississippi - the other two are Tennessee, and Kentucky). In 2019, the adjusted expense per inpatient per day in Alabama was \$1,657, while it was \$1,939 in Georgia and \$1,279 in Mississippi.⁷⁶

But not all hospital admissions are created equally. Some come when overworked Emergency Department doctors, operating from a lack the expertise to make a judgment call about a borderline case, admit a patient who didn't need to be admitted. Others come when chronic conditions worsen suddenly because of a lack of treatment. In both of these cases, admissions could be avoided with a relatively simple telehealth program which connects patients and ED doctors to the specialists they need. Follow-up care could come at home via telehealth, referred to

less-expensive methods like urgent care or clinic locations, or avoided entirely.

The cost of preventable admissions is one that gets compounded daily, across the entirety of the country.

Graph 12. Adjusted Daily Inpatient Expense, by State (2019)



The National Center for Biotechnology Information estimated that there were as many as 3.5 million potentially preventable adult inpatient stays across the United States in 2017, which resulted in avoidable costs of \$33.7 billion that year.

The good news is that research shows that existing solutions can be the most effective for precisely the populations who are hardest hit by healthcare costs and disparities. This includes those with one or more chronic conditions, the elderly, men, Black communities, and those insured with Medicaid would have the highest rates of success.⁷⁷

Heart failure is the most common and expensive reason for potentially preventable stays, followed by pediatric asthma, diabetes, and COPD rounding out the list.

Calculating the preventable hospital admission rate is one that both healthcare advocates and hospital systems have spent considerable time and energy to do, since it is one of the single highest drivers of cost in this country.

The preventable hospital admission rate in the study area counties ranges from 4.9 percent to 9.4 percent.⁷⁸ That results in almost 1,500 preventable admissions annually, at a cost of \$17.2 million every year.

Admissions are classified as preventable according to a wide range of factors, including the existence of chronic and acute conditions, insurance type, previous inpatient care, and a host of socioeconomic and demographic characteristics.⁷⁹ Because of this wide variability, here we take the most conservative approach and model the savings that would come from avoiding just 10 percent of those admissions that have already been identified as preventable, to show the enormous potential in using telehealth to reduce the number of admissions that take place.

Implementing a telehealth program and reducing the preventable admission rate by just 10 percent (i.e. from 5.9 percent in Worth County, Georgia to 5.3 percent) would save significant money, from \$28,000 per year in Worth County, Georgia to \$652,000 per year for Dougherty County, Georgia. Across all nine hospitals, a 10 percent annual savings would amount to more than \$1.7 million each year. If, instead, half of all preventable admissions could be avoided with the implementation of robust telehealth initiatives, the savings modeled in this report would increase fivefold.

We calculate the potential savings using the equation below.

EQUATION: Hospital admissions per year * Preventable admissions rate * \$11,700 * .1

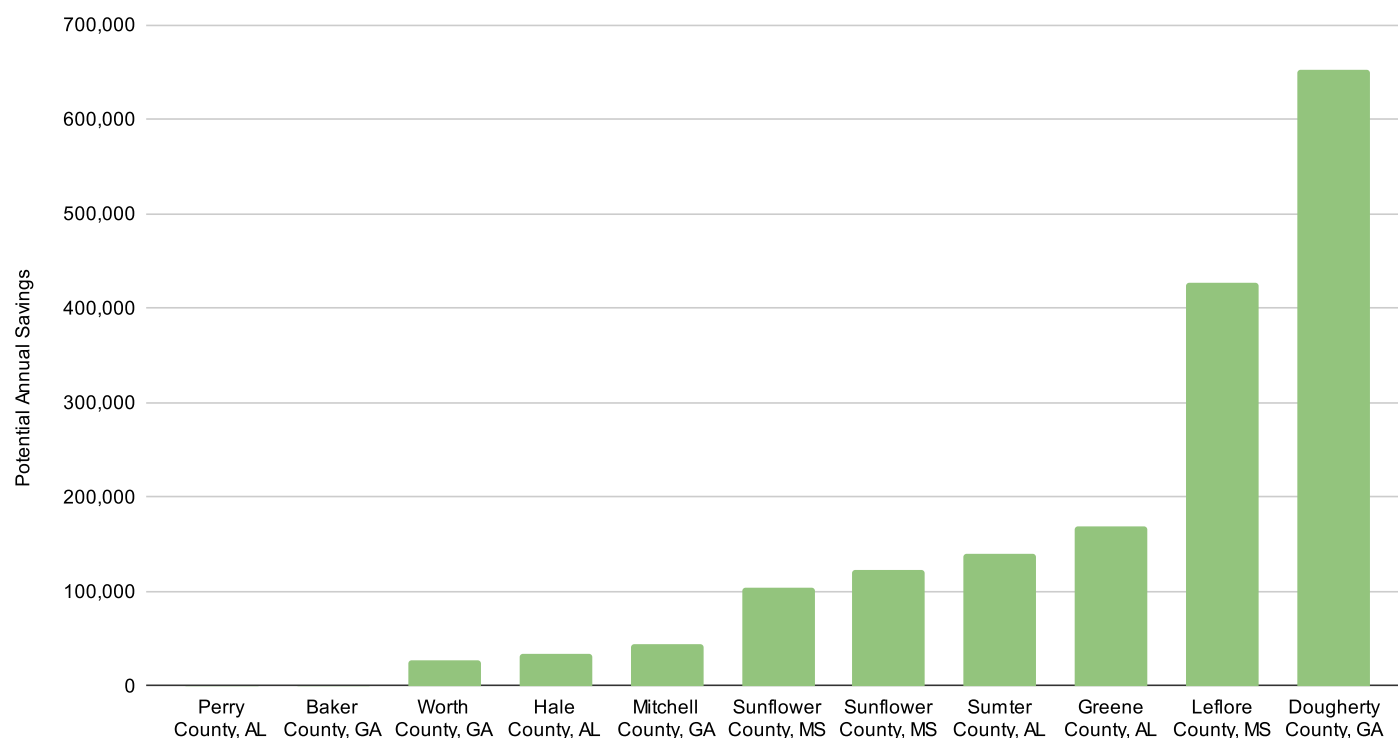
PREVENTABLE READMISSIONS

Hospital readmissions are unplanned hospitalizations which take place within a specified window of time (usually 30 days) of an initial hospitalization. And they are expensive. More expensive, in fact, than first-time (or index) admissions.⁸⁰

There is no single instigator, but instead an array of specific peculiarities to the structure of health care delivery combined with general trends.

At the end of the day, it comes down to both quantity and quality of care. For instance, patients with worsening circulatory diseases (like heart failure) who are discharged with inadequate instructions or unable to reconnect with care teams face the chance that their disease will worsen (along with any comorbidities they have)

Graph 13. Potential Annual Savings in Preventable Admissions, by County



and they will require rehospitalization. In other circumstances, incomplete care for an index admission which leads to discharge but does not solve the underlying disease means that the patient will require more treatment the second time around. And in both instances, this often leads these patients to arriving back in the hospital in worse shape than when they left. This not only can lead to the need for more advanced imaging (which is more expensive), but require more advanced specialty care (which is also more expensive). At the same time, the degeneration of a chronic or acute condition can trigger a flurry of time-sensitive procedures, tests, and care in an attempt to get things under control. All of these and more drive the higher costs of readmissions as compared to index admissions.

Hospital readmission remains one of the most intractable problems for the healthcare system to resolve. For instance, studies show that hospitalization costs nationally for just one condition - heart failure - add up to more than \$30 billion annually.⁸¹ Six months after discharge, between 25 and 50 percent of all heart failure patients are readmitted, with heart failure representing the largest percentage of all 30-day readmissions.⁸²

Researchers estimate a 46 percent increase in the number of heart failure patients and an associated cost of \$70 billion in the US by 2030. Major cardiovascular disease in the study region accounts for between 20 and 30 percent of all deaths, representing a significant cost and quality of life concern.⁸³

Preventable hospital readmissions are the result of one or more of a wide variety of factors, including but not limited to: too early discharge, complications during recovery, no or too little education given to the patient, a lack of follow-up, and lack of timely access to subspecialty providers. Researchers have grouped these elements into broadly defined categories, including things like physician assessment, patient factors, clinician factors, and system factors. Nationwide, the rate of preventable readmissions varies by relatively wide margins. The rates of hospital readmissions also vary significantly by region, population served, and hospital type, with teaching hospitals and those serving low-income patients the most likely to have higher rates.⁸⁴

Readmission rates vary significantly by condition, institution, and population served, but they represent a significant percentage of the cost of health care delivery as a whole - on average, about 18 percent of patients who undergo major surgery require readmission, and the rates go up significantly as populations age or suffer from more than one chronic condition.

Hospital readmissions disproportionately affect economically vulnerable populations, with particular implications for the study area counties. Returning to heart failure for a moment, one study showed that those living in low-income households were more likely to be readmitted after heart failure, and that these patients were "more likely to be younger, less likely to have private insurance with greater self-pay status, and were 21 times more likely to be

admitted to a rural hospital." The same study demonstrated that "[d]espite a younger age, lower-income patients had a greater prevalence of comorbidities associated with adverse outcome in heart failure, including hypertension, diabetes, obesity, smoking, alcohol use, and chronic lung disease."⁸⁵

Because of all this, reducing preventable hospital readmissions is a regular part of hospital management, with approaches aimed at "clarifying patient discharge instructions, coordinating with post-acute care providers and patients' primary care physicians, and reducing medical complications during patients' initial hospital stays."⁸⁶ The Centers for Medicare and Medicaid Services began publicly reporting readmission rates for a small set of conditions in 2009, and expanded its tracking, reporting, and reduction efforts with the introduction of the Hospital Readmissions Reduction Program (HRRP) in 2012. The HRRP documents and levies penalties on hospitals who exceed specific thresholds for a handful of conditions and procedures, with the aim to reduce readmissions and with those penalties varying over time but averaging between 1 and 3 percent of base payments.⁸⁷

Hospital readmissions cost more than index (regular, first-instance) admissions, from an average of \$700 more per instance for patients covered by Medicare to \$3,000 more for those covered by Medicaid or private insurance.⁸⁸ While these amounts vary according to principal diagnosis, the Agency for Healthcare Research and Quality puts the average cost of a hospital readmission across all diagnoses at \$14,400.⁸⁹ The good news is that studies argue that readmissions are also more preventable, by an extra 14 percent, than index admissions.⁹⁰

How much can telehealth save us in readmission costs?

