

Approaches to Improving Healthcare Accessibility
in
Rural United States

An STS Research Paper
presented to the faculty of the
School of Engineering and Applied Science
University of Virginia

by

Christian Anton

March 17, 2023

On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

Signed: _____

Approved: _____ Date _____

Peter Norton, Department of Engineering and Society

Preface

How have public health authorities sought to optimize responses to the coronavirus pandemic? Demands on emergency responders and other medical personnel have risen since the pandemic, especially in underserved rural areas.

Ventilators are costly and can be difficult to use without training. To simplify cable management and improve ease of use, the research team designed and prototyped a 3D-printed manifold and tubing sleeve for Ventis Medical's emergency-use ventilator. The prototype was developed in 3D modeling software and modified iteratively in response to test results. This resulted in assembly time reduction by an average of 3.4 seconds respectively.

In the United States, following the coronavirus pandemic, healthcare providers, public agencies, companies, and local advocacies have sought to improve healthcare access in rural communities by ensuring specialized infrastructure is catered towards these areas.

Introduction

More than 59 million people live in rural United States. For them, access to healthcare is often limited, and digital, financial and health literacy can be deficient (HRSA, n.d.). The relevancy is high post-coronavirus pandemic due to difficulties with remote patient care and limited interactions. Health disparities arise as lower-income households are less likely to have health insurance and seek care. The lack of healthcare options in these areas prompts the attention for long-term actions that negate the effects of the pandemic. While approximately 20% of the U.S. population lives in rural America, barely 10% of the nation's physicians practice in rural areas (Gudbranson et al., 2019). Efforts have been made by various participant groups to increase the amount of healthcare workers in rural areas.

The National Quality Forum (NQF), a non-profit focusing on patient protections and healthcare quality through public reporting, developed the Measure Applications Partnership (MAP) Rural Health Workgroup – this aimed to enhance rural patients’ understanding of their health information to improve access. Aside from non-profits, Homeward, a new healthcare startup, is partnering with Rite Aid to provide primary care in rural Michigan and potentially stores nationwide. Federally-funded programs also help the cause as the California Oregon Medical Partnership to Address Disparities in Rural Education and Health (COMPADRE) program allows medical schools at OHSU and UC Davis to create a graduate medical education where students will train under faculty and community physicians at differing health systems to serve rural, under-resourced areas throughout Northern California and Oregon. The coronavirus pandemic made social distancing necessary, constraining personal interaction. Lockdown efforts cause many health organizations, nonprofits and local advocacies to provide creative care methods to communities affected by COVID-19. These efforts impose an effort to research how public health authorities seek to optimize response to the COVID-19 pandemic.

The post-pandemic challenges facing rural America pose an increased concern for healthcare demands; building new infrastructure in these areas is a popular yet complex solution due to limited resources and willing physicians to work in these areas. Advocacy groups and federally-funded programs are able to improve healthcare conditions for rural areas through increased telehealth opportunities, prioritizing education efforts for health literacy within communities, financial incentives for healthcare workers and creating channels to deliver healthcare in existing stores (e.g., pharmacies, drug stores, retailers).

Review of Research

Health literacy is the foundation of a person's knowledge on how healthcare affects themselves and their community on a broader scale. Low health literacy reduces access to care and other resources, creating an environment that inhibits patient treatment. Kent (2018) highlights that the NQF is improving patient health literacy and reducing out-of-pocket costs in lieu of rural communities. Main issues dwelling on them are costs, inaccessibility and lack of understanding between patients and clinicians. Kent emphasizes the NQF's efforts in improving patient-clinician relationships and communication of health information, insurance information and the significance of healthcare as a whole to provide better, effective care.

Another issue affecting rural access to healthcare is the lack of transportation and the long travel distances to clinics. With COVID-19 restricting in-person access, telehealth and virtual forms of care are becoming more prevalent. However, rural communities do not have adequate technology and the infrastructure to withstand the evolving forms of patient care. The Health Resources and Services Administration (HRSA, n.d.) provides financial aid to rural communities in the United States geared towards funding for clinics, public insurance and workforces. The Federal Communications Commission (FCC, 2022) has provided funding for telehealth resources for rural communities, fostering a greater ability for broadband networking and patient care.

