

White Paper on Telehealth in the Rural American West



Acknowledgements

The [Bill Lane Center](#) for the American West and [Stanford Medicine](#) are pleased to co-issue this white paper on telehealth in the rural American West. The paper builds upon the Lane Center's earlier work from our [Rural West Initiative](#), as well as ongoing research by our undergraduate teams who have been exploring connections between environment and health in the American West. I am particularly grateful to our affiliated scholar and consulting professor at the Stanford School of Medicine, [Phil Polakoff](#), who launched the Center's efforts on this critical topic in 2017 at the [Eccles Family Rural West Conference](#) in Santa Fe, New Mexico.

In collaboration with [Lloyd Minor](#), dean of the Stanford University School of Medicine, and with generous support from the Spencer F. & Cleone P. Eccles Family Foundation, the Lane Center co-hosted an [interdisciplinary workshop](#) in May of 2019 exploring the potential and challenges of deploying digital health technologies more widely in the rural West. Characterized by vast distances, scarcity of care, and even fewer specialist providers, this region challenges health care providers and policymakers to devise solutions that address an aging and more vulnerable population. The possibility of technological solutions is enticing but limited by a patchwork of broadband internet access. In 2019, our one-day workshop examined how telehealth and policy can improve access disparities, and treat specific crises such as opioid addiction, obesity and mental health. Our white paper continues that examination, detailing specific recommendations from the Bill Lane Center and Stanford Medicine that decision-makers might consider. The urgency of these recommendations has only increased in light of the recent coronavirus pandemic as our country confronts the limits of our fragile health care system. While this document is the culmination of recent scholarship, we remain committed to ongoing research on advancing population health in this often-neglected region.

I am grateful for our strong collaboration with and support from Stanford Medicine, Phil Polakoff, and the Eccles Family Foundation. I extend my warmest thanks for the advice and hard work of my predecessor, Professor David Kennedy, former School of Engineering Dean Jim Gibbons, School of Medicine staff Jean Sud, Lakshmi Mani, Jamie Kim, as well as Kylie Gordon and Preeti Hehmeyer on my team. The counsel of our partners, Drs. Ed Clark and Peter Weir, at the University of Utah, proved invaluable in the design and execution of this program. Together, we are making great strides toward improving health care access and delivery in the rural western United States. Finally, I would like to thank Fred Guterl for his efforts to synthesize the latest telehealth research and the discussion from our 2019 workshop into this white paper.



BRUCE E. CAIN, PHD

Spence and Cleone Eccles Family Director of the Stanford Bill Lane Center for the American West,
Charles Louis Ducommun Professor in Humanities and Sciences,
Professor of Political Science

The Big Picture

You're a single mother of four children under the age of 12, and you live in Riverton, Wyoming, in the remote northwest corner of the state. You're juggling two low-wage jobs and still two months behind on rent. You're having some shortness of breath and heart palpitations. Your family doctor advises you to consult a heart specialist in Salt Lake City, Utah, 300 miles away. You don't have access to a car. Traveling by public transportation and back is a full day affair. So, you put off making the journey.

Many Americans who live in the rural West confront this kind of dilemma whenever they get sick and need medical attention. The burdens of

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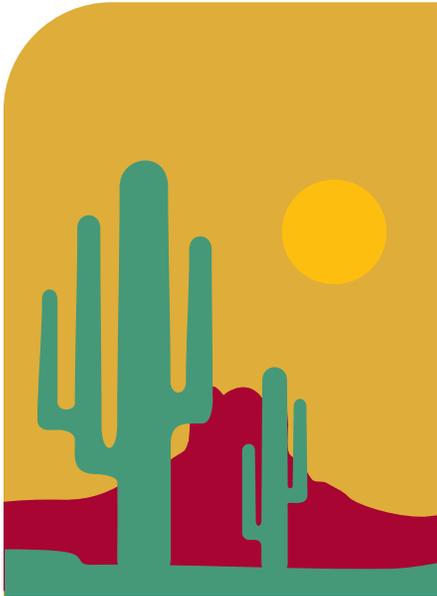
To fill these gaps, health care organizations have turned in part to technology. For instance, Wyoming's health department is bringing specialist care to rural residents by sponsoring a telehealth network that connects specialists in the big cities with primary care doctors and clinics in rural areas. Patients in local clinics consult with specialists via simple video setups, and the state's Medicaid program reimburses for these remote visits. As a result, residents of rural Wyoming have a better chance of being able to get the care they need.

Providing telehealth linkups in doctor's offices and clinics in rural towns is more than simply a matter of convenience. In many cases, it spells the difference between getting the care that patients need and going without — especially for rural residents who have to travel long distances to urban hospitals for specialist care and for people who do not have the means to take the time off to make the long journeys.

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Telehealth started in some university medical centers about 20 years ago as something of an experiment. Now it is on the cusp of becoming a mainstream delivery mechanism for health care services. Major hospitals are investing in sophisticated remote imaging equipment and video conferencing setups, and they're making their own apps that can overcome inefficiencies in health care delivery. Community clinics are using telehealth technology to reach their vulnerable constituents who can't afford to make lengthy trips to the doctor's office or take a day off work for treatment.

Telehealth services are particularly relevant to rural Westerners who are poorer than the national average, less likely to make regular visits to the doctor, and suffer disproportionately from health disorders, often neglected



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for years. Telehealth is being used for a wide range of illnesses and conditions. It is used to diagnose common ailments such as sore throats, bad backs and headaches that would normally be in the province of a general practitioner. It is bringing specialists to patients who wouldn't otherwise get the care they need for diabetes, heart ailments and surgical follow-ups. Behavioral health

treatment, social service assessments, off-hour consultations and remote patient monitoring are also taking place via telehealth.

In May 2019, the Bill Lane Center for the American West, together with Stanford University's School of Engineering and School of Medicine, held a workshop on advancing digital health in the rural West. The meeting brought together a diverse group of experts to discuss the current state of digital health;¹ how services provided through telecommunications are compensated; the fit of particular illnesses to digital health processes; using digital health to educate family caregivers and community health workers; obstacles to greater use of digital health; and new low-cost technology that could fill important digital health needs.*

A big driver of telehealth is technology — video and other equipment is getting cheaper and more affordable to small, rural providers, and access to broadband data is increasing, as illustrated by the growth in smartphones and streaming services.

Another factor has been gradual changes in federal and state laws and regulations governing the reimbursement of remote communications among patients, doctors and specialists. Government has been sympathetic to telehealth, but the laws currently on the books are hidebound — and they constitute one of the biggest inhibitors going forward.

The difficulty of getting reimbursement for telehealth services from government and private insurers is another big obstacle that needs to be addressed.

The purpose of this white paper is to look at how technology is improving the delivery of health care to underserved populations in the rural West, assess its effectiveness against the needs of this population, and point out trends in technology and demographics. Our goal is to continue the dialogue that began in the May 2019 workshop. We'll start by talking about the health care needs of the rural West, continue with the rise of telemedicine, and end with some of the roadblocks: namely, reimbursements and lack of broadband access.

TOPICS AT STANFORD'S DIGITAL HEALTH IN THE RURAL AMERICAN WEST CONFERENCE:

- 1 The current state of digital health
- 2 How services provided through telecommunications are compensated
- 3 The fit of particular illnesses to digital health processes
- 4 Using digital health to educate family caregivers and community health workers
- 5 New low-cost technology that could fill important digital health needs

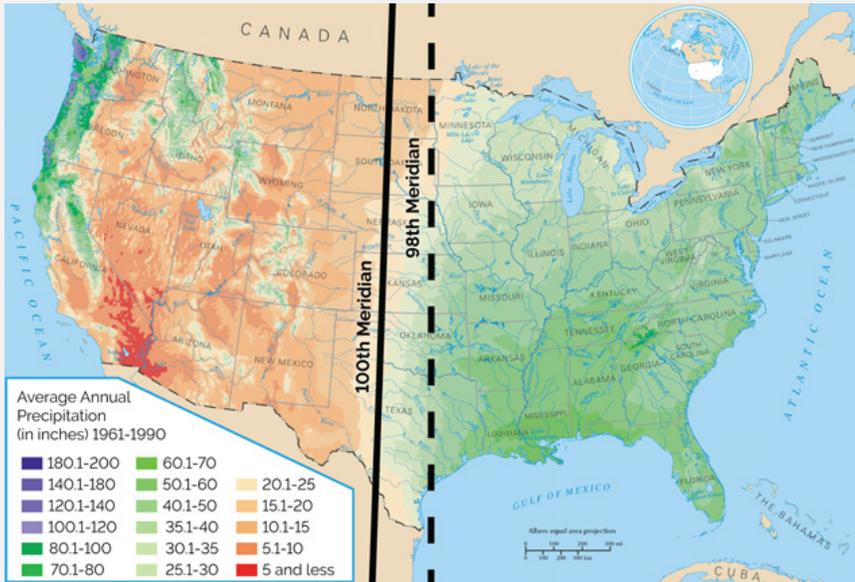
* For the purposes of this paper, the terms "digital health" and "telehealth" will be used interchangeably.

