



# Rural HEALTHY People 2030

TEXAS A&M HEALTH
Southwest Rural Health Research Center

# RURAL HEALTHY PEOPLE 2030

> Geography should not be a determining factor for health status. For 46 million people living in rural America today, health policy, research, and public health measures must focus on the goal of achieving equity. Rural America is not simply a small version of urban, but rather a unique healthcare delivery environment. Across hundreds of small towns and farms today, we see a population that trends older, with greater health disparities, and often lacking both access to care as well as financial resources to address their health concerns. Public health, in this environment, becomes a national imperative and a necessary focus of the nation. Rural America can lead a national transformation to a better, healthier community-based approach in the next decade. This, however, requires an understanding of both the population as well as an understanding of the unique challenges of rural life. A thoughtful path forward, with both data-based goals and measures, can ensure that rural America continues to lead in innovative care models and quality of life for future generations.
>
> **– Alan Morgan***

*Alan Morgan, MPA, is Chief Executive Officer of the National Rural Health Association, a nonprofit membership organization that provides leadership on rural health issues through advocacy, communications, education and research. ruralhealth.us

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# FOREWORD

*Rural Healthy People* began in the early 2000s as the rural counterpart to the national Healthy People initiative – the set of ten-year objectives for improving health and wellbeing. Building upon insights gained from *Rural Healthy People 2010* and *2020*, this third iteration provides a deep dive into the pressing public health concerns identified by those living in rural America. This book outlines the priorities determined by rural stakeholders, provides context, and discusses potential policy and programmatic solutions. Although rural America can often be referred to as a monolith, each rural community has its own unique needs and strengths. While there will never be a one-size-fits-all approach to rural public health and health care, this initiative will inform stakeholders and policymakers as they prepare for a new decade.

Much has changed in the rural health care landscape since *Rural Healthy People 2020*. Despite the many challenges that each new decade presents, new policies, programs, and payment models show promise to better serve rural needs. Congress established the Rural Emergency Hospital designation in December 2020 in response to the loss of essential health care services in rural areas due to hospital closures. Congress and the Administration have also taken steps to improve access to mental health care. In 2023, the Centers for Medicare & Medicaid Services simplified supervision for auxiliary behavioral health professionals. In 2022, Congress expanded future Medicare coverage and payment to include marriage and family therapists and mental health counselors. Beginning in 2024, these professionals will be able to bill directly for mental health services, creating new service options to meet mental health needs in rural communities. The Health Resources and Services Administration's Rural Community Opioids Response Program (RCORP) has ensured that there is a rural focus in the larger national effort to address the ongoing opioid and related substance use epidemic. Since Fiscal Year 2018, RCORP has received $720 million in appropriations and served over 1,800 rural counties across 47 states and two territories.

*Rural Health People 2030* continues to provide frameworks for addressing rural health care challenges, benchmarking progress, and identifying solutions. Each chapter in this book tackles a rural health care priority, as identified by rural stakeholders. I am eager to see this book be used by policymakers, by organizations, and by individuals supporting rural communities. This book acts as a roadmap as we accelerate progress on these priorities and craft policies and programs that have rural needs at the center.

Tom Morris

Associate Administrator
Federal Office of Rural Health Policy
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# DEAN'S MESSAGE

Dear Readers,

Our country is in a vastly different place today than when the 2020 and 2010 editions of Rural Healthy People were produced. As the world emerges from the COVID-19 global public health emergency, we take stock of how this pandemic has changed us. The COVID-19 pandemic laid bare the stark reality of inadequate healthcare access in rural America from years of facility closings and the difficulty in retaining healthcare practitioners. It also showed us the vulnerability of the patchwork systems used to disseminate health information to the general public, and its susceptibility to misinformation.

The goal of *Rural Healthy People 2030* remains unchanged from the 2020 and 2010 editions. This latest edition serves as a resource for translating the current state of rural health priorities and disparities in America, identified through the national Rural Healthy People 2030 survey, and as a roadmap for federal and state leaders. The Texas A&M University School of Public Health, through our Southwest Rural Health Research Center, remains committed to improving rural health and reducing health disparities. We serve as the dedicated steward of the Rural Healthy People initiative with a continuing aim to supply and summarize the vital information generated from the survey so that it can be utilized by decision makers, advocates, and representatives of rural America. Drs. Alva Ferdinand, Jane Bolin, Timothy Callaghan, and a resolute team of researchers and support staff have collaborated broadly in order to execute and bring you the most up-to-date literature on each priority topic and place these results into the context of ever-evolving health priorities within rural America.

Results of the Rural Healthy People 2030 survey reflect our time. "Mental Health and Mental Disorders" and "Addiction" rank first and second, which had not occurred in any previous Rural Healthy People survey. "Health Care Access and Quality" moved from the top priority for 2020 to the third priority for 2030; however, all of the top three priorities are heavily intertwined. The opioid crisis and the COVID-19 pandemic have exasperated already frayed mental health and addiction service systems within the rural areas of our country, which already lacked access.

There is hope and there are opportunities to address rural health disparities. This *Rural Healthy People 2030* volume is provided to you in the belief that it can positively impact the lives of individuals and communities within rural America. Armed with the information contained in this document, policy and decision makers, advocates, and practitioners can work to adjust existing programs and leverage new and existing state and federal resources to create programs that better support the promotion and protection of health in the communities where rural Americans live, learn, work, and play.

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# EDITOR'S INTRODUCTION

This publication represents a commitment by the Texas A&M University School of Public Heath, originally the nation's only school of *rural* public health, to position rural America at the forefront of public health policy considerations. In 2020, approximately 60% of all counties in America were considered rural, constituting a population of roughly 46 million people.[1] Rurality brings with it a unique set of health care challenges and opportunities.

While the federal government's Healthy People program[2] establishes specific goals to improve the health and well-being of *all* Americans, each decade our team at the Southwest Rural Health Research Center (SRHRC) has looked at those goals and objectives in light of their importance to *rural* Americans. The SRHRC produced a collection of literature reviews on these important rural health topics, known as ***Rural Healthy People***, in 2010,[3] 2020,[4,5] and with this volume – 2030. The basis for each publication has been a nationwide survey of rural stakeholders who have used Healthy People's leading health topics to establish a rank order of priority health concerns for rural Americans. Detailed results of our most recent survey of national stakeholders have been presented in webinars, peer-reviewed publications,[6] and a policy brief funded by the Health Resources & Services Administration's (HRSA's) Federal Office of Rural Health Policy.[7] Reflecting the ever-changing landscape of rural healthcare, **Table 1** reveals several shifts in rural priority concerns over the last ten years. It should be noted that many of the Healthy People 2030 topics from which survey respondents selected, were not included in Healthy People 2020 as stand-alone topics.[6-8]

### *Mental Health and Substance Misuse Identified as Leading Concerns*

Seen as the most dramatic shift over the last decade, mental health concerns and issues surrounding substance misuse have moved to the forefront of rural health concerns. The topic of Mental Health and Mental Disorders was identified in our current survey as the number one health concern for rural Americans, up from fourth place in our survey a decade earlier.[6-8] The current prioritization of mental health issues was followed closely by topics related to substance misuse including: Addiction (ranked #2), Drug and Alcohol Use (ranked #5), and Chronic Pain (ranked #20).[6,7]

### *Increasing Importance of Social Determinants of Health*

Another shift from ten years earlier has been increasing recognition of the important role that social determinants of health (SDoH) play in the health of individuals and communities. The SDoH premise is that the condition of an individual's environment greatly impacts their health outcomes and quality of life. Healthy People 2030 generally identifies SDoHs in five domains:[9] Economic Stability, Education Access and Quality, Health Care Access and Quality, Neighborhood and Built Environment, and Social and Community Context.

New SDoH topics, not presented for ranking a decade earlier, were highly ranked in our current survey results; that is, Economic Stability was ranked #10, Transportation (#11), and Housing and Homes (#14).[6,7] The topic Education Access and Quality was ranked as the 16th highest health-related priority for rural residents. These top 20 topics had previously been grouped into more generalized categories a decade earlier, such as Education and Community-based Programs (#12 in Rural Healthy People 2020), Quality of Life and Well-Being (#14 in RHP 2020), and the broad topic of Social Determinants of Health (#19 in RHP 2020).[4,5,8]

### *Topics Not Repeated in the Current Top 20*

Notably, eight of the top 20 topics in the Rural Healthy People 2020 survey, were not ranked in the top 20 in the Rural Healthy People 2030 survey. These include: (1) Heart Disease and Stroke, (2) Physical Activity and Health, (3) Maternal, Infant, and Child Health, (4) Tobacco Use, (5) Oral Health, (6) Immunizations and Infectious Disease, (7) Family Planning and Sexual Health, and (8) Injury and Violence Protection.

**Table 1. Comparison of Top 20 Rankings from the Rural Healthy People 2030[6] and 2020 Surveys[8]**

| RHP2030 Rankings (Callaghan et al., published 2023)[6] | RHP2020 Rankings (Bolin et al., published 2015)[8] |
|---|---|
| #1 Mental Health and Mental Disorders | #1 Access to Quality Health Services<br>a. Access - Insurance & ACA<br>b. Access - Primary Care<br>c. Access - Emergency Medical Services |
| #2 Addiction | #2 Nutrition and Weight Status |
| #3 Health Care Access and Quality | #3 Diabetes |
| #4 Overweight and Obesity | #4 Mental Health and Mental Disorders |
| #5 Drug and Alcohol Use | #5 Substance Abuse |
| #6 Nutrition and Healthy Eating | #6 Heart Disease and Stroke |
| #7 (tie) Older Adults | #7 Physical Activity and Health |
| #7 (tie) Preventive Care | #8 Older Adults |
| #9 Diabetes | #9 Maternal, Infant, and Child Health |
| #10 Economic Stability | #10 Tobacco Use |
| #11 Transportation | #11 Cancer |
| #12 Cancer | #12 Education and Community-Based Programs |
| #13 Public Health Infrastructure | #13 Oral Health |
| #14 Housing and Homes | #14 Quality of Life and Well-Being |
| #15 Workforce | #15 Immunizations and Infectious Disease |
| #16 Education Access and Quality | #16 Public Health Infrastructure |
| #17 Health Insurance | #17 Family Planning and Sexual Health |
| #18 Child and Adolescent Development | #18 Injury and Violence Prevention |
| #19 Hospital and Emergency Services | #19 Social Determinants of Health |
| #20 Chronic Pain | #20 Health Communication and Health IT |

Nevertheless, content related to these eight topics is still reflected in our latest rankings and in our chapters. For example, content related to rural Physical Activity and Health (a top 20 topic in *Rural Healthy People 2020*) is included in the current Overweight and Obesity chapter. Data on Oral Health are presented in our current Preventive Care chapter. An important discussion on prenatal care, previously reported in the Maternal Infant and Child Health chapter a decade ago, can be found in the Preventive Care chapter.

### *Access to Quality Health Services*

One decade ago, 76% of our survey respondents identified Access to Quality Health Services as a top 10 concern, making it the highest-ranked rural health priority.[8] Areas identified as access-related sub-priorities included health insurance, primary care, and emergency medical services.[8] In the current Rural Healthy People 2030 survey, all four of these topics were identified independently and received top 20 rankings; that is, Health Care Access and Quality was ranked #3 overall; Health Insurance (ranked #17); Preventive Care (ranked #7); and Hospital and Emergency Services (ranked #19).[6,7]

### *Impact of COVID-19 Pandemic and ACA*

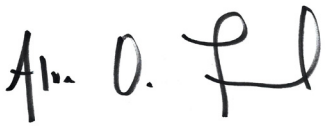
To say that the COVID-19 pandemic has changed health care in rural America would be a significant understatement. The increased use of telehealth, awareness of the digital divide, rural hospital closures, provider burnout, and loss of employer-sponsored insurance are just some of the topics to be discussed in these pages, in light of the COVID-19 experience. The 10-year impact

of the Affordable Care Act, including Medicaid expansion and after non-expansion, has also undoubtedly affected rural healthcare coverage and will be addressed in many of our chapters.

*Acknowledgement*

This *Rural Healthy People 2030* volume was a labor of love for many. More than 1,200 rural stakeholders participated in the online survey to determine the current top 20 priorities that informed the 20 chapters of this book. More than 65 individuals, faculty and graduate students representing a dozen different institutions, contributed their time and expertise to the writing of this volume. It is our hope that these literature reviews will serve as a guide to support policymakers, providers, and rural stakeholders as they plan for a bright and improved future for rural communities.

Sincerely,



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## REFERENCES

1. Dobis EA, Krumel TP, Cromartie J, Conley KL, Sanderson A, Ortiz R. Rural America at a Glance: 2021 Edition. EIB-230. U.S. Department of Agriculture, Economic Research Service. https://www.ers.usda.gov/webdocs/publications/102576/eib-230.pdf?v=9336.6

2. Healthy People 2030. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. https://health.gov/healthypeople

3. Gamm LD, Hutchison LL, Dabney BJ, Dorsey AM, eds. *Rural Healthy People 2010: A Companion Document to Healthy People 2010. Volume 1.* 2003. College Station, Texas: The Texas A&M University System Health Science Center, School of Rural Public Health, Southwest Rural Health Research Center.

4. Bolin JN, Bellamy G, Ferdinand AO, Kash BA, Helduser JW, eds. *Rural Healthy People 2020. Volume 1.* 2015. College Station, Texas: The Texas A&M Health Science Center School of Public Health, Southwest Rural Health Research Center.

5. Bolin JN, Bellamy G, Ferdinand AO, Kash BA, Helduser JW, eds. *Rural Healthy People 2020. Volume 2.* 2015. College Station, Texas: The Texas A&M Health Science Center School of Public Health, Southwest Rural Health Research Center.

6. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: new decade, new challenges. *Prev Med Rep.* 2023;33:102176. doi:10.1016/j.pmedr.2023.102176

7. Kassabian M, Shrestha A, Johnson N, et al. Rural healthy people 2030: common challenges, rural nuances. May 2023. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

8. Bolin JN, Bellamy GR, Ferdinand A, Vuong AM, Kash BA, Schulze A, Helduser JW. Rural Healthy People 2020: new decade, same challenges. *J Rural Health.* 2015; 31(3):326-333. doi:10.1111/jrh.12116

9. Social Determinants of Health. Healthy People 2030. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. https://health.gov/healthypeople/priority-areas/social-determinants-health

# MENTAL HEALTH AND MENTAL DISORDERS: A RURAL CHALLENGE

*By Carly E. McCord, PhD; Kala M. Phillips Reindel, PhD, MS; Kelly Sopchak, PhD, LSSP; Mariah Stickley, PhD; and Meredith Williamson, PhD*

## SCOPE OF THE PROBLEM

- The Rural Healthy People 2030 survey of rural stakeholders ranked Mental Health and Mental Disorders as the number one rural health priority.[1]
- The past year prevalence of serious mental illness was significantly higher in nonmetropolitan areas (i.e. rural) where individuals cite significantly greater problems accessing mental health care due to transportation issues.[2]
- Fewer than 20% of nonmetropolitan adults with depression received treatment from a mental health professional with most receiving medication-only treatment from a general practitioner or family doctor.[3]
- There has been a shift in mental health professional shortage areas (MHPSAs) since Rural Healthy People 2020 with the percentage of federally designated MHPSAs in rural or partially rural areas dropping from more than 85% to just under 68%.[4]
- Suicide rates remain highest in rural areas. Suicide rates peaked in 2018 and have declined overall in 2019 and 2020; but, concerns exist about the impact of COVID-19 such as social isolation, economic hardship, and loss of loved ones.[5]
- Youth in rural areas are dying by suicide at almost double the rate (1.8x) of their urban peers.[6]
- Adverse childhood experiences (ACEs), which are known contributors to mental health and substance use concerns, are more likely to occur for youth in rural areas. These youth also have significantly fewer positive childhood experiences (PCEs) to combat the negative effect of ACEs.[7]

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***M**ental health* touches every aspect of our lives and health and is shaped by individual, family, community, environmental, and societal factors.[8] Mental health includes emotional, psychological, and social well-being.[9] *Mental disorders* significantly impair our functioning in one or more areas and the symptoms are defined by the International Statistical Classification of Diseases and Health Related Problems and/or the Diagnostic and Statistical Manual of Mental Disorders.[10,11] Mental disorders are often categorized as any mental illness (AMI) or serious mental illness (SMI) based on the severity of the impairment caused by the disorder.[12] The prevalence for adults is 21% for AMI and 5.6% for SMI. Rates are higher for females and decrease across the lifespan.[12]

For children and adolescents, mental health conditions are the leading cause of disability and poor life outcomes. One in five children ages three to 17 in the United States report having a mental, emotional, developmental, or behavioral disorder.[13] Recent surveys show major increases in some mental health symptoms including depression and suicidal ideation, attempts, and completions, as well as increases in youth psychiatric visits to emergency departments for mental health concerns.[14-16]

Nearly half of all U.S. adults and kids go without adequate care each year due to lack of providers, providers only accepting cash-pay patients, and major issues with insurance coverage of mental health conditions including total lack of coverage and high rates of out-of-network providers and associated out-of-pocket costs.[17,18] These

issues are made worse in rural areas, which face additional barriers in transportation, lower rates of insurance, greater stigma in seeking mental health care, and even fewer available providers (especially specialty providers like psychiatrists or child/adolescent providers).[19]

COVID-19 was an important historical event that occurred since the publication in 2015 of Rural Healthy People 2020. The COVID pandemic had unique impacts on the mental health of rural children and adults. Children in rural areas were significantly more likely to experience anxiety before the pandemic, but the differences between rural and urban became smaller during the pandemic. Children in rural areas saw significant increases in behavioral problems during the pandemic, while the same increases were not seen in their urban counterparts.[20] No differences between rural and urban children were seen in the prevalence of depression before or during the pandemic.[20]

## HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES: MENTAL HEALTH AND MENTAL DISORDERS

The primary goal for mental health and mental disorders in the U.S. Department of Health and Human Services (DHHS) Healthy People 2030[21] initiative is to "improve mental health," with a focus on "the prevention, screening, assessment, and treatment of mental disorders and behavioral conditions." Healthy People 2030 identifies 26 objectives to address this goal. In this chapter, the section on the intersection of health care and mental health care will address objectives MICH-D01 and MHMD-08. The section on individuals with disabilities will address objectives DH-02, DH-D01, and DH-01, while the section on children and adolescents will address objectives EMC-D05, AH-D02, MHMD-03, EMC-D04, and MHMD-08. The fourth section on, suicide and injury prevention, will address objectives MHMD-01, MHMD-02, and LGBT-06.[21]

## MENTAL HEALTH AND MENTAL DISORDERS IDENTIFIED AS #1 RURAL HEALTH ISSUE

The Rural Healthy People (RHP) 2030 survey,[1] conducted by Texas A&M University, clarifies the current priorities of rural stakeholders. Mental health and mental disorders was ranked as the fourth most important priority in RHP 2020 and has escalated to the number one priority for RHP 2030. Action is being taken by federal and state governments to address what some have classified as a U.S. mental health crisis. Responses range from presidential strategies, to reports from the Surgeon General, to increased funding for mental health initiatives. Over the last decade, there have been decreases in stigma related to talking about mental health due to campaigns like "Okay To Say" and the acceptance of mental health mobile applications and other online mental health help. The economic burden of unmet mental health needs entails lost productivity, preventable emergency room visits, and overutilization of the criminal justice systems in lieu of proper treatment.[8,15] In addition, the opioid epidemic and resulting overdose deaths have highlighted a dire need to improve mental health and mental health care in our nation. It is clear that rural constituents share this urgency, which is likely further fueled by the additional barriers faced in addressing health needs in rural areas. In fact, in RHP 2030 survey results,[1] all four U.S. census regions (West, South, Midwest, and Northeast) agreed that mental health is the highest-ranked health priority for rural communities.

This chapter will provide an overview of the goals and objectives for mental health and mental disorders in Healthy People 2030 and include literature that has evolved over the last 10 years about rural mental health disparities. Based on the priorities and the literature review, the chapter will further discuss the intersection of health care and mental health care, mental health needs of individuals with disabilities, mental health in children and adolescents, and suicide and injury prevention. These sections will include recent research on disparities (i.e. rural/urban, race/ethnicity, other subpopulations), known causes of issues and barriers to treatment, and proven solutions to address each topic.

## INTERSECTION OF HEALTH CARE AND MENTAL HEALTH CARE

There are more than 160 million people living in mental health professional shortage areas (MHPSAs) where access to mental health

treatment is limited or nonexistent. Approximately 68% of identified MHPSAs are in rural locations.[4] Additionally, historical stigma for seeking mental health treatment among rural populations decreases the likelihood that rural populations will receive mental health treatment despite having higher rates of depression and suicide.[22,23] As a result, primary care clinics and emergency rooms are often the main access points for mental health treatment in rural communities.[24]

Medical providers are often the first to identify mental health conditions through routine screening outlined by the U.S. Preventive Services Task Force (USPSTF).[25] The USPSTF has developed numerous guidelines for the assessment and treatment of mental health conditions in medical settings including primary care clinics. These guidelines directly address the Healthy People 2030 objectives related to screening for mental health concerns (MICH-D01, MHMD-08). Universal depression screening using evidence-based screening questionnaires is recommended for adults and adolescents, including women in the peripartum and postpartum period.[26] Universal screening for anxiety disorders in pediatric and adolescent populations is also recommended, while suicide screening is not universally recommended unless a patient is identified as being at increased risk for suicide.[27,28] Although no formalized mental health training curriculum for most medical specialties outside of psychiatry has been developed, the Accreditation Council for Graduate Medical Education has recently expanded its recommendations for some medical specialties (e.g. family medicine) to include mental health training.[29] Unfortunately, not all front-line medical providers, including emergency medicine physicians, have recommended training in mental health despite being the medical providers for most suicide attempts in rural areas.[30]

One strategy to address knowledge and training gaps among primary care and emergency medical providers is to provide integrated behavioral health opportunities within rural primary care and emergency settings. Integrated behavioral health initiatives aim at addressing access and stigma concerns by providing both mental health and medical care within primary care and emergency settings. There are two predominant models for integrated behavioral health including the Primary Care Behavioral Health Model (PCBH) and the Collaborative Care Model (CoCM).[31,32] The Substance Abuse and Mental Health Services Administration (SAMHSA) and the Health Resources and Services Administration (HRSA) also developed a framework for integrated behavioral health to help health care systems better understand the ways that mental health providers can partner with primary care and emergency providers to address disparities in mental health care in rural settings.[33]

### *Primary Care Behavioral Health Model*

The PCBH model[31] is a population-based interdisciplinary model where mental health providers known as behavioral health consultants are embedded within medical settings to provide targeted practice-based prevention and intervention for comorbid mental and physical health conditions. Behavioral health consultants are often on call to receive a "warm handoff" or same-day contact from the medical providers for brief consultations, focused assessments and diagnostic clarity, and/or brief interventions. According to Hunter et al[31] the purpose of the behavioral health consultant is to provide feedback to physicians and develop a treatment plan for the patient. There are no appointment limits and patients often meet with the behavioral health consultant before, during, or after visits with their physician. The primary goal of this model is to provide evidence-based interventions from a biopsychosocial perspective for a wide array of presenting concerns throughout the lifespan.[31] The PCBH model is ideal for same day nonpharmacological face-to-face behavioral health interventions to treat mental and physical health conditions. The Rural Health Information Hub provides models of PCBH in rural clinics and hospitals.[34]

### *Collaborative Care Model*

The CoCM[31,32] uses principles of chronic illness management and applies them to mental health conditions through population health-based approaches. Primary care providers often partner with psychiatric consultants and develop strategies for case management with other mental health personnel to track specific mental health

conditions within defined patient populations through patient registries for specific concerns (e.g., Major Depressive Disorder). Measurement-based practice, including frequent follow-up screening, is utilized to identify individuals in need of additional mental health services from either a psychiatric consultant, primary care provider, or case manager who may recommend medication changes or brief behavioral interventions. Most patient contacts for mental health treatment are conducted between the patient and either the primary care provider or case manager. This provides the ability for the psychiatric consultant to care for a large patient population remotely which offers the possibility for psychiatric care to be accessed by rural populations. The CoCM is typically focused on pharmacological management of mental health conditions within primary care with population-based strategies to monitor longitudinal treatment over time for primary care populations without face-to-face visits with a psychiatric consultant.

***Research Support for Integrated Behavioral Health***

Research supports the use of integrated behavioral health strategies for mental health treatment within underserved populations such as those in rural settings. Ogbeide et al[35] found that 61% of underserved primary care patients who engaged in integrated behavioral health services would not have sought mental health treatment if it had been offered outside the primary care setting.[35] This study represents the importance of having integrated behavioral health services available in primary care and emergency settings in rural locations to increase access and decrease stigma commonly associated with mental health treatment. The CoCM has also been found to be just as efficacious in reducing rates of depression in rural settings compared to urban settings.[36] Additionally, integrated behavioral health services within medical settings in general have been found to be cost effective, improve patient outcomes and experiences, and even decrease burnout of medical personnel.[37]

## INDIVIDUALS WITH DISABILITIES

The mental health and health care of rural Americans living with disabilities warrants particular attention. More than one in four adults in the U.S. are living with a disability, rates of which are highest in the South (including urban) and in rural areas.[38-40] A population-based survey comparing rates of disability of adults living in six different county types, from large metropolitan to noncore or rural counties, revealed that adults in rural areas were 9% more likely to have a disability and 24% more likely to have three or more disabilities, even after controlling for notable demographic factors (e.g., age, race/ethnicity, sex, education, and poverty level).[40] The subpopulation of people with disabilities is diverse, comprised of individuals with developmental or acquired disability and functional differences in physical movement and mobility, cognition and learning, hearing, vision, psychological and emotional well-being, self-care, or independent living, and those living with chronic conditions. Importantly, the prevalence of individuals living with mobility, cognitive, hearing, vision, self-care, and independent living disabilities was highest in rural versus large metropolitan areas, with rural adults having anywhere from a 7% (cognition) to 35% (hearing) increased likelihood of disability.[40]

In consideration of the existing disparities for people with disabilities, DHHS has established the following objectives for mental health and mental disorders in its Healthy People 2030 initiative[21]: reduce the proportion of adults with disabilities who delay preventative care because of cost (DH-01); reduce the proportion of adults with disabilities who experience psychological distress (DH-02); and reduce anxiety and depression in family caregivers of people with disabilities (DH-D01). Based on the existing disability literature and advocacy efforts, this section will explore three potential solutions in working to address these objectives for rural people living with disabilities: 1) utilizing telehealth services to help reduce cost and increase access to specialty care; 2) educating providers on, and use of disability-affirmative integrated primary care; and 3) educating providers on, and use of family-centered care.

***Reduce the Proportion of Adults with Disabilities Who Delay Preventative Care Because of Cost***

Many people with disabilities in rural areas face socioeconomic disadvantages including

higher rates of poverty, unemployment, lower educational attainment, and inadequate health insurance.[41] It is estimated that approximately one in three disabled adults do not have a usual health care provider and have an unmet health care need due to cost.[38,39] According to Healthy People 2030,[21] 53.2% of adults with disabilities experienced delays in receiving primary and periodic preventive care due to cost in 2019. A primary systemic issue for people with disabilities is accessible and affordable health care,[42,43] which is compounded by rurality. Many rural areas lack specialty care or primary care physicians who are competent or confident in caring for the unique needs of disabled individuals.[41,44] Findings from a recent survey indicate that only 40.7% of physicians report confidence in their ability to provide equitable care to people with disabilities.[45] Many rural areas also do not have accessible health care buildings or equipment.[41] Collectively, these barriers either lead people with disabilities to receive non-specialized and/or poor-quality care from a local primary care provider or spend time and money traveling long distances to receive specialized care in urban areas.[41] The latter may often not be possible as the lack of accessible transportation is one of the most widely cited barriers to care for disabled people. These issues are further compounded in rural areas that may not have sidewalks, public transportation, rideshare options, and/or accessible restrooms en route to metropolitan health care centers.

### *Reduce the Proportion of Adults with Disabilities Who Experience Psychological Distress*

Healthy People 2030[21] revealed that 22% of adults with disabilities aged 18 years and over experienced serious psychological distress in 2018. Nationwide estimates suggest that adults with disabilities are 4.6 times more likely to experience mental distress, rates of which appear to be highest among individuals with both cognitive and mobility disabilities (55.6%).[46] Similar patterns of poorer mental health have been observed in young people with disabilities.[47] Research on the mental health of people with disabilities in rural communities is quite limited. However, some studies suggest that physical, economic, and quality health care barriers as well as lack of transportation, cultural and social differences, geographic isolation, and stigma are thought to contribute to worsened physical and mental health in rural areas.[44] Anxiety and depression are some of the most widely cited mental health concerns among disabled people.[48] Indeed, disabled women in rural areas report higher rates of depression compared to women in urban areas, and experience greater barriers to receiving mental health treatment.[44]

There is a known shortage of mental health providers across the U.S., particularly in rural areas. Moreover, if a mental health provider is available within rural communities, it is not guaranteed that they will be equipped with the specialized knowledge of living with a disability. For example, rehabilitation psychologists are specialized providers who receive training in, and provide clinical service, conduct research, and advocate on behalf of persons with disability. However, based on a recent state-of-the-field survey, only 4% of rehabilitation psychologists (10 out of 259 respondents) reported working in rural areas.[49] This suggests that people with disabilities in rural areas may not only have unmet mental health care needs, but they may not have access to the type of specialized mental health care that may be of utmost benefit to them.

### *Reduce Anxiety and Depression in Family Caregivers of People with Disabilities*

Physical, economic, and quality health care barriers are also thought to extend to the experience of family members of people with disabilities. The cost of professional care attendant services is often unaffordable or unavailable, which may be particularly true in rural areas, often necessitating family members to assume the role as a personal care attendant.[42] As a result, many family members of people with disabilities, whether parents of children with a disability, a spouse, or adult family member caring for a relative with a disability, may encounter additional stress and responsibility.[50] A robust caregiving literature review indicates increases in psychological distress, poor health habits, physical illness, and mortality among caregivers, with caregiving having the most notable impact on one's psychological well-being, particularly depression and stress.[51,52] In a recent study of caregivers of people with either physical or mental disabilities, 33% of caregivers

reported levels of "probable" depression and 19% reported suicidal ideation.[53] Similarly, in a study of caregivers of people with intellectual or psychiatric disabilities, caregivers reported symptoms of stress, anxiety, and depression, with rates highest among caregivers of people with intellectual disabilities.[54] However, it also important to note that many family members demonstrate great resiliency and report positive impacts of caregiving, such as increased sense of purpose, meaning and strengthened relationships.[42,51]

***Utilizing Telehealth Services to Help Reduce Cost and Increase Access to Specialty Care***

As will be seen throughout this chapter, telehealth is one viable option to accessing specialty care such as rehabilitation psychology services.

> *"Rehabilitation Psychologists assess and treat cognitive, emotional, social, behavioral, and functional difficulties; seek to build on individual's strengths; consider psychosocial factors; and help people to overcome barriers to participation in life activities."*[49]

In a recent state-of-the-field survey, 96% of rehabilitation psychologists reported working in urban/suburban areas, with 70% working in hospitals/medical centers.[49] Use of telehealth services will allow specialty providers in urban areas to provide care to rural people with disabilities, versus relying on primary/general care within the rural community. The use of telehealth services is also likely to help reduce economic and transportation barriers involved in seeking specialty care. Current policies limit access and reimbursement of telemental health care services across state lines; therefore, advocacy efforts aimed at expanding access to specialty providers across state lines will only further reduce health care disparities for people with disabilities.

***Disability-Affirmative Integrated Primary Care***

Consistent with the content above regarding integrated behavioral health in primary care settings, rural people with disabilities that include mental health care needs may be more likely to first seek care in primary care settings. Thus, rural providers – physicians, nurses, social workers, and mental health care providers alike – are encouraged to receive education in and adopt disability-affirmative integrated primary care.[55] The tenets of disability-affirmative and competent care are centered on taking a person-centered approach, respecting patient choice, and eliminating medical and institutional bias. Disability-affirmative care encourages providers to treat people with disabilities in a holistic manner, to engage in care coordination and connect people with disabilities to specialists, long-term services, supports, and behavioral health. Therefore, adequate provider training in disability-affirmative care will likely increase the chances that people with disabilities are properly referred to, and receive, necessary behavioral health care.

***Family-Centered Care***

Ideally, people with disabilities and their families would also receive family-centered care, which is a collaborative approach to health care among health care providers, individuals, and their family members.[42] This collaborative approach aims to improve communication, include integral family members in health care decisions, and provide greater continuity of care. Research on family-centered care has shown lower levels of stress, improved mental health, and greater satisfaction for parents of children with disabilities. Therefore, training providers in rural areas on the delivery of family-centered care will likely be beneficial for helping to reduce mental health concerns among family caregivers of people with disabilities, with likely trickle-down effects on family members with disabilities.

## CHILDREN AND ADOLESCENTS

Rural youth have comparable mental health needs to their peers in urban areas, but the availability of care providers and community resources to support mental health drastically differs.[56] Most rural communities within the U.S. are designated as MHPSAs and lack access to effective mental health care programs and treatments, which leads to countless youth struggling with mental health issues without support. The increased risk factors for youth in rural communities are well documented, including increased suicide rates, financial distress, isolation, stigma, and low mental health literacy.[57-59] Additionally, higher exposure to co-occurring ACEs have been

identified amongst individuals living in rural areas.[60,61] This can increase one's risk of suicide, as well as mental and physical health needs. Many rural communities have shown promising improvement in the mental health of their youth by addressing these disparities through prevention and intervention on three fronts: primary care, community partnerships, and schools.

### *Youth Behavioral Health within Primary Care*

Primary care is a critical access point for children and adolescents in rural areas. While the DHHS Healthy People 2030[21] objectives for children focus on increasing the proportion of children who get appropriate treatment for behavior problems (EMC-D05), symptoms of trauma (AH-D02) and mental health problems like anxiety and depression (MHMD-03, EMC-D04), the first step in this process is proper screening (MHMD-08) followed by brief interventions. By screening for youth mental health needs regularly within health care settings, and providing brief interventions, duration and prognosis can be improved.[62] Some examples of evidence-based models for youth include The Programme for Improving Mental Health Care (PRIME)[63] and the Teens Achieving Mastery over Stress (TEAMS).[64]

The PRIME is a project generating evidence on increasing mental health care in underserved countries facing similar mental health disparities as rural America. PRIME has shown acceptability and feasibility among stakeholders, communities, and health care workers for the utilization of trained health care staff and the task sharing of mental health care as an effective means to decrease stigma and increase support.[63] To increase mental well-being, TEAMS, a depression prevention program, has also been shown to be effective within primary care settings.[64] By training medical professionals in effective skills-based programs such as these, rural communities can increase mental health care support and alleviate some of the rural care disparities.

### *Youth Behavioral Health through Community Partnerships*

Communities provide another mechanism for children and adolescents to receive mental health support, especially care focused on prevention and early intervention. Community mental health awareness programs are key to increasing access and improving youth mental health care. Partnerships and collaborations among community organizations and stakeholders can increase the success and continuation of initiatives. Lack of parent mental health literacy and resource knowledge is a significant barrier to rural youth accessing mental health care.[65] Gatekeeper and mental health literacy or awareness programs have been shown to be an effective means of decreasing stigma, increasing understanding of coping skills, and increasing competency of community members to assist and support others.[57,58,66] Many programs have shown innovation in increasing community involvement in these events, such as Neighbor-to-Neighbor (N2N), where mental health education and resources were delivered at community tailgating events with a meal provided to participants.[57] Mentoring programs within communities are also an effective means of improving academic, social, emotional, and behavioral outcomes for youth[67] and can be most beneficial when mentors are consistent in attendance of mentorship appointments.[68] Tele-mentoring can also be used as an effective means of increasing the competencies of providers within rural communities to effectively intervene and treat youth with severe mental illness.[69]

### *Youth Behavioral Health within Schools*

Schools provide another access point for youth mental health. The Healthy People 2030[21] objective EMC-D06 seeks to increase the proportion of children and adolescents who get preventative mental health care in school. In rural communities, this can potentially transform mental health care access among youth, as rural schools are often community cornerstones.[70] For many rural areas, state and/or federal funding for mental health care in schools has increased in response to the COVID-19 pandemic. The impact of this funding is not yet seen in the literature, which is sparse for evidence-based mental health programs and interventions in rural schools. Utilizing evidence-based practices which were created and evaluated in urban schools in rural schools without modification to fit the uniqueness of the rural community should be avoided.[71] Collaborations among community

members, educators, mental health professionals, and researchers can lead to effective social and emotional learning and trauma-informed education programs designed for the unique needs of rural schools.[70]

### *Increasing Mental Health Support for Youth*

While the barriers and disparities related to rural youth mental health are daunting, hardships are not new to rural communities. Characteristics common to rural communities, such as resiliency and strength of community, can be utilized to mitigate the current youth mental health crisis. Rural areas can combat mental health disparities and lack of access to care through programs within primary care, communities, and schools. However, many of these entities are already overloaded with meeting the physical, academic, and personal needs of their communities. The following are methods of implementing mental health care programs, interventions, and support without overwhelming the systems or individuals working within systems.

### *Telebehavioral Health and Youth*

It is important to highlight the increased acceptance and evidence for the effectiveness of mental health care delivered via telehealth as a front-line intervention for youth within rural communities.[72] While there may be connectivity issues for many living in rural areas, entities such as schools, healthcare offices, community centers, and libraries can partner with telehealth providers through the hub and spoke model.[73] Specifically for youth, telebehavioral health care has high rates of utilization, effectiveness, and satisfaction.[56,72,74] Rural youth express significant concerns related to confidentiality when seeing a provider in their own community, which could create preference for utilizing telehealth with providers outside of their community.[75] Digital health and telehealth interventions are effective, and youth show preference for accessing care though these mediums.[76] Across access points of mental health care, special attention and consideration should be made to ensure confidentiality for youth engaging in mental health supports.

Schools typically have internet access and have become a part of hub and spoke models for telehealth in rural communities, serving as the access point for telebehavioral health services for students. While some states have passed legislation allowing for insurance to cover telemental health care in schools, others are passing funding for health-related institutes to provide telebehavioral health care in schools (i.e., Hopeful Futures Campaign). This is an important step in ensuring access for the uninsured in rural communities. In addition to school counselors and campus support staff, there has been success with sharing licensed mental health professionals across rural school districts. These professionals can provide both telebehavioral and in-person services for students with more severe mental health issues. Additionally, there is support for engaging school counselors, mental health staff, and lay mental health providers in rural schools in virtual skills building and mental health competencies.[77] Utilizing the Extensions for Community Health Outcomes (ECHO) model, partnerships between universities and rural school mental health supports have also been shown as an effective way to increase competencies in specific areas of mental health care.[78]

### *Community Health Workers*

Community health worker (CHW) models are well known for serving adults and this is an emerging practice for helping youth with mental health concerns in school, community, and medical settings. By having CHWs trained in mental health topics, youth mental health needs are more readily identified and interventions can commence.[79] It is critical for medical settings and schools to have processes and procedures in place for mental health screenings and the identification of youth who may be struggling with emotional and behavioral distress, and for communities to have programs and mentors or CHWs to help promote mental wellness. The CHW has a unique advantage in reducing stigma, as they are members of the same community and have shared life experiences.[79] Within rural communities, individuals fulfilling multiple roles is common, and this cultural norm of task sharing can be successfully utilized to include mental health. Collaboration and interconnected systems between touchpoints can lead to greater improvements in outcomes and reductions in mental health disparities for rural youth.[80,81]

Partnerships between families, communities, schools, and healthcare are essential for reaching these aims. Programs such as Telehealth ROCKS increase access to effective behavioral health care by utilizing CHWs to support families, while coordinating and facilitating the navigation of services and partnering with schools, communities, and health care providers.[79]

## SUICIDE AND INJURY PREVENTION

Suicidality and intentional self-harm remain significant public health concerns across the U.S., especially in rural areas. From 1999 to 2016, the U.S. has seen a rise in suicide rates, with the most significant increase being in rural counties.[82] Accordingly, the Healthy People 2030[21] initiative identified several related objectives, including reducing the overall suicide rate (MHMD-01), reducing suicide attempts in adolescents (MHMD-02), and reduction of suicidal thoughts in lesbian, gay, bisexual, and transgender youth (LGBT-06). This section will explore current statistics and potential solutions for these objectives.

### *Reducing the Overall Suicide Rate*

According to data from the 2018-2019 National Vital Statistics System,[83] suicide was the 10th leading cause of death in the U.S., with the highest rates among Native American/Alaskan Native and White persons. While women were more likely to attempt suicide, men were more likely to die by suicide.[83] Further, while studies have shown similar rates of suicidal ideation across geographic groups,[84] rural-residing individuals have higher rates of death by suicide than those in urban areas.[83] Literature reviews examining the disparity in suicide risk between urban and rural individuals postulate that increased access to firearms and other lethal means, reduced access to health care and increased mental health stigma account for much of this variance.[85]

Many systems have adopted "train-the-trainer" and "gatekeeper" models as a means of suicide prevention, with the hopes of training large numbers of suicide interventionists. However, such models are widely understudied with some evidence to suggest significant variability in their effectiveness.[86-88] Additional evidence suggests that while such trainings improve understanding of suicide there is little evidence of a direct impact on suicidal behavior.[89]

### *Reducing Suicide Attempts in Rural Adolescents*

While rates for adolescent suicide attempts are high across the U.S., rural-residing teens are at greater risk than urban-residing teens.[90] Nationally, suicide is the second leading cause of death for individuals aged 10-24 years.[91] However, youth in rural areas have nearly double the suicide rate (1.8x) of urban youth.[6] Gender and method explain much of the suicide rate disparity between urban and rural youth.[92] For example, rural boys are at the highest risk for dying by suicide and report greater access to firearms, the most lethal suicide method, relative to girls and/or urban youth.[93,94]

Rural teens also experience more difficulty accessing physical and mental health care providers, factors associated with higher suicide rates.[93,94] With the growing need for mental health treatment and the significant shortage of mental health providers in rural areas, recent studies have pointed to increasing mental health care through schools (both in-person and via telehealth) and reducing access to firearms as potential solutions.[95] Extensive resources for firearm safety and education are available through Project ChildSafe.[96]

Evidenced based programs are also available for reducing youth suicide. Two examples are the Safe Alternatives for Teens & Youth (SAFETY) program[97] and the Youth Aware of Mental Health (YAM) program.[98] The SAFETY program is a suicide intervention program for youth and their families with efficacy when utilized by emergency departments and primary care.[97] The YAM program is a suicide prevention and mental health literacy program focused on empowering youth to gain an understanding of stressors, protective factors, resources, and ways to support the mental wellness of themselves and their friends.[98] The YAM program has been effective in reducing suicide attempts and suicidal ideations in youth.[98] It has also been effectively implemented within rural schools by extension agents who are members of their rural communities.[99]

*Reducing Suicidal Thoughts in LGBT Youth*

According to the Youth Risk Behavior Surveillance Survey conducted in 2017, lesbian, gay, bisexual, and transgender (LGBT) youth comprise an estimated 9.5% of U.S. adolescents.[100] Moreover, nearly 25% of youth ages 12 to 14 who died by suicide identified as LGBT.[101] Current empirical evidence suggests that LGBT youth in rural communities experience more difficulty in accessing resources and support than their heterosexual and cisgender peers, as well as LGBT youth in urban settings.[102] For instance, rural healthcare providers report more discomfort treating sexual minority youth than those in urban areas.[103] The LGBT youth in rural areas also report greater marginalization, stigmatization, and discrimination within their communities.[104] Such incidents increase the vulnerability of LGBT youth in rural schools to victimization, bullying, and feelings of isolation. These factors have long been linked to the increased rates of suicidality for LGBT youth.[105]

Recent studies suggest that family and peer acceptance and interventions targeting family-relationship stressors improve mental health outcomes for LGBT youth, including reduced suicidality.[101,106] In addition, a 2021 meta-analysis examining over 20 years of literature on risk and protective factors for LBGT youth experiencing suicidal thoughts, reported further findings indicating a need to develop programs and policies to support and protect LGBT youth and their families.[107] Studies explicitly examining predictive and protective factors for suicidality in transgender and gender non-conforming youth have demonstrated evidence that gender-affirming care significantly reduces a child's risk for suicidal ideation and attempts.[108-110] Gender-affirming care includes a wide array of services ranging from non-medical interventions such as the use of the child's chosen name,[111] support for gender-affirming hair styles and clothing, and for medical interventions such as puberty blockers. However, due to a lack of substantial knowledge on the long-term effects and implications of medically transitioning for children, providers should utilize the best available evidence to provide ethically sound, gender-affirming care.[112]

## SUMMARY

Addressing mental health needs is a clear priority for rural constituents. Issues of accessibility, availability, and acceptability of mental health care in rural areas are well documented. There are viable solutions for improvement as evidenced by the percentage of federally designated MHPSAs in rural or partially rural areas dropping from more than 85% to just under 68% since the 2015 publication of RHP 2020. The use of screening tools for anxiety and depression and the continued integration of mental/behavioral health care within primary care, coupled with intentional focus on training health professionals across disciplines in these models will positively benefit rural areas. Telehealth has a critical role in addressing the mental health crisis and can be used across the lifespan in a variety of settings including homes, schools, community centers, and medical facilities. Thinking outside the medical system by including peer support, utilizing evidence-based models for suicide prevention and mental health awareness, and capitalizing on extended support from community mental health workers will further increase access. Particular attention should be paid to those experiencing the greatest disparities in access and outcomes such as youth, LGBT individuals, and individuals with disabilities.

## REFERENCES

1. Kassabian M, Shrestha A, Callaghan T, et al. Rural healthy people 2030: common challenges, rural nuances. May 2023. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

2. Borders TF, Williams T. Serious Mental Illness and Mental Health Treatment Utilization among Adults Residing in Non-Metropolitan and Metropolitan Counties. Rural & Underserved Health Research Center Publications. 2022;(20). https://uknowledge.uky.edu/ruhrc_reports/20

3. Borders TF. Major Depression, Treatment Receipt, and Treatment Sources among Non-Metropolitan and Metropolitan Adults. Rural & Underserved Health Research Center Publications. 2020;(14). https://uknowledge.uky.edu/ruhrc_reports/14

4. Bureau of Health Workforce Health Resources and Services Administration, (HRSA). Designated Health Professional Shortage Areas Statistics: As of September 30, 2022. Accessed July 5, 2023. https://data.hrsa.gov/topics/health-workforce/shortage-areas

5. Ehlman DC, Yard E, Stone DM, Jones CM, Mack KA. Changes in Suicide Rates — United States, 2019 and 2020. *MMWR Morb Mortal Wkly Rep.* 2022;71(8):306-312. doi:10.15585/mmwr.mm7108a5

6. Hedegaard H, Curtin SC, Warner M. Suicide Mortality in the United States, 1999–2017. *NCHS Data Brief.* 2018;(330). https://www.cdc.gov/nchs/data/databriefs/db330-h.pdf

7. Crouch E, Shi S, Kelly K, et al. Publication Details: Rural-Urban Differences in Adverse and Positive Childhood Experiences: Results From the National Survey of Children's Health - Rural Health Research Gateway. Accessed July 5, 2023. https://www.ruralhealthresearch.org/publications/1474

8. Office of the Surgeon General. Protecting Youth Mental Health: The U.S. Surgeon General's Advisory. U.S. Department of Health and Human Services, Public Health Service. 2021. Accessed July 5, 2023. https://www.hhs.gov/sites/default/files/surgeon-general-youth-mental-health-advisory.pdf

9. U.S. Department of Health and Human Services. What is Mental Health? February 2, 2023. Accessed July 5, 2023. https://www.samhsa.gov/mental-health

10. World Health Organization. International Statistical Classification of Diseases and Related Health Problems. Accessed July 5, 2023. https://www.who.int/standards/classifications/classification-of-diseases

11. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (DSM 5-TR). Accessed July 5, 2023. https://www.psychiatry.org:443/psychiatrists/practice/dsm

12. National Institutes of Health. Mental Illness. National Institute of Mental Health (NIMH). Updated March 2023. Accessed July 5, 2023. https://www.nimh.nih.gov/health/statistics/mental-illness

13. Perou R, Bitsko RH, Blumberg SJ, et al. Mental health surveillance among children--United States, 2005-2011. *MMWR Suppl.* 2013;62(2):1-35.