Mobile health clinics have increased in popularity due to its unique service model. Landi (2022) highlights the efforts of healthcare startup, Homeward, to provide rural clinical services through partnership with Rite Aid. Foster (2023) also states similar efforts by Dollar General (DG) partnering with urgent care services company, DocGo On-Demand, to provide mobile health clinics in rural Tennessee populations outside of DG stores. Elimination of long travel

distances for care is an advantage, as mobile health vans are parked outside stores for use. These programs also work with certain insurance companies, providing a wide range of in-network services.

While direct funding and short-term solutions are easy fixes for the problem of rural care, Koldas (2022) explains the importance of training and exposing the next generation of medical professionals to these areas. Koldas highlights the National Health Service Corps (NHSC) program, which provides financial incentives such as scholarships and loan repayments to entice current medical graduate students to work in communities with health professional shortages in the future.

Importance of Health Literacy Among Rural Communities

High health literacy is needed to use relevant health information and implement it in the daily lives of patients. Low health literacy can be a barrier to accessing safe and effective healthcare, impact doctor-patient relationships and can potentially lead to frequent hospital visits. (Berkman et al., 2011). Low health literacy can create a pattern of service that drains resources in these hospitals, causing financial burdens for both parties. Factors that contribute to low health literacy include but are not limited to: low income, physical/mental disabilities, low education level, ethnicity (primarily Black and Hispanic in the United States), cultural association and low socioeconomic status (Bush et al., 2010); most of these factors are prevalent in rural communities, putting them at higher risk for low health literacy. Specifically, cultural association may have an influence on rural communities as certain beliefs and practices may be adopted relating to health, leading to poorer health outcomes. The National Quality Forum uses a two-fold approach to increase health literacy involving “education for both patients and

clinicians on the importance of patient engagement in healthcare” and “clinician-patient communication overall” (Kent, 2018). Other nuances such as monitoring insurance plans and availability of clinicians in-network were recommended by stakeholders to improve timeliness of care.

Nonprofit organizations also advocate for rural communities. In Florida, many Latinx communities, specifically farmers, “were afraid... many of them were working while everybody else was buying groceries to quarantine at home” (Xiuhtecutli & Shattuck, 2021), María Carmona, an organizer from the Farmworker Association of Florida (FWAF, n.d.), explains. To counter this, the FWAF served as a distribution center by receiving and giving donations to help alleviate food inaccessibility driven by the pandemic for Latinx farming communities. In addition, the FWAF provides educational videos in multiple languages to help rural Latinx communities understand COVID-19 risks and provide testing (Silvert et al., 2021). Overall, it’s not enough to ensure there are healthcare channels for rural communities – prioritizing health literacy and helping rural communities understand the significance of their well-being is equally important.

The Impact of Federally-funded Programs on Rural Healthcare Access

Some national organizations serve to increase accessibility of cost-effective healthcare to rural communities by providing aid to compensate for the lack of infrastructure. The HRSA has contributed \$234.3 million to rural health clinics across the US for COVID-19 testing in May 2020 (HRSA, n.d.). The HRSA also provides grants to community health centers, supporting their workforce and reimbursements through public insurance. Early in the pandemic however, vaccinations were focused mainly on healthcare workers in densely-populated, urban areas

compared to those in rural areas. This led to “the impetus for the administration to set up this program to have a direct supply of vaccines to health centers who have long standing relationships with their communities” (Temin, 2022) Suma Nair, director of the Office of Quality Improvement at the HRSA, states. By doing this, it encourages community outreach and brings individuals to these health centers to get the medical attention needed.

Federal agencies also increase funding through the COVID-19 Telehealth Program, allowing health-care providers to purchase equipment for telehealth care. The FCC made it easier for broadband providers to support telehealth through improved Wi-Fi capabilities. An additional \$42.19 million funded by the FCC ensured more resources to improve telehealth needs (FCC, 2022). The FCC also oversees funding of rural telehealth through the Universal Service Fund (USF), used to see if low-income households qualify for long distance telehealth care. This is not to be confused with “a deployment “grant” program... because it does not provide the upfront capital necessary to construct networks,” Michael Romano, Vice President of the National Telephone Cooperative Association (NTCA, 2022) states. The USF merely provides support over a period of time to help recover costs and enable deployment, but does not finance it.