The Challenges of Delivering Health Care to the Rural West

Communities Project,³ four in five people in rural America are white, and fewer than one in four hold a bachelor's degree (about average for the U.S.). They rely on primary care physicians who are more likely than average to be overworked. A primary care physician in the rural West sees 393 patients more than the U.S. average of 2300 per year. Injury related deaths are higher than the national average as well — 94 deaths due to injury per 100,000 people versus the national average of 65. Primary care physicians are growing scarcer. From 2005 to 2015, the number of family doctors in the U.S. population fell from 46.6 per 100,000 people to 41.4 per 100,000 people, with greater losses in rural areas, according to a 2019 study by Stanford researchers.⁴

Many of the most vulnerable people in rural America live on tribal lands. There are 43 counties, mostly in the rural West, in which half or more of the population are indigenous — a total of 839,000 people. The median household income on these Native American lands is \$41,700. Health behaviors here fare worse than other communities: 28% of adults on tribal lands are smokers, 11% higher than the national average. Obesity rates are 8% higher than average. Only 41% of the population in these communities has access to adequate exercise facilities. Nearly a quarter of the population reports fair or poor health, compared to an average of 16% nationwide.⁵

Twelve million people live in parts



Credit: National Atlas, modified by Kat Cantner, AGI.

At the Bill Lane Center, the vision for the American West is generally defined by the 100th meridian, which is 100 degrees longitude west of the prime meridian in Greenwich, England. The line passes through six U.S. states, and it has long been considered the dividing mark between the more arid western and humid eastern United States. The boundary is shifting eastward, however, and climate models predict that it will continue to do so in the coming decades.

Life in the rural American West presents a difficult set of challenges. Rates of poverty are higher than the national average, patients are isolated by distance, and local primary care clinicians are too few.

The rural West is a loose designation that comprises states of the Rocky Mountains and West Coast. At the Bill Lane Center, the vision for the American West is generally defined by the 100th meridian, long considered the dividing

line between the more arid western and humid eastern United States. The 17 states west of and including the 100th meridian are over-represented by retirees and those nearing retirement age. Five other defining features characterize the rural western region, and these are sparse population; vast distance between zip code centers; large amounts of public land; tribal lands and reservations; and disconnectedness brought on by lack of broadband availability.² According to the American

DEMOGRAPHICS OF THE RURAL AMERICAN WEST:



Overworked Doctors



Fewer family doctors



More injury-related death

NATIVE AMERICAN COMMUNITIES IN THE RURAL WEST:



28% of adults are smokers



\$41,700 median household income



25% reports fair or poor health

HISPANIC COMMUNITIES IN THE RURAL WEST:



17% hold a bachelor's degree



19% are uninsured



\$45,800 annual income

of the country with large Hispanic populations. Many of these Hispanic centers are located in cities in Texas and Florida, but many are in the rural West. About 17% of individuals in these Hispanic communities hold a bachelor's degree. The annual income is \$45,800. About 19% of people in Hispanic center communities are uninsured (nearly twice the national average). Nearly a quarter of the population reports fair or poor health. Hispanic centers have an additional 1,000 people per primary care physician compared to the national average.⁶

Hospital closures

Residents of rural areas have borne the brunt of disruption in the health care system. Since 2005, 166 rural hospitals have closed in the U.S., according to the University of North Carolina.⁷ The trend appears to be accelerating. Between 2010 and 2019, 113 rural hospitals have shut down — including 20 in Texas, four in California, three in Arizona, and one each in Alaska, South Dakota and Nevada. Of the 166 closures, most were shuttered since 2013.

Another 430 hospitals are in imminent danger of closing, according to University of Washington researchers Kritee Gujral and Anirban Basu. In their analysis of 92 rural hospital closings in California from 1995 to 2011, they linked the closings to a rise of mortality by 5.9% in rural areas, but not corresponding increase in urban areas, which suggests that rural populations have few choices

when an area hospital closes. The results differed depending on the ailment: mortality for stroke patients increased by 3.1% and heart attack (acute myocardial infarction) patients by 4.5%. Mortality rates for asthma and chronic obstructive pulmonary disease (COPD) patients decreased by 8.8%.⁸

The gap is most acutely felt among vulnerable populations — the poor, the elderly, Native Americans, the disabled and the homeless. More than one in seven Native Americans report recent hospital closures, and one-third say they have recently experienced problems with health care access. Twenty-three percent say it is a problem to get to their doctor or health care provider, 18% say it is a problem to travel to the closest grocery store or place they get most of

“We must address poverty and inequity of resources in addition to providing medical and behavioral health care. If we ignore the poverty and a homeless patient walks out the door, the greatest treatment plan in the world's going to fall apart.”

WENDY VIERRA,
DIRECTOR OF BEHAVIORAL HEALTH
OPERATIONS, NEIGHBORHOOD
HEALTHCARE

Rural areas have shortages of behavioral health practitioners (psychologists, social workers, and counselors). Four in five rural counties lack even a single psychiatrist — nearly 185 of Texas’ 254 counties have no practicing psychiatrists.

their food, and 15% of employed rural Native Americans say access to reliable transportation is a problem in getting to their jobs.

Homelessness

Homelessness presents a big obstacle not only in access to health care but in the ability of patients to accept treatment and live a healthful life. Homeless people, says Wendy Vierra, Director of Behavioral Health Operations at Neighborhood Healthcare (NHCare.org), “don’t have a refrigerator to put their insulin in, they don’t have access to nutritional food, they don’t belong to gyms where they can follow an exercise plan. They’re worried about where they’re going to sleep and what they’re going to eat. We must address poverty and inequity of resources in addition to providing medical and behavioral health care. If we ignore the poverty and a homeless patient walks out the door, the

greatest treatment plan in the world’s going to fall apart.”

In part due to a lack of access to care, rural Americans have higher rates of heart disease, cancer and stroke than their urban counterparts, and they live shorter lives.⁹ “Without sufficient access to care, rural Americans post worse health outcomes than their peers elsewhere,” writes Dr. G. Richard Olds, president of St. George’s University.¹⁰ “These trends could worsen in the next several years. The country will need upwards of 122,000 additional doctors by 2032.”

Many residents in the rural West have benefitted from Medicaid expansion under the Affordable Care Act of 2010 — most western states have accepted



the ACA’s expansion of Medicaid eligibility. This gives residents, in theory, better access to Medicaid benefits and treatment for mental health and substance abuse disorder. However, despite the expansion of coverage, access to care remains inadequate. Rural areas have shortages of behavioral health practitioners (psychologists, social workers, and counselors). Four in five rural counties lack even a single psychiatrist¹¹ — nearly 185 of Texas’ 254 counties have no practicing psychiatrists.¹² In particularly high demand are child and adolescent psychiatrists, geriatric psychiatrists and addiction psychiatrists, according to a 2018 study by the University of Michigan School of Public Health.¹³

In general, rural areas have trouble attracting highly trained clinicians. The University of Michigan study found that whereas more EMTs and paramedics per capita reside in rural as compared to urban areas, rural areas have fewer physicians and surgeons per capita.

