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Making Connections: Using a Systems Perspective to Understand Rural Health Disparities

Georgia Health Policy Center

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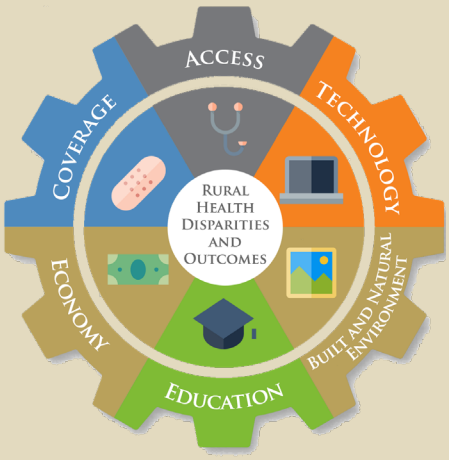
There are a number of troubling population health trends that present challenges to rural health today. Persistent issues like higher rates of risky health behaviors, lower rates of health insurance coverage, and physician shortages are creating pressure on rural health systems to intervene in order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



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

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

RURAL HEALTH DISPARITIES

Older, sicker, poorer. Rural communities across the country share many measures that are associated with poorer health. Compared to urban counterparts and to the nation as a whole, rural areas have a larger percentage of the population 65 years or older,[1] higher rates of poverty (including higher numbers of children living in poverty),[2] lower educational attainment,[3] and lower rates of employer-sponsored health insurance.[4] Additionally, rural Americans engage in riskier health behaviors, including higher rates of smoking and alcohol consumption and lower levels of physical activity when compared to urban and suburban counterparts.[5]

Health disparities, as defined in Healthy People 2020, are those differences in health and health outcomes that are "closely linked with social, economic and/or environmental disadvantage."[6] Health disparities are often experienced by groups of people who face systematic barriers to health based on their race/ethnicity, geographic location, gender and gender identity, religion, or other socioeconomic characteristics that are linked to exclusion or discrimination.[6]

Where one lives can have a significant impact on health. Recently, there have been numerous headlines highlighting the worsening health outcomes for rural residents and the emerging health crises affecting rural communities. Rural

[1] Moy, E., Garcia, M. C., Bastian, B., et al. (2017). Leading causes of death in nonmetropolitan and metropolitan areas — United States, 1999-2014 *Morbidity and Mortality Weekly Report Surveillance Summaries* 66, SS-1.
[2] Farrigan, T., & Hertz, T. (2016). *Understanding the rise in rural child poverty*, 2003–2014. Washington, DC: Department of Agriculture, Economic Research Service. https://www.ers.usda.gov/publications/pub-details/?pubid=45543
[3] U.S. Department of Agriculture. (2017). *Rural education at a glance*. Washington, DC: Author. Retrived from https://www.ers.usda.gov/webdocs/publications/83078/eib-171.pdf?v=42830
[4] NewKirk, V., & Damico, A. (2014). *The Affordable Care Act and insurance coverage in rural areas*. San Francisco: Henry J. Kaiser Family Foundation. Retrieved from https://www.kff.org/uninsured/issue-brief/the-affordable-care-act-and-insurance-coverage-in-rural-areas/
[5] Matthews, K. A., Croft, J. B., Liu, Y., et al. (2017). Health-related behaviors by urban-rural county classification — United States, 2013. *Morbidity and Mortality Weekly Report Surveillance Summaries* 66, SS-5, 1–8.
[6] Office of Disease Prevention and Health Promotion. *Healthy People 2020*. Washington, DC: U.S. Department of Health and Human Services. Retrieved at: http://www.healthypeople.gov/

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Americans are more likely than their nonrural counterparts to die prematurely from the top five causes of death (heart disease, cancer, unintentional injury, chronic lower respiratory disease, and stroke).[7]

The infant mortality rate is often used as a proxy for population health because of the links between poor birth outcomes and health care access, health behavior, and social determinants of health. In the United States, the more rural the community, the higher the infant mortality rate. In 2014, infant mortality in the most rural counties was 6% higher than that in small and medium urban counties and 20% higher than the infant mortality rate in large urban counties. Neonatal mortality rates (deaths within the first 28 days of birth) and post-neonatal mortality rates (infant deaths that occur more than 28 days post-birth) are also higher in rural counties compared to urban counties.[8]

Disparities in mental and behavioral health outcomes in rural communities are notable. A higher prevalence of mental and behavioral health issues is found among children in small rural areas than among those in urban areas. It has been estimated that approximately one in six young children in rural communities had a diagnosed mental, behavioral, or developmental disorder.[9] Rural communities also report higher rates of suicide among adults,[10] with rates of death from suicide among children, teens, and young adults nearly double in rural communities, versus urban ones.[11]

