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### The Double Disparity Facing Rural Local Health Departments

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## The Double Disparity Facing Rural Local Health Departments

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# The Double Disparity Facing Rural Local Health Departments

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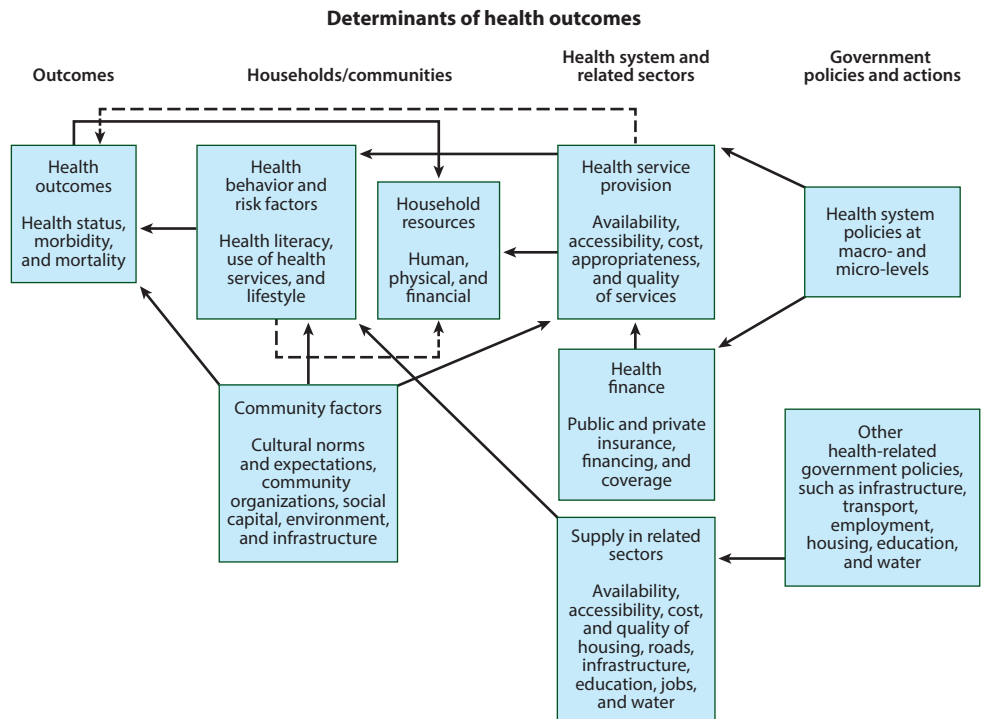
## Abstract

Residents of rural jurisdictions face significant health challenges, including some of the highest rates of risky health behaviors and worst health outcomes of any group in the country. Rural communities are served by smaller local health departments (LHDs) that are more understaffed and underfunded than their suburban and urban peers. As a result of history and current need, rural LHDs are more likely than their urban peers to be providers of direct health services, leading to relatively lower levels of population-focused activities. This review examines the double disparity faced by rural LHDs and their constituents: pervasively poorer health behaviors and outcomes and a historical lack of investment by local, state, and federal public health entities.

## INTRODUCTION

Residents of rural areas in the United States tend to be older and poorer, report more risky health behaviors, have more barriers to accessing health care, and have worse health status and health outcomes than do their urban and suburban counterparts (90). Local health departments (LHDs), one of the primary units of governmental public health, are charged with assessment, policy development, and assurance of the provision of public health services at the community level. Among these core functions, the assurance function most distinguishes health departments from each other. Organizational resources and structures, partnerships, and community need influence which public health services that LHDs prioritize and assure within a jurisdiction. Rural LHDs have fewer resources and provide fewer services compared with urban and suburban LHDs (50, 54, 86, 134).

This review characterizes these compound challenges: inadequate capacity in rural LHDs and poor rural health. It is organized on the basis of a conceptual framework for understanding health inequality published by the World Health Organization (WHO) and reprinted in a review of global rural and urban health disparities (Figure 1) (139). Part I is focused on health challenges faced by rural residents represented under the “Health Systems and Related Sectors” and “Government Policies and Actions” headings in Figure 1; part II is focused on rural LHDs, which fit primarily into the health service provision box in the third column. We conclude with possible future directions for research, policy, and practice.



**Figure 1**

A conceptual framework for understanding health inequality (122, 139).

