Healthcare From Anywhere

**Telehealth
Use & Perceptions
in Rural Michigan**

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CONNECTED NATION℠
Michigan

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KEY FINDINGS

Telehealth – A New Approach To Healthcare In Rural Michigan

Telehealth, or the use of information and telecommunications technology to support long-distance clinical healthcare, patient and professional health education, public health, and health administration,[1] has grown rapidly in the past years. This tool helps practitioners offer healthcare services to patients who would have had to travel for hours in the past; provides opportunities for subject matter experts to consult with physicians in the most remote portions of the world; and makes specialized care an option where none existed before, all while increasing efficiency for healthcare providers and patients alike.

1 The United States Health Resources and Services Administration

No longer must patients take time off from work, or find a babysitter, when doctors' appointments can be conducted via videoconference. Instead of forcing older patients into nursing homes, some of these patients can now be monitored remotely, giving them more personal freedom and allowing them to remain in their homes. Rural patients who once had to travel for hours to seek out specialized care in far-off cities can now see those same experts in a clinic mere minutes from their home. These and other benefits of telehealth are now being experienced, but questions remain about how broadly these services are being made available, particularly to older and rural patients, and how those patients view the telehealth opportunities that are now available to them.

In 2019, Connected Nation Michigan (CN Michigan) partnered with Kelley Cawthorne LLC and AARP in an effort supported by the Michigan Health Endowment Fund to seek out answers to those questions. In particular, this study focused on the following questions:

- How do state and local policies related to both healthcare provision and broadband access in Michigan affect access to telehealth services?

- How do rural Michigan residents use and perceive currently-available telehealth services, and what demand is there for expanded telehealth offerings?

- How are rural Michigan healthcare providers currently using telehealth applications?

- What barriers prevent rural Michigan healthcare providers from increased usage of telehealth applications?

- What barriers or concerns prevent rural residents from taking advantage of telehealth services currently offered?

- What steps can be taken by healthcare management networks, state or federal policymakers, internet service providers (ISPs), or technology software firms to improve the use of telehealth applications?

To answer these questions, this study undertook a three-step investigation process.

First, to understand how Michigan compares to other states, CN Michigan analyzed health outcomes and physician access rates and compared them to the progressiveness of every state's telehealth policy stances to determine how strong of a correlation existed between these measurements. CN Michigan then cross-tabulated county-level estimates of various health outcomes and the progressiveness rating of each state's telehealth policy environment.

In addition, this analysis compared these same health outcomes and the progressiveness of each state's telehealth policies with access to home broadband service to determine how significant of an impact these have on each other and where the greatest opportunities for growth in telehealth services exist.

Second, CN Michigan conducted random digit dial (RDD) telephone surveys of 2,001 adult heads of households living in five rural Michigan counties: Gladwin, Sanilac, Roscommon, Osceola, and Dickinson. These five counties were selected due to their differences and representative nature in terms of geography, employment, and the prominence of non-related healthcare provision networks in each county. These surveys took respondents approximately 12 minutes to complete and asked about telehealth usage, interest in further use of telehealth services, savings experienced from accessing healthcare services online, demand for expanded telehealth offerings, and barriers that prevent individuals from using telehealth services more often.

The third facet of this research involved convening healthcare providers in each of these five counties for extended interviews and focus groups. These meetings included a variety of representatives from different healthcare networks, including doctors, nurses, medical assistants, directors of telehealth programs, medical IT experts, outreach coordinators, and others who are all affected by, and influence, telehealth offerings in each of the five counties. Healthcare networks that participated in these focus groups ranged in their telehealth offerings from just beginning to experiment with offering these services to those with award-winning established telehealth programs. During these sessions, participants discussed how they saw telehealth opportunities impacting their communities, what benefits their patients have experienced as a result of their current telehealth offerings, how their patients have reacted to prior or current telehealth options, what efforts could best help them expand their telehealth offerings, and what challenges they have experienced with their efforts to initiate and expand telehealth offerings to their patients.

As a result of this research, CN Michigan found that while each community may face its own unique challenges to providing telehealth services, many trends and correlations may be found:

- With regard to its state telehealth policy structure, Michigan is found to have a moderate telehealth policy environment, along with 17 other states.

  1 Among the 1,374 counties in these 18 states, counties that are deemed "Care Underserved" (often rural and low-income) have an average ratio of 4,758 residents per primary care physician (PCP), the highest such ratio in the nation.

  2 These counties also have lower-than-average life expectancies and a higher average rate of preventable hospital stays than the rest of the country. All five of the Michigan counties that were surveyed fall into this category.

  3 Counties with a greater Digital Divide, or a smaller percentage of households subscribing to home broadband service such as the five Michigan counties surveyed, also have a higher average ratio of persons per PCP.

- By comparison, states with progressive state telehealth policies have lower rates on the Digital Divide Index proposed by Purdue University researcher Dr. Roberto Gallardo (DDI; this represents greater overall broadband access to more households) and fare better on both the socioeconomic and infrastructure indices that compose the DDI.

- Numerous Michigan counties have both infrastructure and socioeconomic opportunities that, if addressed, can improve broadband (and thus telehealth) opportunities for their residents.

- Across Michigan, ten counties are currently Care Underserved yet have relatively small digital divides to overcome, making them excellent targets for telehealth expansion in the near future.

- In the five counties surveyed, approximately one in three adults (34%) said they went online to interact with healthcare providers in some form. Nearly one-half (48%) said they use the internet but do not interact with providers online, while the remaining 18% said they do not use the internet at all.

- Meanwhile, nearly two out of three respondents (62%) say their healthcare providers offer an online portal, website, or mobile app where they can access their medical records, schedule appointments, or request a consultation.

- Among those who do interact with healthcare professionals online, the largest share (21%) interacted with a general practitioner or family physician, followed by those interacting with specialist physicians (15%); dentists, dental hygienists, or orthodontists (11%); convenient care facilities or walk-in clinics (9%); eye doctors, ophthalmologists, or opticians (9%); emergency rooms or hospitals (7%); and therapists, psychiatrists, or other mental health providers (5%).

- Interacting via a website is the most popular way of interacting with healthcare providers, used by 36% of those who interacted with providers online. This is followed in popularity by interacting via e-mail (34%), text messaging (17%), via mobile apps (12%), through video conference applications such as Skype (4%), and through social media (4%).

- Younger adults are most likely to use online tools to interact with healthcare providers online, with nearly one-half of respondents age 18–34 saying they do so at least occasionally.

- Among those who have not used any of these tools for communicating with their healthcare providers, more than one in five (21%) say they would use telehealth tools if their providers offered them.

- One in ten adults in these five counties have used online health services such as remote monitoring, counseling, or electronic reminders to follow their prescribed healthcare protocols within the past 12 months.

- Remote heart monitoring is the application used most often (used by 3.9% of adults in these counties), followed by electronic reminders to take medication or follow health protocols (2.3%); remote blood pressure monitoring (2.1%); remote glucose or blood sugar monitoring (1.8%); and accessing health or motivational coaching (1.5%).

- Among those who have not used any of these services, nearly one in eight (12%) say that they or a member of their household would have benefited from these telehealth tools within the previous 12 months.

- One in seven adults (14%) in these five counties believe that accessing healthcare information online prevented trips to the doctor or medical center for members of their household in the prior 12 months.

- A significant majority of those who had used telehealth services say that using those tools saved them time, were more convenient than in-person visits, the telehealth practitioners were proficient in their roles, and the quality of care was as good as an in-person visit.

- Those who had fewer trips thanks to online interactions reported saving an average of 4.8 trips per household.

- In these five counties, telehealth usage represents a savings of nearly $4.7 million per year, just for simple 15 minute visits to general practitioners.

- With studies showing that the average doctor's visit requires approximately two hours between travel, waiting rooms, and the visits themselves, this represents nearly $1 million ($985,000) in lost productivity per year, totaling a savings of $5.7 million per year in these five counties alone.

- The one area where telehealth users split was in the question of cost: Only slightly less than half of telehealth users strongly or mostly agreed that the telehealth applications saved them money. This suggests related costs and provider compensation may continue to be a barrier to patients when they seek out telehealth services, just as it is when going for in-person treatment.

- The majority of patients still prefer traditional visits with healthcare providers, as over one-half of those who had used telehealth tools (55%) said they still prefer in-person visits.

- By comparison, only 8% prefer online health applications, while 34% had no preference and 3% said it either depended on the application or were unsure of their preference.

- The top barrier to telehealth usage was a concern about the privacy of the information they share. For others, the potential cost, or the potential risk that some costs would not be covered by their insurance or payer, gave them cause for concern.

The focus groups that were held with healthcare providers in these five counties could be condensed into four key findings:

FINDING 1:
Some of the best telehealth programs in the state of Michigan are offered in its rural areas.

FINDING 2:
Rural Michigan healthcare providers are currently able to offer their patients a wide variety of benefits through their telehealth offerings.

FINDING 3:
Healthcare providers, as well as the patients they serve, like the flexibility that telehealth services provide for them and are hopeful about the growing number of services that will be available in the near future.

FINDING 4:
Healthcare service providers recognize that there are numerous barriers to expanding telehealth options in their rural communities. These barriers include a lack of funding for program expansions; a dearth of quality broadband access among rural patients and in networks between clinics and hospitals; and disparate reimbursement rates for telehealth services provided to patients covered by insurance and Medicaid.

- As a result of these analyses, CN Michigan has identified six key issues and recommends that they be addressed as soon as possible to allow more rural Michigan patients to experience the benefits and efficiencies provided by telehealth services:

ISSUE 1

Access to, and use of, home broadband (high-speed internet) service is too low, particularly in rural areas, making it less likely that residents can use telehealth services from their homes.

To address this issue, CN Michigan recommends that the state should follow through on the steps laid out in the Michigan Broadband Roadmap to improve broadband access, adoption, and use; it should support the creation and dissemination of content to educate residents about how to access and use the internet; and the state should collaborate with local leaders, educators, libraries, and other Community Anchor Institutions to identify local technology information gaps and work toward closing those gaps.

ISSUE 2

Rural Michiganders have concerns about the safety of their online information, particularly the type of sensitive data that is shared through telehealth applications.

To address this issue, the state should tap into the knowledge base of educators at Michigan colleges and universities to determine the best methods to teach the public about online data security to help them feel more comfortable with using telehealth applications; support opportunities for residents to learn more about online safety, as increased digital-skills training results in a greater sense of control over what information is shared, and with whom; and support opportunities for healthcare providers to inform the public about the steps they are taking to protect consumer information.

ISSUE 3

Telehealth services are not reimbursed or are reimbursed by Medicaid, Medicare, and several private insurers at lower rates than in-person healthcare services, creating a financial disincentive to expand the provision of telehealth offerings. This promotes less efficient use of Medicare/Medicaid dollars as more patients are directed to emergency rooms, rather than taking preventative measures beforehand.

To address this issue, Michigan should conduct a cost-benefit study to determine how much can be saved by increasing reimbursement options for telehealth services; the state should strengthen legislation to update definitions and provide stricter penalties that will ensure greater guidance and create greater deterrence to Medicaid and insurance fraud resulting from telehealth services, ensuring such activities will be reined in; adopt both coverage and reimbursement parity policies for Medicaid services; and it should adopt reimbursement parity policies for Michigan patients covered under private insurance.

ISSUE 4

Healthcare providers need additional funding to support the expansion and improvement of offered telehealth services.

To address this issue, Michigan should create opportunities where healthcare network experts can identify and benefit from state and federal grants and bring healthcare providers together to help share best practices regarding applying for and using available grants.

ISSUE 5

Telehealth technology systems are not integrative; typically health systems that want to provide telehealth services must adopt and learn how to use new tools and procedures for each telehealth application. Often, those applications do not mesh with the telehealth tools being used at other health networks, reducing the ability to share information.

To address this issue, we should encourage institutions of higher learning to create better telehealth software and hardware that can be integrated with a variety of health systems; intentionally work to make Michigan's public universities a hub for medical technology engineering and programming through post-doctorate educational offerings, hiring decisions, and state funding; and encourage private-sector engineering and software design firms to focus on this issue through tax abatements, funding, and promotion to national and international markets via the Pure Michigan Business Connect initiative.

ISSUE 6

Support for telehealth services in Michigan is scattershot, relying on a handful of national organizations and constant monitoring of a variety of sources to stay up to date.

To address this issue, Michigan should designate an office, individual, or neutral non-profit entity that will provide information about telehealth resources to healthcare networks and patients; we should also support and fund research to determine the economic and sociological impact of using telehealth applications in the state as well as best practices in telehealth service provision.

LITERATURE REVIEW

Telehealth encompasses the use of technology to provide access to medical assistance, supervision, health education, and training to overcome geographical barriers. The concept of telehealth and its use has been around since 19th century. Lancet journals from 1879 give an account on the use of telephone for medical consultation to reduce unnecessary visits to doctor's offices (Nesbitt et al.). Through advances in telecommunications, telehealth usage by the mid-20th century had evolved to include radio transmissions to consultation centers in Europe and telephonic transmission of radiographic images between cities in Pennsylvania (Mahar et al; Committee on Evaluating Clinical Applications of Telemedicine).

The term "telemedicine," a subset of the realm of "telehealth," was coined in the 1970s to define the concept and practice of "healing at distance," thus highlighting the significance of telecommunication technologies in improving patient access to medical care and information. The World Health Organization has broadly described telemedicine as "the delivery of healthcare services, where distance is a critical factor, by all healthcare professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of healthcare providers, all in the interests of advancing the health of individuals and their communities (World Health Organization)." Meanwhile, telehealth encompasses a wider array of healthcare services to remote areas beyond an in-person doctor-patient relationship. The term telehealth includes support services provided by advanced practice providers and social workers that help further patient and community health education, social support, and resolving health concerns of patients and their caregivers (FCC).

Based on the delivery and exchange of medical service and information, telehealth can be divided into synchronous, asynchronous, and remote monitoring services (Mechanic and Kimball). Synchronous delivery involves the real-time conveyance of health information and medical expertise by the provider to the patient and allows for live discussion, just like a face-to-face visit. On the other hand, asynchronous modalities refer to "store-and-forward" services through which patient medical records, images, and clinical reports are first collected and then transmitted electronically to the healthcare provider (not located in the same area as the patient) for consultation and expert advice. "Remote monitoring" includes direct video surveillance or remote data collection and sharing for patients who require constant tracking of vital signs, health criteria, or other measurable factors.

Synchronous services are popular in emergency cases where a patient may not have close proximity to a certified health center for a required procedure, as it allows a non-certified health center to see the patient and be directed via live video monitoring from the experts in a certified center (Mechanic and Kimball; Pennic). Asynchronous transmission is useful in a scenario where a patient has no immediate way to be directly checked by a healthcare provider, let alone a specialist (Mechanic and Kimball; Pennic). In this fashion, relevant images, audio, or recordings of the affected body area are relayed to the healthcare professionals for interpretation remotely without requiring presence of the patient. Remote monitoring, as mentioned above, is best utilized in monitoring chronic diseases like diabetes or post-hospital rehabilitation (Mechanic and Kimball; Pennic). A new form of telemedicine model has emerged in the last decade with the ever-expanding presence and use of cell phones (and smartphones). This new model, often referred to as "mobile health" or mHealth, provides supportive care by promoting healthy behavior through alerts and reminders for medication adherence, vital sign recording, or by sending daily tips on healthy dietary and lifestyle choices (Pennic).

Technology and infrastructure advancements in telecommunications, initiatives taken by governments to reduce medical expenses, the escalating number of chronic diseases due to the rise of an aging population, and many other factors have resulted in a projected expansion of the global telehealth market at a Compound Annual Growth Rate (CAGR) of 14.77% to 17.7% through 2026 (Wood; Market Research and Statistics; Combi et al.). The global telehealth market in 2017 alone accounted for $21.56 billion in revenue and, if continued in the projected CAGR range, then by 2026 is expected to surpass $93.45 billion (Wilson; Hedge). North America has the biggest market size for telehealth, followed by Asia-Pacific and Europe (Wilson; Hedge). According to a market research analysis report, the U.S. telehealth market is expected to grow at 27% CAGR, reaching $13 billion in revenue by 2023 (Wood).

At present, neurology (with a 39.8% market share) is the biggest market segment for global telehealth (Global Market Insights). In coming years, home care as a telehealth segment is expected to see the biggest growth on a global level (Lineaweaver). It is projected to grow at a CAGR of 18.21% in comparison to telehealth services offered at clinics and hospitals by 2021 (Market Research and Statistics). A similar upward trend in the home healthcare market is indicated in the U.S. with projected expansion from $103 billion in 2018 to $173 billion by 2026, a 7% CAGR (Lineaweaver). Increasing focus on disease prevention, awareness, promotion of wellness, and continued monitoring for better disease management have all caused mHealth to become the frontrunner for the U.S. telehealth market amongst all segments.

Applications and benefits of telehealth

In developed nations, the number of chronic disease cases far eclipses communicable diseases, whereas it is the opposite in developing countries. This results in more physicians focusing on disease management in developed nations and, therefore, different telehealth applications being used more often than in developing countries. Disease management, more prevalent in developed countries, involves asynchronous, remote-monitoring, and mHealth delivery modes.

Common asynchronous telehealth services include teleradiology, teledermatology, teleophthalmology, teleneurology, and telepsychiatry. Other services include telepediatrics, telecardiology, tele-infectious disease, telepathology, telepulmonology, telerheumatology, and telenursing. With rapid progress in technology, all these services are now also available for "live" consultations or synchronous information exchange.

In the United States, acute and chronic wound care management post-hospital discharge is an emerging area for "store-and forward" telehealth models (Shelton and Reimer). An estimated 6.5 million patients need wound care management, for which approximately $25 billion is spent annually (Shelton and Reimer). To reduce healthcare costs and still provide effective care post-surgery and post-hospital discharge, telehealth is being adopted. According to an evidence-based research study conducted by the American College of Surgeons National Surgical Quality Improvement Project, 42% of patients contracted surgical site infections (SSIs) post-discharge (Shelton and Reimer).

Wound care management using telehealth technologies to assist in daily patient surveillance and care post-surgery has helped in effective management of SSI complications. Teledermatology has also been a popular area for the adoption of asynchronous telemedicine worldwide. Australia has had a 24-hour national online teledermatology consultation and educational service named TeleDerm for more than a decade (ACRRM).

Synchronous telehealth services have been in high demand for intensive care and emergency medicine. A scenario becoming increasingly popular for ICU telehealth utilizes outsourcing of intensivists to a major ICU center, which is then connected to several smaller client ICU centers. Such "eICU" centers are now present across the United States (Wilson and Maeder). A recent review of 25 studies indicated reduced patient mortality and lower burn-out amongst these ICU staff and, thus, high effectiveness of eICU systems (Wilson and Maeder).