Less health care means that rural Westerners are particularly vulnerable to population health problems:

Suicide

Residents of the rural West are more prone to suicide than the national average, particularly in counties with large Native American populations.¹⁴ Men in rural areas are at three times greater risk of suicide than the national average. Suicide rates are rising

throughout the rural West in just about every demographic group. Mean suicide rates increased by more than 10% from 2005 to 2015 for 99% of U.S. counties, and increased 20% for 87% of counties.¹⁵ “Counties with the highest model-based suicide rates were consistently located across the western and northwestern U.S., with the exception of southern California and parts of Washington,” wrote Lauren M. Rossen et al. in the American Journal of Preventive Medicine. “Compared with more urban counties, more rural counties had the highest estimated suicide rates from 2005 to 2015, and also the largest increases over time.”

Obesity

The rates of obesity in adults in rural counties are higher than for adults in urban counties, according to the CDC. It found that obesity rates ran to 34.2% in rural counties, compared to 28.7%

in cities, which was consistent in most sociodemographic categories, including age, sex, and household income.¹⁶

The gap seems to be getting wider. An analysis of body-mass index (BMI) by researchers at Imperial College found that between 1985 and 2017, the global average BMI of rural women rose to 2.09 compared to 1.35 for urban women, and for rural men, BMI rose by 2.10 compared to 1.59 in urban men.¹⁷

Diabetes

Native Americans, who live largely in rural western regions, are more likely to have diabetes and more likely to die of kidney failure as a complication of diabetes, according to the CDC.¹⁸ Native Americans are more than twice as likely to be diagnosed with diabetes than white Americans. The reasons have to do with multiple health factors, including high blood sugar, high blood pressure, and significant barriers to health care.

More than 16% have been diagnosed with type 2 diabetes, nearly twice the rate for non-Hispanic whites.

Opioid abuse

The opioid epidemic has hit the urban and rural parts of the U.S. According to the CDC, in 2017 there were 70,237 drug overdose deaths in the United States. The mortality rate of 21.7 per 100,000 was 9.6% higher than the rate in 2016.¹⁹ Rates in most western states were on par with the national average, but the problem is exacerbated by poorer access to mental health and other forms of care. As a result, “rural older adults are dying from the opioid epidemic at a higher rate than older adults in the nation as a whole,” according to the American Society on Aging.²⁰ “Fewer than one in 10 opioid treatment centers are located in rural America, and many rural first responders are not trained to administer life-saving medications for overdose.”



Less health care in the rural west



more population health problems

The Promise of Telehealth

By removing the obstacle of distance, telehealth could go a long way toward filling the care gap that patients currently experience on the farm, ranch or reservation. Although data on the impact of telehealth on people living in the rural West is in short supply, the anecdotal evidence is overwhelming that telehealth has already increased access to health care for millions of rural Westerners.

First, let's establish what telehealth is. The Health Resources and Services Administration, a part of the U.S. Department of Health and Human Services, defines telehealth as “the use of electronic information and

WHAT IS TELEHEALTH?

“The use of electronic information and telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration.”

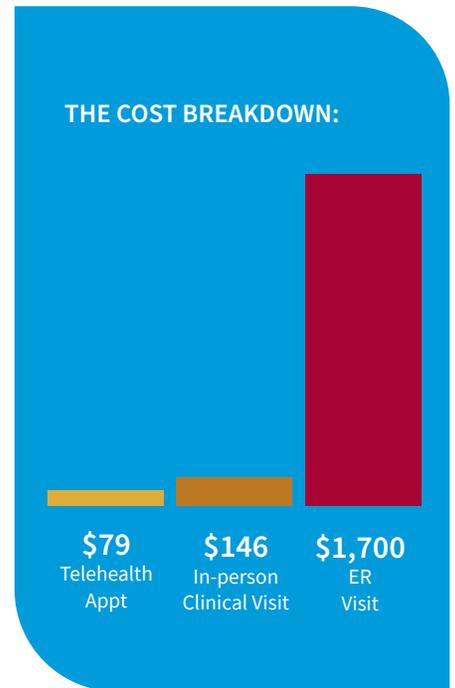
HEALTH RESOURCES AND SERVICES ADMINISTRATION

telecommunications technologies to support long-distance clinical health care, patient and professional health-related education, public health and health administration.”²¹

Telehealth and telemedicine refer to technologies that enable clinicians to treat or advise patients remotely. It ranges from elaborate videoconferencing with high-definition cameras to simply talking to a patient on the telephone or providing care through a smartphone app. (The terms telehealth and telemedicine have different meanings in certain contexts, but in this paper, we'll use telehealth to cover broadly any application of technology to remote health care.)

The range of uses runs the gamut from diagnosing common ailments—sore throats, bad backs, headaches—that would normally be the province of a general practitioner, to bringing rural patients and clinicians in consultation with specialists from urban areas. The interactions that take place over telehealth can also include social service assessments, off-hour consultation, remote patient monitoring and post-treatment appointments.

Cheaper technology is a big factor in the adoption of telehealth in rural clinics and doctor's offices. “Things are getting smaller, more compact,” said Mei Wa



Kwong, Executive Director for the Center for Connected Health Policy (CCHP), a program at the Public Health Institute. “If you're in a clinic with limited space, you don't have to have this huge unit that's taking up space or maybe an entire exam room.” Being cheap and compact means that more clinics and doctor's offices in rural areas can afford to provide telehealth linkups for their patients.

A key motivator to the take-up of telehealth is cost savings. The cost per employee for health insurance in 2009 averaged \$10,000 and is projected by 2019 to be nearly \$30,000.²² A clinical appointment conducted over telehealth costs about \$79 on average, as compared to \$146 for an in-person visit and \$1,734 for an emergency room visit, according to a RAND study.²³

Telehealth has grown over recent years as new state laws have broadened the permissible uses for telehealth. During the period 2011 to 2016, insurance claims data have indicated that some telehealth use increased the most in rural areas (960%), compared with an increase of 629% in urban areas.²⁴ A 2019 survey by FAIR Health found that between 2014 and 2018, non-hospital-based provider-to-patient telehealth grew 897% in rural areas but 1227% in urban areas.²⁵

A national study of insurance claims found telehealth increased 53% from 2016 to 2017, outpacing increases in the use of urgent care centers (14%) retail clinics (7%) and ambulatory surgical centers (6%). By the same token, emergency department claims declined by 2%.²⁶

By most accounts, investments in telehealth are rising rapidly, though reliable figures are hard to find. One estimate put the increase from \$1 billion in 2011 to \$5 billion in 2015; another projects the industry will exceed \$90 billion in revenues by 2026.

Here are a few of the more prominent efforts to expand telehealth services to patients living in the rural West:

Project ECHO

In 2003, Dr. Sanjeev Arora, a liver specialist in Albuquerque, New Mexico, launched the Extension for Community Healthcare Outcomes (ECHO) project

at the University of New Mexico School of Medicine. Arora created an online platform for specialists to mentor rural doctors on the proper diagnosis and care of hepatitis C. “Within a year of Project ECHO’s launch all these people had become experts,” Arora told mHealth Intelligence, and his own wait times for appointments dropped from eight months to two weeks. “We were seeing exponential improvement in capacity to treat.”²⁷

In 2011, Arora and colleagues published a paper in the New England Journal of Medicine comparing clinical results for hepatitis C treatments given at the University’s Albuquerque medical center with those given in 21 ECHO-equipped satellite clinics located in rural areas and prisons.²⁸ The results were nearly identical. Of the 146 patients treated at UNM, 57.5% had a “sustained virologic response.” Of 152 patients treated at the satellite clinics, 58.2% showed the same result. “The results of this study show that the ECHO model is an effective way to treat HCV infection in underserved communities,” the authors wrote. “Implementation of this model would allow other states and nations to treat a greater number of patients infected with HCV than they are currently able to treat.”

Patients were more likely to trust their local clinicians than specialists from afar and were able to make more frequent visits. As a result, the authors reported, patients were more likely to adhere to

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SANJEEV ARORA, MD
HEAD OF PROJECT ECHO

treatments. “Local providers may be better able to comply with best-practice protocols, ensure close assessment of the results of laboratory tests, offer education tailored to the patient, and provide better and more timely management of side effects,” the study concluded.