**Table 1 Urbanization levels of US counties (90)**

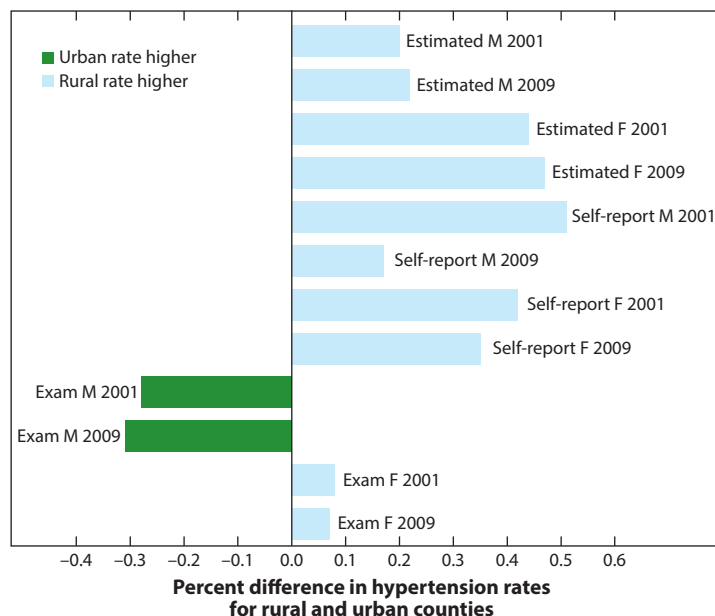
Urban/rural designation	Type of urban/rural area	Definition
Metropolitan (urban) counties	Large central (inner cities)	Counties in metropolitan statistical areas (MSA) of 1 million or more that <ul style="list-style-type: none"> <li>■ Contain the entire population of the largest principal city of the MSA,</li> <li>■ Are completely contained in the largest principal city of the MSA, or</li> <li>■ Contain at least 250,000 residents of any principal city of the MSA</li> </ul>
	Large fringe (suburban)	Remaining counties in MSAs with a population of at least 1 million residents
	Small metro	Counties in MSAs with a population of fewer than 1 million residents
Nonmetropolitan (rural) counties	Micropolitan (large rural)	Counties in micropolitan statistical areas (population of 10,000 to 49,999)
	Noncore (small rural, includes frontier)	Remaining nonmetropolitan counties that are not in an MSA

## PART I: HEALTH IN RURAL AREAS

The 2010 US Census estimated that 60 million adults, or 20% of the population, live in rural areas (123). To illustrate trends in health and health care access among rural populations, the US Department of Health and Human Services released the *Urban and Rural Health Chartbook* in 2001; the *Chartbook* compared mortality, risk factors, and health care access across urbanization levels (defined in **Table 1**) over time and was updated in 2014 (35, 90). Although US health improved, many health challenges faced by rural populations identified in the 2001 report remained or worsened in 2014. Specifically, gaps between rural and nonrural areas widened for chronic obstructive pulmonary disease mortality, suicide rates, and obesity (35, 90). Even though health care access, health behaviors, and health outcomes are often discussed separately, health behaviors are influenced by health care and the public health environment, and health behaviors and the environment influence health outcomes (90, 122).

### Health Behavior and Risk Factors

Through a comparative assessment of risk factors, the WHO and others identified the five most important health risk factors contributing to disease burden and premature mortality for the United States and Canada: tobacco, alcohol, obesity, high blood pressure, and elevated cholesterol (93). These factors are closely followed by three additional major risks: low fruit and vegetable intake, physical inactivity, and illicit drug use (93). With some exceptions, rural residents have higher rates of tobacco use (1, 34, 138, 141), obesity (13, 15, 106), physical inactivity (106, 110, 141), and lower rates of fruit and vegetable intake (82) compared with residents of nonrural areas. In addition, rural and urban areas share the distinctions of highest, or equally high, rates of alcohol and drug use compared with lower suburban rates. Specifically, rural areas have higher alcohol abstinence rates (22, 143) and higher rates of methamphetamine use compared with nonrural areas (42, 68), but there is no consistent pattern of problem drinking by area type. Evidence suggests lower illicit drug use rates among rural adults (42, 76) but higher rates among rural young adults (68) compared with their nonrural counterparts.



**Figure 2**

Percent difference in hypertension between rural and urban counties, 2001 and 2009.

Although high blood pressure (hypertension) and elevated cholesterol are positively associated with obesity (92, 105), which is higher in rural areas (13, 15, 106), data challenges have limited direct comparison of rural and nonrural areas for these risk factors (43, 93, 137). Olives and colleagues estimated 2001 and 2009 county-level hypertension rates on the basis of self-reported data from the Behavioral Risk Factor Surveillance Survey (BRFSS) and physical exam-based rates from the National Health and Nutrition Examination Survey (NHANES), but they did not report rurality or county population (104). We examined the data published by Olives and colleagues (104) for the estimated, self-reported, and physical exam-based hypertension rates by Rural-Urban Commuting Area (RUCA) status and found higher rates in rural counties for all except the physical exam measures for men. The differences were small; rural areas had 0.2% higher hypertension rates on average across all groups (**Figure 2**). In addition, 2013 BRFSS data showed that rural participants were more likely to report high blood pressure (44.2% versus 39.4%) and high cholesterol (39.5% versus 37.8%) than were their urban counterparts.