14. Centers for Disease Control and Prevention (CDC). Youth Risk Behavior Surveillance Data Summary & Trends Report: 2009-2019. Dear Colleague Letters | NCHHSTP | CDC. February 21, 2022. Accessed July 5, 2023. https://www.cdc.gov/nchhstp/dear_colleague/2020/dcl-102320-YRBS-2009-2019-report.html

15. Kalb LG, Stapp EK, Ballard ED, Holingue C, Keefer A, Riley A. Trends in psychiatric emergency department visits among youth and young adults in the US. *Pediatrics (Evanston).* 2019;143(4):e20182192. doi:10.1542/peds.2018-2192

16. Curtin SC. State Suicide Rates Among Adolescents and Young Adults Aged 10-24: United States, 2000-2018. *Natl Vital Stat Rep.* 2020;69(11):1-10.

17. Whitney DG, Peterson MD. US national and state-level prevalence of mental health disorders and disparities of mental health care use in children. *JAMA Pediatr.* 2019;173(4):389-391. doi:10.1001/jamapediatrics.2018.5399

18. National Alliance on Mental Illness. The Doctor is Out: Continuing Disparities in Access to Mental and Physical Health Care. November 2017. Accessed July 5, 2023. https://www.nami.org/Support-Education/Publications-Reports/Public-Policy-Reports/The-Doctor-is-Out/DoctorIsOut

19. Morales DA, Barksdale CL, Beckel-Mitchener AC. A call to action to address rural mental health disparities. *J Clin Transl Sci.* 2020;4(5):463-467. doi:10.1017/cts.2020.42

20. Figas K, Giannouchos T, Crouch E. Rural-Urban Differences in Child and Adolescent Mental Health Prior to and During the COVID-19 Pandemic: Results From the National Survey of Children's Health. Rural and Minority Health Research Center. 2021. Accessed July 5, 2023. https://sc.edu/study/colleges_schools/public_health/research/research_centers/sc_rural_health_research_center/documents/youthmhbriefnov2022final.pdf

21. Objectives and Data - Healthy People 2030 | health.gov. Accessed July 5, 2023. https://health.gov/healthypeople/objectives-and-data

22. Carpenter-Song E, Snell-Rood C. The changing context of rural America: a call to examine the impact of social change on mental health and mental health care. *Psychiatr Serv.* 2017;68(5):503-506. doi:10.1176/appi.ps.201600024

23. Rural Mental Health Overview - Rural Health Information Hub website. Accessed July 5, 2023. https://www.ruralhealthinfo.org/topics/mental-health

24. Faghri NMA, Boisvert CM, Faghri S. Understanding the expanding role of primary care physicians (PCPs) to primary psychiatric care physicians (PPCPs): enhancing the assessment and treatment of psychiatric conditions. *Ment Health Fam Med.* 2010;7(1):17-25.

25. Home page. United States Preventive Services Taskforce. Accessed July 5, 2023. https://www.uspreventiveservicestaskforce.org/uspstf/

26. US Preventive Services Task Force, Barry MJ, Nicholson WK, et al. Screening for depression and suicide risk in adults: US Preventive Services Task Force recommendation statement. *JAMA.* 2023;329(23):2057. doi:10.1001/jama.2023.9297

27. US Preventive Services Task Force, Mangione CM, Barry MJ, et al. Screening for anxiety in children and adolescents: US Preventive Services Task Force recommendation statement. *JAMA.* 2022;328(14):1438. doi:10.1001/jama.2022.16936

28. US Preventive Services Task Force, Mangione CM, Barry MJ, et al. Screening for depression and suicide risk in children and adolescents: US Preventive Services Task Force Recommendation Statement. *JAMA.* 2022;328(15):1534. doi:10.1001/jama.2022.16946

29. ACGME Program Requirements for Graduate Medical Education in Family Medicine. Accreditation Council for Graduate Medical Education website. Updated 2022. https://www.acgme.org/globalassets/pfassets/programrequirements/120_familymedicine_2022.pdf

30. ACGME Program Requirements for Graduate Medical Education in Emergency Medicine. Accreditation Council for Graduate Medical Education website. Updated 2022. https://www.acgme.org/globalassets/pfassets/programrequirements/110_emergencymedicine_2022.pdf

31. Hunter CL, Goodie JL, Oordt MS, Dobmeyer AC. *Integrated Behavioral Health in Primary Care: Step by Step Guidance for Assessment and Intervention, Second Edition.* American Psychological Association; 2022.

32. University of Washington AIMS Center. Collaborative Care AIMS Center: Advancing Integrated Mental Health Solutions. Updated 2023. Accessed July 5, 2023. http://aims.uw.edu/collaborative-care

33. Substance Abuse and Mental Health Services Administration. SAMHSA-HRSA. 2013 Framework for Levels of Integrated Healthcare.pdf. 2013. Accessed July 5, 2023. https://thepcc.org/sites/default/files/resources/SAMHSA-HRSA%202013%20Framework%20for%20Levels%20of%20Integrated%20Healthcare.pdf

34. Primary Care Behavioral Health Model - Rural Services Integration Toolkit. Rural Health Information Hub website. Accessed July 5, 2023. https://www.ruralhealthinfo.org/toolkits/services-integration/2/primary-care-behavioral-health

35. Ogbeide SA, Landoll RR, Nielsen MK, Kanzler KE. To go or not go: patient preference in seeking specialty mental health versus behavioral consultation within the primary care behavioral health consultation model. *Fam Syst Health.* 2018;36(4):513-517. doi:10.1037/fsh0000374

36. Powers DM, Bowen DJ, Arao RF, et al. Rural clinics implementing collaborative care for low-income patients can achieve comparable or better depression outcomes. *Fam Syst Health.* 2020;38(3):242-254. doi:10.1037/fsh0000522.supp

37. Behavioral Health Integration Fact Sheet. American Psychological Association website. June 2022. Accessed July 5, 2023. https://www.apa.org/health/behavioral-integration-fact-sheet

38. Disability and Health Overview: Impairments, Activity Limitations, and Participation Restrictions. Centers for Disease Control and Prevention. September 15, 2020. Accessed July 5, 2023. https://www.cdc.gov/ncbddd/disabilityandhealth/disability.html

39. Okoro CA, Hollis ND, Cyrus AC, Griffin-Blake S. Prevalence of disabilities and health care access by disability status and type among adults — United States, 2016. *MMWR Morb Mortal Wkly Rep.* 2018;67(32):882-887. doi:10.15585/mmwr.mm6732a3

40. Zhao G, Okoro CA, Hsia J, Garvin WS, Town M. Prevalence of disability and disability types by urban–rural county classification—U.S., 2016. *Am J Prev Med.* 2019;57(6):749-756. doi:10.1016/j.amepre.2019.07.022

41. Iezzoni LI, Killeen MB, O'Day BL. Rural residents with disabilities confront substantial barriers to obtaining primary care. *Health Serv Res.* 2006;41(4):1258-1275. doi:10.1111/j.1475-6773.2006.00534.x

42. Andrews EE, Dunn RA. Families and disability. In: Brenner LA, Reid-Arndt SA, Elliott TR, Frank RG, Caplan B, eds. *Handbook of Rehabilitation Psychology, 3rd Ed.* American Psychological Association; 2019:189-202. doi:10.1037/0000129-013

43. McPherson M, Arango P, Fox H, et al. A new definition of children with special health care needs. *Pediatrics.* 1998;102(1):137-139. doi:10.1542/peds.102.1.137

44. Khubchandani A, Thew D. Achieving Equity in the Health of Women with Disabilities Through Telehealth: Challenges and Benefits. In: Miles-Cohen SE, Signore C, eds. *Eliminating Inequities for Women with Disabilities: An Agenda for Health and Wellness.* American Psychological Association; 2016:83-91. doi:10.1037/14943-005

45. Iezzoni LI, Rao SR, Ressalam J, et al. Physicians' perceptions of people with disability and their health care. *Health Aff (Millwood).* 2021;40(2):297-306. doi:10.1377/hlthaff.2020.01452

46. Cree RA, Okoro CA, Zack MM, Carbone E. Frequent mental distress among adults, by disability status, disability type, and selected characteristics - United States, 2018. *MMWR Morb Mortal Wkly Rep.* 2020;69(36):1238-1243. doi:10.15585/mmwr.mm6936a2

47. Honey A, Emerson E, Llewellyn G. The mental health of young people with disabilities: impact of social conditions. *Soc Psychiatry & Psychiatr Epidemiol.* 2011;46(1):1-10. doi:10.1007/s00127-009-0161-y

48. Okoro CA, McKnight-Eily LR, Strine TW, Crews JE, Holt JB, Balluz LS. State and local area estimates of depression and anxiety among adults with disabilities in 2006. *Disabil Health J.* 2011;4(2):78-90. doi:10.1016/j.dhjo.2010.05.001

49. Baker LN, Karol RL, Stern GA, Waldron-Perrine B, Barisa M, Sweatman M. Rehabilitation psychology: 2020 state of the field survey. *Rehabil Psychol.* 2022;67(2):111-119. doi:10.1037/rep0000433

50. Brehaut JC, Garner RE, Miller AR, et al. Changes over time in the health of caregivers of children with health problems: growth-curve findings from a 10-year Canadian population-based study. *Am J Public Health.* 2011;101(12):2308-2316. doi:10.2105/AJPH.2011.300298

51. Tarlow BJ, Wisniewski SR, Belle SH, Rubert M, Ory MG, Gallagher-Thompson D. Positive aspects of caregiving: contributions of the REACH project to the development of new measures for Alzheimer's caregiving. *Res Aging.* 2004;26(4):429-453. doi:10.1177/0164027504264493

52. Schulz R, Sherwood PR. Physical and mental health effects of family caregiving. *J Social Work Educ.* 2008;44:105-113. doi:10.5175/JSWE.2008.773247702

53. Huang YC, Hsu ST, Hung CF, Wang LJ, Chong MY. Mental health of caregivers of individuals with disabilities: relation to suicidal ideation. *Compr Psychiatry.* 2018;81:22-27. doi:10.1016/j.comppsych.2017.11.003

54. Panicker AS, Ramesh S. Psychological status and coping styles of caregivers of individuals with intellectual disability and psychiatric illness. *J Appl Res Intellect Disabil.* 2019;32(1):1-14. doi:10.1111/jar.12496

55. Cordes CC. Disability-affirmative integrated primary care. *Fam Syst Health*. 2021;39(3):546-550. doi:10.1037/fsh0000640

56. Myers K, Valentine J, Melzer S. Child and adolescent telepsychiatry: utilization and satisfaction. *Telemed J E Health*. 2008;14(2):131-137. doi:10.1089/tmj.2007.0035

57. Franzen-Castle L, Krehbiel M, Elsen K, Chasek C, Schwarz C. Using interagency partnerships to establish neighbor-to-neighbor programming: supporting rural mental health. *J Fam Consum Sci*. 2022;114(1):34-37. doi:10.14307/jfcs114.1.34

58. Robertson MN, DeShong HL, Steen JS, Buys DR, Nadorff MR. Mental health first aid training for extension agents in rural communities. *Suicide Life Threat Behav*. 2021;51(2):301-307. doi:10.1111/sltb.12705

59. Pendse SR, Nugent NR. Mental health challenges and opportunities in rural communities. *Brown University Child & Adolescent Behavior Letter*. 2017;33(6):1-7. doi:10.1002/cbl.30217

60. Exploring the Rural Context of Adverse Childhood Experiences (ACEs). Policy Brief and Recommendations. (2018). National Advisory Committee on Rural Health and Human Services. https://files.eric.ed.gov/fulltext/ED591840.pdf

61. Derefinko KJ, Salgado García FI, Talley KM, et al. Adverse childhood experiences predict opioid relapse during treatment among rural adults. *Addict Behav*. 2019;96:171-174. doi:10.1016/j.addbeh.2019.05.008

62. Feiden D. Identifying anxiety and depression in adolescents through primary care screening. *J Nurse Pract*. 2021;17(10):1285-1287. doi:10.1016/j.nurpra.2021.08.005

63. Mendenhall E, De Silva MJ, Hanlon C, et al. Acceptability and feasibility of using non-specialist health workers to deliver mental health care: stakeholder perceptions from the PRIME district sites in Ethiopia, India, Nepal, South Africa, and Uganda. *Soc Sci Med*. 2014;118:33-42. doi:10.1016/j.socscimed.2014.07.057

64. Gladstone TRG, Feinstein RT, Fitzgibbon ML, et al. Path 2 Purpose: design of a comparative effectiveness study of prevention programs for adolescents at-risk for depression in the primary care setting. *Contemp Clin Trials*. 2022;117:106763. doi:10.1016/j.cct.2022.106763

65. Searcey van Vulpen K, Habegar A, Simmons T. Rural school-based mental health services: parent perceptions of needs and barriers. *Child Sch*. 2018;40(2):104-111. doi:10.1093/cs/cdy002

66. Story CR, Kirkwood AD, Parker S, Weller BE. Evaluation of the Better Todays/Better Tomorrows youth suicide prevention program: increasing mental health literacy in rural communities. *Best Pract Ment Health*. 2016;12(1):14-25.

67. DuBois D, Portillo N, Rhodes J, Silverthorn N, Valentine J. How effective are mentoring programs for youth? a systematic assessment of the evidence. *Psychol Sci Public Interest*. 2011;12(2):57-91 doi:10.1177/1529100611414806

68. Karcher MJ. The effects of developmental mentoring and high school mentors' attendance on their younger mentees' self-esteem, social skills, and connectedness. *Psychol Sch*. 2005;42(1):65-77. doi:10.1002/pits.20025

69. Walker JS, Baird C. Using "remote" training and coaching to increase providers' skills for working effectively with older youth and young adults with serious mental health conditions. *Child Youth Ser Rev*. 2019;100:119-128. doi:10.1016/j.childyouth.2019.02.040

70. Frankland M. Meeting students where they are: trauma-informed approaches in rural schools. *Rural Educ*. 2021;42(2):51-71. doi:10.35608/ruraled.v42i2.1243

71. Bryant J. Dismantling rural stereotypes. *Educ Leadersh*. 2010;68(3):54-58.

72. Fairchild RM, Ferng-Kuo SF, Rahmouni H, Hardesty D. Telehealth increases access to care for children dealing with suicidality, depression, and anxiety in rural emergency departments. *Telemed J E Health*. 2020;26(11):1353-1362. doi:10.1089/tmj.2019.0253

73. Tarlow KR, McCord CE, Du Y, Hammett J, Wills T. Rural mental health service utilization in a Texas telepsychology clinic. *J Clin Psychol.* 2020;76(6):1004-1014. doi:10.1002/jclp.22903

74. Bowman S, Nic Giolla Easpaig B, Fox R. Virtually caring: a qualitative study of internet-based mental health services for LGBT young adults in rural Australia. *Rural Remote Health.* 2020;20(1):5448. doi:10.22605/RRH5448

75. Robards F, Kang M, Luscombe G, et al. Predictors of young people's healthcare access in the digital age. *Aust N Z J Public Health.* 2019;43(6):582-588. doi:10.1111/1753-6405.12936

76. Aschbrenner K, Naslund JA, Tomlinson E, Kinney A, Pratt SI, Brunette MF. Adolescents' use of digital technologies and preferences for mobile health coaching in public mental health settings. *Front Public Health.* 2019;7:178. doi:10.3389/fpubh.2019.00178

77. Eiraldi R, McCurdy BL, Khanna MS, et al. Development and evaluation of a remote training strategy for the implementation of mental health evidence-based practices in rural schools: pilot study protocol. *Pilot Feasibility Stud.* 2022;8(1):128. doi:10.1186/s40814-022-01082-4

78. Hardesty C, Moody EJ, Kern S, et al. Enhancing professional development for educators: adapting Project ECHO from health care to education. *Rural Spec Educ Q.* 2020;40(1):42-52. doi:10.1177/8756870520960448

79. Nelson E-L, Zhang E, Bellinger S, et al. Telehealth ROCKS at home: pandemic transition of rural school-based to home-based telebehavioral health services. *Rural Ment Health.* 2023;47(2):114-122. doi:10.1037/rmh0000222

80. Huber BJ, Austen JM, Tobin RM, Meyers AB, Shelvin KH, Wells M. Overcoming barriers to rural children's mental health: an interconnected systems public health model. *Adv Sch Ment Health Promot.* 2016;9(3-4):219-241. doi:10.1080/1754730X.2016.1224121

81. Hoffman MS, Ramsay-Seaner K, Letcher A, Heckmann C. Collaboration is key: implications for successful rural opioid misuse prevention programming. *Rural Ment Health.* 2021;45(3):198-206. doi:10.1037/rmh0000184

82. Steelesmith DL, Fontanella CA, Campo JV, Bridge JA, Warren KL, Root ED. Contextual factors associated with county-level suicide rates in the United States, 1999 to 2016. *JAMA Netw Open.* 2019;2(9):e1910936. doi:10.1001/jamanetworkopen.2019.10936

83. Stone DM, Jones CM, Mack KA. Changes in suicide rates - United States, 2018-2019. *MMWR Morb Mortal Wkly Rep.* 2021;70(8):261-268. doi:10.15585/mmwr.mm7008a1

84. Tarlow KR, Johnson TA, McCord CE. Rural status, suicide ideation, and telemental health: risk assessment in a clinical sample. *J Rural Health.* 2019;35(2):247-252. doi:10.1111/jrh.12310

85. Barry R, Rehm J, de Oliveira C, Gozdyra P, Kurdyak P. Rurality and risk of suicide attempts and death by suicide among people living in four English-speaking high-income countries: a systematic review and meta-analysis. *Can J Psychiatry.* 2020;65(7):441-447. doi:10.1177/0706743720902655

86. Cross W, Pisani A, Schmeelk-Cone K, et al. Measuring trainer fidelity in the transfer of suicide prevention training. *Crisis.* 2014;35(3):202-212. doi:10.1027/0227-5910/a000253

87. Cross WF, Chen T, Schmeelk-Cone K, Tu X, Kleinman M, Gould MS. Trainer fidelity as a predictor of crisis counselors' behaviors with callers who express suicidal thoughts. *Psychiatric Services.* 2017;68(10):1083-1087. doi:10.1176/appi.ps.201600417

88. Peterson AL, Monahan MF, Bender AM, Gryglewicz K, Karver MS. Don't invite everyone! Training variables impacting the effectiveness of QPR trainings. *Adm Policy Ment Health.* 2021;48(2):343-353. doi:10.1007/s10488-020-01078-3

89. Torok M, Calear A l., Smart A, Nicolopoulos A, Wong Q. Preventing adolescent suicide: a systematic review of the effectiveness and change mechanisms of suicide prevention gatekeeping training programs for teachers and parents. *J Adolesc.* 2019;73:100-112. doi:10.1016/j.adolescence.2019.04.005

90. Goldman-Mellor S, Allen K, Kaplan MS. Rural/Urban disparities in adolescent nonfatal suicidal ideation and suicide attempt: a population-based study. *Suicide Life Threat Behav.* 2018;48(6):709-719. doi:10.1111/sltb.12390

91. Heron M. Deaths: Leading Causes for 2017. *Natl Vital Stat Rep.* 2019;68(6):1-77.

92. Fontanella CA, Hiance-Steelesmith DL, Phillips GS, et al. Widening rural-urban disparities in youth suicides, United States, 1996-2010. *JAMA Pediatr.* 2015;169(5):466-473. doi:10.1001/jamapediatrics.2014.3561

93. Graves JM, Abshire DA, Mackelprang JL, Amiri S, Beck A. Association of rurality with availability of youth mental health facilities with suicide prevention services in the US. *JAMA Netw Open.* 2020;3(10):e2021471. doi:10.1001/jamanetworkopen.2020.21471

94. Nestadt PS, Triplett P, Fowler DR, Mojtabai R. Urban-rural differences in suicide in the state of Maryland: the role of firearms. *Am J Public Health.* 2017;107(10):1548-1553. doi:10.2105/AJPH.2017.303865

95. Barnhorst A, Gonzales H, Asif-Sattar R. Suicide prevention efforts in the United States and their effectiveness. *Curr Opin Psychiatry.* 2021;34(3):299-305. doi:10.1097/YCO.0000000000000682

96. Project Child Safe. Project ChildSafe. Accessed July 11, 2023. https://projectchildsafe.org/

97. Asarnow JR, Berk M, Hughes JL, Anderson NL. The SAFETY Program: a treatment-development trial of a cognitive-behavioral family treatment for adolescent suicide attempters. *J Clin Child Adolesc Psychol.* 2015;44(1):194-203. doi:10.1080/15374416.2014.940624

98. Wasserman C, Postuvan V, Herta D, Iosue M, Värnik P, Carli V. Interactions between youth and mental health professionals: the Youth Aware of Mental health (YAM) program experience. *PLoS ONE.* 2018;13(2):1-33. doi:10.1371/journal.pone.0191843

99. Bailey SJ, Oosterhoff B, Lindow JC, Robecker T, Bryan B, Byerly MJ. Feasibility, acceptability, and fidelity: extension agents teaching youth aware of mental health. *Rural Ment Health.* 2022;46(2):88-99. doi:10.1037/rmh0000170

100. Conron K. LGBT Youth Population in the United States. The Williams Institute, UCLA, Los Angeles, CA. September 2020. Accessed July 5, 2023. https://williamsinstitute.law.ucla.edu/wp-content/uploads/LGBT-Youth-US-Pop-Sep-2020.pdf

101. Ream GL. What's unique about lesbian, gay, bisexual, and transgender (LGBT) youth and young adult suicides? Findings from the National Violent Death Reporting System. *J Adolesc Health.* 2019;64(5):602-607. doi:10.1016/j.jadohealth.2018.10.303

102. De Pedro KT, Lynch RJ, Esqueda MC. Understanding safety, victimization and school climate among rural lesbian, gay, bisexual, transgender, and questioning (LGBTQ) youth. *J LGBT Youth.* 2018;15(4):265-279. doi:10.1080/19361653.2018.1472050

103. Li CC, Matthews AK, Aranda F, Patel C, Patel M. Predictors and consequences of negative patient-provider interactions among a sample of African American sexual minority women. *LGBT Health.* 2015;2(2):140-146. doi:10.1089/lgbt.2014.0127

104. Miller LR, Grollman EA. The social costs of gender nonconformity for transgender adults: implications for discrimination and health. *Sociol Forum (Randolph NJ).* 2015;30(3):809-831. doi:10.1111/socf.12193

105. Ballard ME, Jameson JP, Martz DM. Sexual identity and risk behaviors among adolescents in rural Appalachia. *Rural Ment Health.* 2017;41(1):17-29. doi:10.1037/rmh0000068

106. Green AE, Price-Feeney M, Dorison SH. Association of sexual orientation acceptance with reduced suicide attempts among lesbian, gay, bisexual, transgender, queer, and questioning youth. *LGBT Health.* 2021;8(1):26-31. doi:10.1089/lgbt.2020.0248

107. Hatchel T, Polanin JR, Espelage DL. Suicidal thoughts and behaviors among LGBTQ youth: meta-analyses and a systematic review. *Arch*

*Suicide Res.* 2021;25(1):1-37. doi:10.1080/13811118.2019.1663329

108. Green AE, DeChants JP, Price MN, Davis CK. Association of gender-affirming hormone therapy with depression, thoughts of suicide, and attempted suicide among transgender and nonbinary youth. *J Adolesc Health.* 2022;70(4):643-649. doi:10.1016/j.jadohealth.2021.10.036

109. Wagner J, Sackett-Taylor AC, Hodax JK, Forcier M, Rafferty J. Psychosocial overview of gender-affirmative care. *J Pediatr Adolesc Gynecol.* 2019;32(6):567-573. doi:10.1016/j.jpag.2019.05.004

110. Hughto JMW, Gunn HA, Rood BA, Pantalone DW. Social and medical gender affirmation experiences are inversely associated with mental health problems in a U.S. non-probability sample of transgender adults. *Arch Sex Behav.* 2020;49(7):2635-2647. doi:10.1007/s10508-020-01655-5

111. Russell ST, Pollitt AM, Li G, Grossman AH. Chosen name use is linked to reduced depressive symptoms, suicidal ideation, and suicidal behavior among transgender youth. *J Adolesc Health.* 2018;63(4):503-505. doi:10.1016/j.jadohealth.2018.02.003

112. Kimberly LL, Folkers KM, Friesen P, et al. Ethical issues in gender-affirming care for youth. *Pediatrics.* 2018;142(6):e20181537. doi:10.1542/peds.2018-1537

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*Related Chapters:*
Chapter 2. Addiction in Rural America
Chapter 5. Rural Substance Misuse Trends in America
Chapter 18. Rural Health Issues in Child and Adolescent Development
Chapter 20. The Issue of Chronic Pain in Rural America

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# ADDICTION IN RURAL AMERICA

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## SCOPE OF THE PROBLEM

- Addiction was identified as the second most-frequently selected public health priority for rural America by respondents to the Rural Healthy People 2030 survey.[1]
- Addiction is a treatable chronic disease; however, immense disparities in treatment options exist in rural America.
- Addiction can be to a single or multiple substances; however, opioid overdoses are a leading cause of death among adults in America.[2]
- The United States Department of Health and Human Services has declared a public health emergency due to the opioid crisis.[3]

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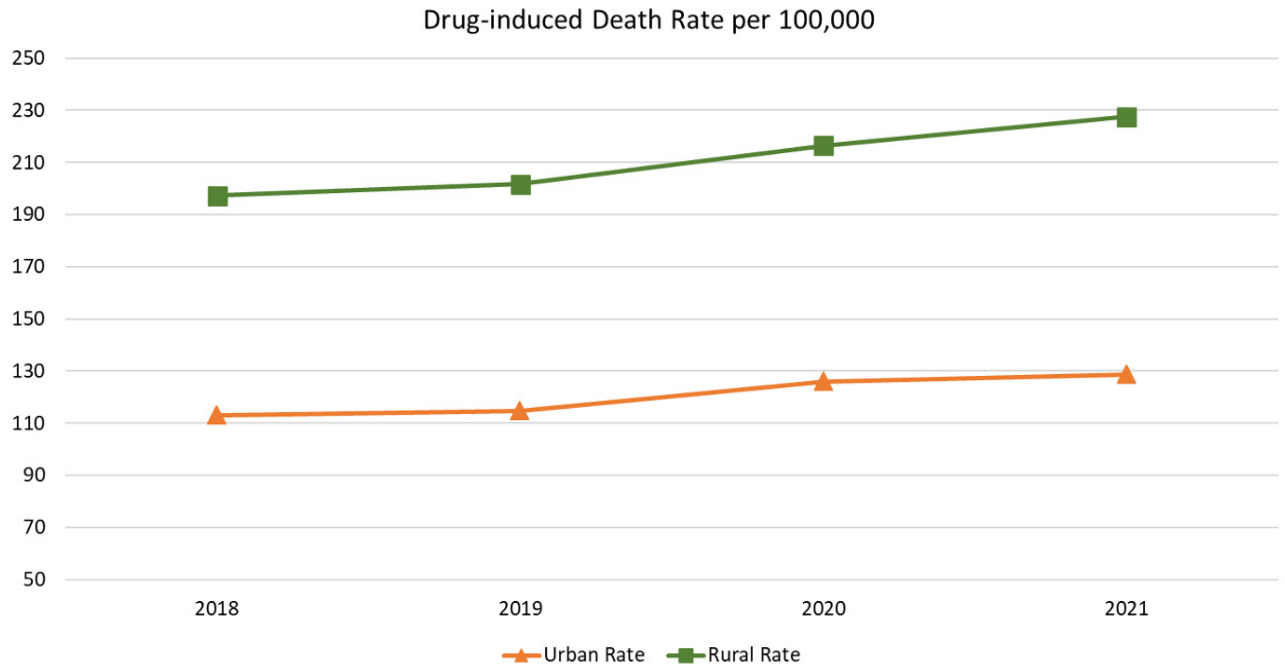
Addiction, clinically referred to as a substance use disorder (SUD), is a complex disease of the brain and body that involves compulsive use of one or more substances despite serious health and social consequences. The term addiction medicine has been recognized since 1990 and is concerned with the prevention, evaluation, diagnosis, treatment, and recovery of persons with the disease of addiction. This includes those with substance-related health conditions, and people who show unhealthy use of substances such as nicotine, alcohol, prescription medications, and other licit and illicit drugs.[4] Addiction Psychiatry became an available certification from the American Board of Medical Specialties (ABMS) in 1993 and Addiction Medicine was recognized as a medical subspecialty under the American Board of Preventive Medicine in 2016, with certification available in 2017.[4]

The Secretary of Health and Human Services (HHS) first issued notice of an opioid public health emergency in 2017, classifying opioid use disorders as an epidemic. That was renewed in January of 2022 as the rate of drug overdose deaths in rural counties increased from 4.0 per 100,000 persons in 1999 to 19.6 in 2019.[3] **Figure 1** displays rural-urban differences in overdose deaths for all substances. Deaths from synthetic opioids (fentanyl, fentanyl analogs, and tramadol) doubled in the United States (U.S.) between 2015 and 2016 and deaths related to heroin increased 400% between 2010 and 2016.[5] Roughly two-thirds of all American overdose deaths in 2017 involved opioids,[6] and an estimated 100,306 Americans died between April 2020 and March of 2021, making opioids a leading cause of injury-related death among adults.[2]

While addiction can involve a single or multiple substances, America is faced with a catastrophic health problem due to the swift increase in fatal overdoses from opioid addiction. Opioids are estimated to claim the lives of over 130 Americans every day.[7,8] Thus, this chapter provides a snapshot of addiction in rural America, with an emphasis on issues related to SUD and more specifically, opioid use disorder (OUD). There are multiple epidemics identified (prescription opioids, heroin, and prescription-synthetic opioid mixtures), as well as a concurrent and overlapping epidemic that involves all opioids.[9] In rural areas, SUD is also more likely to involve polysubstance use. Methamphetamine and prescription stimulant use are more common in rural areas, while cocaine and prescription anxiolytics are more common in urban areas.[10] **Table 1** and **Figure 2** show differences in types of substances used in non-metropolitan (<50,000), small metropolitan (50,000 - 249,999), and large metropolitan (⩾ 250,000) census tracts.

**Addiction as a Health Condition.** Addiction involves both behavioral activities and neurobiological changes that contribute to

**Figure 1. Overdose Deaths by Rural v. Urban for All Substances**




*Source: Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 2018-2021 on CDC WONDER Online Database. MCD - Drug/alcohol induced causes: Drug-induced causes.*

**Table 1. Rural-urban substance use rates by population and substance type (ages 12+ unless noted).**

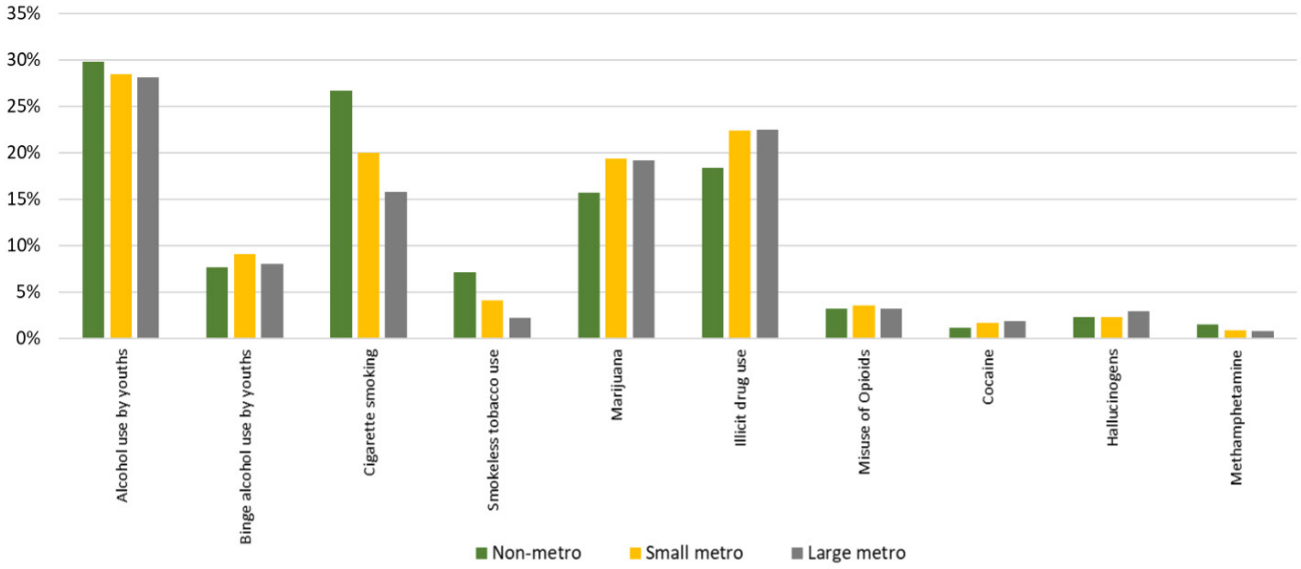
| | Non-metropolitan | Small metropolitan | Large metropolitan |
|---|---|---|---|
| Alcohol use by youths aged 12-20 | 29.8% | 28.5% | 28.1% |
| Binge alcohol use by youths aged 12-20 (in past month) | 7.7% | 9.1% | 8.0% |
| Cigarette smoking | 26.7% | 20.0% | 15.8% |
| Smokeless tobacco use | 7.1% | 4.1% | 2.2% |
| Marijuana | 15.7% | 19.4% | 19.2% |
| Illicit drug use | 18.4% | 22.4% | 22.5% |
| Misuse of opioids | 3.2% | 3.6% | 3.2% |
| Cocaine | 1.2% | 1.7% | 1.9% |
| Hallucinogens | 2.3% | 2.3% | 2.9% |
| Methamphetamine | 1.5% | 0.9% | 0.8% |

*Source: Substance Abuse and Mental Health Services Administration (SAMHSA), Results from the 2021 National Survey on Drug Use and Health: Detailed tables.*

dependency that impairs day-to-day functioning; addiction interferes with the ability to maintain positive relationships, employment, and/or education.[11] Substances commonly associated with addiction (e.g., alcohol, cocaine, amphetamines, and opiates/opioids) share common effects on neural adaptation, which are mediated by dopamine activity in parts of the brain known as the "reward pathway".[12] The reward pathway evolved to promote behaviors that enhanced survival, such as food gathering and reproduction. The neural structures in the reward pathway are saturated with dopamine receptors. Substances that cause addiction typically increase dopamine activity in the reward pathway and create lasting adaptations that intensify addiction.[12]

With repeated use, neurological changes reinforce drug-seeking behaviors. Ironically, dopamine

Figure 2. Rural-Urban Substance Use Rates by Census Region and Substance Type (Ages 12+)




receptor activity decreases with chronic substance use such that people with SUD may only feel "normal" when using the substance. Withdrawal can lead to depressed mood, cravings, and relapse; repeated use also inhibits frontal lobe function, contributing to poor impulse control and judgment.[13-16] Understanding that addiction is a health condition with neurobiological changes can reduce stigma and remove barriers to treatment and sustained recovery.

## RELEVANT HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

Healthy People 2020 named 11 objectives focused on outcomes related to opioids under the priority topic "Substance Abuse".[17] The current Healthy People 2030 program focuses on preventing SUD and helping those with SUD get treatment. Addiction or SUD is linked to many health problems and can lead to overdose and death. Addiction is listed in Healthy People 2030 as a health condition with a 2030 goal to reduce drug and alcohol addiction that is linked to five (5) baseline objectives and *three (3) developmental objectives*.[18]

- SU-01: Increase the proportion of people with SUD who got treatment in the past year
- SU-13: Reduce the proportion of people who had alcohol use disorder in the past year
- SU-14: Reduce the proportion of people who had marijuana use disorder in the past year
- SU-15: Reduce the proportion of people who had drug use disorder in the past year
- SU-18: Reduce the proportion of people who had an OUD in the past year
- SU-D01: Increase the number of admissions to substance use treatment for injection drug use
- SU-D02: Increase the number of people who get a referral for substance use treatment after an emergency department visit
- SU-D03: Increase the rate of people with an OUD getting medications for addiction treatment

## RURAL HEALTHY PEOPLE 2030 SURVEY

"Addiction" was not an available term for ranking in previous Rural Healthy People (RHP) surveys nor a leading indicator for Healthy People in prior decades. "Substance Abuse" was ranked fifth in the 2020 edition of RHP. In the current RHP 2030 survey, "Addiction" as a health condition ranks as the second overall health priority for rural Americans for the coming decade,[1] and "Drug and Alcohol Use" as a health behavior is ranked fifth.[1,19] The RHP 2030 survey respondents, representing rural America, voiced concerns over mental health and substances consistently across all groups surveyed (e.g., gender, age group, employment type).[1] Outcomes from the RHP 2030 survey fall in line with the overwhelming concern voiced by many state and local officials who view opioid abuse as the most pressing problem facing rural America.[9]

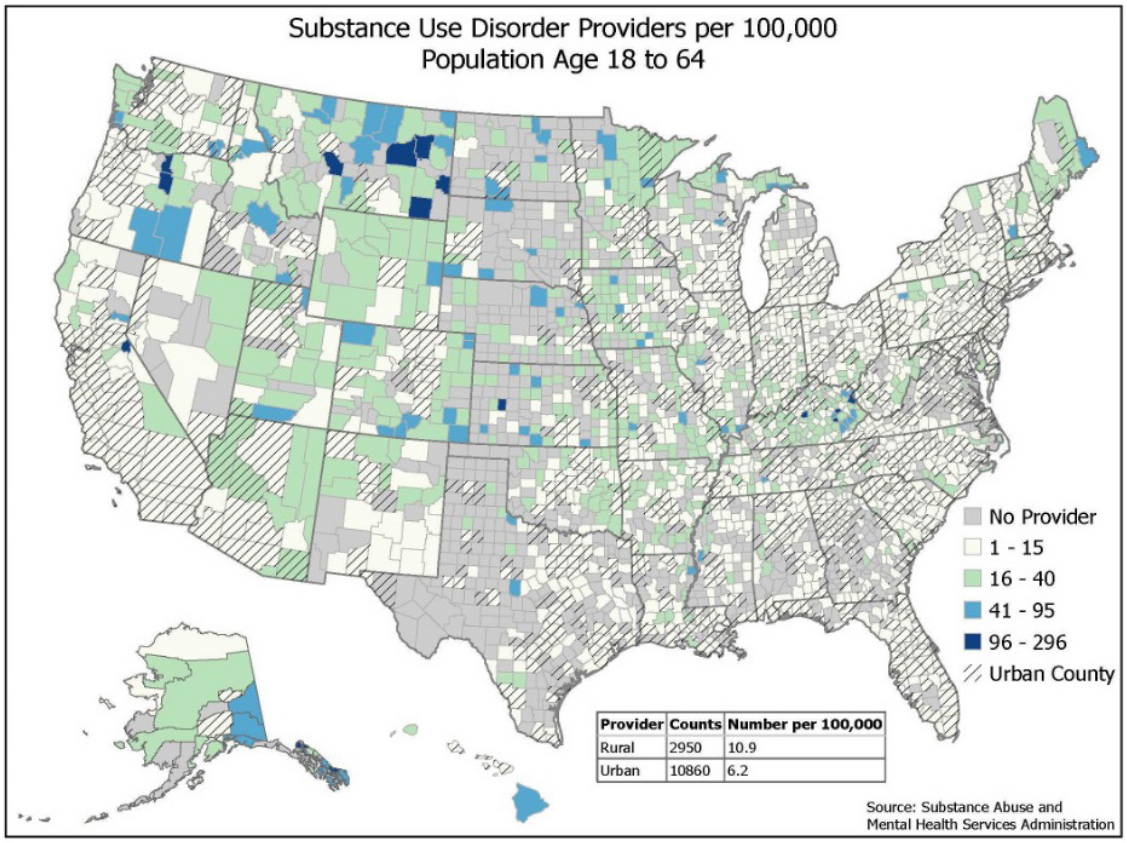
## PREVALENCE AND DISPARITIES IN RURAL AMERICA

Overall, the opioid epidemic has disproportionate impacts in rural communities.[9,10,20-34] In 2015 the overdose death rate for rural Americans surpassed those in urban areas.[27] Variations in urban versus rural rates of overdose deaths have fluctuated over time with different patterns related to specific substance types.[3] Rural America has limited access to general healthcare and even more limitations related to substance use treatment providers.[30,31] **Figure 3** provides a snapshot of SUD treatment providers per 100,000 population, highlighting rural and urban counties. While it appears on the map that several rural counties have high rates of providers per the color coding, these rates are inflated by low populations in these counties. Notably, there are large rural swaths with no substance use providers, particularly in the central part of the country. Rural communities have distinctive factors that increase susceptibility and vulnerability to drug use and associated harms such as earlier age of drug use, engagement in riskier drug use behaviors, and increased likelihood of methamphetamine use.[35]

**Alcohol Use.** Alcohol use has been shown to be more prevalent in rural areas, and mortality rates in rural populations while driving under the influence of alcohol are twice as high as in urban areas.[36] Broffman et al. reported that mental health conditions and alcohol misuse are seen as normal parts of life by rural individuals and therefore do not require treatment.[37] Some treatment barriers for alcohol misuse in rural America can be attributed to stigma, denial, and a lack of healthcare providers who provide medically assisted treatment for alcohol use disorder.[37] It is suggested that use of medications for alcohol use disorder (MAUD) and medications for OUD (MOUD) follow similar patterns and are both more prevalently used in urban than rural communities.[38]

Underage drinking is a pattern within rural communities,[37] and alcohol use continues into college years for rural populations.[39] However, urban and rural rates of alcohol consumption were disproportionate with urban students being much more likely to consume alcohol in their

**Figure 3. Substance Use Disorder Treatment Providers by Population and Urban-Rural Counties**



freshman year of college.[39] Future interventions for rural communities will need to include improving community-based resources and prioritizing access to care.[37]

**Marijuana Use.** Increased psychosocial stress is linked to higher rates of marijuana use among rural populations.[40] Young adults consider driving under the influence of marijuana less dangerous than driving under the influence of alcohol.[36] The nationwide acceptance of marijuana has led to increases in use during pregnancy which is correlated with negative outcomes for newborns. The misperception that marijuana has no impact on infant health is prevalent among rural women and their families.[41]

**Illicit Drug Use.** Urban-rural differences in overdose rates involving psychostimulants with abuse potential (methamphetamine, amphetamine, and methylphenidate) have consistently remained higher in rural areas since 2012.[3,28,29] Rural communities can have environmental elements that support methamphetamine use such as earlier exposure from a friend or family member, availability and being inexpensive, and lower stigma relative to heroin.[35] Rural residents reported using methamphetamines as a temporary coping mechanism for opioid withdrawal. Specifics include times when MOUD was not available, during efforts to quit using opioids or enhance functioning, and especially in labor intensive jobs or those with long shifts.[35] Heroin is also known as an attractive alternative for those addicted to prescription opioids as it is cheaper and more readily available.[9] In addition to heroin and methamphetamines, people who inject drugs (PWID) also report injecting fentanyl.[21] Most heroin found in the U.S. has entered the country through the southern border from Mexican drug trafficking organizations who control the wholesale distribution of heroin in the U.S.[42] Concurrent use of methamphetamine and opioids is associated with increased injection drug use, HIV and hepatitis C virus (HCV) infections, and severe mental illness that boosts adverse outcomes.[28] As no medications are currently available for those addicted to stimulants, behavioral healthcare is critically important, but these resources are lacking in most rural areas.[28]

**Opioid Use/Misuse.** Overall, rural residents using opioids reported overall poorer health, higher pain levels, lower education, and a higher rate of unemployment that those in urban areas.[22] Rural residents are also more likely to be prescribed an opioid than those in urban areas.[10,22] While larger cities have seen a decline in prescription opioid overdose deaths, possibly due to policy changes and increased use of heroin, this rate remains high in rural areas.[9] Synthetic opioids, manufactured from inorganic chemicals, are tightly controlled in the U.S. Street synthetics, analogs that are inexpensive to produce, potent in small amounts, and easily mixed with other substances, are produced abroad and brought across U.S. borders.[42] Fatal overdoses from synthetic opioids are growing in urban areas due to high potency, lower cost, and ample availability.[9]

## VARIATION BY RURAL REGIONS

The geography of the opioid overdose crisis shows spatial mortality discrepancies across America with large areas of the upper Midwest and Great Plains having some of the lowest rates of fatal overdoses; Appalachia and parts of the Ohio River Valley have, for some time, experienced the highest fatality rates.[9] There are also areas with previous minor drug problems that are now suffering high opioid overdose fatalities, in particular states in the Southwest, Eastern Great Lakes, and New England.[9] Risk factors contributing to higher overdose rates include high rates of poverty, unemployment, disability, single parent families, divorce, lower educational attainment, and belonging to certain vulnerable demographic groups such as the elderly, military veterans, and Native Americans.[43] Areas of high opioid overdose tend to be older communities that are less racially and ethnically diverse and have a declining industrial base.[44]

## VARIATION BY RACE AND ETHNICITY

At the start of the opioid epidemic, there were associations between opioid overdose deaths and being White, middle-class persons.[32,45] However, trends for the last two decades show that overdose death rates for Black individuals have doubled[32,45] with the steepest rise in rural opioid death rates from 2016 to 2017.[29,45] Overdose deaths from

opioids have increased across all racial and ethnic groups.[32,34] There has been a dramatic increase in deaths for low socioeconomic status Whites as OUD-associated deaths occur at a higher rate in rural counties with higher populations of poor and unemployed Whites.[32]

Higher rates of opioid prescribing, fentanyl exposure, economic distress, reliance on mining and employment in the service sector, and constant population loss are associated with higher fatal drug overdoses among non-Hispanic Whites.[44] Rural White Americans are more likely to use injectable opioids.[29] Limited awareness of injection risks and co-occurring mental health problems are precursors to injection opioid use; additionally, many rural residents experience income-related struggles and gaps in insurance, which are both connected to greater risk for opioid-related consequences.[29]

Age-adjusted opioid-overdose death rates have steadily increased for the past 20 years in rural America and data shows that rural residents are less likely than their urban counterparts to be administered naloxone, a medicine that rapidly reverses an opioid overdose, by emergency departments.[29] Literature also shows greater barriers in accessing naloxone exist for Whites and younger adults, two groups who have had an increase in overdose deaths and a rise in seeking treatment for OUD.[29,44]

## IMPACT ON SPECIAL POPULATIONS

**Pregnant and Parenting Women.** Pregnant women in rural America are more likely to report both illicit opioid use and use of multiple illicit substances than their urban peers.[34] Primary treatment barriers to parenting women with SUD (both in urban and rural areas) are reported as access to specialty health care services, affordability, stigma, and lack of readiness to stop using.[46] Parenting women with SUD residing in rural areas have 97% lower odds of undergoing SUD treatment compared to those in urban areas.[46] About 20% of parenting women with SUD in rural areas reported using SUD treatment, although only about 10% of these women perceived a need for treatment.[46]

**Infants, Children and Adolescents.** Rates of neonatal abstinence syndrome (NAS) are higher in rural areas versus urban.[34,47] The developmental consequences of NAS can include low birth weight or premature birth, failure to thrive, and placement in the neonatal intensive care unit. Parental SUD can also result in child abuse and/or neglect due to impaired parents, and the social and economic consequences of SUD. Research has identified associations between the prevalence of opioid diagnoses and hospitalizations for child maltreatment.[48] The intergenerational normalization of substance misuse creates risk for children to develop unhealthy relationships with substances as they grow.[49]

**Adolescents.** Opioid misuse, addiction, and overdose has emerged as a national health crisis among adolescents. The earlier an individual initiates alcohol use, the greater their risk for misusing alcohol as an adult.[50] Nearly 17% of high school students have misused prescription opioids.[6,51]

## BARRIERS

Disparities related to addiction in rural America are vast and well documented to include poor treatment infrastructure; insufficient or lack of insurance coverage; geographic isolation; lack of transportation; low health literacy; smaller health care workforce with a lack of treatment services as well as providers trained in providing this type of specialty care; and stigma. It is suggested that the extent of the current rural opioid crisis is not fully known. Deaths from unknown opioid-like substances that escape detection are attributed to less detailed toxicology tests.[9] General barriers to SUD treatment exist in rural communities including access to and availability of services, access to current technology to support client services and/or functions of the agency, cost of services, denial, and stigmatization.[10,25,27,46,52]

**Lack of Rural Treatment Options.** A commonly noted barrier to accessing SUD is travel distances for rural Americans due to the lack of treatment options locally, including limited facilities and workforce.[20,24,25,27,29,33,34,53] Rural Americans are challenged by a lack of access to treatment with fewer methadone programs, MOUD providers, and behavioral health services.[28,33] A lack of mental health support services compounds the barrier to providing MOUD.[20] While expansion

of telehealth and telebehavioral health services represent an opportunity to address key barriers and increase access to care, structural barriers such as availability of and access to internet and broadband services persist.[25] There is a notable disparity in the availability of naloxone in rural communities[54] as well as MOUD providers.[55] There is a relative lack of MOUD available at federally qualified health centers in rural communities and it is estimated that less than 20% of those with OUD receive MOUD.[32,56] Previously there was a federal requirement for practitioners to have a special waiver obtained by submitting a Notice of Intent to prescribe MOUD. The need for this waiver was removed in 2023 and MOUD, like all other prescriptions, only requires a standard Drug Enforcement Administration (DEA) registration number. While previous literature noted a lack of treatment access for rural counties related to a lack of waivered providers, there are still challenges to access in rural counties that have providers. This was attributed to the vast MOUD demand and providers that were not offering MOUD despite being waivered.[20,26,27,34,55] **Table 2** presents data on counties with high-need, and low-to-no capacity, for buprenorphine prescribing for OUD by census region and rural-urban differences.