One five-year study⁹¹ of 800 heart failure patients at the University of Pennsylvania Health System found that using a tablet-based system which transmitted vital statistics in real time, included educational videos, and allowed for synchronous video conversations reduced the 30-day readmission rate for the pilot group from 19.3 percent prior to the pilot program to just 5.2 percent after its fourth full year of operation.

That equates to a 73 percent reduction in readmissions. This pilot project only required two registered nurses and two telehealth liaisons, with participants using the tablets and connected devices for an average length of two months after discharge.

While it may seem odd for a hospital to spend \$500 on a tablet to send home with a patient, or pay the cost of the patient's home Internet subscription for two months (roughly \$130), each readmission costs in excess of \$14,000.⁹²

Further, most telehealth programs often target the highest-risk and highest-utilization patients, which means they have an even greater impact on reducing avoidable readmissions for a fraction of the cost.

In Maryland, a telehealth pilot program took aim at patients with conditions like chronic heart failure, COPD, diabetes,

hypertension, and a history of frequent hospital admissions at Frederick Memorial Hospital (FMH) (see Table 4). Three registered nurses, two licensed nurse practitioners, and one certified nursing assistant participated in patient education, remote monitoring, and regular visits. The cost was a one-time \$950 equipment cost for monitoring devices and tablets capable of video conferencing and data collection, and \$54/month for data. The results of the study just a year and a half after implementation were extremely promising: it reduced hospital readmissions by 75 percent and Emergency Department visits by 41 percent, leading to \$2 million in direct savings to the hospital just during the pilot phase.⁹³ By November 2021, the program had registered savings of almost \$9 million, reducing ED visits by 39 percent and readmissions by 61 percent.⁹⁴

TABLE 4. FREDERICK MEMORIAL HOSPITAL, MARYLAND CHRONIC CARE MANAGEMENT PROGRAM SAVINGS⁹⁵

CCMP PATIENTS					
TOTAL	METRIC	PRE	POST	VARIANCE	VARIANCE %
	ED VISITS	553	276	-277	-50%
	30 DAY RE-ADMIT	102	17	-85	-83%
	PART A EXPENSE	\$8,252,311	\$3,284,682	\$ (4,967,630)	-60%
	PART B EXPENSE	\$1,761,871	\$1,631,823	\$ (130,048)	-7%
PER PATIENT	METRIC	PRE	POST	VARIANCE	VARIANCE %
	ED VISITS	2.17	1.08	-1.09	-50%
	30 DAY RE-ADMIT	0.40	0.07	-0.33	-83%
	PART A EXPENSE	\$32,362	\$12,881	\$ (19,481)	-60%
	PART B EXPENSE	\$6,909	\$6,399	\$ (510)	-7%

MEDICATION MANAGEMENT PATIENTS (subset of CCMP patients)					
TOTAL	METRIC	PRE	POST	VARIANCE	VARIANCE %
	ED VISITS	65	39	-26	-40%
	30 DAY RE-ADMIT	5	3	-2	-40%
	PART A EXPENSE	\$1,154,035	\$466,477	\$ (687,558)	-60%
	PART B EXPENSE	\$269,364	\$344,827	\$ 75,463	-28%
PER PATIENT	METRIC	PRE	POST	VARIANCE	VARIANCE %
	ED VISITS	1.71	1.03	-0.68	-40%
	30 DAY RE-ADMIT	0.13	0.08	-0.05	-40%
	PART A EXPENSE	\$30,369	\$12,276	\$ (18,094)	-60%
	PART B EXPENSE	\$7,089	\$9,074	\$ 1,986	-28%

While heart failure has proven to be a particularly promising route to avoid the costs of hospital readmissions, other acute and chronic conditions are less well-suited. Still, given that heart failure patients make up the largest percentage of readmissions in the United States, the potential savings is huge.

In the study area, readmission rates range from 14.9 percent in Worth County, Georgia to 16.1 percent in Dougherty County, Georgia, costing from \$870,000 to \$26.4 million, respectively. Across all ten counties, readmissions cost more than \$56.3 million each year.

In this study, we assume that telehealth interventions could reduce hospital readmissions by a conservative 10 percent. That would mean readmission rates in Worth County, Georgia of 13.4 percent and Dougherty County, Georgia of 14.5, and savings of

\$87,000 and \$2.6 million each year, respectively. Across all ten counties, a 10 percent reduction of readmissions would save more than \$5.6 million each year.

EQUATION: (Annual Admissions⁹⁶/12) * 30 day readmission rate * 12 * 14,400 * .1

PREVENTABLE EMERGENCY DEPARTMENT VISITS

Preventable emergency department (ED) visits are those which are either avoidable with a telehealth visit (via a phone call or video session with a nurse or doctor), treatable by a primary care physician or urgent care clinic, or avoidable altogether with better treatment plans after inpatient procedure. Emergency department care costs many times more than regular clinic visit or even urgent clinic visit care. In fact, it represents a particularly expensive way to deliver healthcare for populations that, for a variety of reasons, use the emergency department as the primary route by which they receive care. While some among this population have medical insurance, many do not. Industry studies show that the United States spends more than \$30 billion on at least 18 million preventable emergency department visits each year, with rates rising steadily over the last thirty years across all age groups and insurance types.⁹⁷

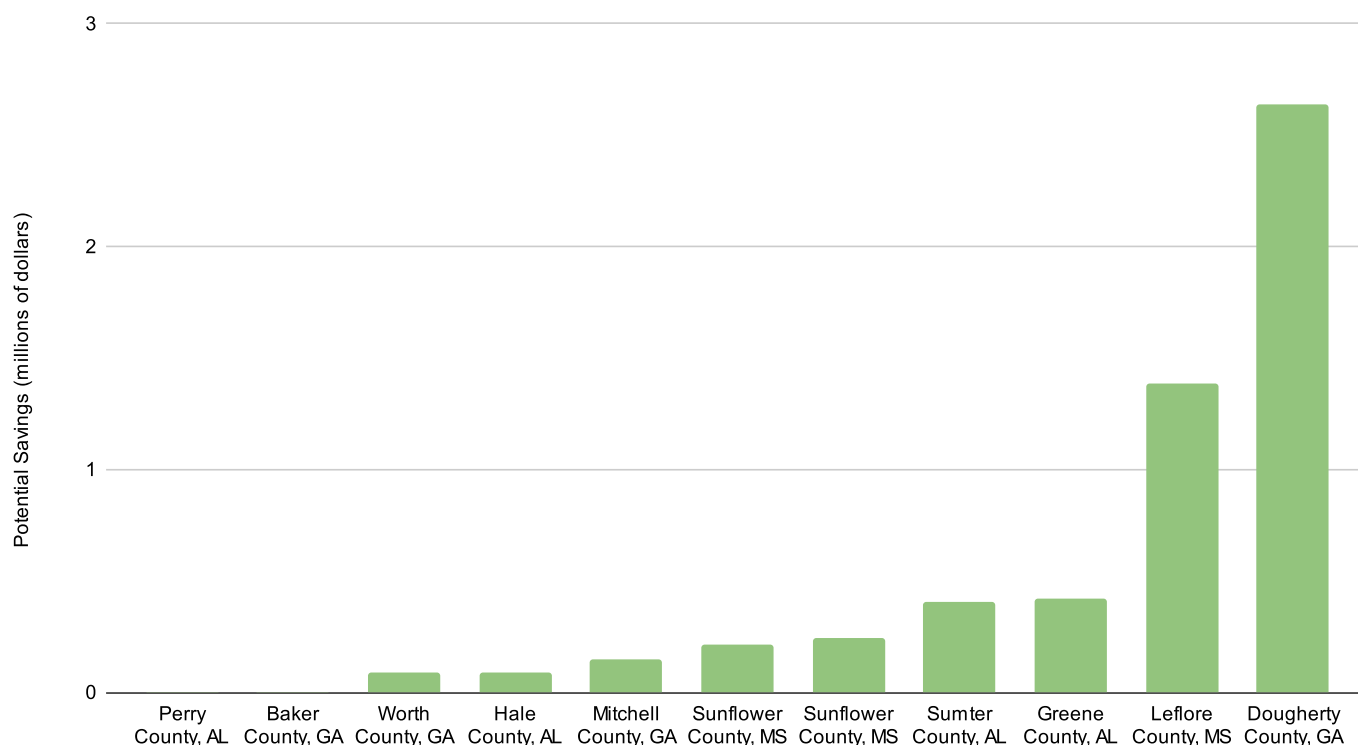
Emergency department visits cost ten times as much as an urgent care visit (\$2,000 versus \$200). Avoiding the cost of a single ED visit can pay for two and a half years of a home broadband subscription.

Emergency department visits cost ten times as much as an urgent care visit, at more than \$2,000 per instance.⁹⁸ Though the research shows that many visits could be avoided altogether with a good telehealth program, in this study we take the most conservative route and assume that any avoided savings come from the additional cost of an emergency department visit, over and above the cost of a regular clinic visit. We calculate this number to be \$1,800 per instance. In other words, though both the research and many pilot projects show that telehealth interventions can prevent the need for in-person visits altogether, here we only calculate the additional cost of health care services in an emergency department.