ECHO quickly expanded throughout New Mexico and other states and has caught on in a wide range of specialties, including cardiology, HIV/AIDS, opioid abuse, endocrinology and mental health. It’s now in use in more than 130 hubs across the United States, including the University of Missouri Health System, the MD Anderson Cancer Center at the University of Texas, the University of Massachusetts Medical School, the

Oregon Health Sciences University, the University of Idaho, and the University of Chicago. It's also used in at least 23 other countries, such as Northern Ireland in the UK, Uruguay, India and Canada.

The Utah Experiment

The University of Utah Health began experimenting with telehealth services in the early 2000s. Surgeons and physicians soon realized that telehealth could be used to reduce the number of patients who were flown in via helicopter from rural areas — mainly victims of strokes and burns. The university began to invest in telehealth in earnest in 2012.

The university formed regional partnerships where they could “design care pathways, go upstream and make sure patients are only coming down when they absolutely have to,” says Nathan Gladwell, Administrative Director of Telehealth for the University of Utah Hospitals and Clinics. “As an academic center, we want to capture those higher end, more complex patients for our training programs and trials. But the more routine care we feel strongly should remain as close to home as possible. Telehealth just became one of those mechanisms to further that strategy.”

Today the university has expanded to critical care, dermatology, urology, cardiology, mental health, and behavioral health therapies.

Utah's strategy has been to build

telehealth links where local physicians currently practice. Its tele-stroke program, for example, supports 28 hospitals in the mountain West with 24/7 access to stroke experts. Those experts are the same ones that are on call for the University of Utah Hospital — they don't have to go to a special building or clinic to perform a telehealth visit. The remote consults are built into the everyday operation of the health system. They go to a telehealth station — typically, a dual monitor station behind a closed door for privacy, with a headset, microphone and camera.

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ADMINISTRATIVE DIRECTOR OF
TELEHEALTH FOR THE UNIVERSITY OF
UTAH HOSPITALS AND CLINICS

Patients come into one of 25 locations in the University of Utah medical system, where they have equipment that allows for high quality video examination. For dermatology, for example, a high-resolution camera plugs into the USB port of a laptop. With the help of a nurse,

who's with the patient, the doctor in Salt Lake City can get an up-close, high definition picture.

An orderly workflow is designed for each clinical program. It covers supplies and training for clinicians. Each program has different procedures and requirements for training. In the case of stroke, for instance, typically the patient comes to a rural emergency room where a physician and nurse team have already done their evaluation. The decision they need to make is, does the patient have a major stroke that they can treat, or do they need to send the patient elsewhere? At that point, they'll make the call, via telehealth, to Utah's stroke expert, who will help them make that final decision.

In the case of a burn victim, most emergency room physicians in rural areas have had training to handle those cases. However, for a major burn, typically the local clinicians will consult with University of Utah physicians on how to package the patient in preparation for a helicopter transfer. In cardiology, a medical assistant or nurse from the rural clinic will come down to the university and spend a week in Utah's cardiology clinic to learn terminology, medications and what the cardiologist at the other end of the connection will likely be looking for.

Solid data on what impact these programs have had is hard to come by, said Gladwell. Part of the problem is the lack of a common standard across

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electronic health record systems, which makes it hard to collect and share data. Another problem is the difficulty of capturing records of cases in local communities. Large academic centers have integrated delivery networks with sophisticated data gathering systems. They have the resources to gather data and put it out in analytic format. Small and medium-sized cities typically do not have the resources to invest in up-to-date IT systems.

Gladwell got a taste of how hard data gathering could be when Utah tried to document the effectiveness of a sepsis protocol with its telehealth partners. They made requests for data sets across their 28 partner organizations, but typically their IT departments were not equipped to do data analytics. Gathering

the necessary data took 18 months of back-and-forth communications. Eventually, they were able to prove that the program worked — it saved the lives of eight people who would have died without the sepsis protocol in place.

In general, says Gladwell, demographic information is relatively easy to get, but disease-state specific information is difficult. “We have to have a grant that funds some person to actually physically go on site and hand collect most of the data,” he says. “Inpatient medicine is a little easier to capture, outpatient statistics is almost nonexistent. There are doctors’ offices we work with that are still on paper. It’s a big challenge.”

Telehealth outcomes data is easier to gather in internal projects that use the University of Utah’s IT network. In its tele-ICU program, for example, which provides expert consultation on whether a patient needs to be put in an ICU, Utah tracked patients that came in the University before and after the intervention program was established. It was able to document that the tele-ICU program led to a 17% decline in patients that were admitted to ICU and then discharged within 72 hours—a discharge time period that suggests that a patient’s case may not have been appropriate for admission, according to Gladwell. “We take that as pretty good evidence that that program is working,” he said.

The project was also devised to help physicians in smaller rural hospitals

manage patients that have already been admitted to the ICU. “Sometimes physicians get overwhelmed or uncomfortable with the level of care that a patient in the ICU needs. A typical response is, ‘I’m a little bit uncomfortable. I’m going to send this patient to a bigger center,’” said Gladwell. With the implementation of tele-ICU, specialists can reassure local doctors that their patients are getting proper care locally and give them the option of keeping them there and checking in every so often.

Gladwell estimates that about three-quarters of patients in the university’s regions — which includes Idaho, Montana, Wyoming, parts of Nevada, parts of Colorado and Utah — are within reach of a telehealth node.

Entering the Mainstream

The adoption of telehealth by big health care providers in recent years marks the entry of this practice into the mainstream of health care delivery. Intermountain Healthcare, the large health care provider in Salt Lake City, Utah, started investing in telehealth in the past five years or so. Its first foray came in adult critical care; it has since expanded into many other areas, and now has 35 telehealth programs in various disciplines.

More recently, it has partnered with American Well on an app that patients can use to schedule two-way audio and video visits with clinicians. The

app is integrated with Intermountain's electronic health records. About 100,000 people have downloaded it, but not all of them have used it. The company would not give a figure for the number of patients who use it, but said the app is "a growing segment of our health care."

Patients can use the app to schedule virtual visits (or they can call the office). The remote visits appear on the clinician's schedule in the same way they would for a physical visit. The patient logs onto the app and is put on call for when the doctor is ready. When the doctor is free, the video conversation starts.

Last year Intermountain launched another app — a "doc-in-the-box" app called ConnectCare — that can be used for questions related to urgent care. The app was designed to make it easier for patients to query their primary care clinicians — say, if a patient feels sick but can't get to the doctor's office and isn't sure whether to check into the local ER. Most of these cases involve rashes, cold symptoms and coughs.

To assess the economic impact of the ConnectCare program, Intermountain looked at nearly 200,000 insurance claims for the kinds of diagnoses that the program is used for. It then compared those claims to the total cost of care for the next 21 days for people whose initial contact was in their doctor's office, in an urgent care, or in an emergency department. For

patients that started with ConnectCare, costs were significantly lower, said Bill Beninati, medical director for telehealth programs at Intermountain. The study, however, was not a randomized clinical trial and used data that could be inconsistent; it also had not yet been published.

Beninati said that the use of telehealth has in general allowed Intermountain to lower the barriers to care for many rural patients. For instance, patients in rural areas who get a cancer diagnosis often refuse further treatment because of the distances they must travel for treatment. When consultations with the oncologist happen via video, and chemotherapy infusions are delivered locally, patients are likely to accept care.

On the one hand, the benefits of telehealth to the community are substantial. Keeping specialist care local means fewer patients are transferred out of local hospitals. Income from expensive procedures, like infusions, stays at the local clinic or hospital. Since operating margins are so slim in community hospitals, being able to keep a few admissions per month could be the difference between closing the doors and remaining open.