The motivation for telehealth adoption in developing countries arises from the need to make basic healthcare more readily accessible to a wider population. Unlike developed nations, where telehealth has been used alongside conventional medical care to reduce medical costs, in developing countries it is the only alternative. Due to factors like a dearth of healthcare workers, funding, and infrastructure, the adoption of telehealth tools has become imminent in such countries. As a pertinent example, the African continent, home to 14% of the world's population, has a global disease burden of 24% but is served by only 3% of the world's healthcare workers who get access to meager 1% of world health expenditure (Scot and Mars). Efforts are therefore required to develop, expand, and integrate telehealth for minimizing the distance between less advanced or rural areas and specialized centers located in bigger cities or in developed countries.

Remote areas and rural communities in developed countries also face a lack of high quality healthcare. While 20% of the U.S. population lives in rural areas, only 9% of physicians serve that population (May). Long traveling distances to healthcare facilities, poor socioeconomic conditions resulting in a greater number of uninsured citizens, and low rates of higher education are some of the variables causing disparities in medical care in rural vs. urban populations. For example, in a retrospective study conducted in rural Michigan, stage I and II Breast Cancer patients were less likely to get radiation therapy due to greater distance from such facilities (Meden et al.). Therefore, diffusion of telehealth services to deeper or poorly accessible rural areas of the country has become one of the major goals of healthcare in the 21st century.
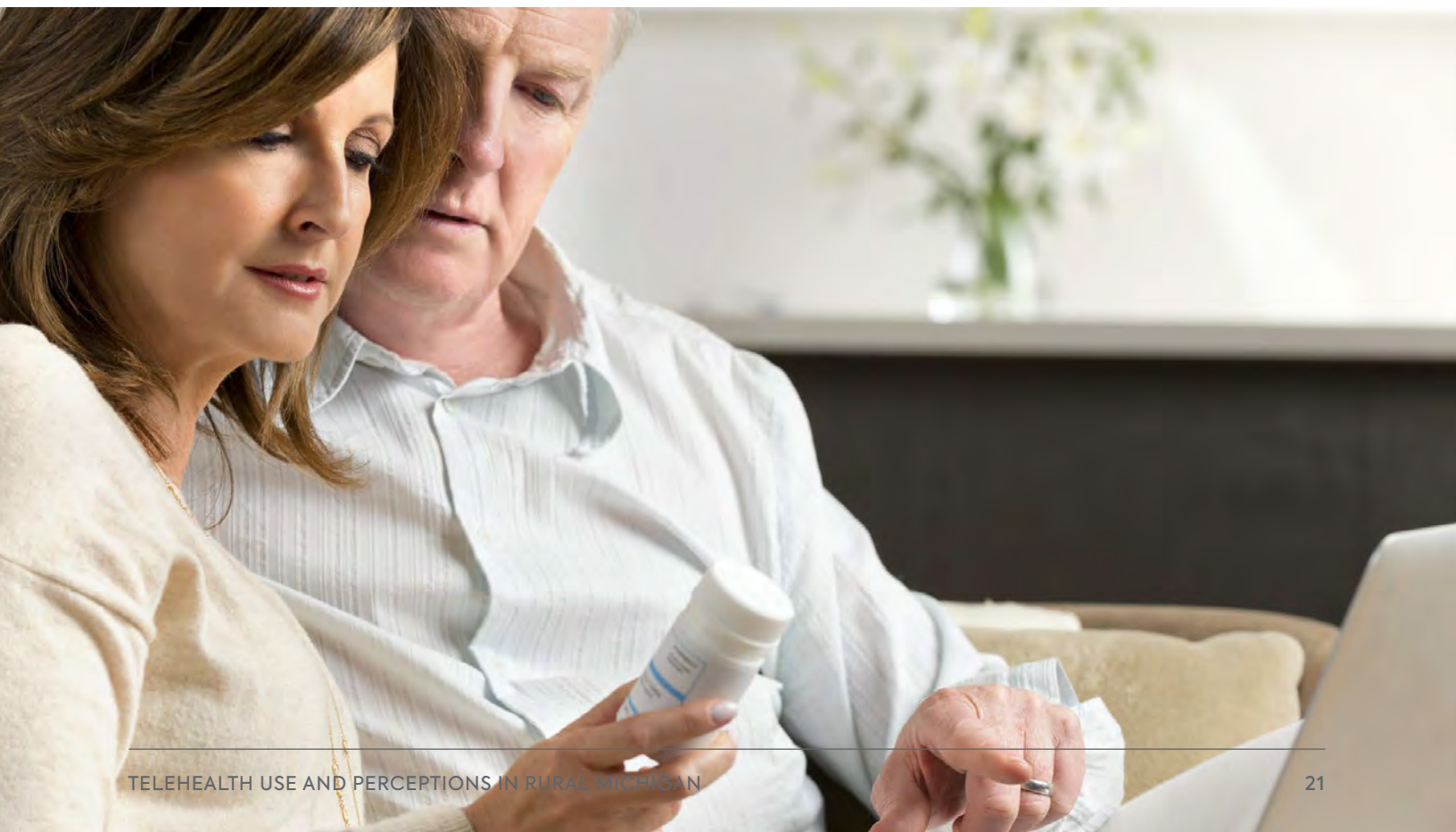
Other areas where telehealth has contributed include disaster relief, school-based health centers, industrial health, and clinical trials (AMD). The method of clinical trials that is used to test and approve new medical interventions is generally very time-consuming and expensive. To streamline this process and make it more cost- and time-efficient, telehealth technologies are being introduced. Benefits of remote patient monitoring and mHealth devices are being leveraged to conduct virtual clinical trials (Blake; Miller; Care Innovations). One source of major delays and increased costs in clinical trials occurs due to low patient enrollment. Remote patient monitoring helps overcome this issue. Additionally, it provides an opportunity for the rural patients to participate in clinical trials.

One NIH-funded pilot study to streamline the clinical trial process conducted by Nemours Children's Health System tested the use of a step-by-step video to obtain informed consent, schedule telehealth appointments, keep online symptom diaries, and electronically transfer compensation for trials (Blake). The short video was designed to engage and help participants of all levels of literacy and health awareness in comprehending information about the trial. Patients and caregivers in the group that learned about the trial by watching the video understood better and retained more information about the trial compared to the group that had consented conventionally after reading through the print material.

In another instance, remote monitoring and videoconferencing helped a stage IV Non-Small Cell Lung Cancer patient from rural California to have multidisciplinary tumor consultations, therapy and participation in relevant clinical trial (Clark et al.). Artificial Intelligence, another new branch of growing telehealth technologies, is currently being used to reduce costs linked to finding eligible volunteers for clinical trials (Care Innovations).

The future of telehealth

One prominent trend in telehealth is mHealth or mobile health. This includes healthcare and medical practices that utilize mobile devices, such as cell phones, patient monitoring devices, and other similar devices. The growing popularity of mHealth can be attributed to its cost efficiency and the massive outreach achieved using cell phones, which can be realized by the fact that in 2015, nearly 97% of the world subscribed to cellular services (Iribarren et al.). Other benefits of mHealth include enhancing patient knowledge about a disease, improving patient-doctor interaction or communication, coordination between multidisciplinary teams, and giving social support to patients suffering from "stigmatized" diseases.

The majority of the mHealth services currently offered are focused on behavioral change communication, or BCC, which comprises sending text or call reminders for clinical appointments and medication adherence (for example, MediSafe), apps that train patients in self-care (for example, ChronicCareIQ) or promote health awareness and positive lifestyle changes, and many more (Iribarren et al.; Adoriasoft). The global mHealth medical apps market is anticipated to reach $102.43 billion in revenues by 2022, with the largest share coming from the United States (Adoriasoft). Two areas where mHealth interventions are showing promising results in the U.S. are mental health and chronic disease management, especially for rural residents. Nearly one-quarter of the 60 million people living in rural America are affected with psychiatric illness(es), which is equivalent to their urban and suburban counterparts, but do not have similar access to proper healthcare provisions like the latter (Bunnell et al.). With increasing penetration of cellular network and internet access, mHealth has become an attractive method to deliver medical and healthcare interventions to rural Americans.

As the world gets smaller through internet connectivity, the scope of telehealth expands further toward virtual medical centers and peer-sharing at national and international levels. Combining digital and telecommunication platforms has helped big medical centers to decentralize and spread their specialists' network to tertiary care and rural health centers. Many pilot studies are being conducted to this effect - Mercy Hospital System in Missouri is currently testing a new virtual care center to serve a four-state area. Meanwhile, in northern Virginia, Inova Health Systems has started a project where telehealth facilities allow a team of intensivists to provide medical service to 122 ICU beds located throughout the state (eVisit).

Barriers to telehealth adoption and distribution

By 2016, approximately 60% of U.S. health institutions and 40–50% of U.S. hospitals reported using telehealth applications (Mahar et al.). However, to make telehealth a mainstream approach instead of just being an ad-hoc addition to medical techniques, a lot of roadblocks need to be overcome.
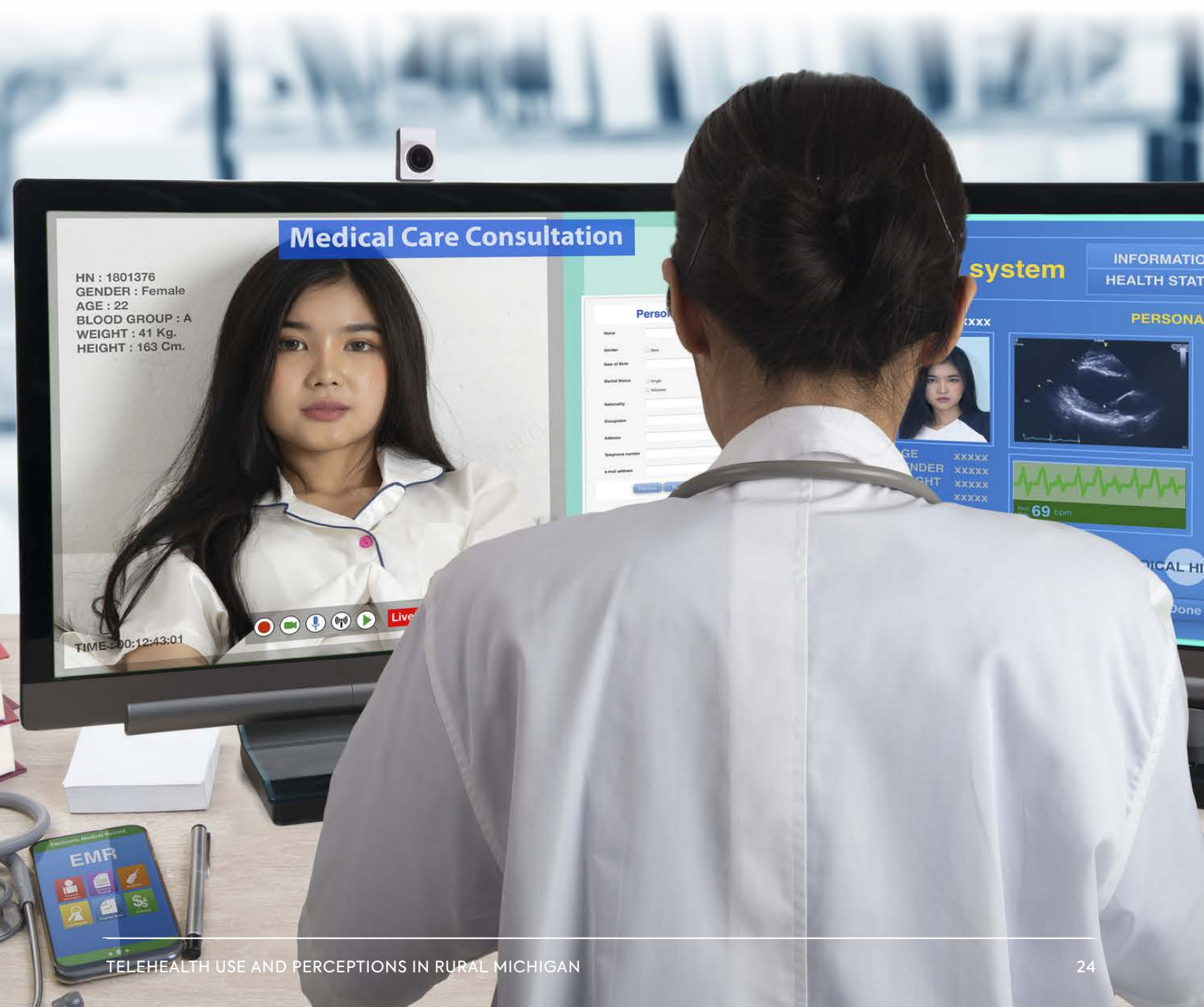
Barriers to telehealth adoption and distribution

Broadband access needs to be ubiquitous for widespread adoption of telehealth. In 2013, the diffusion of broadband in the United States was recorded at a rate of 26.4 connections per 100 inhabitants, resulting in the country being ranked 15th by the Organization for Economic Cooperation and Development (OECD) (FCC). By 2019, more than one in four households (27%), particularly in rural portions of the country, did not subscribe to home broadband service (Pew Research Center). To increase broadband connectivity, and thus penetration of telehealth into mainstream medical practice nationwide, additional funding must be dedicated to promoting broadband access and adoption. According to the 2018 one-year estimate from the United States Census Bureau's American Community Survey, more than three in ten American households (30.4%) do not subscribe to broadband.

According to the National Broadband Plan (NBP) crafted by the Federal Communications Commission (FCC), a $23.5 billion investment would be needed to extend broadband to all unserved areas in the country (nearly 7 million homes at the time) (LeRouge and Garfield).

Key recommendations included:

- Focusing on only one network in each unserved geographic area to judiciously utilize public funds.

- Careful selection of disbursement mechanisms for distribution of broadband support funds as it will affect size of the Investment Gap needed to bridge households..

- Selecting and focusing on terrestrial solutions to gain broadband access instead of satellite-based internet services. Although satellite-based services have clear advantages to provide access in remote areas, it may not cover all the houses in the unserved areas with sufficient speeds and reliability.

- Supporting and selecting any broadband technology that provides service to the majority of the unserved area and meets the NBP service criteria but is not necessarily a market winner.

- Building a sustainable network that provides immediate network access. Investing in a future-proof infrastructure can cost a lot more than paying over time for system upgrades.

The FCC's National Broadband Map shows that there are still many rural portions of the country, particularly in Michigan, that do not have access to any providers offering broadband service at speeds of 25 Mbps downstream and 3 Mbps upstream (the current definition of broadband used by the FCC) (Figure 1).

Figure 1.
Fixed Broadband Providers in Each County
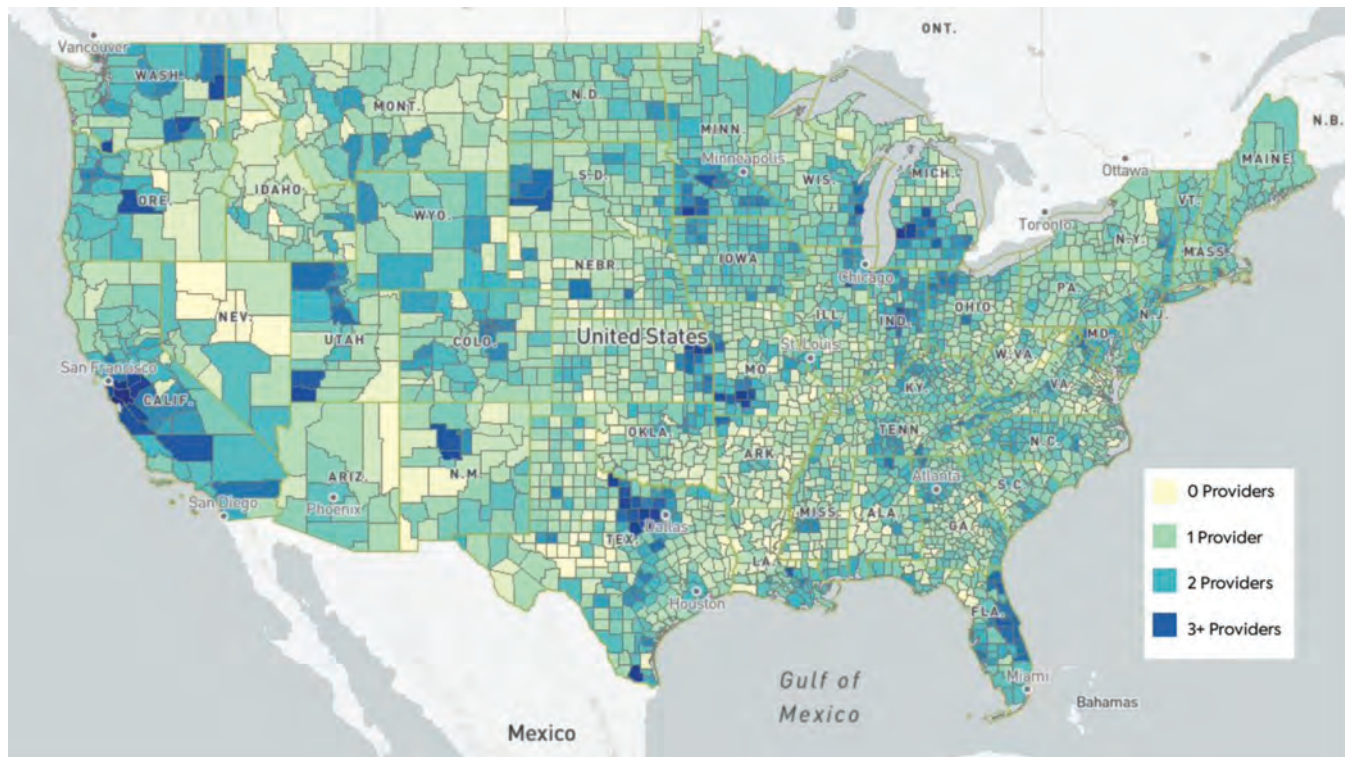
While some urban or suburban Michigan counties have multiple broadband competitors offering high-speed internet, most of the rural counties do not have any (or providers face no competition).

This map illustrates the effect of household density and available infrastructure on broadband competition and access. Based on these maps, Michigan counties with the greatest Investment Gap are found in the Upper Peninsula, with an average gap per housing unit in each county being nearly $2,500 (NBP). One of the major factors contributing to the large gap in the Upper Peninsula is the low population density (typically 1–5 housing units per mile).