The rate of emergency department visits vary by institution type and geography. The study-area hospitals in Mississippi and Alabama are classified as governmental/county institutions, with rates per 1,000 residents at 240 in Mississippi and 234 in Alabama. In the nonprofit hospitals in Dougherty, Mitchell, and Worth Counties, Georgia, the rate of emergency department visits is 365 per 1,000 residents per year.⁹⁹

One study by Cigna found that as many as 36 percent of emergency department visits could be prevented with the implementation of a robust telehealth initiative.¹⁰⁰ Another study looked at the results of a telehealth initiative undertaken at the Sidney Kimmel Medical College of Thomas Jefferson University in Philadelphia which offered a synchronous video visit with a medical doctor for a flat rate of \$49 at any time of the day (called JeffConnect). The study found that of participants, only

Graph 14. Potential Annual Savings in Preventable Readmissions, by County



16 percent would have done nothing as an alternative, with the remainder visiting the emergency department (12 percent), the doctor's office (34 percent), the urgent care clinic (33 percent), or a retail health clinic (5 percent). Further, follow-up surveys showed that 74 percent of JeffConnect users sought no further care, indicating that the initiative solved participant's issues either by avoiding interventions altogether or completing them remotely.¹⁰¹

In this study model the savings that could come from reducing ED visits by 10 percent. Further, we only model the potential *additional* savings of avoiding an ED visit - which the literature suggests is \$1,800 more than a clinic visit. This is despite instances, like in the JeffConnect program above, where it looks like telehealth programs could prevent the need for any kind of intervention, including a regular clinic visit.

Avoiding 10 percent of ED visits would save between \$200,000 per year in Baker County, Georgia and \$5.9 million per year for Dougherty County, Georgia. Collectively, the ten counties in the study area could save \$13.2 million annually, constituting significant avoided costs to the health systems.

To calculate the potential cost savings for the additional cost of emergency department visits, we use the equations below.

EQUATION: (Emergency department visits per year/1,000 population * county population) * .1 * \$1,800

PREVENTABLE TRANSPORTATION COSTS

ED visits, hospital admissions, and hospital readmissions collectively result in hundreds of thousands of miles driven each year for medical care in each county of the study area. Across the country, this cost is disproportionately borne by residents in rural counties, where hospitals (especially specialty providers) are closing and the average travel distance is greater. This means costs associated with gas, tolls, and car maintenance.

Residents across the ten-county study area drive almost 1.7 million miles per year for ED visits, hospital admissions, and hospital readmissions. A 10 percent reduction would save 170,000 miles of driving.¹⁰²

Preventable Transportation Costs



A 10 percent reduction would save 170,000 miles of driving

A 10 percent reduction at the IRS standard mileage rate for medical expenses of 18 cents per mile (2022) would see these counties save \$3,400 (Sumter), \$4,200 (Sunflower), and \$6,500 (Dougherty) each year, or \$67,000, \$83,000, and \$129,000 over twenty years, respectively.¹⁰³ Across all ten counties, this would result in \$27,000 in savings each year, for a total of \$540,000 over 20 years.¹⁰⁴

EQUATION: (Number of ED visits each year + Number of hospital admissions each year + number of hospital readmissions each year) * average distance to the nearest intracounty hospital in miles one way * 2 * .16 * .1

PREVENTABLE CARBON EMISSIONS

Transportation contributes to the amount of carbon emissions each year in the United States, which is the single highest contributor to climate change. Carbon emissions serve as “the primary driver of global climate change” today, with firms and experts working across dozens of sectors around the globe to develop new manufacturing processes, incent new practices, and reorganize the way we live and work in order to reduce CO2 emissions and stay under target thresholds to avoid the worst consequences of unchecked climate change.¹⁰⁵ In 2019, the world produced 36.4 billion metric tons of carbon emissions, with the United States contributing 5.9 billion metric tons to that total.¹⁰⁶ Avoiding the travel associated with in-person medical care would translate directly to avoided vehicle carbon emissions.

Avoiding in-person visits means fewer emissions, which will reduce the negative impact of climate change by the end of this century: negative impacts that scholars have demonstrated will be felt most strongly in the south and southeast part of the country, with ominous projections for reduced agricultural yields, coastal damage from rising sea level, mortality rates, and economic distress having an outsized impact on coastal states like Alabama, Georgia, and Mississippi.¹⁰⁷ For example, Jackson, Mississippi is ranked 9th on the list of projected hardest-hit metro

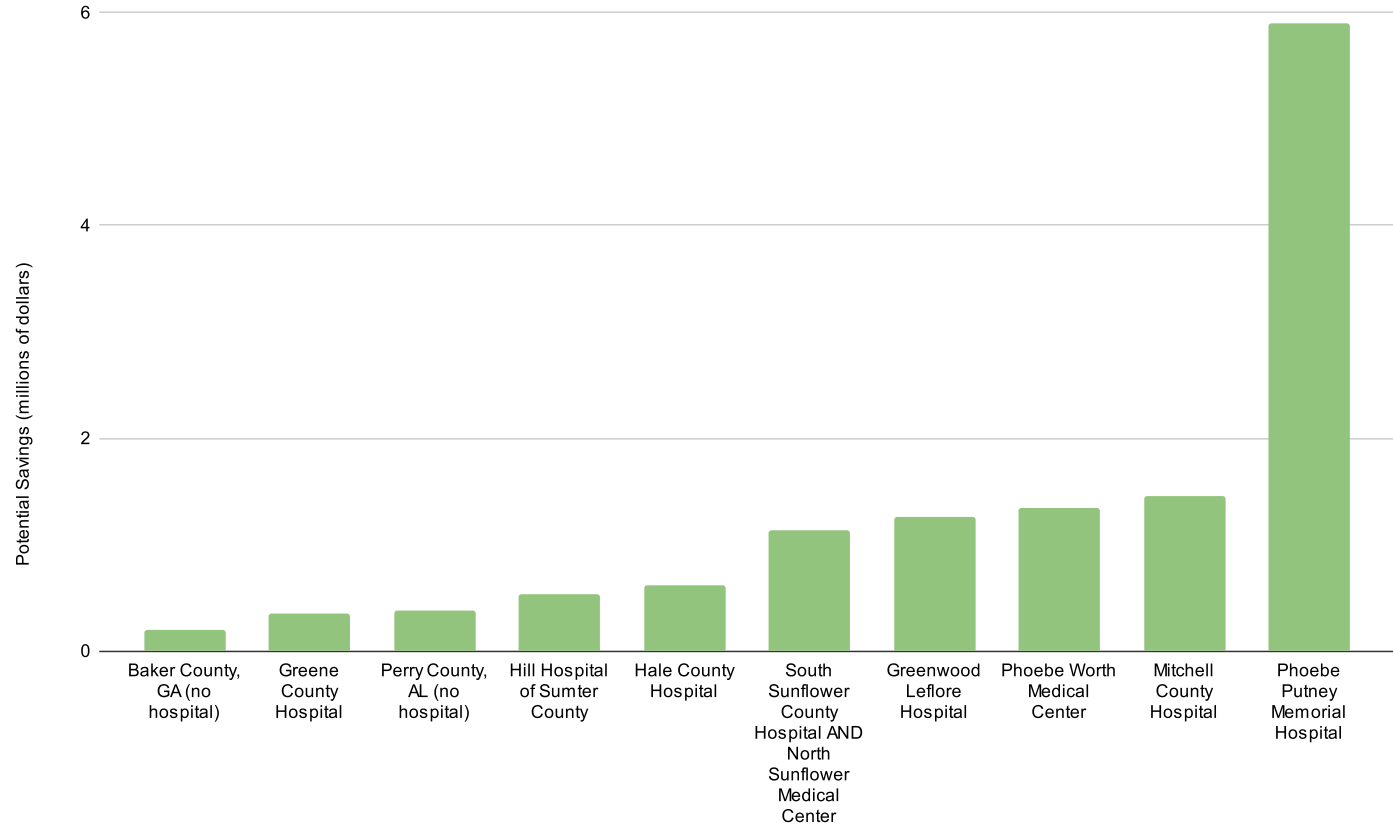
areas, while Birmingham, Alabama is ranked 15th. It is without question that low-income counties will bear a larger proportion of the costs of climate change.

Negative climate change impacts that scholars have demonstrated will be felt most strongly in the south and southeast part of the country, with ominous projections for reduced agricultural yields, coastal damage from rising sea level, mortality rates, and economic distress having an outsized impact on coastal states like Alabama, Georgia, and Mississippi.