On the other hand, the economics for the sponsoring organization can be tricky. For Intermountain, telehealth leads to more overall doctor visits, but fewer take place in an Intermountain facility. Why, then, would Intermountain

invest in remote telehealth equipment, which it installs in the facilities of community hospitals and other partners, when it results in fewer billable cases? Although hospitals pay a subscription fee for telehealth services to Intermountain, it is not likely that these make up for the income lost when the caseload is no longer local. In a strict fee-for-service accounting, Intermountain's investment doesn't make sense. "In a classic business case analysis looking at net operating income, this looks terrible from that perspective," said Beninati. "Right now, Intermountain is putting far more into developing our telehealth programs than the income that we generate."

However, telehealth does make sense for Intermountain's accountable care business, says Beninati. In accountable care, the health care provider also acts as an insurer, which creates an incentive to practice preventative care. "We believe that the benefit of telehealth is going to come down to the health plan," says Beninati. "The benefit lies in reducing the total costs of care."

Currently, 45% of Intermountain's business is in accountable care, but Beninati expects that share to increase rapidly in the next few years. "As Intermountain goes further and further into accountable care, then the entire economic model gets turned on its head. Currently our senior leaders, who are financing us for this, recognize that the direct revenue we bring in some of

these services that we have are billable, and we do generate revenue from some of these services.”

“In the large centers, the volumes are enough that we hardly notice the lost revenue from the small numbers of patients. Even if we did, it’s the right thing to do.”

Behavioral Health in the Community

Telehealth has broad applicability to many kinds of diseases and conditions. The field of behavioral health seems particularly well suited to remote interactions, according to practitioners. Behavioral health is generally a labor-intensive practice that requires frequent and regular patient visits. Specialists are scarce in rural areas, and mental health still carries a stigma that makes many rural residents reluctant to seek

help. Taken together, these factors make behavioral health ripe for telehealth. The availability of telehealth services has already increased access to mental health services for many rural patients. The Fair Health survey found that acute upper respiratory infections were the most widely sought telehealth consultations at 16 %, but mood disorders were second at 6% and anxiety was third at 5 %.

between them,” she said. Behavioral health via telehealth has worked well for Neighborhood Healthcare (NHCare.org). This private, non-profit community health organization began using telehealth for behavioral health services less than two years ago. Its 17 clinics serve more than 76,000 people in Southern California. NHcare is a Federally Qualified Healthcare Organization (FQHC), which means that it does not turn anyone away for inability to pay. It provides a wide array of services: medical, behavioral health, dental, chiropractic, acupuncture, women’s health, podiatry, vision, pharmacy and lab.

When getting started in telehealth, NHcare.org considered buying a telehealth device that integrates with its electronic health record system but decided against it because of the cost. The clinic ended up going with a freestanding videoconferencing device that was built specifically for them at a cost of less than \$3,000 each. The devices, mounted on carts, are easy to move from one location to the next. Funding from the Health Resources and Service Administration, a part of the U.S. Department of Human Services, allowed it to purchase five of the carts initially. NHcare now has 11 telehealth carts to use among its 13 primary-care clinics with integrated behavioral health services.

Telehealth has given the clinic greater

“A decade ago, the inability of the clinician to physically touch patients was a drawback to remote medicine. With mental health, the distance can be an advantage in some ways.”

MEI WA KWONG,
EXECUTIVE DIRECTOR,
CENTER FOR CONNECTED
HEALTH POLICY

CCHP’s Kwong says that the rise of mental health services via telemedicine has changed the view of many policymakers on the viability of telehealth. “A light bulb has gone off in their heads,” she said. A decade ago, the inability of the clinician to physically touch patients was a drawback to remote medicine. With mental health, the distance can be an advantage in some ways. “Some people feel more comfortable kind of having that screen

MOST WIDELY SOUGHT TELEHEALTH SERVICES ARE FOR:

16%

Acute upper
respiratory
infections

6%

Mood
disorders

5%

Anxiety

flexibility to expand services to rural sites where it would not make economic sense to hire a psychiatrist. It also fit well with NHcare.org's unique mission, which is to provide holistic care to underserved patients who do not have the means to navigate the U.S. health care system or community-based resources. NHcare has a "no wrong door" policy, which means that any patient who shows up for any reason is cared for holistically, regardless of what brought them to the clinic in the first place. "We've got to meet them where they're at to be able to get the health care they need," said Vierra.

NHcare.org has set up partnerships with other community-based organizations, which often refer patients. A person who walks into a food bank for breakfast might be referred to NHcare.org for treatment. Once the patient walks through the doors, they get whatever care they need. A primary care doctor might treat them for a broken bone, but an indication of, say, opioid addiction results in a "warm handoff" to a behavioral psychologist down the hall. The psychologist is then going to do a full assessment to see if medication is called for — which of course requires a psychiatrist — or determine if the patient has more complex needs. If so, the psychologist does another warm handoff to a "complex care resource specialist," who performs a social service assessment, navigation assistance, referrals, and tracking to ensure connection to resources.

Behavioral health is integrated into every one of NHcare.org's primary care clinics. Each one has a psychologist or a licensed social worker. To help guide patients through the complexities of medical care, the clinic provides community-based navigation services to walk patients through the steps they need to take to get care and to help them take advantage of services and resources that community-based organizations provide. "Think of someone who has a fourth-grade education, who's new to this country, and doesn't speak our language," said Wendy Vierra. "How are they possibly supposed to navigate medical, behavioral health, and social services? We have a universal social determinants of health screening at program at each of our clinics. Someone is going to walk them through and totally assess all their social service needs and create what we call a success plan with them that the patient directs."

NHcare also provides universal screening. Each patient is screened at intake for social service needs, depression, and alcohol and drugs use. Positive responses to any those questions, if above a threshold, can result in a "warm hand-off" to a behavioral-health consultant, regardless of the original complaint. If a person walks in off the street to see a counselor but they have a wound or mention diabetes, they're referred on to a primary care doctor who can coordinate care.

Some of these services now take place via telehealth. But the technology is useful in removing barriers to health care for the vulnerable population that NHcare.org serves. It has partnered with community-based organizations such as social service agencies and food pantries to bring primary care to the communities and their most vulnerable residents, the homeless. NHcare has put a primary care clinic inside the headquarters of a social-service agency, which includes an on-site homeless shelter and residential substance-abuse treatment center. They're now looking to open one at a local YMCA.

Telehealth has the potential to increase the reach of NHcare through its partner organizations. Providers using video monitors can assess patients, provide treatment, and connect them with the

"Think of someone who has a fourth-grade education, who's new to this country, and doesn't speak our language. How are they possibly supposed to navigate medical, behavioral health, and social services?"

WENDY VIERRA,
DIRECTOR OF BEHAVIORAL HEALTH
OPERATIONS, NEIGHBORHOOD
HEALTHCARE

resources they need without a physical visit.

Telehealth for Native Americans

One population that stands to benefit from telehealth services is Native Americans. The Wyoming Department of Health, in cooperation with the University of Wyoming, has set up a telehealth network for Medicaid providers. Tribal Health, an extension of the Indian Health Service designed to provide outreach to tribal members in

northern Wyoming, is taking advantage of this network that Wyoming has set up. It is one of many tribal areas that is adopting telehealth. It was preparing to launch telehealth for its members, using video monitors, in 2020.

The clinic plans to use telehealth for diabetes maintenance, surgical follow-up visits and behavioral health visits, among other things. Director David Meyers and his staff have met with behavioral health providers, diabetes educators and others to figure out what services they can provide and in what forms. He said the main goal of the clinic's telehealth program is to reduce travel for patients.

"We're so rural," he says. "If somebody needs surgical care or anything that can't be provided in our area, we're two hours away from everything. Sometimes we help transport clients to appointments, but you're going to Salt Lake City or Billings a lot, and that's six hours away. We can get patients to the initial appointment, but then you have a lot of 15-minute follow-up appointments. If we could use telehealth services for follow-up care that would eliminate a lot of stress on clients."

Meyers, like other health care practitioners interviewed for this paper, anticipates that behavioral health will be the most effective application for telehealth among the tribal members. At the moment, there's a big unmet need. A suicide prevention program started four

Due to generations of mistreatment, tribal members are slow to trust outsiders, especially in discussing their private mental health issues.

years ago never got off the ground due to a lack of funding. Few providers are in close proximity to the tribes.