**Stigma.** Stigmatization against people who use drugs is a substantial issue in rural America. Stigma often manifests as negative perceptions held by community members and providers, and negative responses toward those using drugs, those seeking drug treatment, and those seeking treatment protocols.[10,23,26,29,31,57] Negative attitudes and concerns regarding persons with SUD and medication treatments are some reasons few providers deliver treatment in rural settings.[23,24,29,57] Stigma against those who use drugs can be especially pronounced in rural communities where there is decreased anonymity, lack of treatment resources, absence of harm reduction strategies, and lack of community understanding of addiction.[23,58]

**Table 2. Percentage of counties with need and capacity for buprenorphine prescribing for OUD: rural vs. urban comparison.**

| Census Region | Percentage of counties with high-need and low-to-no-capacity for buprenorphine prescribing, among all counties | Percentage of counties with low-to-no capacity for buprenorphine prescribing, among high-need counties |
|---|---|---|
| **All Counties** | | |
| Northeast | 0.5% | 5% |
| South | 29% | 59% |
| Midwest | 13% | 57% |
| West | 18% | 48% |
| **Rural Counties** | | |
| Northeast | 1% | 14% |
| South | 34% | 67% |
| Midwest | 14% | 70% |
| West | 21% | 56% |
| **Urban Counties** | | |
| Northeast | 0% | 0% |
| South | 21% | 46% |
| Midwest | 44% | 36% |
| West | 11% | 31% |

*Sources: Buprenorphine-Waivered Providers - County Data (link: https://oig.hhs.gov/oei/maps/waivered-providers/index.html and NCHS Urban-Rural Classification Scheme for Counties (link: https://www.cdc.gov/nchs/data_access/urban_rural.htm)*

In rural communities, stigmatizing and negative attitudes about those who use drugs has been found in multiple sectors of the community including law enforcement,[23] emergency medical service professionals,[58] and a variety of health care professionals who also reported a lack of comfort/low self-efficacy in treating those with SUD.[55,59] For those diagnosed with SUD, low uptake of MOUD is hindered by misconceptions regarding the implications and benefits of evidence-based OUD treatment medication protocols—a barrier particularly significant in rural areas lacking behavioral health treatment options.[23,57,60] Overall, stigmatization represents a complex and persistent barrier to treatment, particularly in rural areas. Recognition of the role of stigma in diagnosis and treatment represents significant opportunity for changes and highlights the need for increased education and awareness to neutralize the pattern of stigmatization and shift the focus toward access, treatment, and recovery.

**Spread of Infectious Diseases.** The opioid epidemic has fueled outbreaks of HIV and HCV infections among people who inject drugs,[21] with those in rural counties being most vulnerable.[53] Policy changes to curtail the diversion of prescription drugs (illegal distribution or abuse of prescription drugs for purposes not intended by the prescriber) have increased the risk of overdose as well as HIV/HCV infections in rural America.[32,61]

## CONTRIBUTING FACTORS/KNOWN CAUSES OF THE CONDITION

**Policy.** There have been policy changes related to prescription opioids in response to the crisis such as efforts to decrease prescriptions and diversion to include prescription drug monitoring programs (PDMP), pain clinic laws, prescription duration limits, the disciplining of providers who prescribe disproportionate amounts of opioids, and ultimately the advent of abuse deterrent prescription opioid formulas.[61] Prescription drug monitoring programs were intended to curtail nonmedical opioid use and diversion through the tracking of scheduled medications prescribed and dispensed.[42,62] Yet, these policies have resulted in unintended consequences, specifically a transition of those who misuse prescription opioids to heroin, fentanyl or injection drug use.[32,62,63] Dramatic escalation in heroin overdoses is associated with decreased opioid prescribing[62] and, despite new guidelines and PDMPs, per capita opioid prescriptions are high in rural populations, especially among residents that are White, have diabetes and arthritis, and are unemployed.[24]

**Polysubstance Use.** There is an increase in use of multiple substances while concurrently using methamphetamine and opioids, simultaneously as well as separately.[10,28,35] While there is an increased risk of overdose both with cocaine and methamphetamine combined with opioids, methamphetamines pose the threat of overdose regardless of opioid use. Research has shown that the epidemic of opioid overdoses in rural America is associated with pervasive methamphetamine use among people using drugs.[10,28] Rural residents are more apt to misuse multiple prescribed substances compared to urban polysubstance users who more often use illicit opioids.[10] Healthcare providers have concerns in caring for individuals with polysubstance use.[55] Polysubstance use has a significant impact on addiction treatment modalities, self-management of withdrawal symptoms, risk of overdose, and compensatory use with cigarettes, alcohol, and or other illicit drugs such as methamphetamine.[10]

## SOLUTIONS/INTERVENTIONS/ RECOMMENDATIONS

**Community-based Solutions.** Comprehensive community-based initiatives for those with addictions are needed.[34] Rural community stakeholders can provide valuable inferences and solutions based on local experience to mitigate addiction for their communities.[24,49] Examples include the need to address those that are homeless in rural areas[24] and the importance of family and social support for resilience as well as risk factors.[24,49,64] There is a need to increase community education about nonmedical opioid use, overdose and its reversal, and the benefits of harm reduction.[61] Other services that can be facilitators for recovery from addiction in rural communities are medication-assisted treatment, peer recovery groups, rehabilitation centers, faith-based recovery programs, and long-term recovery programs.[24]

Given the potential for continuation of substance use during recovery, the concept of continuity of

care can be applied by connecting those with SUD to recovery support services. There is a need to coordinate continuity of care following completion of formal treatment services, linking treatment to recovery support services that account for individual needs and community capacity.

Stigma prevention efforts in rural communities should aim to improve public knowledge on factors contributing to substance use and harm reduction programming's moral and fiscal value.[23] Education and training initiatives to improve health care providers' attitudes, self-efficacy, and SUD assessment skills are needed to better serve rural Americans who use substances.[59] Pharmacy naloxone dispensing may be an especially effective strategy to alter the overdose risk environment in rural communities.[54]

**Expansion of Treatment Options.** Expansion of telemedicine, with options for rural patients, can help rural Americans with SUD connect with providers.[29,31] Additionally, psychosocial approaches such as technology-assisted remote treatment options (telehealth) and peer support specialists (PSS) are low-cost, evidence-based options to explore for implementation in rural communities. These options may also decrease travel burden as well as facilitate medication treatment expansion among providers.[9,29,34] Educational interventions are needed to train primary care practitioners—who are key providers of opioid use disorder treatment in the rural U.S.—how to better address multiple addictions such as methamphetamine use among people who use opioids.[28,55]

**MOUD Treatment.** The critical need to expand access to medication treatment and emergency opioid-overdose reversal medications to rural communities has been identified.[65] Established treatment standards for OUD include medications (buprenorphine, methadone, or naltrexone) and psychosocial treatment. However, treatment options in rural America are limited.[9,29,55] Medication for the treatment of addiction, specifically OUD, is central to best practices[27] and requires long-term management with a combination of treatments tailored to the individual.[32] Methadone, buprenorphine, and naltrexone are currently the medications approved by the Federal Drug Administration to treat OUD. Long-acting buprenorphine injectables offer a solution to improve OUD treatment in rural areas which also improves treatment access and retention by decreasing risk of nonadherence, diversion, and misuse.[60] Literature findings also consistently noted sociodemographic risk factors related to MOUD access intersecting with rural status, potentially exacerbated by rural-specific risks.[29]

The implementation chasm (gap between scientific advances and their implementation) is wide for those with addiction in rural America, especially for MOUD.[20,26,27,29,32-34,53,55,56] Education is needed for providers,[59] people who use opioids, and the community at-large about the safety and efficacy of MOUD, and the dangers of detoxification and other contraindicated "drug treatments" that may decrease tolerance and increase overdose risk.[61] Best practices for patients who use opioids nonmedically, become physically dependent, or develop an OUD are needed as guidelines and should include screening tools for referral of those in need of MOUD.[61]

The Comprehensive and Addiction Recovery Act (CARA) of 2016 temporarily extended the ability for nurse practitioners and physician assistants to get a DEA waiver to prescribe buprenorphine (an MOUD). By the end of 2017, 30% of rural residents were living in a county without a buprenorphine provider, compared with only 2.2% of urban residents.[20] In 2018, under the Substance Use-Disorder Prevention that Promotes Opioid Recovery and Treatment for Patients and Communities Act, the number of patients a provider could manage with buprenorphine prescriptions was increased and CARA became permanent. The need for a waiver to treat OUD was rescinded as part of the 2023 Consolidation Appropriations Act.

**Peer Support Specialists.** Peer support has shown to be successful in maintaining recovery for behavioral health conditions such as SUD[66,67] with increased treatment retention, improved treatment satisfaction, and a reduction in relapse rates.[68] The use of PSS or recovery coaches brings the lived experience of recovery, combined with training and supervision, to assist others in initiating and maintaining recovery. PSS help enhance the quality of personal and family life in long-term recovery and is a promising approach

for resource-poor areas.[69] Recovery coaches help persons with SUD to connect to, engage in, and be active participants in treatment and recovery support services,[70] decrease substance use, increase engagement with medical care, and increase day-to-day function.[68,71] The operationalization and effectiveness of PSS in low-resource populations lacks appraisal,[68] but is a promising and viable strategy to implement and adopt in the wake of the COVID-19 pandemic.

**Harm Reduction Strategies.** Harm reduction and SUD treatment interventions should aim to address methamphetamines, as well as opioids, to combat overdoses in rural communities.[28] Policies differ across rural America related to harm reduction as state-level policies regulate harm reduction activities.[26] Interventions with the strongest evidence include PDMPs and pain clinic legislation, insurance strategies, motivational interviewing in clinical settings, feedback to providers on opioid prescribing behavior, intensive school and family-based programs, and patient education in the clinical setting.[72] More research in rural communities is needed on strategies to prevent overdose that include public, patient, and provider behavior.[72] It is imperative for programs aimed at youth and adolescents to target and highlight the misuse of opioids as substances that are highly addictive and can lead to the use and abuse of other substances.[51]

## SUMMARY AND CONCLUSIONS

Continued investigation, and interventions that emphasize environments which better conditions underpinning increased risk, are critical. In general, rural Americans are at-risk and understudied in relation to the opioid epidemic.[29] This chapter highlights drug use in rural America, as the opioid epidemic is certainly on the forefront of addiction concerns. The need is great for stronger partnerships among the medical community, increased access to substance use treatments, and collaborative public health organizations to better support rural communities.

## REFERENCES


1. Kassabian M, Shrestha A, Callaghan T. et al. Rural Healthy People 2030: Common Challenges, Rural Nuances. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

2. Ahmad FB, Cisewski JA, Rossen LM, Spencer MR, Warner M, Sutton P. Provisional Drug Overdose Data. Centers for Disease Control and Prevention. March 16, 2022. Updated April 12, 2023. Accessed October 20, 2022. https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm

3. Hedegaard H, Spencer MR. Urban–rural differences in drug overdose death rates, 1999–2019. NCHS Data Brief, no 403. Hyattsville, MD: National Center for Health Statistics. 2021. doi:10.15620/cdc:102891. https://aspr.hhs.gov/legal/PHE/Pages/Opioid-4Apr22.aspx

4. Nunes EV, Kunz K, Galanter M, O'Connor PG. Addiction psychiatry and addiction medicine: the evolution of addiction physician specialists. *Am J Addict*. 2020;29(5):390-400. doi:10.1111/ajad.13068

5. Hedegaard H, Miniño AM, Spencer MR, Warner M. Drug overdose deaths in the United States, 1999–2020. NCHS Data Brief, no 428. Hyattsville, MD: National Center for Health Statistics. 2021. doi:10.15620/cdc:112340

6. Drug Overdose, Death Rate Maps & Graphs. U.S. Centers for Disease Control and Prevention. Updated May 23, 2022. Accessed October 20, 2022. https://www.cdc.gov/drugoverdose/deaths/index.html

7. Understanding Drug Overdoses and Deaths. U.S. Centers for Disease Control and Prevention. Updated February 14, 2022. Accessed October 20, 2022. https://www.cdc.gov/drugoverdose/epidemic/

8. Truong EI, Kishawi SK, Ho VP, et al. Opioids and injury deaths: a population-based analysis of the United States from 2006 to 2017. *Injury*. 2021;52(8):2194-2198. doi:10.1016%2Fj.injury.2021.03.018

9. Peters DJ, Monnat SM, Hochstetler AL, Berg MT. The opioid hydra: understanding overdose mortality epidemics and syndemics across the rural-urban continuum. *Rural Sociol*. 2020;85(3):589-622. doi:10.1111%2Fruso.12307

10. Ellis MS, Kasper ZA, Cicero TJ. Polysubstance use trends and variability among individuals with

opioid use disorder in rural versus urban settings. *Prev Med*. 2021;152(Pt 2):106729. doi:10.1016/j.ypmed.2021.106729

11. What is Addiction? National Institute on Drug Abuse. National Institutes of Health. Updated July 2020. Accessed Oct. 20, 2022. https://nida.nih.gov/publications/drugs-brains-behavior-science-addiction/drug-misuse-addiction

12. Ettinger, RH. *Psychopharmacology*. Routledge; 2017.

13. Baumann MH, Rothman RB. Alterations in serotonergic responsiveness during cocaine withdrawal in rats: similarities to major depression in humans. *Biol Psychiatry*. 1998;44(7):578-591. doi:10.1016/s0006-3223(98)00123-1

14. Hasin DS, Grant BF. Major depression in 6050 former drinkers: association with past alcohol dependence. *Arch Gen Psychiatry*. 2002;59(9):794-800. doi:10.1001/archpsyc.59.9.794

15. Kosten TR, Baxter LE. Review article: Effective management of opioid withdrawal symptoms: a gateway to opioid dependence treatment. *Am J Addict*. 2019;28(2):55-62. doi:10.1111/ajad.12862

16. Sofuoglu M, Dudish-Poulsen S, Poling J, Mooney M, Hatsukami DK. The effect of individual cocaine withdrawal symptoms on outcomes in cocaine users. *Addict Behav*. 2005;30(6):1125-1134. doi:10.1016/j.addbeh.2004.10.010

17. Healthy People 2020. U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. Archived April 12, 2022. Accessed October 20, 2022. https://wayback.archive-it.org/5774/20220413182850/https://www.healthypeople.gov/2020/

18. Addiction. Healthy People, 2030. U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. Accessed September 1, 2022. https://health.gov/healthypeople/objectives-and-data/browse-objectives/addiction

19. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: new decade, new challenges. *Prev Med Rep*. 2023 Mar 21;33:102176. doi:10.1016/j.pmedr.2023.102176

20. Andrilla CHA, Moore TE, Patterson DG, Larson EH. Geographic distribution of providers with a DEA waiver to prescribe buprenorphine for the treatment of opioid use disorder: a 5-year update. *J Rural Health*. 2019;35(1):108-112. doi:10.1111/jrh.12307

21. Allen ST, O'Rourke A, White RH, Schneider KE, Kilkenny M, Sherman SG. Estimating the number of people who inject drugs in a rural county in Appalachia. *Am J Public Health*. 2019;109(3):445-450. doi:10.2105/AJPH.2018.304873

22. Cochran GT, Engel RJ, Hruschak VJ, Tarter RE. Prescription opioid misuse among rural community pharmacy patients: pilot study for screening and implications for future practice and research. *J Pharm Pract*. 2017;30(5):498-505. doi:10.1177/0897190016656673

23. Ezell JM, Walters S, Friedman SR, et al. Stigmatize the use, not the user? Attitudes on opioid use, drug injection, treatment, and overdose prevention in rural communities. *Soc Sci Med*. 2021;268:113470. doi:10.1016/j.socscimed.2020.113470

24. Hargrove AJ, Rafie C, Zimmerman E, Moser DE. A rural community's perspective on the causes of and solutions to the opioid crisis in southern Virginia: a qualitative study. *Rural Remote Health*. 2022;22(2):7152. doi:10.22605/RRH7152

25. Heitkamp TL, Fox LF. Addressing disparities for persons with substance use disorders in rural communities. *J Addict Nurs*. 2022;33(3):191-197. doi:10.1097/JAN.0000000000000483

26. Jenkins RA, Hagan H. What is a rural opioid risk and policy environment?. *Int J Drug Policy*. 2020;85:102606. doi:10.1016/j.drugpo.2019.11.014

27. Johnson Q, Mund B, Joudrey PJ. Improving rural access to opioid treatment programs. *J Law Med Ethics*. 2018;46(2):437-439. doi:10.1177/1073110518782951

28. Korthuis PT, Cook RR, Foot CA, et al. Association of methamphetamine and opioid use with nonfatal overdose in rural communities.

*JAMA Netw Open*. 2022;5(8):e2226544. doi:10.1001/jamanetworkopen.2022.26544

29. Lister JJ, Weaver A, Ellis JD, Himle JA, Ledgerwood DM. A systematic review of rural-specific barriers to medication treatment for opioid use disorder in the United States. *Am J Drug Alcohol Abuse*. 2020;46(3):273-288. doi:10.1080/00952990.2019.1694536

30. Rigg KK, Nicholson HL. Prescription opioid misuse among African-American adults: a rural-urban comparison of prevalence and risk. *Drug Alcohol Depend*. 2019;197:191-196. doi:10.1016/j.drugalcdep.2019.01.023

31. Thomas N, van de Ven K, Mulrooney KJD. The impact of rurality on opioid-related harms: a systematic review of qualitative research. *Int J Drug Policy*. 2020;85:102607. doi:10.1016/j.drugpo.2019.11.015

32. Mitchell P, Samsel S, Curtin KM, et al. Geographic disparities in access to medication for opioid use disorder across US census tracts based on treatment utilization behavior. *Soc Sci Med*. 2022;302:114992. doi:10.1016/j.socscimed.2022.114992

33. Negaro SND, Benavidez G, Andrews CM, et al. Availability of Substance Use Disorder Treatment in Minoritized Racial/Ethnic Group Areas and Urban Communities. Rural and Minority Health Research Center. September 2022. https://www.ruralhealthresearch.org/publications/1527

34. Palombi LC, St Hill CA, Lipsky MS, Swanoski MT, Lutfiyya MN. A scoping review of opioid misuse in the rural United States. *Ann Epidemiol*. 2018;28(9):641-652. doi:10.1016/j.annepidem.2018.05.008

35. Baker R, Leichtling G, Hildebran C, et al. "Like Yin and Yang": perceptions of methamphetamine benefits and consequences among people who use opioids in rural communities. *J Addict Med*. 2021;15(1):34-39. doi:10.1097/ADM.0000000000000669

36. Greene KM. Perceptions of driving after marijuana use compared to alcohol use among rural American young adults. *Drug Alcohol Rev*. 2018;37(5):637-644. doi:10.1111/dar.12686

37. Broffman L, Spurlock M, Dulacki K, et al. Understanding treatment gaps for mental health, alcohol, and drug use in South Dakota: a qualitative study of rural perspectives. *J Rural Health*. 2017;33(1):71-81. doi:10.1111/jrh.12167

38. Abraham AJ, Yarbrough CR. Availability of medications for the treatment of alcohol use disorder in U.S. counties, 2016-2019. *J Stud Alcohol Drugs*. 2021;82(6):689-699.

39. Derefinko KJ, Bursac Z, Mejia MG, Milich R, Lynam DR. Rural and urban substance use differences: effects of the transition to college. *Am J Drug Alcohol Abuse*. 2018;44(2):224-234. doi:10.1080/00952990.2017.134190327

40. Black P, Hendy HM. Do painkillers serve as "hillbilly heroin" for rural adults with high levels of psychosocial stress?. *J Ethn Subst Abuse*. 2019;18(2):224-236. doi:10.1080/15332640.2017.1333478

41. Cameron LD, Fleszar-Pavlović SE, Yepez M, Manzo RD, Brown PM. Beliefs about marijuana use during pregnancy and breastfeeding held by residents of a Latino-majority, rural region of California. *J Behav Med*. 2022;45(4):544-557. doi:10.1007/s10865-022-00299-1

42. 2018 National Drug Threat Assessment. U.S. Department of Justice Drug Enforcement Administration. Unclassified. October 2018. Accessed Sept. 1, 2020. https://www.dea.gov/sites/default/files/2018-11/DIR-032-18%202018%20NDTA%20final%20low%20resolution.pdf

43. Monnat SM. Factors associated with county-level differences in U.S. drug-related mortality rates. *Am J Prev Med*. 2018;54(5):611-619. doi:10.1016/j.amepre.2018.01.040

44. Monnat SM. The contributions of socioeconomic and opioid supply factors to US drug mortality rates: urban-rural and within-rural differences. *J of Rural Stud*. 2019;68:319-335. doi:10.1016/j.jrurstud.2018.12.004

45. James K, Jordan A. The opioid crisis in black communities. *J Law Med Ethics*. 2018;46(2):404-421. doi:10.1177/1073110518782949

46. Ali MM, Nye E, West K. Substance use disorder treatment, perceived need for treatment, and

barriers to treatment among parenting women with substance use disorder in US rural counties. *J Rural Health*. 2022;38(1):70-76. doi:10.1111/jrh.12488

47. Villapiano NL, Winkelman TN, Kozhimannil KB, Davis MM, Patrick SW. Rural and urban differences in neonatal abstinence syndrome and maternal opioid use, 2004 to 2013. *JAMA Pediatr*. 2017;171(2):194-196. doi:10.1001/jamapediatrics.2016.3750

48. Sumetsky N, Burke JG, Mair C. Relationships between opioid-related hospitalizations and intimate partner violence and child maltreatment hospitalizations in Pennsylvania across space and time. *J Interpers Violence*. 2022;37(5-6):NP3474-NP3491. doi:10.1177/0886260520948525

49. Gary JC, Downing NR, Pittman A. The impact of parental opioid use disorder on children in rural Texas. *Subst Use Misuse*. 2022;57(8):1273-1280. doi:10.1080/10826084.2022.2076879

50. Ohannessian CM, Finan LJ, Schulz J, Hesselbrock V. A long-term longitudinal examination of the effect of early onset of alcohol and drug use on later alcohol abuse. *Subst Abus*. 2015;36(4):440-444. doi:10.1080/08897077.2014.989353

51. Evans R, Widman L, Javidi H, et al. Preliminary evaluation of a prescription opioid misuse prevention program among rural middle school students. *J Community Health*. 2020;45(6):1139-1148. doi:10.1007/s10900-020-00899-5

52. Browne T, Priester MA, Clone S, Iachini A, DeHart D, Hock R. Barriers and facilitators to substance use treatment in the rural South: a qualitative study. *J Rural Health*. 2016;32(1):92-101. doi:10.1111/jrh.12129

53. Cooper HL, Cloud DH, Freeman PR, et al. Buprenorphine dispensing in an epicenter of the U.S. opioid epidemic: a case study of the rural risk environment in Appalachian Kentucky. *Int J Drug Policy*. 2020;85:102701. doi:10.1016/j.drugpo.2020.102701

54. Green TC, Bratberg J, Baird J, et al. Rurality and differences in pharmacy characteristics and community factors associated with provision of naloxone in the pharmacy. *Int J Drug Policy*. 2020;85:102602. doi:10.1016/j.drugpo.2019.11.010

55. Harder VS, Villanti AC, Heil SH, et al. Opioid use disorder treatment in rural settings: the primary care perspective. *Prev Med*. 2021;152(Pt 2):106765. doi:10.1016/j.ypmed.2021.106765

56. Jones CM, McCance-Katz EF. Co-occurring substance use and mental disorders among adults with opioid use disorder. *Drug Alcohol Depend*. 2019;197:78-82. doi:10.1016/j.drugalcdep.2018.12.030

57. Cole ES, DiDomenico E, Green S, et al. The who, the what, and the how: a description of strategies and lessons learned to expand access to medications for opioid use disorder in rural America. *Subst Abus*. 2021;42(2):123-129. doi:10.1080/08897077.2021.1891492

58. Beaugard CA, Hruschak V, Lee CS, Swab J, Roth S, Rosen D. Emergency medical services on the front lines of the opioid overdose crisis: the role of mental health, substance use, and burnout. *International Journal of Emergency Services*. [Epub ahead of print August 24, 2022]. doi:10.1108/IJES-11-2021-0073

59. Baylis JD, Charron E, Archer S, et al. Attitudes, self-efficacy, and practices related to opioid risk assessment and mitigation: a comparison of health care professionals in rural communities. *Subst Abus*. 2022;43(1):1163-1171. doi:10.1080/08897077.2022.2074593

60. Lofwall MR, Fanucchi LC. Long-acting buprenorphine injectables: opportunity to improve opioid use disorder treatment among rural populations. *Prev Med*. 2021;152(Pt 2):106756. doi:10.1016/j.ypmed.2021.106756

61. Dickson-Gomez J, Krechel S, Spector A, et al. The effects of opioid policy changes on transitions from prescription opioids to heroin, fentanyl and injection drug use: a qualitative analysis. *Subst Abuse Treat Prev Policy*. 2022;17(1):55. doi:10.1186/s13011-022-00480-4

62. Finley EP, Garcia A, Rosen K, McGeary D, Pugh MJ, Potter JS. Evaluating the impact of prescription drug monitoring program implementation: a scoping review. *BMC Health Serv Res*. 2017;17(1):420. doi:10.1186/s12913-017-2354-5

63. Martins SS, Ponicki W, Smith N, et al. Prescription drug monitoring programs operational characteristics and fatal heroin poisoning. *Int J Drug Policy*. 2019;74:174-180. doi:10.1016/j.drugpo.2019.10.001

64. Robertson MN, Downey LH, Seitz HH, Hardman AM, Buys DR. Rural adults' perceived role of family members in prescription opioid misuse prevention: Implications for family-based approaches. *J Rural Health*. 2022;38(1):100-111. doi:10.1111/jrh.12565

65. National Institute on Drug Abuse (NIDA). 2016–2020 Strategic Plan: Advancing Addiction Science. Bethesda, MD: National Institutes of Health, U.S. Department of Health and Human Service; 2015. https://nida.nih.gov/sites/default/files/2016-2020nidastrategicplan.pdf

66. Adams WE, Rogers ES, Edwards JP, Lord EM, McKnight L, Barbone M. Impact of COVID-19 on peer support specialists in the United States: findings from a cross-sectional online survey. *Psychiatr Serv*. 2022;73(1):9-17. doi:10.1176/appi.ps.202000915

67. Bassuk EL, Hanson J, Greene RN, Richard M, Laudet A. Peer-delivered recovery support services for addictions in the United States: a systematic review. *J Subst Abuse Treat*. 2016;63:1-9. doi:10.1016/j.jsat.2016.01.003

68. Eddie D, Hoffman L, Vilsaint C, et al. Lived experience in new models of care for substance use disorder: a systematic review of peer recovery support services and recovery coaching. *Front Psychol*. 2019;10:1052. doi:10.3389/fpsyg.2019.01052

69. Clair V, Rossa-Roccor V, Mokaya AG, et al. Peer- and mentor-enhanced web-based training on substance use disorders: a promising approach in low-resource settings. *Psychiatr Serv*. 2019;70(11):1068-1071. doi:10.1176/appi.ps.201900201

70. Gagne CA, Finch WL, Myrick KJ, Davis LM. Peer workers in the behavioral and integrated health workforce: opportunities and future directions. *Am J Prev Med*. 2018;54(6 Suppl 3):S258-S266. doi:10.1016/j.amepre.2018.03.010

71. Cos TA, LaPollo AB, Aussendorf M, Williams JM, Malayter K, Festinger DS. Do peer recovery specialists improve outcomes for individuals with substance use disorder in an integrative primary care setting? a program evaluation. *J Clin Psychol Med Settings*. 2020;27(4):704-715. doi:10.1007/s10880-019-09661-z

72. Haegerich TM, Jones CM, Cote PO, Robinson A, Ross L. Evidence for state, community and systems-level prevention strategies to address the opioid crisis. *Drug Alcohol Depend*. 2019;204:107563. doi:10.1016/j.drugalcdep.2019.107563

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# RURAL HEALTHCARE ACCESS AND QUALITY

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## SCOPE OF THE PROBLEM

- The number of Americans with health insurance increased significantly during the decade of evaluation for Healthy People 2020, in large part due to the passage of the Patient Protection and Affordable Care Act (ACA).[1-3]
- For the first time across three decades of research, healthcare access and quality is no longer the top Rural Healthy People priority. For Rural Healthy People 2030, it has dropped to third, likely due to insurance gains over the past decade.[4,5]
- In 2010, 23.7% of rural Americans and 21.6% of urban Americans were uninsured. By 2019 those numbers had dropped to 16.0% and 12.9% respectively.[6]
- More than 140 rural hospitals have closed in the United States since 2010. This has been accompanied by the closure of certain services (i.e., obstetrics) in rural hospitals that remain open, as well as a troubling number of health professional shortage areas in rural communities.[7-9]
- Ten states have elected not to expand Medicaid under the ACA, resulting in an uninsured rate of 6.6% in Medicaid expansion states and 12.7% in non-expansion states as of 2021. Importantly, many holdout states have large rural populations including Texas, Florida, and Georgia.[10,11]
- The COVID-19 pandemic exacerbated challenges with healthcare access and quality. Many Americans lost their jobs (and job-based insurance), pushing them towards Medicaid. They also were forced to confront overstrained hospital systems and provider shortages which served to reduce both access and quality of care.[12-15]
- Innovations in telehealth over the past decade,[16-19] and telehealth policy changes in light of the COVID-19 pandemic, have made telehealth a more viable strategy to increase healthcare access.[20-21] With that said, challenges tied to broadband internet access and access to devices have slowed telehealth-based progress in improving health access in rural communities.[22,23]
- Rural Americans are more likely to be enrolled in (and to be unsatisfied with) traditional fee-for-service Part D Medicare prescription drug benefits. They are also less likely to have access to a Medicaid-contracted pharmacy.[24,25]
- Rural America continues to experience regional and racial disparities in different facets of healthcare access. Regions of particular concern include the South, Mountain West, and Great Plains.[26-28]

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Over the past decade in the United States, we have seen remarkable changes in healthcare access and quality. As recently as 2010, there were 48.2 million non-elderly (under 65) Americans without access to health insurance.[1] By the end of the decade, that number had dropped substantially to 30 million uninsured individuals even as the U.S. population grew over that period from roughly 309 million Americans to 331 million Americans.[1,29] This drop in the uninsured rate has been observed in both rural and urban communities. In 2010, 23.7% of rural Americans and 21.6% of urban Americans were uninsured. By 2019 those numbers had dropped to 16.0% and 12.9%, respectively.[6] However, these gains have been uneven across rural and urban areas, with the gap between uninsured rates in rural and urban America increasing from 2.1% to 3.1% over that period.[6]

These improvements in healthcare access and quality are attributable in large part to the passage of the Affordable Care Act (ACA) in 2010. Dramatic coverage improvements were achieved by providing financial support to states that expanded their Medicaid programs, issuing premium credits to Americans making less than 400% of the federal poverty level to purchase insurance, allowing children to stay on their parents' health plans until age 26, and mandating the coverage of essential health benefits.[30,31] Importantly however, the Supreme Court's 2012 decision in NFIB v. Sebelius made state expansion of Medicaid under the ACA optional, resulting in uneven gains in healthcare access for low-income adults. To date, ten states have elected not to expand Medicaid, resulting in a disparate uninsured rate of 6.6% in expansion states compared to 12.7% in non-expansion states as of 2021.[10,11] Notably, many holdout states have large rural populations, including Texas, Florida, and Georgia.

Beyond the passage of the ACA, healthcare access and quality have been substantially impacted by the COVID-19 pandemic. In the first year of the pandemic, rural "employment dropped to 92% of 2007 levels, lower than at any point in the Great Recession."[12,13] With most non-elderly Americans relying on employment for insurance, this put considerable strain on healthcare access in the U.S. Simultaneously, the pandemic has made access to high quality health care more difficult. Issues tied to provider shortages and hospital closures in rural communities were exacerbated by the pandemic, which took up hospital beds and added stress to already burned-out providers, making it difficult for individuals to access needed quality care.[7,14,15] Notably, the pandemic also increased utilization of telehealth, which could result in significant shifts towards its use in rural communities over the next decade.[32]

## HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

Given the importance of healthcare access and quality to the health of all Americans, this topic has been and will continue to be central to the work of providers, practitioners, and researchers. Improvements in this domain have clear and direct impacts on morbidity and mortality in the U.S. and can be made in a number of ways including through policies to decrease the uninsured rate, efforts to improve care provided to patients, and by addressing the social determinants of health that have been increasingly recognized as central to health over the past decade.[33-35] This centrality of access to health care is exemplified through the efforts of the Healthy People 2030 initiative, which includes 49 distinct objectives focused on healthcare access and quality.[36]

For the purposes of this review chapter, we will focus on the following Healthy People 2030 goals and objectives tied to healthcare access and quality:

- Increase the proportion of people with health insurance — AHS 01
- Increase the proportion of people with prescription drug insurance — AHS 03
- Reduce the proportion of people under 65 years who are underinsured — AHS R03
- Increase the use of telehealth to improve access to health services — AHS R02
- Reduce the proportion of people who can't get medical care when they need it — AHS 04

In the area of health insurance, the baseline was 88% of persons under 65 having health insurance in 2019, with a goal of 92.4% by 2030.[37] Similarly, the U.S. hopes to increase its prescription drug insurance coverage for persons under 65 from 82.1% to 89% and to reduce the proportion of people who can't get care when they need it from 8.5% to 5.9%.[38,39] At the same time, Healthy People 2030 will serve as an opportunity to begin research into underinsured rates as well as telehealth, both topics with important implications for the future of healthcare access and quality in the U.S.[36]

## RURAL HEALTHY PEOPLE 2030 SURVEY

The Rural Healthy People 2030 survey of rural stakeholders across the U.S. identified "health care access and quality" as the third most important priority for rural America over the next decade.[4] This is the first time across three decades of Rural Healthy People that healthcare access is not the number one rural health priority as identified by rural stakeholders.[40-42] This relative drop in importance is likely attributable,

at least in part, to important gains in health insurance in the U.S. over the past decade. While there were over 48 million uninsured Americans at the launch of the Healthy People 2020 initiative in 2010, that number had dropped to 30 million uninsured by 2020, despite gains in the size of the U.S. population.[1]

Critically, we must recognize that despite this drop in relative importance, health care access and quality remain vital for the health of rural Americans and remain an important priority for rural stakeholders. This finding is largely consistent across subgroups within the U.S. population. Health care access and quality is the third highest priority in both Medicaid expansion and non-expansion states, among both male and female stakeholders, across stakeholder age, and within most stakeholder industries.[4] With that said, the priority does drop slightly to the fourth most important priority among stakeholders in the Northeast and South, stakeholders working in both the healthcare and human services sectors, as well as among stakeholders specifically working in rural hospitals and federally qualified health centers.[4]

## PREVALENCE AND DISPARITIES IN RURAL AREAS

While considerable gains in healthcare access and quality have been made over the past decade, persistent disparities remain between rural and urban communities. Rural residents are more likely to live in areas with lower median incomes, to be older, to have more chronic conditions, and to be uninsured or underinsured.[5,43] Perhaps unsurprisingly then, research has found that rurality is associated with higher mortality rates in general, including deaths in hospital settings and for a number of chronic conditions.[43,44] Although the ACA was responsible for significant improvements in healthcare access, relative insurance gains and reductions in cost-related barriers to care were larger in urban communities.[45] Simultaneously, the ACA has been associated with access to a regular source of medical care and doctor visits in urban but not rural communities.[45]

These larger improvements in urban as opposed to rural areas after the implementation of the ACA could be attributable at least in part to countervailing forces on rural healthcare access. Most importantly, there have been over 140 rural hospital closures since 2010 and 65.8% of health professional shortage areas are located in rural communities.[7,46] As a result, rural communities are less likely to have access to obstetric services and must travel greater distances to access any form of healthcare services.[8,9,47,48] This places higher burdens on rural communities and makes it harder for rural residents to get medical care when they need it. In the area of prescription drugs, rural residents have unique challenges in accessing needed medications. They were more likely to be enrolled in traditional Part D Medicare prescription drug plans with concomitant lower levels of satisfaction, were less likely to have access to a Medicaid-contracted pharmacy, and were less likely to have in-person visits for the prescription drugs they were taking.[24,25,49]

Many policymakers and practitioners have pointed to telehealth as a potential path forward for eliminating some of these disparities, and important gains in rural telehealth use were seen during the pandemic.[20,21] Unfortunately, rural-urban disparities in telehealth access and utilization persist. Inherently, patients need access to the internet and to electronic devices to participate in telehealth services. Importantly, however, 57.1% of Americans without broadband access live in rural areas.[22] Furthermore, rural households are more likely to lack access to any digital devices.[23] In addition, rural hospitals are less likely than urban hospitals to have telehealth systems with patient engagement capabilities and, after COVID-19 telehealth policy expansions, there was actually an 11% decrease in telehealth visits from very high vulnerability regions including some rural communities.[17,20]

## VARIATION BY RURAL REGIONS

The rural U.S. also continues to experience regional disparities in healthcare access, with particular concern in the South, the Mountain West, and the Great Plains. For instance, southern states have the lowest levels of health insurance coverage and the highest out-of-pocket costs, followed by western states, the Midwest, and then the Northeast.[26] These high uninsured rates in the South can be explained in part by the large number of southern states that

have not expanded Medicaid under the ACA.[11] Furthermore, urban-rural disparities in health insurance coverage within states tend to be highest in the South, the Rocky Mountain states, and the Great Plains. Conversely, urban-rural disparities tend to be lowest in the Great Lakes region and the Northeast.[27] Mountain states and parts of the South also experienced a widening urban-rural disparity in the rate of uninsured Americans between 2013 and 2017, compared to the rest of the country.[27]

Similarly, telehealth capabilities vary across regions in rural areas. Although hospital closures are more prevalent in rural areas, rural hospitals in certain regions are disproportionately more likely to possess telehealth capabilities – particularly in the Rocky Mountain states, the Great Plains, and the Upper Midwest.[28] The use of telehealth services may be mitigated by several factors, however, such as a lack of broadband access that is more prominent in the Great Plains and the South.[50,51]

## VARIATION BY RACE AND ETHNICITY

There are also considerable disparities in healthcare access and quality based on race and ethnicity. As of 2019, rural Hispanics and American Indians/Native Americans continued to lag behind White rural residents and urban residents in health insurance coverage,[40,52] including postpartum coverage within the first half year after childbirth.[53] In Medicaid non-expansion states, low-income adults – who are disproportionately Black and rural – have worse health outcomes than their counterparts in Medicaid expanding states.[54] Even after Medicaid expansion, however, racial disparities in the uninsured rate among rural residents remain in expansion states.[55,56]

In addition, non-White rural residents were more likely to have reported not being able to see a physician in the past 12 months because of cost, compared to White rural residents.[57] Non-White rural residents are also at greater risk of experiencing a hospital closure, compared to White rural residents, though this difference may be accounted for by insurance rates and economic factors like the unemployment rate.[58] With that said, some disparities across race and ethnicity are not necessarily accounted for by other health-based or socio-demographic factors. For instance, certain groups of non-White rural residents – such as Spanish-speaking Hispanic farmworkers in rural communities – face unique barriers to healthcare access and services that standard brick and mortar models inadequately address.[59]

Telehealth and online services also have racial and ethnic disparities within rural areas. Although the proportion of urban, suburban, and rural Americans with internet access has increased over the decade, rural residents overall continue to lag behind non-rural residents in broadband and online access.[60] In particular, non-White rural residents are less likely than White rural residents to have access to broadband internet.[50]

## IMPACT ON MORBIDITY AND MORTALITY

Chronic health conditions and associated morbidity and mortality are more prevalent in the rural U.S., with limited healthcare access compounding these issues.[61,62] Healthcare access, morbidity, and mortality are all jointly shaped by factors like socioeconomic deprivation, physician shortages, and a lack of health insurance. The root cause of many of these issues is ultimately state-level policy decisions, including policy choices tied to Medicaid expansion, investment in healthcare infrastructure, and economic policy decisions. While the ACA has certainly improved healthcare access and, in turn, reduced the number of uninsured while improving healthcare quality and outcomes, disparities persist. Research has shown that rural insurance enrollees from racial and ethnic minority groups have lower access to timely primary and preventive care compared to their urban counterparts.[63,64] Furthermore, mortality among uninsured rural patients in trauma centers is five times higher than for rural patients with commercial insurance.[65]

Compared to those in urban areas, rural Americans generally utilize health care less, fill fewer prescriptions, and pay more out-of-pocket costs for care.[54] Hospital closures, which have occurred frequently over the past decade in rural America, are also associated with decreased access to care, with important consequences for morbidity and mortality.[66] For example, a study in Texas found that between 2014-2019, rural

hospital closures significantly reduced outpatient and emergency department utilization.[66] Approximately 45% of rural counties in the U.S. have no hospital obstetrics services, hindering obstetric and routine primary care, especially for those living in states with lower Medicaid income eligibility thresholds.[47] In addition, evidence suggests that rural women report fewer routine primary and prenatal care behaviors, including obstetrician visits and pre-pregnancy dental visits, which can contribute to chronic illness and pregnancy complications resulting in increased morbidity and maternal mortality.[8]

Low-income rural adults are also less likely to receive flu vaccinations and blood pressure checks, which are important to prevent morbidity and mortality.[54] In addition, rural communities experience a shortage of mental health services, despite experiencing higher mortality rates due to behavioral health challenges, including substance use, alcohol, and suicide.[67] While telehealth may be a viable treatment option for meeting many rural mental health needs, limited coverage networks, low reimbursement rates, state licensure restrictions, and inadequate broadband access, among wider policy changes, hinder the effective implementation of telehealth to improve access across rural America.[67]

Rural Americans also are less likely than those in non-rural communities to receive routine dental care. Poor oral health is associated with serious illnesses like cardiovascular disease, certain types of cancer, pneumonia, dementia and Alzheimer's disease, and birth complications. [68,69] In addition, inferior access to preventive dental care among rural children makes them susceptible to these long-term morbidities and mortalities.[68,69] Similarly, having a usual source of care is associated with an 11% increase in the probability of having a preventive dental checkup within a year; however, rural adults have significantly lower odds of having one dental checkup per year and of having a usual source of care, compared to their urban counterparts.[54,70]

## BARRIERS TO ACCESS AND KNOWN CAUSES OF THE PROBLEM

While rural uninsured rates have declined over the past decade, rural Americans still disproportionately face barriers to accessing quality health care and affordable health insurance.[6] Rural Americans are poorer than their urban counterparts and more likely to report delaying care, or not obtaining prescription medications, due to cost.[71] Those living in rural areas have also experienced persistently higher unemployment rates following the onset of the COVID-19 pandemic,[13] limiting access to employer-sponsored insurance.