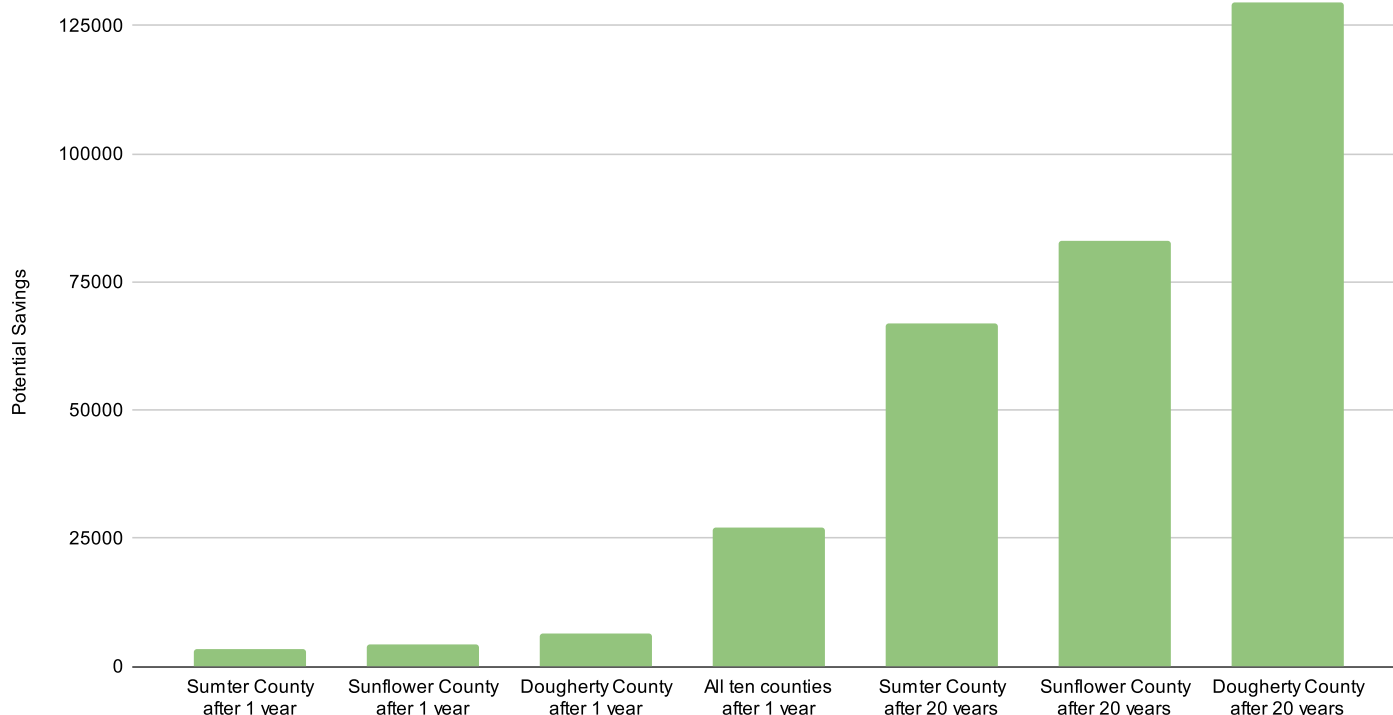
Counties in Alabama, Georgia, and Mississippi where residents must travel farther for medical care results in more carbon emissions. In the study area this includes Sunflower County (296.3 metric tons per year) and Sumter County (553.1 metric tons per year) for ED visits, hospital admissions, and hospital readmissions alone. Medical care visits in Perry County also contribute to significant emissions, likely because residents there have to travel on average more than 26 miles one way to the hospital (ER visits account for 94.4 metric tons each year alone, not including hospital admissions or readmissions).

Across the 10-county study area, medical care results in more than 1,900 metric tons of CO2 emissions each year. A 10 percent reduction in travel would result in 190 metric tons of emissions avoided each year, adding up to more than 3,800 metric tons over a 20-year period.¹⁰⁹

Graph 15. Potential Annual Savings in Preventable ED Visits, by Hospital



Graph 16. Potential Savings in Preventable Transportation Costs in Highest-Return Counties



EQUATION: (Number of ED visits each year + number of hospital admissions each year + number of hospital readmissions each year) * Average kilograms of CO₂ emitted per round trip to intra-county hospitals / 1000 * .1

WHO BENEFITS FROM AVOIDED COSTS?

Where do telehealth savings go? Accounting for all of the buckets into which savings from implementing telehealth programs can go is difficult. Sometimes savings go directly to hospitals by reducing the number of lost direct-contact hours between doctors and patients. Likewise, in the case of avoided transportation costs, savings go directly to patients who can avoid driving to county clinics - or farther for specialty care - and save money on gas and vehicle repair.

AVOIDING DOUBLE COUNTING AVOIDED COSTS

Other times, tracking where and how much of each dollar saved goes is more complicated. For example, in the case of the JeffConnect program in Philadelphia (which offered flat rate \$49 visits with doctors in an attempt to head off unnecessary ED visits), the enthusiastic response no doubt resulted in some significant aggregate savings, but pinning down where each saved dollar went is difficult. Many users probably did not submit their \$49 bill for insurance reimbursement, though even if they had, the savings from avoiding ED visits would quickly grow. If patient co-pay rates were less than \$49, this means some of the health care delivery cost was shifted to individuals. It is also possible that

some users were uninsured, lifting a burden for taxpayers and the hospital itself for that percentage of the population that receives services but cannot pay.

Here, we illustrate a number of ways in which savings can accrue as a function of telehealth use (Graph 15,16, Table 5).

Avoidable emergency department visits, admissions, and readmissions lead to direct and indirect savings for insurance companies, hospital systems, and the general public. For insurance companies, the savings come from diverting those with insurance who might visit the emergency department and to telehealth interventions for unplanned events or post-inpatient care, or in less costly clinic visits. For hospital systems and the general public, the savings comes from bearing the cost of uninsured emergency department visits.

Avoided transportation costs translate to direct savings in the form of vehicle ownership, maintenance, and gas, or public transportation costs for those without personal vehicles. A regular monthly pass in the city of Albany, Georgia (in Dougherty County), for instance, costs \$45/month.¹¹⁰ While residents may have needs that require public transportation or a personal vehicle outside of medical care, it would be expected that some percentage would save money or avoid those costs with a telehealth program in place.

Avoided vehicle emissions translate to direct and indirect savings to the public. While the cumulative cost of carbon emissions doesn't convert easily to economic data, according to the EPA's

Greenhouse Gas Equivalencies Calculator, avoiding 3,800 metric tons of emissions is the equivalent necessary to power 690 homes for an entire year. This represents one-tenth of the output of a traditional coal-fired plant.

believe that the best solution for reliable, fast service is a fiber optic cable. Though fixed wireless may be less expensive (and deliver slower, less reliable service) in the short term, federal funding programs are likely to be used in building these networks and they have a strong preference for fiber optic technology.

TABLE 5. TOTAL SAVINGS SUMMARY

Avoiding even a small number of Emergency Department visits, preventable admissions and readmissions, and recapturing some of the costs associated with lost productivity and transportation, would total more than \$42 million dollars per year across these ten counties.

Totals	Annual Savings	Five-Year Savings	Ten-Year Savings	Twenty-Year Savings
Emergency Department Annual Savings	\$13,182,983	\$65,914,917	\$131,829,835	\$263,659,669
Lost Productivity Annual Savings	\$22,328,472	\$111,642,358	\$223,284,716	\$446,569,433
Preventable Admissions Annual Savings	\$1,719,578	\$8,597,891	\$17,195,783	\$34,391,565
Readmissions Annual Savings	\$5,636,357	\$28,181,786	\$56,363,573	\$112,727,146
Transportation Costs Annual Savings	\$26,978	\$134,888	\$269,776	\$539,551
Totals	\$42,894,368	\$214,471,841	\$428,943,682	\$857,887,363

Part 3: Cost to Build High-Quality Networks

Avoiding even a small fraction of health care costs would save these ten counties across Alabama, Georgia, and Mississippi more than \$40 million each year, but the residents there live in a region that is among the most unconnected in the nation. In order to unlock the potential of telehealth, we need universal and robust broadband infrastructure in place. In many areas, that means we'll need to build it.

The costs of building high-quality Internet access in the counties considered in this report are difficult to precisely calculate. However, a broadband consulting firm with a history of working in rural areas similar to these regions has compiled estimates based on their experience. With that information, as well as basic estimates regarding the cost of needed digital inclusion programs, it is possible to develop a range of estimates for how much it would cost to ensure every household has a high-quality Internet connection as well as the means to use it. These costs are important to understand to compare to the potential benefits from the telehealth benefits discussed above.

Each of the study counties has significant areas with no high-quality Internet access available today. High-quality Internet access will require a fiber optic cable connecting each home, as explained by the federal funding programs like BEAD that were created in 2022 to connect rural regions.¹¹¹ Residents in these counties often do not have cable Internet access available to them, and the existing copper telephone lines from decades ago do not support the high-quality of service needed. Fixed wireless services may be a decent bridge technology, but many experts

Mobile wireless service is not as effective for telehealth use, for many reasons including the relative high cost of those services and the presence of a data cap on many plans.

The Institute for Local Self-Reliance estimates that more than 200 rural electric cooperatives (or electric power associations or electric membership corporations, depending on what part of the country they are in) are building fiber optic networks to connect residents in 2022. Created to run and manage electric wires more than 70 years ago to improve quality of life and spur economic development, many cooperatives have found investments in fiber optic services are aligned to their core mission of ensuring rural regions have high-quality access to essential services.

One of the underlying assumptions of this report, and agreed upon by digital equity and broadband infrastructure experts around the country, is that all households should be wired, and with equally capable technology. Though having telehealth facilities at local clinics may be an improvement over the status quo, many of the interventions discussed in the report above assume a connection in the home to remove as many barriers to access as possible.

Conexon, LLC has worked with more rural electric cooperatives to build fiber optic networks than any other consultant in the United States, and is currently building more than 50,000 miles of fiber network per year. The firm has already “helped connect more than 500,000 rural residents.”¹¹³ It has focused its work

on electric cooperatives, and electric cooperatives serve the vast majority of the area covered by this study. Conexon has publicized its estimates of the cost to connect the unserved areas of this report's study counties, offering a good starting place for developing the expected costs of connecting everyone in the regions.¹¹⁴

Mississippi has made the most aggressive investments in rural broadband via established electric cooperatives to reach unserved and underserved addresses over the last two years. It has established itself as a leader among the three states in this study, **enabling 17 of its 26 electric cooperatives** to invest more than \$760 million to reach 100,000 residents with fiber. This has included \$75 million in matching state funds for projects by 15 of the cooperatives.

