

Rural Cancer Disparities in the United States: A Multilevel Framework to Improve Access to Care and Patient Outcomes

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Cancer mortality rates are higher in rural versus urban areas in the United States,^{1,2} especially for cancers with effective interventions for prevention, early detection, and treatment.³ Furthermore, progress in reducing mortality for some cancers has been slower in rural compared with urban areas, resulting in increasing rural-urban disparities.² As shown in [Figure 1A](#), age-standardized colorectal cancer death rates from 2013 to 2017 were among the highest quintile in Kentucky, West Virginia, Arkansas, Mississippi, and Louisiana, all states with large rural populations in the southern region of the United States. In earlier years, colorectal cancer death rates were high in all states ([Fig 1B](#)), and disparities were much less pronounced. These dramatic changes in death rates by geography over the past 30 years suggest that differential receipt of effective colorectal cancer prevention, screening, and treatment has contributed to growing disparities.

As Levit et al⁴ note in *JCO Oncology Practice*, clinical trial enrollment provides access to state-of-the-art cancer care. A recent pooled analysis of 44 Southwest Oncology Group clinical trials reported that survival outcomes for most rural and urban patients were similar when cancer treatment was standardized and guideline concordant.⁵ Unfortunately, many living in rural areas experience barriers to clinical trial enrollment. Levit et al describe innovative approaches to overcome barriers and encourage clinical trial enrollment in rural populations, including community-based coalitions and outreach, enhanced oncology care infrastructure, and affiliations with local practices, such as those created through Project Echo, a telementoring program connecting community providers with specialist experts.⁶ As the authors mention, disparities in clinical trial enrollment by rural residents reflect many factors, including patient barriers and local health care infrastructure.

The theoretic framework displayed in [Figure 2](#) shows the interdependency of factors at multiple levels, including patient, provider, community, and state and national policy levels, which are associated with geographic disparities in access to cancer care and health outcomes. Consideration of factors at each of these levels can further highlight potentially modifiable barriers to care as well as levers for intervention and,

more specifically, the need for coordinated multilevel interventions to reduce geographic disparities in care.

The innermost circle of [Figure 2](#) illustrates patient-level factors associated with access to care and health outcomes. Rural residents are more likely than their urban counterparts to have lower educational attainment, lower income, and higher unemployment rates.³ Socioeconomic disadvantages can limit health care-seeking behaviors and health literacy, which are less common in rural areas.^{7,8} Many modifiable cancer risk factors, including obesity and cigarette smoking, are more prevalent in rural areas.^{3,9,10} Lack of health insurance is also more prevalent in rural populations,³ and being uninsured can adversely affect not only receipt of cancer care and trial participation, but also access to interventions promoting healthy eating, active living, and smoking cessation.¹¹ Rural residents are less likely to receive recommended cancer prevention^{3,12} and screening.^{9,13} Among those diagnosed with cancer, many rural residents have later-stage disease at diagnosis¹⁴ and are less likely to receive guideline-concordant cancer treatment.^{15,16} Some of these disparities are likely influenced by challenges associated with affordability and lack of insurance coverage; rural cancer survivors are more likely to report delaying or forgoing medical care because of cost.¹⁷

The second circle of [Figure 2](#) identifies health care provider factors that can limit access to care and lead to poorer outcomes. Many rural areas are classified as health professional shortage areas (HPSAs), and as Levit et al⁴ describe, oncologists are underrepresented in rural areas. Rural areas have experienced most of the hospital closures in the past decade,¹⁸ which are associated with reductions in availability of surgeons and other specialists.¹⁹ Lack of local provider availability can adversely affect access to and receipt of health care.^{20,21} With higher uninsured prevalence, greater reliance on low-cost or charity care may further strain remaining rural health care provider resources.²² Additionally, lack of locally available providers²³ requires rural patients to travel farther for care; longer patient travel distances are adversely associated with receipt of guideline-concordant care.^{15,16,21}