Rural Americans have experienced the greatest gains in insurance coverage under the ACA expansion of Medicaid coverage. However, in non-expansion states, many low-income rural Americans still lack access to health insurance; the rural uninsurance rate is nearly twice as high in non-expansion states versus expansion states.[6] This higher uninsured rate can be attributed to rural America having fewer large employers mandated to provide health insurance under the ACA, the large number of rural employers not offering any insurance, and the fact that rural Americans are more likely to participate in part-time, seasonal, or agricultural jobs without benefits.[72,73]

In addition to coverage challenges, numerous logistical barriers – including inadequate provider networks, distance to medical facilities, and lack of reliable transportation – also limit rural Americans' access to timely, quality healthcare services.[74,75] While most rural Americans have access to primary care locally, many rural residents must travel considerable distances to reach specialty or hospital care, making access more difficult.[48] These access barriers have been exacerbated by the large number of rural hospital closures and provider shortages over the past decade. For many, this has increased the distance to needed care while simultaneously overburdening those providers that do remain in rural America, negatively impacting the quality of care they can provide.[7,9, 14,15,46] Recent studies have found that rural hospital closures are associated with decreased utilization of both outpatient and emergency departments,[67] as well as overall reductions in the rural primary and specialty provider workforce.[76] While telehealth holds potential for expanding specialty and behavioral healthcare access in rural regions, technology limitations remain.[18] More than

half of all Americans lacking broadband access reside in rural regions.[22]

Although rural educational attainment has increased in recent years, rural Americans still lag behind their urban counterparts in both high school and college completion,[77] and health literacy overall is lower in rural areas.[78-79] Combined with technology limitations, these factors may hinder rural Americans' ability to navigate the healthcare system, limit their access to health information, and affect the quality of communication between providers and rural patients.[80]

## POTENTIAL SOLUTIONS OR INTERVENTIONS

To improve healthcare access and quality in rural communities, policy interventions are needed across a number of different domains at both the state and federal levels. To begin, considerable gains in rural healthcare access could be made through continued Medicaid expansion under the ACA. To date, over two million Americans fall into the coverage gap – making too much money to qualify for ACA marketplace subsidies, and too little to qualify for Medicaid in the states that have not expanded Medicaid.[11,81] By following the lead of other conservative states like Oklahoma, Missouri, Utah, Nebraska, and South Dakota in expanding Medicaid, the remaining states could impactfully expand healthcare access for poor rural Americans.[11]

In addition, improvements in rural healthcare access could be made in the area of telehealth. The COVID-19 pandemic saw dramatic expansions to telehealth permissibility in state and federal laws, but the majority of these actions were temporary and set to expire with the end of the COVID-19 public health emergency. Federal legislation passed at the end of 2022 extended many of these telehealth provisions an extra two years, but efforts to codify permissive telehealth provisions into permanent law would be a boost to rural healthcare access.[82]

Beyond Medicaid expansion and changes in telehealth law, policy efforts to slow the pace of rural hospital closure are vital. One potential path to supporting rural hospitals that remains is the rise of Rural Emergency Hospitals (REHs) – a new hospital designation launched by the Centers for Medicare and Medicaid Services on January 1, 2023.[83] Rural facilities with the REH designation will receive enhanced Medicare payments in return for providing 24-hour emergency and observation services with the option to provide outpatient services.[84] Critically, these REHs will be expected to close their non-emergency inpatient services and lose access to the 340B drug pricing program, which has led to some criticism and questions about how effective the new hospital type will be.[85] While it is too soon to gauge the impact of this new program, the hope is that it will help to sustain the more than 450 rural hospitals that have been identified as at-risk of closing. Given the dire need to prevent further rural hospital closures, other models of care and financial support for rural hospitals should also be explored.[86]

Finally, continued policy interventions are needed in the area of prescription drugs to improve access and reduce costs. The passage of the Inflation Reduction Act in 2022 should provide some relief by allowing the federal government to negotiate the prices of a limited number of drugs in Medicare, capping out-of-pocket spending for Medicare Part D enrollees, and expanding benefit eligibility in the Medicare Part D Low Income Subsidy Program, among other changes.[87] With that said, changes outside of the Medicare program are still needed. Policy efforts to reign in the ever-rising cost of prescription drugs and to make coverage itself more affordable for those who need it should be a policy priority over the next decade.

## SUMMARY AND CONCLUSIONS

The past decade has been a period of considerable improvement in healthcare access and quality in the U.S. The passage of the ACA has allowed millions of Americans to access affordable health insurance for the first time. This, in turn, has allowed more Americans to access needed healthcare services while reducing burdens on certain parts of the health sector that previously had to provide large amounts of uncompensated care. Gains tied to the ACA have been supplemented by improvements in technology and policy that have allowed more Americans than ever to access care through telehealth, improving the proportion of Americans who can get care when they need it.

Importantly, however, disparities in healthcare access and quality remain. Rural Americans remain less likely to hold health insurance, while also being more likely to travel greater distances to care, face more health professional shortage areas, and confront more hospital closures. They are also less likely to have the internet and device access necessary to make telehealth viable. However, rural Americans are not alone in facing considerable healthcare access challenges –minority groups across the U.S. face many of these same barriers, as well as individuals living in states that have not expanded Medicaid under the ACA.

Overcoming these disparities will require continued efforts at policy change over the next decade. The expansion of Medicaid in the remaining states that have yet to expand would be the quickest and among the most impactful ways to improve healthcare access. Efforts are also needed to continue to improve internet coverage, and in turn, telehealth access in rural communities. Equally important, policymakers need to continue to work towards reducing health professional shortage areas in rural communities, to bolster rural hospitals against closure and to lower the price of prescription drugs. Efforts in these areas are already underway in the form of REHs and prescription drug provisions within the Inflation Reduction Act.[86,90] These policies will need to be closely monitored over the next decade to gauge their impact on the lives and health of rural Americans.

## REFERENCES


1. Finegold K, Conmy A, Chu R, Bosworth A, Sommers, B. Trends in the U.S. uninsured population, 2010-2020. ASPE Office of Health Policy. Issue Brief. February 11, 2021. https://aspe.hhs.gov/sites/default/files/private/pdf/265041/trends-in-the-us-uninsured.pdf

2. Burns ME, Dague L, DeLeire T, et al. The effects of expanding public insurance to rural low-income childless adults. *Health Serv Res.* 2014;49(Suppl 2):2173-2187. doi:10.1111/1475-6773.12233

3. Blumenthal D, Abrams M, Nuzum R. The affordable care act at 5 years. *N Engl J Med.* 2015;372(25):2451-2458. doi:10.1056/NEJMhpr1503614

4. Kassabian M, Shrestha A, Callaghan T, et al. Rural healthy people 2030: common challenges, rural nuances. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

5. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: new decade, new challenges. *Prev Med Rep.* 2023;33:1-6. doi:10.1016/j.pmedr.2023.102176

6. Turrini G, Branham K, Chen L, et al. Access to Affordable Care in Rural America: Current Trends and Key Challenges. ASPE Office of Health Policy. Issue Brief. July 9, 2021. httpsI//aspe.hhs.gov/sites/default/files/2021-07/rural-health-rr.pdf

7. The Cecil G. Sheps Center for Health Services Research. Rural hospital closures. Updated 2023. Accessed January 3, 2023. https://www.shepscenter.unc.edu/programs-projects/rural-health/rural-hospital-closures/

8. Burns R, Keomany J, Okut H, Ablah E, Montgomery H. Preventive care utilization among rural versus urban women 12 months prior to pregnancy. *Kans J Med.* 2022;15:278-284. doi:10.17161/kjm.vol15.16221

9. McCarthy S, Moore D, Smedley WA, et al. Impact of rural hospital closures on health-care access. *J Surg Res.* 2021;258:170-178. doi:10.1016/j.jss.2020.08.055

10. Conway D, Mykyta L. Decline in Share of People Without Health Insurance Driven by Increase in Public Coverage in 36 States. US Census Bureau. September 15, 2022. Accessed April 3, 2023. https://www.census.gov/library/stories/2022/09/uninsured-rate-declined-in-28-states.html

11. Status of State Medicaid Expansion Decisions: Interactive Map. Kaiser Family Foundation. Updated March 27, 2023. Accessed January 3, 2023. https://www.kff.org/medicaid/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map/

12. Tracking the COVID-19 Economy's Effects on Food, Housing, and Employment Hardships. Center on Budget and Policy Priorities. Updated

February 10, 2022. Accessed January 3, 2023. https://www.cbpp.org/research/poverty-and-inequality/tracking-the-covid-19-economys-effects-on-food-housing-and

13. Sanders A. Coronavirus (COVID-19) Job Losses Hit Rural Areas Still Recovering From Great Recession. USDA Economic Research Service. May 2, 2022. Accessed January 3, 2023. https://www.ers.usda.gov/amber-waves/2022/may/coronavirus-covid-19-job-losses-hit-rural-areas-still-recovering-from-great-recession/

14. Diaz A, Chhabra KR, Scott JW. The COVID-19 pandemic and rural hospitals—adding insult to injury. Health Affairs Blog. 2020;10. doi:10.1377/forefront.20200429.583513

15. Oster N, Patterson D, Skillman S, Frogner B. COVID-19 and the Rural Health Workforce: The Impact of Federal Pandemic Funding to Address Workforce Needs. Center for Health Workforce Studies. Policy Brief. March 2022. Accessed January 3, 2023. https://familymedicine.uw.edu/chws/wp-content/uploads/sites/5/2022/03/Covid-19-and-the-Rural-Health-Workforce-PB-2022.pdf

16. Talbot JA, Burgess AR, Thayer D, Parenteau L, Paluso N, Coburn AF. Patterns of telehealth use among rural Medicaid beneficiaries. *J Rural Health*. 2019;35(3):298-307. doi:10.1111/jrh.12324

17. Chen J, Amaize A, Barath D. Evaluating telehealth adoption and related barriers among hospitals located in rural and urban areas. *J Rural Health*. 2021;37(4):801-811. doi:10.1111/jrh.12534

18. Lee S, Black D, Held ML. Factors associated with telehealth service utilization among rural populations. *J Health Care Poor Underserved*. 2019;30(4):1259-1272. doi:10.1353/hpu.2019.0104

19. Schmit CD, Ferdinand AO, Callaghan T, Kageyama M, Khodakarami N, Morrisey MA. The development of telehealth laws in the US from 2008 to 2015: a legal landscape. Southwest Rural Health Research Center. November 2019. https://srhrc.tamu.edu/publications/the-development-of-telehealth-laws-in-the-us-policy-brief.pdf

20. Khairat S, Yuxiao Y, Coleman C, McDaniel P, Edson B, Shea CM. Changes in patient characteristics and practice outcomes of a tele-urgent care clinic pre- and post-COVID-19 telehealth policy expansions. *Perspect Health Inf Manag*. 2022;19(2):109-119.

21. Callaghan T, McCord C, Washburn D, et al. The changing nature of telehealth use by primary care physicians in the United States. *J Prim Care Comm Health*. 2022;13:1-9. doi:21501319221110418

22. Ekezue BF, Bushelle-Edghill J, Dong S, Taylor YJ. The effect of broadband access on electronic patient engagement activities: assessment of urban-rural differences. *J Rural Health*. 2022;38(3):472-481. doi:10.1111/jrh.12598

23. Curtis ME, Clingan SE, Guo H, Zhu Y, Mooney LJ, Hser Y-I. Disparities in digital access among American rural and urban households and implications for telemedicine-based services. *J Rural Health*. 2022;38(3):512-518. doi:10.1111/jrh.12614

24. Henning-Smith C, O'Connor H, Casey M, Moscovice I. Rural-urban differences in satisfaction with Medicare Part D: implications for policy. *J Aging Soc Policy*. 2016;28(2):65-80. doi:10.1080/08959420.2016.1139421

25. Graves JM, Abshire DA, Undeberg M, Forman L, Amiri S. Rural-urban disparities in access to Medicaid-contracted pharmacies in Washington state, 2017. *Prev Chronic Dis*. 2020;17:E92. doi:10.5888/pcd17.200066

26. Hoagland A, Shafer P. Out-of-pocket costs for preventive care persist almost a decade after the Affordable Care Act. *Prev Med*. 2021;150:106690. doi:10.1016/j.ypmed.2021.106690

27. Day JC. Rates of uninsured fall in rural counties, remain higher than urban counties. Census.gov. April 9, 2019. Accessed April 3, 2023. https://www.census.gov/library/stories/2019/04/health-insurance-rural-america.html

28. Puro NA, Feyereisen S. Telehealth availability in US hospitals in the face of the COVID-19 pandemic. *J Rural Health*. 2020;36(4):577-583. doi:10.1111/jrh.12482

29. Historical Population Change Data (1910-2020). United States Census Bureau. April 26, 2021. Accessed January 3, 2023. https://www.

census.gov/data/tables/time-series/dec/popchange-data-text.html

30. Summary of the Affordable Care Act. Kaiser Family Foundation. Updated April 26, 2021. Accessed January 3, 2023. https://www.kff.org/health-reform/fact-sheet/summary-of-the-affordable-care-act/

31. Essential Health Benefits. U.S. Centers for Medicare & Medicaid Services. Accessed January 3, 2023. https://www.healthcare.gov/glossary/essential-health-benefits/

32. Telehealth in the Pandemic – How Has It Changed Health Care Delivery in Medicaid and Medicare? U.S. Government Accountability Office. September 29, 2022. Accessed January 3, 2023. https://www.gao.gov/blog/telehealth-pandemic-how-has-it-changed-health-care-delivery-medicaid-and-medicare

33. Braveman P, Gottlieb L. The social determinants of health: it's time to consider the causes of the causes. *Public Health Rep.* 2014;129(suppl 2):19-31. doi:10.1177/00333549141291S206

34. Braveman P, Egerter S, Williams DR. The social determinants of health: coming of age. *Annu Rev Public Health.* 2011;32(1):381-398. doi:10.1146/annurev-publhealth-031210-101218

35. World Health Organization, 2008. Social Determinants of Health (No. SEA-HE-190). WHO Regional Office for South-East Asia.

36. Health Care Access and Quality. Healthy People 2030. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed January 3, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care-access-and-quality

37. Increase the Proportion of People with Health Insurance – AHS-01. Healthy People 2030. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care-access-and-quality/increase-proportion-people-health-insurance-ahs-01

38. Increase the Proportion of People with Prescription Drug Insurance – AHS-03. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care-access-and-quality/increase-proportion-people-prescription-drug-insurance-ahs-03

39.Reduce the Proportion of People Who Can't Get Medical Care When They Need It – AHS-04. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care-access-and-quality/reduce-proportion-people-who-cant-get-medical-care-when-they-need-it-ahs-04

40. Gamm L, Hutchison L, Bellamy G, Dabney BJ. Rural healthy people 2010: identifying rural health priorities. *J Rural Health.* 2002;18(1):9-14. doi:10.1111/j.1748-0361.2002.tb00869.x

41. Bellamy GR, Bolin JN, Gamm LD. Rural healthy people 2010, 2020, and beyond: the need goes on. *Fam Community Health.* 2011;34(2):182-188. doi:10.1097/FCH.0b013e31820dea1c

42. Bolin JN, Bellamy GR, Ferdinand AO, et al. Rural healthy people 2020: new decade, same challenges. *J Rural Health.* 2015;31(3):326-333. doi:10.1111/jrh.12116

43. Elson LE, Luke AA, Barker AR, McBride TD, Joynt Maddox KE. Trends in hospital mortality for uninsured rural and urban populations, 2012-2016. *J Rural Health.* 2021;37(2):318-327. doi:10.1111/jrh.12425

44. Callaghan T, Ferdinand A, Akinlotan A, et al. Healthy people 2020 progress for leading causes of death in rural and urban America: a chartbook. March 2020. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/healthypeople-2020-progress-for-leading-causes-of-death-chartbook.pdf

45. Benitez JA, Seiber EE. US health care reform and rural America: results from the ACA's Medicaid expansions. *J Rural Health.* 2018;34(2):213-222. doi:10.1111/jrh.12284

46. Designated Health Professional Shortage Area Statistics. First Quarter of Fiscal Year 2023 Designated HPSA Quarterly Summary. December 31, 2022. Bureau of Health Workforce. Accessed January 3, 2023. https://data.hrsa.gov/Default/GenerateHPSAQuarterlyReport

47. Hung P, Henning-Smith CE, Casey MM, Kozhimannil KB. Access to obstetric services in rural counties still declining, with 9 percent losing services, 2004-2014. *Health Aff (Millwood).* 2017;36(9):1663-71. doi:10.1377/hlthaff.2017.0338

48. Akinlotan M, Primm K, Khodakarami N, Bolin J, Ferdinand A. Rural-urban variations in travel burdens for care: findings from the 2017 National Household Travel Survey. December 2021. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/travel-burdens-07.2021.pdf

49. Kirby JB, Zuvekas SH, Borsky AE, Ngo-Metzger Q. Rural residents with mental health needs have fewer care visits than urban counterparts. *Health Aff (Millwood).* 2019;38(12):2057-2060. doi:10.1377/hlthaff.2019.00369

50. Zahnd WE, Bell N. Larson AE. Geographic, racial/ethnic, and socioeconomic inequities in broadband access. *J Rural Health.* 2022;38(3):519-526. doi:10.1111/jrh.12635

51. Grubesic TH. The geodemographic correlates of broadband access and availability in the United States. *Telematics and Informatics.* 2004;21(4):335-358. doi:10.1016/j.tele.2004.02.003

52. Turrini G, Branham DK, Chen L, Conmy AB, Chappel AR, De Lew N, Sommers BD. Access to Affordable Care in Rural America: Current Trends and Key Challenges. ASPE Research Report. Published July 9, 2021. Accessed March 26, 2023. https://aspe.hhs.gov/sites/default/files/2021-07/rural-health-rr.pdf

53. Kozhimannil KB, Interrante JD, Basile Ibrahim B, et al. Racial/ethnic disparities in postpartum health insurance coverage among rural and urban U.S. residents. *J Womens Health (Larchmt).* 2022;31(10):1397-1402. doi:10.1089/jwh.2022.0169

54. Han X, Nguyen BT, Drope J, Jemal A. Health-related outcomes among the poor: Medicaid expansion vs. non-expansion states. Report. *PLoS One.* 2015;10(12):e0144429. doi:10.1371/journal.pone.0144429

55. Dalstrom M, Weinzimmer LG, Foulger R, Klein CJ. Medicaid expansion and accessibility to healthcare: the Illinois experience. *Public Health Nurs.* 2021;38(5):720-729. doi:10.1111/phn.12899

56. Sanders SR, Cope MR, Park PN, Jeffery W, Jackson JE. Infants without health insurance: racial/ethnic and rural/urban disparities in infant households' insurance coverage. Article. *PLoS One.* 2020;15(1):1-13. doi:10.1371/journal.pone.0222387

57. James CV, Moonesinghe R, Wilson-Frederick SM, Hall JE, Penman-Aguilar A, Bouye K. Racial/ethnic health disparities among rural adults—United States, 2012-2015: MMWR Surveillance Summaries. 2017;66(23):1-9. doi:10.15585%2Fmmwr.ss6623a1

58. Rhoades CA., Whitacre BE, Davis AF. Community sociodemographics and rural hospital survival. *J Rural Health.* 2023;39(3):643-655. doi:10.1111/jrh.12728

59. Tulimiero M, Garcia M, Rodriguez M, Cheney AM. Overcoming barriers to health care access in rural Latino communities: an innovative model in the eastern Coachella Valley. *J Rural Health.* 2021;37(3):635-644. doi:10.1111/jrh.12483

60. Vogels EA. Some digital divides persist between rural, urban and suburban America. Pew Research Center. August 19, 2021. https://www.pewresearch.org/fact-tank/2021/08/19/some-digital-divides-persist-between-rural-urban-and-suburban-america/

61. Gong G, Phillips SG, Hudson C, Curti D, Philips BU. Higher US rural mortality rates linked to socioeconomic status, physician shortages, and lack of health insurance. *Health Aff (Millwood).* 2019;38(12):2003-2010. doi:10.1377/hlthaff.2019.00722

62. Golembiewski EH, Gravholt DL, Torres Roldan VD, et al. Rural patient experiences of accessing care for chronic conditions: a systematic review and

thematic synthesis of qualitative studies. *Ann Fam Med*. 2022;20(3):266-272. doi:10.1370/afm.2798

63. Loftus J, Allen EM, Call KT, Everson-Rose SA. Rural-urban differences in access to preventive health care among publicly insured Minnesotans. *J Rural Health*. 2018;34:s48-s55. doi:10.1111/jrh.12235

64. Simning A, Orth J, Caprio TV, Li Y, Wang J, Temkin-Greener H. Receipt of timely primary care services following post-acute skilled nursing facility care. *J Am Med Dir Assoc*. 2021;22(3):701-705.e1. doi:10.1016/j.jamda.2020.09.016

65. Ahmed A, Harland KK, Hoffman B, et al. Not just an urban phenomenon: uninsured rural trauma patients at increased risk for mortality. *West J Emerg Med*. 2015;16(5):632-641. doi:10.5811/westjem.2015.7.27351

66. Andreyeva E, Kash B, Averhart Preston V, Vu L, Dickey N. Rural hospital closures: effects on utilization and medical spending among commercially insured individuals. *Med Care*. 2022;60(6):437-443. doi:10.1097/mlr.0000000000001711

67. Myers CR. Using telehealth to remediate rural mental health and healthcare disparities. *Issues Ment Health Nurs*. 2019;40(3):233-239. doi:10.1080/01612840.2018.1499157

68. The Many Costs (Financial and Well-Being) of Poor Oral Health. College of Dentistry, University of Illinois Chicago. Published August 9, 2019. Accessed January 22, 2023. https://dentistry.uic.edu/news-stories/the-many-costs-financial-and-well-being-of-poor-oral-health/

69. Cao S, Gentili M, Griffin PM, Griffin SO, Serban N. Disparities in preventive dental care among children in Georgia. *Prev Chronic Dis*. 2017;14(E104):1-10. doi:10.5888/pcd14.170176

70. Khan A, Thapa JR, Zhang D. Preventive dental checkups and their association with access to usual source of care among rural and urban adult residents. *J Rural Health*. 2017;33(4):419-426. doi:10.1111/jrh.12271

71. Probst J, Eberth JM, Crouch E. Structural urbanism contributes to poorer health outcomes for rural America. *Health Aff (Millwood)*. 2019;38(12):1976-1984. doi:10.1377/hlthaff.2019.00914

72. Berry EH, Oh EJV, Glasgow N. *Rural Aging in 21st Century America. Understanding Population Trends and Processes*. v7. Springer; 2013.

73. Bolin J, Bellamy G, Ferdinand A, Ojinnaka C. Rural Access to Quality Health Insurance. Chapter 1a. In: Bolin JN, Bellamy G, Ferdinand AO, Kash BA, Helduser JW, eds. *Rural Healthy People 2020: Volume 1*. College Station, Texas: Texas A&M University Health Science Center, School of Public Health, Southwest Rural Health Research Center; 2015:1-11.

74. Douthit N, Kiv S, Dwolatzky T, Biswas S. Exposing some important barriers to health care access in the rural USA. *Public Health*. 2015;129(6):611-620. doi:10.1016/j.puhe.2015.04.001

75. Henning-Smith C, Evenson A, Corbett A, Kozhimannil K, Moscovice I. Rural transportation: challenges and opportunities. University of Minnesota Rural Health Research Center. November 2017. https://rhrc.umn.edu/wp-content/uploads/2019/01/1518734252UMRHRCTransportationChallenges.pdf

76. Germack HD, Kandrack R, Martsolf GR. When rural hospitals close, the physician workforce goes. *Health Aff (Millwood)*. 2019;38(12):2086-2094. doi:10.1377/hlthaff.2019.00916

77. Economic Research Service. Rural Education at a Glance, 2017 Edition. Economic Information Bulletin 171. United States Department of Agriculture. April 2017. Accessed April 3, 2023. https://www.ers.usda.gov/webdocs/publications/83078/eib-171.pdf?v=1606.5

78. Zahnd WE, Scaife SL, Francis ML. Health literacy skills in rural and urban populations. *Am J Health Behav*. 2009;33(5):550-557. doi:10.5993/AJHB.33.5.8

79. Aljassim N, Ostini R. Health literacy in rural and urban populations: a systematic review. *Patient Educ Couns*. 2020;103(10):2142-2154. doi:10.1016/j.pec.2020.06.007

80. Chen X, Orom H, Hay JL, et al. Differences in rural and urban health information access

and use. *J Rural Health*. 2019;35(3):405-417. doi:10.1111/jrh.12335

81. Garfield R, Orgera K, Damico A. The Coverage Gap: Uninsured Poor Adults in States that Do Not Expand Medicaid. Kaiser Family Foundation. January 21, 2021. Accessed January 26, 2023. https://www.kff.org/medicaid/issue-brief/the-coverage-gap-uninsured-poor-adults-in-states-that-do-not-expand-medicaid/

82. Pifer R. 'Bravo Congress': Telehealth Groups Cheer Omnibus Extension of Covid-19 Flexibilities. Healthcare Dive. December 21, 2022. Accessed January 26, 2023. https://www.healthcaredive.com/news/telehealth-extension-omnibus-bill-congress-medicare/639324/

83. Rural Emergency Hospitals Proposed Rulemaking. Centers for Medicare and Medicaid Services. July 15, 2022. Accessed January 22, 2023. https://www.cms.gov/newsroom/fact-sheets/rural-emergency-hospitals-proposed-rulemaking

84. Rural Emergency Hospitals. Rural Health Information Hub. October 21, 2022. Accessed January 26, 2023. https://www.ruralhealthinfo.org/topics/rural-emergency-hospitals

85. Dreher A. New Rural Hospital Model a Lifeline for Some, a Gamble for Others. Axios. January 23, 2023. Accessed January 26, 2023. https://www.axios.com/2023/01/23/rural-hospital-payments-risky-gamble

86. Topchik M, Gross K, Pinette M, Brown T, Balfour B, Kein H. The Rural Health Safety Net Under Pressure. The Chartis Group. 2022. Accessed January 27, 2023. https://www.chartis.com/sites/default/files/documents/Rural%20Hospital%20Vulnerability-The%20Chartis%20Group.pdf

87. Cubanski J, Neuman T, Freed M. Explaining the Prescription Drug Provisions in the Inflation Reduction Act. Kaiser Family Foundation. September 22, 2022. Accessed January 22, 2023. https://www.kff.org/medicare/issue-brief/explaining-the-prescription-drug-provisions-in-the-inflation-reduction-act/

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*Related Chapters:*
Chapter 8. Preventive Care for Rural Populations and Providers: Routine Screenings, Prenatal Care, and Oral Health
Chapter 13. Public Health Infrastructure in Rural America: Elevating Quality Improvement, Accreditation and Core Competencies
Chapter 15. An Examination of the Workforce in Rural America
Chapter 17. Health Insurance for Rural Americans
Chapter 19. Hospital and Emergency Services in Rural Areas

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# OBESITY AND PHYSICAL ACTIVITY IN RURAL SETTINGS

*By Jay E. Maddock, PhD; Rebecca A. Seguin-Fowler, PhD, RD; Aakriti Shrestha, MPH; and Alva O. Ferdinand, DrPH, JD*

## SCOPE OF THE PROBLEM

- Obesity and physical inactivity remain leading chronic disease risk factors in the United States.
- The U.S. adult obesity rate is over 40% and has increased by more than 25% since 2008.[1]
- Obesity prevalence is significantly higher among adults living in nonmetropolitan (i.e., rural) counties than among those living in metropolitan counties.[2]
- Rural children have 26% greater odds of obesity compared to children residing in urban areas.[3]
- Only one in five (19.6%) rural adults meet the U.S. Physical Activity Guidelines for Americans, significantly less than their urban counterparts.[4]
- The medical costs of obesity among adults exceed $250 billion dollars per year.[5]

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Obesity prevalence is consistently higher in rural communities compared to urban areas. In 2016, analysis of the Behavioral Risk Factor Surveillance Survey (BRFSS) showed that obesity rates for adults living in nonmetropolitan counties (34.2%) were higher than for adults living in metropolitan counties (28.7%).[2] Additionally, people living in rural areas, regardless of race, were more likely to be obese and less likely to be physically active than people in more urban areas.[2] While obesity and physical inactivity have long been recognized as major public health risk factors,[5] it was not until 2020 with the onset of the COVID-19 pandemic that it became clear how important they were. Both obesity and physical inactivity were found to be significant risk factors for developing severe COVID-19 linked to higher rates of mortality.[6,7] In addition to COVID-19, people with obesity are at increased risk for a variety of adverse health conditions including high blood pressure, type 2 diabetes, stroke, coronary heart disease, osteoarthritis, sleep apnea, and several types of cause and all-cause mortality.[8] Despite a myriad of public health communications and interventions, obesity rates have continued to steadily rise across the U.S. since the 1970s. By 2017-2018, the National Health and Nutrition Examination Survey (NHANES) found adult obesity prevalence to be 42.4%.[9] The medical costs of obesity exceed $250 billion dollars per year, and the costs for adults with obesity was over $2,500 higher per year than their normal-weight peers.[5]

These findings are similar for rural youth. A meta-analysis of studies with children ages two to 19 found that rural children have 26% greater odds of obesity compared to urban children.[3] An additional study found that this disparity existed even after controlling for physical activity and dietary patterns, indicating the need to examine additional factors to address these differences.[10]

Physical inactivity is a major risk factor for obesity. However, it is also an independent risk factor for several health outcomes, including heart disease, type 2 diabetes, and some forms of cancer.[11] Getting adequate physical activity also provides benefits including better sleep and cognitive ability, as well as increased ability to perform everyday tasks.[12]

The most recent national Physical Activity Guidelines for Americans was released in 2018.[13] The guidelines recommend 60 minutes a day of aerobic exercise for youth, with three days of bone and muscle strengthening activities. For adults, 150 minutes a week of moderate to vigorous

physical activity, with two days a week of muscle strengthening activities, is recommended.[13] Despite these benefits, more than three-quarters of American adults and 77% of high school students do not get enough aerobic physical activity.[11] In 2017, only one in four (25.3%) urban residents and one in five (19.6%) rural residents met the combined guidelines.[4]

In general, rural residents are less physically active than their urban counterparts and are also disproportionately affected by chronic diseases and conditions associated with caloric imbalance, which included obesity.[14] High levels of sedentary behavior, an associated but independent risk factor from inadequate physical activity, has been linked to lower health-related quality of life, stress, anxiety, depression, cardiovascular disease, and all-cause mortality.[13,15-17] While the national Physical Activity Guidelines for Americans addressed the importance of reducing sedentary time for adults, no targets were established.[13] There is some preliminary evidence that rural children, but not adults, engage in more sedentary time than their urban counterparts.[18,19]

While awareness of the dual epidemics of inadequate physical inactivity and obesity had increased in the early 2000s, the COVID-19 pandemic overshadowed most other public health issues between 2020 and 2022. With COVID-19 likely to become an endemic issue through much of the world, physical inactivity and obesity will remain important risk factors. By addressing these risk factors, we can help create a population that is more resilient to future pandemics and other chronic diseases.[20,21]

## HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

A U.S. Department of Health and Human Services' initiative, Healthy People, has for several decades established goals and objectives to improve the health and well-being of all Americans. The overall goal in the current decade, for the leading health indicator Overweight and Obesity, is to "reduce overweight and obesity by helping people to eat healthy and get adequate physical activity."[22] The Healthy People 2030 objectives for this topic are focused on helping people maintain a healthy weight through healthy eating and active living.[22] The physical activity objectives in Healthy People 2030 encourage Americans to get active in a variety of safe and accessible settings.[23]

Specific objectives of Heathy People 2030 related to obesity and physical activity that will be addressed in this chapter are:

*Obesity Objectives*[22]:

1. Reduce the proportion of adults with obesity — NWS-03
2. Reduce the proportion of children and adolescents with obesity — NWS-04
3. Increase the proportion of health care visits by adults with obesity that include counseling on weight loss, nutrition, or physical activity — NWS-05

*Physical Activity Objectives*[23]:

1. Increase the proportion of adults who do enough aerobic physical activity for substantial health benefits — PA-02
2. Increase the proportion of adults who do enough aerobic and muscle-strengthening activity — PA-05
3. Increase the proportion of adults who walk or bike to get places — PA-10
4. Increase the proportion of childcare centers where children aged 3 to 5 years do at least 60 minutes of physical activity a day — PA-R01

*Physical Activity Adolescent Objectives*[23]:

1. Increase the proportion of adolescents who do enough aerobic and muscle-strengthening activity — PA-08

*Child and Adolescent Development Objectives*[23]:

1. Increase the proportion of children who do enough aerobic physical activity — PA-09
2. Increase the proportion of adolescents who walk or bike to get places — PA-11
3. Increase the proportion of children aged 2 to 5 years who get no more than 1 hour of screen time a day — PA-13

## RURAL HEALTHY PEOPLE 2030 SURVEY

A Rural Healthy People (RHP) 2030 survey, conducted by Texas A&M University, ranked overweight and obesity as the fourth highest priority for rural stakeholders.[24] Responses were

slightly different across U.S. census regions, with the Northeast and West regions ranking obesity in fifth place, while the South and Midwest ranked it in third place.[24] This is in line with data from the BRFSS which showed that obesity rates were highest in the South (32%) and Midwest (31.4%).[2]

Physical activity was ranked 26th in the RHP 2030 survey. However, it is covered in this chapter since it is a major determinant of obesity. Nutrition and healthy eating behaviors, other major determinants of obesity, are covered separately in Chapter 6 of this volume.

## OBESITY PREVALENCE AND DISPARITIES IN RURAL AREAS

### *Adults*

Obesity is measured based on delineations of the body mass index (BMI). The BMI uses measures of height and weight.[25] The formula is weight in kilograms divided by the height in meters squared. Individuals with a BMI > 30 are considered obese and those with a BMI between 25 and 30 are considered overweight. The two main surveillance systems that measure adult obesity are the NHANES and the BRFSS. While the NHANES uses objective measurements of height and weight, the BRFSS uses self-reported data. Compared to NHANES, the BRFSS has been found to underestimate obesity by about 10%.[26]

According to 2016 BRFSS data, adult obesity rates were 19% higher in rural regions than they were in metropolitan areas.[2] More than one-third (34.2%) of adults in rural areas had self-reported obesity, compared with 28.7% of metropolitan adults.[2] Similar disparities are seen for physical activity. Between 2008 and 2017, the percentage of urban adults meeting physical activity guidelines increased from 19.4% to 25.3%, while the percentage of rural adults meeting the guidelines increased from 13.3% to 19.6%.[4]

### *Variations by Region*

Obesity rates differ dramatically across the U.S. ranging from a 25.0% obese population in Hawaii to 40.6% in West Virginia.[27] In 2016, obesity prevalence among nonmetropolitan regions was highest in the South at 36.6%, followed by the Midwest (34.2%), Northeast (31.8%), and West (28.6%).[2]

In addition to state and regional differences, differences within states between urban and rural counties have also been observed. Some of the biggest differences in obesity prevalence between counties were found in the South and Northeast regions. For example, the obesity rate in Fulton County, Georgia (an urban county, home to Atlanta) was 29%, which is below the national rate of 32% and well below the rate of 41% in Georgia's rural Stewart County.[28] **Figure 1** shows obesity rates as assessed by analysis of the BRFSS in 2021.[28] The highest levels of obesity can be seen stretching from Oklahoma and Texas through the south and up through the Appalachian region.[28]

Similarly, an analysis of NHANES data by the Centers for Disease Control and Prevention (CDC) found that adults living in the most urban areas of the country (i.e., large metropolitan statistical areas) had the lowest obesity rates.[2]

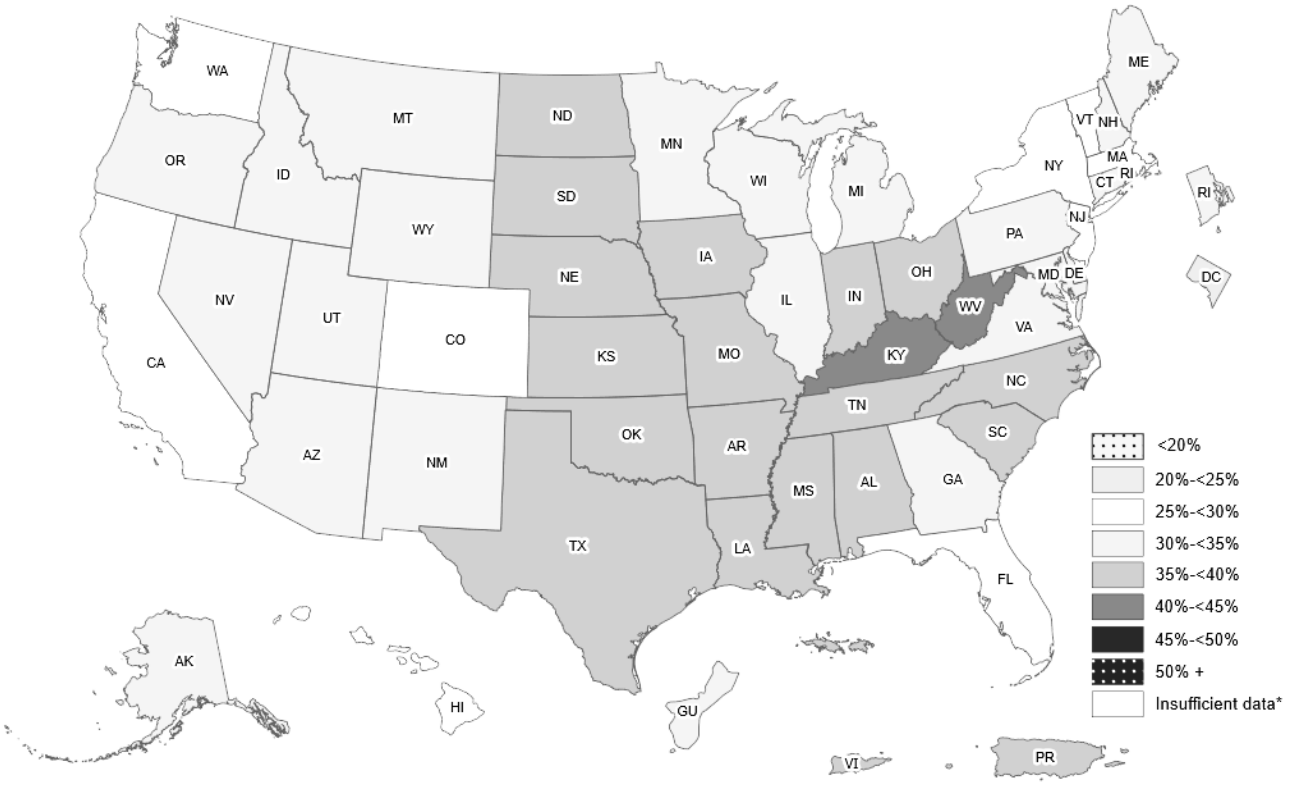
Physical activity trends follow obesity trends. In 2017, only 14.7% of Southern adults met physical activity guidelines.[4] This was lower than adults living in the Midwest (19.9%), Northeast (24.2%), and the West (25.4%).[4] While physical activity increased by 5%-9% between 2008 and 2017, for urban and rural adults residing outside of the southern U.S., this increase was not seen in the South where compliance only increased from 13.2% in 2008 to 14.7% in 2017.[4]

### *Youth and Children*

Obesity is measured differently in children than in adults. While BMI is calculated the same, the thresholds are relative to other children of the same age and sex using the CDC growth charts.[29] The percentile thresholds are > 95% weight by height for obesity and 85%-95% weight by height for overweight.[29]

Children living in rural areas are more likely to be obese than their urban counterparts. A meta-analysis found that rural children had 26% greater odds of being obese compared to their urban counterparts.[3] Differences in obesity rates in rural versus urban children have been observed in children as young as three- to four-year-olds.[30] However, one study examining NHANES data showed that rural children ages two to 11 reported higher levels of physical activity and higher calorie consumption that their urban counterparts.[31]

**Figure 1. State Level Obesity Map, BRFSS 2021[28]**




During the COVID-19 pandemic, children and youth were less physically active and gained weight at a faster rate than during non-pandemic periods.[32] Across 29 clinics in Pennsylvania, for example, childhood obesity increased from 13.7% in 2019 to 15.4% in 2020.[33]

The prevalence of overweight and obesity in school-aged children in rural areas of California, Kentucky, Mississippi, and South Carolina ranged from 37% to 60%, with children living in Kentucky having the highest prevalence.[34] Nonmetropolitan Black youth had the highest risk of obesity (26%), an 86% rate of consuming fatty snack foods more than two days per week, and a 91% rate of spending more than two hours per day in screen time compared to White metropolitan youth.[35]

Health literacy disparities among rural Appalachian children are prevalent, which then leads to differences in fruit and vegetable intake. Significant group differences in daily fruit and vegetable intake have been found among the lowest 20th, 30th, and 40th percentiles.[36] A 2021 study of rural children found that on school days children had more physical activity, less sedentary time, and less screen time than on non-school days, indicating the importance of interventions aimed at times when children are not in school.[37] Another study examining the effect of income on physical activity found that rural children who paid full price for lunch were four times more likely to participate in youth sports compared to children who receive free or reduced lunch.[38]

***Gender and Race Ethnicity***

A study using NHANES data found that rural Black adults (49.6%) had the highest rate of obesity, followed by rural Hispanic adults (38.6%) and rural White adults (34.2%).[39] An interaction was found between race and rurality, such that disparities between Black and White residents were increased in more rural areas.[40] Men (37.7%) were more likely to be obese than women (33.4%).[40] For physical activity, rural Hispanic adults (12.4%) were the least likely to get adequate physical activity compared to White, non-Hispanic rural adults (19.5%) and Black adults (17.9%).[4] Rural Black adults had the biggest increase (7.7%) in the percentage of people meeting guidelines between 2008-2009 and 2016-2017 compared to only 1.4% for rural Hispanic adults.[4] Men (21.1%) were more likely to meet physical activity guidelines than women (16.3%).[4]

Racial and ethnic differences in obesity also exist for children. As reported from 2017-2020 NHANES data, obesity prevalence was 26.2% among Hispanic children, 24.8% among non-Hispanic Black children, 16.6% among non-Hispanic White children, and 9.0% among non-Hispanic Asian children.[41]

***Built Environment***

The built environment, or lack thereof, is one of many contributing factors to the obesity prevalence among rural Americans. Rural residents may have limited access to outdoor activities and spaces for exercise, with these spaces possibly being poor quality as well.[42] Additionally, rural communities face barriers to healthy food options, such as farther distance from grocery stores where healthier food options are available.[43] Food options available within rural communities are often convenience stores where healthier options are not readily available.[44] Looking at the influence of built environment from a qualitative perspective, adults in rural Montana indicated that investments were needed in pedestrian-friendly features and that the lack of quality sidewalks were a barrier for those seeking to walk as a form of exercise.[45] Beyond the barriers to physical activity, themes surrounding geographic isolation from healthier food options also demonstrate how built environment further contributes to the obesity prevalence among rural Americans.[43]

A systematic literature review on the built environment found strong evidence for a positive association between traffic-related air pollution (nitrogen dioxide and nitrogen oxides exposure) and childhood obesity, while built environment characteristics supportive of walking (street intersection density and access to parks) was associated with lower rates of childhood obesity.[46] Within rural communities, the presence of a town center has been linked with higher levels of physical activity.[47] Another study found that home and church settings in rural communities provided both physical and social support for physical activity.[48] Inactive rural women reported less access to a place where they could be active and a lesser belief in the relevance of physical activity to health than their more active peers.[49]

## BARRIERS

There are a variety of barriers to a healthy diet and exercise in rural areas, as well as access to counseling and weight loss programs, including:

*Healthcare Resources*

- Many rural counties are in primary care professional shortage areas[50]
- Significant deficits exist in space and trained staff for telemedicine[51]
- Lack of reimbursement for healthy behavior change programs and services[52]
- Lack of clinician knowledge and pediatric subspecialists[52]
- Lack of health insurance[52]

*Healthy Eating*

- Higher price of healthy foods, which prevents rural residents from purchasing these healthy foods and preparing nutritious meals[53]
- Distance to grocery stores that have healthy food options and related considerations for spoilage and waste[45]
- Accessible convenience stores with limited selection of healthy foods[54]
- Food deserts and swamps[55]
- School-based nutrition policy[55]
- Sociocultural normative behaviors, attitudes, and expectations regarding preferred and acceptable foods[56,57]

*Physical Activity*

- Lack of motivation[58]
- Physical environment[44]
- Sociocultural barriers[59]
- Safety[59]
- Long work hours, lack of transportation, increased screen time[60]

## COMMUNITY MODELS KNOWN TO WORK

***Obesity Counseling Interventions***

Given that many rural Americans have indicated that distance to medical treatment and limited availability of providers have deterred them from receiving the care that they need, telehealth may be an effective tool in obesity management and treatment.[61] The use of telehealth among rural Americans has led to improvements in diet,

activity levels, and favorable changes in weight.[62] A clinical randomized trial conducted by the U.S. Cooperative Extension Service offices found that providing individual telephone counseling for weight management in rural communities led to >10% weight reductions than those in a control group.[63] Utilization of telehealth has not only improved obesity counseling among adults in rural America, but children as well. A systematic review looking at the effectiveness of clinic-based telehealth versus face-to-face modalities found that the telehealth option showed a reduction in BMI as well as improvement in eating habits, physical activity, and patient satisfaction.[64]

***Community-Based Behavioral Interventions***

Additionally, community-based interventions have been successful in addressing not only obesity, but physical activity as well. Community-based interventions provide accessible means of exercise and provide knowledge on exercise and proper nutrition. Two examples of evidence-based community programs are Strong Hearts, Healthy Communities (SHHC) and Play Streets. Additional emerging programs are also being studied under the Center for Disease Control and Prevention (CDC) High Obesity Funding program.

Strong Hearts, Healthy Communities is a community-based program that addresses cardiovascular risk in midlife and older overweight and obese women in rural communities.[65] The program seeks to address cardiovascular risk factors including weight loss and management; improved dietary intake patterns; increased physical activity; reduced sedentary behavior; and tailored, intentional engagement strategies in social and built environments to support these changes. In a randomized community-based trial of SHHC, intervention participants attended six months of twice-weekly exercise, nutrition, and heart health classes which included an individual, social, and environmental-level component.[66] The intervention participants significantly reduced their weight over the course of the program. Participants in the study were from rural New York and many intervention participants saw improvements in physical activity score (41.5%), healthy diet (37.3%), and BMI (14.5%).[66] A refined version of the program called SHHC 2.0 saw significantly improved scores for Life Simple 7, a composite measure which includes obesity, hypertension, cholesterol, blood glucose, smoking, physical activity, and nutrition.[67] Intervention participants also showed significant increases in both self-reported and objectively measured physical activity.[67]

Play Streets is a program implemented within rural communities to promote childhood physical activity.[68] It creates safe places for active play for families and children by implementing neighbor-led short road closures along with free opportunities for physical activity.[68] Play Streets has been adopted in rural communities in Maryland, North Carolina, Oklahoma, and Texas. Researchers found that children attending three hours of a Play Streets event accrued an average of over 7,500 steps, which would account for over 50% of the estimated steps required for children to meet moderate to vigorous physical activity recommendations of 60 minutes per day.[68] Along with Play Streets increasing physical activity among children, it helped in addressing equity challenges surrounding access for families as Play Streets provided an easy, no-cost service.[68]

The CDC's High Obesity Program funds 15 land grant universities that work with their local communities to increase access to healthier foods and promote physical activity in rural counties where more than 40% of adults are obese.[69] During its first five years (2014–2018), the program increased healthy food access for more than 1.5 million people and expanded physical activity opportunities for nearly 1.6 million people.[70] The CDC publishes a variety of success stories and promising practices from these grants that may be helpful in addressing obesity in rural communities.[71]

## SUMMARY AND CONCLUSIONS

Obesity and physical inactivity are risk factors for chronic disease throughout the U.S. However, rural adults are at a higher risk for both of these, with differences in obesity seen as early as three years old. Cultural norms and the built environment contribute to these disparities. However, in recent years several effective interventions have been developed that can improve the health of rural residents.

Dissemination and widespread adoption of these interventions, along with changes to the food and physical activity environments, are needed to eliminate rural/urban disparities in obesity and physical inactivity.