Delta Electric Power Association is already working with Conexon to build a network in LeFlore and Sunflower counties in Mississippi.

Likewise, Mitchell EMC recently partnered with Conexon **on a project in Georgia to connect** all of Mitchell EMC members to fiber in Baker, Dougherty, Mitchell, and Worth Counties (as well as neighboring counties) over the next four years, at a cost of \$80 million, beginning this year. **At least 25 of Georgia's electric cooperatives** are likewise embarking on FTTH projects, sometimes with plans to operate themselves and sometimes working with local and national providers to serve as ISP. The state was a trailblazer **in building its own broadband maps**, and in so doing set itself up as a leader among states to address its unserved and underserved rural residents. The state **has allocated more than \$500 million** to extend access statewide.

While 10 electric cooperatives in Alabama are currently or plan to begin FTTH projects, Black Warrior EMC (which covers Hale, Perry, Greene, and Sumter Counties) has not committed to any investments, **despite rural residents asking for it**. The state's **Alabama Broadband Accessibility Fund has allocated** nearly \$300 million in Rescue Plan for rural broadband and cooperatives are eligible, but the program caps grants at merely \$5 million per project - far too low to make a dent in sparsely populated counties.

The one-time costs to build to unserved areas of each county range from several million dollars to approaching \$15 million dollars (Table 5). Electric cooperatives or other potential ISPs would almost certainly build to the higher areas of density within these counties as well, but the costs are focused on the most costly and hardest to serve areas that have been left behind Table 5). To be clear, this amount of money covers the cost of building a fiber optic network passing every household in the county currently lacking hybrid fiber-coaxial (HFC) cable or fiber-optic service. This network will be able to deliver high-quality Internet access for decades into the future.

The vast majority of these underserved areas qualify for federal funds being distributed from one of several programs by each state to cover the majority of these costs. But even in the absence of such significant subsidies, the potential benefits to the health care system and its stakeholders could well justify the expense. The total cost to build to all of the underserved locations across the study area would be around \$95 million, or about a 1/3 of

one percent of the annual healthcare costs for the roughly 235,000 residents of the study area. That's about the same as half a dozen miles of six-lane interstate highway in neighboring Florida,¹¹⁵ a small wastewater treatment plant in Portsmouth, New Hampshire,¹¹⁶ or 40 percent of the total cost to rebuild the I-35W bridge in Minnesota back in 2008.¹¹⁷

ONGOING MONTHLY SUBSIDIES

Building better networks to each unserved home in each county is a large challenge, but is now likely a given with the reality of multiple federal funding programs to improve rural Internet access. However, households may face additional challenges to using the connections that will soon be built. The most obvious one is whether households will be able to afford the monthly cost of new connections. The rural broadband networks built by electric cooperatives across the nation have generally kept costs lower or similar to that of urban areas, but those costs are often too expensive for tight budgets as well.

Fortunately, the federal government has created a new program called the Affordable Connectivity Program (ACP), which provides a \$30 monthly subsidy to qualifying households (\$75/month for qualifying households on Tribal lands) as well as a one-time, \$100 device benefit to help families get online. Tens of millions of households qualify for the ACP through a variety of avenues (e.g. annual income, the use of Medicaid or one of several other federal benefit programs, a child attending a Title 1 school),¹¹⁸ and while the fate of the program after funding runs out remains unclear, at present many families are getting critical help to stay connected and online.¹¹⁹ These counties have deep poverty, with between half and three quarters of households in each county qualifying for ACP, per the table above.

While the \$30/month ACP coupon will help more households to access it, a connection that costs \$80 or \$100 per month after additional fees may still be out of reach. Given the amount of poverty in this region, local governments should be working hard to make sure any ISP getting federal funds to build new network infrastructure is rooted in the community and will be charging appropriately.

Alongside this, and because of the tremendous potential benefits to the health care system and stakeholders with universal connectivity, local and state governments may want to consider an additional benefit to help some households afford the service. An extra \$20/month to subsidize Internet access could result in many more homes being brought and kept online, and tens to hundreds of thousands of dollars per year in additional savings. States like Vermont and Maryland have already talked about or planned allocations to do so.¹²⁰

DIGITAL INCLUSION PROGRAMS

The final significant roadblock to most households being able to use the soon-to-be-available high-quality Internet service is a concept that includes a lot of smaller roadblocks: digital inclusion. As explored in a series of **Fact Sheets by ILSR created with the help of AARP**, households may also remain offline due to a combination of lacking digital skills or devices.

TABLE 6. EXPECTED COST TO BUILD UNSERVED BY COUNTY IN 2022

County	State	Population	Population Underserved	Underserved Housing Units	Cost to Build Underserved (Original)	Average Cost / HH	% ACP Eligible HH
Dougherty	Georgia	90,000	2,060	1,026	\$2,800,000	\$2,729	46%
Worth	Georgia	21,000	6,962	3,126	\$11,800,000	\$3,775	39%
Baker	Georgia	3,200	3,089	1,601	\$5,900,000	\$3,685	52%
Mitchell	Georgia	23,000	7,874	3,560	\$13,200,000	\$3,708	47%
Greene	Alabama	8,300	8,239	4,992	\$10,100,00	\$2,804	68%
Hale	Alabama	15,000	7,267	4,005	\$11,700,000	\$2,921	51%
Perry	Alabama	9,300	9,315	4,746	\$13,300,000	\$2,802	75%
Sumter	Alabama	13,500	6,508	3,645	\$10,700,000	\$2,936	63%
LeFlore	Mississippi	29,000	4,326	1,913	\$5,300,000	\$2,771	63%
Sunflower	Mississippi	26,000	7,117	2,294	\$6,400,000	\$2,833	54%

Though nearly all households have mobile phone devices, many lack a device that is appropriate for educational work or taking advantage of telehealth opportunities. In other cases, households may have concerns about the safety of engaging online where they do not have sufficient experience and knowledge to avoid the fraud and danger that many more digitally-savvy Internet users ignore multiple times per day.

Hundreds of communities are developing digital inclusion efforts using a variety of budgets across the United States as the **Digital Equity Act** (DEA) creates federal support for such initiatives. Part of the Internet for All Initiative, the DEA will disburse \$2.75 billion in funds to states to support the planning, outreach, and implementation of community-centered digital equity projects over the next five years. These projects will especially help communities that face skill and literacy challenges in getting online. Initially, states will get planning grants (Alabama - \$1 million, Georgia - \$1.5 million, and Mississippi - \$.9 million), but upon approval of a five-year plan will receive a proportion of the \$2.75 billion (likely tens of millions of dollars each) to enact those plans.¹²¹

Though digital equity efforts should be local in nature to ensure they are addressing actual needs and taking advantage of local assets, it is not clear that each region and/or county would need its own program. Given commonalities across the counties focused on this work, joint digital equity initiatives would be practical. Much of the ground-level work for these programs has already been developed by efforts like Senior Planet from AARP. See the breakout box below for more information on Senior Planet

Digital equity efforts will likely require, at a minimum, one or two full-time equivalent employees in each state to manage the study counties. These are people that will focus on maximizing enrollment for the Affordable Connectivity Program, and coordinating with organizations that have relevant training programs and initiatives to provide appropriate devices to

people in each county who need them. The **National Digital Inclusion Alliance** is overflowing with resources and ideas about how to implement and organize these efforts. Though we believe a larger budget could result in many more benefits more quickly, we would suggest a minimum of \$500,000 per state per year in digital equity programming for the study-area counties to get a good start together. In the absence of a joint plan that would be more efficient, each county could individually budget at least \$150,000 per year for digital equity efforts. Depending on the availability of refurbished devices and what is needed, a larger budget may be required in early years to meet that demand.

The **Senior Planet from AARP** licensing program provides no-cost digital literacy courses, programs, and activities for older adults. Senior Planet from AARP is a program created and sponsored by national nonprofit **Older Adults Technology Services (OATS)** from AARP. The age friendly digital literacy curriculum is designed to be available at in-person program locations, and online attendance. The program is delivered in three different languages - Spanish, English, and Mandarin.

The Senior Planet licensing program powerfully equips local organizations across the country with the tools to help older adults access technology and use it to enhance their lives. Through an adaptable program model, the Senior Planet licensing structure works with community-based organizations to develop local trainers to deliver Senior Planet's proprietary curriculum and bring Senior Planet's world-class programs to older adults in their area. The program includes:

- A license for enrolled organizations
- Trainer coaching, support, and ongoing professional development
- Tools and special guidance for program administrators
- Technology guidance and recommendations for delivering programming
- Access to a digital program support center
- Ongoing communication around tech news, profiles of other participating organizations, and new program offerings
- Program participants receive one free year of being a Senior Planet Supporter (exclusive events and benefits)

CONCLUSION

Above, we explored the total benefits that come from reducing healthcare costs and improving quality of life. In order to achieve that vision, these counties will require improved Internet access, affordable services, appropriate devices, and in some cases, training. The cost of achieving those goals for these counties is on the order of \$100 million in one-time capital expenditures for fiber optic networks and a minimum of \$500,000 per year per state or \$150,000 per county on digital equity efforts to ensure people will be able to take advantage of the networks.

LIMITATIONS

The potential cost, time, and travel savings explored here are more likely to have an immediate impact for people who are already familiar with technology or who use the Internet often. This is also true, though to a lesser extent, for the quality-of-life improvements mentioned above.

Telehealth interventions that require more complex interactions with clinics or physicians (like two-way video) may be less accessible than audio-only telephone service, especially for those who are unfamiliar with technology. Improving accessibility, however, is not impossible. It requires that telehealth programs include digital skills training or otherwise include the use of digital navigators that can teach participants how to use devices and telehealth platforms and help them troubleshoot when they get stuck.