Rates of screenings and immunizations also influence rural health. Rural residents are less likely than nonrural counterparts to be screened for colon, cervical, and breast cancers (18, 27, 33). However, influenza, human papillomavirus, and pneumonia vaccination rates are equal to or higher in rural areas than in nonrural areas (27, 108, 111, 150).

### Household Resources

Sixty-four percent of rural counties experience persistent poverty (above 20% over the past 50 years) compared with 14% of metropolitan counties (91). This lack of financial resources adversely impacts rural populations' access to health insurance (100). Twenty-three percent of the nonelderly population lacked health insurance during 2010–2011 in rural areas compared with 19% in suburban counties (90). Although some rural communities have increased access

to health insurance in states expanding Medicaid following the implementation of the Patient Protection and Affordable Care Act (ACA), low-income rural residents are more likely than their urban counterparts to live in states not expanding Medicaid (149). Being uninsured is associated with the use of fewer health care services and poorer health status (45, 115). In addition, lower socioeconomic status (SES) is independently associated with poor health and early mortality after controlling for risky health behaviors and uninsured status (70, 80), and rural residence exacerbates this relationship (122).

## Community Factors

The public health, health care, physical, and sociocultural environments in a community are important to the health and well-being of its residents. Having faced widespread rural hospital closures (28) and workforce shortages (99, 130), rural health care systems lack the capacity to serve local residents (30, 102, 124, 147). As a result, rural residents face long travel times that are difficult to manage because of employment and family responsibilities and few public transportation options. Travel for health care can be near impossible for the oldest and frailest rural residents with multiple chronic conditions (30, 102).

Geographic distance and other characteristics of the rural built environment also influence health behaviors. Rural residents report having few recreational facilities (4, 38, 116) and having to travel long distances to recreational facilities (38, 116, 145). Others report weather extremes (4, 83, 116, 145) and safety issues, including busy streets (4, 145), limited street lighting and sidewalks (4, 38, 83, 116), and loose dogs (4, 83, 116). Rural neighborhoods have poor access to chain grocery stores and supermarkets, limiting access to healthy foods (71, 83, 140), a characteristic they share with low-income and minority urban communities (71, 140).

In addition to the physical environment, sociocultural context also influences rural health (29, 39, 56, 103). Rural cultures tend to value self-reliance, independence, religiosity, and social conformity in communities that are often isolated and segregated and allow little anonymity (29, 56, 103). These attributes likely decrease the use of stigmatized services, such as those in mental health, alcohol use treatment, HIV prevention and treatment, and contraception (29, 39, 56, 103). However, rural communities are also characterized by high social integration. Specifically, adults in rural areas tend to have large social networks (2, 3, 142), which can improve oral health (2), diabetes management (3), and resilience (142). Social ties also influence cancer screening behavior (36, 128) and illicit drug use in rural adults (49, 62).

Public health policies, such as clean indoor air ordinances, are among the most effective strategies to improve public health. Compared with urban jurisdictions, rural jurisdictions pass fewer public health policies (25, 53). When combined with high poverty rates (121), an unhealthy policy environment contributes to higher rates of risky health behaviors and poor health outcomes.

## Health Outcomes

Rural areas have higher cancer incidence (15, 122) and higher rates of poor cancer outcomes, including increased mortality (77, 141). Likewise, diabetes rates, end-stage renal disease, and injury mortality rates are higher in rural than in urban areas in the United States (122). Rural populations experience higher rates of multiple chronic conditions than do suburban populations (90). Patients with multiple chronic conditions have more health care needs and are more likely to experience major depression, substance use, addiction disorders, dementia, cognitive impairment, and other mental illnesses (136) that complicate disease management.

Aside from those with multiple chronic conditions who are more likely to experience mental illness, studies have found no difference in mental health diagnoses in rural and nonrural settings

(102, 122). One exception may be suicide; most of those who commit suicide have been diagnosed with mental illness, and suicide rates are higher in rural areas compared with urban areas (90, 102, 120, 122). Higher rural suicide rates have sometimes been attributed to sociocultural factors (56). Rural and urban areas in the United States share the highest rates of heart disease and infant mortality in the country (122). Mortality rates among all age groups are higher among rural populations compared with suburban and urban populations (93). The life expectancy rates for Americans living in rural areas were up to 9.1 years lower than the US average, with some variation by race and geography (93).

## PART II: LOCAL HEALTH DEPARTMENTS IN RURAL AREAS

Governmental public health has its roots in urban health. Even though there was a push to fund rural public health departments in the late 1800s and early 1900s, funding was inconsistent (89). Still, rural public health grew throughout the early 1900s until the Hill-Burton Act of 1945, which shifted rural efforts toward safety net services following World War II (89). In 1973, Assistant Surgeon General Hanlon called for public health to leave direct service provision to the private sector and to focus on roles and functions that included community health planning, health policy development, partnerships with other local government agencies and community groups, and surveillance over activities that affect public health (51). Shortly thereafter, former American Public Health Association President Milton Terris predicted that health departments would expand their roles and conduct environmental planning and design as well as clinical service provision, pharmaceutical regulation, and administration of a national health service (129). Although health departments have not expanded to match this vision, they do provide many of the functions he described, now included in a set of 3 core functions and 10 Essential Public Health Services (EPHS) released in 1994 (109) (Table 2). Despite recommendations to divest from direct service provision in the 1970s and in the 1988 Institute of Medicine report on the *Future of Public Health* (61), many rural jurisdictions continued to provide direct services owing to community demand (19).