As of 2018, the most recent data available from the FCC and Connect Michigan, approximately 300,000 households in the state (nearly 8% of all Michigan households) do not have access to internet service at speeds that the FCC designates as broadband. Among rural portions of the state, the share of households that are not served by fixed broadband service nearly doubles to 13%. So despite the growth in broadband availability since the inception of the National Broadband Plan, many rural households still are not being served.

Safety of personal medical data

Patient health information is always at risk of being misused. With telehealth and other decentralized modes of connected healthcare gaining in popularity, patient data privacy and security has become an extremely relevant consideration.

Various standards have been created by the International Standards Organization (ISO) for protection and management of health information, like ISO/IEC 2382-8:1998 & ISO/IEC 27000:2009 that allow access to patient health information only to authorized persons who can ensure management and maintenance of information security up to those standards (LeRouge and Garfield; Kuziemsky). Protocols in ISO 27799 delineate privacy guidelines for governing health information exchanges through its entire life cycle, from creation to destruction. Copious amounts of data generation, faster speeds, and newer data sharing and storage technologies, however, have posed more security and compliance issues. For example, storing and obtaining data has become easier with cloud systems and has posed major risk for data being stolen and misused. In addition to ISO standards, each country can have its own additional information safety regulations. In the United States, the Health Insurance Portability and Accountability Act, or HIPAA, helps in ensuring that all healthcare information available to insurance companies and providers is well-protected by means of using encryption, though it does not extend to patients (Hale and Kvedar).

Patient data sharing can be segregated into three patterns of information exchange (Kuziemsky et al.). Pattern 1 involves a patient viewing his/her health information through an online portal or app. Pattern 2 consists of the exchange of information between the patient and provider. Pattern 3 is an extension of Pattern 2 and includes patient-provider interchange of information, but at many contact points like electronic health records (EHR), smartphone apps, and patient monitoring devices. Many telehealth applications operate with different combinations of these data exchange patterns and hence, each requires different regulations for data protection. As an example, direct telehealth applications use all three patterns for information exchanges and thus pose a risk of direct data transmission to unwanted locations.

Therefore, measures that ensure controlled access, having information creation only as needed, and early destruction may prevent misuse of data. Telehealth applications like EHR (asynchronous mode) utilize Patterns 1 and 2 only, and could be better protected by finding more secure ways of storing and archiving the large amounts of data. The Federal Trade Commission (FTC) creates and enforces all telehealth privacy and security regulations. Nonetheless, a comprehensive solution to prevent data breach is necessary, including patient education and awareness about data handling.

Federal and state government policies and insurance laws

Healthcare providers at all levels of service acquire licenses to practice in one state across all the 50 states in the United States. With telehealth diminishing geographical boundaries to provide patients the best of all healthcare facilities, the portability of provider licenses to practice still remains a hurdle to overcome for expansion of telehealth.

Reimbursement is another major regulatory component that remains to be addressed for allowing better adoptability of telehealth interventions. Forty-two states and the District of Columbia have parity laws for telehealth-related reimbursements from private insurance companies, but they vary in how they require telehealth treatments to be covered by private insurers and many still require provisions to encompass all current and upcoming telehealth technologies (Lactman et al.; Center for Connected Health Policy). Advancements in this area have also been made as the Center for Medicare and Medicaid services (CMS) has introduced policies for relevant reimbursement to be included in Medicaid and Medicare with the intent of extending telehealth coverage (Kuziemsky et al.).

Since 2013, Medicare pays for telehealth as Medicare Part B services, which includes patient health education, consultations, and some mental health services conducted via real-time videoconferencing. Medicaid also no longer recognizes telehealth as a distinct service and has created Healthcare Common Procedure Coding System (HCPCS) codes for states that choose to cover such services under Medicaid (Kuziemsky et al.). Where eligible, reimbursement rates are the same for telehealth and conventional medical services in Michigan (eVisit) but oftentimes these rates differ due to Medicaid-defined ineligibility.

Educating rural patients and training healthcare providers

For effective expansion and diffusion of telehealth services to rural areas, another critical factor is education and training of rural healthcare staff in adapting to and incorporating telehealth technologies into their practice (Doorenbos et al.). This can be provided as part of Continuing Medical Education via larger urban hospitals that have succeeded in or are currently undergoing similar training for their staff.

Due to a number of socioeconomic factors, rural residents are not always aware of the potential benefits of internet use and are thereby less motivated to adapt to telehealth practices like mHealth (Horrigan). This is also a contributing factor toward lower broadband adoption. Therefore, it is essential to address telehealth literacy amongst rural residents to successfully establish telehealth as a mainstream medical practice.

Conclusion

Rural households face a number of barriers that currently prevent them from connecting to telehealth services. From a lack of broadband availability to concerns about the quality and safety of the service, the literature shows that rural residents face an uphill battle to receive quality telehealth care, despite the numerous potential benefits that such telehealth services can offer them. To bridge this gap, it is important to understand how telehealth can be used, how it is currently in use, and what can be done to overcome these obstacles.

TELEHEALTH POLICY ECOSYSTEMS

Telehealth applications offer an opportunity to provide quality healthcare access to patients who otherwise do not have or have limited physical access to a primary care physician (PCP).

While telehealth implementation decisions are largely made at the discretion of individual healthcare providers and systems, state policies can greatly impact the ability of healthcare providers to implement various applications. A 2018 scan of state telehealth policies categorized the progressiveness of every state's telehealth policy environment. The scan covered six policies including:

1. Practice Standards and Licensure

2. Medicaid Coverage and Reimbursement

3. Medicaid Eligible Patient Settings

4. Medicaid Eligible Provider Types

5. Medicaid Eligible Technologies

6. Medicaid Service Limitations

Following the results of the scan, each state was provided an overall grade of Progressive, Moderate, or Restrictive in their overall telehealth policy ecosystem.

State Telehealth Policy Environments

Restrictive	Moderate	Progressive
Arkansas	Alabama	Alaska
Georgia	Delaware	Arizona
Maryland	Illinois	California
Massachusetts	Indiana	Colorado
New Hampshire	Iowa	Connecticut
North Carolina	Kansas	Florida
North Dakota	Kentucky	Hawaii
Ohio	Louisiana	Idaho
Pennsylvania	**Michigan**	Maine
Rhode Island	Mississippi	Minnesota
South Carolina	Oklahoma	Missouri
Texas	Oregon	Montana
	South Dakota	Nebraska
	Tennessee	Nevada
	Virginia	New Jersey
	West Virginia	New Mexico
	Wisconsin	New York
	Wyoming	Utah
		Vermont
		Washington

Source: State Telehealth Laws and Medicaid Policies

Pairing state telehealth policy environments with information from the County Health Rankings program (a program of the Robert Wood Johnson Foundation) allows for a county-level examination of health outcomes and access to PCPs through the lens of telehealth policy.

Primary Care Access

Access to healthcare requires not only financial coverage, but also access to providers. While high rates of specialist physicians have been shown to be associated with higher (and perhaps unnecessary) utilization, sufficient availability of primary care physicians is essential for preventive and primary care and, when needed, referrals to appropriate specialty care.

In 2010, the average county in the United States had 94 primary care physicians (PCPs). This equates to an average of approximately 2,547 persons per PCP for each county in the United States. By 2019, the average county had fewer PCPs at 84; however, the overall average persons-per-PCP ratio stayed relatively unchanged (2,523:1). The maintenance of the persons-per-PCP ratio and drop in average number of PCPs per county points to an increasing disparity in the dispersion of PCPs across the country.

Using a persons-per-PCP ratio of 2,500:1 as a break point, counties with a ratio greater than 2,500:1 can be considered as Care Underserved Counties (CUCs), while those with a ratio less than 2,500:1 can be considered as Care Served Counties (CSCs) for the purposes of this study. There are 3,141 counties or county-equivalents in the United States (less the District of Columbia), of which 32.8% are considered Care Underserved Counties using this definition.

Care Underserved Counties (CUCs) tend to be more rural in nature. The United States Census delineates each Census Tract (the third most granular Census division) as rural or non-rural. Counties with more densely populated small towns or those on the edges of metropolitan or suburban areas have a mix of rural and non-rural residents. On average, approximately three-quarters of residents in CUCs are considered rural. Conversely, approximately half of residents in CSCs are considered rural. So while the definition of Care Served and Care Underserved Counties are not wholly synonymous with non-rural and rural, respectively, CUCs are generally much more rural than those with greater access to PCPs.

Since 2010, access to primary care physicians has increased for CSCs, but decreased for more rural CUCs. The table below shows the persons-per-PCP rate for Care Served and Care Underserved Counties from 2010-2019 by state telehealth policy environment.

Table 1.
Ratio of Persons per Primary Care Physician for Care Served and Care Underserved Counties by State Telehealth Policy Environment

State Telehealth Policy Environment	Total Counties	Care Served Counties Average Persons per PCP		Care Underserved Counties Average Persons per PCP	
		2010	2019	2010	2019
Restrictive	895	1,612:1	1,444:1	3,695:1	4,745:1
Moderate	1,374	1,890:1	1,502:1	3,853:1	4,758:1
Progressive	872	1,517:1	1,308:1	3,840:1	4,606:1
Nationwide	3,141	1,696:1	1,425:1	3,801:1	4,723:1

Source: 2010 and 2019 County Health Rankings Database

Across all CSCs, the persons-per-PCP ratio dropped an average of 16%, while in CUCs, the rate of access to PCPs increased 24.3%. While a pattern is not readily apparent for CSCs related to their state's telehealth policy environment, a clear pattern emerges for CUCs. CUCs in telehealth restrictive states saw an increase of more than 28% in the ratio of persons per PCP, while those in more telehealth moderate states saw an increase of 23.5%. CUCs in states with progressive telehealth policies saw the lowest increase in the persons-to-PCP ratio of 19.9%. This indicates that access to telehealth applications is growing increasingly critical in states that restrict its usability.

Health Outcomes and State Policies

The distribution of CUCs among the three gradations of state telehealth policy is roughly equal, with 35.8% located in states with restrictive telehealth policies, 36.6% in moderate policy states, and 24% in states with progressive telehealth policies. The following provides an examination of health outcomes in Care Served Counties (CSCs) and Care Underserved Counties (CUCs) as they relate to states' telehealth policy ecosystems.

Table 2.
Health Outcomes for Care Served and Care Underserved Communities by State Telehealth Policy Environment

State Telehealth Policy Environment	Average Percent of Population in Fair/Poor Health		Average Life Expectancy		Average Number of Preventable Hospital Stays	
	CSC	CUC	CSC	CUC	CSC	CUC
Restrictive	17.8%	19.8%	77.5	76.3	4,897	5,322
Moderate	17.2%	18.9%	77.1	76.2	4,914	5,557
Progressive	15.3%	17.7%	79.4	77.9	3,940	4,479
Nationwide	16.8%	18.9%	77.9	76.6	4,610	5,267

Source: 2019 County Health Rankings Database

Health Assessments

The County Health Rankings (CHR) data estimates the percent of residents in each county who consider themselves to be in fair or poor health through a self-reported assessment that is adjusted for age. The CHR uses this data as part of a general measurement of health-related quality of life. As shown in Table 2, the average percent of residents that report being in fair/poor health across CSCs is 16.8%, while 18.9% of residents in CUCs report being in the same condition. Comparing CSCs to CUCs across the three grades of state telehealth policy environments finds the same low/high pattern, respectively. However, the data becomes more interesting when examining the percent of residents in fair/poor health in CUCs.

In states with restrictive telehealth policy environments, nearly one-fifth (19.8%) of residents report being in fair/poor health in the average CUC. This rate decreases as state telehealth policies become more progressive. Moderate telehealth states show that the average CUC has 18.9% of residents reporting that they are in fair/poor health, while 17.7% report the same condition in states with progressive telehealth policy environments.

Life Expectancy

Life expectancy is a common and important population health outcome measure. The County Health Rankings life expectancy data measures the average number of years from birth a person can expect to live according to the current mortality experience of the population.

As shown in Table 2, nationally, CSCs have a higher life expectancy than CUCs at 77.9 and 76.6 years, respectively. This pattern continues when comparing CSCs to CUCs within the three gradations of state telehealth policy environments. However, just like with the percent of residents in fair/poor health, CUCs located within more progressive state telehealth ecosystems have an average life expectancy that is greater than those in more telehealth restrictive states.

Preventable Hospital Stays

Preventable hospital stays measures the number of hospital stays for ambulatory care sensitive conditions per 100,000 Medicare enrollees. Hospitalization for ambulatory care sensitive conditions, which are diagnoses treatable in outpatient settings, suggests that the quality of care provided in the outpatient setting was less than ideal. This measure may also represent a tendency to overuse hospitals as a main source of care.

Preventable hospital stays could be classified as both a quality and access measure, as some literature describes hospitalization rates for ambulatory care sensitive conditions primarily as a proxy for access to primary healthcare. Similar to patterns found in the other two metrics of Table 2, CSCs have lower rates of preventable hospital stays than CUCs. Again, however, examining number of the preventable hospital stays within CUCs across the three gradations of state telehealth policy environments finds that CUCs in more progressive states have a lower average number than those in more restrictive policy states.

While a definitive causal relationship cannot be determined, as there are many factors that can contribute to the health outcomes and PCP access for county residents, the patterns presented above show that a relationship exists between state telehealth policy and health outcomes in communities that are underserved by primary care physicians. Telehealth applications provide an opportunity to access primary and preventative care with an internet-enabled device, and this opportunity becomes more critical for communities underserved by primary care physicians. State telehealth policies, however, are not the only barrier to implementing telehealth applications

Telehealth and the Digital Divide

The implementation of telehealth applications is reliant on the prevalence of internet connectivity and its subsequent adoption and use by patients and healthcare practitioners. Without broadband, doctors cannot videoconference with patients, prescriptions can't be transferred in real time, and medical records and large related files cannot be transferred from PCPs to specialists and vice-versa.

Digital Divide Index

Purdue University's Center for Regional Development developed and released the Digital Divide Index (DDI). The DDI is a tool to identify counties in the United States that are struggling with the access, adoption, and use of broadband.

The DDI is comprised of two scores:
1) Infrastructure/Adoption and 2) Socioeconomic.

The Infrastructure/Adoption score groups five variables related to broadband infrastructure and adoption:

01   Percent of the total population without access to fixed broadband of at least 25/3 Mbps

02   Percent of homes without a computing device (desktop, laptop, smartphone, tablet, etc.)

03   Percent of homes with no internet access (have no internet subscription)

04   Median maximum advertised download speed

05   Median maximum advertised upload speed.

The five related indices provide a benchmark for comparing technology and connectivity access from one county to another.

The Socioeconomic score groups four variables together that are known to impact technology adoption:

01   Percent of the population ages 65 and over

02   Percent of the population 25 and over with less than a high school education

03   Individual poverty rate

04   Percent of noninstitutionalized civilian population with a disability.

These variables indirectly measure broadband adoption since they are potential predictors of lower technology adoption.

Access to broadband connectivity and the ability to adopt and use technology are critical for the successful implementation of any telehealth application or initiative. The Digital Divide Index allows the continued comparison of PCP access and health outcomes in rural and non-rural areas and within the various state telehealth policy environments.

Primary Care Access and the Digital Divide

On a scale of zero to 100 (with 100 indicating a large Digital Divide and zero indicating no Digital Divide) across the country, the median county Digital Divide Index (DDI) score is 36.7. Similar to the ratio of persons per PCP discussed earlier, DDI scores are highly correlated with rural counties; higher DDI scores are most likely to be found in rural counties. Unsurprisingly, counties with a higher Digital Divide have a higher ratio of persons per primary care physician, and this ratio rose between 2010 and 2019. Table 3 below shows the average persons-per-PCP ratio for counties with DDI scores above and below the national median for 2010 and 2019.

Table 3. Persons per PCP Ratio by Digital Divide Index Score		
Digital Divide Index	**2010 Average Persons-Per-PCP Ratio**	**2019 Average Persons-Per-PCP Ratio**
DDI 37 or Higher	2,869:1	3,055:1
DDI Lower than 37	1,944:1	1,989:1

Source: 2019 County Health Rankings Database, Purdue Center for Regional Development

As shown, the persons-per-PCP ratio is higher in counties with a higher (worse) DDI score in both 2010 and 2019. The persons-per-PCP ratio for counties with a DDI of 37 or more rose 6.5% between 2010 and 2019, while the ratio rose only 2% during the same period for counties with a smaller Digital Divide. This indicates that counties with a high DDI score tend to be CUCs. Again, this is not surprising given the more rural nature of high DDI counties. On average, 79% of residents in counties with DDI scores of 37 or higher are considered rural, compared to 49% in counties with lower DDI scores. Not only do more rural counties, therefore, struggle with physical access to primary care physicians, they also struggle to achieve the broadband connectivity needed to provide them with telehealth opportunities to stand in place of physical access to a PCP.

State Telehealth Policies and the Digital Divide

As indicated previously, counties within more progressive state telehealth policy environments tend to have better health outcomes in Care Underserved Communities (CUCs) than counties in states with more restrictive telehealth policies. Counties under more progressive telehealth policy ecosystems also have a lower (better) average DDI score. Table 4, below, shows the average DDI score for states based on those states' telehealth policies.

Table 4.
Average County Digital Divide Index Scores by State Telehealth Policy

State Telehealth Policy Environment	Digital Divide Index	Socioeconomic Index	Infrastructure Index
Restrictive	39.8	44.2	31.7
Moderate	39.7	42.8	32.8
Progressive	33.8	37.6	27.1

Source: Purdue Center for Regional Development

As shown, there is a large gap between the average DDI of counties under restrictive and moderate telehealth policy environments and those in more progressive ecosystems. The Socioeconomic and Infrastructure Indices that comprise the composite DDI score are included in Table 4 as well in an attempt to identify which factor is contributing more to this gap. A similarly large gap can be seen between counties in restrictive and moderate telehealth states and those in more progressive states, while the Infrastructure Index gap, is less dramatic. This suggests that socioeconomic factors are contributing more to the Digital Divide in restrictive and moderate states than is a lack of broadband infrastructure.

Identifying Telehealth Opportunities

County-level data on PCP access, health outcomes, telehealth policy environments, and the Digital Divide can help to identify specific places in the United States where telehealth interventions could significantly impact community health. The following describes how the data and research presented thus far is combined and organized to identify these places. Counties are clustered into four opportunity groups and a fifth that identifies counties that could be considered "telehealth ready."

The common thread among the five groups is that the counties included in them are Care Underserved Counties, meaning they have a persons-per-PCP ratio of 2,500:1 or more, which makes them primarily rural places:

01   Policy Opportunities: These are counties in states with restrictive telehealth policies, but that have lower-than-average infrastructure and socioeconomic Digital Divide issues.

02   Infrastructure Opportunities: These are counties in states with moderate or progressive telehealth policy environments that have infrastructure-related Digital Divide issues, but lower-than-average socioeconomic concerns.