Programs that include these characteristics will reach more people and be more likely to succeed. In the study area, we conducted

a Facebook survey campaign to see how residents felt about a variety of Internet-access issues, including comfortability, use, devices, challenges, and value. We collected 338 responses over a two-week period during the fall of 2021, and the results were striking (see Appendix 2). Large percentages of the respondents shared that they had missed doctor's appointments in the last year, or had taken unpaid sick leave to go to the clinic. If they had completed a telehealth appointment, 85 percent rated the experience as good or better than an in-person visit. They valued the conveniences, cost savings, comfort, and quality of care in making use of telehealth as compared to in-person visits. But they shared barriers to use, too, including relying on a cell phone to connect to the Internet, the exorbitant cost of wireline service, and slow speeds and unreliable connections.

INTERNET USE AND COMFORTABILITY

It is important to note that telehealth is not a panacea for reducing healthcare costs. For instance, in one study of veterans receiving mental health care via a video tablet program, there was no impact on the use of emergency departments or urgent care visits.¹²³ But the point is not that telehealth can fix all of our many health system problems. Rather, it is that it should be an option to expand access to care and in many cases, offers the chance to reduce the cost of delivering services and prevent the longer-term costs associated with poorly managed health conditions.

Telehealth can also play a role in health promotion and the prevention of poor health before it happens, which in turn can contribute to reducing healthcare costs in the long run. All this adds up to social and economic benefits for patients, providers and the healthcare system as a whole. First and foremost though, telehealth requires digital inclusion. It requires that everyone has fast, affordable and reliable Internet service, a device to connect to the Internet, skills or assistance to navigate the digital world, and a sense of safety and comfort in doing so.

Finally, it is also important to point out the many additional possible ways that telehealth programs could find additional savings not captured in this report. For instance, no-shows for clinic appointments are a drain on health systems, creating inefficiencies for medical staff time and reducing billable hours. Studies show that missed appointments cost up to \$150 billion nationwide each year, calculated by multiplying clinic no-show rates (which vary from 5-30 percent across health systems) by the roughly \$200-per-hour lost in paying physicians who are not seeing patients during that time.¹²⁴

No-show rates vary widely across clinic types, geography, and diagnosis. Socioeconomic factors also contribute heavily to no-show rates, with patients with more unmet social needs missing far more appointments.¹²⁵ One study found that "the strongest association was for those with health care transportation needs as compared with those without (36 percent vs 27 percent)."¹²⁶ The result of this is clear: no-shows not only contribute to system inefficiency, but to widening health inequities that lead to an increased number of ED visits as well.¹²⁷

Because of all of this, reducing the number of no-shows has

become a central focus of hospital management. Both academic studies and industry research show that of all the areas where costs could be avoided, no-show rates are the most responsive to telehealth initiatives and offer the chance for the highest reduction in unnecessary costs. For instance:

- A recent study found that the Memorial Hospital at Gulfport, Mississippi could expect a revenue increase of \$1 million per year by simply improving the appointment and reminder system to reduce the no-show rate.¹²⁸
- The Native American Health Center, which serves the California Bay Area, recorded many fewer no-shows during the COVID-19 pandemic after switching to telehealth.¹²⁹
- The Taskforce on Telehealth Policy - an alliance of providers and industry policy groups - has shown that telehealth dramatically reduces no-show rates, especially for behavioral health appointments. One study showed that the normal no-show rate for psychiatry services (between 19-22 percent) could be reduced to 4.4-7.3 percent, representing a 62 to 80 percent decrease.¹³⁰

We do not model the potential savings from preventing no-shows in this study because access to clinic appointment numbers in the study area were not available. Preventable no-shows likely cost the study-area clinics hundreds of thousands or millions of dollars per year.

The refrains that Internet access is a luxury that those who live in rural areas have chosen to forego by virtue of living there, or that it is simply too expensive to connect every household to robust, affordable broadband in this country, are simply not true. It's clear that the potential savings that could come from implementing universal telehealth would pay for the cost of building that infrastructure many, many times over throughout the life of a fiber network.

But the savings don't stop there. In this report we don't talk about the many other economic benefits that come from universally accessible, affordable, fast Internet access.

These include the direct economic development benefits that hundreds upon hundreds of communities recognize as one of, if not the most important, agenda item for the next decade. But it also includes a wealth of indirect economic benefits. Universal Internet access would help close the homework gap, which disproportionately hits communities of color. It would also help unlock the latent potential both in young people and the working class, whether they are eager to learn to code, want to start a microbusiness, or aim to work at a well-paying job remotely while enjoying all the benefits that abound outside of urban and suburban America.

There are, of course, things that will need to be considered after that infrastructure is built for it to reach its full potential. Addressing the array of security and transparency issues that go along with telehealth programs will be key; **software-defined open access networks** offer one potential path forward here. Addressing skepticism by patients is another barrier, even when services are free.

So is dealing with the gaps in health care delivery that get exposed by telehealth programs and offer chances to save more while improving care. For instance, the telehealth initiative at Frederick Memorial Hospital in Baltimore discovered that one of the reasons patients were getting readmitted after discharge was because they were simply unable to open their pill bottles at home. A library-based telehealth initiative in Pottsboro, Texas found that patients assumed the presence of a laptop on marketing materials meant that they had to own and know how to use one.

In the end, saving billions of dollars of systemic inefficiencies before they go out the door is just the beginning. At the heart of telehealth is the potential to reimagine the country's healthcare system, by connecting patients and care teams more quickly, more regularly, and more completely. It's about bringing medical care from the hospital into the home. At Frederick Memorial, it meant using that knowledge to send nurses into patients' homes to fill pill bottles and check in.

There is no single button that will solve all the problems that contribute to the crisis of healthcare costs in this country. But there is one big one we could press today, and it would have massive ancillary benefits that would flow for generations to come.

Appendix 1: Current State and FCC Initiatives

ALABAMA

The Alabama Department of Health (ADPH) currently has 65 county health departments equipped with telehealth technology, and maintains a telehealth calendar accessible to ADPH employees and partners to schedule patient visits at county health departments. Across its footprint, ADPH has 54 active telehealth sites that offer a variety of health care services, including behavioral health and subspecialty care (i.e. cardiology, nephrology, neurology) with 11 intradepartmental and external partners. Sumter, Hale and Perry Counties are included in its service territory, with Greene County recently receiving grant funding to add a site of its own via grant funding.¹³¹

The Alabama Office of Primary Care and Rural Health publishes grant opportunities monitored by the Alabama Rural Health Association (ARHA) that are specifically to improve health care services for underserved and rural communities. The ARHA acts as a liaison between the funding source and applicants. These grants are not limited to telehealth.

GEORGIA

Georgia's Department of Public Health (DPH) has a secure, HIPAA-compliant telehealth network where connectivity is available in all of the 159 county health departments. DPH has telehealth solutions organized in 50 health districts, which includes a "stethoscope, otoscope and a general exam camera." The Georgia Department of Health receives \$2.4 million annually to support the telehealth network, using the funds to support a diverse category of health care services such as "dental care, HIV care, [and] pediatric specialty care," where providers can virtually connect with patients within their home, hospital or a private practice.¹³²

The state also participates in a University of New Mexico-founded program called ECHO (Extension for Community Healthcare Outcomes), which connects "specialists with care providers in local communities through video conferencing. Participants become part of a learning community where they receive mentoring and feedback from specialists as they manage complex patient cases." Today, the Georgia DPH offers clinics in infectious diseases, viral hepatitis, stroke, and cancer.¹³³

There are localized telehealth efforts in the state too. In Atlanta, the Emory University School of Medicine recently received a \$1.2 million grant from the Health Resources and Services Administration (HRSA) of the U.S. Department of Health (HHS) for the Emory Rural Tele-EMS Network (ER-TEMS). While patients are transported to a local hospital, EMS personnel can virtually connect with an emergency department provider at Emory for evaluation. The funding supports Emory's Emergency Medicine physicians in providing telehealth to 14 rural counties, including Worth County in the current study area (the others are Baldwin, Ben Hill, Brooks, Clay, Cook, Decatur, Hancock, McIntosh, Pierce, Quitman, Randolph, and Seminole Counties).¹³⁴

MISSISSIPPI

The Mississippi State Department of Health does not have telehealth capabilities at its county health departments.

However, the federal Health Resources and Services Administration (HRSA) has given the University of Mississippi Medical Center (UMMC) national recognition via a Telehealth Center for Excellence in 2017 award. This designation affords UMMC the chance to serve as a hub for resources and research. UMMC's Center for Telehealth provides emergency telehealth and behavioral health support to rural counties in Mississippi and maintains connectivity with 17 health centers across the state, which includes Greenwood Leflore Hospital (in Leflore County) and North Sunflower Medical Center (in Sunflower County).

