
Rurality as a Root or Fundamental Social Determinant of Health

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Introduction

Place matters; it contextualizes health. When examining the influence of community, neighborhood, and social space, researchers from multiple disciplines¹⁻¹⁰ found that geography matters when assessing health status, health service use, health service deficits, adequacy of health care, and health-related behaviors. Where people live, work, and play protects and promotes their health and/or contributes to the health risks they experience.¹¹⁻¹³ Koh et al¹² advocate that all individuals should have an equal opportunity to maximize their health. However, some might experience a health disparity because of where they live. Such disparities, though, are not fixed. Once identified, changes to improve health outcomes and reduce disparities are possible.

A health disparity or health inequity refers to differences in health or health outcomes related to factors such as gender, race, ethnicity, socioeconomic status, or sexual orientation. As government reports such as Healthy People 2020 advocate for the fundamental human justice of addressing avoidable health-related inequities, it is important to recognize the extensive body of public health-related research associating place or geographic locale as a significant factor in identifying populations vulnerable to health disparities. Although there is long-standing awareness of the health inequities for people living in the inner city, there is an emerging body of research acknowledging the importance of rurality in social epidemiology,¹¹ as well as the vulnerability of this specific population.¹⁴

Multiple definitions of rurality exist for both research and policy purposes.¹⁵⁻¹⁹ Determining the specific definition of rural to apply depends on the purpose of the study, the data used in the analyses, and the appropriate and available taxonomy.¹⁷ Although there is no perfect definition of rural,¹⁷ rural communities are typically characterized by being smaller and by their distance from larger communities. What we do know is that, regardless of the exact definition used, when *rural* locale is included in epidemiologic analyses, it is often a significant and independent contributing factor to health-related inequities. For example, rural populations display higher rates of heart disease, major depression, violent injury, and suicide. Although some disparity might be attributed to the demographic composition of rural areas (eg, rural residents tend to be older and poorer), studies consistently show that the context of rural communities frequently surfaces as an independent risk factor.

Hartley¹⁴ urged researchers investigating the health of rural Americans to explore why rural residency impacts health behaviors. He suggested examining the role that community, culture, and environment play in generating disparities. Other researchers⁸ assert that more investigation to examine how and if rural residency affects health behaviors is important to confirm *rural residency as a fundamental social cause*^{20,21} of health. This article examines the position that rural residency in the US is a fundamental social cause or root determinant of health and that the rural context is an independent contributor to the health inequities or disparities experienced by rural residents.

Root or Fundamental Causes

Link and Phelan²⁰ introduced the theory of fundamental causes of health and mortality in the mid-1990s. They also focused on the historical and sociologic persistence of the association between socioeconomic status typically defined as a combination of income, education, and occupation with health and mortality. Socioeconomic status remained a strong independent risk factor even after the reduction or elimination of other specific risk factors and diseases.^{20,21} However, Link and Phelan did not expand the concept of root or fundamental causes beyond socioeconomic status to include a broader array of other factors that constitute social determinants of health, such as discrimination or food security, and which may be root causes in their own right. Social determinants of health (eg, healthy food, adequate housing) are life-enhancing resources, the distribution of which across populations effectively determines length and quality of life, and the lack of these life-enhancing resources is often considered to be the root causes of

health disparities. Nevertheless, by examining and identifying the places where people are at risk of a health disparity, Link and Phelan opened up a provocative debate about what social determinants of health are key contributors to health disparities or inequities. We believe that examining how and if rural residence (culture, community, and environment) affects health status, health care, and health behaviors can affirm rural residency as a fundamental or root social cause of health inequity.

As defined by Link and Phelan,²⁰ 4 features characterize a fundamental social cause. These 4 characteristics are (1) it influences multiple disease or health outcomes; (2) it affects these outcomes through multiple risk factors; (3) it impacts access to resources that may be used to either avoid risks or minimize the consequence of disease; and (4) the association between the fundamental cause and health is reproduced over time through the replacement of intervening mechanisms.²¹ The next section of this article explores the concept of rural residency as a fundamental or root social cause of health inequities by taking these characteristics and posing 4 questions about rural residency.

Rural Residency as a Root Social Cause of Health Inequities

The 4 features that Phelan et al²¹ characterize as essential to identifying a fundamental or root social cause of health inequities can be converted into questions. These questions are as follows:

1. Does rural residency influence multiple disease or health outcomes?
2. Does rural residency affect health outcomes through multiple risk factors?
3. Does rural residency impact access to resources that may be used to either avoid risks or minimize the consequence of disease?
4. Is the relationship between rural residency and health reproduced over time through the replacement of intervening mechanisms?

Question 1: Does Rural Residency Increase the Risk for Multiple Disease or Health Outcomes?