The National Telephone Cooperative Association (NTCA), a trade association representing nearly 850 independent, community-based telecommunications companies, works with the FCC in funding the digital development of rural communities. While funding and grant programs are in effect to help rural communities, “we cannot forget that it is equally important to sustain those networks once they are deployed and keep services affordable” (NTCA, 2022) – Shirley Bloomfield, CEO of the NTCA, claims in a press release regarding the FCC’s report to Congress about the future of the USF. In response, the “NTCA further encouraged the Commission at a minimum to set the stage in the report for thoughtful consideration of how to

update the eroding USF contribution mechanism,” Romano states. Thus, expressing the NTCA’s desire for the FCC to clarify the USF’s purpose and garner further support from Congress in the future. Relevant to the FCC’s demand for clarity, during the first few months of the pandemic, many were “troubled by the lack of transparency regarding the health care providers who have applied but have not yet received an award” (House Committee on Energy & Commerce, 2020), Frank Pallone and Mike Doyle express, whom are chairmen of the Energy and Commerce Committee and the Communications and Technology Subcommittee respectively.

Federally-funded programs and aid from national organizations improve the quality infrastructure and help alleviate issues with rural care access. Thus, help from these entities can aid in the development of rural areas by streamlining the process of improving healthcare access and resource allocation.

Improving Accessibility of Healthcare Through Existing Consumer Channels

Resource limitations foster a lack of health infrastructure. Infrequent transportation of medicine, limited product selection and lack of practicing physicians in the area are all limiting factors that prevent adequate care. With up to 700 Rite Aid locations, Homeward “will start providing in-network clinical services... using its mobile van parked in Rite Aid parking lots” and will be offered to Medicare and Medicare Advantage members (Landi, 2022). The main objective of this partnership is to “make it convenient and accessible for patients who live in rural areas, where people typically drive multiple hours to the closest large health system,” Jennifer Schneider, M.D. and CEO of Homeward stated. Homeward’s mobile, community-based care model will help patients get introduced to annual wellness visits, screenings, risk

assessments and diagnostic testing. If needed, Homeward clinicians can refer members to regional health systems and specialists for complex care. To address secondary care, “we can collaborate with other organizations and providers to expand and diversify our services,” Thomas Siemers, CEO of Wilbarger General Hospital states (Muhammad & Dyrda, 2023). The collaboration of third-parties with existing providers help bridge the gap that other potential solutions fail to close (e.g., telehealth). By focusing on convenience and efficiency in the form of smaller-scale health services rather than larger entities, time of patient care can be reduced and more people can be attended to.

Healthcare through mobile platforms have been increasing in popularity – not to be confused with telehealth however. While both share similarities, mobile healthcare is not solely an emergency service but instead also provides high-quality medical care for common symptoms, pediatric and family care and COVID-19 testing. The feasibility of appointment scheduling and contacting medical services is an advantage over telehealth. The ability to call, text and make an appointment online gives rural communities an easier time to contact for medical attention. DocGo On-Demand is a mobile healthcare business that helps streamline the process of asking for medical care and uses the methods for contact mentioned previously; DocGo also has a mobile app where users can schedule appointments from there, further easing the process. While most mobile healthcare services do not have urgent care capabilities, DocGo has in-home urgent care services in many parts of New Jersey and New York (DocGo, n.d.), improving efficiency and time of care.

Similar to Homeward, DG is implementing a new program partnering with DocGo called “DG Wellbeing” in three rural locations near DG’s headquarters of Goodlettsville, Tennessee. This partnership will “provide services including annual physicals, acute illness, urgent care

needs, vaccinations, and lab testing,” Dr. Albert Wu, DG’s chief medical officer stated. DG’s purpose in this initiative is to work with customers and bring affordable healthcare closer to home while equally establishing DG as a trusted partner for medical services in rural areas. DocGo mutually benefits, as “improving healthcare accessibility and providing care to patients where and when they need it most is our primary goal” Aaron Severs, chief product officer at DocGo stated (Foster, 2023). The in-home model of this service is especially important due to 26% of rural adults in the US saying there have been times in recent years when they needed healthcare but did not receive any. Out of the 26%, reasons to the lack of healthcare include 45% of them could not afford it, 19% could not find a doctor that would take their health insurance, 23% found it difficult to travel long distances to the nearest clinic and 22% had difficulty scheduling an appointment (Robert Wood Johnson Foundation, 2019). DocGo alleviates the issues mentioned previously through its ease of use, flexible health insurance options, appointment scheduling capabilities through its mobile application, texts and call capabilities. Also eliminating the need to travel as the company provides in-home services. Even if people do not prefer in-home services, DG is establishing these DocGo services outside of their stores in the form of mobile health "van clinics" in store parking lots, close to rural communities. Furthermore, “over 75% of the U.S. population lives within five miles of a DG location,” DG stated, recognizing the unique accessibility the company has in rural communities and the potential for further expansion. Alongside the patient services DocGo will offer, assortments of cough and cold, dental, nutritional aids and feminine hygiene products will now be carried across many DG stores.