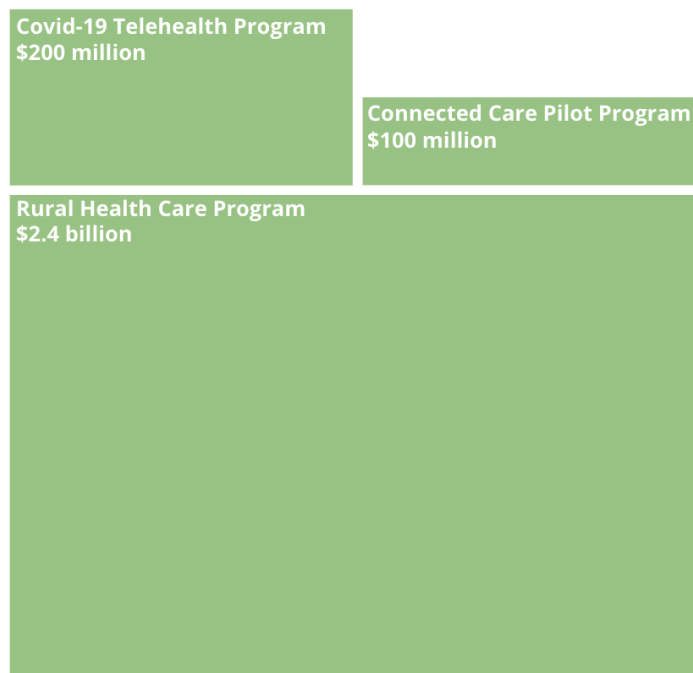
FEDERAL COMMUNICATIONS COMMISSION

The Federal Communications Commission established the Connect2HealthFCC as a task force to help advance broadband and advanced healthcare technologies like telehealth. The taskforce develops partnerships with private and public stakeholders, identifies regulatory barriers to telehealth utilization, and identifies incentives to support broadband implementation for telehealth. The Connect2HealthFCC conducted an analysis of broadband and healthcare needs in the United States and **created lists of "critical need" counties** to help prioritize broadband investment in these communities, though it remains unclear what concrete outcomes will come from the effort.

The Commission also maintains a **Mapping Broadband Health in America tool**, which charts broadband access and speed (according to Form 477 data), and overlays it with health data at the national, state and county levels.

The FCC currently oversees three funding programs in the name of telehealth.

Graph 17. FCC Telehealth Funding Programs



The first is the new **Connected Care Pilot Program**, launched in 2020, to provide up to \$100 million from the Universal Service Fund (USF) for broadband connectivity, network equipment and information services for connected care services. **The first two rounds of awardees have been made**, totaling 93 projects and \$69 million dollars. Initial results, however, suggest that only a small proportion of the funds will go towards new wireline broadband infrastructure.

The second is the **Rural Health Care Program**, which provides funding to healthcare providers for telecommunications and broadband services required to provide telehealth. The goal of the program is to increase access to quality healthcare via telehealth to rural communities by ensuring accessibility to broadband by healthcare providers. \$571 million is disbursed each year, to an array of sites aimed at improving rural outcomes.

Finally, there's the Covid-19 telehealth program, which used \$200 million to facilitate "telecommunications services, information services, and devices necessary to provide critical connected care services." Two rounds of funding have gone out.

Appendix 2:

This is the result of a Facebook survey conducted in the study counties from September 16th to 30th, 2021 exploring residents' access to the Internet, digital skills, cost, and use of telehealth services.

Chart 1

How often do you access the Internet?

338 responses

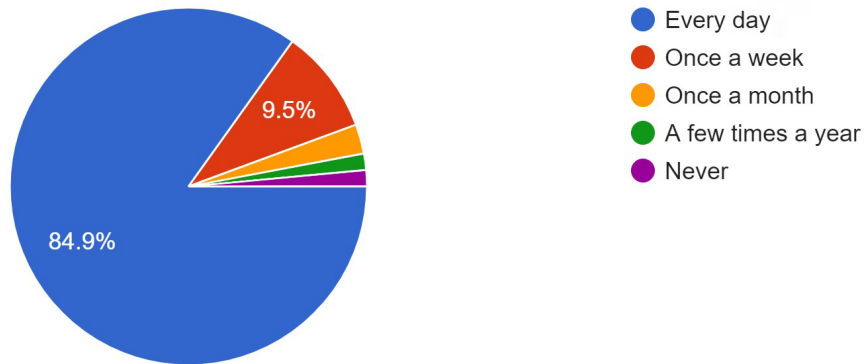


Chart 2

If you are employed, how often in the last year did you have to use paid sick leave to visit the doctor?

288 responses

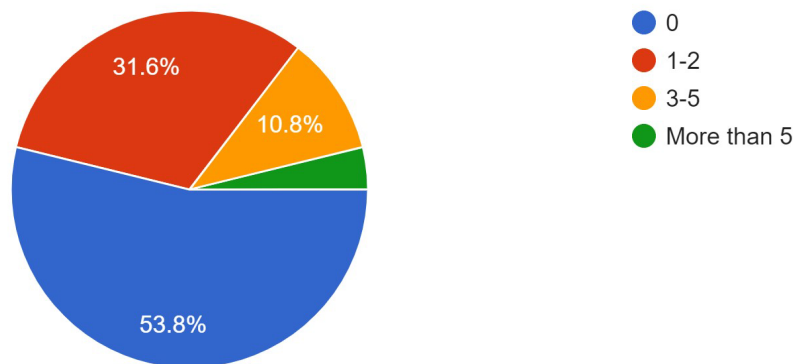


Chart 3

If you are employed, how often in the last year did you have to use unpaid sick leave to visit the doctor?

291 responses

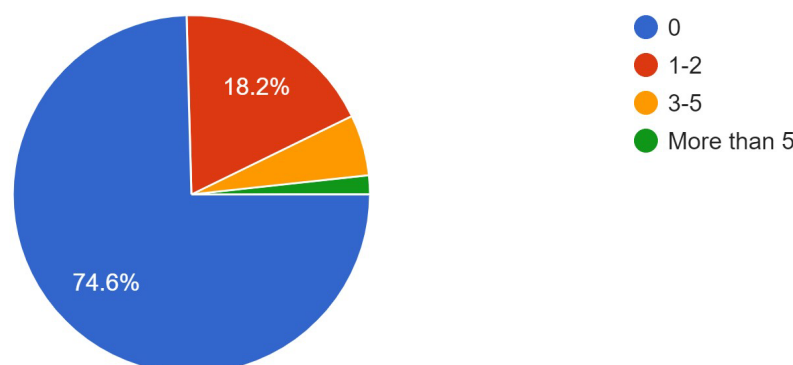


Chart 4

Have you completed a telehealth visit with your doctor using a desktop computer, laptop, or mobile device (phone or tablet) over the last year?

338 responses

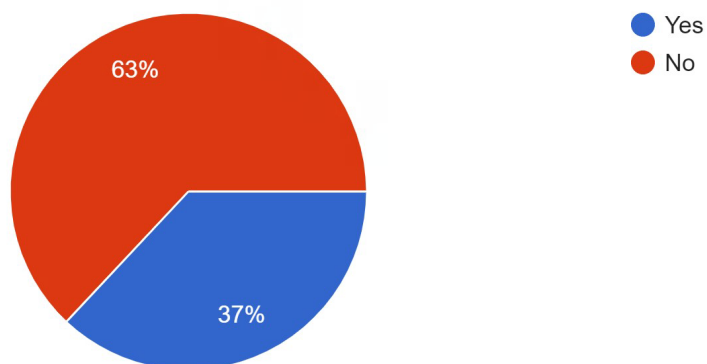


Chart 5

If you have completed a telehealth visit with your doctor, how many have you done?

168 responses

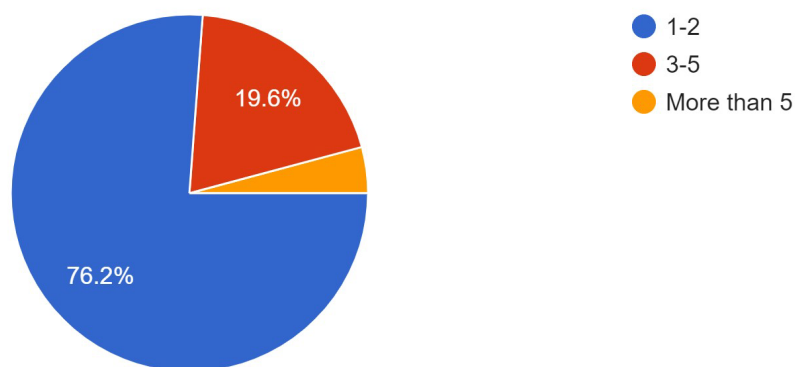


Chart 6

If you have completed a telehealth visit, how would you rate it?

171 responses

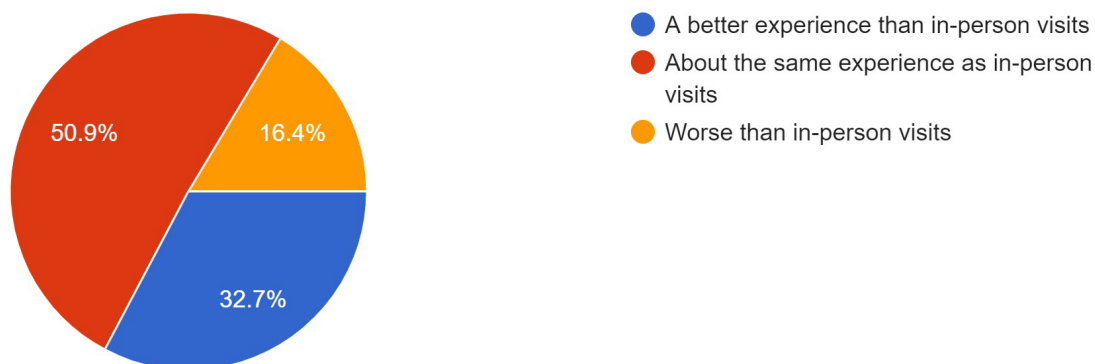
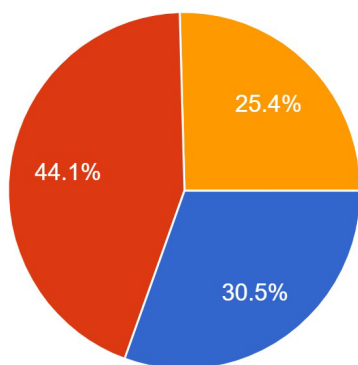


Chart 7

If you have completed a telehealth visit, would you consider doing it again?