## REFERENCES


1. Warren MS, Beck SJ, Delgado DM. *The State of Obesity: Better Policies For A Healthier America 2020*. September 2020. Accessed November 14, 2022. https://www.tfah.org/wp-content/uploads/2020/09/TFAHObesityReport_20.pdf

2. Lundeen EA, Park S, Pan L, O'Toole T, Matthews K, Blanck HM. Obesity prevalence among adults living in metropolitan and nonmetropolitan counties - United States, 2016. *MMWR Morb Mortal Wkly Rep*. 2018;67(23):653-658. doi:10.15585/mmwr.mm6723a1

3. Johnson JA 3rd, Johnson AM. Urban-rural differences in childhood and adolescent obesity in the United States: a systematic review and meta-analysis. *Child Obes*. 2015;11(3):233-41. doi:10.1089/chi.2014.0085

4. Whitfield GP, Carlson SA, Ussery EN, Fulton JE, Galuska DA, Petersen R. Trends in meeting physical activity guidelines among urban and rural dwelling adults - United States, 2008-2017. *MMWR Morb Mortal Wkly Rep*. 2019;68(23):513-518. doi:10.15585/mmwr.mm6823a1

5. Cawley J, Biener A, Meyerhoefer C, et al. Direct medical costs of obesity in the United States and the most populous states. *J Manag Care Spec Pharm*. 2021;27(3):354-366. doi:10.18553/jmcp.2021.20410

6. Zhou Y, Chi J, Lv W, Wang Y. Obesity and diabetes as high-risk factors for severe coronavirus disease 2019 (Covid-19). *Diabetes Metab Res Rev*. 2021;37(2):e3377. doi:10.1002/dmrr.3377

7. Sallis R, Young DR, Tartof SY, et al. Physical inactivity is associated with a higher risk for severe COVID-19 outcomes: a study in 48 440 adult patients. *Br J Sports Med*. Oct 2021;55(19):1099-1105. doi:10.1136/bjsports-2021-104080

8. Health Effects of Overweight and Obesity. Centers for Disease Control and prevention. Updated September 24, 2022. Accessed November 14, 2022. https://www.cdc.gov/healthyweight/effects/index.html

9. Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of Obesity and Severe Obesity Among Adults: United States, 2017-2018. *NCHS Data Brief*. 2020;(360):1-8. https://www.cdc.gov/nchs/data/databriefs/db360-h.pdf

10. Smith LH, Laurent D, Baumker E, Petosa RL. Rates of obesity and obesogenic behaviors of rural Appalachian adolescents: how do they compare to other adolescents or recommendations? *J Phys Act Health*. 2018;15(11):874-881. doi:10.1123/jpah.2017-0602

11. Physical Inactivity. Center for Disease Control and Prevention. Updated September 8, 2022. Accessed January 29, 2023. https://www.cdc.gov/chronicdisease/resources/publications/factsheets/physical-activity.htm

12. Benefits of Physical Activity. Center for Disease Control and Prevention. Updated June 16, 2022. Accessed January 29, 2023. https://www.cdc.gov/physicalactivity/basics/pa-health/index.htm

13. Piercy KL, Troiano RP, Ballard RM, et al. (2018). The physical activity guidelines for Americans. *JAMA*. 2018;320(19):2020-2028. doi:10.1001/jama.2018.14854

14. Okobi OE, Ajayi OO, Okobi TJ, et al. The burden of obesity in the rural adult population of America. *Cureus*. 2021;13(6):e15770. doi:10.7759/cureus.15770

15. Wu XY, Han LH, Zhang JH, Luo S, Hu JW, Sun K. The influence of physical activity, sedentary behavior on health-related quality of life among the general population of children and adolescents: a systematic review. *PLoS One*. 2017;12(11):e0187668. doi:10.1371/journal.pone.0187668

16. Lee E, Kim Y. Effect of university students' sedentary behavior on stress, anxiety, and depression. *Perspect Psychiatr Care*. 2019;55(2):164-169. doi:10.1111/ppc.12296

17. Stamatakis E, Gale J, Bauman A, Ekelund U, Hamer M, Ding D. Sitting Time, Physical

Activity, and Risk of Mortality in Adults [published correction appears in J Am Coll Cardiol. 2019;73(21):2789]. *J Am Coll Cardiol*. 2019;73(16):2062-2072. doi:10.1016/j.jacc.2019.02.031

18. Carson V, Iannotti RJ, Pickett W, Janssen I. Urban and rural differences in sedentary behavior among American and Canadian youth. *Health Place*. 2011;17(4):920-928. doi:10.1016/j.healthplace.2011.04.007

19. Robertson MC, Song J, Taylor WC, Durand CP, Basen-Engquist KM. Urban-rural differences in aerobic physical activity, muscle strengthening exercise, and screen-time sedentary behavior. *J Rural Health*. 2018;34(4):401-410. doi:10.1111/jrh.12295

20. Maddock JE, Seguin-Fowler R. Healthy eating and active living in a post-pandemic world. *J Healthy Eat Act Living*. 2021;1(2):39-40. doi.org/10.51250/jheal.v1i2.17

21. Ramirez Varela A, Sallis R, Rowlands AV, Sallis JF. Physical inactivity and COVID-19: when pandemics collide. *J Phys Act Health*. 2021;18(10):1159-1160. doi: 10.1123/jpah.2021-0454

22. Overweight and Obesity. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. Access January 29, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/overweight-and-obesity

23. Physical Activity. US Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed January 29, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/physical-activity

24. Kassabian M, Shrestha A, Callaghan T, et al. Rural healthy people 2030: common challenges, rural nuances. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

25. Garrow JS, Webster J. Quetelet's index (W/H2) as a measure of fatness. *Int J Obes*. 1985;9(2):147-153.

26. Ward ZJ, Long MW, Resch SC, et al. Redrawing the US obesity landscape: bias-corrected estimates of state-specific adult obesity prevalence. *PLoS One*. 2016;11(3):e0150735. doi:10.1371/journal.pone.0150735

27. Adult Obesity Prevalence Maps. Centers for Disease Control and Prevention. Updated September 27, 2022. Accessed January 29, 2023. https://www.cdc.gov/obesity/data/prevalence-maps.html

28. PLACES: local data for better health. Centers for Disease Control and Prevention. 2020. Accessed January 23, 2023. https://experience.arcgis.com/experience/dc15b033b88e423d85808ce04bd7a497/page/Health-Outcomes/?data_id=dataSource_17-PLACES_LocalData_for_BetterHealth_5583%3A1520&views=Obesity

29. Defining Childhood Weight Status. Center for Disease Control and Prevention. 2023. https://www.cdc.gov/obesity/basics/childhood-defining.html

30. Contreras DA, Martoccio TL, Brophy-Herb HE, et al. Rural-urban differences in body mass index and obesity-related behaviors among low-income preschoolers. *J Public Health (Oxf)*. 2021;43(4):e637-e644. doi:10.1093/pubmed/fdaa162.

31. Davis AM, Bennett KJ, Befort C, Nollen N. Obesity and related health behaviors among urban and rural children in the United States: data from the National Health And Nutrition Examination Survey 2003-2004 and 2005-2006. *J Pediatr Psychol*. 2011;36(6):669-676. doi:10.1093/jpepsy/jsq117

32. Stavridou A, Kapsali E, Panagouli E, et al. Obesity in children and adolescents during COVID-19 pandemic. *Children*. 2021;8(2):135. doi.org/10.3390/children8020135

33. Jenssen BP, Kelly MK, Powell M, Bouchelle Z, Mayne SL, Fiks AG. COVID-19 and changes in child obesity. *Pediatrics*. 2021;147(5):e2021050123. doi:10.1542/peds.2021-050123

34. Tovar A, Chui K, Hyatt RR, et al. Healthy-lifestyle behaviors associated with overweight

and obesity in US rural children. *BMC Pediatr.* 2012;12:102. doi:10.1186/1471-2431-12-102

35. Kenney MK, Wang J, Iannotti R. Residency and racial/ethnic differences in weight status and lifestyle behaviors among US youth. *J Rural Health.* 2014;30(1):89-100. doi:10.1111/jrh.12034

36. Reid AL, Porter KJ, You W, et al. Low health literacy is associated with energy-balance-related behaviors, quality of life, and BMI among rural Appalachian middle school students: a cross-sectional study. *J Sch Health.* 2021;91(8):608-616. doi:10.1111/josh.13051

37. Brazendale K, Rayan S, Eisenstein D, et al. Obesogenic behaviors of rural children on school and nonschool days. *Child Obes.* 2021;17(7):483-492. doi:10.1089/chi.2021.0084. Epub 2021 Jun 15.

38. Kellstedt DK, Schenkelberg MA, Essay AM, et al. Youth sport participation and physical activity in rural communities. *Arch Public Health.* 2021;79(1):46. doi.org/10.1186/s13690-021-00570-y

39. Cohen SA, Nash CC, Byrne EN, Mitchell LE, Greaney ML. Black/white disparities in obesity widen with increasing rurality: evidence from a national survey. *Health Equity.* 2022;6(1):178-188. doi: 10.1089/heq.2021.0149

40. Trivedi T, Liu J, Probst J, Merchant A, Jhones S, Martin AB. Obesity and obesity-related behaviors among rural and urban adults in the USA. *Rural Remote Health.* 2015;15(4):3267. https://pubmed.ncbi.nlm.nih.gov/26458564/

41. Stierman B, Afful J, Carroll MD, et al. *National Health and Nutrition Examination Survey 2017-March 2020 Prepandemic Data Files-Development of Files and Prevalence Estimates for Selected Health Outcomes.* National Health Statistics Reports; 2021.

42. Umstattd Meyer MR, Moore JB, Abildso C, Edwards MB, Gamble A, Baskin ML. Rural active living: a call to action. *J Public Health Manag Pract.* 2016;22(5):E11-20. doi:10.1097/PHH.0000000000000333

43. Seguin R, Connor L, Nelson M, LaCroix A, Eldridge G. Understanding barriers and facilitators to healthy eating and active living in rural communities. *J Nutr Metab.* 2014;2014:146502. doi:10.1155/2014/146502

44. McCormack LA, Meendering JR, Burdette L, Prosch N, Moore L, Stluka S. Quantifying the food and physical activity environments in rural, high obesity communities. *Int J Environ Res Public Health.* 2021;18(24):13344. doi:10.3390/ijerph182413344

45. Lo BK, Morgan EH, Folta SC, et al. Environmental influences on physical activity among rural adults in Montana, United States: views from built environment audits, resident focus groups, and key informant interviews. *Int J Environ Res Public Health.* 2017;14(10):1173. doi:10.3390/ijerph14101173

46. Malacarne D, Handakas E, Robinson O, et al. The built environment as determinant of childhood obesity: a systematic literature review. *Obes Rev.* 2022;23(Suppl 1):e13385. doi:10.1111/obr.13385

47. Kegler MC, Gauthreaux N, Hermstad A, et al. Inequities in physical activity environments and leisure-time physical activity in rural communities. *Prev Chronic Dis.* 2022;19:E40. doi:10.5888/pcd19.210417

48. Kegler MC, Swan DW, Alcantara I, Wrensford L, Glanz K. Environmental influences on physical activity in rural adults: the relative contributions of home, church and work settings. *J Phys Act Health.* 2012;9(7):996-1003. doi:10.1123/jpah.9.7.996

49. Cadmus-Bertram LA, Gorzelitz JS, Dorn DC, Malecki KMC. Understanding the physical activity needs and interests of inactive and active rural women: a cross-sectional study of barriers, opportunities, and intervention preferences. *J Behav Med.* 2020;43(4):638-647. doi:10.1007/s10865-019-00070-z

50. Nielsen M, D'Agostino D, Gregory P. Addressing rural health challenges head on. *Mo Med.* 2017;114(5):363-366.

51. Batsis JA, McClure AC, Weintraub AB, et al. Barriers and facilitators in implementing a pilot, pragmatic, telemedicine-delivered healthy lifestyle program for obesity management in a

rural, academic obesity clinic. *Implement Sci Commun.* 2020;1:83. doi:10.1186/s43058-020-00075-9

52. Findholt NE, Davis MM, Michael YL. Perceived barriers, resources, and training needs of rural primary care providers relevant to the management of childhood obesity. *J Rural Health.* 2013;29(Suppl 1):s17-24. doi:10.1111/jrh.12006. Epub 2013 Feb 22.

53. Hardin-Fanning F, Rayens MK. Food cost disparities in rural communities. *Health Promot Pract.* 2015;16(3):383-391. doi:10.1177/1524839914554454

54. Smith ML, Sunil TS, Salazar CI, Rafique S, Ory MG. Disparities of food availability and affordability within convenience stores in Bexar County, Texas. *J Environ Public Health.* 2013;2013:782756. doi:10.1155/2013/782756

55. Southerland JL, Dula TM, Slawson DL. Barriers to healthy eating among high school youth in rural southern Appalachia. *J Appalach Health.* 2019;1(2):31-43. doi:10.13023/jah.0102.04

56. Kaur H, Fernández JR, Locher JL, Demark-Wahnefried W. Rural and urban differences in vegetable and fruit consumption among older cancer survivors in the Deep South: an exploratory cross-sectional study. *J Acad Nutr Diet.* 2022;122(9):1717-1724.e4.

57. Patrick H, Nicklas TA. A review of family and social determinants of children's eating patterns and diet quality. *J Am Coll Nutr.* 2005;24(2):83-92. doi:10.1080/07315724.2005.10719448

58. Jones N, Dlugonski D, Gillespie R, et al. Physical activity barriers and assets in rural Appalachian Kentucky: a mixed-methods study. *Int J Environ Res Public Health.* 2021;18(14):7646. doi:10.3390/ijerph18147646

59. Nolan JA, Lilly CL, Leary JM, et al. Barriers to parent support for physical activity in Appalachia. *J Phys Act Health.* 2016;13(10):1042-1048. doi:10.1123/jpah.2015-0474

60. Domogalla B, Ko LK, Jones R, et al. Rural Latino parent and child physical activity patterns: family environment matters. *BMC Public Health.* 2021;21(1):2043. doi:10.1186/s12889-021-12085-w

61. Butzner M, Cuffee Y. Telehealth interventions and outcomes across rural communities in the United States: narrative review. *J Med Internet Res.* 2021;23(8):e29575. doi:10.2196/29575

62. Batsis JA, Pletcher SN, Stahl JE. Telemedicine and primary care obesity management in rural areas - innovative approach for older adults? *BMC Geriatr.* 2017;17(1):6. doi:10.1186/s12877-016-0396-x

63. Perri MG, Shankar MN, Daniels MJ, et al. Effect of telehealth extended care for maintenance of weight loss in rural US communities: a randomized clinical trial. *JAMA Netw Open.* 2020;3(6):e206764. doi:10.1001/jamanetworkopen.2020.6764

64. Whitley A, Yahia N. Efficacy of clinic-based telehealth vs. face-to-face interventions for obesity treatment in children and adolescents in the United States and Canada: a systematic review. *Child Obes.* 2021;17(5):299-310. doi:10.1089/chi.2020.0347

65. Seguin RA, Eldridge G, Graham ML, Folta SC, Nelson ME, Strogatz D. Strong Hearts, Healthy Communities: a rural community-based cardiovascular disease prevention program. *BMC Public Health.* 2016;16:86. doi:10.1186/s12889-016-2751-4

66. Seguin-Fowler RA, Strogatz D, Graham ML, et al. The Strong Hearts, Healthy Communities Program 2.0: an RCT examining effects on Simple 7. *Am J Prev Med.* 2020;59(1):32-40. doi:10.1016/j.amepre.2020.01.027. Epub 2020 May 7.

67. Maddock JE, Demment M, Graham M, et al. Changes in physical activity outcomes in the Strong Hearts, Healthy Communities (SHHC-2.0) community-based randomized trial. *Int J Behav Nutr Phys Act.* 2022;19(1):159. doi:10.1186/s12966-022-01401-1

68. Umstattd Meyer MR, Bridges Hamilton CN, Prochnow T, et al. Come together, play, be active: physical activity engagement of school-age children at Play Streets in four diverse rural communities in the U.S. *Prev Med.* 2019;129:105869. doi:10.1016/j.ypmed.2019.105869

69. High Obesity Program (HOP). Center for Disease Control and Prevention Division of

Nutrition, Physical Activity, and Obesity. 2023. Updated January 20, 2023. Accessed April 12, 2023. https://www.cdc.gov/nccdphp/dnpao/state-local-programs/hop-1809/high-obesity-program-1809.html

70. Murriel AL, Kahin S, Pejavara A, O'Toole T. The High Obesity Program: overview of the Centers for Disease Control and Prevention and Cooperative Extension Services efforts to address obesity. *Prev Chronic Dis.* 2020;17:E25. doi:10.5888/pcd17.190235

71. Success Stories. Center for Disease Control and Prevention Division of Nutrition, Physical Activity, and Obesity. 2022. Updated April 8, 2022. Accessed April 12, 2023. https://www.cdc.gov/nccdphp/dnpao/state-local-programs/program-highlights.html

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# RURAL SUBSTANCE MISUSE TRENDS IN AMERICA

*By Benjamin N. Montemayor, PhD; Gracie Woodland, BSPH; and Adam E. Barry, PhD*

## SCOPE OF THE PROBLEM

- Substance use and misuse continue to be significant public health concerns in the United States,[1] with annual cost estimates of $192 billion and $151 billion for alcohol and drug use and misuse, respectively.[2]
- Despite both urban and rural areas experiencing overall increases in the use of alcohol and drugs from previous years, rural communities are disproportionately impacted by the use of alcohol and drugs, including substance use disorders and alcohol- and drug-related mortalities, due to limited access to healthcare services and other resources in rural communities.[3-5]
- Alcohol remains the most popular substance used across racial and ethnic groups and among all age groups in rural communities. Alcohol use tends to be greatest among those with peers and/or parents who consume alcohol,[6] men,[5] American Indian/Alaska Native people,[7] and people with a mental health condition,[8] especially if they are underage (< 21 years old).[5]
- As more Americans favor the legalization of cannabis and the use of cannabis, and those diagnosed with a cannabis use disorder continues to increase in rural areas,[5,9] the landscape of cannabis in the U.S. makes its use a particularly important issue.
- Illicit drugs other than cannabis, primarily central nervous system depressants such as opioids and fentanyl, a synthetic opioid, present a significant concern in rural communities with fentanyl-related overdoses accounting for a majority of the overdoses in these areas.[10]
- In addition to creating policies and community-level strategies that enhance prevention and treatment infrastructure in rural areas, assessing intrapersonal determinants of alcohol and drug use in rural communities could allow for tailored intervention and prevention strategies.[11]

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Substance use and misuse in the U.S. remains an important public health issue.[1] Annual cost estimates, which encompass costs associated with specialty treatment, prevention services, medical treatment, and costs related to crashes, fires, crime and criminal justice involvement, for alcohol and drug use or misuse in the U.S. totals $192 billion and $151 billion, respectively.[2] Additionally, drug overdoses are a leading cause of injury death in the U.S., with significant impacts on both rural and urban communities.[12] It is estimated that 46 million Americans (16.5%) aged 12 years or older met the criteria for a substance use disorder (SUD) in the past year, of which 28 million are alcohol use disorders (AUD).[13] Approximately 50% of Americans aged 12 and older (133 million) report alcohol consumption within the past thirty days, of whom 45% (62 million) were classified as binge drinkers (> four drinks for women, and > five drinks for men, in a short time period).[13,14] Those who engaged in past-month binge drinking the most were young adults aged 18-25 (29% of current drinkers), followed by adults 26 years and older (22%), and adolescents aged 12-17 (3.8%).[15] Nationwide, underage drinking continues to remain a concern as over 15% of underage people from ages 12-20 participated in past-month alcohol use.[5]

Next to alcohol, cannabis remains the second most commonly used drug among U.S. residents.[16] Despite various state policies that exist surrounding cannabis use, its use is still prohibited at the federal/national level, thus making cannabis the most commonly used federally illegal substance in the U.S.[16] Fifty-two and a half million people in the U.S. aged 12 or older, or nearly one-

fifth of this population, reported using cannabis in the past year, a historically high prevalence (**Figure 1**).[17] Similarly to alcohol, young adults aged 18-25 constituted the highest percentage of users (35%) followed by adolescents at 10.5%.[5] Furthermore, studies contend that active users may have about a 10% likelihood of being dependent upon cannabis and about 3-in-10 active cannabis users may already use at levels indicative of a cannabis use disorder (CUD).[18]

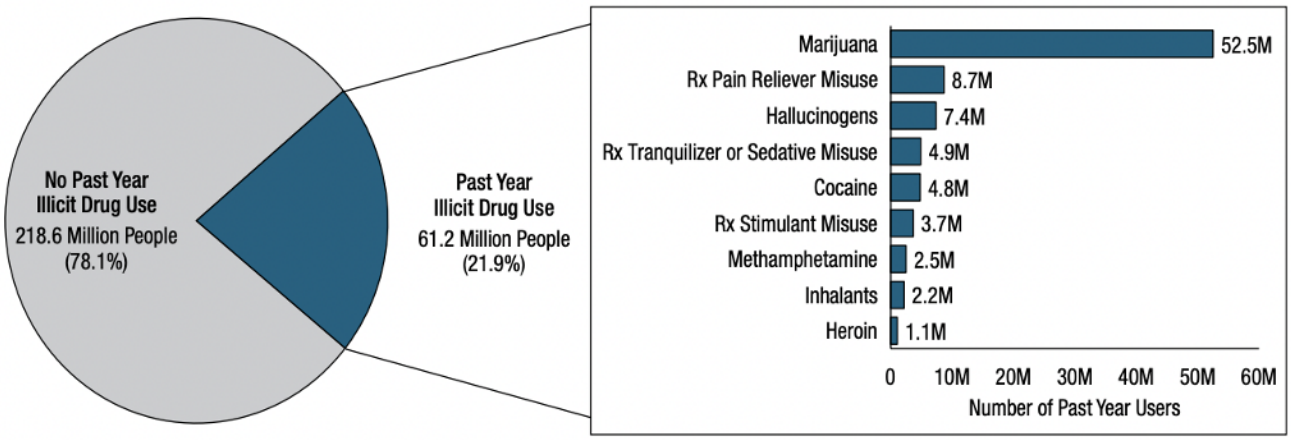
The use of illegal substances other than cannabis also remains prevalent in the U.S.[17] The explicit and intentional use or misuse of opioids, such as heroin or prescription pain relievers, in the past year was reported among 3.3% of individuals aged 12 or older, most of whom (96%) misused prescription pain relievers such as oxycodone, hydrocodone, and fentanyl.[5] **Figure 1** shows a detailed breakdown of the most common illegal substances used among U.S. adults aged 12 and older. Furthermore, of the 46 million Americans who met the criteria of an SUD in the past year, nearly a quarter (23%) of those were aged 25 or younger.[17] Implications for assessment of substance use beginning at a young age, ≤ age 12 in the case of most of the reported data in this chapter, allows for a comprehensive data representation of users and substances used, allows for comparative analysis, enables the informing of tailored prevention, intervention, and treatment planning and services, and supports evidence-based policy development and resource allocation.[17]

Alcohol, cannabis, and other substance use rates vary by geographic region and classification (rural vs. urban), and are influenced by a wide array of individual (age, sex, socioeconomic status), interpersonal (peer pressure, familial drinking), and community-level factors (built environment, alcohol outlet density).[19] The factors within these contributing levels of influence form complex, fluid systems that evolve and intersect with protective and risk factors over time.[20,21]

## HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

The overarching goal of Healthy People 2030 is to set data-driven national health objectives, and to ultimately improve the health, well-being, and quality of life of Americans. Reducing substance use behaviors and the associated consequences among Americans remains a priority area. Among the nine general Drug and Alcohol Use objectives monitored by Healthy People, the vast majority (n=7) have had little to no discernable change or have gotten worse over the past decade.[1] These nine general objectives include:

**Figure 1. Past-year Illicit Drug Use: Among People Aged 12 or Older; 2021**




Rx = prescription.

Note: The estimated numbers of past year users of different illicit drugs are not mutually exclusive because people could have used more than one type of illicit drug in the past year.

*Source:*[17]

| Drug & Alcohol Use Objectives[1] | Status |
|---|---|
| Reduce the proportion of people who used heroin in the past year — SU-16 | Target met or exceeded |
| Reduce the proportion of people who started using heroin in the past year — SU-17 | Target met or exceeded |
| Reduce the proportion of people aged 21 years and over who engaged in binge drinking in the past month — SU-10 | Little or no detectable change |
| Reduce the proportion of people who misused prescription drugs in the past year — SU-12 | Little or no detectable change |
| Reduce cirrhosis deaths — SU-02 | Getting worse |
| Reduce drug overdose deaths — SU-03 | Getting worse |
| Reduce the proportion of adults who used drugs in the past month — SU-07 | Getting worse |
| Reduce the proportion of adults who use marijuana daily or almost daily — SU-08 | Getting worse |
| Reduce the proportion of motor vehicle crash deaths that involve a drunk driver — SU-11 | Getting worse |

Herein, we will outline the scope of drug and alcohol use in rural America, highlighting the unique factors specifically contributing to substance use in rural areas of America and the need for comprehensive prevention, treatment, and harm reduction strategies. According to the U.S. Census Bureau, a rural area is defined as "any population, housing, or territory NOT in an urban area."[22] Areas with 50,000 or more people are considered Urban Areas (UA), while Urban Clusters (UC) are those areas with a population of at least 2,500, but less than 50,000 persons. Information presented in this chapter will:

1. Identify important personal (e.g., race/ethnicity) and environmental factors impacting substance use/misuse in rural areas and associated consequences.
2. Outline how the use/misuse of specific drugs differs in rural regions of the U.S., compared to urban areas.
3. Discuss drug and alcohol prevention and treatment in the rural U.S.

## UNDERSTANDING SUBSTANCE USE AND RELATED DISORDERS

In order to address the substance use behaviors of rural Americans, the definitions of various behaviors associated with substance use, and shifts in the modern terminology associated with substance use must be understood. Substance use, which does not necessarily equate to problematic use, nor use indicative of a disorder, is the consumption of psychoactive (affecting the mind) substances; this includes licit (legal) substances like alcohol and cannabis (in some states), or illicit (illegal) drugs such as the non-medical use of certain opioids, stimulants, hallucinogens, etc.[23] Substance misuse includes the intentional and non-medical or inappropriate use of legal or prescribed substances, or the use of illegal psychoactive drugs, which may lead to harm or other negative consequences.[24] Until more recently, the term addict or dependence was commonly reserved for those who used substances at rates deemed problematic or at rates destructive or interruptive of personal and social health, relationship and responsibilities.[25] More recently, the American Psychiatric Association encouraged a shift in terminology away from the use of harmful, stigmatized language that labels individuals (e.g. addict, substance abuser) and oversimplifies or prioritizes the behavior over the person, and toward terminology that places greater emphasis on describing problematic substance use, more notably, alcohol use disorder, cannabis use disorder, and substance use disorder.[26] As the language evolves over time, and as professionals begin to understand more of the implications of different terminology on behavior, it is imperative that the correct language is used to minimize harm associated with these behaviors.[27]

Alcohol, cannabis, and substance use disorders are all diagnosable conditions under the American Psychiatric Association which are

primarily characterized by problematic substance use.[26] Substance use disorder is a broad diagnostic term that has a wide-ranging severity and refers to the recurrent use of psychoactive substances that result in deleterious effects on bio-psycho-social health.[26] Although SUDs encompass alcohol and cannabis use disorders, alcohol and cannabis impact the person and their environment in different ways and have their own clinical diagnoses. Alcohol and cannabis use disorders refers to the problematic consumption of alcohol or cannabis, respectively, leading to impairment or experiences of distress. Within each respective substance, symptoms include a lack of control of the use of the substance, unsuccessful efforts to cut down or control use, development of tolerance to the substance, cravings or withdrawal symptoms, neglect of major life responsibilities, and preoccupation with receiving and consuming more of the substance despite adverse consequences.[26] It is worth noting that each specific substance entails a separate diagnosis and disorder (e.g., opioid use disorder, stimulant use disorder), but for the purposes of this chapter, we focused on the two major substances, and encompassed the rest as SUDs.

## SUBSTANCE USE, DISPARITIES, AND CONTRIBUTING FACTORS IN RURAL AREAS

### *Alcohol*

In the U.S., the likelihood of current drinkers exceeding daily suggested drinking limits and exhibiting AUDs are higher in rural areas, compared to suburban areas.[11,28] There are many well established factors contributing to the association between living in a rural community and experiencing alcohol-related harm and the prevalence of increased alcohol frequency and quantity. Specifically, being a man, being younger in age, having peers and/or parents who consume alcohol, and having a mental health condition are well-known risk factors associated with alcohol use, and continue to ring true for persons in rural communities.[6,8,29] Accordingly, limited entertainment options, fewer alternative leisure activities, social norms surrounding the acceptance of heavy or high-risk alcohol use, and experiences of stressors unique to the rural community, such as challenges with agricultural or economic uncertainty, contribute to the inequitable ways in which rural communities engage in hazardous alcohol use and experience the related effects.[30] For example, rural areas experience alcohol-related mortality and traffic fatalities at a disproportionately high rate.[3] Having to drive longer distances in secluded areas, lack of public transportation, and scarce enforcement or monitoring of alcohol policy violations in remote regions can contribute to increased risk of alcohol-related accidents and traffic fatalities (e.g., fatal alcohol collisions).[31] Some rural areas experience higher death rates from chronic misuse of alcohol, such as alcohol cirrhosis and other alcohol-related accidents and health complications.[32] Barriers to seeking treatment, such as risk for loss of confidentiality, and fear of being stigmatized or judged by peers, coupled with limited treatment accessibility and availability may further hinder those with or at risk for AUD from getting the help they need.[4]

### *Cannabis*

Cannabis use in rural America has garnered increasing attention as the landscape of cannabis use continues to experience unprecedented shifts in policy. As these policy shifts favor medicinal and recreational legalization of cannabis use, fewer U.S. Americans perceive cannabis use as harmful and an overwhelming amount of U.S. older and younger adults favor the legalization of cannabis.[9,33,34] Among hundreds of other elements found in cannabis plants (i.e., cannabinoids), the most commonly studied and highly used substances are cannabidiol (CBD) and delta-9-tetrahydrocannabinol (THC).[35] THC, the primary psychoactive ingredient in cannabis, can range in potency and effects depending on the chemical alteration and the method in which it is ingested (e.g., smoked, wax, edibles). CBD is considered effective for medical use because of its potential therapeutic effects and trace amounts of THC, thus users experience some of the benefits without the "high" associated with THC.[36] To date, only three states still prohibit CBD or cannabis use, while the remaining have mixed policies ranging from medical use only (CBD/Low THC) to recreational use allowed.[37]

According to the National Survey on Drug Use and Health, cannabis use patterns have revealed

significant increases in use over the past decade, including increases in both the frequency and intensity of cannabis use in rural communities.[5] Additionally, research suggests individuals who live in rural communities may experience higher rates of cannabis use, CUDs, SUDs, and associated mental health disorders compared to their urban counterparts.[5,38] Limited access to healthcare services and resources in rural communities may lead to individuals using cannabis as a way to self-medicate or alleviate symptoms of depression, anxiety, and chronic pain.[17] Additionally, challenges related to misinformation or limited knowledge and education surrounding cannabis can contribute to overall misconceptions, stigma, and incomprehension regarding cannabis use benefits, responsible use methods, and associated consequences.[39] For example, perceptions of harm regarding driving after consuming cannabis or THC among young adults is viewed as less dangerous than driving after consuming alcohol.[40] Although information on this phenomenon is somewhat limited and continues to be evaluated, with disparities in cannabis use and associated mental health conditions growing, it is essential to address patterns of cannabis use in rural areas and understand the unique dynamics that continue to shape these behaviors.

### *Illicit Drugs*

Illicit drugs refer to potentially highly addictive, and largely illegal, substances, though it is also important to note that many Americans use prescription drugs illegally (e.g., in ways not directed, or someone else's prescription medication).[5] Similar to alcohol and cannabis, factors contributing to illicit substance use in the U.S. include social and geographic isolation, unemployment due to economic downturns or limited employment opportunities, poorer health behaviors and outcomes, lower educational attainment, poverty, lack of access to mental health care or other comprehensive prevention and intervention programs, and a higher likelihood of risk-taking behaviors and labor-intensive work.[17,41] As noted, societal and cultural elements, and stigma and negative reactions, often deter people from admitting to their drug use.[26,42] For example, rural individuals are less likely to admit their drug use and misuse for fear of judgment and shame, thus contributing to underrepresentation in illicit drug use, not being properly diagnosed for a potential disorder, low treatment-seeking behavior, and further exacerbation of disparities in prevention and treatment services.[42,43] Additionally, non-abstinence based medical and evidence-based methods to reduce harm and help those who suffer from a disorder are supported less often.[44] Such ideologies were demonstrated in rural West Virginia, where a public outcry caused a needle exchange program to be shut down, further highlighting the lack of necessary support for many effective substance use interventions to function well in rural contexts.[45]

While statistics often reveal that urban areas have higher rates of use, rural communities have more impacts due to drug-related illnesses.[46] For example, more than 106,000 deaths occurred in 2021 due to drug overdoses nationwide, the vast majority of which stemmed from the misuse of prescribed opioids such as oxycodone, hydrocodone, and fentanyl.[10] However, overdose rates in rural areas of the U.S. were 10% higher than in urban areas.[12] Some evidence suggests prescription medications were disproportionality prescribed in rural versus urban communities without methods to sufficiently track or monitor the flow of medications into the community, contributing to a concerning pattern of missed or false diagnoses, overreliance on prescription medication, and potential misuse or SUD.[47] When individuals in these communities are no longer able to afford the higher prices of prescription medications, some find themselves seeking non-prescription alternatives as a means of managing their potential disorder.[48] Additionally, the availability and lethal potency of synthetic opioids, such as fentanyl, continue to contribute to an already concerning trend in illicit drug use and misuse. Of the over 100,000 drug overdose deaths in the U.S. last year, 67% involved synthetic opioids like fentanyl.[49] With overdose deaths continuing to be a significant public health concern, efforts to address the overdose crisis remain at an all-time high.

## AGE, RACE/ETHNICITY, AND ENVIRONMENTAL INFLUENCES ON SUBSTANCE MISUSE IN RURAL AREAS

### *Adolescents and Young Adults - Alcohol*

Originally thought to be protective against exposure to substances, and the high rates of substance use observed in urban areas, rural

areas are experiencing their own influx of high-risk substance use.[50] Across the U.S., underage drinking tends to be higher in most rural areas.[11] For adolescents who started drinking before or during high school, the average age of first alcohol use falls between 14-16 years old.[51,52] Risks of early initiation of alcohol use include higher likelihood of developing long-term alcohol-related problems, such as an AUD, delays in key cognitive developments, and more experiences of alcohol-related negative outcomes such as injuries or accidents and decreased academic performance.[53] Adolescents in rural areas are more likely to report riding with a driver under the influence of alcohol (i.e., riding in a car with a driver who had been consuming alcohol).[54] Overall, substance use among rural adolescents aged 12-17 is highest in small-medium rural areas (i.e., population of 2,500 to 19,999) and highest for young adults aged 18-25 in large rural regions (i.e., population of 20,000+) not adjacent to other urban or suburban areas.[55] Compared to their rural White counterparts, Black students (aged 13-17) were less likely to report past-month alcohol use, such that 33% of 15-year old African American students drank in the past month compared to nearly half (48%) of White 15-year old students.[56] Rural residence has been associated with higher AUD rates for underage Hispanic drinkers.[11] Parental permissiveness (e.g., "parents don't care if I drink", "parents don't care if I drink at home") of alcohol use has been linked to greater alcohol consumption among rural adolescents, such that increasing parental permissiveness increased the likelihood of past-month alcohol use.[56] Overall, past-year and past-month alcohol use prevalence among those over the age of 12 was 57.5% and 40.3% for rural areas respectively, slightly less than among those living in urban areas. The highest prevalence observed for both past-year (65.1%) and past-month (48%) alcohol use was among rural residents aged 18-25 years. Past-year and past-month underage drinking (ages 12-20) prevalence in rural areas was 29.8% and 15%, respectively, both higher than underage drinkers who reside in urban areas.[5]

***Adolescents and Young Adults - Cannabis***

Nationwide, the legalization of cannabis use in some capacity (medicinal or recreational) has garnered significant support from the public. The majority of U.S. adults (59%) believe that cannabis should be legal for medical and recreational use, while 30% believe in legal use of cannabis for medicinal purposes only.[9] Just one-in-ten adults believe complete prohibition of cannabis use is the right course of action.[9] Among high school seniors, the majority (51.1%) of 12th grade students in the U.S. favored the legalization of cannabis use in 2021, the first time since the inception of the measurement that the majority of students supported legalization of cannabis use.[57] Of particular concern is the average age of initiation for young adult cannabis users in the U.S., which falls between 15-18 years old.[58] Research contends the earlier the onset of cannabis use among individuals, and the more frequent the use of cannabis, the higher the risk of developing a CUD in the future.[59] With cannabis being the most commonly reported illicit drug used among users (86%), and with nearly a quarter of active cannabis users nationwide under the age of 25, it is important to understand the behaviors of those in rural communities.[5] According to the National Survey on Drug Use and Health,[60] past-year cannabis use was reported among 10% of adolescents ages 12-17 in urban areas, identical to the rates reported among those in rural communities.[5] Young adults ages 18-25 years reported the highest rates of cannabis use of any population for rural residents. Nearly one-third (32.2%) of young adults in rural areas reported past-year cannabis use, slightly lower than their counterparts in urban communities (35.9%).[5] Approximately 14% of rural-dwelling adults over the age of 26 years also participated in cannabis use. Despite cannabis use increasing in both urban and rural areas of the U.S.,[61] the lack of resources and support, including limited access to healthcare or treatment facilities, leaves those in rural communities at a disadvantage.[17] As noted earlier, cannabis use by adolescents and young adults is associated with impaired cognitive functioning and decreased academic performance; however, among rural areas in particular, there is often less overall education about cannabis, and cannabis use is associated with other risk-taking behaviors and potential mental health concerns.[39]

***Illicit drugs***

Other illicit drug use, not including cannabis, also poses a significant concern to various age groups

throughout rural communities, necessitating attention and intervention. Although the motives for illicit drug misuse vary among individuals, a common trajectory of illicit drug users involves a transition from the use and misuse of prescription drugs to the use of more illicit non-prescription drugs like methamphetamines, hallucinogens, heroin, etc.[48] Of those 12 years and older in rural areas, 13.3% and 3.7% have reported lifetime use of hallucinogens and crack, respectively.[5] While this transition to illicit drug use might occur because these individuals prefer the effects of non-prescription drug use, oftentimes users find they are no longer able to afford the high prices of prescription medications and thus opt for the more affordable non-prescription options.[48] The ingestion method of choice also increases the risks associated with illicit drug use. In addition to the mental health, drug overdose, and legal consequences related to drug use, intravenous injection of drugs can lead to the development of hepatitis B or C, as well as human immunodeficiency virus (HIV) due to needle sharing or unclean syringe use.[62] Nonetheless, although drugs like methamphetamine and hallucinogens pose a threat to rural communities, the misuse of central nervous system depressants like opioids has emerged as a top health concern in rural areas.[47] In 2021, almost one-third (29%) of individuals from rural communities reported any use of opioids and prescription pain relievers in the past year, 3% of which reported intentional misuse of these substances.[5] As policies that restrict access to, and the prescription of, opiates for pain relief become enforced, those who are already using at levels indicative of a disorder might turn to other illicit substances to alleviate disorder symptoms.[63] This is especially problematic in rural areas with low access to comprehensive prevention, education, and treatment or support.

***Differences between Sex, and Race and Ethnicity***

Across the U.S., 63.8% of men aged 12 and older used alcohol in the past year, slightly higher than their women counterparts at 60.9%.[5] Although more underage drinkers tend to be women over men (30.7% vs. 26.4%), men who are of legal drinking age (70%) have a higher prevalence of alcohol use relative to women of legal drinking age (65%).[5] Overall, men are more likely to report higher rates of binge drinking and heavy use drinking, compared to similarly aged women.[64] Generally speaking, the previous trends hold true in rural areas. Nationwide cannabis use patterns tend to also align with the sex-based trends observed in alcohol consumption. More men aged 12 and older engaged in cannabis use in the past year than women (20.8% vs. 16.7%), and this trend held constant among the 12-17, 18-25, and 26 and older age groups.[5] Cannabis patterns observed in both rural and urban settings independently tend to align with the national trends mentioned. Finally, sex demographic differences are also observed among illicit drugs other than cannabis among those aged 12 and older. Across all illicit substances, men tended to use more than women on categories besides opioids until age 24, at which point slightly more women used opioids.[5]

Research has shown variables such as social and cultural factors or traditions, economic challenges, health disparities, coping mechanisms due to low availability of resources, and historical context (e.g., communities with a history of oppression or marginalization) may at some point play a major role in the use of alcohol and illicit drugs among racial and ethnic minorities in rural areas and health inequities at large.[65] The following racial and ethnic nationwide trends tend to hold true in rural areas. White individuals report the highest levels of current alcohol consumption, while individuals of American Indian/Alaska Native heritage report the highest rates of alcohol misuse and dependence.[7] Additionally, individuals of American Indian/Alaska Native heritage are most vulnerable to experiencing alcohol-related consequences.[7] Compared to their heterosexual peers, sexual minority youth continue to demonstrate higher prevalence of alcohol use behaviors.[66,67] National data revealed individuals of American Indian/Alaska Native heritage aged 12 and older had the highest prevalence of cannabis use, followed by the next highest among those who reported being bi-racial, and then Black or African American.[5] Additionally, individuals of American Indian/Alaska Native heritage had higher lifetime hallucinogen use, crack and cocaine use, and opioid use, though the gap in use for opioids within ethnic and racial demographics were relatively close among all besides those who

reported being of Asian origin or race.[5] Overall, compared to their heterosexual peers, sexual minority individuals continue to demonstrate higher prevalence of cannabis use and an increased risk for overall illicit drug use.[68]

*Other Environmental Factors*

Beyond the aforementioned factors that contribute to the use of substances in rural communities (i.e., limited entertainment options and recreational opportunities, social norms and influence, economic challenges, and lack of healthcare resources), neighborhood characteristics, including alcohol outlet density, economic conditions/circumstances, and property crime, have been linked to increased binge drinking behaviors.[69-71] Among Black Americans, experiences of racial discrimination are associated with alcohol consumption, binge drinking, and negative alcohol-related consequences.[7,72-74] In an exploration of substance use among rural adolescents, engagement in violent and aggressive behavior, as well as having delinquent friends, were associated with increased likelihood of using alcohol, tobacco and cannabis.[54,56,61] Furthermore, cannabis and other illicit drugs may be more readily available in some areas due to the reduced presence of law enforcement and monitoring of illicit drug activities, and overall closer proximity to cultivation locations.[75] Additionally, individuals who have experienced adverse childhood events (ACE) (e.g., witnessing or experiencing violence, physical or emotional abuse, or neglect in the home or community) are also more likely to participate in substance use.[76] Individuals living in rural areas, especially ethnic and racial minorities, may experience challenges unique to their communities and higher rates of ACEs compared to their urban counterparts.[77] Perceived social support from family members has been identified as a strong protective factor against substance use among rural adolescents.[78]

## SUBSTANCE USE TREATMENT AND PREVENTION BARRIERS IN RURAL AREAS

Overall, the need for, and availability of treatment services differ in rural communities/areas. There are few alcohol and drug treatment facilities operating outside of urban and rural adjacent areas. Treatment facilities in rural regions are less likely to provide comprehensive services that are crucial to successful outcomes such as detoxification, mental health services, or having counselors who are readily accepted by minority populations, women, or HIV-positive individuals.[79] Urban areas tend to have more specialized professionals, with more education, than the staff that work in rural treatment facilities.[80] Moreover, intensive services are less frequently offered within rural facilities.[81] Consequently, Lambert & Gale (2008) have recommended "Rural community infrastructure should be enhanced to support abuse prevention and intervention."[55(p221)]

Computerized interventions have been highlighted as potential cost-effective options for rural and sparsely populated areas that may help address the lack of robust treatment options available to persons in rural communities.[11] Telehealth or teletreatment options for SUDs have emerged as treatment options that span geographical divides, can occur in a person's home, and increase privacy for those receiving treatment.[82] It should be noted, however, that telehealth or teletreatment represent one component of what, ideally, should be a coordinated and comprehensive approach, inclusive of approaches such as screening, brief intervention and referral, personal counseling, and/or group therapy. Screening for substance use behaviors and referrals to counseling interventions have demonstrated positive effects and outcomes. Moreover, there is no evidence indicating screening instruments and counseling interventions are associated with unintended harmful effects.[83,84] Given the strong connection between alcohol, drug use, and mental health, coupled with the geographic disparities associated with living in a rural area, such as significantly less access to primary care,[8] efforts to increase physical and/or digital infrastructure represent important public health initiatives. Finally, treatment centers or clinics can come at a cost, and public transportation to clinics is scarce in rural areas. These realities inhibit access to, and affordability of, treatment services.[79] In a low socioeconomic area, like the many rural areas facing growing poverty levels, expensive drug treatment might not seem essential to users.

## SUMMARY AND CONCLUSION

If prevention and treatment options are going to target individual substances, it is recommended that prevention efforts prioritize alcohol use. First, alcohol is the most commonly used substance among American school-aged youth.[85] Second, alcohol has been identified as the initial substance adolescents try, and its use is tied to subsequent illicit substance use later in life.[86] Moreover, alcohol use is linked to poorer academic performance and engagement in other risky behaviors, both of which could negatively impact future work and educational opportunities.

An approach preferred to specific substance-focused interventions would be policies and strategies enhancing prevention and treatment infrastructure. Currently, "the narrow range of services available in rural areas may preclude an individualized treatment approach and long-term follow-up."[81(i)] Thus, environmental approaches that account for the unique rural geographic, economic, and social forces should be developed. Given school is required of all American youth between six and 19 years of age, the primary school setting represents an ideal environment in which to ground these efforts. That said, the Center for Disease Control and Prevention's Whole School, Whole Community, Whole Child[87] approach asserts a student-centered approach emphasizing alignment and integration across ten different components (e.g., health education, physical environment, counseling, community and family involvement) and represents best practice in this environment.

Future research and prevention efforts exploring differences in alcohol and other substance use across geographic regions would be improved by employing standardized definitions for these areas, as well as more nuance across the continuum of rural to urban classifications, as opposed to a dichotomous rural vs. urban approach.[11] Nevertheless, as this chapter has made clear, rural areas represent unique contexts that are consistently linked to the substance use behaviors of their residents. For instance, a systematic review exploring international research including 280 studies across 49 countries, found "rural, relative to urban, residence to be associated with an increased likelihood of hazardous alcohol use or alcohol-related harm."[29(e177)] The authors further stated "improved public health strategies to reduce the burden of alcohol use in rural communities are required, but their efficacy will depend on how well they are tailored to the unique needs of the region they are implemented in."[29(e177)] Consequently, in-depth needs assessments that assess important individual, community, and familial-level factors are recommended. These include, but are not limited to levels of religiosity, social norms surrounding alcohol and other substance use, as well as family relationships and community ties.[11] Once assessed, these factors can then be leveraged in the conceptualization and implementation of targeted intervention and prevention strategies.