Three diseases, type 2 diabetes,³ cervical cancer,² and lung cancer,²² are among the several diseases or health outcomes that provide empirical evidence for the influence of rural locale or rurality. Regarding the prevalence of type 2 diabetes, using data from 2 national data sets, the Behavioral Risk Factor Surveillance System, and the Medical Expenditure Panel Survey, Krishna et al³ found a higher prevalence of diabetes among rural residents, 7.9% vs 6.0% in Medical Expenditure Panel

Survey and 7.6% vs 6.6% in Behavioral Risk Factor Surveillance System. These differences persisted after adjustment for age, body mass index, insurance coverage, and other demographic characteristics.³

When examining trends and patterns in cervical cancer incidence and mortality, Singh² concluded that during 2000-2008, women in small urban and rural areas had, respectively, 6% and 15% higher cervical cancer incidence rates than women in metropolitan areas. Further, analysis from the same study yielded that starting in the 1960s, nonmetropolitan women had higher cervical cancer mortality rates than women in metropolitan areas.² In 2007, the age-adjusted cervical cancer mortality rate for women in nonmetropolitan areas was 2.9 deaths per 100,000 population; 22% higher than the rate of 2.3 per 100,000 for those in metropolitan areas (relative risk [RR], 1.22; 95% confidence interval [CI], 1.13-1.32).²

A recent study examining cancer trends in Appalachia²¹ revealed that overall cancer incidence rates were higher in that region than in the rest of the US. Although there are urbanized parts of the 12 state Appalachia region, approximately 80% of its 246 counties are considered rural.²³ This study also revealed that the lung cancer rate for Appalachian men was nearly 25% higher when compared with men living in the rest of the US.²² The lung cancer rate for Appalachian women was 8% higher than the rate for women in the rest of the US.²²

Question 2: Does Rural Residency Affect Health Outcomes Through Multiple Risk Factors?

Fruit and vegetable consumption,⁶ childhood overweight and/or obesity,⁵ and smoking tobacco⁷ are 3 specific risk factors that affect health outcomes and, according to recent evidence, are factors influenced by US rural residency or rurality. A national study conducted by Lutfiyya et al⁶ revealed that in comparison with nonrural US adults, rural adults were less likely to consume ≥ 5 daily servings of fruits and vegetables (OR, 1.161; 95% CI, 1.160-1.162). When comparing the prevalence differences between rural and nonrural US adults within a state, 37 states had a lower prevalence and 11 states had a higher prevalence of rural adults consuming at least 5 daily servings of fruits and vegetables.⁶

During the past 20 years, the prevalence of childhood overweight and obesity has increased at such an alarming rate that it is now referred to by many as an epidemic.^{24,25} A recent study found that overweight or obese children aged ≥ 5 years were more likely to live in rural rather than metropolitan areas (OR, 1.25; 95% CI, 1.25-1.26) even after controlling

for risk factors such as poverty, health insurance, television viewing time, and time spent on nonschool computer use.⁵

Smoking tobacco is the leading cause of preventable morbidity and mortality in the US. A national population-based study⁷ concluded that adolescents living in rural locales were more likely to be daily smokers than those living in either urban or suburban locales. This study found that rural youths who became daily smokers were more likely to have used smokeless tobacco products in the past 12 months (OR 1.25; 95% CI 1.04-1.51), to have first smoked a whole cigarette when they were ≤ 12 years of age (OR 2.08; 95% CI 1.82-2.38), and to have smoked at school in the past 30 days (OR 14.52; 95% CI 11.97-17.60).⁷

Question 3: Does Rural Residency Impact Access to Resources That May Be Used to Either Avoid Risks or Minimize the Consequence of Disease?

It has long been held that rurality or rural residency impacts access to resources—mostly health care services and providers—that might reduce risks or minimize the consequences of diseases. For instance, the relative shortage of physicians in rural areas of the US is well recognized.²⁶ Approximately 20% of the US population—more than 50 million people—live in rural areas, but only 9% of the nation's physicians practice in rural communities.²⁶ Furthermore, physician supply in rural areas is closely tied to the specialty mix of American physicians. Family physicians distribute themselves in proportion to the population in both rural and urban locations and are the largest single source of physicians in rural areas. All other specialties are much more likely to settle in urban areas.²⁶ Access is a common consideration for those concerned with providing health services to rural communities.