In turn, Homeward and DG are increasing the capabilities of mobile health clinics by partnering with bigger companies and using their resources to further support and market their services for the benefit of rural communities.

Financial Incentives as a Tool for Increased Rural Care

With a disproportionate amount of physicians in rural versus urban areas, “patients have to travel 70 miles to see a physician at the nearest hospital and often even farther,” Joy Anderson, who runs a community health center in Fossil, Oregon states (Jaret, 2020). Instead of traveling to providers, incentivizing physicians to work in rural areas may improve recruitment. With a \$1.8 million AMA grant, the main objective of the COMPADRE program is to improve the lack of physicians in rural areas and “better prepare residents for practice in under-resourced communities,” Mark Servis, M.D., Vice Dean for Medical Education at UC Davis states (White, 2019). Students in the program are incentivized with medical school application guidance, financial aid resources and valuable work experience by working in rural areas. This program sets the tone for potential influence of the younger generation of physicians to practice in underserved communities and create significant health networks within.

The NHSC Scholarship Program provides financial support in exchange for students pursuing a degree in primary health care to practice in communities with limited access to care for a minimum of two years after awardees obtain their degrees and licenses. Approximately 10% of applications receive this competitive scholarship that goes towards tuition and eligible fees, monthly stipend for living expenses and an annual other reasonable costs payment (HRSA, 2023). Along with financial aid, the NHSC is “about helping the community, being part of the community, and also being educators and advocates for your patients’,” says Vanessa Bustos, a

first-year Rutgers School of Dental Medicine (RSDM) student and University of Virginia alumni (Koldas, 2022). Bustos, who majored in public health as an undergraduate, “noticed how important it was to communicate basic yet preventative information to patients.” Tying into health literacy, Bustos was drawn to the program due to her own personal experiences – her family being from Colombia posed a language barrier for the United States healthcare system. Diversity in health care is important for health, digital and financial literacy and with help from the NHSC program, Bustos can fulfill her mission to help other families that experienced the same troubles as her own. Aquine Kujaruk, a fourth-year RSDM student part of the same program states that “it will not only be a financial relief but also allow them to work with underserved populations.” Kujaruk also credits the program allowing her to “cultivate her interest in dental public health and dental rehabilitation, which sprouted during her RSDM career,” (Koldas, 2022). The NHSC program has helped students foster their interest in medicine and increased working physicians in rural areas by using financial incentives for graduate students.

Graduate programs using incentives to entice students is one way to increase the amount of medical care available to rural areas. The likelihood of retention in these areas post-graduation is higher, due to the exposure and familiarity these programs provide for students (World Health Organization, 2020).

Conclusion

In conclusion, the substantial public health efforts associated with post COVID-19 and its potential contribution to health inequity in rural areas is indicative of the increasing demand for the issue. While federally-funded programs, health literacy improvement, financial incentives

and improvements in healthcare consumer channels are only a few possible solutions, they are certainly contributing to significant positive impacts for rural communities in recent years. With the development of technology channels via telehealth and mobile applications along with an increase in technical and health infrastructure improvements, rural communities are becoming digitalized. Rural communities should be guaranteed access to basic healthcare services even if the efforts are limited by distance, finances and lack of physicians. Medical professionals and national organizations alike should strive to contribute to this cause and ensure the delivery of quality medical care for all.

References

- Berkman, N., Sheridan, S., Donahue, K., Halpern, D., Crotty, K., (2011) Low Health Literacy and Health Outcomes: An Updated Systematic Review. *Annals of Internal Medicine*. (n.d.).
<https://www.acpjournals.org/doi/full/10.7326/0003-4819-155-2-201107190-00005>
- Bush, P. R., Ostini, D. R., Ozolins, D. I., Brabant, D. M., Soto, D. E. J., & Eriksson, M. L. (2010). *Advancing Health Literacy Through Primary Health Care Systems*.
- DocGo On-Demand In-Home Urgent Care—Insurance Accepted. (n.d.). *DocGo*.
<https://docgo.com/ondemand/>
- FCC. (n.d.). Federal Communications Commission. Connecting Americans to health care.
www.fcc.gov/connecting-americans-health-care
- Foster, J. (2023). Dollar General pilots new mobile health clinics with 2 in Clarksville.
ClarksvilleNow.Com.