## REFERENCES


1. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Healthy People 2030 Objectives - Drug and Alcohol Use. Accessed May 2, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/drug-and-alcohol-use

2. Miller T, Hendrie D. Substance Abuse Prevention Dollars and Cents: A Cost-Benefit Analysis, DHHS Pub. No. (SMA) 07-4298. Rockville, MD: Center for Substance Abuse Prevention, Substance Abuse and Mental Health Services Administration, 2008. Accessed May 2, 2023. https://www.samhsa.gov/sites/default/files/cost-benefits-prevention.pdf

3. Czech S, Shakeshaft AP, Byrnes JM, Doran CM. Comparing the cost of alcohol-related traffic crashes in rural and urban environments. *Accid Anal Prev.* 2010;42(4):1195-1198. doi:10.1016/j.aap.2010.01.010

4. Rapp RC, Xu J, Carr CA, Lane DT, Wang J, Carlson R. Treatment barriers identified by substance abusers assessed at a centralized intake unit. *J Subst Abuse Treat.* 2006;30(3):227-235. doi:10.1016/j.jsat.2006.01.002

5. 2021 National Survey on Drug Use and Health Detailed Tables. U.S. Department of Health and Human Services, Substance Abuse and Mental Health Administration. January 4, 2023. Accessed May 2, 2023. https://www.samhsa.gov/data/report/2021-nsduh-detailed-tables

6. Edwards AC, Maes HH, Prescott CA, Kendler KS. Multiple mechanisms of influencing the relationship between alcohol consumption and peer alcohol use. *Alcohol Clin Exp Res.* 2015;39(2):324-332. doi:10.1111/acer.12624

7. Delker E, Brown Q, Hasin DS. Alcohol consumption in demographic subpopulations: an epidemiologic overview. *Alcohol Res.* 2016;38(1):7-15.

8. Davis MM, Spurlock M, Dulaki K, et al. Disparities in alcohol, drug use, and mental health condition prevalence and access to care in rural, isolated, and reservation areas: findings from the South Dakota health survey. *J Rural Health.* 2016;32(3):287-302. doi:10.1111/jrh.12157

9. Green TV. Americans overwhelmingly say marijuana should be legal for medical or recreational use. Pew Research Center. November 22, 2022. Accessed May 2, 2023. https://www.pewresearch.org/short-reads/2022/11/22/americans-overwhelmingly-say-marijuana-should-be-legal-for-medical-or-recreational-use/

10. Drug Overdose Death Rates. National Institute on Drug Abuse. February 9, 2023. Accessed May 2, 2023. https://nida.nih.gov/research-topics/trends-statistics/overdose-death-rates#:~:text=More%20than%20106%2C000%20persons%20in,drugs%20from%201999%20to%202021

11. Dixon MA, Chartier KG. Alcohol use patterns among urban and rural residents: demographic and social influences. *Alcohol Res.* 2016;38(1):69-77.

12. Spencer MR, Garnett MF, Miniño AM. Urban-rural differences in drug overdose death rates, 2020. NCHS Data Brief, no 440. Hyattsville, MD: National Center for Health Statistics. 2022. doi:10.15620/cdc:118601

13. Highlights for the 2020 National Survey on Drug Use and Health. Substance Abuse and Mental Health Services Administration. 2020. Accessed May 2, 2023. https://www.samhsa.gov/data/sites/default/files/2021-10/2020_NSDUH_Highlights.pdf

14. U.S. Department of Health and Human Services National Institutes of Health. NIAAA Moves to Fishers Lane. *NIAAA Newsletter.* 2004. Accessed May 2, 2023. https://pubs.niaaa.nih.gov/publications/Newsletter/winter2004/Newsletter_Number3.pdf

15. Highlights for the 2021 National Survey on Drug Use and Health. Substance Abuse and Mental Health Services Administration. 2021. Accessed May 2, 2023. https://www.samhsa.gov/data/sites/default/files/2022-12/2021NSDUHFFRHighlights092722.pdf

16. SAMHSA Announces National Survey on Drug Use and Health (NSDUH) Results Detailing Mental Illness and Substance Use Levels in 2021. Substance Abuse and Mental Health Services Administration. January 4, 2023. Accessed May 2, 2023. https://www.samhsa.gov/newsroom/press-announcements/20230104/samhsa-announces-nsduh-results-detailing-mental-illness-substance-use-levels-2021

17. Key Substance Use and Mental Health Indicators in the United States: Results from the 2021 National Survey on Drug Use and Health. Substance Abuse and Mental Health Services Administration. December 2022. Accessed April 20, 2023. https://www.samhsa.gov/data/sites/default/files/reports/rpt39443/2021NSDUHFFRRev010323.pdf

18. Addiction. Centers for Disease Control and Prevention. Updated October 19, 2020. Accessed May 2, 2023. https://www.cdc.gov/marijuana/health-effects/addiction.html#:~:text=Some%20people%20who%20use%20marijuana,marijuana%20have%20marijuana%20use%20disorder

19. McLeroy KR, Bibeau D, Steckler A, Glanz K. An ecological perspective on health promotion programs. *Health Educ Q.* 1988;15(4):351-377. doi:10.1177/109019818801500401

20. Apostolopoulos Y, Lich KH, Lemke MK, Barry AE. A complex-systems paradigm can lead to evidence-based policymaking and impactful action in substance misuse prevention—a rejoinder to Purshouse *et al.* (2018). *Addiction.* 2018;113(6):1155-1156. doi:10.1111/add.14211

21. Apostolopoulos Y, Lemke MK, Barry AE, Lich KH. Moving alcohol prevention research forward-Part II: new directions grounded in community-

based system dynamics modeling. *Addiction.* 2018;113(2):363-371. doi:10.1111/add.13953

22. How does the U.S. Census Bureau Define "Rural?". United States Census Bureau. Accessed May 2, 2023. https://mtgis-portal.geo.census.gov/arcgis/apps/MapSeries/index.html?appid=49cd4bc9c8eb444ab51218c1d5001ef6

23. Drugs (psychoactive). World Health Organization. Updated 2023. Accessed May 2, 2023. https://www.who.int/health-topics/drugs-psychoactive#tab=tab_1

24. Substance Misuse. American Public Health Association. Updated 2022. Accessed May 2, 2023. https://www.apha.org/topics-and-issues/substance-misuse#:~:text=Substance%20misuse%20is%20a%20serious,is%20harmful%20to%20our%20health

25. Words Matter - Terms to Use and Avoid When Talking About Addiction. National Institute on Drug Abuse. November 29, 2021. Accessed May 2, 2023. https://nida.nih.gov/nidamed-medical-health-professionals/health-professions-education/words-matter-terms-to-use-avoid-when-talking-about-addiction

26. What is a Substance Use Disorder? American Psychiatric Association. Updated December 2020. Accessed May 2, 2023. https://www.psychiatry.org/patients-families/addiction-substance-use-disorders/what-is-a-substance-use-disorder

27. Hadland SE, Park TW, Bagley SM. Stigma associated with medication treatment for young adults with opioid use disorder: a case series. *Addict Sci Clin Pract.* 2018;13(1):15. doi:10.1186/s13722-018-0116-2

28. Borders TF, Booth BM. Rural, suburban, and urban variations in alcohol consumption in the United States: findings from the National Epidemiologic Survey on Alcohol and Related Conditions. *J Rural Health.* 2007;23(4):314-321. doi:10.1111/j.1748-0361.2007.00109.x

29. Friesen EL, Bailey J, Hyett S, et al. Hazardous alcohol use and alcohol-related harm in rural and remote communities: a scoping review. *Lancet Public Health.* 2022;7(2):e177-e187. doi:10.1016/S2468-2667(21)00159-6

30. Sudhinaraset M, Wigglesworth C, Takeuchi DT. Social and cultural contexts of alcohol use: influences in a social-ecological framework. *Alcohol Res.* 2016;38(1):35-45.

31. Love S, Rowland B, Davey J. Exactly how dangerous is drink driving? An examination of vehicle crash data to identify the comparative risk of alcohol-related crashes. *Crime Prev Community Saf.* 2023;25:131-147. doi:10.1057/s41300-023-00172-6

32. Implementing Community-Level Policies to Prevent Alcohol Misuse. Substance Abuse and Mental Health Administration. 2022. Accessed May 2, 2023. https://store.samhsa.gov/sites/default/files/SAMHSA_Digital_Download/pep22-06-01-006.pdf

33. Hammond CJ, Chaney A, Hendrickson B, Sharma P. Cannabis use among U.S. adolescents in the era of marijuana legalization: a review of changing use patterns, comorbidity, and health correlates. *Int Rev Psychiatry.* 2019;32(3):221-234. doi:10.1080/09540261.2020.1713056

34. Palamar JJ. An examination of opinions toward marijuana policies among high school seniors in the United States. *J Psychoactive Drugs.* 2014;46(5):351-361. doi:10.1080/02791072.2014.962716

35. Atakan Z. Cannabis, a complex plant: different compounds and different effects on individuals. *Ther Adv Psychopharmacol.* 2012;2(6):241-254. doi:10.1177/2045125312457586

36. Cannabis (Marijuana) and Cannabinoids: What You Need To Know. National Center for Complementary and Integrative Health. Updated October, 2019. Accessed May 2, 2023. https://www.nccih.nih.gov/health/cannabis-marijuana-and-cannabinoids-what-you-need-to-know

37. State Medical Cannabis Laws. National Conference of State Legislatures. Updated June 9, 2023. Accessed June 12, 2023. https://www.ncsl.org/health/state-medical-cannabis-laws

38. Rubin-Kahana DS, Hassan AN, Sanches M, Le Foll B. Medical cannabis and past-year cannabis use disorder among adult recreational users in the United States: results from a nationally representative sample. *Front Psychiatry.* 2022;13:836908. doi:10.3389/fpsyt.2022.836908

39. Bottorff JL, Bissell LJL, Balneaves LG, Oliffe JL, Capler NR, Buxton J. Perceptions of cannabis as a stigmatized medicine: a qualitative descriptive study. *Harm Redt J.* 2013;10(Article 2). doi:10.1186/1477-7517-10-2

40. Greene KM. Perceptions of driving after marijuana use compared to alcohol use among rural American young adults. *Drug Alcohol Rev.* 2018;37(5):637-644. doi:10.1111/dar.12686

41. Bush DM, Lipari RN. Substance use and substance use disorder by industry. Substance Abuse and Mental Health Services Administration. April 16, 2015. Accessed May 2, 2023. https://www.samhsa.gov/data/sites/default/files/report_1959/ShortReport-1959.html

42. Stigma, Prejudice and Discrimination Against People with Mental Illness. American Psychiatric Association. Updated August 2020. Accessed May 2, 2023. https://www.psychiatry.org/patients-families/stigma-and-discrimination

43. Committee on the Science of Changing Behavioral Health Social Norms; Board on Behavioral, Cognitive, and Sensory Sciences; Division of Behavioral and Social Sciences and Education; National Academies of Sciences, Engineering, and Medicine. Chapter 2: Understanding Stigma of Mental and Substance Use Disorders. In: Ending Discrimination Against People with Mental and Substance Use Disorders: The Evidence for Stigma Change. Washington (DC): National Academies Press (US); 2016:33-52. https://www.ncbi.nlm.nih.gov/books/NBK384923/

44. Eddie D, Hoffman L, Vilsaint C, et al. Lived experience in new models of care for substance use disorder: a systematic review of peer recovery support services and recovery coaching. *Front Psychol.* 2019;10:(Article 1052). doi:10.3389/fpsyg.2019.01052

45. Nutter KJ. Substance use in rural areas: a narrative concerning the care, treatment, and stigma of rural substance users. The Mid-Southern Journal of Criminal Justice. 2022;21(Article 2). https://mds.marshall.edu/msjcj/vol21/iss1/2/

46. CDC Reports Rising Rates of Drug Overdose Deaths in Rural Areas. Centers for Disease Control and Prevention. October 19, 2017. Accessed May 2, 2023. https://www.cdc.gov/media/releases/2017/p1019-rural-overdose-deaths.html

47. Keyes KM, Cerdá M, Brady JE, Havens JR, Galea S. Understanding the rural-urban differences in nonmedical prescription opioid use and abuse in the United States. *Am J Public* Health. 2014;104(2):e52-e59. doi:10.2105/AJPH.2013.301709

48. Prescription opioid use is a risk factor for heroin use. National Institute on Drug Abuse website. Updated January 2018. Accessed May 2, 2023. https://nida.nih.gov/publications/research-reports/prescription-opioids-heroin/prescription-opioid-use-risk-factor-heroin-use

49. Fentanyl Awareness. United States Drug Enforcement Administration. April 29, 2022. Accessed May 2, 2023. https://www.dea.gov/fentanylawareness

50. The National Center on Addiction and Substance Abuse at Columbia University. *No Place to hide: Substance Abuse in Mid-Size Cities and Rural America.* United States Conference of Mayors, Washington, DC.; Drug Enforcement Administration (Dept. of Justice), Washington, DC.; National Inst. on Drug Abuse (DHHS/PHS), Rockville, MD; 2000. https://eric.ed.gov/?id=ED443618

51. Alcohol's Effects on Health. National Institute on Alcohol Abuse and Alcoholism. Updated March 2023. Accessed May 2, 2023. https://www.niaaa.nih.gov/publications/brochures-and-fact-sheets/underage-drinking

52. Aiken A, Clare PJ, Wadolowski M, et al. Age of alcohol initiation and progression to binge drinking in adolescence: a prospective cohort study. *Alcohol Clin Exp Res.* 2018;42(1):100-110. doi:10.1111/acer.13525

53. Early drinking linked to higher lifetime alcoholism risk. News release. National Institute on Alcohol Abuse and Alcoholism. July 3, 2006. Accessed May 2, 2023. https://www.niaaa.nih.gov/news-events/news-releases/early-drinking-linked-higher-lifetime-alcoholism-risk

54. Smalley KB, Warren JC, Tarasenko YN, Barefoot KN. The Impact of rurality on likelihood of drunk driving and riding with a driver under the influence among high school students. *J Rural Health*. 2019;35(3):354-361. doi:10.1111/jrh.12321

55. Lambert D, Gale JA, Hartley D. Substance abuse by youth and young adults in rural America. *J Rural Health*. 2008;24(3):221-228. doi:10.1111/j.1748-0361.2008.00162.x

56. Dickens DD, Jackman DM, Stanley LR, Swaim RC, Chavez EL. Alcohol consumption among rural African American and White adolescents: the role of religion, parents, and peers. *J Ethn Subst Abuse*. 2018;17(3):273-290. doi:10.1080/15332640.2016.1179155

57. Miech RA, Johnston LD, O'Malley PM, Bachman JG, Schulenberg JE, Patrick ME. *Monitoring the future National Survey results on drug use 1975-2021*. The University of Michigan Institute for Social Research; 2022. https://monitoringthefuture.org/wp-content/uploads/2022/08/mtf-vol1_2021.pdf

58. Richmond-Rakerd LS, Slutske WS, Wood PK. Age of initiation and substance use progression: a multivariate latent growth analysis. *Psychol Addict Behav*. 2017;31(6):664-675. doi:10.1037/adb0000304

59. Connor JP, Stjepanović D, Le Foll B, Hoch E, Budney AJ, Hall WD. Cannabis use and cannabis use disorder. *Nat Rev Dis Primers*. 2021;7(1):16. doi:10.1038/s41572-021-00247-4

60. Substance Use and Misuse in Rural Areas. Rural Health Information Hub. Updated December 9, 2020. Accessed April 24, 2023. https://www.ruralhealthinfo.org/topics/substance-use

61. Evans CBR, Cotter KL, Rose RA, Smokowski PR. Substance use in rural adolescents: the impact of social capital, anti-social capital, and social capital deprivation. *J Addict Dis*. 2016;35(4):244-257. doi:10.1080/10550887.2016.1171671

62. Drug Use and Viral Infections (HIV, Hepatitis) DrugFacts. National Institute on Drug Abuse. July 2020. Accessed May 2, 2023. https://nida.nih.gov/publications/drugfacts/drug-use-viral-infections-hiv-hepatitis

63. Owens B. Opioid prescriptions down but some patients fear doctors now too strict. *CMAJ*. 2019;191(19):E546-E547. doi:10.1503/cmaj.109-5748

64. White AM. Gender differences in the epidemiology of alcohol use and related harms in the United States. *Alcohol Res*. 2020;40(2):01. doi:10.35946/arcr.v40.2.01

65. National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Population Health and Public Health Practice; Committee on Community-Based Solutions to Promote Health Equity in the United States; Baciu A, Negussie Y, Geller A, et al., editors. Communities in Action: Pathways to Health Equity. Washington (DC): National Academies Press (US); 2017 Jan 11. 3, The Root Causes of Health Inequity. Available from: https://www.ncbi.nlm.nih.gov/books/NBK425845/

66. Marshall SA, Henry TR, Spivey LA, Rhodes SD, Prinstein MJ, Ip EH. Social context of sexual minority adolescents and relationship to alcohol use. *J Adolesc Health*. 2019;64(5):615-621. doi:10.1016/j.jadohealth.2018.11.011

67. Phillips G, Turner B, Felt D, Han Y, Marro R, Beach LB. Trends in alcohol use behaviors by sexual identity and behavior among high school students, 2007-2017. *J Adolesc Health*. 2019;65(6):760-768. doi:10.1016/j.jadohealth.2019.06.007

68. Medley G, Lipari RN, Bose J, Cribb DS, Kroutil LA, McHenry G. *Sexual orientation and estimates of adult substance use and mental health: results from the 2015 National Survey on Drug Use and Health*. Substance Abuse and Mental Health Services Administration. NSDUH Data Review; 2016.

69. Chung T, Creswell KG, Bachrach R, Clark DB, Martin CS. Adolescent binge drinking. *Alcohol Res*. 2018;39(1):5-15.

70. Fairman BJ, Goldstein RB, Simons-Morton BG, et al. Neighbourhood context and binge drinking from adolescence into early adulthood in a U.S. national cohort. *Int J Epidemiol*. 2020;49(1):103-112. doi:10.1093/ije/dyz133

71. Lo CC, Weber J, Cheng TC. A spatial analysis of student binge drinking, alcohol-outlet density, and social disadvantages. *Am J Addict*. 2013;22(4):391-401. doi:10.1111/j.1521-0391.2013.12022.x

72. Walker CJ, Derlan Williams C, Cage J, et al. Associations between ethnic-racial identity and alcohol problems among diverse emerging adults. *J Ethn Subst Abuse*. 2022;21(2):638-661. doi:10.1080/15332640.2020.1793865

73. Witbrodt J, Mulia N, Zemore SE, Kerr WC. Racial/ethnic disparities in alcohol-related problems: differences by gender and level of heavy drinking. *Alcohol Clin Exp Res*. 2014;38(6):1662-1670. doi:10.1111/acer.12398

74. Desalu JM, Goodhines PA, Park A. Racial discrimination and alcohol use and negative drinking consequences among Black Americans: a meta-analytical review. *Addiction*. 2019;114(6):957-967. doi:10.1111/add.14578

75. Johnson BD. Patterns of drug distribution: implications and issues. *Subst Use Misuse*. 2003;38(11-13):1789-1806. doi:10.1081/ja-120024241

76. Douglas KR, Chan G, Gelernter J, et al. Adverse childhood events as risk factors for substance dependence: partial mediation by mood and anxiety disorders. *Addict Behav*. 2010;35(1):7-13. doi:10.1016/j.addbeh.2009.07.004

77. Zhang X, Monnat SM. Racial/ethnic differences in clusters of adverse childhood experiences and associations with adolescent mental health. *SSM Popul Health*. 2021;17:100997. doi:10.1016/j.ssmph.2021.100997

78. Hamdan-Mansour AM, Puskar K, Sereika SM. Perceived social support, coping strategies and alcohol use among rural adolescents/USA sample. *Int J Ment Health Addict*. 2007;5:53-64. doi:10.1007/s11469-006-9051-7

79. Pullen E, Oser C. Barriers to substance abuse treatment in rural and urban communities: counselor perspectives. *Subst Use Misuse*. 2014;49(7):891-901. doi:10.3109/10826084.2014.891615

80. Bond Edmond M, Aletraris L, Roman PM. Rural substance use treatment centers in the United States: an assessment of treatment quality by location. *Am J Drug Alcohol Abuse*. 2015;41(5):449-457. doi:10.3109/00952990.2015.1059842

81. Lenardson JD, Gale JA. (2007). Distribution of substance abuse treatment facilities across the rural-urban continuum. (Working Paper #35). Portland, ME: University of Southern Maine, Muskie School of Public Service, Maine Rural Health Research Center https://digitalcommons.usm.maine.edu/behavioral_health/33/

82. Health Resources and Service Administration. Tele-treatment for substance use disorders. Telehealth.HHS.gov. Updated December 7, 2022. Accessed May 2, 2023. https://telehealth.hhs.gov/providers/best-practice-guides/telehealth-for-behavioral-health/tele-treatment-for-substance-use-disorders

83. O'Connor EA, Perdue LA, Senger CA, et al. Screening and behavioral counseling interventions to reduce unhealthy alcohol use in adolescents and adults: updated evidence report and systematic review for the U.S. Preventive Services Task Force. *JAMA*. 2018;320(18):1910-1928. doi:10.1001/jama.2018.12086

84. Xuan Z, Chaloupka FJ, Blanchette JG, et al. The relationship between alcohol taxes and binge drinking: evaluating new tax measures incorporating multiple tax and beverage types. *Addiction*. 2015;110(3):441-450. doi:10.1111/add.12818

85. Kirby T, Barry AE. Alcohol as a gateway drug: a study of U.S. 12th graders. *J Sch Health*. 2012;82(8):371-379. doi:10.1111/j.1746-1561.2012.00712.x

86. Barry AE, King J, Sears C, Harville C, Bondoc I, Joseph K. Prioritizing alcohol prevention: establishing alcohol as the gateway drug and linking age of first drink with illicit drug use. *J Sch Health*. 2016;86(1):31-38. doi:10.1111/josh.12351

87. Whole School, Whole Community, Whole Child (WSCC) CDC Healthy Schools. Division of Population Health, National Center for Chronic Disease Prevention and Health Promotion Centers for Disease Control and Prevention. Updated February 9, 2023. Accessed May 2, 2023. https://www.cdc.gov/healthyschools/wscc/index.htm

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*Related Chapters:*
Chapter 1. Mental Health and Mental Disorders: A Rural Challenge
Chapter 2. Addiction in Rural America
Chapter 3. Rural Healthcare Access and Quality
Chapter 20. The Issue of Chronic Pain in Rural America

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# NUTRITION AND HEALTHY EATING IN RURAL AMERICA

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## SCOPE OF THE PROBLEM

- People in rural areas are less likely to consume the recommended five or more daily servings of fruits and vegetables than those in urban areas.[1,2]
- Rural adults are more likely to consume sugar-sweetened beverages than urban adults.[3]
- Food insecurity rates are higher in rural areas than urban areas; in 2021, 10.8% of households outside metropolitan areas were food insecure, compared to 10.1% of households in metropolitan areas.[4]
- Nearly 90% of high food insecurity counties are rural.[5]
- Rates of hypertension are higher in rural areas (40.0%) than in urban areas (29.4%).[6]
- The prevalence of adult obesity is higher in rural areas (34.2%) than in urban areas (28.7%).[7]

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Across the lifespan, people who eat less healthfully are at higher risk for health problems such as obesity, type 2 diabetes, and cardiovascular disease. Healthy eating can help prevent these problems, as well as help manage them.[8] Healthy eating patterns include consumption of vegetables, fruits, whole grains, dairy or alternatives, and lean proteins, and limiting foods and beverages with added sugars, saturated fats, and sodium. Generally, most Americans do not eat according to the recommendations provided in the Dietary Guidelines for Americans.[9] Food insecurity among adults is associated with unhealthier eating patterns, cardiovascular disease (e.g., hypertension, high cholesterol), mental health issues (e.g., depression), poor quality sleep, and overall worse health outcomes.[10] Food insecurity among children is associated with lower nutrient intake, cognitive problems, behavioral problems (e.g., aggression), mental health issues (e.g., depression, anxiety), asthma, and being in poorer overall health.[10] People in rural areas are more likely to have lower diet quality,[1-3] higher food insecurity,[4] and chronic, diet-related conditions such as hypertension[6] and obesity.[7]

## HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

The United States Department of Health and Human Services established the Healthy People initiative 30 years ago to provide a roadmap for Americans to improve their health and wellbeing. The current iteration of the program, Healthy People 2030, contains more than 25 objectives related to nutrition and healthy eating. The following Healthy People 2030 objectives will be discussed in this chapter, particularly as they pertain to rural Americans.

a. **Increase consumption of healthy foods**
   *NWS-06: Increase fruit consumption by people aged 2 years and over*[11]
   *NWS-07: Increase vegetable consumption by people aged 2 and over*[11]
   *NWS-08: Increase consumption of dark green vegetables, red and orange vegetables, and beans and peas by people aged 2 years and over*[11]
   *NWS-09: Increase whole grain consumption by people aged 2 years and over*[11]

b. **Reduce consumption of unhealthy nutrients**
*NWS-10: Reduce consumption of added sugars by people aged 2 years and over*[11]

c. **Improve food security, increase the proportion of students participating in nutrition programs, and increase the proportion of schools that promote healthy eating**
*NWS-01: Reduce household food insecurity and hunger*[11]
*NWS-02: Eliminate very low food security in children*[11]
*AH-04: Increase the proportion of students participating in the School Breakfast Program*[11]
*AH-R03: Increase the proportion of eligible students participating in the Summer Food Service Program*[11]
*ECBP-D02: Increase the proportion of schools that don't sell less healthy foods and drinks*[11]

d. **Reduce high blood pressure and obesity**
*HDS-04: Reduce the proportion of adults with high blood pressure*[11]
*NWS-03: Reduce the proportion of adults with obesity*[11]

## RHP 2030 SURVEY OUTCOMES

Nearly 1,300 rural stakeholders responded to a web-based Rural Healthy People 2030 survey to determine the most important health priorities for rural Americans.[12] Respondents, including government officials, healthcare providers, academicians, and community leaders selected the top 10 priorities for rural Americans from 62 Healthy People 2030 leading health indicators. Overall, 38.3% of respondents identified nutrition and healthy eating as a top 10 priority for rural Americans, creating an overall ranking of sixth most important priority. Fourteen percent of respondents selected nutrition and healthy eating as the first, second, or third health priority for rural Americans. Rankings did not vary significantly between census regions or gender. Respondents over age 65 years ranked nutrition and healthy eating as the 10th highest priority. Non-White respondents ranked nutrition and healthy eating third, whereas White respondents ranked it sixth.

## PREVALENCE AND DISPARITIES IN RURAL AREAS

Note: The terms 'metropolitan,' 'non-metropolitan,' 'urban,' and 'rural' are used across different studies with slightly different definitions. To maintain integrity and accuracy, we have retained the terms used in the original research when referring to specific studies. When specific studies are not referenced, we use the terms 'urban' and 'rural.'

### *Eating Patterns*

Rural-dwelling adults face a host of barriers that influence food choices and contribute to less healthy eating patterns and negative health outcomes, when compared to their urban-dwelling counterparts.[13] For example, residents in rural areas tend to consume fruits and vegetables less frequently than those in urban areas,[1] and rural adults are less likely to consume five or more daily servings of fruits and vegetables.[2] Furthermore, rural adults are more likely to consume sugar-sweetened beverages than urban adults.[3] Older cancer survivors living in isolated small towns had roughly one-half the vegetable and fruit consumption of those living in other rural and urban areas.[14]

For children from low-socioeconomic, rural, and population groups historically considered minority, the home food environment is a substantial predictor of food choices, consumption of fruit and vegetables, and overall dietary intake patterns.[15] In particular, food availability in the home plays a significant role in children's dietary intake.[16] The rural versus urban disparities in dietary intake among adults are also noted among youth: among 12- to 19-year-olds, rural children were less likely to consume any fruit or meet the recommendation of two cups of fruit a day.[17] A four-county study in rural Colorado found that parent reports of child dietary intake indicated 2- to 5-year-old children did not meet USDA dietary recommendations for adequate daily consumption of vegetables (0.7 cups consumed/1.5 cups recommended), whole grains (0.7 oz consumed/2.5 oz recommended), protein (2.3 oz consumed/4 oz recommended) and dairy (2.2 cups consumed/2.5 cups recommended).[18] Eittenne-Gittens et al. found that urban children

were offered and consumed a greater variety of vegetables compared to their rural counterparts.[19] Some research has demonstrated mixed findings, however; for example, one study demonstrated that relative to rural adolescents, suburban adolescents had a significantly higher intake of sugar-sweetened beverages, sugary food, and fruit/vegetable intake.[20]

***Food Insecurity and Nutrition Programs***

Poverty is directly related to the ability to obtain healthy and affordable foods, which is linked to food insecurity. In 2020, in metropolitan areas, the poverty rate was 11.0%, while in nonmetropolitan areas the poverty rate was 14.0%, which was notably higher than urban areas.[21] According to the 2022 USDA Household Food Security report, 10.8% of rural households were food insecure in 2021, compared with 10.1% of urban households.[4] In the U.S., nearly 90% of high food-insecure counties are rural.[5]

For children in 2019 21.1% of nonmetropolitan children in the U.S were poor, compared to 16.1% of metropolitan children.[21] From 2015-2019, at the county level, there were 138 counties in the U.S. with child poverty rates of 40% or higher, and only 11 of them were metropolitan counties.[21] The remaining 127 were nonmetropolitan counties, primarily in the South (84.3%) with concentrations in Mississippi, Georgia, Kentucky, and Texas[21] – where child poverty rates have been persistently high, particularly among the Black population.

Food and nutrition assistance programs for Americans with a low income exist to address food security and improve diet quality, including the Supplemental Nutrition Assistance Program (SNAP) and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). Additionally, the USDA's child nutrition programs (the National School Lunch Program, School Breakfast Program, Child and Adult Care Food Program, Summer Food Service Program, and After-School Snacks and Meals) play a significant role in children's food security, diets, and overall well-being.[21]

***Related Health Conditions***

According to data from the 2013 nationwide Behavioral Risk Factor Surveillance System (BRFSS) of over 440,000 adults in the U.S., those living in nonmetropolitan counties were more likely to report chronic diseases associated with unhealthy eating practices and associated risk factors compared to those living in metropolitan counties.[22] In the most rural areas, the self-reported unadjusted prevalence of hypertension was 40%, compared to 29% in the most urban areas.[6] There is a higher prevalence of obesity in nonmetropolitan versus metropolitan counties and this is particularly acute in the South and Northeast.[7] Among youth, there was significantly more obesity among rural compared to urban individuals (21.8% vs 16.9%, respectively).[23] A meta-analysis of over 74,000 pooled participants ages two- to 19- years old reported that rural youth had 26% greater odds of obesity, compared to urban children (odds ratio=1.26; 95% confidence interval, 1.21–1.32).[24] Related, food insecurity is negatively associated with health in a variety of populations.[10]

## VARIATION BY RURAL REGION

***Eating Patterns***

Little data exist about eating patterns by region, but some state level data contribute to understanding differences in dietary intake. Fruit and vegetable intake patterns from BRFSS indicate state-level variation for vegetables, but not for fruit, with median daily intake at 1.0 cups for fruit and 1.6 cups for vegetables.[25] All states reported median daily intake frequencies of 1.0 cups for fruit.[25] For vegetables, median daily intake ranged from 1.5 to 1.9 cups.[25] Louisiana, Mississippi, Nevada, and New Mexico report the lowest median daily intake of vegetables.[25] Three of these four states, Louisiana, Mississippi, and New Mexico, have more than 15% of their population residing in rural areas.[26]

***Food Insecurity***

Poverty and food security are intrinsically linked; households in poverty often lack the resources to access sufficient nutritious food. While the overall rate of poverty is higher in rural versus urban areas, the difference between rural and urban poverty rates varies significantly across U.S. census regions.[21] Food insecurity rates are higher than the national average (10.2%) in many southern

states: Kentucky (12.3%), South Carolina (12.6%), Alabama (13.1%), Texas (13.7%), Oklahoma (13.8%), West Virginia (14.0%), Louisiana (14.5%), Arkansas (15.0%), and Mississippi (15.3%);[4] the South census region has higher than national average percentages of the population living in rural areas.[27] There are marked regional disparities, with eight out of 10 high food insecure counties in the South and nine out of 10 high food insecurity counties nationwide disproportionately rural.[28] The COVID-19 pandemic also exacerbated the food insecurity already prevalent in the southern regions with southern and mid-southern regions reporting higher food insecurity rates compared to the U.S. average.[21]

### *Related Health Conditions*

According to 2017 BRFSS data, hypertension prevalence is consistently higher in the Southeastern region, Appalachian counties, and among non-Hispanic Blacks.[6] County-level prevalence of hypertension ranged from 18.0% to 55.0%.[6] From BRFSS 2016 data, the prevalence of obesity-associated chronic diseases was significantly higher among adults living in nonmetropolitan counties in the South census region compared to adults living in metropolitan counties in the same census region.[7] This finding is partly attributed to the high rate of persistent poverty and lack of access to healthier food retailers (supermarkets, large grocery stores, and fruit/vegetable specialty stores) in rural areas of the South region.[7]

## VARIATION BY RACE AND ETHNICITY

### *Eating Patterns*

In a cluster analysis of African American women in the rural southern U.S., two dietary patterns were identified. One dietary pattern was characterized by a higher frequency of intake for cereals, fast/fried foods, and desserts, and the other dietary pattern was characterized by higher frequency of salad, water, whole grains, added sugars, and alcohol intake.[29] However, as a whole, the study participants did not tend to consume recommended amounts of fruits and vegetables and consumed more than the recommended amount for added sugars.[29] A healthier cluster was identified which consumed fruits, vegetables, and nuts, but study participants in this healthier cluster still ate higher than recommended amounts of salt and added sugar.[29] In Texas, rural Hispanic children had lower diet quality (as measured using a modified Healthy Eating Index) than non-Hispanic children.[30] A study of Native American caregivers and their children found that caregivers who were in rural, food insecure households ate less vegetables, and consumed more fruit juice, sugar-sweetened beverages, and fried potatoes than their rural, food secure counterparts.[31]

### *Food Insecurity*

Food insecurity is also more pronounced among non-White racial/ethnic groups compared to their White counterparts. Data from 2020 indicate that Black rural residents were 2.5 times more at risk of hunger than their White counterparts residing in rural areas.[28] Furthermore, American Indians and Alaska Natives living in rural communities experience extremely high rates of food insecurity when compared with other racial and ethnic groups.[28] Using data from the Current Population Survey Food Security Supplement, it was found that 25% of American Indian/Alaska Natives were consistently food insecure and were twice as likely to be food insecure as their White counterparts.[32] In contrast to other studies, one study of American Indians found that food insecurity was significantly higher in urban versus rural American Indian households.[31]

### *Related Health Conditions*

From 1999 to 2018, annual age-adjusted mortality rates were substantially higher for Black adults compared with White adults for diabetes in rural areas versus the national average (average mortality rate 1999 to 2018: 76.2 vs. 37.2 deaths per 100,000; $p < 0.001$); hypertension (31.3 vs. 10.9; $p < 0.001$); heart disease (425.0 vs. 331.7; $p < 0.001$); and stroke (112.6 vs. 73.9; $p < 0.001$).[33] Thus, mortality rates of diabetes, hypertension, heart disease, and stroke are highest among Black adults in rural parts of the U.S., when compared to White adults in rural areas.[33] Although not rural-specific, data from 2018 indicates that American Indians/Alaska Natives also have higher rates of coronary heart disease than non-Hispanic Whites (8.6% for American Indians/Alaska Natives vs. 5.8% for non-Hispanic

Whites).[34] Healthy eating can help prevent, as well as help manage, conditions such as diabetes and cardiovascular disease.[8]

## IMPACT ON MORTALITY, MORBIDITY, AND OTHER HEALTH PROBLEMS

Because residents of rural areas tend to eat less healthfully and have higher levels of obesity and hypertension, they are at higher risk for associated health problems, such as diabetes, cardiovascular disease, and certain cancers.[33] In one study, diabetes and coronary heart disease prevalence were 8.6% and 38.8% higher among rural residents compared with urban residents, respectively.[35] While diabetes mortality continues to decline in urban areas, diabetes mortality in the rural South has remained stagnant.[36] Less healthful dietary patterns and limited access to healthy food likely contribute to these health disparities, as one study found that a higher density of low-quality food stores was associated with a 34% higher incidence of type 2 diabetes.[37]

## BARRIERS

### *Poverty and Financial Strain*

Poverty and financial strain make it difficult for rural residents with a low income to consume a healthy diet that aligns with Healthy People 2030 goals.[38] Poverty and financial struggle in rural areas are driven by higher unemployment rates, which were exacerbated by COVID-19, when compared to urban areas.[39] One study found that rural unemployment and underemployment made it difficult for families to afford food.[39] The consequences of higher poverty rates in rural versus urban areas are detected in individual residents' lives as they face greater difficulty in obtaining a healthy diet. For example, a qualitative analysis of longitudinal in-depth interviews with rural adults found individuals cost burdened with many struggling to pay rent and buy food, constantly redirecting financial resources from one part of their budget to pay for another.[40] Similarly, a qualitative study interviewing SNAP recipients in different rural regions found that the majority of individuals felt as though their SNAP monthly benefit was not enough to feed their families.[41] Moreover, rural residents are vulnerable to deepened poverty and food insecurity when natural disasters occur and job opportunities change that are connected to natural resources.[42,43]

### *Access to Healthy Food*

The difficulty in accessing high quality, healthy, and fresh foods exacerbates stressors on rural families. Food access is impacted by a lack of reliable transportation, or public transportation, in rural communities. Qualitative data from rural residents in Mississippi revealed that the time constraints faced due to significant travel time to procure healthy foods were also barriers to healthy eating.[44] In a study of food insecure rural residents, participants described how employment opportunities, community resources, and food retail establishments were far away from their homes, making it difficult to make money and obtain healthy and affordable food.[41] Furthermore, participants reported that the location and hours of operation of meal sites for the Summer Food Service Program were important to program access, as transportation was a major barrier to summer meal participation.[41]

Lack of access to healthier food retailers (supermarkets, large grocery stores, and fruit/vegetable specialty stores) in rural areas is an environmental barrier that contributes to limited food choices, adverse eating patterns, and food insecurity. In 2015, 6% to 18% of the U.S. population had limited access to a supermarket or grocery store, based on proximity measures of 0.5 to one mile for urban and 10 to 20 miles in rural areas.[45]

In many rural areas of the U.S., counties with a higher percentage of White residents had better access to food than other counties.[46] In rural American Indian/Alaska Native communities, limited access to food was more than three times as high as rural counties with a majority of non-Hispanic White residents (29.8% versus 9.0%).[46] Another study found that stores serving rural residents in Maryland were more likely to offer less healthy food than healthy food options.[47] Being located in proximity to healthy food sources is a key component of healthy food intake. Among rural participants, lower perceptions of the availability of affordable healthy food in one's neighborhood are

associated with a lower likelihood of meeting fruit recommendations.[48]

Because rural areas often have access to small "corner" stores as opposed to supermarkets,[49] many studies have included the implementation of healthy small store interventions to improve healthy food access in rural areas. Unfortunately, some small store owners do not think that products such as fresh fruits and vegetables, whole grains, and other healthy products will sell well in their stores.[41,50] While some small store owners are concerned about their ability to stock and promote healthy foods to customers, customers are generally supportive of efforts to add healthier foods to small stores.[51]

*Limited Healthy Food Availability*

Taber et al. found that there were fewer healthy food retail policies in rural versus urban areas of the U.S., and healthy retail policies were positively associated with income in rural areas.[52] A study in rural central Appalachian counties reported that higher food costs in the region, when compared to other non-Appalachian regions, were predictive of food insecurity and greatly influenced the consumption of fruits and vegetables.[53] In Montana, fruits and vegetables in rural grocery stores were lower in quality than those in urban areas.[40] Such findings provide evidence of low healthy food availability in rural areas, which further drives less healthful dietary behaviors.

## KNOWN CAUSES OF THE PROBLEM

The noted disparities in healthy dietary behaviors and subsequent diet-related disease risk are multi-faceted and related to many of the reviewed barriers. The heterogeneity of rural areas in the U.S. makes it challenging to pinpoint exact targets for intervention and area-specific knowledge is often needed. However, there are certain known causes of an unhealthy diet and diet-related diseases that cross most rural boundaries. For example, those living in rural areas who are also facing financial hardships likely find it difficult to obtain healthy, affordable foods.[40] Furthermore, limited access to healthy foods is a known cause of an unhealthy diet, and rural residents are more likely to live farther from healthy food venues.[54-57] In a study among rural African American adults in Alabama, access to healthy foods was noted as a challenge when attempting to eat healthfully.[58] Furthermore, the cultural beliefs and practices of rural versus urban residents are often different, leading to misperceptions about body weight and risk, as well as about health risks associated with unhealthy dietary behaviors and unhealthy body weight.[59-61] Financial issues, lack of access to healthy food venues, and cultural beliefs are not insurmountable causes of disparities in rural areas, and several promising strategies are discussed in the following section.

## SOLUTIONS AND INTERVENTIONS

Healthy eating depends on multiple personal, social, setting, behavioral, and policy level factors that may prevent or motivate behaviors. Public health responses to support the intake of healthy foods have been developed, such as individual-level nutrition education and/or changes in policies, systems, and environments. While there are many barriers to healthy eating in the rural U.S., there are also many rural assets such as seasonal produce stands, fishing, foraging, and strong social ties through churches or other social groups, which can be utilized to promote healthier eating in rural populations.[44] Thus, solutions and interventions for healthy eating in rural areas require a multi-pronged approach shaped by overlapping and dynamic influences.

*Increase Access*

- Increasing access to healthy foods is essential since many rural communities are challenged by a lack of retail food options, inadequate stocking of healthy foods, affordability, and transportation barriers. Multiple nutrition interventions have been conducted in rural geographies and found success in improving food access through incentives (e.g., coupons) for healthy food, food boxes, awareness about healthy food, educational displays in food retail, recipes and taste tests, healthy food marketing, and in-store training.[62,63] Additionally, the U.S. Department of Agriculture's Gus Schumacher Nutrition Incentive Program funds nutrition incentive and produce prescription projects nationwide, including in rural spaces, that provide consumers with a low income with financial incentives

for fruits and vegetables. This mechanism has demonstrated increases in fruit and vegetable intake and food security across participating populations, as well as positive economic impacts for food retailers.[64]

- Innovations such as California's "Produce on the Go," a mobile fruit and vegetable market, combined with a social marketing campaign, should be tested for effectiveness in additional rural areas of the U.S.[65] Rural areas in particular may be ideal for healthy corner store interventions as there may be increased opportunities for partnerships with farmers to supply local produce, and because such stores may be increasingly used by rural residents due to long distances to more traditional food stores, such as supermarkets.[66-68]

- In rural Indigenous communities, food retail interventions to improve food and beverage environments have been effective.[69]

***Food Labeling***

- In rural settings, a substantial percentage of food shopping occurs at mass merchandisers (e.g., Walmart) and discount stores.[70] In these spaces where packaged food is prevalent, consumers can use a food label to make decisions about the nutritional components of the food. Interventions that offer choice experiments in food label placement (e.g., putting nutrition labels on the front of food packages) and nutrition facts panel tailoring (e.g., color coding to indicate healthfulness) both have the potential to shape healthy food selection. Gustafson and Prate (2019) tested the impact of tailoring healthy food labels for a rural American Indian population and found that although generic labeling drove healthy food selection, tailored labeling toward the community was more effective.[71]

***Other Relevant Considerations***

Several additional working solutions and innovations related to improving nutrition in rural communities are noted in the following list.

- Community-wide approaches to supporting nutrition in rural spaces are warranted. In Kentucky, a community-driven multi-year intervention focused on food retailer and physical activity space improvements resulted in increased fruit and vegetable intake.[13]

- Because summer months are particularly difficult for food insecure families, and because rural households have difficulty accessing the Summer Food Service Program, the Meals-to-You program was pilot tested in rural Alaska, New Mexico, and Texas.[72] Those participating in Meals-To-You and Emergency Meals-To-You had larger declines in food insecurity, especially in more remote and rural areas of the U.S.[72] This suggests that future studies should include improvements to increase the accessibility of federal nutrition assistance programs particularly in rural and remote areas.

- A lack of healthcare access in rural versus urban areas has led to telehealth solutions for obesity treatment, as well as management and prevention of chronic disease.[73-76]

- Text messaging and other mobile health interventions have the potential to reach residents in rural areas and increase information about healthy eating.[77]

- Predominantly rural states could consider the adoption of statewide policy, systems, and environmental interventions to increase access to fresh fruits and vegetables as has been done in West Virginia and many school districts.[78,79]

- "Food as Medicine" programs, such as the U.S. Department of Agriculture's Gus Schumacher Nutrition Incentive Program - Produce Prescription Program, expand access to healthy foods by providing free or subsidized fruit and vegetable prescriptions, home-delivered meals, medically tailored meals, or food baskets to participating individuals.[80,81]

- School-based interventions in rural areas have been effective in reaching youth to encourage healthy eating.[82]

- Strategies to modify foods available at home are recommended to improve the quality of dietary intake for young children. This is of more significance for families with socioeconomic and racial/ethnic diversity at risk for health disparities.[18]

- Other solutions lie outside of food interventions. For example, the solutions to healthy eating for food insecure populations intersect with poverty. In a national study of 153 rural individuals who serve as the primary grocery shopper for their household and face food insecurity, it was found that barriers in affordability, availability, and preferences were difficult to overcome despite shoppers' desire to provide healthy meals to their families.[40] These individuals coped by coordinating multiple resources for food (e.g., federal food assistance, free meal programs, donations from friends and family), implementing food resource management skills, consuming lower quality foods, rationing food, and taking desperate actions (e.g., skipping meals, watering down food and drink).[40] Further economic intervention to reduce barriers for food insecure populations in rural spaces is warranted.

- Rural residents have higher transportation-related costs related to accessing healthy food than do urban residents,[83] and thus, transportation innovations (e.g., drone delivery and mobile markets) should be tested in rural areas, ultimately to improve access to healthy foods in rural and remote areas.