03   Socioeconomic Opportunities: These are counties in states with moderate or progressive telehealth policy ecosystems that show lower-than-average broadband infrastructure concerns, but higher-than-average socioeconomic Digital Divide issues.

04   Comprehensive Intervention Opportunities: These are counties that could be described as telehealth deserts. These counties are in states with restrictive telehealth policies and suffer from both higher-than-average infrastructure and socioeconomic Digital Divide issues.

05   Telehealth Ready: Telehealth Ready communities are those where the implementation of telehealth applications are not likely to meet much resistance. These are counties in states with progressive telehealth policies and lower-than-average infrastructure and socioeconomic Digital Divide barriers.

The following sections examine the number of counties in each of the groups defined above by state. It should be noted that some states do not have Care Underserved Counties and have been removed from the tables in the following sections for brevity (these states include Connecticut, Delaware, Hawaii, Maine, Massachusetts, New Hampshire, and Rhode Island).

Policy Opportunities

State telehealth policies provide a framework within which healthcare providers can implement telehealth applications. Without progressive policies, providers are limited in the applications and services they can offer to patients remotely. This limits the healthcare outcomes of rural communities that have less physical access to primary care physicians. Table 5 shows the number of Care Underserved Counties that would be impacted by progressive changes in each state's telehealth policy environment.

Table 5.
Telehealth Policy Opportunities

State	State Telehealth Policy Environment	Total Counties	Total Care Underserved Counties	Policy Opportunity Counties
Arkansas	Restrictive	75	28	1
Georgia	Restrictive	159	68	12
Maryland	Restrictive	24	5	4
North Carolina	Restrictive	100	35	7
North Dakota	Restrictive	53	11	9
Ohio	Restrictive	88	33	11
Pennsylvania	Restrictive	67	7	2
South Carolina	Restrictive	46	18	3
Texas	Restrictive	254	115	16

Source: Purdue Center for Regional Development

Policy Opportunity Counties are those Care Underserved Counties that experience a less-than-average Digital Divide. They generally have access to advanced broadband connectivity and have fewer socioeconomic barriers to the use of technology; however, the state's telehealth policies may be preventing them from fully experiencing the benefits of various telehealth applications.

Infrastructure Opportunities

Even when state telehealth policies are moderately progressive or outright progressive compared to other states, communities may lack access to broadband infrastructure that is critical for the implementation of telehealth applications and initiatives.

Table 6.
Infrastructure Opportunity Counties

State	State Telehealth Policy Environment	Total Counties	Total Care Underserved Counties	Infrastructure Opportunity Counties
Illinois	Moderate	102	38	13
Indiana	Moderate	92	34	9
Iowa	Moderate	99	31	15
Kansas	Moderate	105	25	11
Kentucky	Moderate	120	58	1
Louisiana	Moderate	64	35	5
Michigan	Moderate	83	28	2
Oklahoma	Moderate	77	41	10
South Dakota	Moderate	66	14	4
Tennessee	Moderate	95	45	3
Virginia	Moderate	133	43	7
West Virginia	Moderate	55	18	2
Wisconsin	Moderate	72	13	4
Wyoming	Moderate	23	4	2
Alaska	Progressive	29	3	2
California	Progressive	58	10	2
Colorado	Progressive	64	10	2
Idaho	Progressive	44	16	5
Minnesota	Progressive	87	15	2
Missouri	Progressive	115	59	11
Montana	Progressive	56	9	3
Nebraska	Progressive	93	13	5
Nevada	Progressive	17	5	2
Washington	Progressive	39	7	1

Infrastructure Opportunity Counties (shown in Table 6) are those Care Underserved Counties located in states with moderate or progressive telehealth policy environments that have a higher-than-average infrastructure-related Digital Divide but have a lower-than-average socioeconomic Digital Divide. This indicates that the state has provided the policy opportunities for implementing telehealth applications and initiatives, but healthcare providers in local communities may be struggling to implement them due to a lack of broadband infrastructure. There are 123 counties in 24 states that could benefit from local broadband infrastructure interventions to improve their access to healthcare via telehealth applications.

Socioeconomic Opportunities

Communities with better-than-average access to high-speed broadband infrastructure in states with moderate or progressive telehealth policy environments may still struggle to fully realize the benefits of telehealth if there are socioeconomic-related Digital Divide barriers. Care Underserved Counties falling into this category would benefit from interventions that address the adoption and use of technology so healthcare providers could more confidently implement telehealth applications (see Table 7).

Table 7.
Socioeconomic Opportunity Counties

State	State Telehealth Policy Environment	Total Counties	Total Care Underserved Counties	Socioeconomic Opportunity Counties
Alabama	Moderate	67	29	2
Illinois	Moderate	102	38	1
Indiana	Moderate	92	34	1
Iowa	Moderate	99	31	1
Kentucky	Moderate	120	58	6
Louisiana	Moderate	64	35	3
Michigan	Moderate	83	28	2
Mississippi	Moderate	82	43	2
Oklahoma	Moderate	77	41	1
Oregon	Moderate	36	4	1
Tennessee	Moderate	95	45	4
Arizona	Progressive	15	3	1
Colorado	Progressive	64	10	1
Florida	Progressive	67	24	3
Idaho	Progressive	44	16	2
Missouri	Progressive	115	59	4
Nebraska	Progressive	93	13	1
Nevada	Progressive	17	5	3
New Mexico	Progressive	33	9	1
New York	Progressive	62	16	3
Washington	Progressive	39	7	5

The number of Care Underserved Socioeconomic Opportunity Counties is much lower than the number of Infrastructure Opportunity Counties. However, these communities are primed for adoption and use interventions since state telehealth policies and infrastructure access do not appear to be an issue. There are 48 counties across 21 states that should address technology adoption and use barriers to more fully leverage telehealth opportunities.

Comprehensive Intervention Opportunities

While some communities struggle with state policies, infrastructure, or socioeconomic barriers to fully leverage telehealth applications, many others struggle with all of these issues. Restrictive state telehealth policies, a lack of infrastructure, and socioeconomic conditions are holding back many communities from improving their health outcomes via telehealth. The number of rural hospital closures in each state has also been included in this section to further stress the need for telehealth interventions in the wake of high PCP ratios and low access totelehealth.

Access to telehealth is critically important given the number of rural hospital closures since 2005. An ongoing study by the Cecil G. Sheps Center for Health Services Research tracks the closure of rural hospitals. The following provides a summary of rural hospital closures by state.

Table 8.
Rural Hospital Closures by State 2005–2019

State	Rural Hospital Closures	Total Beds Lost	State	Rural Hospital Closures	Total Beds Lost
Alabama	7	180	Nebraska	1	20
Alaska	1	12	Nevada	2	25
Arizona	4	135	New Jersey	1	83
Arkansas	3	143	New York	5	176
California	9	336	North Carolina	11	361
Florida	5	157	North Dakota	1	25
Georgia	8	275	Ohio	2	33
Illinois	2	119	Oklahoma	8	307
Indiana	2	70	Pennsylvania	3	103
Kansas	6	177	South Carolina	4	208
Kentucky	5	163	South Dakota	2	26
Louisiana	2	127	Tennessee	13	535
Maine	3	126	Texas	23	857
Massachusetts	1	98	Virginia	2	95
Michigan	**2**	**48**	Washington	1	25
Minnesota	5	206	West Virginia	3	112
Mississippi	6	290	Wisconsin	1	25
Missouri	16	302			

*Source: Cecil G. Sheps Center
for Health Services Research*

A hospital closure is defined as a facility that stopped providing general, short-term, acute inpatient care. The loss of rural hospitals reduces access to primary care physicians, reducing the physical access to healthcare for rural residents. Table 9 provides a count of Care Underserved Counties in states with restrictive telehealth policy environments that have higher-than- average infrastructure and socioeconomic Digital Divide barriers.

Table 9.
Comprehensive Intervention Opportunity Counties

State	State Telehealth Policy Environment	Total Counties	Total Care Underserved Counties	Comprehensive Intervention Counties	Avg. Percent of Residents in Fair/ Poor Health	Rural Hospital Closures since 2005
Arkansas	Restrictive	75	28	26	23.3%	4
Georgia	Restrictive	159	68	45	21.6%	8
Maryland	Restrictive	24	5	1	22.4%	0
North Carolina	Restrictive	100	35	25	21.6%	11
North Dakota	Restrictive	53	11	1	13.1%	1
Ohio	Restrictive	88	33	13	18.5%	2
Pennsylvania	Restrictive	67	7	3	14.7%	3
South Carolina	Restrictive	46	18	15	22.9%	4
Texas	Restrictive	254	115	83	21.3%	23

The 212 counties in the Table 9 are those in need of both state and local interventions. Changes in state telehealth policies would certainly help enable healthcare providers to implement telehealth initiatives; however, the local broadband infrastructure may not be available to implement those applications, and there are likely several socioeconomic barriers to fully realizing the benefits of telehealth. Table 9 also includes the average percentage of residents in fair or poor health in the Comprehensive Intervention Counties by state. State policy changes could improve these statistics by approximately 12% and closing the Digital Divide could improve the share of the population in fair/poor health by as much as 37%.

Restrictive state telehealth policies, a high ratio of persons per PCP, and a wide Digital Divide combined with a rapid loss of rural hospitals significantly reduces access to healthcare for rural residents. Texas has seen the loss of 23 rural hospitals since 2005, more than half of which have closed in the last five years. Georgia has lost eight rural hospitals in the same time frame and North Carolina has lost 11. These states exhibit the greatest need for comprehensive state and local telehealth interventions to improve access to healthcare for residents.

Telehealth Ready Counties

In contrast to the previous Comprehensive Intervention Counties discussion, Telehealth Ready counties are Care Underserved Counties in states with moderate or progressive telehealth policy environments where the Digital Divide is less prevalent. These places appear to have decent access to broadband connections and a socioeconomic environment that is less likely to interfere with the adoption and use of technology or telehealth applications.

Table 10.
Telehealth Ready Counties

State	State Telehealth Policy Environment	Total Counties	Total Care Underserved Counties	Telehealth Ready Counties
Alabama	Moderate	67	29	3
Illinois	Moderate	102	38	11
Indiana	Moderate	92	34	14
Iowa	Moderate	99	31	13
Kansas	Moderate	105	25	9
Kentucky	Moderate	120	58	4
Louisiana	Moderate	64	35	5
Michigan	Moderate	83	28	10
Mississippi	Moderate	82	43	1
Oklahoma	Moderate	77	41	4
Oregon	Moderate	36	4	1
South Dakota	Moderate	66	14	7
Tennessee	Moderate	95	45	4
Virginia	Moderate	133	43	6
Wisconsin	Moderate	72	13	6
Wyoming	Moderate	23	4	2
California	Progressive	58	10	3
Colorado	Progressive	64	10	4
Florida	Progressive	67	24	2
Idaho	Progressive	44	16	5
Minnesota	Progressive	87	15	11
Missouri	Progressive	115	59	11
Montana	Progressive	56	9	2
Nebraska	Progressive	93	13	6
New Jersey	Progressive	21	1	1
New Mexico	Progressive	33	9	2
New York	Progressive	62	16	11
Utah	Progressive	29	8	8
Washington	Progressive	39	7	1

Telehealth Ready Counties are those CUCs that have the policy environment in place to support telehealth implementation and have relatively small Digital Divide issues to overcome. Healthcare providers in these 167 counties could easily implement telehealth applications to improve access to healthcare for residents.

TELEHEALTH IN RURAL MICHIGAN

To increase the use of telehealth applications, it is necessary to determine best practices for using telehealth tools, particularly among rural healthcare providers, as well as the barriers that are preventing some of these healthcare providers from increasing their use.

In 2019, Connected Nation Michigan (CN Michigan) partnered with AARP, Kelley Cawthorne, LLC, and the Michigan Health Endowment Fund to address these issues and provide insights into the following questions:

- How are rural Michigan healthcare providers currently using telehealth applications?

- What barriers prevent rural Michigan healthcare providers from increased usage of telehealth applications?

- What steps can be taken by healthcare management networks, state or federal policymakers, internet service providers (ISPs), or technology software firms to improve the use of telehealth applications?

To answer these questions, CN Michigan and its partners conducted focus group discussions with healthcare providers in each of five rural Michigan counties: Gladwin, Sanilac, Roscommon, Osceola, and Dickinson. Focus group participants included healthcare professionals, including but not limited to physicians, nurses, nurse practitioners, other licensed or non-licensed patient caregivers, healthcare IT professionals, and administrators representing local healthcare networks and facilities.

During this timeframe, CN Michigan also conducted concurrent telephone surveys of 2,001 adult heads of households to answer similar questions from the perspective of potential telehealth users.

CN Michigan surveyed at least 400 adults (age 18 or older) in each of the five counties who were contacted via telephone (either landline or cell phone). CN Michigan took several steps to ensure that the sample was both randomized and representative of the counties being surveyed, including making multiple attempts to reach each working telephone number at various times of the day and on varied days of the week, as well as establishing quotas based on respondent age to collect information from respondents of all adult age groups.

County Health Outcomes and Physician Access

The following table contains health outcome, healthcare access, and Digital Divide data for the five counties included in the study.

Table 11.
Healthcare Metrics and Indicators for Study Counties

Metric	State Average	Study Counties				
	Michigan	Dickinson	Gladwin	Osceola	Roscommon	Sanilac
Persons-per-PCP Ratio	1,260:1	1,017:1	5,047:1	3,323:1	2,987:1	3,752:1
Residents in Fair/Poor Health	17%	14.4%	17.1%	19.4%	17%	15.9%
Physically Unhealthy Days per Month	4.3	4.0	4.4	4.5	4.4	4.1
Life Expectancy	78.1	79.2	76.8	77.9	75.5	77.1
Number of Preventable Hospital Stays	5,188	2,436	4,067	2,963	4,188	5,157
Socioeconomic Digital Divide Index	41.9	40.4	61.4	49.0	71.4	43.4
Infrastructure Digital Divide Index	29.2	29.6	43.5	48.6	26.3	39.6
Overall Digital Divide Index	37.2	36.7	55.4	51.8	50.9	43.8

Overall, Michigan has an average persons-per-PCP ratio of 1,260:1. Approximately 17% of the state's residents are in fair/poor health and experience 4.3 physically unhealthy days per month. The average Michigan county has a Digital Divide Index score of 37.2 with infrastructure and socioeconomic sub-indices that are in line with the national county median.

Dickinson County is the only study county with a persons-per-PCP rate less than the state average. The county has a high number of primary care physicians compared to its mostly rural population. This rate may impact the health outcomes of the county. The rate of residents in fair/poor health in Dickinson is much less than the state average as well as among the other study counties. Life expectancy among Dickinson residents is also greater, and they have a much lower rate of preventable hospital stays than the state and other study counties. Finally, Dickinson County's Digital Divide Index scores are on par with the median scores of counties across the country. Dickinson's healthcare access will be examined in greater details later in this section.

The other study counties, Gladwin, Osceola, Roscommon, and Sanilac, have higher persons-per-PCP ratios than the state and are considered Care Underserved Counties. Gladwin and Roscommon Counties have rates of residents in fair/poor health that are on par with the state, while Osceola has a higher rate, and it's lower in Sanilac County. Life expectancy in these four study counties, however, are lower than the state average.

Gladwin, Osceola, Roscommon, and Sanilac Counties have higher-than-average Digital Divide Index scores. This indicates that these four counties struggle with both infrastructure-related issues and socioeconomic barriers to broadband adoption and use. Gladwin and Roscommon, in particular, struggle most with socioeconomic barriers to the Digital Divide while Osceola struggles with infrastructure access.

Telehealth Perceptions and Barriers

To examine how residents of these five counties feel about telehealth applications, Connected Nation Michigan conducted random digit dial (RDD) telephone surveys of 2,001 adult heads of households living in these areas. The purpose of these surveys was to determine the following:

• The demand for, and use of, currently available telehealth applications

• How residents are using telehealth tools available to them

• How much households have saved from using telehealth tools

• Interest in using telehealth applications if they were offered

• Barriers and concerns that prevent households from using telehealth tools

These surveys were designed to measure these facets among all adult residents of these five select counties. In addition, demographic questions were included to compare responses between particular portions of the populations, such as elderly residents, younger adults who are potential or current caretakers of either children or elderly family members, low-income residents who often face greater difficulty paying for medical care, individuals living alone who may face greater risk of experiencing medical emergencies while home alone, and adults with disabilities. By examining issues related to telehealth usage among these key rural populations, this study hoped to shed light on the need for improved telehealth applications in these rural counties.

Online Interactions with Healthcare Providers

Across these five counties, slightly more than one-third of adults (34%) interact with healthcare providers via the internet; another 48% report that they use the internet for other reasons, while 18% say they do not use the internet at all (Figure 2).

**Figure 2.
Online Interaction with Healthcare Providers**

- **48%** Use the internet, but not to interact with healthcare providers
- **34%** Interact online with healthcare providers
- **18%** Do not use the internet at all
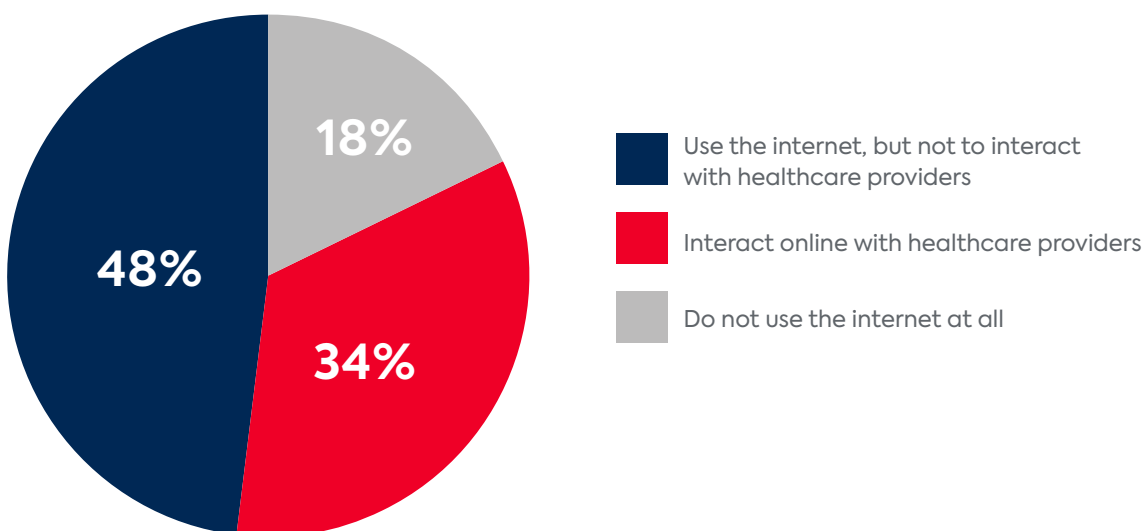
Among those who interact with healthcare providers, the largest share (21%) interacted with a general practitioner or family physician, followed by those interacting with specialist physicians (15%); dentists, dental hygienists, or orthodontists (11%); convenient care facilities or walk-in clinics (9%); eye doctors, ophthalmologists, or opticians (9%); emergency rooms or hospitals (7%); and therapists, psychiatrists, or other mental health providers (5%). A website is the most popular way of interacting with healthcare providers, used by 36% of those who interacted with providers online. This is followed in popularity by interacting via e-mail (34%), text messaging (17%), via mobile apps (12%), through video conference applications such as Skype (4%), and through social media (4%).