A recently published population-based study examining health service deficits for asthma⁸ determined that rural adults with current asthma had greater odds of having a health service deficit (OR, 1.09; 95% CI, 1.08-1.10) when compared with nonrural adult residents. Service deficits were defined as not having an identified health care provider during the past 12 months, a health insurance, a routine physical examination, and having deferred medical care because of cost. Rural adults with asthma specifically had a greater risk of not having health insurance (OR, 1.32; 95% CI, 1.315-1.322) and of deferring medical care because of cost (OR, 1.285; 95% CI, 1.282-1.288).⁸

When examining the adequacy of care for diabetes for older adults, a cross-sectional population-based study revealed that older rural adults with diabetes were more likely to receive less than adequate care when

compared with their nonrural counterparts (OR, 1.465; 95% CI, 1.454-1.475).⁹ Older rural adults receiving less than adequate care for their diabetes were more likely to be male, non-Caucasian, less educated, unmarried, poorer, inactive, and a smoker. They were also more likely to have deferred medical care because of cost, not have a personal health care provider, and not have had a routine medical checkup within the past 12 months.⁹

Finally, in 2007, a study comparing urban and rural hospitals on 12 hospital quality care indicators found significant differences in 8 indicators examined.¹⁰ In 7 instances, these differences favored urban hospitals.¹⁰ These findings suggested that there may be differences in quality in rural critical access hospitals and urban acute care hospitals and there may be differences in access to services for rural residents.¹⁰

Question 4: Is the Relationship Between Rural Residency and Health Reproduced over Time Through the Replacement of Intervening Mechanisms?

Phelan et al²¹ argued that for something to be a fundamental or root determinant, its relationship with and to health must occur and reoccur over time even when there have been actionable gains in knowledge to reduce the occurrence of a disease. In other words, following the development of new knowledge or successful medical intervention related to some disease, individuals in the more advantaged group will experience a greater decline in disease prevalence and incidence compared with a less advantaged group. Unlike socioeconomic status, rural residency or rurality has only recently gained a foothold in epidemiologic analyses as a significant factor in identifying and explaining health status, outcomes, and disparities. Nevertheless, there is already compelling evidence that for breast, cervical, and colorectal cancer—all disease states for which there are effective screening tests and interventions for early stage cancer—higher incidence rates exist in rural populations in contrast to significantly decreasing rates in nonrural populations.

For instance, despite significantly reduced breast cancer mortality from advances in screening mammography and treatment, when Hausauer et al²⁷ examined invasive breast cancer rates for US Caucasian women, they found that between 2001 and 2004, overall invasive breast cancer incidence decreased by 13.2%, with greater reductions in overall invasive breast cancer incidence among women living in urban (−13.8%) vs rural (−7.5%) counties.²⁷

A Papanicolaou test or Pap smear is a screening test used to detect potentially precancerous and cancerous changes in the endocervical canal

of the female reproductive system. This screening test has been available in developed countries for >60 years and when combined with appropriate treatment is credited for reducing cervical cancer mortality. Nevertheless, research demonstrates that during the period from 1950 to 2007, annual cervical cancer mortality decreased in metropolitan areas at a significantly faster rate than in nonmetropolitan areas.²

Colonoscopy is an effective screening test for colorectal cancer, and when detected early, colorectal cancer is amenable to cure. All the same, research findings published in 2007 yielded that colorectal cancer incidence rates among both men and women residing in Appalachia were significantly higher than rates among men and women in the rest of the US.²²

Discussion

Although a health determinant is not necessarily a proximate cause of health, it must be a plausible critical component of a causal pathway leading to a given health outcome.²⁸ When a social determinant of health meets the criteria of a fundamental cause as set out by Phelan et al,²¹ it may be thought of as a root cause of health and as a critical component in a causal pathway. Monitoring equity in health status and health care by comparing indicators of health and its social determinants among social groups with different levels of underlying social advantage (ie, groups who occupy different positions in a social hierarchy) is essential if health disparities are to be reduced or eliminated. As demonstrated in this article, rural geographic location or rurality often reflects differences both in social advantage and in physical environment.

Health disparities are complex and are likely due to the interplay of many factors that include biological, genetic, behavioral, and sociologic factors. Often attributed to poorer access to health care providers and facilities, there appear to be other influences that play a role in rural health inequities. Differences in the built environment, economic environment, and social milieu may account in part for contextual rural/nonrural differences. For instance, the presence of food deserts in rural communities may inhibit access to fresh food and vegetables. Moreover, geographic isolation and poorer roads may make it more difficult to access available services. Additionally, attitudes related to health and healthy behaviors might be different in rural settings, making less healthy behaviors more acceptable. By contrast, social factors associated with rural communities such as stronger support systems might be protective.

Rural communities are often thought of as monolithic, but within these communities there may be disadvantaged persons who represent those

most vulnerable to health inequities. Understanding the nuances of rural communities by monitoring equity in health social determinants among social groups with different levels of underlying social advantage is essential.

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