<https://clarksvillenow.com/local/dollar-general-piloting-new-mobile-health-clinics-at-three-locations-two-of-those-in-clarksville/>

Gudbranson, E., Glickman, A., Emanuel, E., (2017). Reassessing the Data on Whether a Physician Shortage Exists. *JAMA Network*.
https://jamanetwork.com/journals/jama/article-abstract/2613209?casa_token=HaTn9mtYg4AAAAA:9LiflB6loafavNPmyekOprkAISrNA8K-Z95kHkVJJZKF7OxotwDyv64qbLhr8PYbSFM3JE8s

House Committee on Energy & Commerce. (2020). Pallone & Doyle Request Public Transparency for FCC's Covid-19 Telehealth program. *Democrats, Energy and Commerce Committee*.
www.energycommerce.house.gov/newsroom/press-releases/pallone-doyle-request-public-transparency-for-fcc-s-covid-19-telehealth

HRSA (n.d.). Health Resources and Services Administration, Department of Health and Human Services. *Defining Rural Population*.
<https://www.hrsa.gov/rural-health/about-us/what-is-rural>

HRSA. (2023). National Health Service Corps Scholarship Program, School Year 2023-2024 Application & Program Guidance. *HRSA*.
<https://nhsc.hrsa.gov/sites/default/files/nhsc/scholarships/scholarship-application-guidance.pdf>

Jaret, P. (2020). Attracting the next generation of physicians to rural medicine. *AAMC*.
<https://www.aamc.org/news-insights/attracting-next-generation-physicians-rural-medicine>

Kent, J. (2018). Health Literacy Education Key to Rural Population Health, Care Access. *HealthITAnalytics*.
<https://healthitanalytics.com/news/health-literacy-education-key-to-rural-population-health-care-access>

Koldas, K. (2022). Three RSDM Students Receive National Health Services Corps Scholarship. *Rutgers School of Dental Medicine*.
<https://sdm.blogs.rutgers.edu/2022/10/three-rsdm-students-receive-national-health-services-corps-scholarship/>

Landi, H. (2022). Startup Homeward inks partnership with Rite Aid to provide primary care in rural communities. *Fierce Healthcare*.
<https://www.fiercehealthcare.com/retail/startup-homeward-inks-partnership-rite-aid-provide-primary-care-rural-communities>

Muhammad, M. & Dyrda, L. (2023). What will save rural healthcare? *Becker's Hospital Review*.
<https://www.beckershospitalreview.com/hospital-management-administration/what-will-save-rural-healthcare.html>

- NTCA. (2022). National Telephone Cooperative Association–The Rural Broadband Network. NTCA statement on FCC Future of USF report. www.ntca.org/ruralischool/newsroom/press-releases/2022/16/ntca-statement-fcc-future-usf-report *Mayo Clinic Proceedings*, 92(9), 1382–1400
- Robert Wood Johnson Foundation. (2019). Life in Rural America Part II. *NPR, Harvard T.H. Chan School of Public Health* https://www.rwjf.org/en/insights/our-research/2019/05/life-in-rural-america--part-ii.html?cid=xtw_rwjf_unpd_ini:ruralpoll_dte:20190515
- Silvert, Stone, Diaz, O’Neal (2021). Pandemic Impacts on Florida farmworkers: Emerging takeaways to inform outreach and policy making. edis.ifas.ufl.edu/publication/WC402
- Temin, T. (2022). How one agency made sure vaccines and other Covid medicines reached the poor and underserved. *Federal News Network*. www.federalnewsnetwork.com/people/2022/05/how-one-agency-made-sure-vaccines-and-other-covid-medicines-reached-the-poor-and-underserved/?readmore=1
- White, F. (2019). New partnership seeks to transform health care, graduate medical education in rural California, Oregon. *OHSU News*. <https://news.ohsu.edu/2019/06/05/new-partnership-seeks-to-transform-health-care-graduate-medical-education-in-rural-california-oregon>
- World Health Organization. (2020). Retention of the Health Workforce in Rural and Remote Areas: A Systematic Review. *World Health Organization*. <https://apps.who.int/iris/bitstream/handle/10665/337187/9789240013896-eng.pdf>
- Xiuhtecutli, N., & Shattuck, A. (2021). Crisis politics and US Farm Labor: Health Justice and Florida Farmworkers amid a pandemic, *The Journal of Peasant Studies*, 48:1, 73-98, DOI: 10.1080/03066150.2020.1856089