Multiple factors contribute to poorer rural health, including:

- **structural** factors, like limited clinical services located within the geographic area, a shortage of specialty providers, and a lack of access to healthy foods,
- **environmental** factors, like geographic isolation and lack of safe spaces for recreation, and
- **social** factors, like high rates of outmigration and an increasingly older rural population, that bring higher prevalence of chronic disease and need for specialty health care and other supportive services.[12]

These factors play out differently in rural and nonrural areas and this shows up in health outcomes. For example, while a shortage of health care providers, particularly primary care physicians, is a nationwide challenge, rural and frontier communities suffer a more acute workforce shortage.

THE PATIENT-TO-PRIMARY CARE PHYSICIAN RATIO IN RURAL AREAS IS 39.8 PHYSICIANS PER 100,000 PEOPLE VERSUS 53.3 PHYSICIANS PER 100,000 IN URBAN AREAS.[13]

[7] Garcia, M. C., Faul, M., Massetti, G., et al. (2017) Reducing potentially excess deaths from the five leading causes of death in the rural united states. *Morbidity and Mortality Weekly Report Surveillance Summaries* 66, No. SS-2, 1–7.

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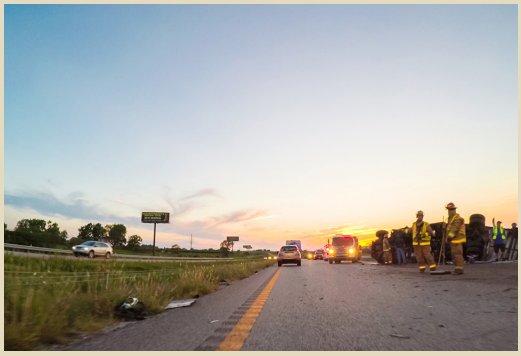
[12] Diez Roux, A. V. (2011). Complex systems thinking and current impasses in health disparities research. *American Journal of Public Health* 101(9), 1627-1634.

USING A SYSTEMS PERSPECTIVE TO DEEPEN UNDERSTANDING



Each of these factors in isolation can contribute to an understanding of why rural communities may experience poorer health outcomes than urban areas, but none of these factors exist or act in isolation. They operate at both the population and the individual level, and they are inextricably connected in reinforcing and balancing parts of a larger system.[12]

A systems perspective helps explain how different elements related to social infrastructures and environmental factors can drive both positive changes (e.g., the availability of healthy and affordable food options in a community can drive healthier food choices by individuals, which in turn increases demand for healthier food) and negative ones (e.g., congested roads may spur investment in additional roads, which in turn often results in increased traffic congestion on those new roads).

As an example, consider unintentional injuries, which include motor vehicle crashes and other accidents, as well as drug and alcohol overdoses. Age-adjusted death rates due to unintentional injuries were approximately 50% higher in rural area when compared to nonrural communities.[7] In 2015, the age-adjusted rate of motor vehicle traffic deaths was three times higher in rural counties than in large metropolitan counties in the United States.[14] There are multiple influences behind this urban/rural difference.

Behavioral factors contribute to higher unintentional injury rates in rural areas, including lower seat belt use, alcohol-impaired driving, and patterns of opioid prescribing and use.[7] In order to understand and potentially address these risky behaviors, it is important to understand the drivers behind them. For example, factors contributing to patterns of opioid use can be mapped to broader dynamics in a community. Opioid misuse may be tied to certain regional and local industries, where workplace injury and need for pain management may have initially established opioid prescribing patterns in a community. Economic factors may also affect opioid prescribing. In one study, researchers found that opioid prescribing was higher in counties with lower median household income and higher unemployment, suggesting that local economic factors are a major contributing factor to rates of opioid prescribing.[15] In this example, we see the confluence of structural and economic factors contributing to behaviors that lead to higher rates of risk-taking behavior.

This situation with unintentional injury is compounded by issues related to the health care delivery system. Patients with access to rapid emergency treatment are more likely to survive injuries.[16] Patients in rural and frontier communities who are injured or suffering from alcohol- or drug-related poisoning face delays in access to treatment because emergency medical services take longer to reach injured patients in rural areas. In addition, rural areas have fewer trauma centers with advanced equipment and specialized staff available to treat injured or drug-poisoned patients at any time of day.[17]

The Need for Rural-Relevant Programs, Policy, and Research

At times, the design and implementation of programs, policies, and research at federal and state levels excludes rural and frontier communities or has unintended, often negative, consequences for rural health systems and outcomes. There are barriers to full participation by rural communities because of the lack of consideration of the unique context of rural settings by many program developers, policymakers, and researchers.