Lack of local providers isn't the only barrier to behavioral health care. Tribal members are often reluctant to seek help. Part of the problem is the stigma of mental illness, but a lot has to do with historical trauma, says Meyers. Due to generations of mistreatment, tribal members are slow to trust outsiders, especially in discussing their private mental health issues. Meyers believes that telehealth will be able to help clients overcome their inhibitions. Although patients would have to make initial visits in the clinic, afterwards, with a Wi-Fi setup, they wouldn't have to leave the house. Remote visits offer a way to "get people in the comfort of their own home to use a service, where they don't have to go to a doc's office or someplace where they feel very uncomfortable," says Meyers. "I don't know if telehealth can overcome historical trauma, but it offers another resource, another option."



"We're so rural. If we could use telehealth services for follow-up care that would eliminate a lot of stress on clients."

DAVID MEYERS
DIRECTOR, TRIBAL HEALTH CLINIC

Low-tech solutions

Telehealth services can be high-tech affairs, but they don't have to be. Text messaging offers a way to stay in touch with patients between visits. Lisa Chamberlain, professor of pediatrics at Lucile Packard Children's Hospital at Stanford, has found that low-tech communications such as text messaging can be valuable in delivering health care to Spanish-speaking immigrant communities in San Jose.

The use of low-tech telehealth can also benefit the health and well-being of families in indirect ways. For instance, Chamberlain noticed during her clinic appointments that many otherwise smart five-year-old children were not ready for kindergarten. "When they would come in for their back to school checkup, I could tell by asking them questions — what color is my skirt, count to 10 for me — that although these were

bright bilingual kids, they lacked basic knowledge that they needed to have going into kindergarten," she said at the May 2019 workshop. "If you don't go into kindergarten ready, you start behind and it's very difficult to catch up. Since education is the predominant social determinant of health, this felt to me like something we should be thinking more about."

Chamberlain and her colleagues studied the problem and found that only 13% of patients in a public clinic in Redwood City were ready for kindergarten, compared with 88% of those in wealthier Palo Alto. After listening to families and running focus groups, she concluded that parents were eager to support their children, and were curious to know what it was they could work on. "I was glad to hear that," she said. "The knowledge gap is the easiest one to fix. Parents said, uniformly, 'if you tell me what we need to do, I'll do it.'"

Chamberlain consulted Stanford's Graduate School of Education, which had been developing texting interventions for pre-schools. But many families can't afford private preschools and Head Start preschools had waiting lists. It occurred to her that health care clinics were well-placed to reach these children. She started a program that offered instructions and reminders to parents, using text messaging, that helped them take on the role of first educators for their children. A text message might suggest, for instance, that when parents are at the grocery

Lisa Chamberlain, professor of pediatrics at Lucile Packard Children's Hospital at Stanford, started a program that offered instructions and reminders to parents, using text messaging, that helped them take on the role of first educators for their children.

store with their children they look for things that are red and talk to their kids about it. Or when they're reading a book to show the child that the words go from left to right.

"They're very basic things that parents can build into their day to day activity," says Chamberlain. "The mom gets a text in her phone three times a week every week," she said. "That's really leveraging the clinic relationship to help promote the behaviors and give these behavioral nudges for the families and directions so that they can help all their children thrive."

Chamberlain recently concluded a randomized controlled trial at Santa Clara Valley Medical Center to evaluate the effectiveness of the program and found that it improved child literacy levels and that parents enjoyed receiving the texts.



Telehealth services can be high-tech affairs, but they don't have to be. Text messaging offers a way to stay in touch with patients between visits.

Problems that Limit the Expansion of Telehealth

When you think about all the ways the internet and smartphones have transformed how services are delivered in other sectors — transportation, retail, and so forth — the promise of telehealth still seems to be largely unfulfilled. Although a great deal of progress has been made in recent years, many barriers remain.

Reimbursement

One of the problems holding up the implementation of telehealth



Medicare has been a problem because the federal laws that govern reimbursement are rigid in requiring patients and clinicians to be physically present at a consultation — the “four walls” rule.

is limitations in the laws and reimbursement policies.

Medicare has been a problem because the federal laws that govern reimbursement are rigid in requiring patients and clinicians to be physically present at a consultation — the “four walls” rule. To change this requirement would require an act of legislation. In 2018, the U.S. Congress considered a telehealth bill, but it never passed. Since then, some bills have gradually changed policy to make telehealth easier to implement. Centers for Medicare and Medicaid Services (CMS) has also shown administrative leniency in allowing telehealth services in all but name. “If you call something telehealth then Medicare has to follow what the law says, which is limited,” said CCHP’s Kwong. “The use of telehealth is meant to replace how patients receive a particular service that’s provided in-person and Medicare reimburses for. CMS has recognized that there are services that technology can provide which aren’t currently provided in-person. To get around these restrictions, CMS is really saying that there are some services you can buy that are not currently face-to-face services that we typically reimburse for. These are new services that use telehealth



WHAT IS A VIRTUAL CHECK-IN?

The check-in call is a triage system that saves time for clinicians, and saves patients a trip to the doctor’s office. In rural areas, the potential to save patients long car rides is large.

technologies, but they’re not calling it telehealth.”

A case in point is chronic care management, in which data from devices in a patient’s home automatically relay information to the clinic or hospital. Medicare has been reimbursing for this service for several years, even though it’s clearly a telehealth setup. Last year, Medicare approved reimbursement for “virtual check-in,” in which a patient uses telehealth to consult with clinicians before making a visit. Providers hold a five-minute call with their patient, who might say, “I’m feeling good, do I really need to come in for my appointment this week?” The doctor asks a few questions and says, “No, sounds like everything’s okay. Let’s see you in a month.”

In theory, the check-in call is a triage system that saves time for clinicians, and saves patients a trip to the doctor's office. In rural areas, the potential to save patients long car rides is large. By the same token, a patient who may be reluctant to make the trip to see a doctor might realize, after answering a few of the doctor's questions, that there's something serious that's worth following up on.

Medicare also recently started reimbursing for "inter-professional communications or consultation," which is a provider-to-provider consultation — a practice that probably goes on now without reimbursement. It covers not only informal consultations, but those in which actual records are sent back and forth. This pays the providers' time on both ends — the specialist's time and the primary care clinician's time. "That actually may have more of an impact," says Kwong. "For one thing, providers

will be paid for work they're likely already doing now—consulting with one another—but not being compensated for. Also, offering reimbursement might encourage providers, especially primary care providers, to take advantage of it."

Changes in law are still needed to free up telehealth services under Medicare. In particular, community health clinics — federally qualified health centers — that fall under Medicare are currently not allowed to provide specialist services. For instance, Medi-Cal, the California state Medicaid agency, currently will not compensate providers who bill for telepsychiatry from the clinic to a patient's home; a visit must take place at clinics on both ends.

At NHcare, Medi-Cal rules have been downright stifling. The biggest limitations, said Vierra, is the stipulation that providers can only bill one session per person per day. "That is an onerous burden for, say, a woman pushing a stroller who doesn't have access to childcare," she said. "It would be beautiful if patients could come and get all their appointments done in one day, but they can't do that. That creates unnecessary barriers to accessing health care."

The states have been more forward thinking in allowing for telehealth services than the federal government. At the Medicaid level, CMS allows states broad discretion to fashion their own programs, so long as they meet broad

obligations involving effectiveness and cost.

Wyoming, for instance, ventured into telehealth in 2009, when the legislature formed the Wyoming Telehealth Consortium. Since then, the state has contracted with the University of Wyoming Institute for Disabilities to manage a network that is HIPAA-compliant. "We're pretty easy-going," said Dr. James Bush, the Medicaid and Medicare officer and staff physician at the Wyoming Department of Health. "When we use state dollars, we use the highway rule — we can use the funds to maintain the roads, but we don't tell them where to drive."

Wyoming's service, which is based on a Zoom license, is open to all Medicaid providers and patients for free. Patients can be anywhere, including the home. In the third quarter of 2019, 187 providers hosted meetings for 7583 participants in the state. Most of these involve direct clinical services, but some sessions are for administrative meetings and education, such session with ECHO (Extension for Community Healthcare Outcomes) systems.