Younger adults are most likely to use online tools to interact with healthcare providers, with nearly one-half of respondents age 18-34 saying they interact with healthcare providers via the internet at least occasionally (Figure 3).

Figure 3.
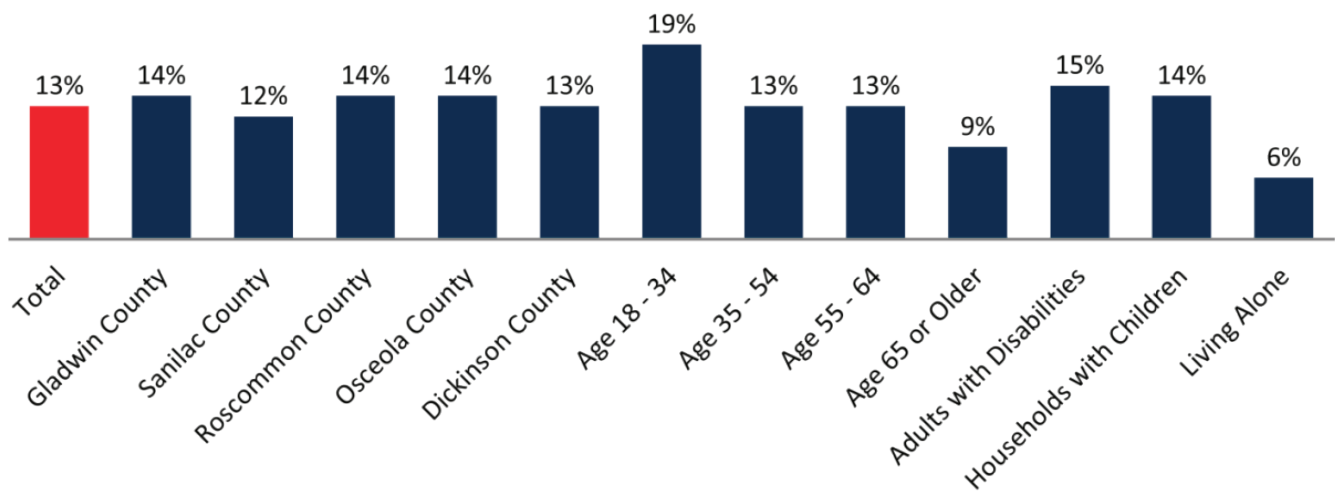**Online Interaction with Healthcare Providers by Demographic**
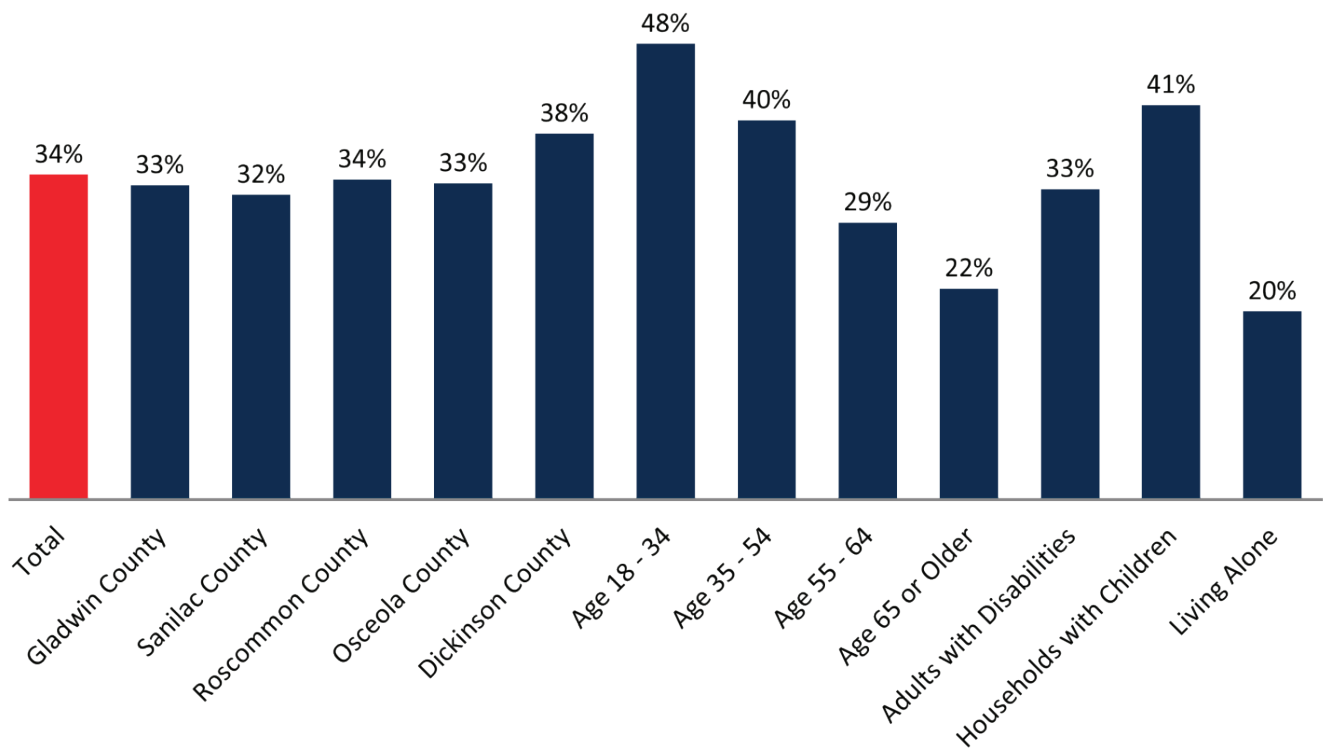
Respondents who subscribe to a fixed internet connection are more likely to interact with their healthcare providers online than those who only go online via cell phones or mobile devices. More than two out of five respondents who subscribe to home internet service report interacting with healthcare providers online; similarly, 42% of those who only use the internet from someplace other than home do the same. Among those who rely solely on mobile connectivity, though, fewer than one in three (31%) report interacting with healthcare providers online, suggesting that the type of internet connection, fixed or mobile, is a stronger indicator of this activity than the location of the internet connection being used.

Among those who have not used any of these tools for communicating with their healthcare providers, more than one in five (21%) say they would use them if their providers offered them. This suggests that there is demand among potential patients to use the internet to conduct activities that have historically required a face-to-face interaction.

Interacting with healthcare providers via websites or online portals is one of the most popular ways for patients to interact online. Altogether, more than one in eight respondents (13%) said they interact with their healthcare providers using the provider's website (Figure 4).

Figure 4.
**Households Using Healthcare Provider Websites**

This represents more than one in three adults (36%) who interact with their providers online using any medium. Adults age 18-34 are the most likely to use the websites offered by healthcare providers, while those 65 and older and individuals who live alone are significantly less likely to do so.

Despite these relatively low numbers, many individuals say that their healthcare providers do offer online options with which they may interact. Nearly two out of three respondents (62%) say their healthcare providers offer an online portal, website, or mobile app where they can access their medical records, schedule appointments, or request a consultation (Figure 5). Others reported that their healthcare providers did not offer these services, or they did not know whether they were available.

Patients in Osceola County were the most likely to say their providers offered this option, while those in Sanilac County were the least likely to say this is the case.

Figure 5.
Patients Reporting that Their Healthcare Providers Offer an Online Portal, Mobile App, or Website
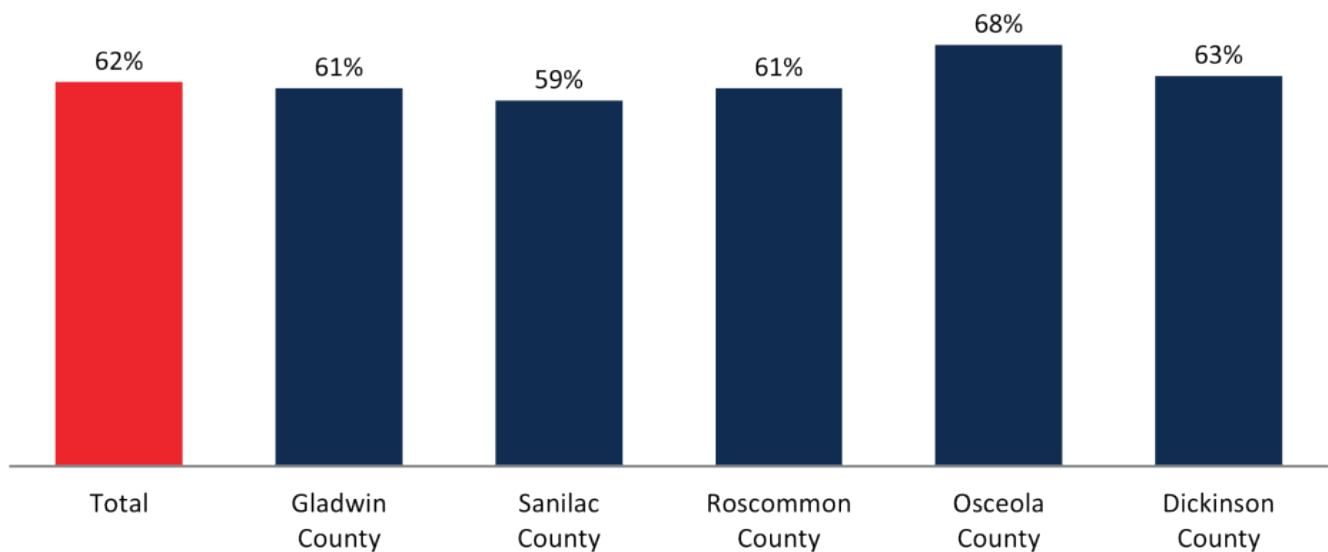
Using Online Health Services and Monitoring

In addition to online interactions, one in ten adults in these counties have used online health services such as remote monitoring, counseling, or electronic reminders to follow their prescribed healthcare protocols within the past 12 months (Figure 6).

**Figure 6.
Patients Using Online Health or Monitoring Services**
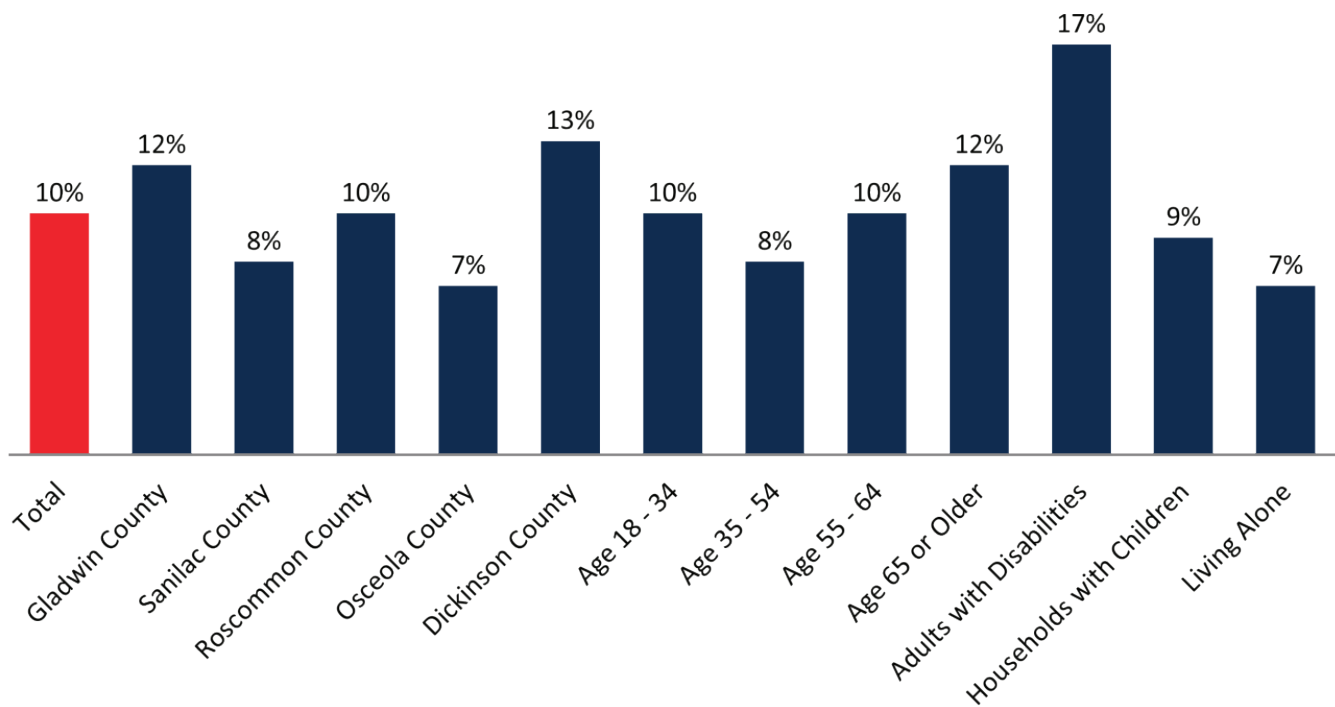
Adults in Osceola County were the least likely to report using these services, while those in Dickinson County were the most likely to do so.

Remote heart monitoring is the application used most often (used by 3.9% of adults in these counties), followed by electronic reminders to take medication or follow health protocols (2.3%), remote blood pressure monitoring (2.1%), remote glucose or blood sugar monitoring (1.8%), and accessing health or motivational coaching (1.5%) (Figure 7).

Figure 7.
Online Health or Monitoring Services Used in Each County
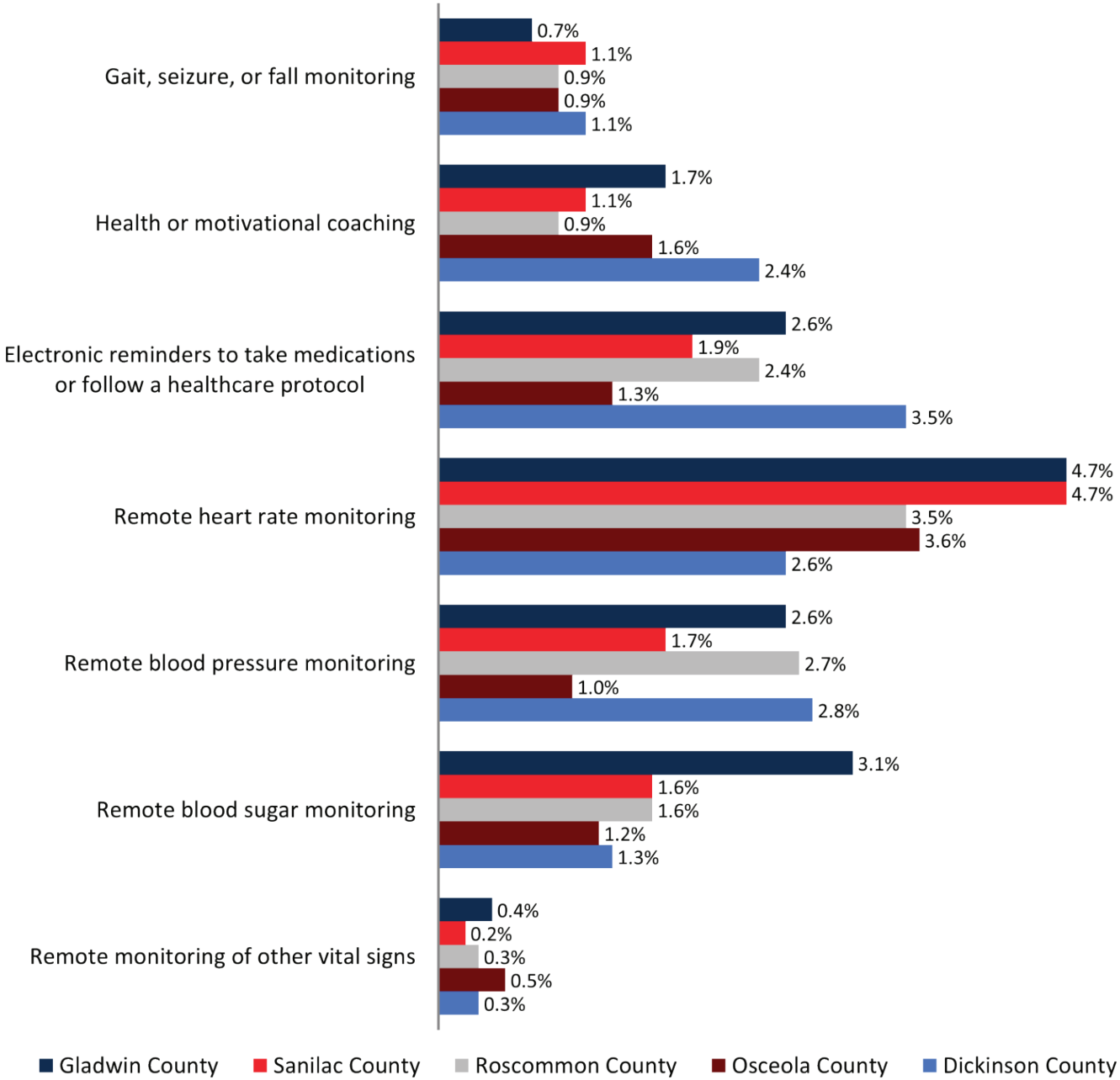
Gait, seizure, or fall monitoring
- 0.7%
- 1.1%
- 0.9%
- 0.9%
- 1.1%

Health or motivational coaching
- 1.7%
- 1.1%
- 0.9%
- 1.6%
- 2.4%

Electronic reminders to take medications or follow a healthcare protocol
- 2.6%
- 1.9%
- 2.4%
- 1.3%
- 3.5%

Remote heart rate monitoring
- 4.7%
- 4.7%
- 3.5%
- 3.6%
- 2.6%

Remote blood pressure monitoring
- 2.6%
- 1.7%
- 2.7%
- 1.0%
- 2.8%

Remote blood sugar monitoring
- 3.1%
- 1.6%
- 1.6%
- 1.2%
- 1.3%

Remote monitoring of other vital signs
- 0.4%
- 0.2%
- 0.3%
- 0.5%
- 0.3%

■ Gladwin County ■ Sanilac County ■ Roscommon County ■ Osceola County ■ Dickinson County