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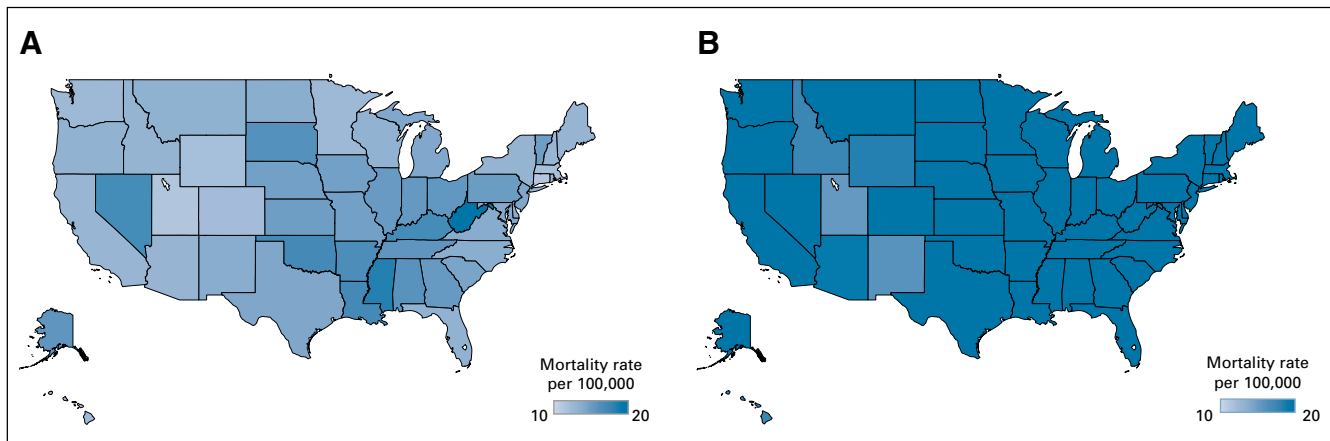


FIG 1. Age-standardized colorectal cancer mortality rates per 100,000 in the United States from (A) 1990 to 1994 and (B) 2013 to 2017.

Community-level resources identified in the third circle of [Figure 2](#) also play an important role in access to care and health outcomes. Rural residents are more likely to be socioeconomically disadvantaged, resulting in areas of concentrated poverty. Lack of grocery stores and fresh produce can create food deserts, making it more difficult for rural residents to develop and maintain healthy eating habits. Industries and employers vary by geography, and those more common in rural areas (eg, agriculture) are less likely to offer health insurance coverage to their employees, which can make health care access more difficult. Importantly, many rural communities lack public transportation and broadband Internet, limiting travel

options to care for those without vehicles and reducing access to telehealth.

The outermost circles in [Figure 2](#) represent state and federal policies. The federal Medicare program provides insurance coverage for almost all adults age ≥ 65 years, and the state-federal Medicaid program provides coverage for some low-income children and families. Medicare offers incentives for physicians to practice in HPSAs, which may help increase provider availability in rural areas. Multiple federal agencies encourage and promote telehealth and telemedicine, especially in rural areas.²⁴

The Affordable Care Act (ACA), which was passed in 2010, contains many provisions that can improve access to cancer

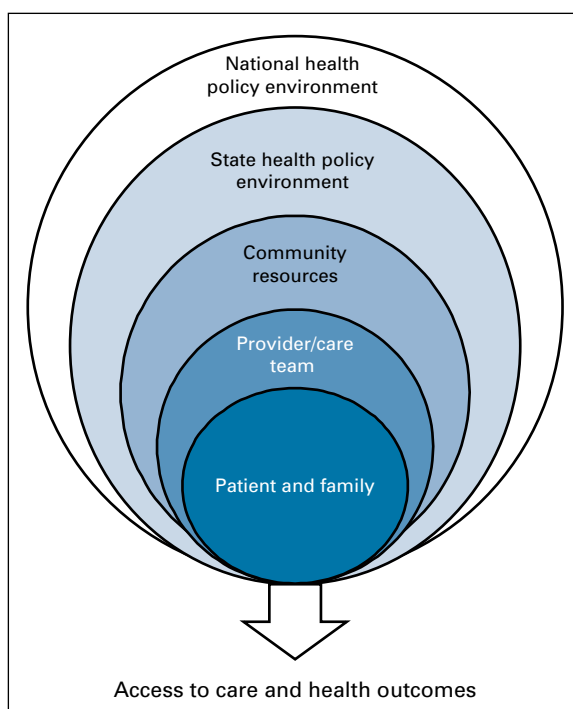


FIG 2. Factors at multiple levels associated with geographic disparities in cancer care and outcomes.