The program has been particularly useful for Native American groups living in the Wind River Reservation — mainly Shoshone and Arapahoe tribes — which is both remote and poor. (The Tribal Health clinic, above, is part of this program.) For a patient in the Riverton area to visit a doctor in Salt Lake City would be an entire day's trip. The



Changes in law are still needed to free up telehealth services under Medicare.

goal is that each tribe has a dedicated telehealth room at a local clinic.

The downside for the Wyoming Health Department is that some of the telehealth sessions take place with out-of-state specialists, which means Medicaid dollars leave the state for reimbursements. “We’re a very small state. It doesn’t take many dollars leaving to have a negative impact. Some of our critical access hospitals have closed. I’m trying to build a medical infrastructure in Wyoming and strengthen and support it, and out of the state [providers] are sucking the dollars out of the state.”

To mitigate the problem, the state is working on integrating its network with proprietary systems so that the state can



WHAT IS BROADBAND?

A broadband connection must have a download speed of least 25 megabits per second and an upload speed of three megabits per second, regardless of what technology is used to deliver it.

manage referrals better, with an eye to keeping care local whenever feasible.

Lack of Broadband Access

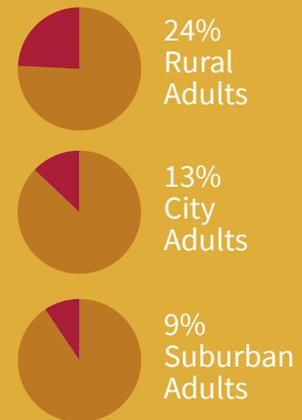
The best telehealth program is not going to work if patients and rural clinics don’t have access to broadband internet services that can support video. The Federal Communications Commission (FCC) defines broadband connection as one with a download speed of least 25 megabits per second and an upload speed of three megabits per second, regardless of what technology is used to deliver it. But in the rural West, broadband is hard to come by in many places. And good data about broadband coverage doesn’t seem to exist.

A 2018 Pew Research survey found that 24% of rural adults said access to high-speed internet is a “major problem” in their area, compared to 13% in cities and 9% in suburbs.²⁹

The FCC, which is charged with regulating telecommunications, says that the number of Americans who lack connections of at least 25 Mbps/3Mbps dropped in 2017 to from 26.1 million Americans to 21.3 million, and that most of that progress had been made in rural areas — about 4.3 million new connections were made in rural areas.³⁰

Those estimates are almost certainly too optimistic. The software firm Microsoft came up with its own estimate of broadband coverage in its home state of Washington by comparing its own data

WHICH POPULATIONS CLAIM HIGH-SPEED INTERNET IS A “MAJOR PROBLEM”?



on users who have signed up for updates to its Windows software with the FCC estimates. Microsoft estimates that 162.8 million Americans lack broadband access — more than six times the FCC estimate.

The trouble with the FCC data is that it’s overly permissive in how it calculates coverage. The FCC gets its data from Form 477 filings by internet service providers. If providers indicate on the form that they can provide broadband to one resident, the FCC considers the entire block to be broadband enabled. “This is the worst rounding error imaginable,” says Carter Boon Casady, a researcher at Stanford’s Bill Lane Center for the American West. “It’s like saying you have one, so let’s round up to 100.”

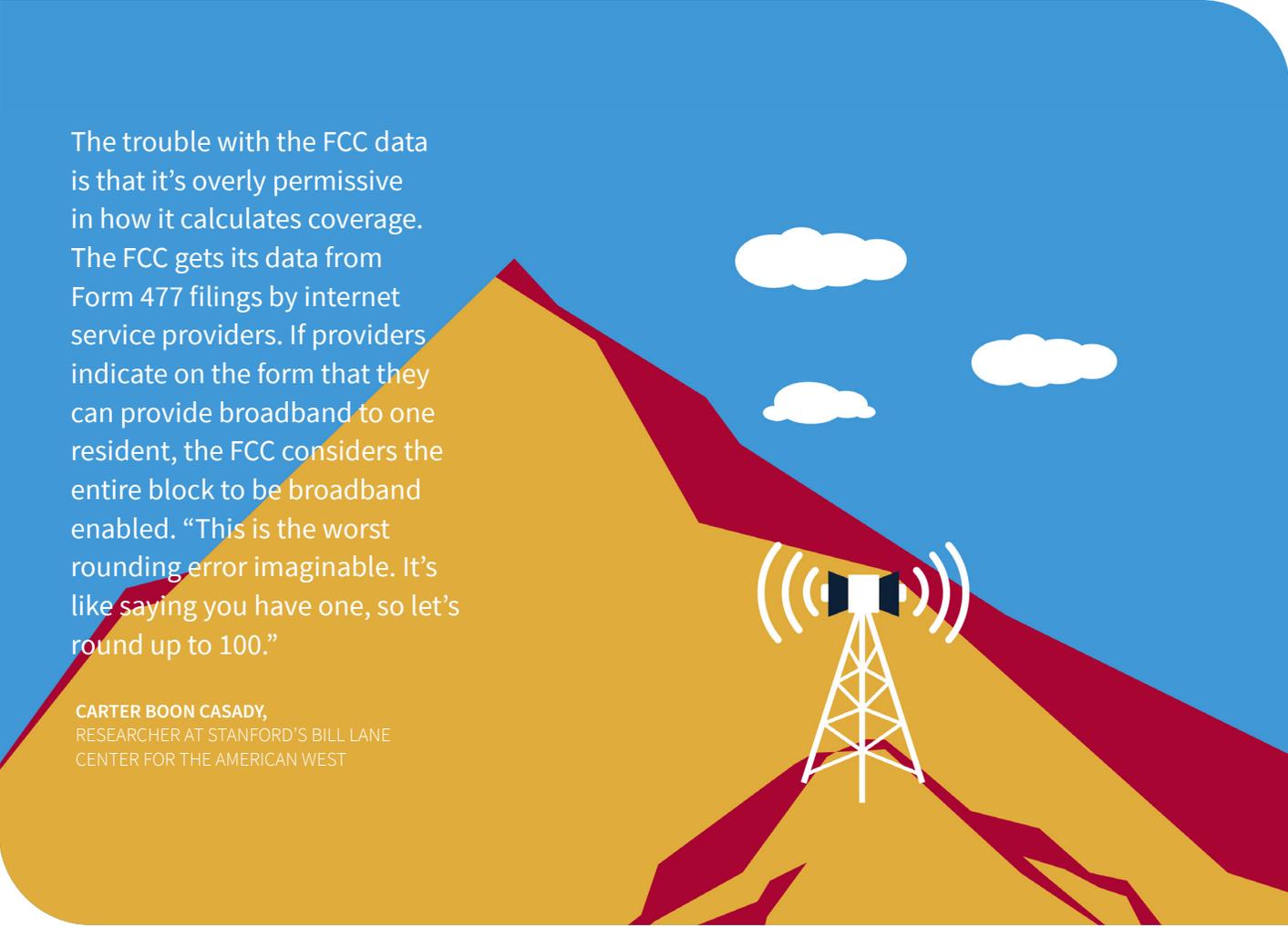
Stevens County in northeast Washington is a case in point. It is 91.5% rural,

according to census blocks, and slightly poorer than the national average. Mountains present a formidable obstacle to data transmission infrastructure to the county. According to FCC, Stevens is 100% served by broadband, with at least three providers in each census block. According to a Microsoft, however, the true figure is much lower: “When we spoke to local officials, they indicated that very few residents in this rural county had access and those that did were using broadband in business. Our data bears this out, showing that only two percent of Ferry County is using broadband,” wrote John Kahan,

Microsoft’s Chief Data Analytics Officer in a blog post.

It’s not clear how accurate the Microsoft figure is. It uses download speeds for software updates as a proxy for broadband access, which may introduce its own errors. “We haven’t figured out yet what kind of error the data might be exhibiting,” says Casady.

It’s clear, though, that lack of access to broadband is a limiting factor to the proliferation of telehealth.