Among those who have not used any of these services, nearly one in eight (12%) say that they or a member of their household would have benefited from these telehealth tools within the past 12 months.
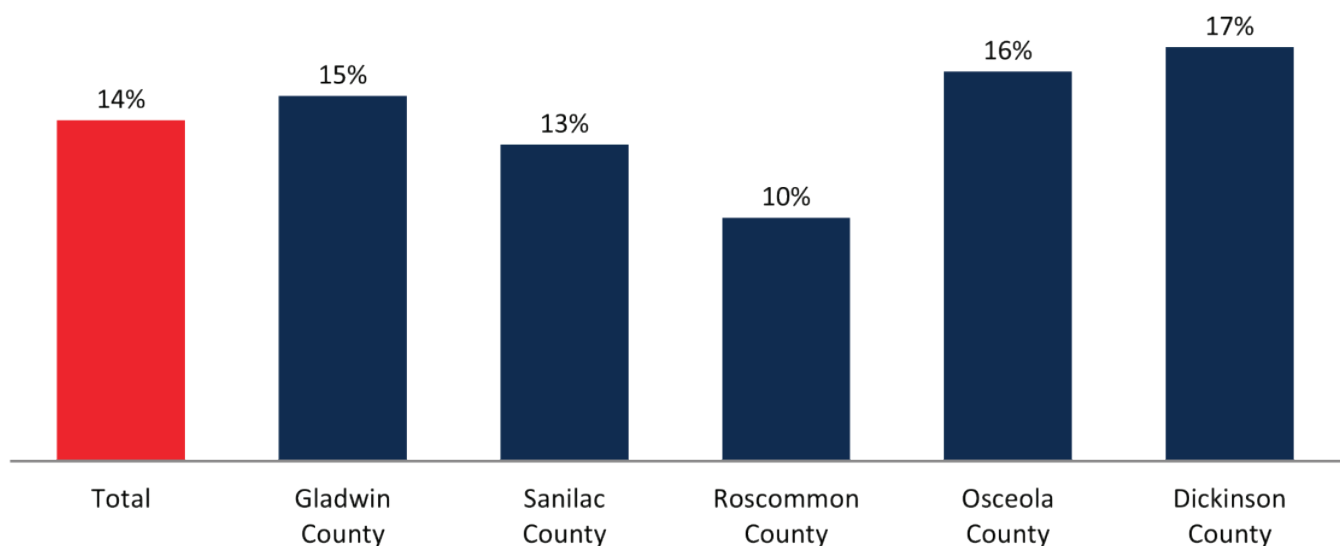
Consumer Perceptions of Telehealth Applications

For many rural patients, access to quality healthcare is hampered by travel time, access to specialists, and a lack of transportation. Many of these issues can be addressed by telehealth tools, but only if patients are willing and able to use them.

Nearly one in twelve adults in these five counties (8%) report that they had been referred for some type of medical service such as a test, prescription medication, or consultation with a specialist, but did not follow through with that referral. The most popular reason for not following through with a referral was a lack of conviction that the referred service was necessary (reported by 2% of adults), followed by the cost of the procedure, the inability to get off of work, the trouble of getting to the appointment, a lack of nearby providers, inconvenient office hours, and a lack of transportation. With one exception, the use of telehealth applications for consulting and treatment could have remedied all of these issues.

In fact, 14% of adults in these five counties believe that accessing healthcare information online prevented trips to the doctor or medical center for members of their household in the prior 12 months (Figure 8).

Figure 8.
Residents Who Say Online Interactions
Saved Them Trips to the Doctor or Medical Center

	Total	Gladwin County	Sanilac County	Roscommon County	Osceola County	Dickinson County
	14%	15%	13%	10%	16%	17%

Those who had fewer trips thanks to online interactions saved an average of 4.8 trips per household. In these five counties, for simple 15-minute visits to general practitioners, telehealth usage represents a savings of nearly $4.7 million per year, just for routine visits with healthcare professionals.[2] With studies showing that the average doctor's visit requires approximately two hours between travel, waiting rooms, and the visits themselves,[3] that represents nearly $1 million ($985,000) in additional lost productivity per year,[4] totaling a savings of $5.7 million per year in these five counties alone.

2 Based on per-visit costs provided in the healthcare bluebook (healthcarebluebook.com) as of December 2019.
3 https://www.ajmc.com/journals/issue/2015/2015-vol21-n8/opportunity-costs-of-ambulatory-medical-care-in-the-united-states
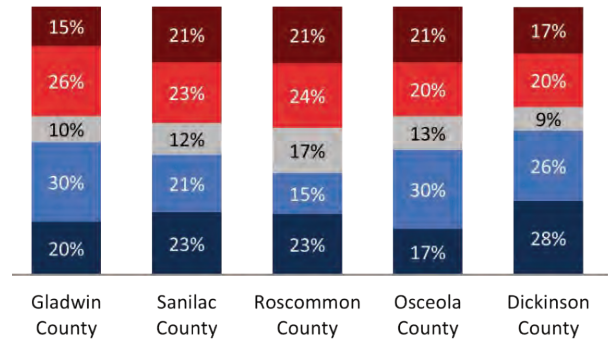4 Based on Michigan's median hourly wage of $18.08 per hour (source:https://www.bls.gov/oes/current/oes_mi.htm#00-0000)

In addition to financial savings, many users of telehealth applications felt like these tools provided other benefits and had generally positive things to say about their telehealth experiences (Figure 9).
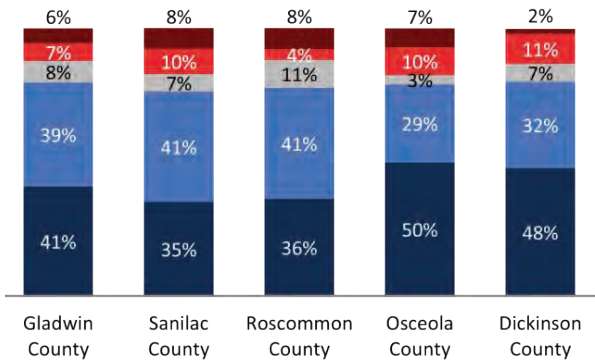
**Figure 9.
Telehealth User Impressions**

Legend:
- Strongly Agree
- Mostly Agree
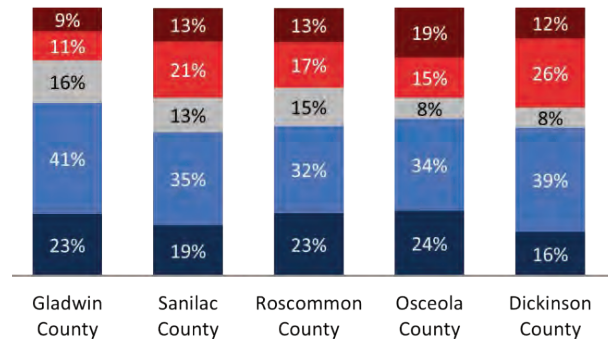- Don't Know
- Mostly Disagree
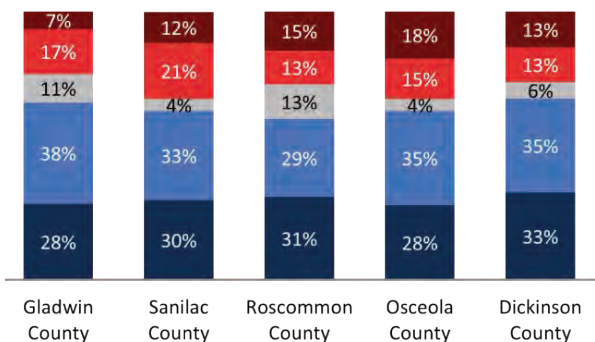- Strongly Disagree

Using Telehealth Applications Saved Me Money

	Gladwin County	Sanilac County	Roscommon County	Osceola County	Dickinson County
Strongly Disagree	15%	21%	21%	21%	17%
Mostly Disagree	26%	23%	24%	20%	20%
Don't Know	10%	12%	17%	13%	9%
Mostly Agree	30%	21%	15%	30%	26%
Strongly Agree	20%	23%	23%	17%	28%

Using Telehealth Applications Saved Me Time

	Gladwin County	Sanilac County	Roscommon County	Osceola County	Dickinson County
Strongly Disagree	6%	8%	8%	7%	2%
Mostly Disagree	7%	10%	4%	10%	11%
Don't Know	8%	7%	11%	3%	7%
Mostly Agree	39%	41%	41%	29%	32%
Strongly Agree	41%	35%	36%	50%	48%

Telehealth Applications Resulted in Service That Was As Good As In-Person Visits

	Gladwin County	Sanilac County	Roscommon County	Osceola County	Dickinson County
Strongly Disagree	9%	13%	13%	19%	12%
Mostly Disagree	11%	21%	17%	15%	26%
Don't Know	16%	13%	15%	8%	8%
Mostly Agree	41%	35%	32%	34%	39%
Strongly Agree	23%	19%	23%	24%	16%

Telehealth Applications Were More Convenient Than In-Person Visits

	Gladwin County	Sanilac County	Roscommon County	Osceola County	Dickinson County
Strongly Disagree	7%	12%	15%	18%	13%
Mostly Disagree	17%	21%	13%	15%	13%
Don't Know	11%	4%	13%	4%	6%
Mostly Agree	38%	33%	29%	35%	35%
Strongly Agree	28%	30%	31%	28%	33%

The Practitioner Seemed Proficient and Comfortable Using the Application

|	Gladwin County	Sanilac County	Roscommon County	Osceola County	Dickinson County
Strongly Disagree	4%	2%	5%	3%	2%
Mostly Disagree	4%	11%	4%	11%	6%
Don't Know	11%	14%	22%	7%	6%
Mostly Agree	33%	33%	33%	34%	47%
Strongly Agree	48%	41%	36%	46%	38%
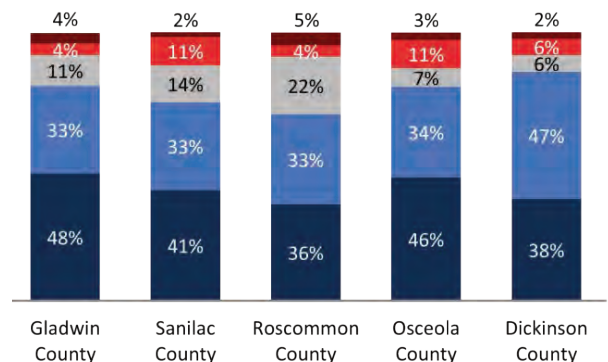
The majority of individuals who had used telehealth applications strongly agreed or mostly agreed that using those applications saved them time and the telehealth applications were more convenient than an in-person visit. They also felt that the practitioners who used these telehealth tools were proficient and comfortable in the use of the applications, and they felt like the service they received was as good as they would have gotten in an in-person visit.

The one area where telehealth users split was in the question of cost. About half of telehealth users strongly or mostly agreed that the telehealth applications saved them money, suggesting that costs and provider compensation may continue to be a barrier to patients when they seek out telehealth services, just as it is when going for in-person treatment.

Barriers to Telehealth Usage

Despite many of the benefits that telehealth users describe, there are still many residents who prefer in-person visits with their healthcare providers. Across the five counties, over one-half of those who had used telehealth tools (55%) prefer in-person visits. By comparison, only 8% prefer online health applications, while 34% had no preference and 3% said it either depended on the application, or were unsure of their preference between online applications and in-person visits (Figure 10).

**Figure 10.
Healthcare Paradigm Preferences**

Legend:
- Prefer Telehealth Tools
- Prefer In-Person Visits
- No Preference
- Unsure, or Depends on the Application
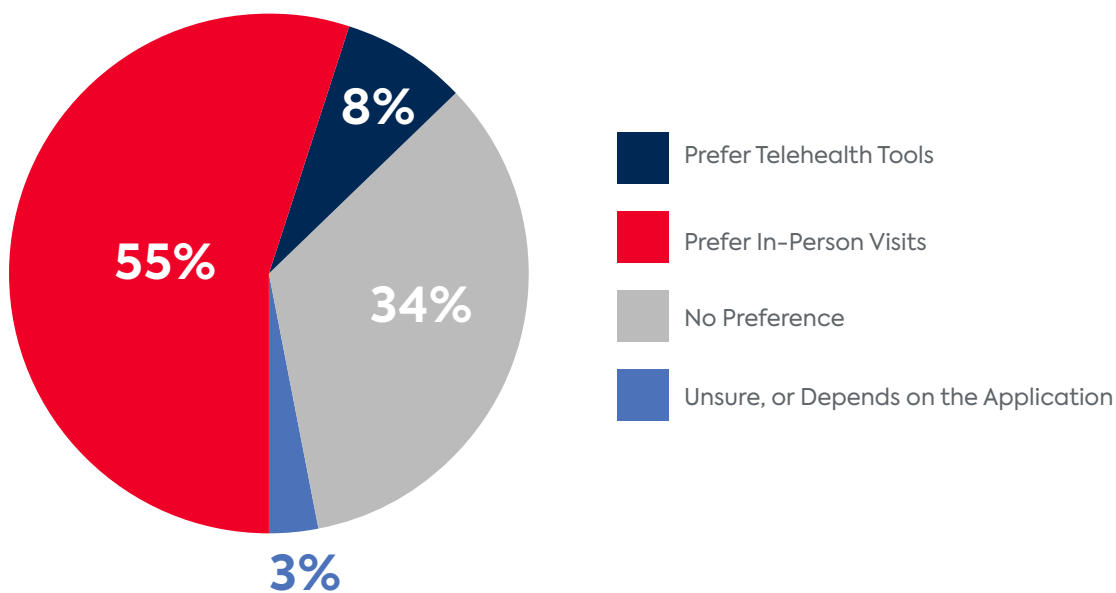
These preferences vary dramatically across the counties, as well as between demographic groups (Figure 11).

Figure 11.
Healthcare Preferences by Demographic

Prefer Telehealth Applications

Prefer In-Person Visits

No Preference

Unsure, or Depends on the Application
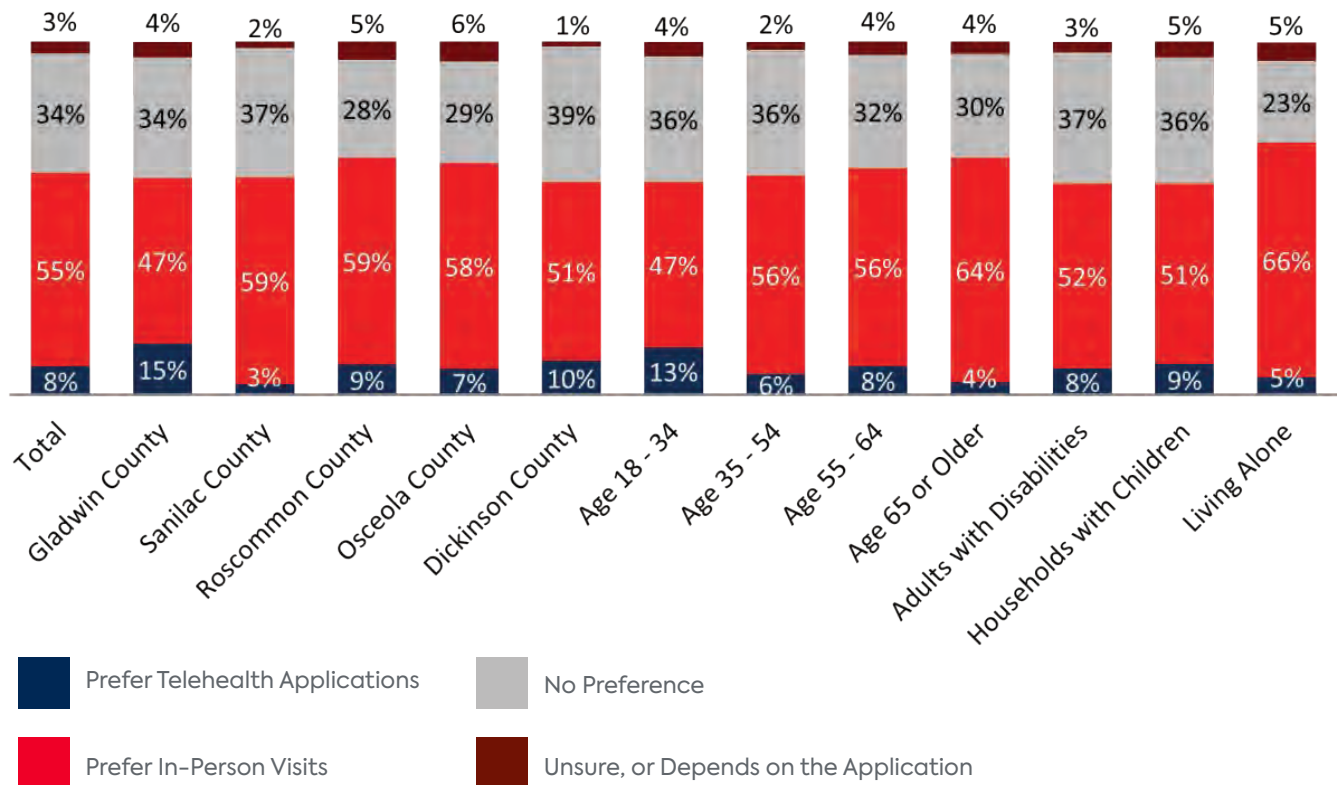
Residents of Gladwin County report a strong preference for the use of telehealth applications compared to residents of other counties. In addition, younger residents are much more interested than older residents in using telehealth applications.