Definitions of rurality vary among government agencies (123); small population size is commonly used to classify LHDs as rural (Figure 3). Instead, the RUCA system classifies census tracts into categories of rurality by population density, urbanization, and daily commuting (59). Using RUCA, ~47% of LHDs are rural and serve 13% of the US population (Figure 4); a typical (median) rural LHD serves 15,000 people and has a \$500,000 annual budget and 9 full-time staff members (72). Use of RUCA in LHD research is rare, and thus many findings summarized in this review are based on small population size rather than on rural designation.

### Health Service Provision

**LHD performance.** The CDC's National Public Health Performance Standards Program (NPHPSP) used the EPHS as the foundation for current health department performance standards (32, 118), replacing evaluation tools from earlier decades (134). Although LHDs have been the focus of many performance studies, most have focused on large/urban LHDs (58).

LHDs serving smaller/rural populations tend not to perform as well as their larger or urban counterparts on some or all of the core functions and the EPHS (Table 2) (50, 54, 86, 134). Some studies examined performance above and below specific population thresholds; they have found that jurisdictions with fewer than 100,000, 50,000, or 25,000 residents scored lower than those with more residents (37, 54, 112, 126, 127). Other studies examined trends and found significant positive relationships between population size and performance in multistate samples (86)



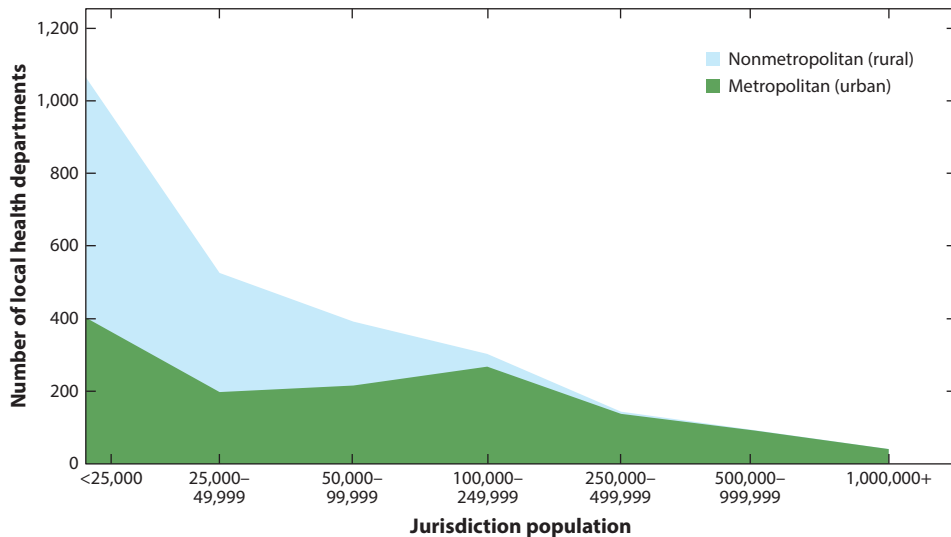
**Table 2 Studies comparing small/rural and large/urban health department performance**

Core function	Essential service	Small/rural performs better	No large/significant difference	Large/urban performs better
Assessment	1: Monitor health status to identify and solve community health problems		57, 132	21, 40, 85, 86, 112, 126, 127, 133, 135
	2: Diagnose and investigate health problems and health hazards in the community		57, 117, 132	21, 40, 85, 86, 112, 126, 127, 133, 135
Policy development	3: Inform, educate, and empower people about health issues		21, 40, 57, 132	85, 86, 112, 126, 127, 133, 135
	4: Mobilize community partnerships and action to identify and solve health problems		21, 40, 57, 117, 132	6, 9, 63, 78, 85, 86, 112, 126, 127, 133, 135
	5: Develop policies and plans that support individual and community health efforts		21, 40, 54, 57, 132	21, 53, 85, 86, 112, 126, 127, 133, 135
Assurance	6: Enforce laws and regulations that protect health and ensure safety		40, 132	21, 57, 85, 86, 112, 126, 127, 133, 135
	7: Link people to needed personal health services and assure the provision of health care when otherwise unavailable	65	21, 40, 57, 86, 132	63, 85, 112, 126, 127, 133, 135
	8: Assure competent public and personal health care workforce	7	12, 21, 40, 57, 75, 86, 101, 132	41, 47, 85, 112, 114, 126, 127, 133, 135
	9: Evaluate effectiveness, accessibility, and quality of personal and population-based health services		21, 40, 57, 86, 132	85, 112, 126, 133, 135
	10: Research for new insights and innovative solutions to health problems		40, 57, 132	21, 85, 86, 112, 117, 126, 127, 133, 135

and in individual states, including Iowa (113), Texas (66), New Jersey (40), North Carolina (78), Wisconsin (146), Washington (84), and Mississippi (57).