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CARTER BOON CASADY,
RESEARCHER AT STANFORD’S BILL LANE
CENTER FOR THE AMERICAN WEST

The Future of Telehealth

Utah's Gladwell maintains that the past 20 years have demonstrated beyond a doubt that telehealth is effective in broadening the reach of health care and creating efficiencies. "We've been highly successful deploying telehealth into the rural Intermountain West," he said. "We've proven [it's] the model that is successful, is effective to provide high quality care. Where we need to move as an organization is to move telehealth into the mainstream of the care that we provide across our whole system. We need to aggressively provide a much better experience for people trying to access care regardless of distance, geography, or time."



"We need to aggressively provide a much better experience for people trying to access care regardless of distance."

NATHAN GLADWELL,
ADMINISTRATIVE DIRECTOR OF
TELEHEALTH FOR THE UNIVERSITY OF
UTAH HOSPITALS AND CLINICS

If a patient has a condition that's new and overwhelming, trying to figure out where to go and whom to talk to is where the system often breaks down. Telehealth could help patients at this stage by making better information on how to navigate the health care industry available at their fingertips. "That means pushing it out to people's mobile phones, engaging them on an app where they can get information," says Gladwell. "On that app you would say, 'Gosh, my stomach is hurting,' and go through an algorithm where the outcome would be a pretty precise diagnosis. We want an algorithm, guided by our physicians, that will help that patient make the best decision. Such an app would direct a patient as early as possible to the most appropriate location of care with the least amount of delay."

The movement to telehealth offers an opportunity to fix some of the problems with healthcare procedures, said Beninati. "If you look at a hospital today, you're going to see that the processes were kludged together over the years to answer all kinds of different masters. The result is something that nobody would use today if we were to sit down with a blank slate. When we launch a telehealth program, that's the time to think about how to engineer patient safety and clinical quality into the care process. That comes back to over and over again

the idea of protocolizing care as much as possible, around best practices."

Telehealth offers an opportunity to provide a flow of patient data that could serve to inform population health analysis. Assisted by machine learning and other artificial intelligence technologies, patient data could be used to better inform medical choices.

Stanford researchers used the recent wildfires in California as an example of how data can inform decisions at the level of policy. One long-term solution to the risk of wildfires has been controlled burn-offs of forests. But policymakers have been reluctant to take these measures because of the health risks of air pollution — the wildfires of 2019, after all, posed one of the biggest public health problems the West faced in years. Evaluating the tradeoffs requires data.

Fortunately, for 20 years scientists have been collecting comprehensive data on wildfires — on their impact on air quality over every census tract in the state — as well as data from health facilities on mortality and morbidity. This gives policymakers a tool for weighing their decisions.

The use of telehealth technologies could help bring such comprehensive data to bear on routine health care. Stanford

researchers are developing ways of using data from health records to inform medical decision-making in much the same way. They have developed a technology for exchanging health information from electronic health records and abstracts that overcome many of the limitations imposed by the fragmentation of the U.S. health care system. They are piloting the technology in Solano County, California. In theory, a Commissioner of Health in Solano County can have access to information on all 500,000 people that live in that county. That data can be used to design prevention programs,

improve vaccination rates and evaluate the public-health impacts of things like wildfires.

“Data from population health can and should be used to better understand and better impact the health provided to individuals,” said Lloyd Minor, dean of Stanford Medicine. “By combining prevention, prediction and treatment of individuals with a broader population-wide understanding, we believe we’re going to be able to have an impact both at that level of individual health and also the health and well-being of populations.”

An essential feature of such a program is to leverage digital technologies. Smartphones and other devices and technologies that people use in their daily lives can yield information about life events, the functioning of the body, and interactions with the environment. AI analytics can use a trove of data from devices and technologies, as well as data from genomic screening tests and other lab work, to inform treatment and prevention for individuals as well as for populations. Telehealth could provide a crucial link in that effort.



Selected recommendations from the Stanford / Bill Lane Conference that decision-makers might consider



NO. 1 Increase broadband access.

Increase broadband access

Governments, health care organizations and internet service providers must work to ensure that people living in rural areas have inexpensive access to broadband internet connections.

To compensate for the apparent abandonment of the Federal government, local communities should be encouraged to form Broadband Action Teams (BATs) that are neutral in terms of vendors, municipal and state boundaries and politics and work to expand access in rural communities. BATs could be formed from educational institutions, libraries, local politicians and tribes. They could help manage

the lack of broadband access and gather data to come up with more accurate assessments of true broadband coverage than the FCC's.

The Federal government should reconsider giving the FCC sole discretion to assess broadband penetration and perhaps form another agency that is accountable to improving access. Further, Washington must act to end the anti-competitive practices of the Internet Service Providers in rural areas, who act as monopolies. Internet service providers should take more responsibility for ensuring that residents in need have access to broadband services.



NO. 2 Establish consistent rules for reimbursement.

Establish consistent rules for reimbursement

The Federal government must smooth the way for telehealth visits to be fully reimbursable by private and government insurers, with consistent rates and practices.

Wide discrepancies between Medicare, Medicaid, private insurers and among the states on standards for eligibility for re-payment have created confusion among patients, insurers, health care organizations and government health officials. Researchers at the Bill Lane Center have documented inconsistencies in Medicaid reimbursements. For instance, programs in Alaska, Arizona, California and some other states have liberal rules for reimbursement for video visits. But other western states do not: North Dakota, Utah, Idaho have limitations, and in Washington, rural health clinics are not authorized to serve as a distant site for consultations. Only Oregon reimburses for phone and email consultations. And whereas many states reimburse for telehealth visits at the same rate as in-person visits, many states, including South Dakota, Alaska and Utah do not. The Federal government must impose

some consistency on Medicare-Medicaid programs and establish rules that mandate consistency among private insurers as well.



Leverage data

Government and the medical industry should work to better use data to inform medical and public-health decision-making, particularly in relation to the issues of rural health populations.

Medicine needs to focus more attention on the process of understanding disease and being able to predict and prevent it. Public health practitioners also need to be better at tracking the health of populations to identify the trends and the patterns that help clinicians and health care organizations deliver better care to individuals.

Health care institutions, such as academic health care centers like Stanford Medicine, are working on this problem. Stanford, for instance, is

focusing on the synergy and interaction between the health care of individuals and populations. Data from populations can and should be used to better understand the health care provided to individuals with more of a focus on prediction and prevention than has been in the case in the past. Precision health is one such area that could have a significant impact on patient health.

Medicine must leverage the devices and technologies deployed by individuals, which can give them information about life events, the functioning of the body and interactions with the environment and also allow them to share that information with others. AI machine learning analytics can also bring in vast amounts of data from devices and technologies, as well as from lab tests such as genomic screening, to inform treatments. Electronic health records must be made interoperable, so data can be shared between institutions and patients.



Promote low-tech telehealth

Regulators and insurers should recognize that low-tech measures, such as texting and phone calls, are a valid form of communication between patients and their clinicians, and work to make them a full part of health care practices.

The U.S. should take a page from Denmark, which more than a decade ago began using low-tech telehealth technology to encourage home visits. In the town of Holbaek, for instance, video and telephone communications were used to shorten the length of office visits by home health care workers and nurses and reduced unnecessary visits. The effort reduced hospital stays by 30%, freeing up resources. Many services that required the physical presence of a nurse, such as assisting wheelchair-bound patients, were able to be delegated to home health care workers with remote assistance. Patients in general reported feeling safer and better cared for. Such programs would be particularly valuable in the American West, especially in providing assisted living services in rural areas for patients living at home.

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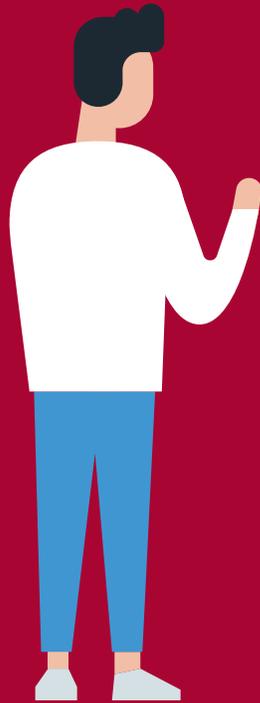
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