One barrier to telehealth usage is a lack of home internet access; for many rural residents, home broadband service is unavailable or unaffordable, making it impossible for them to utilize telehealth tools from the privacy of their own home. Across the five counties, two out of five households (40%) do not subscribe to home broadband service (Figure 12).
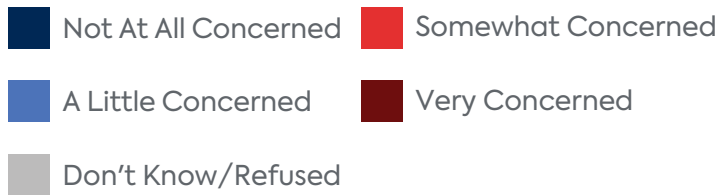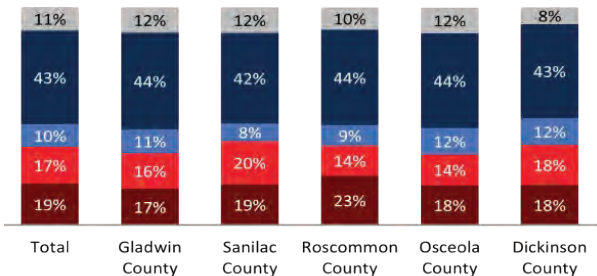
Figure 12.
Home Broadband Adoption
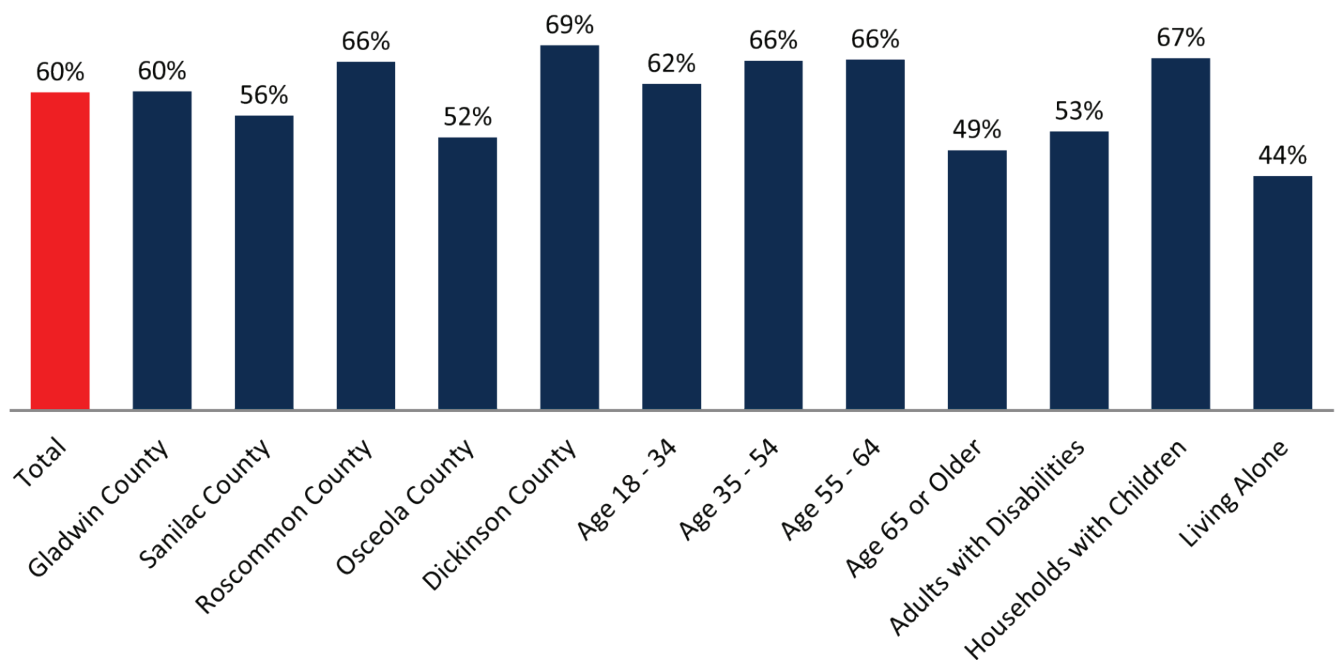
Residents age 65 and older and those with disabilities, two groups of individuals who often face difficulty traveling for medical appointments, are also significantly less likely to have broadband service at home. For some, the lack of available broadband is the reason for not subscribing — one in three respondents (33%) who do not subscribe to broadband say that it is not available where they live. For others, cost or security concerns may be a barrier to home broadband usage.

Others have concerns about the telehealth applications themselves. The most often-reported concern among residents in these five counties is the privacy of their information; for these individuals, sharing personal information over the internet is considered risky and may leave them open to identity theft or fraud. Because of those online threats, two out of three adults (66%) said that they are Very Concerned or Somewhat Concerned about the privacy of their data when using telehealth applications (Figure 13).
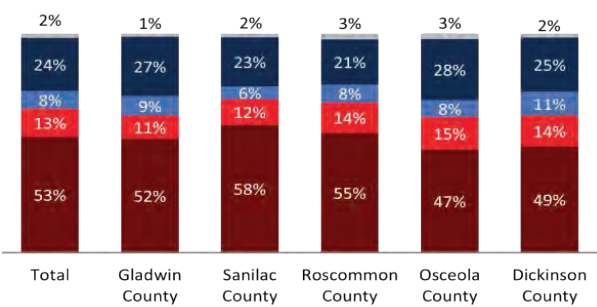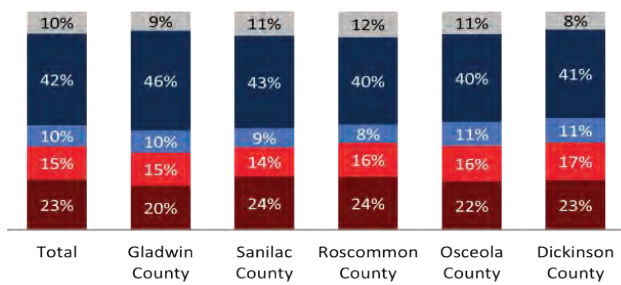
Figure 13.
Concerns with Telehealth Applications

Legend:
- Not At All Concerned
- A Little Concerned
- Don't Know/Refused
- Somewhat Concerned
- Very Concerned

The Frequency with Which the Provider Responds to/Checks the Application

	Total	Gladwin County	Sanilac County	Roscommon County	Osceola County	Dickinson County
Don't Know/Refused	11%	12%	12%	10%	12%	8%
Not At All Concerned	43%	44%	42%	44%	44%	43%
A Little Concerned	10%	11%	8%	9%	12%	12%
Somewhat Concerned	17%	16%	20%	14%	14%	18%
Very Concerned	19%	17%	19%	23%	18%	18%

The Privacy of the Patient's Online Data

	Total	Gladwin County	Sanilac County	Roscommon County	Osceola County	Dickinson County
Don't Know/Refused	2%	1%	2%	3%	3%	2%
Not At All Concerned	24%	27%	23%	21%	28%	25%
A Little Concerned	8%	9%	6%	8%	8%	11%
Somewhat Concerned	13%	11%	12%	14%	15%	14%
Very Concerned	53%	52%	58%	55%	47%	49%

The Willingness of Insurance (or Equivalent) To Cover the Cost of the Online Service

	Total	Gladwin County	Sanilac County	Roscommon County	Osceola County	Dickinson County
Don't Know/Refused	10%	9%	11%	12%	11%	8%
Not At All Concerned	42%	46%	43%	40%	40%	41%
A Little Concerned	10%	10%	8%	11%	11%	11%
Somewhat Concerned	15%	15%	14%	16%	16%	17%
Very Concerned	23%	20%	24%	24%	22%	23%

The Patient's Ability to Use A Computer or the Internet

	Total	Gladwin County	Sanilac County	Roscommon County	Osceola County	Dickinson County
Don't Know/Refused	5%	4%	5%	6%	5%	4%
Not At All Concerned	60%	61%	56%	62%	61%	66%
A Little Concerned	9%	9%	9%	7%	11%	9%
Somewhat Concerned	11%	12%	11%	12%	10%	9%
Very Concerned	15%	14%	19%	14%	14%	12%
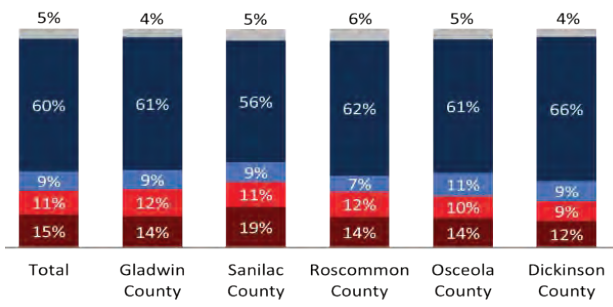
The Risk that Health Issues Will Be Missed or Insufficiently Addressed Online

	Total	Gladwin County	Sanilac County	Roscommon County	Osceola County	Dickinson County
Don't Know/Refused	6%	6%	5%	6%	6%	4%
Not At All Concerned	41%	41%	41%	42%	44%	38%
A Little Concerned	11%	11%	9%	9%	11%	14%
Somewhat Concerned	18%	17%	19%	15%	16%	21%
Very Concerned	25%	25%	26%	28%	23%	23%
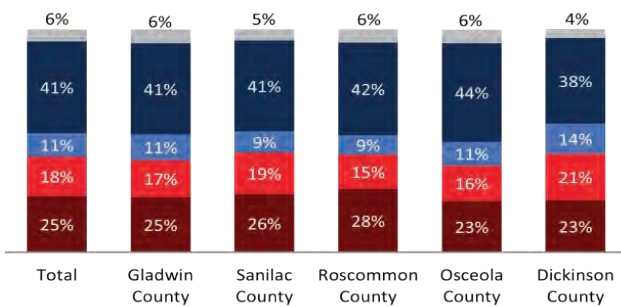
The Patient's Ability to Access the Internet from Home

	Total	Gladwin County	Sanilac County	Roscommon County	Osceola County	Dickinson County
Don't Know/Refused	4%	4%	4%	7%	4%	4%
Not At All Concerned	58%	59%	56%	58%	58%	60%
A Little Concerned	9%	9%	10%	8%	8%	10%
Somewhat Concerned	10%	9%	11%	9%	12%	9%
Very Concerned	19%	19%	19%	18%	18%	18%
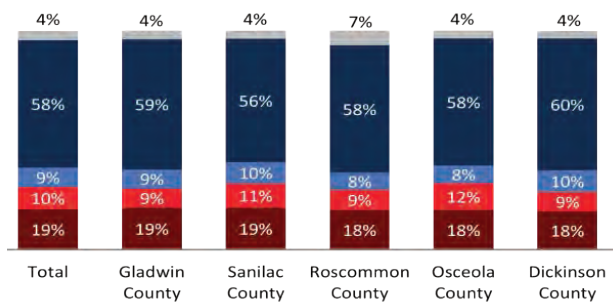
The Potential for Online Health Services To Cost More than In-Person Visits

	Total	Gladwin County	Sanilac County	Roscommon County	Osceola County	Dickinson County
Don't Know/Refused	6%	7%	6%	6%	7%	5%
Not At All Concerned	41%	39%	42%	42%	39%	42%
A Little Concerned	9%	7%	8%	8%	11%	11%
Somewhat Concerned	14%	15%	13%	14%	14%	12%
Very Concerned	31%	31%	32%	30%	30%	31%
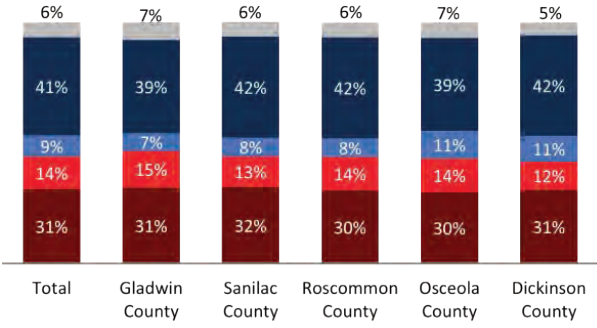
Many voiced a sense that they lack of control over their data once it is shared electronically and do not feel like they have the resources necessary to protect their own information.

For others, the potential cost, or the potential risk that some costs would not be covered by their insurance or payer, gave them cause for concern. These concerns represent barriers that prevent individuals from benefiting from the use and growth of telehealth applications in their area.

FOCUS GROUP MEETINGS

During the spring and summer of 2019, representatives from Connected Nation Michigan (CN Michigan) and Kelley Cawthorne met with healthcare providers in each of the five counties surveyed. These focus groups typically lasted between one and two hours and included a wide variety of representatives whose work relates to telehealth network development. Participants included more than fifty doctors, nurses, medical assistants, directors of telehealth programs, medical IT experts, outreach coordinators, and others who are all affected by, and influence, telehealth offerings in each of the five counties.

Participants gave up their time willingly in order to share their stories about the benefits and challenges of providing telehealth services to their patients in rural communities. Participants were asked to speak about how they saw telehealth opportunities impacting their communities, what benefits their patients have experienced as a result of current telehealth services, how their patients have reacted to prior or current telehealth options, what efforts could best help them expand their telehealth offerings, and what challenges they have experienced with their efforts to initiate and expand telehealth offerings to their patients.

Although each county is unique and each medical network represented in these interviews faced different challenges, several themes arose from these conversations. These themes, consistent across the various conversations, show that some of the state's best rural healthcare services are being supplemented through telehealth offerings, though there are still many hurdles to be overcome in order to expand those offerings to rural Michigan patients. From these insightful conversations, four primary findings arose consistently across the various groups of participants.

FINDING 1:
Some of the best telehealth programs in the state are offered in its rural areas.

Despite the many challenges that face rural healthcare networks nationally, rural Michigan counties are offering cutting-edge services through their tele-health programs. One example is in Sanilac County, home of the only certified telehealth stroke program in the state. As a result, when local residents first have symptoms of a stroke, they can go to a nearby clinic and begin treatment in a matter of minutes, rather than hours; this can make a difference between life and death in some cases, and in others, the difference between a full recovery and life-long physical disabilities.

Healthcare networks in these five counties offer a variety of other benefits to their patients through their telehealth offerings, including counseling and substance abuse services, post-operation consultations, and the ability to schedule online appointments with doctors' offices, labs, and radiology services. For many focus group participants, the ability to offer specialty services was paramount to expanding their telehealth offerings.

The reason for this variety of offerings is two-fold. First, many participants discussed how these services had been developed in these rural areas because that was simply where they were needed. Healthcare centers located in urban areas with a larger pool of patients have an easier time attracting medical specialists, whereas rural communities may not have enough nearby patients who need these specialized services to warrant a full-time specialist healthcare provider. As a result, many rural patients face the decision of either foregoing specialist services or traveling to a larger city to be treated. By incorporating telehealth services, these rural healthcare providers are meeting the needs of their community in a much more convenient manner.

Other participants discussed a history of rural healthcare networks being more willing and able to try new methods to help their local communities. As a result of being smaller institutions, many rural healthcare provision networks see themselves as less bureaucratic with a history of innovations that address issues that may not be present in large urban healthcare systems. This makes many rural healthcare networks more agile and able to adopt new paradigms faster. Several of the rural healthcare providers cited this willingness to adapt to change as a reason why their telehealth services have been so successful.

FINDING 2:
Rural Michigan healthcare providers are able to offer their patients a wide variety of benefits through their telehealth offerings.

With many rural hospitals closing, the ability of those remaining to offer high-quality medical service is sometimes called into question; how could a remote health clinic provide the same quality of care as a large centralized healthcare system located in an urban center? The answer is through telehealth services.

Healthcare networks cited a number of benefits that their telehealth programs offer their patients. By offering remote consultations, patients are able to go to appointments and convalesce from treatments closer to home, rather than traveling to see a healthcare provider in a large city that may be hours away. This ability to provide patients services closer to home means that they are more likely to follow through with consultations and further visits without taking a day off from work. Additionally, many rural families have been affected by substance abuse issues which can require frequent consultation with a counselor specializing in preventing relapse.

These meetings are much more manageable when conducted remotely at a local clinic than if the patient is required to drive (or be transported) long distances for each appointment. For many of their rural patients, these sorts of services would not be options were it not for the ability to meet with counselors or doctors near their homes using telehealth services. For this reason, remote substance abuse counseling has been a boon for many rural patients.

Even the ability to go online to schedule appointments makes it easier for patients to take control of their schedules, giving those patients more flexibility in their scheduling and making it more likely that they will be able to find a time to which they can commit for their appointments. Every healthcare provision network confirmed that making things as easy and flexible as possible for their patients led to a greater likelihood that patients would follow through with their appointments, resulting in better clinical care.

FINDING 3:
Healthcare providers, as well as the patients they serve, like the flexibility that telehealth services provide for them and are hopeful about the growing number of services that will be available in the near future.

When asked about their opinions toward telehealth services, doctors, nurses, and other direct care providers sounded positive about the services they are able to offer through telehealth tools and are optimistic about the services they will be able to offer in the near future as telehealth technology expands.

Doctors and nurses report that they are able to see more patients by using telehealth services and get real-time information from their patients as symptoms develop and change. Healthcare administrators report that despite the initial cost of initiating telehealth services, they allow local rural hospitals to stay open and provide treatment for local residents in a way that is much more cost effective than hiring full-time doctors at every facility.

When asked how patients react to telehealth offerings, many health service providers said that patients (particularly older ones) are often surprised by the myriad of offerings that are now available, from remote consultation to monitoring of vital signs. Once that novelty wears off, though, patients become accustomed to the new procedures and have little difficulty adjusting. For some patients, the fact that they are seen in a local clinic with a medical assistant or other healthcare professional in the room while they are connected to devices for remote monitoring provides them with reassurance and makes the experience feel more like a doctor's visit to which they are accustomed.

FINDING 4:
Healthcare service providers are optimistic, but they recognize that there are numerous barriers to expanding telehealth options in their rural communities.

Despite the benefits that telehealth services offer their patients, healthcare provision networks see several barriers to expanding or improving telehealth offerings in their communities.

The issue that was brought up most often is the disparity in reimbursement from insurance companies, Medicaid, and Medicare between seeing patients in person and providing services via telehealth tools. Both public and private payer sources either will not reimburse healthcare providers for patients they see remotely, or they do so at rates that are much lower than when those providers see the same patients in-person in their office. This results in an incentive to steer away from telehealth offerings and see more patients in person, despite the many benefits that both doctors and patients experience from telehealth services. As a result, the doctor-patient dynamic is less efficient than it could be if aided through telehealth. Overcoming this hurdle will be necessary for more doctors to expand their telehealth offerings.

Many telehealth networks rely on their own hardware and software, and oftentimes those systems do not integrate smoothly. This means that a telehealth tool that is used in one community may not be able to send or receive information from a network in another town, preventing those health networks from integrating their treatment seamlessly. Several healthcare providers noted that to fully benefit from telehealth offerings, more must be done to allow those networks to all integrate and communicate smoothly.

This issue comes about when two healthcare facilities attempt to link their telehealth services, as well as when facilities try to provide remote services to their patients in their homes. Many healthcare networks have invested millions in ensuring that they have fast, reliable broadband networks within their facilities, but many Michigan residents (particularly in rural parts of the state) do not have access to high-speed internet, making it impossible for them to use telehealth services, even on their smartphones or mobile devices. Even when attempting to send large image files between different facilities in the state, connectivity issues and lag often impede doctors' ability to send or receive the information they need in a timely fashion. As such, despite the strides that have been made in improving broadband infrastructure across the state, the lack of available reliable service hampers the growth of telehealth services for rural communities.