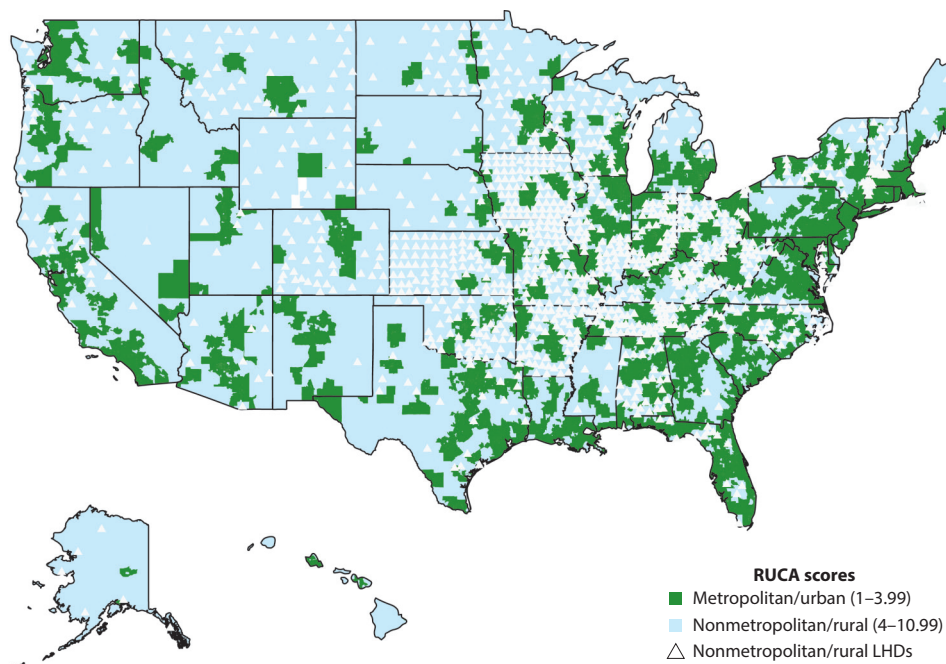
Performance strengths and challenges are not universal among LHDs of different sizes. Small/rural health departments perform well in some areas and not in others compared with larger LHDs and, in some cases, even perform well and poorly on the same core function or essential service across studies. For example, in Mississippi, larger population size was significantly associated with improved performance of essential service 6 (57). Another study found that larger population size significantly associated with higher performance of seven essential services (86) but not with performance of essential services 6, 7, or 8. In 2013, Bhandari replicated an earlier study (117) and found that population size positively and significantly associated with performance of essential services 1, 2, 5, 6, and 10 compared with just service 6 in the original study (21). Bhandari also retested a model published in 2006 (86) and found a positive and significant association between population size and performance of essential services 1, 2, 6, and 10 compared with services 1 through 6 in the earlier study. LHDs in New Jersey serving larger populations had higher performance scores for assessment, which includes essential services 1 and 2, but not for the other two core functions, which include essential services 3 through 10 (40). **Table 2** shows these and other findings across the core functions and EPHS.

Other aspects of performance also vary by health department size or rurality. Compared with larger/urban jurisdictions, smaller/rural jurisdictions have lower compliance rates (146), are



**Figure 3**

Local health departments characterized as metropolitan (urban) or nonmetropolitan (rural), 2010 (59, 98).



**Figure 4**

Rural local health departments (LHDs) and their jurisdictions in the United States, 2010.

significantly less likely to report using evidence-based decision making (79) or administrative evidence-based practices (24), report using fewer strategies to combat health disparities (144), and report providing fewer types of services (9, 37). Among the service types performed less frequently in small/rural jurisdictions compared with larger/urban jurisdictions were early and periodic screening, diagnostic, and treatment services for infants and children (48), other maternal and child health functions (85), access to medical care (81), access to dental care (81), and behavioral health services (81). One study found that obesity prevention programs were performed less frequently in smaller jurisdictions (125), whereas another found no significant difference in obesity and diabetes programming by rurality or population size (148). Smaller jurisdictions were also less likely to delegate or privatize services compared with large jurisdictions (63, 64). Jurisdiction population size was also positively and significantly associated with seeking accreditation (119) and being accredited (11).