- For American Indian/Alaska Native communities residing in rural areas, community-based participatory interventions that draw upon cultural values and food ways (e.g., customs of food production, preparation, preservation and presentation), as well as environmental supports have shown effectiveness in improving healthy eating.[84,85]

- Interventions exist for rural areas that pair active living with healthy eating.[86] For example, multilevel approaches such as the Strong Hearts, Healthy Communities intervention and the Eat Healthy, Be Active community workshops led by promotoras (Hispanic/Latino community health workers) address diet, physical activity, and other needs in rural areas.[87,88]

## SUMMARY AND CONCLUSIONS

Rural populations continue to face significant barriers and challenges to healthy eating. Rural adults and youth eat fewer fruits and vegetables[1,2,17] and consume more sugar-sweetened beverages[3,20] than urban adults and youth; they also are more likely to report chronic diseases and associated risk factors.[6,7,22-24] Food insecurity rates continue to be higher in rural compared to urban areas.[4] Food insecurity is related to chronic physical and mental health issues,[10] and health costs are higher for people with nutrition-related health problems. Eating patterns, food insecurity, and related health conditions vary by rural region, race, and ethnicity. Food insecurity rates are higher in the South[28] and among Black[28] and Native American residents[28,32]; obesity-associated chronic disease rates are higher in the South and Southeastern U.S., as well as among Blacks.[28,33] Healthy People 2030 nutrition and healthy eating goals and objectives include increasing the consumption of healthy foods, reducing consumption of unhealthy nutrients, improving micronutrient consumption, improving food security, and reducing high blood pressure and obesity.[11]

Barriers to healthy eating include poverty and financial strain, lack of access to healthy food, and limited healthy food availability. Longer travel times in rural areas and lack of reliable transportation or public transportation affect access to healthy food retailers, as well as to Summer Food Service Program meal sites for youth.[41,44] Fruits and vegetables in rural areas may be of lower quality.[40] Higher food costs in rural areas contribute to the unaffordability of healthy foods.[53] Rural areas are less likely to implement healthy food retail policies,[52] and corner store owners are hesitant to stock products such as fresh fruits and vegetables and whole grains.[41,50]

Successful interventions that focus on increasing access to healthy foods in rural areas have included incentives, produce prescription projects, mobile fruit and vegetable markets, and increased access to summer meals. Increasing awareness about healthy food, in-store training, tailored food labels, community-wide approaches, telehealth and mobile health interventions, school-based programs, and transportation innovations (e.g., drone delivery) have also been effective in rural areas. Measurement, including the definition of rural itself, needs more research and attention. Although some tools do exist, measurement related to food access and insecurity also needs more rural-tailored tools.[89,90] GIS and other technologies should be employed both from surveillance and intervention/need perspective.[23,91] Common assumptions related to the relationship between nutrition, obesity, health, and mortality may have to be reconsidered in certain populations, in particular due to considerations such as acculturation.[92,93] Online shopping, drone delivery, mobile markets, and other emergent innovations provide opportunities for evaluation and advancement of rural food access and healthy eating.[83]

Consumer diet-related behaviors (e.g., food shopping, meal preparation) depend on a variety of individual, social, environmental, and policy factors. Rural disparities persist, in terms of diet quality, food insecurity, and nutrition-related health conditions, indicating the need for increased funding for effective, sustainable projects, programs, and interventions tailored to rural areas to reduce barriers to healthy eating.

## REFERENCES


1. Fastring D, Nadorff D, DeShong H. The influence of rurality on fruit and vegetable intake and BMI: findings in Mississippi are not consistent with those at the national level. *Int J Environ Res Public Health*. 2021;18(9):5021. doi:10.3390/ijerph18095021

2. Lutfiyya MN, Chang LF, Lipsky MS. A cross-sectional study of U.S. rural adults' consumption of fruits and vegetables: do they consume at least five servings daily? *BMC Public Health*. 2012;12(1):280. doi:10.1186/1471-2458-12-280

3. Chevinsky JR, Lee SH, Blanck HM, Park S. Prevalence of self-reported intake of sugar-sweetened beverages among U.S. adults in 50 states and the District of Columbia, 2010 and 2015. *Prev Chronic Dis*. 2021;18(E35):200434. doi:10.5888/pcd18.200434

4. Coleman-Jensen A, Rabbitt M, Gregory C, Anita Singh A. Household Food Security in the United States in 2021, ERR-309. U.S. Department of Agriculture, Economic Research Service. Accessed July 26, 2023. https://www.ers.usda.gov/webdocs/publications/104656/err-309.pdf

5. Hake M, Engelhard E, Dewey A. Map the Meal Gap 2022: A Report on County and Congressional District Food Insecurity and County Food Cost in the United States in 2020. Feeding America. Accessed July 26, 2023. https://www.feedingamerica.org/sites/default/files/2022-07/Map%20the%20Meal%20Gap%202022%20Report.pdf

6. Samanic CM, Barbour KE, Liu Y, et al. Prevalence of self-reported hypertension and antihypertensive medication use by county and rural-urban classification - United States, 2017. *MMWR Morb Mortal Wkly Rep*. 2020;69(18):533-539. doi:10.15585/mmwr.mm6918a1

7. Lundeen EA, Park S, Pan LP, O'Toole T, Matthews K, Blanck HM. Obesity prevalence among adults living in metropolitan and nonmetropolitan counties - United States, 2016. *MMWR Morb Mortal Wkly Rep*. 2018;67(23):653-658. doi:10.15585/mmwr.mm6723a1

8. U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2025*. 9th Edition. December 2020.

9. U.S. Department of Agriculture and U.S. Department of Health and Human Services. Top 10 Things You Need to Know about the Dietary Guidelines for Americans, 2020-2025. *Dietary Guidelines*. Accessed February 21, 2023. https://www.dietaryguidelines.gov/resources/2020-2025-dietary-guidelines-online-materials/top-10-things-you-need-know-about-dietary

10. Gundersen C, Ziliak JP. Food insecurity and health outcomes. *Health Aff*. 2015;34(11):1830-1839. doi:10.1377/hlthaff.2015.0645

11. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Healthy People 2030 Objectives - Nutrition and Healthy Eating. Accessed January 31, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/nutrition-and-healthy-eating

12. Kassabian M, Shrestha A, Callaghan T, et al. Rural healthy people 2030: common challenges, rural nuances. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

13. Gustafson A, McGladrey M, Stephenson T, et al. Community-wide efforts to improve the consumer food environment and physical activity resources in rural Kentucky. *Prev Chronic Dis.* 2019;16:180322. doi:10.5888/pcd16.180322

14. Cohen SA, Greaney ML, Sabik NJ. Assessment of dietary patterns, physical activity and obesity from a national survey: rural-urban health disparities in older adults. *PloS One.* 2018;13(12) e0208268. doi:10.1371/journal.pone.0208268

15. Kaur H, Fernández JR, Locher JL, Demark-Wahnefried W. Rural and urban differences in vegetable and fruit consumption among older cancer survivors in the Deep South: an exploratory cross-sectional study. *J Acad Nutr Diet.* 2022;122(9):1717-1724. doi:10.1016/j.jand.2022.01.003

16. Patrick H, Nicklas TA. A review of family and social determinants of children's eating patterns and diet quality. *J Am Coll Nutr.* 2005;24(2):83-92. doi:10.1080/07315724.2005.10719448

17. Liu J-H, Jones SJ, Sun H, Probst JC, Merchant AT, Cavicchia P. Diet, physical activity, and sedentary behaviors as risk factors for childhood obesity: an urban and rural comparison. *Child Obes.* 2012;8(5):440-448. doi:10.1089/chi.2012.0090

18. Boles RE, Johnson SL, Burdell A, Davies PL, Gavin WJ, Bellows LL. Home food availability and child intake among rural families identified to be at-risk for health disparities. *Appetite.* 2019;134:135-141. doi:10.1016/j.appet.2018.12.002

19. Ettienne-Gittens R, McKyer ELJ, Odum M, et al. Rural versus urban Texas WIC participants' fruit and vegetable consumption. *Am J Health Behav.* 2013;37(1):130-140. doi:10.5993/ajhb.37.1.15

20. Kirkpatrick BM, Yuhas M, Zoellner JM. Exploring differences in adolescent BMI and obesity-related behaviors by urban, suburban, and rural status. *Prev Med Rep.* 2022;29:101960. doi:10.1016/j.pmedr.2022.101960

21. Economic Research Service, United States Department of Agriculture. Rural Poverty & Well-Being. Updated November 29, 2022. Accessed February 14, 2023. https://www.ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being

22. Shaw KM, Theis KA, Self-Brown S, Roblin DW, Barker L. Chronic disease disparities by county economic status and metropolitan classification, Behavioral Risk Factor Surveillance System, 2013. *Prev Chronic Dis.* Sep 2016;13:160088. doi:10.5888/pcd13.160088

23. McCormack LA, Meendering J. Diet and physical activity in rural vs urban children and adolescents in the United States: a narrative review. *J Acad Nutr Diet.* 2016;116(3):467-480. doi:10.1016/j.jand.2015.10.024

24. Johnson JA, Johnson AM. Urban-rural differences in childhood and adolescent obesity in the United States: a systematic review and meta-analysis. *Child Obes.* 2015;11(3):233-241. doi:10.1089/chi.2014.0085

25. Lee SH, Moore LV, Park S, Harris DM, Blanck HM. Adults meeting fruit and vegetable intake recommendations—United States, 2019. *MMWR Morb Mortal Wkly Rep.* 2022;71(1):1-9. doi:10.15585/mmwr.mm7101a1

26. United States Department of Agriculture, Economic Research Service. State Fact Sheets. Updated February 24, 2023. Accessed April 10, 2023. https://www.ers.usda.gov/data-products/state-fact-sheets/

27. Nation's Urban and Rural Populations Shift Following 2020 Census. Press Release Number CB22-CN.25. United States Census Bureau. December 29, 2022. Accessed February 21, 2023.

https://www.census.gov/newsroom/press-releases/2022/urban-rural-populations.html

28. Feeding America. Hunger in Rural Communities. Accessed January 31, 2023. https://www.feedingamerica.org/hunger-in-america/rural-hunger-facts

29. Sterling S, Judd S, Bertrand B, Carson TL, Chandler-Laney P, Baskin ML. Dietary patterns among overweight and obese African-American women living in the rural south. *J Racial Ethn Health Disparities*. 2018;5(1):141-150. doi:10.1007/s40615-017-0351-3

30. Chen X, Cisse-Egbuonye N, Spears EC, Mkuu R, McKyer ELJ. Children's healthy eating habits and parents' socio-demographic characteristics in rural Texas, USA. *Health Educ J*. 2018;77(4):444-457. doi:10.1177/0017896917752014

31. Tomayko EJ, Mosso KL, Cronin KA, et al. Household food insecurity and dietary patterns in rural and urban American Indian families with young children. *BMC Public Health*. 2017;17(1):611. doi:10.1186/s12889-017-4498-y

32. Jernigan VBB, Huyser KR, Valdes J, Simonds VW. Food insecurity among American Indians and Alaska Natives: a national profile using the Current Population Survey-Food Security Supplement. *J Hunger Environ Nutr*. 2017;12(1):1-10. doi:10.1080/19320248.2016.1227750

33. Aggarwal R, Chiu N, Loccoh EC, Kazi DS, Yeh RW, Wadhera RK. Rural-urban disparities: diabetes, hypertension, heart disease, and stroke mortality among Black and White adults, 1999-2018. *J Am Coll Cardiol*. Mar 23 2021;77(11):1480-1481. doi:10.1016/j.jacc.2021.01.032

34. Villarroel MA, Blackwell DL, Jen A. Tables of Summary Health Statistics for U.S. Adults: 2018 National Health Interview Survey. National Center for Health Statistics. 2019. http://www.cdc.gov/nchs/nhis/SHS/tables.htm

35. O'Connor A, Wellenius G. Rural-urban disparities in the prevalence of diabetes and coronary heart disease. *Public Health*. 2012;126(10):813-820. doi:10.1016/j.puhe.2012.05.029

36. Callaghan T, Ferdinand AO, Akinlotan MA, Towne SD, Bolin J. The changing landscape of diabetes mortality in the United States across region and rurality, 1999-2016. *J Rural Health*. 2020;36(3):410-415. doi:10.1111/jrh.12354

37. Gebreab SY, Hickson DA, Sims M, et al. Neighborhood social and physical environments and type 2 diabetes mellitus in African Americans: the Jackson Heart Study. *Health Place*. 2017;43:128-137. doi:10.1016/j.healthplace.2016.12.001

38. Burton LM, Lichter DT, Baker RS, Eason JM. Inequality, family processes, and health in the "new" rural America. *Am Behav Sci*. 2013;57(8):1128-1151. doi:10.1177/0002764213487348

39. Mueller JT, McConnell K, Burow PB, Pofahl K, Merdjanoff AA, Farrell J. Impacts of the COVID-19 pandemic on rural America. *Proc Natl Acad Sci USA*. 2021;118(1):2019378118. doi:10.1073/pnas.2019378118

40. Shanks CB, Andress L, Hardison-Moody A, et al. Food insecurity in the rural United States: an examination of struggles and coping mechanisms to feed a family among households with a low-income. *Nutrients*. 2022;14(24):5250. doi:10.3390/nu14245250

41. Haynes-Maslow L, Hardison-Moody A, Patton-Lopez M, et al. Examining rural food-insecure families' perceptions of the Supplemental Nutrition Assistance Program: a qualitative study. *Int J Environ Res Public Health*. 2020;17(17):6390. doi:10.3390/ijerph17176390

42. Food and Agriculture Organization of the United Nations. *The Impact of Disasters and Crises on Agriculture and Food Security*. 2021. https://www.fao.org/3/cb3673en/cb3673en.pdf

43. Cutter SL, Ash KD, Emrich CT. Urban–rural differences in disaster resilience. *Ann Assoc Am Geogr*. 2016;106(6):1236-1252. doi:10.1080/24694452.2016.1194740

44. Mann G, Cafer A, Kaiser K, Gordon K. Community resilience in a rural food system: documenting pathways to nutrition solutions. *Public Health*. 2020;186:157-163. doi:10.1016/j.puhe.2020.06.041

45. Rhone A, Ver Ploeg M, Williams R, Breneman V. *Understanding Low-Income and Low-Access Census Tracts Across the Nation: Subnational and Subpopulation Estimates of Access to Healthy Food.* May 2019. https://www.ers.usda.gov/webdocs/publications/93141/eib-209.pdf?v=1520.8

46. Henning-Smith CE, Hernandez AM, Hardeman RR, Ramirez MR, Kozhimannil KB. Rural counties with majority Black or Indigenous populations suffer the highest rates of premature death in the US. *Health Aff (Millwood).* 2019;38(12):2019-2026. doi:10.1377/hlthaff.2019.00847

47. Campbell EA, Shapiro MJ, Welsh C, Bleich SN, Cobb LK, Gittelsohn J. Healthy food availability among food sources in rural Maryland counties. *J Hunger Environ Nutr.* 2017;12(3):328-341. doi:10.1080/19320248.2017.1315328

48. Becker TB, Contreras D, Porth O. Differences in eating and physical activity behaviors, and perceived accessibility and availability barriers between Midwestern rural and urban adults. *J Hunger Environ Nutr.* 2022;17(3):347-362. doi:10.1080/19320248.2021.1930318

49. McGuirt JT, Pitts SBJ, Ammerman A, et al. A mixed methods comparison of urban and rural retail corner stores. *AIMS Public Health.* 2015;2(3):554-582. doi:10.3934/publichealth.2015.3.554

50. Conner A. Healthy Food Accessibility in Rural Mississippi and Potential for a Corner Store Intervention. 2021. Thesis. The University of Mississippi. https://egrove.olemiss.edu/hon_thesis/1622

51. Haynes-Maslow L, Jilcott Pitts SB, Boys KA, et al. Qualitative perspectives of the North Carolina healthy food small retailer program among customers in participating stores located in food deserts. *BMC Public Health.* 2021;21(1):1-10. doi:10.1186/s12889-021-11509-x

52. Taber DR, Chriqui JF, Quinn CM, Rimkus LM, Chaloupka FJ. Cross-sector analysis of socioeconomic, racial/ethnic, and urban/rural disparities in food policy enactment in the United States. *Health Place.* 2016;42:47-53. doi:10.1016/j.healthplace.2016.08.006

53. Hardin-Fanning F, Witt C, Rayens MK. Factors associated with food insecurity in rural central Appalachia. *J Nutr Educ Behav.* 2017;49(7):S15. doi:10.1016/j.jneb.2017.05.046.

54. Byker Shanks C, Ahmed S, Smith T, et al. Availability, price, and quality of fruits and vegetables in 12 rural Montana counties, 2014. *Prev Chronic Dis.* 2015;12:E128. doi:10.5888/pcd12.150158

55. Grimm KA, Moore LV, Scanlon KS. Access to healthier food retailers—United States, 2011. *MMWR Suppl.* 2013;62(3):20-26.

56. McCormack LA, Meendering JR, Burdette L, Prosch N, Moore L, Stluka S. Quantifying the food and physical activity environments in rural, high obesity communities. *Int J Environ Res Public Health.* 2021;18(24):13344. doi:10.3390/ijerph182413344

57. Lenardson JD, Hansen AY, Hartley D. Rural and remote food environments and obesity. *Curr Obes Rep.* 2015;4(1):46-53. doi:10.1007/s13679-014-0136-5

58. Tumwebaze J, Kagulire J, Dawkins NL. Overweight and obesity challenges among African Americans in rural Alabama Black Belt. *J Ext.* 2022;60(2):15. doi:10.34068/joe.60.02.15

59. Baturka N, Hornsby PP, Schorling JB. Clinical implications of body image among rural African-American women. *J Gen Intern Med.* 2000;15(4):235-241. doi: 10.1111/j.1525-1497.2000.06479.x

60. Tarasenko YN, Chen C, Smalley KB, Warren J. Rural-urban differences in perceptions of child overweight among children and adolescents, their guardians and health care professionals in the United States. *J Rural Health.* 2016;32(1):63-71. doi:10.1111/jrh.12135

61. Williams KJ, Taylor CA, Wolf KN, Lawson RF, Crespo R. Cultural perceptions of healthy weight in rural Appalachian youth. *Rural Remote Health.* 2008;8(2):1-13.

62. Fergus L, Seals K, Holston D. Nutrition interventions in low-income rural and urban retail environments: a systematic review. *J Acad Nutr Diet.* 2021;121(6):1087-1114. doi:10.1016/j.jand.2020.12.018

63. Kendall M, Broyles ST, Freightman J, Cater M, Holston D. Opportunities and challenges addressing access to healthy food in five rural Louisiana food stores. *Prev Chronic Dis.* 2019;16(E92):1-6. doi:10.5888/pcd16.190118

64. Gretchen Swanson Center for Nutrition. Gus Schumacher Nutrition Incentive Program Training, Technical Assistance, Evaluation, and Information Center (GusNIP NTAE): Impact Findings. Year 2: September 1, 2020 to August 31, 2021. https://www.nutritionincentivehub.org/media/fjohmr2n/gusnip-ntae-impact-findings-year-2.pdf

65. Ramirez AS, Rios LKD, Valdez Z, Estrada E, Ruiz A. Bringing produce to the people: implementing a social marketing food access intervention in rural food deserts. *J Nutr Educ Behav.* 2017;49(2):166-174.e1. doi:10.1016/j.jneb.2016.10.017

66. Houghtaling B, Serrano EL, Kraak VI, Harden SM, Davis GC, Misyak SA. A systematic review of factors that influence food store owner and manager decision making and ability or willingness to use choice architecture and marketing mix strategies to encourage healthy consumer purchases in the United States, 2005–2017. *Int J Behav Nutr Phys Act.* 2019;16(1):1-14. doi:10.1186/s12966-019-0767-8

67. Rushakoff JA, Zoughbie DE, Bui N, DeVito K, Makarechi L, Kubo H. Evaluation of Healthy2Go: a country store transformation project to improve the food environment and consumer choices in Appalachian Kentucky. *Prev Med Rep.* 2017;7:187-192. doi: 10.1016/j.pmedr.2017.06.009

68. Pitts SBJ, Bringolf KR, Lawton KK, et al. Formative evaluation for a healthy corner store initiative in Pitt County, North Carolina: assessing the rural food environment, part 2. 2013;10:E120. doi:10.5888/pcd10.120319

69. Browne J, Lock M, Walker T, Egan M, Backholer K. Effects of food policy actions on Indigenous Peoples' nutrition-related outcomes: a systematic review. *BMJ Global Health.* 2020;5(8):e002442. doi:10.1136/bmjgh-2020-002442

70. Lacko A, Ng SW, Popkin B. Urban vs. rural socioeconomic differences in the nutritional quality of household packaged food purchases by store type. *Int J Environ Res Public Health.* 2020;17(20):7637. doi:10.3390/ijerph17207637

71. Gustafson CR, Prate MR. Healthy food labels tailored to a high-risk, minority population more effectively promote healthy choices than generic labels. *Nutrients.* 2019;11(10)2272. doi:10.3390/nu11102272

72. Anderson T, Waxman E, Gundersen C. The impact of the Meals-to-You program on food insecurity. *Appl Econ Perspect Policy.* 2022;44(3):1499-1512. doi:10.1002/aepp.13299

73. Hing E, Hsiao C-J. *State Variability in Supply of Office-based Primary Care Providers, United States, 2012.* U.S. Department of Health and Human Services, Centers for Disease Control and Prevention; 2014.

74. Calcaterra V, Verduci E, Vandoni M, et al. Telehealth: a useful tool for the management of nutrition and exercise programs in pediatric obesity in the COVID-19 era. *Nutrients.* 2021;13(11):3689. doi:10.3390/nu13113689

75. Whitley A, Yahia N. Efficacy of clinic-based telehealth vs. face-to-face interventions for obesity treatment in children and adolescents in the United States and Canada: systematic review. *Child Obes.* 2021;17(5):299-310. doi:10.1089/chi.2020.0347

76. Davis AM, Sampilo M, Gallagher KS, et al. Treating rural paediatric obesity through telemedicine vs. telephone: outcomes from a cluster randomized controlled trial. *J Telemed Telecare.* 2016;22(2):86-95. doi:10.1177/1357633X15586642

77. Aldoory L, Yaros RA, Prado AA, Roberts E, Briones RL. Piloting health text messages for rural low-income mothers: effects of source similarity and simple action steps. *Health Promot Pract.* 2016;17(5):702-710. doi:10.1177/1524839915627457

78. Abildso CG, Bias TK, Coffman J. Adoption and reach of a statewide policy, systems, and environment intervention to increase

access to fresh fruits and vegetables in West Virginia. *Transl Behav Med.* 2019;9(5):847-856. doi:10.1093/tbm/ibz095

79. Piekarz-Porter E, Leider J, Turner L, Chriqui JF. District wellness policy nutrition standards are associated with healthier district food procurement practices in the United States. *Nutrients.* 2020;12(11):3417. doi:10.3390/nu12113417

80. Yaroch A, Byker Shanks, C, Nugent N, Fricke H, Parks C. Potential of financial incentives to promote fruit and vegetable intake and support food security. *United Nations Nutr J.* 2022;1:117-122. doi:10.4060/cc2805en

81. Downer S, Berkowitz SA, Harlan TS, Olstad DL, Mozaffarian D. Food is medicine: actions to integrate food and nutrition into healthcare. *BMJ.* 2020;369:m2482. doi:10.1136/bmj.m2482

82. Cohen JF, Kraak VI, Choumenkovitch SF, Hyatt RR, Economos CD. The CHANGE study: a healthy-lifestyles intervention to improve rural children's diet quality. *J Acad Nutr Diet.* 2014;114(1):48-53. doi:10.1016/j.jand.2013.08.014

83. Losada-Rojas LL, Ke Y, Pyrialakou VD, Gkritza K. Access to healthy food in urban and rural areas: an empirical analysis. *J Transp Health.* 2021;23:101245. doi:10.1016/j.jth.2021.101245

84. Redmond LC, Jock B, Gadhoke P, et al. OPREVENT (Obesity Prevention and Evaluation of InterVention Effectiveness in NaTive North Americans): design of a multilevel, multicomponent obesity intervention for native American adults and households. *Curr Dev Nutr.* 2019;3(Supplement2):81-93. doi:10.1093/cdn/nzz009

85. Gutschall M, Thompson K, Visocky S, Johnson K, McRee C. Historical examination of dietary patterns in rural Central/Southern Appalachia. *J Appalach Stud.* 2021;27(2):140-157. doi:10.5406/jappastud.27.2.0140

86. Bhuiyan N, Singh P, Harden SM, Mama SK. Rural physical activity interventions in the United States: a systematic review and RE-AIM evaluation. *Int J Behav Nutr Phys Act.* 2019;16:1-11. doi:10.1186/s12966-019-0903-5

87. Folta SC, Paul L, Nelson ME, et al. Changes in diet and physical activity resulting from the Strong Hearts, Healthy Communities randomized cardiovascular disease risk reduction multilevel intervention trial. *Int J Behav Nutr Phys Act.* Oct 2019;16(1)91. doi:10.1186/s12966-019-0852-z

88. Sanchez JI, Briant KJ, Wu-Georges S, et al. Eat Healthy, Be Active community workshops implemented with rural Hispanic women. *BMC Womens Health.* 2021;21(1):1-10. doi:10.1186/s12905-020-01157-5

89. Seguin RA, Lo BK, Sriram U, Connor LM, Totta A. Development and testing of a community audit tool to assess rural built environments: Inventories for Community Health Assessment in Rural Towns. *Prev Med Rep.* 2017;7:169-175. doi:10.1016/j.pmedr.2017.06.008

90. Love P, Whelan J, Bell C, McCracken J. Measuring rural food environments for local action in Australia: a systematic critical synthesis review. *Int J Environ Res Public Health.* 2019;16(13):2416. doi:10.3390/ijerph16132416

91. Major E, Delmelle EC, Delmelle E. SNAPScapes: using geodemographic segmentation to classify the food access landscape. *Urban Sci.* 2018;2(3):71. doi:10.3390/urbansci2030071

92. Ruiz JM, Steffen P, Smith TB. Hispanic mortality paradox: a systematic review and meta-analysis of the longitudinal literature. *Am J Public Health.* 2013;103(3):e52-60. doi:10.2105/AJPH.2012.301103

93. Teruya SA, Bazargan-Hejazi S. The immigrant and Hispanic paradoxes: a systematic review of their predictions and effects. *Hisp J Behav Sci.* 2013;35(4):486-509. doi:10.1177/0739986313499004

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Chapter 18. Rural Health Issues in Child and Adolescent Development

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# RURAL HEALTHY PEOPLE: OLDER ADULTS

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## PART 1. CHAPTER OVERVIEW

Drawing on Healthy People 2030 goals and objectives for older adults (see **Table 1** for relevant Healthy People 2030 goals and objectives addressed in this chapter), we cover priority topics related to aging, especially in the context of rural aging. In addition to contextualizing the health and social status of older adults in rural America, we discuss challenges to successful aging and provide examples of potential solutions to these challenges.

While we address many critical aspects of successful aging in this chapter, it is impossible to cover all relevant topics. As such, we encourage the examination of additional resources from the U.S. National Institutes of Health (NIH), including the National Institute on Aging (NIA) Health Disparities Framework,[1] U.S. Centers for Disease Control and Prevention (CDC),[2] National Council on Aging (NCOA),[3] Administration for Community Living (ACL),[4] Rural Health Research Gateway,[5] and other relevant resources.[6-8]

### *1.1. SCOPE OF THE PROBLEM*

- Aligned with the Healthy People 2030 goal to *'improve health and well-being for older adults'*, we highlight several key concepts important for successful aging.
- The population of older adults continues to grow throughout the U.S., necessitating solutions to multi-faceted issues linked with complex health-related outcomes.
- While chronic disease continues to dominate the leading causes of death for older adults, unintentional injury and infectious disease (e.g., COVID-19) are also significant contributors.
- Social disconnectedness and social isolation impact older adults in multiple ways.
- Solutions to common issues should be addressed from a variety of sectors and in multiple complementary ways (e.g., policy solutions, built environments, evidence-based programing).
- Aging is not simply a rural health issue, but a broader issue affecting people in all locations, and as such many aspects covered here are relevant for older adults in both rural and urban areas.
- People and places are unique with much of the available data limited to use of largely aggregated measures (e.g., by race and rurality) that may fail to capture all salient issues; albeit the points made in this chapter highlight valuable insights considering measurement limitations.
- The intersectionality of lived experiences across the life course indicates, in part, that noted variations in race, ethnicity, rurality, age, etc. may not represent the lived experience of many, given individuals may identify in many unique combinations of available measures.
- We recommend continued progress in measurement (e.g., better measurements, better data, more representation) and, therefore, the ability to consider more appropriate solutions based on tailored evidence-based information.

Table 1. Healthy People 2030 – selected "Older Adults" objectives.

| Topics | Selected Objectives | Status | Topic area partially addressed in this chapter |
|---|---|---|---|
| **General** | | | |
| | Increase the proportion of older adults with physical or cognitive health problems who get physical activity — OA-01 | Baseline only | Yes |
| | Reduce the rate of hospital admissions for diabetes among older adults — OA-05 | | Yes |
| **Dementias** | | | |
| | Increase the proportion of older adults with dementia, or their caregivers, who know they have it — DIA-01 | Baseline only | Yes |
| | Reduce the proportion of preventable hospitalizations in older adults with dementia — DIA-02 | | Yes |
| | Increase the proportion of adults with subjective cognitive decline who have discussed their symptoms with a provider — DIA-03 | | Yes |
| **Injury Prevention** | | | |
| | Reduce fall-related deaths among older adults — IVP-08 | Getting worse | Yes |
| | Reduce the rate of emergency department visits due to falls among older adults — OA-03 | Baseline only | Yes |
| **Osteoporosis** | | | |
| | Reduce hip fractures among older adults — O-02 | Baseline only | Yes |
| **Respiratory Disease** | | | |
| | Reduce the rate of hospital admissions for pneumonia among older adults — OA-06 | Baseline only | Yes |

## PART 2. INTRODUCTION

The population in the United States has seen, and continues to see, the proportion of older adults grow.[9] This leads to many new opportunities such as intergenerational and economic engagements, but also unique challenges related to health and well-being. While not all issues covered here are unique to rural areas, rural America does face many critical barriers in access to health care and economic challenges due in part to population loss, discussed in greater detail in this chapter. We first examine the leading causes of death and briefly review patterns of population movement. We then discuss demographic characteristics and selected special topics concerning aging and rurality. Finally, we conclude with potential strategies to address some of the identified issues.

### *2.1. LEADING CAUSES OF DEATH AMONG OLDER ADULTS AND OTHER KEY INDICATORS*

Examining the leading causes of death of older adults is one way to highlight the unique challenges facing older Americans, as well as unique considerations for rural Americans. Based on data from 1999 to 2020, the leading causes of death among those aged 65 and older include heart disease, cancer, COVID-19, cerebrovascular diseases, Alzheimer's Disease, chronic lower respiratory disease, diabetes, unintentional injuries, kidney disease, influenza and pneumonia,

and Parkinson Disease, among others.[10] While we do not discuss all leading chronic diseases in this chapter, we provide specific examples which can, in part, provide broader insights for other issues. For example, diabetes affects millions of older adults in the U.S. Of older adults aged 65 years or older, about 30% (15.9 million) have diabetes and 49% (26.4 million) have prediabetes or are at high risk of developing type 2 diabetes.[11,12] Additionally, those who live in underserved areas such as some rural communities are disproportionately affected by diabetes and diabetes-related comorbidities.[13-16]

While chronic diseases make up a substantial portion of those listed as leading causes of death among older adults, other types of causes of death are also included. For example, *unintentional injuries*, such as falls are a major issue facing older adults. Falls and the associated risk of falls can play a complicated role in ones' life that can result from and lead to many other health-related issues.[17] Researchers, therefore, suggest that while treatment is critical, prevention should target causal factors leading to falls.[18] Other items on the list of leading causes of death among older adults, that are not currently considered chronic diseases, include *COVID-19*, and influenza and pneumonia. Given the global reach of COVID-19 and its especially critical role for older adults, we provide a brief discussion of COVID-19 as related to older adults' health and the connection between COVID-19 and social isolation more broadly.

While not listed as a leading cause of death, social connectedness and related concepts are critical,[19-27] including *social isolation* and *social disconnectedness*, for people of all ages, but especially for rural older adults. Social isolation is an important underlying issue that has been linked to a higher risk of premature death, dementia, depression, anxiety and suicide, and costly hospital encounters, including emergency department visits.[28] This may be especially critical for older adults in areas with relatively lower population density, such as rural areas.

*2.2. CONTEXTUALIZING RURALITY*

Residents of rural areas, given the uniqueness of several population metrics such as socioeconomic characteristics and geospatial features (e.g., longer distances to certain resources, limited availability or variable quality of available resources)[29,30] when compared to their urban counterparts, may face additional challenges. While we utilize common terms such as rural or nonmetropolitan, which may carry different definitions depending on the unit of analysis (e.g., county, ZIP Code, Census Tract) and measure of rurality used (e.g., Rural-Urban Commuting Area Codes (RUCA),[31] Rural-Urban Continuum Codes (RUCC),[32] Urban Influence Codes (UIC),[33] National Center for Health Statistics or NCHS Urban-Rural Classification Scheme for Counties),[34] we also recognize significant heterogeneity in rural environments making each community unique. Thus, we encourage the reader to consider the limitations of providing this broad overview of several key items important to older adult health for the purpose of emphasizing rural populations and comparisons to more urban or metropolitan areas.

## PART 3. DEMOGRAPHIC COMPOSITION OF OLDER ADULTS

*3.1. BRIEF OVERVIEW OF KEY SOCIO-DEMOGRAPHICS ACROSS PEOPLE AND SPACE*

*3.1.1. Geospatial Clusters of Older Adults and Patterns of Population Movement*

The geospatial distribution of older adults throughout the U.S. indicates clustering in areas of the Southeast, West, Midwest, and Northeast.[35] Some states included larger clusters of older adults, where within the Southeast region of the U.S., Florida stood out as having several clusters throughout the state.[36] Overall, older adults moved less often than younger adults,[36] and among those moving, older adults were more likely to move shorter distances.[36] Interestingly, among older adults, those with a disability were more likely to move,[36] indicating a 63% higher likelihood of moving during the past year compared to those without a disability.[36] In terms of population movement by state in the U.S., census estimates suggested that Florida had more net migration than any other state (typical year, 2015–2019).[36] Most of those moving to Florida originated from New York, Pennsylvania, and Michigan[36]; while those moving to Arizona mostly originated from California, Washington, and Minnesota.[36]

In addition to these broader regional patterns of movement, rural America has faced significant population loss.[37] For example, among those aged 20-24, there was a 28% decline in nonmetropolitan areas, as compared to an 8% decline in metropolitan areas.[37] Identifying ways to reverse some of this population decline holds relevance for local economies (e.g., social capital, human capital, financial capital),[37] social isolation, and opportunities for intergenerational interactions to increase social connectedness. In addition, due to these population losses, rural communities are challenged with fewer individuals who can work, declines in revenue, and an overall aging population.[37]

*3.1.2. Patterns of Change among the Physician Workforce*

While the above patterns of movement impact both urban and rural areas, there are more specific considerations within rural areas in terms of the health care workforce. For example, in terms of the availability of physicians, evidence suggests that the majority (66%) of Health Professional Shortage Areas (HPSA) for *Primary Care* and HPSAs for *Mental Health* (62%) were in rural (or partially rural) areas as of 2018.[38] In addition, while the overall supply of physicians in rural areas increased by 3% between 2000 and 2017, younger physicians (<50 years of age) decreased by 25% during the same period, within *rural* areas. On the other hand, there was a 12% *increase* in younger physicians in *urban* areas during the same time.[38] In terms of the *projected* change in the size of the rural physician workforce, some findings suggest that the workforce will decrease by an estimated 23% from 2017 to 2030, with much of this change driven by those physicians aged 45 and older (of which a significant portion is expected to retire by 2030). This finding is in contrast to urban areas with relatively stable estimates along the same timeline.[38]

*3.1.3. Racial and Ethnic Composition of Older Adults*

We describe comparisons by race and ethnicity in this chapter due to the critical historic and contemporary inequities identified by these categorical classifications. At this same time, we recognize that use of aggregation is a practical solution to identifying important epidemiological trends. We also recognize that individuals are unique and larger aggregations may lose critical information and are therefore significantly limited in nature, albeit still of relevance when tracking changes over time. The proportion of older adults represented by non-Hispanic White individuals is projected to change from an estimated 76% to 55% from 2020 to 2060.[39] By 2060, it is estimated that 21% of older adults will be of Hispanic ethnicity, followed by 14% for Black or African American individuals, and 9% for Asian individuals. As of 2019, 24% of those aged 65 and older were classified as being a member of a racial or ethnic minority population.[40] The highest percentage of those aged 65 and older by race and ethnicity reported was non-Hispanic Asian American (13%), followed by non-Hispanic African American (12%), non-Hispanic American Indian or Alaska Native (12%), non-Hispanic Native Hawaiian and Other Pacific Islander (10%), Hispanic (8%), and persons identifying as two or more groups (6%).[40]

In terms of rurality, evidence suggests that among rural areas certain racial/ethnic minority groups (excluding individuals identifying as Asian and Native Hawaiian and Other Pacific Islander) experienced a higher likelihood of reporting their health as fair or poor, being obese, and forgoing medical care in the past 12 months because of cost as compared to non-Hispanic White individuals.[41] Furthermore, among rural areas, all racial/ethnic minority groups included in a national analyses were less likely to indicate they had a personal health care provider, as compared to non-Hispanic White individuals.[41]

*3.1.4. Life Expectancy at Age 65*

An examination of inequities in life expectancy beyond age 65 provides important insights. Overall, additional life expectancy at age 65 in the U.S. was approximately 20 years - 20.8 years for females and 18.2 years for males.[42] Additionally, life expectancy at age 65 was estimated to be 18 years for Black individuals compared to 19.4 years for White individuals, and 21.4 years for Hispanic individuals in a recent report.[39] In terms of geospatial comparisons in life expectancy at age 65, some evidence suggests that gains in life expectancy, while promising overall, were not equal across geography.[43] In fact, analyses covering the years 2000-2016 identified that

individuals residing in nonmetropolitan areas had *smaller* relative gains, as compared to individuals residing within larger metropolitan areas and that overall, metropolitan status was a stronger predictor of changes in mortality than region.[43] This highlights an important issue of inequity facing older adults by sex, race, ethnicity, and rurality across the U.S.

## PART 4. SELECT EXAMPLES OF CHALLENGES FACING OLDER ADULTS

### *4.1. CHRONIC DISEASE*

#### *4.1.1. Alzheimer's Disease and Related Dementias (ADRD)*

Alzheimer's Disease and related dementias (ADRD) are on the rise, with nearly all cases occurring among those aged 65 and older, albeit with a growing concern for early-onset dementia affecting those younger than 65 years.[44] Current estimates put the expected number of older adults with Alzheimer's Disease at 13.8 million by 2060,[45] up from an estimated 6.1 million in 2020.[45] In terms of hospital encounters, individuals aged 65 and older with ADRD had higher rates of hospitalization than those without ADRD.[46] Thus, health care utilization and thereby access to health care resources are of critical need for those with ADRD.

Given a higher need and utilization of health care resources for those with ADRD, having adequate resources in place and accessible for those with ADRD and their caregivers becomes critical. Overall, an estimated 20 states in the U.S. are labeled "dementia neurology deserts" indicating fewer than 10 neurologists per 10,000 individuals with ADRD by 2025.[47,48] As additional support for the aforementioned shortages of physicians in rural areas, some evidence suggested that a lack of specialists was reported by 71% of primary care physicians located in rural areas, compared to 63% in small cities/towns, 54% in suburbs near a large city, and 44% within large cities.[47] In addition, recent evidence suggests that the 'risk-adjusted ADRD diagnostic incidence' rate was higher among rural counties (versus metropolitan areas) and that this higher rate was present even though the overall prevalence was lower.[49] Additionally, among those with diagnosed ADRD as of 2008, there was longer survival among those living in metropolitan areas as compared to those in rural and micropolitan areas.[49] Thus, access and utilization of health care resources for those with ADRD remains a challenge in rural areas, indicating another important issue highlighting inequities facing rural residents.

#### *4.1.2. Type 2 Diabetes*

Diabetes, among the leading causes of death for older adults, imposes a substantial economic burden on the healthcare system and older adults. It was estimated that in the U.S., the total cost of diagnosed diabetes in 2017 was $327 billion including $237 billion in medical costs and $90 billion in lost productivity.[50] It was also reported that medical expenditure estimates among those with diagnosed diabetes were approximately 2.3 times that of those without the diagnosis.[51] The average per capita cost of medical care for individuals aged 65 years or older with diabetes was estimated to be $13,239.[50] The majority of older adults are covered under Medicare for their primary health care coverage.[52] Medicare plays a vital role in diabetes prevention and diabetes care and management for older adults with estimates of Medicare spending $42 billion more on diabetes in 2016 than it would have otherwise if those same individuals did not have diabetes.[53]

The overall diagnosed diabetes rates varied by race and ethnicity, where the highest rates were reported among American Indian/Alaskan Native (14.5%), followed by non-Hispanic Black (12.1%), Hispanic (11.8%), Asian (9.5%), and non-Hispanic White (7.4%) individuals.[54] Inequities were also present by rurality, where analyses using data spanning 1999-2018 found diabetes mortality rates were higher in rural areas than urban areas.[55] Additionally, rural adults aged 65 and older are less financially secure than their urban counterparts,[56] have a higher percentage of low or moderate incomes,[56] and have about half the household assets of urban older adults.[56] Thus, identification of inequities by race, ethnicity, and rurality, indicates a critical need to consider multi-faceted solutions for diabetes prevention and management.

### *4.2. FALLS*

As the leading cause of injury-related morbidity and mortality among older adults in the U.S.,

falls accounted for approximately 950,000 hospitalizations (including transfers to another medical facility) and 32,000 deaths in 2018.[57] In 2018, 27.5% of older adults experienced at least one fall, resulting in 35.6 million total reported falls and 8.4 million fall-related injuries.[57] A higher percentage of these reports came from rural residents compared to urban residents,[57] especially among older adults ages 65-74 years, which demonstrates that rurality is an important determinant of falls among older adults. The World Health Organization (WHO) attributes the association of rurality and falls to socioeconomic factors, specifically low and unreliable income; however, other risk factors include lack of access to healthcare services, higher rates of chronic illness, lack of nutritious food options, and inadequate environments for safe walking, all of which are in need of further exploration to determine the quantitative differences in these variables based on rurality.[58] Other risk factors include advanced age; visual, auditory, and cognitive impairments; medication use; and environmental characteristics such as poor lighting and flooring that inhibit mobility.[59]

The financial consequences of this susceptibility can be catastrophic, and the economic burden of falls is expected to increase in the coming decade, with medical expenditures for fatal falls reaching over $101 billion by 2030.[60] Using the CDC's Web-based Injury Statistics Query and Reporting System (WISQARS) and the U.S. Census Bureau's population projections, the estimated number of annual fatal falls could reach 100,000 by 2030,[60] indicating that unintentional falls will continue to pose a substantial public health threat without effective interventions, which are less available and accessible in rural areas.[61] Therefore, rural communities should invest in preventive infrastructure including safer walkways, better outdoor lighting, and more robust physical and/or occupational therapeutic services to minimize the effects of fall-related morbidity and mortality.

### *4.3. OTHER SPECIAL ISSUES*

#### *4.3.1. COVID-19 and Rurality*

COVID-19 impacted life in nearly every part of the world, including both rural and urban areas, with evidence of a differential impact such that the incidence rates in 2020 were higher in urban versus rural areas in certain regions (northeast, Mid-Atlantic),[62] yet this shifted later in the pandemic where COVID-19-related mortality rates rose. Other analyses suggested that among those with COVID-19, residents in rural communities were more likely to be hospitalized, suffer mortality, or suffer other adverse outcomes than those in urban areas.[63]

#### *4.3.2. COVID-19 Social Distancing Effects on Older Rural Adults*

To limit the spread of COVID-19, social distancing protocols were utilized across the country and elsewhere. Particularly for populations that would be most impacted by infection, these protocols became a prominent part of daily life. Older adults were encouraged to reduce interactions with others which resulted in an increase of social isolation. Additionally, older adults in rural areas may have fewer social relationships, yet with higher value placed on those relationships.[64] Thus, the impact of reducing or restricting communal and social opportunities for interaction should be monitored for impacts on rural older adults.

During a multi-year study of data from the Health and Retirement Study, loneliness was associated with a 40% increased risk of dementia regardless of race, gender, ethnicity, education, or genetic risk factors.[65] A 2018 meta-analysis indicated that loneliness was linked to all-cause mortality.[66] Furthermore, a recent report, listed rural residents, among others, as at-risk groups in terms of social disconnection.[67] In addition, some evidence suggests an increased risk of suicide associated with rural residence.[68,69] Limited access to preventive or emergency services which are compounded by sociocultural factors make suicide among rural communities a public health concern.[68,69] Thus, social disconnectedness, loneliness, and geographical location play a significant role in the health and well-being of rural residents.

While protocols were implemented to limit the impact of COVID-19, they also exacerbated the negative effects of reduced socialization.[70,71] Pre-existing conditions such as memory loss and physical abilities were reported to be amplified.[71]

Additionally, the absence of social interaction through visitations created a void of supplemental care which increased the burden of care on healthcare workers.[72] While adjusting to the protocols of COVID-19, communication between staff and patients became important for the safety and well-being of patients due to the increased dependence on interactions between the two and reduced interactions between friends and family.[72]

*4.3.3. Native American Populations and Rurality*

We briefly examine this rather complex topic yet note that it would be impossible to fully consider all relevant items in the space provided. Per the Bureau of Indian Affairs (BIA), as of the writing of this chapter, use of the terms "American Indian" and "Alaska Native" carries specific considerations reflecting, in part, the unique history of Native Peoples within what is now, largely the U.S., and in consideration of services (funded or directly provided by) the BIA.[73] In addition, per the National Museum of the American Indian, "American Indian, Indian, Native American, or Native" are acceptable and often used interchangeably in the U.S.; however, Native Peoples often have individual preferences on how they would like to be addressed".[74] Per a recent National Congress of American Indians report, approximately "574 sovereign tribal nations (variously called tribes, nations, bands, pueblos, communities, and Native villages) have a formal nation-to-nation relationship with the U.S. government".[75] This large number of diverse individuals and nations creates a significant challenge for interpreting key statistics using broad categories from empirical data grouping nearly 600 individual tribal nations with varying health-related outcomes, resources, locations, and history. However, as of the writing of this chapter, even in light of these major considerations, data at a more micro scale with relevant detail to allow for tailored findings is largely absent in large national surveys. Thus, we provide some key statistics using the more limited classifications available at this time.

We discuss this topic in this chapter, because of the expected increase in the population of American Indian and Alaska Native (AI/AN) individuals aged 65 years or older and the significant health equity issues related to this group. AI/AN individuals are expected to increase from roughly 0.5% of the older adult population in 2017 to nearly 0.7% by 2060,[76] representing a more than ***doubling*** of the *number* of individuals, from 272,250 to more than 648,000.[77] Moreover, 29% of individuals identified as American Indian compared to 15% of individuals in the total population[78] resided in rural areas. In addition, rural disparities in death rates were highest among AI/AN populations,[79] between 2013 and 2017. In the same study, analyses of multi-year trends demonstrated a disproportionate mortality rate for unintentional injury present among AI/AN populations that was higher than any other population by race and ethnicity and by rural location.[79] Furthermore, barriers in accessing healthcare services facing both Native American individuals residing in rural areas and the larger rural population include longer distances, transportation barriers, limited resources and facilities, and limited supplies of health care professionals.[80] Furthermore, even after adjusting for rurality and other factors (e.g., income, education, state, population aged 65 and older), areas with higher concentrations of Native American individuals experienced greater distances to providers, and lower screening rates for specific cancers in a large national study.[81] Furthermore, another national study identified poorer quality of Medicare-certified home health care in areas with higher concentrations of Native American individuals across multiple quality indicators, even after adjusting for rurality.[30]

*4.3.4. Social Connectedness and Social Isolation*

In a recent report by the U.S. Surgeon General, among the cited groups that were at highest risk for social disconnection were rural residents, individuals from racial and ethnic minority groups, and other noted populations.[67] In addition, social isolation, while integrated throughout this chapter in multiple ways, is also briefly covered here. Social isolation is both modifiable and linked to negative health-related outcomes,[82] making it critical to assess. There is currently mixed evidence about variation in social isolation by rurality. For example, some evidence from a national sample indicated that the rates of social isolation were 21% lower in urban areas as compared to rural areas, albeit without evidence of a significant difference, which the authors point out may be due a small sample of 'non-

urban areas'.[82] In contrast, another study with a national sample identified less social isolation among rural residents as compared to urban residents.[83] However, this same study identified that among rural residents, individuals identified as non-Hispanic Black, were more likely to report loneliness than non-Hispanic White individuals.[83] In light of these results, and other existing evidence of the role of individual-level factors and place-based factors,[1,84] we recommend continued surveillance considering multiple factors such as race, ethnicity, age, U.S. Census Region, multiple measures of rurality,[31-34] and using multiple measurement levels (e.g., ZIP Code, County) in assessing social isolation in future studies.