For many healthcare provider networks, a lack of information presents a barrier. With rapidly changing technology and legislation, many facilities do not have the resources to follow trends and new applications in telehealth. Funding opportunities may be offered by state and federal agencies that healthcare networks are unable to take advantage of simply because they are not aware that the funds are available. Rural healthcare networks track a large number of issues on a daily basis, and unfortunately telehealth funding opportunities slip through the cracks. Therefore, for many of these rural clinics, assistance with finding and applying for funding opportunities could go a long way toward expanding the telehealth services that they offer.

RECOMMENDATIONS

Throughout this process, the goal has been to do more than simply identify current attitudes and issues related to promoting telehealth services in rural portions of Michigan. The goal is to address the needs that currently prevent rural residents and healthcare networks from embracing these services. Despite the numerous potential benefits of adopting telehealth services, and the presence of nationally recognized telehealth applications being offered to rural Michiganders, many are still not able or willing to use these tools.

This study has identified six primary issues that prevent rural Michiganders in these portions of the state from using telehealth services. Some of these are issues faced by patients, such as low levels of access or a sense of discomfort using internet applications, particularly those that deal with such sensitive topics.

Other issues stem from the state's policies toward compensating providers for their time and expertise when they use telehealth applications. Yet other issues stem from the lack of a centralized source of information about policies, best practices, and funding that can be put to use by telehealth practitioners.

Access to, and use of, home broadband service is too low, particularly in rural areas, making it less likely that residents can use telehealth services at their homes.

Many healthcare provider networks have access to reliable and consistent communication systems, but patients are not as fortunate. Hospitals, health centers, and clinics have spent years and millions of dollars developing sophisticated communications systems, whereas patients are limited by their currently available internet technology. This means that thousands of Michigan households are incapable of connecting to broadband from home, thus preventing them from using telehealth tools. The majority of those residents live in rural portions of the state.

According to a study by the Pew Research Center, more than one in three rural American adults (37%) do not subscribe to home broadband service in 2019, compared to only 25% of urban adults. Among households in the rural counties surveyed by Connected Nation Michigan, only 60% subscribe to home broadband service. The reasons for not subscribing vary from household to household; some live in areas where broadband service is not available, while others may not be able to afford it, do not have the technical skills to make it feel worthwhile, or do not see a benefit of subscribing to home broadband service. Each community faces its own unique set of challenges, yet two issues arose as barriers to accessing broadband in a way that makes telehealth usage possible: a lack of available service and a lack of digital literacy skills. To make telehealth applications available for all rural Michiganders, both of these issues must be addressed. Without the ability or the digital literacy skills needed to access the internet, patients are often unable to fully benefit from the use of telehealth applications.

Our study therefore recommends taking the following steps to address this issue:

RECOMMENDATION 1A

Michigan should follow through on the steps laid out in the Michigan Broadband Roadmap.

In 2018, the Michigan Consortium of Advanced Networks (MCAN) released a series of recommendations as part of its Michigan Broadband Roadmap report.[5] This consortium, brought together by the Office of the Governor and representing a diverse group of public and private entities, recommended steps the state could take to improve broadband access and adoption among its residents. Since that report's release, though, the state has been slow to implement many of those recommendations. Some of the many recommendations included in this report include:

• Taking steps to support partnerships for infrastructure deployment in Michigan communities

• Improving current efforts to collect information on broadband access and utilization

• Increasing available backhaul (or middle-mile broadband) capacity

• Creating a long-term commission focused on broadband issues

Using this Roadmap as a guide, there are numerous long-term and short-term steps that the state can take to improve broadband access and adoption. As such, state policymakers should re-examine the Michigan Broadband Roadmap and use it to direct their decisions to follow through with more of the recommended policy actions included within.

5 https://www.michigan.gov/documents/snyder/MCAN_final_report_629873_7.pdf

RECOMMENDATION 1B

Michigan should support the creation and dissemination of content to educate residents about how to access and use the internet.

For many rural Michigan households, the biggest barrier to home broadband adoption and usage is a lack of digital literacy skills. This sense of discomfort or lack of skill prevents those Michigan residents from using telehealth applications. Digital literacy programs can help consumers overcome the technical barriers to broadband adoption by educating residents and giving them a better sense of control over their online presence.

In surveys conducted by Connected Nation Michigan in these five rural counties, more than one in four respondents (26%) reported being very or somewhat concerned that their familiarity with using a computer or the internet would prevent them from using telehealth tools.

Potential telehealth users need assistance to help them overcome their concerns regarding computer and internet use. This assistance can come in the form of classes, seminars, or training provided by entities they trust that teach them about online safety and steps they can take to ensure their information is safe, how to differentiate between safe and dangerous online practices, and what steps providers are taking to protect their information, allowing them to make more informed decisions.

Others may need help learning the fundamental steps of how to use a computer or how to access the internet in order to feel comfortable going online for telehealth applications. Access to assistance with basic IT support or help dealing with common issues on their computer or smartphone will enable individuals to successfully access the benefits available from telehealth tools. Each community will have its own unique barriers in terms of its digital literacy training needs; for that reason, targeted training opportunities in the form of local forums, outreach efforts, or summits, hosted by and partnering with trusted local entities, will allow communities to overcome their digital training gaps.

RECOMMENDATION 1C

Michigan should collaborate with local leaders, educators, libraries, and other Community Anchor Institutions to identify local technology information gaps and work toward closing those gaps.

Every community has its own unique barriers to home broadband adoption and usage; no two communities will face the same challenges. To this end, communities must be able to identify who is disconnected from broadband and what prevents those individuals from using the internet. Only when those challenges have been identified can they be addressed; unfortunately, many rural communities across the state do not currently have that information available to them in order to make informed decisions.

As such, it is necessary for all levels of government and community institutions to work together to identify and address those needs. Communities can establish partnerships with libraries, hospitals, colleges, and other Community Anchor Institutions to develop mentoring programs that will train local residents in digital skills. These partnerships will promote the importance of being digitally literate to stay safe online, improve job skills, and access online services such as telehealth applications offered by local healthcare providers.

Rural Michiganders have concerns about the safety of their online information, particularly the type of sensitive data that is shared through telehealth applications.

While technology continues to advance, accessing it remains subject to the willingness of patients to change how they participate in their healthcare activities. Not all patients are comfortable accessing healthcare remotely; two out of three survey respondents (66%) cited the security of their sensitive information as something about which they were very concerned or somewhat concerned. Patients must be willing and able to communicate with a provider online, whether that means communicating with remote providers at a healthcare facility or connecting with providers via the internet from their homes or workplaces. In order to do this, patients and healthcare providers must be educated on how to access and use online tools, feel comfortable interacting online, and be prepared to change their current practices.

If patients are given the proper information and taught how to protect their data online, these fears can be dispelled. This would result in a more confident consumer base who would feel more comfortable using telehealth tools on a regular basis. We therefore recommend taking the following steps to address this issue:

RECOMMENDATION 2A

Tap into the knowledge base of educators at Michigan colleges and universities to determine the best methods to teach the public about online data security to help them feel more comfortable with using telehealth applications.

Michigan's network of colleges and universities has a wealth of knowledge regarding information technology, data security, and principles of learning. All of these elements will be necessary to provide the most effective curriculum to help educate residents about ways to protect their online data. These untapped resources should be brought in as partners and collaborators to help design the most effective training tools that will help the greatest number of rural residents learn how to protect their online information, identify potentially risky online activities, and how to safely share information with telehealth applications in a way that minimizes their online risks.

RECOMMENDATION 2B

Support opportunities for residents to learn more about online safety, as increased digital skills training results in a greater sense of control over what information is shared, and with whom.

For many rural residents, concerns about online safety and protecting their online information prevent them from using telehealth services. Data privacy is the top concern for rural residents who were surveyed about telehealth usage, cited as very concerning or somewhat concerning by two out of three respondents. In addition, CN Michigan's 2014 ResidentialTechnology Assessment showed that one in ten rural Michigan residents who did not subscribe to home broadband service said that the lack of digital skills was the main reason for not subscribing.

Education is the tool by which this barrier can be overcome. This training should be localized to address the specific needs that face each community. They can also benefit from partnerships between thought leaders with knowledge on how to teach individuals about technology usage and local leaders who can provide support and provide an environment which will encourage learning. Such efforts, if designed and executed well, can help more individuals feel comfortable using telehealth applications with a firm grasp of what steps they can take to ensure that their information remains safe.

RECOMMENDATION 2C

Provide opportunities for healthcare providers to share what steps they are taking to protect consumer information.

Healthcare providers have spent hundreds of hours and hundreds of thousands of dollars on their telehealth networks. If patients feel uncomfortable using those tools, though, or are unaware of their existence, then they will not get used to their full extent. Healthcare providers take extensive steps to protect their patient's data, and knowing how well that data are protected will be an incentive for some to more fully embrace telehealth applications.

To that end, increasing the number of opportunities where healthcare providers can educate the public about their available telehealth tools will result in a greater sense of comfort using those tools, and in turn, more residents using them. Michigan health networks have world-class quality telehealth tools for diagnosing and treating a number of ailments, and the effort that has gone into developing those networks should be shared with a greater number of residents.

By taking advantage of local summits, health fairs, and other opportunities to meet with the public to discuss the benefits and opportunities represented by telehealth tools, local healthcare providers can increase the number of telehealth patients.

ISSUE 3

Telehealth services are not reimbursed or are reimbursed at lower rates than in-person healthcare services, creating a financial disincentive to expand the provision of telehealth offerings. This promotes less-efficient use of Medicare/Medicaid dollars as more patients are directed to emergency rooms, rather than taking preventative measures beforehand.

Policy- and decision-makers should examine the way Michigan allows Medicaid and private insurance to reimburse for telehealth services in comparison to steps neighboring states have taken. Telehealth allows patients to be evaluated by healthcare providers regardless of location. Therefore, it is important to provide continuity of care across state lines. Further, with Medicaid and Medicare being federal programs, implementation of the reimbursement structures should be consistent with the intent set forth at the federal level. Additionally, many third-party payers operate on a national level. As a result, determining what is working as well as what is not working in other states can set forth a foundation from which to build consistent policy and implementation.

RECOMMENDATION 3A

Conduct a cost-benefit study to determine how much (if anything) can be saved by increasing reimbursement options for telehealth services.

An important component when looking at telehealth both in Michigan and across the country is the cost and benefit of increasing the acceptance of telehealth through more broad reimbursement. Right now, telehealth services are largely reimbursed with a reduced co-pay amount for patients. As a result, consumers save money and time when accessing services though this modality. Further, telehealth visits can be accomplished at home, at work, or at any location that is convenient for both patients and physicians. A study of the costs to the healthcare system would help demonstrate other areas of potential savings such as less costs of bricks and mortar facilities, reduced costs of travel, and increased efficiencies for both patient and provider when attending appointments.

RECOMMENDATION 3B

Strengthen legislation to update definitions and provide stricter penalties that will ensure greater guidance and create greater deterrence to Medicaid and insurance fraud through telehealth services, ensuring such activities will be reined in.

An important concern about telehealth adoption is the potential for fraud. The best way to efficiently utilize scarce healthcare dollars is to ensure the elimination of fraudulent claims and reduce "doctor shopping" through telehealth tools, which can lead to duplication of tests and procedures as well as overmedication.

RECOMMENDATION 3C

Adopt both coverage and reimbursement parity policies for Medicaid services.

While Medicaid is a federal program, the administration of and distribution of Medicaid dollars takes place at the state level. Therefore, state Medicaid programs should work toward a consistent interpretation through which telehealth services can be reimbursed at locations outside of hospitals and clinics. To truly accomplish costs savings, the system must be adaptable to the changing technological environment. Forcing patients back into a clinical setting does nothing to create either time or monetary efficiencies.

RECOMMENDATION 3D

Adopt reimbursement parity policies for Michigan patients covered under private insurance.

Consistent with the recommendation above, policies for private insurers should be developed on a parallel track. Any discrepancy in coverage between public and private payer sources creates separate standards of care. All patients should be extended the same benefits and efficiencies through the provision of telehealth services.

ISSUE 4

Healthcare providers need additional funding to support the expansion and improvement of offered telehealth services.

Healthcare providers that have expanded their services to include telehealth have done so largely at their own expense. Many rural areas throughout Michigan have neither the technology nor the internet capacity to fully develop a comprehensive network. Consequently, the private sector has had to absorb those financial risks by funding infrastructure to provide additional services to patients. This situation is exacerbated by the reimbursement issue discussed in issue 3. To ensure that providers will continue developing telehealth options, additional resources should be directed to ensure access for patients.

RECOMMENDATION 4A

Create opportunities where healthcare network experts can identify and benefit from state and federal grants.

Utilizing existing public and private resources is a great first step in funding access to telehealth. Compiling that data into a useful and comprehensive format will make it easier for providers to determine eligibility for certain programs; this could include a database of existing state and federal monies that can be used to enhance telehealth offerings. Additionally, knowing where resources exist can help facilitate healthcare providers' interest in developing or expanding programs and increase competition.

Once the information is made available to healthcare providers, they must take steps to apply for the funding. To assist with this, efforts should be made toward supporting access to experts in grant writing who can help health networks successfully apply for federal grants.

Bring healthcare providers together to help share best practices regarding applying for and using available grants.

Best practices come from experience. And, sharing experiences between provider groups can help facilitate high-level discussions about successes, failures, and overall operational expertise.

Keeping provider groups separate creates silos of information without continuity among the healthcare landscape. With payers and government regulators working toward portability of patient information, comprehensive, collaborative systems will make things much more consistent for patients.

ISSUE 5

Telehealth technology systems are not integrative; typically health systems that want to provide telehealth services must adopt/learn new tools and procedures for each telehealth application, and often those applications do not mesh with telehealth tools being used at other health networks, reducing the ability to share information.

Expanding telehealth services involves learning a number of new technologies, redesigning healthcare protocols, and smoothly integrating new online services into a healthcare milieu. This is often hampered by the inability for different telehealth tools or networks to share information or transfer data seamlessly in a user-friendly fashion. Creating telehealth tool networks that integrate smoothly will make it easier for healthcare providers to expand their telehealth offerings. To that end, we recommend the following:

RECOMMENDATION 5A

Encourage institutions of higher learning to create better telehealth software and hardware that can be integrated with a variety of health systems.

Vesting confidence in a separate entity could bring about a product or idea that is not based solely on one provider system or existing entity. This could bring forth new ideas and solutions to the limitations surrounding telehealth technology. Again, a collaboration with stakeholders could maximize outcomes by starting the learning curve at a higher level instead of starting from the beginning.

RECOMMENDATION 5B

Intentionally work to make Michigan's public universities a hub for medical technology engineering and programming through post-doctorate educational offerings, hiring decisions, and state funding

Institutions of higher learning could develop curricula to benefit themselves as well as the healthcare community as a whole. Providing educational opportunities around real-life issues can facilitate enhanced student experiences and increased community gains.

RECOMMENDATION 5C

Encourage private-sector engineering and software design firms to focus on this issue through tax abatements, funding, and promotion to national and international markets via the Pure Michigan Business Connect initiative.

In addition to public institutions of higher education, the private sector in Michigan can boost telehealth usage by designing and implementing new tools for healthcare providers. The state of Michigan can encourage this work, attract more high tech medical equipment businesses to the state, and develop a reputation as a medical technology powerhouse by supporting private sector medical technology companies through various means.

ISSUE 6

Support for telehealth services in Michigan is scattershot, relying on a handful of national organizations and constant monitoring by a variety of sources to stay up to date.

Some healthcare providers feel like they are adrift in a sea of information. Best practices, funding opportunities, and sources of support seem difficult to find, particularly in a constantly changing world of telehealth services. Making it easier for healthcare networks across the state to share information and learn about new opportunities would enhance their ability to expand their telehealth service offerings. There are several actionable steps that can help address this issue.

RECOMMENDATION 6A

Designate an office, individual, or neutral non-profit entity that will provide information about telehealth resources to healthcare networks and patients.

The state of telehealth is in constant flux, and it is an inefficient use of time and resources to require each healthcare network in the state to seek out every opportunity to advance its healthcare network. To ease this burden, the state of Michigan should create or designate an entity that will help state health networks identify funding opportunities, maintain the previously recommended public database, maintain a public one-stop location for patients to learn what telehealth services are offered near them, and advocate for increased federal funding and access to programs that will enhance telehealth usage in the state.

RECOMMENDATION 6B

Support and fund research to determine the economic and sociological impact of using telehealth applications in the state as well as best practices in telehealth service provision.

As new telehealth applications are designed and introduced, communities will see an increasing number of benefits for supporting and implementing those tools. Focused research on the benefits of telehealth implementation in rural communities is essential to determine how telehealth tools are being used, and what gaps exist between the services offered and those that patients are using. Ongoing studies into the economic and community benefits of implementing telehealth applications can help demonstrate how telehealth tools can be most efficient, how communities are actually benefiting from these applications, and how healthcare networks can more efficiently design and implement such programs.

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Telemedicine Market Size By Services (Tele-consulting, Tele-monitoring, Tele-education/training), By Type (Telehospital, Telehome), By Specialty (Cardiology, Gynecology, Neurology, Orthopedics, Dermatology, Mental Health), By Delivery Mode (Web/Mobile {Telephonic, Visualized}, Call Centers), Industry Analysis Report, Regional Outlook (U.S., Canada, Germany, UK, Italy, France, Spain, Russia, Poland, The Netherlands, Belgium, Sweden, Switzerland, China, Japan, India, Australia, Brazil, Mexico, South Africa, Saudi Arabia), Type Potential, Competitive Market Share & Forecast, 2019 – 2025. Report ID: GMI3129. Global Markets Insights. March 2019.

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ATTRIBUTION

Connected Nation (CN) is an organization dedicated to expanding the access, adoption, and use of broadband and broadband-enabled technologies. As a 501(c)3 nonprofit organization, we believe that everyone should have opportunities to improve their lives, families, and communities regardless of who they are, where they live, or how they begin. We develop and provide the tools, resources, and methods that help states and communities create and implement solutions to their broadband and digital technology gaps. We assess and plan for the expansion of broadband access, adoption, and use. We empower people with technology skills and resources to improve their quality of life, and we develop public-private partnerships to bring technology access to targeted geographies and population.

Connected Nation, through its Connected Nation Michigan (CN Michigan) efforts, has been working to address broadband and technology challenges in the Great Lakes State since 2009. CN Michigan is a subsidiary of CN and operates as a nonprofit in the state of Michigan. CN Michigan has partnered with the Michigan Public Service Commission to engage in comprehensive broadband planning and technology initiatives as part of a national effort to map and expand broadband and believes that technology, especially widespread access, use and adoption of broadband, improves all areas of life.