**Local health department revenues and spending.** Internal and external characteristics of public health agency structure are associated with public health system performance (117). Higher-performing LHDs tend to have higher total LHD expenditures and higher expenditures per capita (37). Studies have established a clear tie between population size and spending after accounting for other characteristics, suggesting the benefit of economies of scale (44, 87). Economies of scale appear to begin around 100,000 residents; jurisdictions that have fewer residents spend more per capita but have lower-than-average total spending (95–98).

Per capita spending estimates may not allow for accurate comparison across jurisdictions; some scholars believe comparisons should take into account total spending, per capita spending, and spending per square mile for comparisons across LHDs (20). This strategy identified geographic funding patterns; examples include densely populated urban areas with smaller geographic size receiving more funding per square mile, while rural areas with large geographic coverage receive more funding per capita but less per square mile (20).

Revenue streams differ substantially for small/rural LHDs compared with their larger counterparts. A national study of 1999–2000 LHD revenue found that rural LHDs received about 35% of revenue from local sources, 35% from state sources, and 24% from service reimbursement. Comparatively, urban LHDs received 58% of revenue from local sources, 22% from state, and 14% from service reimbursement (47). This distribution changed dramatically by 2010 for the smallest jurisdictions, with relatively less support from local, state, and federal sources and considerably more from service reimbursement and fees (97). Bernet (20) suggests that, as in gambling, money begets money in health department funding. That is, higher funding from state and federal sources has a positive association with funding from local sources. Differences in revenue streams and associated discretion, or lack thereof, can impact LHDs (8). Rural jurisdictions were much less likely to have a continuing education budget (47). In the aftermath of the bioterrorism funding bolus that mainly targeted areas of high risk (urban areas), the National Rural Health Association called for greater flexibility and the allowance to spend bioterrorism dollars to build broader capacities within jurisdictions (88).

**Local health department human resources.** A strong relationship exists between revenue and staff size; higher revenue often equates to more full-time equivalent (FTE) staff members (46). Together, the 1,500 smallest and most rural LHDs in the country have fewer staff than the largest 25 urban LHDs combined (74). Although the proportion of the LHD workforce employed at small population health departments has remained stable over time (12), jurisdictions serving fewer than 100,000 residents accounted for three-quarters of the growth in the part-time workforce

between 2008 and 2013 (75). Overall, small/rural health departments employ fewer FTEs than do large/urban departments, resulting in a narrower range of public health skills (37, 40). Formal training of leadership also varies by size; the larger the population served, the more likely it is that the top executive holds a college degree in public health (41). LHDs serving smaller populations had proportionally fewer MDs in the top executive role (41), whereas smaller LHDs are up to three times more likely to be led by someone with a nursing degree (17, 21, 24).

**Local health department technology and information access.** Small/rural health departments have limited access to technology and, relatedly, to information that is often available primarily electronically (19). Nurses in rural LHDs describe the need for basic technological software for transferring information, scheduling, monitoring patients, and developing client education materials (131). Lack of information technology can also hinder performance management and quality improvement activities in rural LHDs (10, 11). As one example, executives from rural LHDs report difficulty accessing trainings on health disparities, thus exacerbating existing health disparities (144). Smaller LHDs are half as likely to have access to current information on evidence-based public health practices and current research compared with larger LHDs (24). Small/rural health departments are also less likely to adopt and use new media, such as Facebook and Twitter, which represent a promising strategy for meeting essential service 3 (55).

**Local health department partnerships and other external factors.** In addition to internal capacity (human, financial, and informational resources), external factors including partnerships (117) and population characteristics (31) play a vital role in LHD performance. Partnerships may be especially important for rural/small LHDs to make up for capacity limitations (9, 19, 132). Although LHDs tend to partner with other LHDs that are the same size and in the same state (52), LHD partnerships with other types of organizations vary by size and rurality (5, 6, 9). Small LHDs partner with fewer types of organizations overall (9) and are less likely to partner with faith-based organizations (6). Larger/urban jurisdictions have access to more local partners and partner types, whereas small/rural jurisdictions are limited and may partner with the same local organizations for multiple purposes (5, 73). Larger LHDs are more likely to collaborate with hospitals on community health assessments, a prerequisite for accreditation (26).

Population heterogeneity also influences performance in rural or small population health departments. Specifically, rural health departments composed of many counties have better performance when the counties are similar in geographic size, morbidity, and SES (31). An examination of low-population-density areas reported that having 50,000 residents provides economies of scale for jurisdictions to support population-based programming, submission of grant applications, and other activities (67).

## DISCUSSION

Health outcomes for rural residents are influenced by a combination of low-performing health departments and individual and environmental characteristics (see **Figure 1**). The current and historical lack of health care access in rural areas and limited LHD resources have encouraged rural LHDs to focus more on providing direct services at the cost of population-level public health activities (e.g., policy development). The lack of population-level activities likely influences the rural public health environment, resulting in higher rates of risky health behaviors. Although we found that many health challenges were consistent across rural areas, some rural areas fared better or worse on certain health behaviors and outcomes compared with others (90, 93, 94).