177 responses

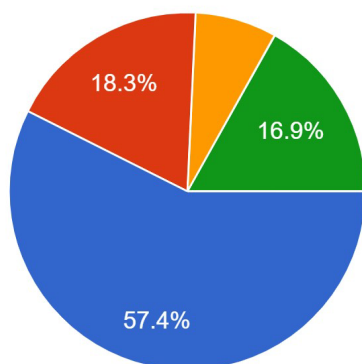


- I would most likely or definitely use a telehealth visit over an in-person visit
- I would like the option of choosing a telehealth visit in the future
- I would probably not or definitely not choose a telehealth visit over an in-person visit

Chart 8

If you could visit your doctor through your computer, what would you *most* value?

338 responses

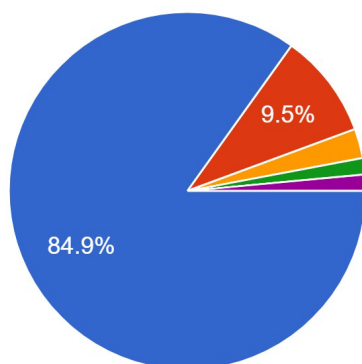


- Convenience (not having to go to the doctor's office and the flexibility of scheduling to save time)
- Comfort (being able to talk with the doctor in my own home)
- Quality of care (being able to follow up more frequently)
- Saving money (not having to take sick time off work or spend money on transportation)

Chart 9

How often do you access the Internet?

338 responses



- Every day
- Once a week
- Once a month
- A few times a year
- Never

Chart 10

How comfortable do you feel using the Internet?

338 responses

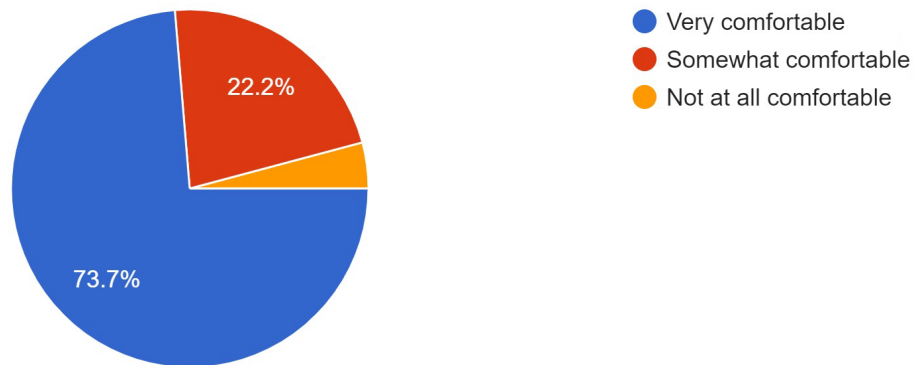


Chart 11

If you have an Internet-capable device, does it have a camera?

338 responses

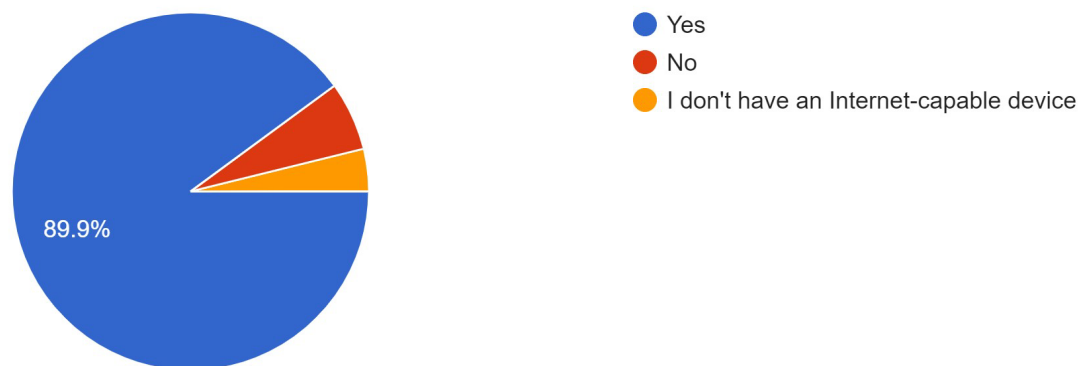


Chart 12

Have you ever hesitated to use the Internet?

338 responses

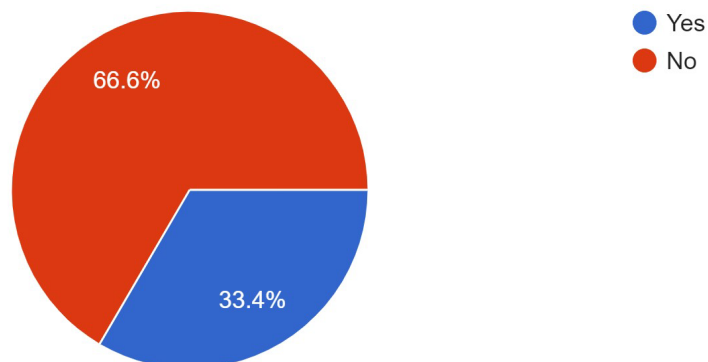
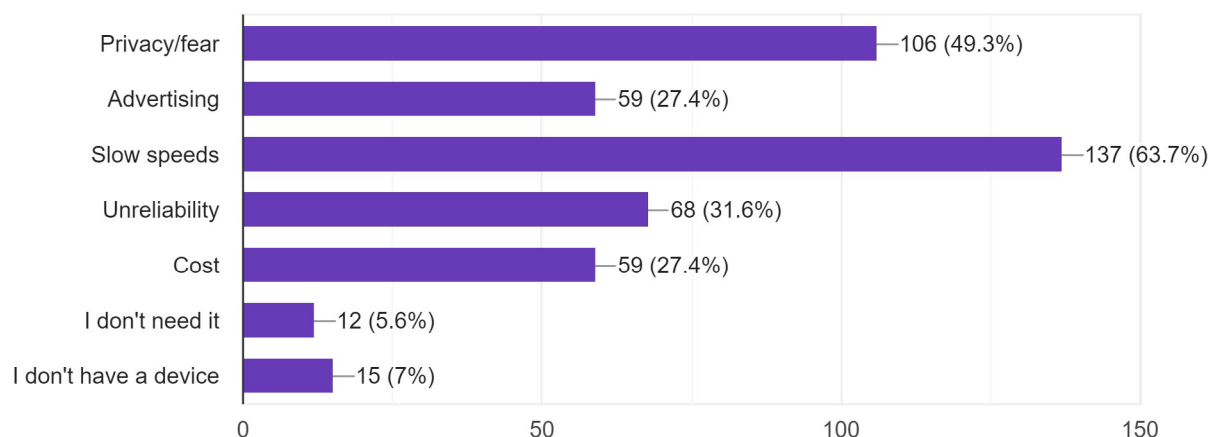


Chart 13

If you have hesitated to use the Internet, what were the reasons (check all that apply)?

215 responses



Graph 31.

If you could choose better Internet access, what would it look like? (please check all that apply)

337 responses

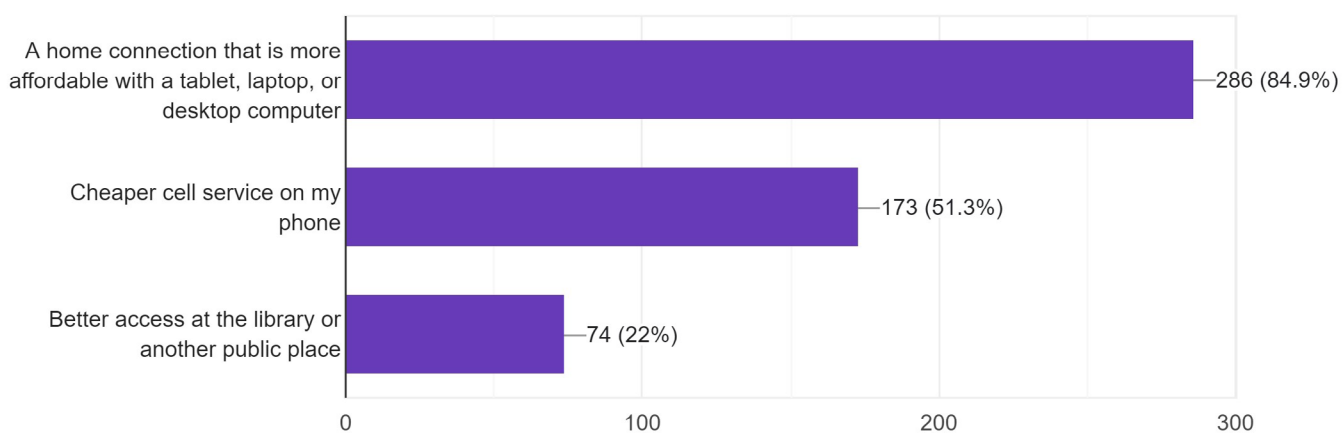
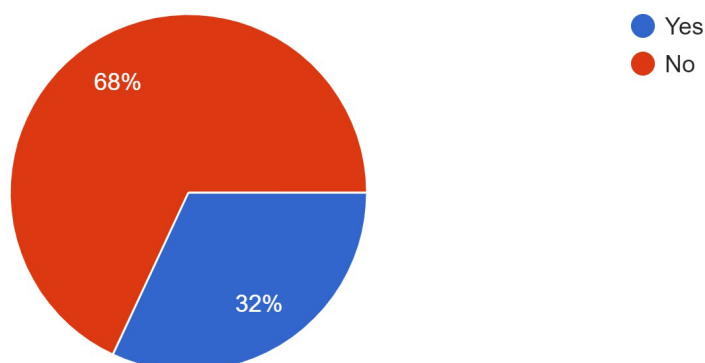


Chart 14

Have you missed any doctor's appointments in the last year?

338 responses



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