Programs: At the state and federal levels, notices of funding opportunities may set minimum population sizes for eligible applicant communities that eliminate rural and frontier participation. Requirements for certain partners to be present (e.g., larger tertiary care facilities, specialty providers, research universities, regional commissions), as well as requirements for applicants to demonstrate capacity to administer large awards, may exclude smaller entities such as those in rural and frontier communities.

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[13] Hing E, Hsiao C.J. State variability in supply of office-based primary care providers: United States, 2012. NCHS Data Brief, no 151. Hyattsville, MD: National Rural Health Association. Retrieved from https://www.cdc.gov/nchs/products/databriefs/db151.htm.

[14] Centers for Disease Control and Prevention. (2017). QuickStats: Age-adjusted rate of motor vehicle traffic deaths, by urbanization of county of residence — 2005 and 2015. *Morbidity and Mortality Weekly Report Surveillance Summaries* 66(21), 567.

[15] Zhou, C., Yu, N. N., & Losby, J. L. (2018). The association between local economic conditions and opioid prescriptions among disabled Medicare beneficiaries. *Medical Care* 56(1), 62-68.

[16] Gonzalez, R. P., Cummings, G., Mulekar, M., & Rodning, C. B. (2006). Increased mortality in rural vehicular trauma: Identifying contributing factors through data linkage. *Journal of Trauma and Acute Care Surgery* 61(2), 404-409.

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Policy: Across the health care system there are examples of policies that increase barriers to care for rural and frontier communities. Long distances and a lack of rural providers pose significant barriers to care for many rural residents. Alternative models of service delivery like telehealth, care delivered in alternative settings (e.g., a setting other than a clinic or hospital), or care delivered in different ways (e.g., group disease-management sessions or online therapies) could expand access to health and mental health education and services. However, reimbursement policies, state-specific licensing requirements, and limitations on scope of practices for advanced practice providers like family nurse practitioners and physician assistants are significant factors limiting the full realization and sustainability of these rural-relevant models of health care delivery.

Research: There is a dearth of rural-produced and -tested evidence-based practices.[18] One reason is that for ease, researchers developing and testing health and public health interventions often turn to urban settings. The distinctive characteristics of rural settings are less often the focus of published studies, which has implications for the effective transferability and adaptation of evidence-based practices to rural settings. This is important because the compatibility of the setting with an evidence-based program has a significant impact on the implementation process as well as program outcomes.[19, 20] This gap in understanding requires researchers, program practitioners, funders, and supporting organizations to consider the implications of rural settings for evidence-based practice translation.

Innovation: Creative Methods of Expanding Access to Care

Rural communities have strong traditions of formal and informal health networks that expand access to care, improve the coordination of care, build local capacity, and achieve economies of scale across entities.

A regional rural health network in Appalachia provides health information technology (HIT) training and troubleshooting assistance, electronic health record data reporting and analysis support, and needed human and infrastructure capacity to member rural health care clinics and hospitals that are unable to recruit, retain, and support their own HIT staff. A rural health network in the Delta region provides services and supports (e.g., grant-writing, community event planning, staff and provider training, and patient navigation services) to small rural hospitals.

Rural communities adapt staffing models to expand the role that advanced practice providers, health outreach workers, and panel managers play in ensuring access to care and supporting patient engagement. This staffing flexibility is necessitated by constrained budgets and workforce challenges. Nurses often play dual roles — both providing clinical care as well as acting as care coordinators or quality improvement leads. Rural-based hospitals and clinics are developing staffing models that support the provision of care via telemedicine using care coordinators to support patients in their care. For example, rural health care entities in New Mexico are developing innovative contracting and financing models to support community health workers and care coordinators' work to connect patients to care, sustain their engagement with health care providers, and more effectively manage their chronic diseases.

Innovative, Resourceful, Efficient

There are numerous examples of adaptation, effective leveraging, and creative repurposing coming out of rural and frontier communities seeking to address health challenges and improve health outcomes. These lessons can be applied in other communities and can inform work in program, policy, and research development.

Using a systems perspective can help to identify and better understand the various components of the rural system and factors that impact rural health outcomes. Recognizing that the factors that impact health outcomes are complex and interrelated can lead to programs, policies, and research that are designed to support rural assets and build upon existing strengths in rural communities and do not lead to unintended negative consequences for rural health systems, rural communities, and rural residents.

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