Like all cultures, rural culture is shaped by the way people live, work, and play, and each rural area has a unique culture rooted in its own history. For example, the Appalachian culture (14) in the Appalachian Mountains is different from the culture in the Delta area located along the Mississippi River, and both of those areas differ from the Great Plains where many American Indian reservations are located.

Several studies have suggested that regionalization, or combining adjacent jurisdictions with smaller populations, could increase the capacity of rural LHDs (57, 107, 113). However, given that homogeneity with respect to geographic size, morbidity, and SES is important to maintain high performance of multicounty rural jurisdictions, this recommendation should be undertaken with caution (31). Other suggestions include developing more partnerships, including formal and informal cross-jurisdictional sharing; increasing involvement in other sectors; and partnering with neighbor agencies (19, 107). These strategies and others should be evaluated. One approach might be positive deviance, or conducting in-depth studies of rural LHDs scoring highly on the NPHPSP and representing the distinct rural regions across the country to determine what already works in rural areas (23).

In 2012, the Institute of Medicine suggested prioritizing a “minimum package of public health services” focused largely on population-level activities and paralleling the minimum health care services prescribed in the ACA (16, 60). The Public Health Leadership Forum translated the minimum package into the Foundational Public Health Services (FPHS) model, which identifies programs and services that should be delivered in every jurisdiction with the idea that there is a minimum level of public health activity that must occur everywhere for the public health system to work anywhere (16). Although there is limited evidence examining implementation of the FPHS, public health practitioners find the FPHS relevant (16). One evaluation found a statistically significant shift by LHDs toward population health activities following a statewide policy that aimed to refocus LHDs on related core services (69). The FPHS has important implications for small and rural jurisdictions that may not have the capacity to meet minimum standards, given existing rural health and organizational challenges.

Existing studies of rural health and rural public health suggest a lack of quality data for consistent and meaningful urban, suburban, and rural studies and comparisons (122). For example, risk factor and outcome (other than mortality) data come from national sources such as NHANES and BRFSS. These sources tend to pool county-level data across years or estimate county prevalence owing to the small sample size in many of the rural areas. In addition, LHD data [such as the National Association of County and City Health Officials (NACCHO) biannual profile study] tend to rely on population size rather than rurality. In addition, only about 70% of LHD jurisdictions are single whole counties, making data on health behaviors and outcomes difficult to link to data on LHD resources and activities. Therefore, research directly capturing the relationship between local public health and local health is rare and relies on methods that are difficult to perform and may not be accurate (125).

Improving health in rural areas will require a substantial effort from policy makers and public health and health care researchers and practitioners to address health behaviors and risk factors, poverty, and the health care and public health environments. First steps toward this goal may include building and disseminating an evidence base of best practices for rural LHDs based on successful and geographically and demographically diverse rural health departments, increasing population-level public health activities (e.g., policy activity) in rural areas, and working toward better data quality on health behaviors, outcomes, and service provision in rural areas.

## SUMMARY POINTS

1. Health outcomes for rural residents are influenced by individual and environmental characteristics, including higher rates of risky health behaviors, limited financial resources, limited access to health care and poor health care quality, and a weak public health policy environment.
2. Rural areas face persistent poverty, which is independently related to poor health even when risky health behaviors such as smoking are accounted for.
3. Health outcomes for rural residents are also influenced by LHDs that lack the capacity for high performance of the 10 EPHS.
4. Rural LHDs have fewer staff and lack specialty staff, with the exception of nursing staff (e.g., no epidemiologists).
5. Rural LHDs rely on partnerships to provide services but are limited in the number and types of local organizations available to partner.
6. Rural LHDs have limited access to technology, which limits access to information available electronically, including the latest public health evidence, training opportunities, and quality improvement materials.
7. Suggestions for addressing the capacity issues of rural LHDs have included cultivation of additional partnerships and consolidation of adjacent jurisdictions.
8. Research on rural jurisdictions is seriously challenged by the lack of a consistent definition of rurality, the lack of consistent units of measure that can be harmonized (e.g., county to jurisdiction), and sampling frames in rural areas that do not allow for data use or sharing. Collaboration among funders, researchers, and practitioners is needed to address this critical gap.