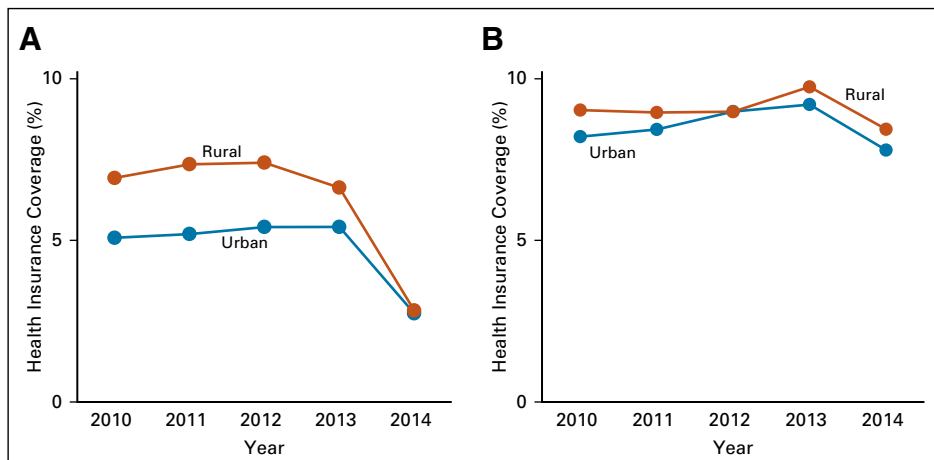


FIG 3. Association of Medicaid expansion with rural vs. urban disparities in health insurance coverage among patients newly diagnosed with cancer (A) expansion and (B) nonexpansion states.²⁸

care and clinical trials.²⁵ The ACA expanded health insurance coverage options nationally, including creating a marketplace for individual and small business purchase of private plans and allowing young adults to remain on parents' private health insurance plans. The ACA also mandated that nongrandfathered private plans cover routine care costs as part of clinical trial participation, consistent with the Medicare coverage policy, which began in 2000.

The ACA also incentivized states to expand Medicaid eligibility to 138% of the federal poverty line (FPL) for adults with and without children. Not all states expanded Medicaid, and eligibility is as low as 17% of the FPL for parents of a family of 3 in nonexpansion states (\$3,692 in 2019).²⁶ After Medicaid expansion in 2014, rural adults age 18 to 64 years were half as likely to be uninsured in expansion states than in nonexpansion states.²⁷ Among patients with newly diagnosed cancer, Medicaid expansion was associated with elimination of rural-urban coverage disparities in expansion states, but not in nonexpansion states²⁸ (Fig 3). In addition to income eligibility, other variations in Medicaid policies concern enrollee premiums and cost sharing, provider reimbursement, and coverage of services, including nonemergency medical transportation. Notably, there is no national policy requiring state Medicaid programs to cover routine care for clinical trial participants, leaving that policy to the discretion of states. Some states have passed laws mandating such coverage, and others cover these costs through administrative procedures. Lack of coverage is thought to be associated with lower clinical trial participation among Medicaid enrollees in states that do not cover routine care costs.

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Other state and federal policies that affect prevalence of cancer risk factors and care that vary by state include cigarette taxes, which ranged from a low of \$0.17 per pack to a high of \$4.35 per pack in 2017, with many southern and midwestern states having taxes of < \$1.00 per pack. Scope-of-practice laws, which are related to the ability of nurse practitioners and physician assistants to see patients independently, without physician supervision, also vary by state.

Barriers to receipt of cancer prevention, screening, early diagnosis, and treatment in rural areas are multilevel and interdependent. Similarly, reducing rural cancer disparities will require multilevel interventions, with coordinated efforts at the patient, provider, community, and policy levels. Scientists have been highlighting the need for multilevel approaches to address persistent health disparities for many years.²⁹⁻³¹ One of the strongest predictors of access to cancer care and better health outcomes is health insurance coverage.³² Increasing insurance coverage options for rural adults through Medicaid expansion and availability of other coverage options, improving local provider coordination with cancer centers and creating shared resources and expertise through networks such as the National Cancer Institute Community Oncology Research Program and telemedicine, and developing broader community-based resources to support and promote healthy lifestyles may improve access to cancer prevention, screening, diagnosis, and treatment. Coupled with Medicaid coverage of routine care costs for clinical trial participation and travel for care in all states, these efforts may increase trial participation among rural residents and reduce rural cancer disparities.

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