## DISCLOSURE STATEMENT

The authors are not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

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# Contents

## Epidemiology and Biostatistics

Improved Designs for Cluster Randomized Trials  
*Catherine M. Crespi* ..... 1

Mediation Analysis: A Practitioner’s Guide  
*Tyler J. VanderWeele* ..... 17

Nutritional Determinants of the Timing of Puberty  
*Eduardo Villamor and Erica C. Jansen* ..... 33

Spatial Data Analysis  
*Sudipto Banerjee* ..... 47

Using Electronic Health Records for Population Health Research:  
A Review of Methods and Applications  
*Joan A. Casey, Brian S. Schwartz, Walter F. Stewart, and Nancy E. Adler* ..... 61

Metrics in Urban Health: Current Developments and Future Prospects  
*Amit Prasad, Chelsea Bettina Gray, Alex Ross, and Megumi Kano* ..... 113

A Transdisciplinary Approach to Public Health Law: The Emerging  
Practice of Legal Epidemiology  
*Scott Burris, Marice Ashe, Donna Levin, Matthew Penn, and Michelle Larkin* ..... 135

## Environmental and Occupational Health

Cumulative Environmental Impacts: Science and Policy to Protect  
Communities  
*Gina M. Solomon, Rachel Morello-Frosch, Lauren Zeise, and John B. Faust* ..... 83

Heat, Human Performance, and Occupational Health: A Key Issue for  
the Assessment of Global Climate Change Impacts  
*Tord Kjellstrom, David Briggs, Chris Freyberg, Bruno Lemke, Matthias Otto,  
and Olivia Hyatt* ..... 97

Metrics in Urban Health: Current Developments and Future Prospects  
*Amit Prasad, Chelsea Bettina Gray, Alex Ross, and Megumi Kano* ..... 113

One Hundred Years in the Making: The Global Tobacco Epidemic  
*Heather Wipfli and Jonathan M. Samet* ..... 149

## Public Health Practice

- A Transdisciplinary Approach to Public Health Law: The Emerging Practice of Legal Epidemiology  
*Scott Burris, Marice Ashe, Donna Levin, Matthew Penn, and Michelle Larkin* ..... 135
- One Hundred Years in the Making: The Global Tobacco Epidemic  
*Heather Wipfli and Jonathan M. Samet* ..... 149
- The Double Disparity Facing Rural Local Health Departments  
*Jenine K. Harris, Kate Beatty, J.P. Leider, Alana Knudson, Britta L. Anderson, and Michael Meit* ..... 167
- Using Electronic Health Records for Population Health Research: A Review of Methods and Applications  
*Joan A. Casey, Brian S. Schwartz, Walter F. Stewart, and Nancy E. Adler* ..... 61
- Defining and Assessing Public Health Functions: A Global Analysis  
*Jose M. Martin-Moreno, Meggan Harris, Elke Jakubowski, and Hans Kluge* ..... 335

## Social Environment and Behavior

- Civil Rights Laws as Tools to Advance Health in the Twenty-First Century  
*Angela K. McGowan, Mary M. Lee, Cristina M. Meneses, Jane Perkins, and Mara Youdelman* ..... 185
- Documenting the Effects of Armed Conflict on Population Health  
*Barry S. Levy and Victor W. Sidel* ..... 205
- Latino Immigrants, Acculturation, and Health: Promising New Directions in Research  
*Ana F. Abraído-Lanza, Sandra E. Echeverría, and Karen R. Flórez* ..... 219
- Making Healthy Choices Easier: Regulation versus Nudging  
*Pelle Guldberg Hansen, Laurits Rohden Skov, and Katrine Lund Skov* ..... 237
- Preventing Obesity Across Generations: Evidence for Early Life Intervention  
*Debra Haire-Joshu and Rachel Tabak* ..... 253
- Sugar-Sweetened Beverages and Children's Health  
*Rebecca J. Scharf and Mark D. DeBoer* ..... 273
- Visible and Invisible Trends in Black Men's Health: Pitfalls and Promises for Addressing Racial, Ethnic, and Gender Inequities in Health  
*Keon L. Gilbert, Rashawn Ray, Arjumand Siddiqi, Shivan Shetty, Elizabeth A. Baker, Keith Elder, and Derek M. Griffith* ..... 295

One Hundred Years in the Making: The Global Tobacco Epidemic <i>Heather Wipfli and Jonathan M. Samet</i> .....	149
The Health Effects of Income Inequality: Averages and Disparities <i>Beth C. Truesdale and Christopher Jencks</i> .....	413

## Health Services

A Review of Opportunities to Improve the Health of People Involved in the Criminal Justice System in the United States <i>Nicholas Freudenberg and Daliah Heller</i> .....	313
Defining and Assessing Public Health Functions: A Global Analysis <i>Jose M. Martin-Moreno, Meggan Harris, Elke Jakobowski, and Hans Kluge</i> .....	335
Opportunities for Palliative Care in Public Health <i>Liliana De Lima and Tania Pastrana</i> .....	357
Racial and Ethnic Disparities in the Quality of Health Care <i>Kevin Fiscella and Mechelle R. Sanders</i> .....	375
Rural Health Care Access and Policy in Developing Countries <i>Roger Strasser, Sophia M. Kam, and Sophie M. Regalado</i> .....	395
The Health Effects of Income Inequality: Averages and Disparities <i>Beth C. Truesdale and Christopher Jencks</i> .....	413

## Indexes

Cumulative Index of Contributing Authors, Volumes 28–37 .....	431
Cumulative Index of Article Titles, Volumes 28–37 .....	437

## Errata

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