## PART 5. EXAMPLES OF INTERVENTIONS AND POTENTIAL SOLUTIONS TO CHALLENGES FACING OLDER ADULTS

There are several potential solutions to issues facing older adults, given no single item is likely to provide a solution to any one issue comprehensively. What we provide here is by no means an exhaustive discussion, albeit we do provide several items for consideration that will be critical for diverse stakeholder groups with an interest in healthy aging issues.

Broadly speaking, investment in health care resources, especially in under-resourced areas of the country, are critical, especially to combat health inequities. These healthcare resources should span the continuum from prevention to treatment to recovery services. Furthermore, investment in and promotion of research by NIH, the Alzheimer's Association, and other major research funders will continue to be critical, especially for research that examines health inequities. More specific recommendations are provided in what follows.

### *5.1. POLICY AND COMMUNITY INTERVENTIONS*

#### *5.1.1. Policy Considerations for Novel Issues related to COVID-19 and Social Isolation*

Emergency management strategies for future potential situations similar to the COVID-19 pandemic should observe precautionary measures that can be taken to limit the impact of reduced socialization. While physical isolation may reduce immediate threats of exposure, it may paradoxically lead to limited interactions essential for older adults' social and emotional well-being, functional support, and resource utilization.[85] Many older adults depend on social networks as a primary resource for retaining a healthy ability to age in their communities.[86] It is suggested that "connection plans" be developed to retain communication with older adults and their social network.[87] This will provide a predetermined hierarchy and formation of communication to friends, family, and medical personnel. This should be paired with a "safety plan" to predetermine responses if there is a failure in the "connection plan" or if the older adult is found to need services.[87] Additionally, there is a need for campaigning for a de-stigmatization of mental health utilization in rural communities. Public health messaging on how to access mental health services in rural areas can be key to overcoming sociocultural factors that prevent utilization of mental healthcare and crisis support services.[88]

A review of publications related to COVID-19 noted the effects of quarantines and revealed suggestions to mitigate negative impacts.[89] Isolation should be monitored for necessity and should be reduced in the time of quarantine to what is deemed necessary. Additionally, information should be readily available and provided to individuals in isolation that provides the rational for time in isolation. Supply availability should also be considered while individuals are in isolation to mitigate issues pertaining to food security and medical stability.[89]

Technological difficulties may inhibit people with communication difficulties such as sight or hearing loss from utilizing telemedicine options. However, the usage of alternative communication methods can ease the impact of reduced socialization and was shown to be accepted by the patients in medical facilities even for people with minor cognitive declines.[90,91] Further consideration and research are needed to combine the use of technology with established Age-Friendly Health Systems which can be pivotal in meeting the needs of older adults in rural areas.[92] A report of the Alzheimer Society of Canada Task Force concluded that while still early in research development, video-based telecommunication can yield promising and

reliable results for neuropsychological testing which suggest that this method can influence the future design of remote care.[93,94]

*5.1.2. Evidence-Based Programs*

Evidence-based programs delivered to community-dwelling adults remain critical, given their science-based approach to improving the health of adults throughout the nation.[95] We take one disease type as an example of the potential for policy interventions, but we realize this one example may not fully represent the extent of solutions needed for this disease or others. To prevent or delay type 2 diabetes and reduce diabetes-related complications, an evidence-based intervention such as Diabetes Self-management Education and Support (DSMES) for those with diabetes, and the National Diabetes Prevention Program (NDPP) for those with prediabetes, are recommended by the American Diabetes Association (ADA) and the CDC. However, reports have shown that the participation in both interventions have been low among older adults; although both programs are covered benefits for Medicare beneficiaries.[96-100] Older adults living in rural communities with access disparities in health care and providers, need strategies and policies that can be implemented to improve the uptake of both programs. The CDC has been leading several efforts to mitigate this public health issue. For example, State Public Health Actions (SPHA-1305), a cooperative agreement, provided strategies for healthcare systems and communities to prevent and reduce chronic disease and associated complications.[101] One of the key goals of the SPHA-1305 was to increase access to and participation in DSMES.[101] A similar program-DP17-1705, also implemented by CDC, aims to scale up NDPP in underserved areas.[102] Both of these cooperative agreements show the effort by the CDC to promote DSMES and NDPP to reduce the diabetes burden. Yet, more efforts are needed due to the complexity of the disease, particularly with local communities and organizations' involvement in implementing evidence-based strategies and policies that can increase the participation of both programs.

For rural communities, with fewer resources and providers, organizations may face challenges in the application process for accreditation and recognition for their DSMES programs by the American Association of Diabetes Educators (AADE) and American Diabetes Association (ADA).[103] Targeted technical assistance for rural organizations from Centers for Medicare and Medicaid Services (CMS) or the CDC to support and streamline the processes of AADE accreditation and ADA recognition should be considered.[103] Lack of availability of the programs in rural areas also is a key concern. The use of telehealth to improve the accessibility of DSMES in rural areas can be a viable option.[104,105] However, only 38% of rural counties had DSMES.[104] Additionally, virtual delivery of the program may help reduce the burden on rural organizations with possible sharing of resources such as a certified diabetes educator working among different organizations when applicable.[103] While DSMT was allowed to be delivered via telehealth during the COVID-19 Public Health Emergency (PHE), CMS has not committed to continuing the current telehealth policies beyond PHE.[106,107] Awareness campaigns highlighting the need and availability of the programs should be communicated to providers, rural communities, and local organizations to ensure the utilization and sustainability of DSMES for rural residents.[108]

*5.1.3. Built Environmental Interventions*

*Activity-Friendly, Age-Friendly, and Dementia-Friendly Communities.* Features of the built environment are shown to influence various health behaviors and outcomes directly and indirectly. Older adults are more vulnerable to environmental risk factors, and therefore supportive community environments are prerequisite to promoting their health and well-being. A rich body of literature shows that neighborhood environments can serve to promote or hinder community-dwelling older adults' physical activity, social interactions, and mobility, which can impact their long-term health and quality of life. Studies show that walkability of the neighborhood, such as sidewalk availability, proximity to destinations, availability of recreational facilities, and high visual quality, are significantly correlated with older adults' walking, physical activity, and overall perceived health status.[109-114] More detailed conditions like walking surfaces, crossing conditions, lighting, and benches were

also shown to impact older adult's walking and other healthy outdoor activities[115-117] and reduce the risk and fear of falling.[118-120]

Despite increasing policy efforts and programs on dementia-friendly and intergenerational communities, empirical evidence is relatively limited. A recently published systematic review summarizing findings from 37 studies concluded that evidence exists to support the significant role of the neighborhood built environment in general, but lacks in determining the specific measures/contexts linked with specific cognitive health and dementia risk variables.[121] However, more consistent evidence was found for the measures related to parks and green spaces in urban communities in improving cognitive health or reducing dementia risks.[121] Urban-rural differences were also discussed in this review study, but with inconsistent or insufficient results. A recent study identified high-speed streets and traffic-related safety was negatively correlated with older adult's social interactions, especially for intergenerational interactions with children.[122] These strategies are needed in both rural and urban areas, albeit the implementation of these strategies will likely need to be tailored to a given community, regardless of the location, based on the relevant needs, resources, and other considerations. For example, variation in population density (which is typically lower in rural areas), personal preferences, etc. may drive certain choices (e.g., density of benches in the city center) and should be considered by various stakeholders in creating resources that are welcoming for residents, especially those with unique needs.

The WHO has provided guidance[123] for age-friendly community designs that are relevant to both rural and urban areas. This guidance is meant to aide stakeholders (e.g., urban planners, city planners) around the world in better identifying and implementing smart community designs with features within built environments that can aide older adults as they navigate their community.[124] Examples of community design indicators highlighted include equity measures and age-friendly environment outcomes, with emphasis on the impact on well-being.[123] The creation of and/or maintenance of age-friendly environments plays a role in multiple aspects of successful aging. For example, communities considered as more walkable were associated with higher levels of moderate-to-vigorous physical activity and also higher levels of transport activity and lower body mass index, as compared to areas that were less walkable.[125] Reaching adequate levels of physical activity is critical for elder health in multiple ways. For example, evidence suggests that not meeting physical activity guidelines was associated with poorer physical and mental health among older adults.[126] Thus, considerations into how to create and sustain age-friendly environments in all areas of the country and beyond should be strongly considered.

*Social Isolation and Intergenerational Interactions.* Designing age-friendly environments includes ways to lessen the likelihood of social isolation, a critical barrier to successful aging. Intergenerational interactions can be one of many ways to lessen the likelihood of social isolation, especially among older adults, and can bring mutual benefits to both older and younger individuals.[127] These intergenerational interactions can, among other things, provide opportunities to engage in physical activity, build social relationships, improve well-being, and can even act to promote cognitive function.[127] To facilitate intergenerational interactions, it is essential to strengthen social infrastructures in rural communities and introduce pro-connection public policies that can create a culture of connection.[67] Thus, these built environmental interventions more broadly hold promise for millions of older adults within and outside of rural areas and, what's more, can work to promote healthy lifestyles (e.g., promotion of physical activity and social interactions) among people of all ages.

## PART 6. CONCLUSIONS

Every person alive today is aging and as such are stakeholders on this topic. Older adults face challenges that are unique in many ways, highlighted in part, within this chapter. At the same time, some of these challenges, such as social connectedness and social isolation, can be aided in many ways, including, but not limited to the information included within this chapter (e.g., age-friendly community designs). Unique health inequities face older rural residents. In many cases rurality geospatially overlaps with

other disadvantaged population indicators such as historically marginalized racial or ethnic populations, and/or populations with lower socioeconomic status, creating a double or triple jeopardy. The intersectionality of individuals' lived experiences over time and places creates complications for analyses in that one cannot perfectly disentangle this experience into single compartmentalized classifications (e.g., race, ethnicity, rurality). As such, we recommend embedding and disseminating evidence-based programs, policies, and environmental interventions that resonate with rural populations and that are sensitive to the uniqueness of individuals' lived experiences in critical ways. We further recommend continued public health surveillance of progress or the lack thereof on the topics covered in this chapter, especially for the millions of older adults residing in the rural U.S.

## REFERENCES


1. Hill CV, Pérez-Stable EJ, Anderson NA, Bernard MA. The National Institute on Aging health disparities research framework. *Ethn Dis.* 2015;25(3):245-254. doi:10.18865/ed.25.3.245

2. Promoting Health for Older Adults. Centers for Disease Control and Prevention. Updated September 8, 2022. Accessed June 20, 2023. https://www.cdc.gov/chronicdisease/resources/publications/factsheets/promoting-health-for-older-adults.htm

3. National Council on Aging. Accessed June 20, 2023. https://www.ncoa.org/

4. Administration for Community Living. Accessed June 20, 2023. https://acl.gov/

5. Rural Health Research Gateway. Accessed June 20, 2023. https://www.ruralhealthresearch.org/

6. Towne SD Jr, Smith ML, Pulczinski J, Lee C, Ory MG. Older Adults. Chapter 8. In: Bolin JN, Bellamy G, Ferdinand AO, Kasha BA, Helduser JW, eds. (2015) *Rural Healthy People 2020. Vol 1.* College Station, Texas: Texas A&M Health Science Center School of Public Health, Southwest Rural Health Research Center; p.107-118.

7. Towne Jr SD, Probst JC, Smith ML, Salinas M, Ory MG. Rural Health and Aging: Global Perspectives. In: *Encyclopedia of Geropsychology.* Springer International Publishing; 2016:1-7. doi:10.1007/978-981-287-082-7_257

8. National Association of Area Agencies on Aging. Accessed June 20, 2023. https://www.usaging.org/

9. An Aging Nation: Projected Number of Children and Older Adults. United States Census Bureau. Updated October 8, 2021. https://www.census.gov/library/visualizations/2018/comm/historic-first.html

10. Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 1999-2020 on CDC WONDER Online Database, released in 2021. Data are from the Multiple Cause of Death Files, 1999-2020, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed January 31, 2023. http://wonder.cdc.gov/ucd-icd10.html

11. Prevalence of Both Diagnosed and Undiagnosed Diabetes. Centers for Disease Control and Prevention. Updated September 30, 2022. Accessed January 26, 2023. https://www.cdc.gov/diabetes/data/statistics-report/diagnosed-undiagnosed-diabetes.html

12. National Diabetes Statistics Report. Centers for Disease Control and Prevention. Updated June 29, 2022. Accessed January 26, 2023. https://www.cdc.gov/diabetes/data/statistics-report/index.html

13. Curtin SC, Spencer MR. Trends in Death Rates in Urban and Rural Areas: United States, 1999-2019. *NCHS Data Brief.* 2021;(417):1-8. doi:10.15620/cdc:109049

14. Mercado CI, McKeever Bullard K, Gregg EW, Ali MK, Saydah SH, Imperatore G. Differences in U.S. Rural-Urban Trends in Diabetes ABCS, 1999-2018. *Diabetes Care.* Aug 2021;44(8):1766-1773. doi:10.2337/dc20-0097

15. O'Connor A, Wellenius G. Rural-urban disparities in the prevalence of diabetes and coronary heart disease. *Public Health.* Oct 2012;126(10):813-20. doi:10.1016/j.puhe.2012.05.029

16. McAlexander TP, Malla G, Uddin J, et al. Urban and rural differences in new onset type 2 diabetes: comparisons across national and regional samples in the diabetes LEAD network. *SSM Popul Health.* 2022;19:101161. doi:10.1016/j.ssmph.2022.101161

17. Smith ML, Ory MG. Multi-directional nature of falls among older adults: a rationale for prevention and management. *Front Public Health.* 2023;11:1117863. doi:10.3389%2Ffpubh.2023.1117863

18. Vaishya R, Vaish A. Falls in older adults are serious. *Indian J Orthop.* 2020;54(1):69-74. doi:10.1007%2Fs43465-019-00037-x

19. Kearns A, Whitley E, Tannahill C, Ellaway A. Loneliness, social relations and health and well-being in deprived communities. P*sychol Health Med.* 2015;20(3):332-44. doi:10.1080/13548506.2014.940354

20. Scharf T, Phillipson C, Smith AE. Social exclusion of older people in deprived urban communities of England. Eur J Ageing. 2005;2(2):76-87. doi:10.1007%2Fs10433-005-0025-6

21. Algren MH, Ekholm O, Nielsen L, Ersbøll AK, Bak CK, Andersen PT. Social isolation, loneliness, socioeconomic status, and health-risk behaviour in deprived neighbourhoods in Denmark: a cross-sectional study. *SSM Popul Health.* 2020;10:100546. doi:10.1016/j.ssmph.2020.100546

22. Tapia-Muñoz T, Staudinger UM, Allel K, et al. Income inequality and its relationship with loneliness prevalence: a cross-sectional study among older adults in the US and 16 European countries. *PLoS One.* 2022;17(12):e0274518. doi:10.1371/journal.pone.0274518

23. Valtorta NK, Kanaan M, Gilbody S, Ronzi S, Hanratty B. Loneliness and social isolation as risk factors for coronary heart disease and stroke: systematic review and meta-analysis of longitudinal observational studies. *Heart.* 2016;102(13):1009-1016. doi:10.1136/heartjnl-2015-308790

24. Cené CW, Beckie TM, Sims M, et al. Effects of objective and perceived social isolation on cardiovascular and brain health: a scientific statement from the American Heart Association. *J Am Heart Assoc.* 2022;11(16):e026493. doi:10.1161/JAHA.122.026493

25. Cudjoe TK, Prichett L, Szanton SL, Roberts Lavigne LC, Thorpe Jr RJ. Social isolation, homebound status, and race among older adults: findings from the National Health and Aging Trends Study (2011–2019). *J Am Geriatr Soc.* 2022;70(7):2093-2100.doi:10.1111/jgs.17795

26. Huang AR, Roth DL, Cidav T, et al. Social isolation and 9-year dementia risk in community-dwelling Medicare beneficiaries in the United States. *J Am Geriatr Soc.* 2023;71(3):765-773. doi:10.1111/jgs.18140

27. Holt-Lunstad J, Smith TB, Baker M, Harris T, Stephenson D. Loneliness and social isolation as risk factors for mortality: a meta-analytic review. *Perspect Psychol Sci.* 2015;10(2):227-37. doi:10.1177/1745691614568352

28. National Academies of Sciences E, Medicine. Social isolation and loneliness in older adults: Opportunities for the health care system. National Academies Press; 2020. doi:10.17226/25663

29. Probst JC TSJ, Mitchell J, Bennett KJ, Chen Z. Home Health Care Provider Availability in Rural Areas. 2014. doi:10.1080/01621424.2016.1175991

30. Towne SD, Probst JC, Mitchell J, Chen Z. Poorer quality outcomes of Medicare-certified health care in areas with high levels of Native American/Alaska Native residents. *J Aging Health.* 2015;27(8):1339-57. doi:10.1177/0898264315583051

31. Cromartie J. Rural-urban commuting area codes. 2005. Updated: March 22, 2023. Accessed July 9, 2023. https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes/

32. Rural-Urban Continuum Codes (RUCC). Economic Research Service. U.S. Department of Agriculture. Accessed June 20, 2023. https://www.ers.usda.gov/data-products/rural-urban-continuum-codes/

33. Ghelfi LM, Parker TS. A county-level measure of urban influence. *Rural America/Rural Development Perspectives.* 1997;12:32-41. doi:10.22004/ag.econ.289732

34. Ingram DD, Franco SJ. 2013 NCHS Urban-Rural Classification Scheme for Counties. *Vital Health Stat 2.* 2014;(166):1-73.

35. U.S. Census Bureau. Figure 1 Percentage Population Aged 65 and Over: 2013-2017. Accessed June 20, 2023.https://www.census.gov/content/dam/Census/library/visualizations/time-series/demo/older-population/Figure%201%20Population%20Aged%2065%20and%20Over.pdf

36. Peter J. Mateyka and Wan He, U.S. Census Bureau,Current Population Reports, Domestic Migration of Older Americans: 2015–2019, P23-218, U.S. Government Publishing Office, Washington, DC, September 2022. Accessed June 20, 2023. https://www.census.gov/content/dam/Census/library/publications/2022/demo/p23-218.pdf

37. Cromartie J, von Reichert C, Arthun R. Why some return home to rural America and why it matters. 2015. Accessed June 20, 2023. https://www.ers.usda.gov/amber-waves/2015/july/why-some-return-home-to-rural-america-and-why-it-matters/

38. Skinner L, Staiger DO, Auerbach DI, Buerhaus PI. Implications of an aging rural physician workforce. *N Engl J Med.* 2019;381(4):299-301. doi:10.1056/nejmp1900808

39. Ochieng N, Cubanski J, Neuman T, Artiga S, Damico A. Racial and ethnic health inequities and Medicare. Kaiser Family Foundation. February 16, 2021. Accessed June 20, 2023. https://www.kff.org/medicare/report/racial-and-ethnic-health-inequities-and-medicare/

40. 2020 Profile of Older Americans. Administration on Aging (AoA), part of the Administration for Community Living, an operating division of the U.S. Department of Health and Human Services. May 2021. Accessed June 20, 2023. https://acl.gov/sites/default/files/aging%20and%20Disability%20In%20America/2020Profileolderamericans.final_.pdf

41. James CV, Moonesinghe R, Wilson-Frederick SM, Hall JE, Penman-Aguilar A, Bouye K. Racial/ethnic health disparities among rural adults—United States, 2012–2015. *MMWR Surveill Summ.* 2017;66(23):1-9. doi:10.15585/mmwr.ss6623a1

42. Kochanek KD, Xu JQ, Arias E. Mortality in the United States, 2019. NCHS Data Brief, no 395. Hyattsville, MD: National Center for Health Statistics. 2020. Accessed on June 20, 2023. https://www.cdc.gov/nchs/data/databriefs/db395-H.pdf

43. Vierboom YC, Preston SH. Life beyond 65: Changing spatial patterns of survival at older ages in the United States, 2000–2016. *J Gerontol B Psychol Sci Soc Sci.* 2020;75(5):1093-1103. doi:10.1093%2Fgeronb%2Fgbz160

44. National Institute on Aging (NIA). What Are the Signs of Alzheimer's Disease? Accessed on June 20, 2023. https://www.nia.nih.gov/health/what-are-signs-alzheimers-disease#:~:text=For%20most%20people%20with%20Alzheimer's,30s%2C%20although%20this%20is%20rare

45. Alzheimer's Association. 2023 Alzheimer's Disease Facts and Figures. The Patient Journey In An Era of New Treatments. *Alzheimers Dement.* 2023;19(4) doi:10.1002/alz.13016. 2023.https://www.alz.org/media/Documents/alzheimers-facts-and-figures.pdf

46. Phelan EA, Borson S, Grothaus L, Balch S, Larson EB. Association of incident dementia with hospitalizations. *JAMA.* 2012;307(2):165-72. doi:10.1001/jama.2011.1964

47. Alzheimer's Association. 2022 Alzheimer's disease facts and figures. *Alzheimers Dement.* 2022;18(4):700-789. doi:10.1002/alz.12638

48. Rao A, Manteau-Rao M, Aggarwal NT. [P1–561]: Dementia Neurology Deserts: What Are They And Where Are They Located In The US? *Alzheimers Dement.* 2017;13(7S_Part_10):P509-P509. doi:10.1016/j.jalz.2017.06.577

49. Rahman M, White EM, Mills C, Thomas KS, Jutkowitz E. Rural-urban differences in diagnostic incidence and prevalence of Alzheimer's disease and related dementias. *Alzheimers Dement.* 2021;17(7):1213-1230. doi:10.1002/alz.12285

50. American Diabetes Association. Economic Costs of Diabetes in the U.S. in 2017. *Diabetes Care.* 2018;41(5):917-928. doi:10.2337/dci18-0007

51. Cost of Diabetes. American Diabetes Association. Accessed June 20, 2023. https://diabetes.org/about-us/statistics/cost-diabetes

52. An Overview of Medicare. Kaiser Family Foundation. February 13, 2019. Accessed January 26, 2023. https://www.kff.org/medicare/issue-brief/an-overview-of-medicare/#:~:text=Today%2C%20Medicare%20plays%20a%20key%20role%20in%20providing,facility%20and%20home%20health%20care%2C%20and%20hospice%20care

53. Medicare Diabetes Prevention Program (MDPP) Expanded Model. Centers for Medicare & Medicaid Services. Updated June 2, 2023. Accessed June 20, 2023. https://innovation.cms.gov/initiatives/medicare-diabetes-prevention-program/

54. Statistics About Diabetes. Overall Numbers. American Diabetes Association. Accessed June 20, 2023. https://diabetes.org/about-us/statistics/about-diabetes

55. Dugani SB, Wood-Wentz CM, Mielke MM, Bailey KR, Vella A. Assessment of disparities in diabetes mortality in adults in U.S. rural vs nonrural counties, 1999-2018. *JAMA Netw Open*. 2022;5(9):e2232318. doi:10.1001/jamanetworkopen.2022.32318

56. Tuttle C, Tanem J, Lahr M, Schroeder J, Tuttle M, Henning-Smith C. Rural-Urban Differences among Older Adults. University of Minnesota Rural Health Research Center Chartbook. 2021.

57. Moreland B, Kakara R, Henry A. Trends in nonfatal falls and fall-related injuries among adults aged ⩾65 years - United States, 2012-2018. *MMWR Morb Mortal Wkly Rep*. 2020;69(27):875-881. doi:10.15585/mmwr.mm6927a5

58. WHO global report on falls prevention in older age. World Health Organization. Updated March 17, 2008. Accessed June 20, 2023. https://www.who.int/publications/i/item/9789241563536

59. Callis N. Falls prevention: identification of predictive fall risk factors. *Appl Nurs Res*. 2016;29:53-58. doi:10.1016/j.apnr.2015.05.007

60. Houry D, Florence C, Baldwin G, Stevens J, McClure R. The CDC Injury Center's response to the growing public health problem of falls among older adults. *Am J Lifestyle Med*. 2016;10(1):74-77. doi:10.1177/1559827615600137

61. Smith ML, Towne Jr SD, Herrera-Venson A, et al. Delivery of fall prevention interventions for at-risk older adults in rural areas: findings from a national dissemination. *Int J Environ Res Public Health*. 2018;15(12):2798. doi:10.3390/ijerph15122798

62. Cuadros DF, Branscum AJ, Mukandavire Z, Miller FD, MacKinnon N. Dynamics of the COVID-19 epidemic in urban and rural areas in the United States. *Ann Epidemiol*. 2021;59:16–20. doi:10.1016%2Fj.annepidem.2021.04.007

63. Anzalone AJ, Horswell R, Hendricks BM, et al. Higher hospitalization and mortality rates among SARS-CoV-2-infected persons in rural America. *J Rural Health*. 2023;39(1):39-54. doi:10.1111/jrh.12689

64. Sun N, Hua C, Qiu X, Brown JS. The influence of loneliness and rural residence on depression in later life. *Innov Aging*. 2019 Nov;3(Suppl 1):S828. doi:10.1093%2Fgeroni%2Figz038.3051

65. Sutin AR, Stephan Y, Luchetti M, Terracciano A. Loneliness and risk of dementia. J Gerontol B Psychol Sci Soc Sci. 2020;75(7):1414-1422. doi:10.1093/geronb/gby112

66. Rico-Uribe LA, Caballero FF, Martín-María N, Cabello M, Ayuso-Mateos JL, Miret M. Association of loneliness with all-cause mortality: a meta-analysis. *PLoS One*. 2018;13(1):e0190033. doi:10.1371/journal.pone.0190033

67. Tanne J H. Epidemic of loneliness threatens public health, says US surgeon general. *BMJ*. 2023;381:1017. doi:10.1136/bmj.p1017

68. Hirsch JK. A review of the literature on rural suicide. *Crisis*. 2006;27(4):189-199. doi:10.1027/0227-5910.27.4.189

69. Hirsch JK, Cukrowicz KC. Suicide in rural areas: an updated review of the literature. *Rural Ment Health*. 2014;38(2):65. doi:10.1037/rmh0000018

70. Faraji J, Metz GA. Aging, social distancing, and COVID-19 risk: who is more vulnerable and why? *Aging Dis.* 2021;12(7):1624-1643. doi:10.14336%2FAD.2021.0319

71. Paananen J, Rannikko J, Harju M, Pirhonen J. The impact of Covid-19-related distancing on the well-being of nursing home residents and their family members: a qualitative study. *Int J Nurs Stud Adv.* 2021;3:100031. doi:10.1016/j.ijnsa.2021.100031

72. Levere M, Rowan P, Wysocki A. The adverse effects of the COVID-19 pandemic on nursing home resident well-being. *J Am Med Dir Assoc.* 2021;22(5):948-954.e2. doi:10.1016/j.jamda.2021.03.010

73. U.S. Department of the Interior. Bureau of Indian Affairs (BIA). Why are American Indians and Alaska Natives also referred to as Native Americans? Updated August 19, 2017. Accessed June 20, 2023. https://www.bia.gov/faqs/why-are-american-indians-and-alaska-natives-also-referred-native-americans

74. The Impact of Words and Tips for Using Appropriate Terminology: Am I Using the Right Word? Smithsonian, National Museum of the American Indian. Accessed June 20, 2023. https://americanindian.si.edu/nk360/informational/impact-words-tips#:~:text=American%20Indian%20or%20Native%20American,would%20like%20to%20be%20addressed

75. National Congress of American Indians (2020). Tribal Nations and the United States: An Introduction. Washington, D.C., February 2020. Accessed June 20, 2023. https://www.ncai.org/tribalnations/introduction/Indian_Country_101_Updated_February_2019.pdf

76. 2018 Profile of Hispanic Americans Age 65 and Over. Administration for Community Living, U.S. Department of Health and Human Services. October 2019. Accessed June 20, 2023. https://acl.gov/sites/default/files/Aging%20and%20Disability%20in%20America/2018AIAN_OAProfile.pdf

77. Manson SM, Buchwald DS. Aging and health of American Indians and Alaska Natives: contributions from the native investigator development program. *J Aging Health.* 2021;33(7-8 Suppl):3S–9S. doi:10.1177%2F08982643211014399

78. American Indians remain disproportionally rural. Economic Research Service. U.S. Department of Agriculture. Updated December 23, 2014. Accessed June 20, 2023. https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=77893

79. Probst JC, Zahnd WE, Hung P, Eberth JM, Crouch EL, Merrell MA. Rural-urban mortality disparities: variations across causes of death and race/ethnicity, 2013–2017. *Am J Public Health.* 2020;110(9):1325-1327. doi:10.2105/ajph.2020.305703

80. Cromer KJ, Wofford L, Wyant DK. Barriers to healthcare access facing American Indian and Alaska Natives in rural America. *J Community Health Nurs.* 2019;36(4):165-187. doi:10.1080/07370016.2019.1665320

81. Towne SD, Smith ML, Ory MG. Geographic variations in access and utilization of cancer screening services: examining disparities among American Indian and Alaska Native Elders. *Int J Health Geogr.* 2014;13:18. doi:10.1186%2F1476-072X-13-18

82. Lynch L, Mielenz TJ, Li G, et al. Rate of social isolation by geographic location among older adults: AAA LongROAD Study. *Front Public Health.* 2021;9:791683. doi:10.3389/fpubh.2021.791683

83. Henning-Smith C, Moscovice I, Kozhimannil K. Differences in social isolation and its relationship to health by rurality. *J Rural Health.* 2019;35(4):540-549. doi:10.1111/jrh.12344

84. A conceptual framework for action on the social determinants of health. World Health Organization. 2010. Accessed June 20, 2023. https://apps.who.int/iris/handle/10665/44489

85. Smith ML, Steinman LE, Casey E. Combatting social isolation among older adults in a time of physical distancing: the COVID-19 social connectivity paradox. *Front Public Health.* 2020;8:403. doi:10.3389/fpubh.2020.00403

86. Reres A, Hou S. Identifying resources for promoting healthy aging in community. *Int J of*

*Popul Stud*. 2022;8(2):79-88. doi:10.36922/ijps.v8i2.303

87. Van Orden KA, Bower E, Lutz J, et al. Strategies to promote social connections among older adults during "social distancing" restrictions. *Am J Geriatr Psychiatry*. 2021;29(8):816-827. doi:10.1016/j.jagp.2020.05.004

88. Monteith LL, Holliday R, Brown TL, Brenner LA, Mohatt NV. Preventing suicide in rural communities during the COVID-19 pandemic. *J Rural Health*. 2021;37(1):179–184. doi:10.1111%2Fjrh.12448

89. Brooks SK, Webster RK, Smith LE, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. Lancet. 2020;395(10227):912-920. doi:10.1016/s0140-6736(20)30460-8

90. Fearn M, Harper R, Major G, et al. Befriending older adults in nursing homes: volunteer perceptions of switching to remote befriending in the COVID-19 era. *Clin Gerontol*. 2021;44(4):430-438. doi:10.1080/07317115.2020.1868646

91. Padala SP, Jendro AM, Orr LC. Facetime to reduce behavioral problems in a nursing home resident with Alzheimer's dementia during COVID-19. *Psychiatry Res*. 2020;288:113028. doi:10.1016/j.psychres.2020.113028

92. Dryden EM, Kennedy MA, Conti J, et al. Perceived benefits of geriatric specialty telemedicine among rural patients and caregivers. *Health Serv Res*. 2023;58(Suppl 1):26-35. doi:10.1111/1475-6773.14055

93. Cannon J, Wang S, Sharafsaleh G, Movaghar S, Combs A. Virtual cognitive testing: is it really the same? *J Am Geriatr Soc*. 2021:S46-S46.

94. Geddes MR, O'Connell ME, Fisk JD, et al. Remote cognitive and behavioral assessment: report of the Alzheimer Society of Canada Task Force on dementia care best practices for COVID-19. *Alzheimers Dement (Amst)*. 2020;12(1):e12111. doi:10.1002/dad2.12111

95. Office of Disease Prevention and Health Promotion, Office of the Assistant Secretary for Health, Office of the Secretary, U.S. Department of Health and Human Services. Older Adults: Evidence-Based Resources. Accessed June 20, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/older-adults/evidence-based-resources

96. Strawbridge LM, Lloyd JT, Meadow A, Riley GF, Howell BL. Use of Medicare's Diabetes Self-Management Training Benefit. *Health Educ Behav*. 2015;42(4):530-538. doi:10.1177/1090198114566271

97. Strawbridge LM, Lloyd JT, Meadow A, Riley GF, Howell BL. One-year outcomes of diabetes self-management training among Medicare beneficiaries newly diagnosed with diabetes. *Med Care*. 2017;55(4):391-397. doi:10.1097/mlr.0000000000000653

98. Hoerger TJ, Jacobs S, Romaire M, et al. Evaluation of the Medicare Diabetes Prevention Program. 2022. Accessed June 20, 2023. https://www.rti.org/impact/evaluation-of-the-medicare-diabetes-prevention-program-mdpp

99. Cannon MJ, Ng BP, Lloyd K, Reynolds J, Ely EK. Delivering the national diabetes prevention program: assessment of enrollment in in-person and virtual organizations. *J Diabetes Res*. 2022;2022:2942918. doi:10.1155/2022/2942918

100. Ely EK, Gruss SM, Luman ET, et al. A national effort to prevent type 2 diabetes: participant-level evaluation of CDC's national diabetes prevention program. *Diabetes Care*. 2017;40(10):1331-1341. doi:10.2337/dc16-2099

101. State Public Health Actions (1305). Centers for Disease Control and Prevention. Updated February 20, 2020. Accessed January 26, 2023. https://www.cdc.gov/nccdphp/dnpao/state-local-programs/span-1807/past-program.html

102. Scaling the National Diabetes Prevention Program in Underserved Areas. Centers for Disease Control and Prevention. Updated December 9, 2022. Accessed January 26, 2023. https://www.cdc.gov/diabetes/programs/stateandlocal/funded-programs/dp17-1705.html

103. Diabetes Policy Brief: Providing Diabetes Self-Management Education and Support For Rural Americans. Centers for Disease Control and Prevention. Updated March 2,

2018. Accessed January 26, 2023. https://www.cdc.gov/ruralhealth/diabetes/policybrief.html#:~:text=Policy%20options%20that%20can%20help%20rural%20residents%20access,education%20Providing%20diabetes%20self-management%20education%20in%20non-traditional%20venues

104. Rutledge SA, Masalovich S, Blacher RJ, Saunders MM. Diabetes Self-Management Education Programs in Nonmetropolitan Counties - United States, 2016. *MMWR Surveill Summ*. 2017;66(10):1-6. Published 2017 Apr 28. doi:10.15585/mmwr.ss6610a1

105. Lepard MG, Joseph AL, Agne AA, Cherrington AL. Diabetes self-management interventions for adults with type 2 diabetes living in rural areas: a systematic literature review. *Curr Diab Rep*. 2015;15(6):608. doi:10.1007/s11892-015-0608-3

106. ADCES. CMS Removes Restrictions Around RNs and Pharmacists Furnishing DSMT via Telehealth. Updated August 12, 2020. Accessed January 28, 2023. https://www.diabeteseducator.org/news/perspectives/adces-blog-details/adces-perspectives-on-diabetes-care/2020/08/12/cms-removes-restrictions-around-rns-and-pharmacists-furnishing-dsmt-via-telehealth#:~:text=In%20early%20August%2C%20the%20Centers%20for%20Medicare%20%26,telehealth%20during%20the%20COVID-19%20Public%20Health%20Emergency%20%28PHE%29

107. Medicare and Telehealth: Coverage and Use During the COVID-19 Pandemic and Options for the Future. Kaiser Family Foundation. May 19, 2021. Accessed January 28, 2023. https://www.kff.org/medicare/issue-brief/medicare-and-telehealth-coverage-and-use-during-the-covid-19-pandemic-and-options-for-the-future/

108. Overcoming Access Barriers in Rural Idaho. Association of Diabetes Care & Education Specialists. April 30,2019. Accessed January 26, 2023. https://www.diabeteseducator.org/news/perspectives/adces-blog-details/reaching-out-for-better-health/2019/04/30/overcoming-access-barriers-in-rural-idaho

109. Barnett DW, Barnett A, Nathan A, Van Cauwenberg J, Cerin E. Built environmental correlates of older adults' total physical activity and walking: a systematic review and meta-analysis. *Int J Behav Nutr Phys Act*. 2017;14(1):103. doi:10.1186/s12966-017-0558-z

110. Wang Z, Lee C. Site and neighborhood environments for walking among older adults. *Health Place*. 2010;16(6):1268-1279. doi:10.1016/j.healthplace.2010.08.015

111. Moran M, Van Cauwenberg J, Hercky-Linnewiel R, Cerin E, Deforche B, Plaut P. Understanding the relationships between the physical environment and physical activity in older adults: a systematic review of qualitative studies. *Int J Behav Nutr Phys Act*. 2014;11:7. doi:10.1186/1479-5868-11-79

112. Cerin E, Nathan A, Van Cauwenberg J, Barnett DW, Barnett A. The neighbourhood physical environment and active travel in older adults: a systematic review and meta-analysis. *Int J Behav Nutr Phys Act*. 2017;14(1):15. doi:10.1186/s12966-017-0471-5

113. Michael YL, Green MK, Farquhar SA. Neighborhood design and active aging. *Health Place*. 2006;12(4):734-740. doi:10.1016/j.healthplace.2005.08.002

114. Kerr J, Rosenberg D, Frank L. The role of the built environment in healthy aging: community design, physical activity, and health among older adults. *J Plan Lit*. 2012;27(1):43-60. doi:10.1177/0885412211415283

115. Lee C, Ory MG, Yoon J, Forjuoh SN. Neighborhood walking among overweight and obese adults: age variations in barriers and motivators. *J Community Health*. 2013;38(1):12-22. doi:10.1007/s10900-012-9592-6

116. Van Cauwenberg J, Van Holle V, Simons D, et al. Environmental factors influencing older adults' walking for transportation: a study using walk-along interviews. *Int J Behav Nutr Phys Act*. 2012;9(1):85. doi:10.1186/1479-5868-9-85

117. Bonaccorsi G, Manzi F, Del Riccio M, et al. Impact of the built environment and the neighborhood in promoting the physical activity and the healthy aging in older people: an

umbrella review. *Int J Environ Res Public Health*. 2020;17(17):6127. doi:10.3390/ijerph17176127

118. Nicklett EJ, Lohman MC, Smith ML. Neighborhood environment and falls among community-dwelling older adults. *Int J Environ Res Public Health*. 2020;17(17):6127. doi:10.3390/ijerph17176127

119. Chippendale T, Boltz M. The neighborhood environment: perceived fall risk, resources, and strategies for fall prevention. *Gerontologist*. 2015;55(4):575-583. doi:10.1093/geront/gnu019

120. Lee S. Falls associated with indoor and outdoor environmental hazards among community-dwelling older adults between men and women. *BMC Geriatr*. 2021;21(1):547. doi:10.1186/s12877-021-02499-x

121. Chen X, Lee C, Huang H. Neighborhood built environment associated with cognition and dementia risk among older adults: a systematic literature review. *Soc Sci Med*. 2022;292:114560. doi:10.1016/j.socscimed.2021.114560

122. Zhong S, Lee C, Lee H. The role of community environments in older adults' intergenerational and peer social interactions. *Cities*. 2022;129:103785. doi:10.1016/j.cities.2022.103785

123. Measuring the Age-Friendliness of Cities: A Guide to Using Core Indicators. World Health Organization. 2015. Accessed June 20, 2023. https://apps.who.int/iris/handle/10665/203830

124. Creating age-friendly cities and communities. World Health Organization. Accessed June 20, 2023. https://www.who.int/activities/creating-age-friendly-cities-and-communities#:~:text=WHO%20also%20supports%20a%20Global%20Network%20for%20Age-friendly,communities%20to%20find%20-appropriate%20innovative%20and%20evidence-based%20solutions

125. King AC, Sallis JF, Frank LD, et al. Aging in neighborhoods differing in walkability and income: associations with physical activity and obesity in older adults. *Soc Sci Med*. 2011;73(10):1525-1533. doi:10.1016/j.socscimed.2011.08.032

126. Chen S, Ling J, Cheng Y. Physical activity and body mass index were interactively related to health-related quality of life among older adults. *Arch Gerontol Geriatr*. 2023;104:104833. doi:10.1016/j.archger.2022.104833

127. Zhong S, Lee C, Foster MJ, Bian J. Intergenerational communities: a systematic literature review of intergenerational interactions and older adults' health-related outcomes. *Soc Sci Med*. 2020;264:113374. doi:10.1016/j.socscimed.2020.113374

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*Related Chapters:*
Chapter 3. Rural Healthcare Access and Quality
Chapter 8. Rural Preventive Care: Routine Screenings, Prenatal Care, and Oral Health
Chapter 9. The Impact of Diabetes on Rural Americans
Chapter 17. Health Insurance for Rural Americans
Chapter 19. Hospital and Emergency Services in Rural Areas

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# PREVENTIVE CARE FOR RURAL POPULATIONS AND PROVIDERS: ROUTINE SCREENINGS, PRENATAL CARE, AND ORAL HEALTH

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## SCOPE OF THE PROBLEM

- "Preventive Care" was identified as the nation's seventh most important rural health priority in the Rural Healthy People 2030 national survey of rural stakeholders, in a tie with "Older Adults."[1,2]
- Rural areas of the United States face unique challenges in accessing routine health care services, including workforce shortages, transportation, lack of affordable health insurance, and availability of services.[3-9]
- Uptake of immunizations, such as the influenza vaccine, contribute to rural versus urban/suburban disparities in both children[10] and adults.[11]
- Maternal mortality rates are significantly higher for rural women than for women residing in urban areas.[12]
- The utilization of preventive oral health services in rural areas is less than that of urban areas.[13]
- Certain rural or place-based racial and ethnic populations experience greater disparities in both access to, and uptake of prevention services including Alaskan Natives, American Indians, Hispanics, and African Americans.[14]

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Prevention, in general, refers to activities and methods to avoid detrimental life-shortening or life-altering health conditions (primary prevention), or to conduct early detection of disease (secondary prevention), with a focus on minimizing disease burden. Many of the priorities in Healthy People, a decades-old program of the U.S. Department of Health and Human Services (DHHS), have addressed disease prevention through recommendation of lifestyle modifications, as well as routine health screenings, vaccinations, prenatal and maternal care, and dental healthcare services. Utilization of preventive care services has been shown to reduce risk for developing chronic disease, disability, or premature death, making it a priority for all communities in America.[15,16]

According to Healthcare.Gov, *preventive health services* encompass routine clinical activities such as "screenings, check-ups, and patient counseling to prevent illnesses, disease, or other health problems."[17] Preventive healthcare services include three categories of first-level clinical services: those pertaining to all adults, services uniquely tailored to women, and those tailored to children.[18] However, a 2018 study by Borsky and colleagues reported that only 8% of adults aged 35 and older had participated in all of the high-priority screening services recommended to them, and 5% had participated in none.[15] The current Healthy People 2030 objectives for preventive care are intended to increase Americans' focus and action towards reducing the risk of untimely death, or diseases and disabilities that impact quality life-years and lead to unnecessary healthcare costs.[16]

Preventive health care is both critical and timely, as all Americans need access to a regular source of care for assessing current health status and

healthcare needs. The Centers for Medicare and Medicaid Services (CMS) reports the following about preventive care in America:[19]

*"High-quality preventive care helps Americans stay healthy, avoid or delay the onset of disease, lead productive lives, and reduce costs. And yet, despite the proven benefits of preventive health services, too many Americans go without needed preventive care because of financial barriers. Even families with insurance may be deterred by copayments and deductibles from getting cancer screenings, immunizations for their children and themselves, and well-baby check-ups that they need to keep their families healthy."*

Under the Affordable Care Act (ACA), now more than a decade old, health insurers are required to provide certain preventive services with no required cost-sharing, such as pediatric care, immunizations, mammograms, cervical cancer screenings, and prenatal care.[20] Most immunizations are considered routine and covered under the ACA and Title V of the Maternal and Child Health Services Block Grant Program.[21,22] All individual state Medicaid programs are required under federal law to provide immunization services to individuals from birth through age 20 through the Early and Periodic Screening, Diagnostic, and Treatment program (EPSDT), which also includes vision and hearing screening services. During the COVID pandemic, the Medicaid and CHIP Payment and Access Commission issued policy guidance for Medicaid coverage of COVID-19 vaccines and testing.[23,24] Both Medicaid and Medicare are required to cover COVID-19 testing, vaccines, and treatment for beneficiaries and, under the American Rescue Plan Act, may not charge for these services.[25] Likewise, routine preventive dental services are recommended under the EPSDT. Unfortunately, shortages of primary care providers and dentists, in almost all rural regions of the U.S., contribute to disparities in access to the recommended services.[6,9]

In sum, rural disparities in equitable access to preventive health care continue to exist owing in large part to differences in states that have expanded access to health care for their citizens under ACA Medicaid expansion versus those states which have not expanded access to Medicaid.[26] As of November, 2023, a total of ten states had not expanded access to Medicaid.[27] Many of the states that have opted not to expand Medicaid eligibility under the ACA are largely rural with a majority of non-expansion states located in the southern U.S.[27,28]

Rural-urban differences in outcomes such as immunization uptake,[10,11,29] maternal mortality,[12] and use of oral health prevention services[13] are indeed striking across the U.S. In this chapter, three areas of rural preventive care will be examined: (1) routine health screenings, with an emphasis on newborn and childhood screenings; (2) prenatal and maternal care; and (3) oral health services across the lifespan. These important topics will be discussed with a focus on rural-urban contrasts, disparities, and barriers to care.

## RHP 2030 SURVEY OUTCOMES

The importance of preventive care was reflected in results of the Rural Healthy People 2030 survey, this decade's nationwide survey of rural stakeholders (n=1,291).[1] Results of this online survey ranked "Preventive Care" as a top 20 health-related priority for rural Americans (i.e., 7th place ranking, in a tie with the topic "Older Adults").[1] When results of the survey were evaluated by gender and age group, it was noted that female respondents ranked preventive care higher than male respondents (8th versus 11th), while younger adults (age 18-34) ranked preventive care as a higher priority than adults 65 years and older (7th versus 9th).[2]

Preventive care had not been included as a stand-alone Healthy People 2020 topic area a decade earlier, nor in previous iterations of the Rural Healthy People survey.[30] However, many aspects of preventive care including prenatal care, oral health, and immunizations were ranked as top 20 priorities a decade earlier, namely, Maternal and Child Health (9th place ranking),[31] Oral Health (13th),[32] and Immunizations and Infectious Disease (15th).[33]

## RELEVANT HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

Among its priorities for the current decade, Healthy People 2030 conveys a focus on encouraging and assisting children, mothers and fathers, and people of all ages to understand

and seek to adhere to recommended preventive healthcare guidelines. The overall Healthy People 2030 goal for preventive care is to "help people get recommended preventive healthcare services."[16] There are 34 Healthy People 2030 objectives[16] aimed at addressing preventive care. Nineteen of the preventive healthcare objectives have insufficient, baseline-only, or no data available; hence, progress has not yet been tracked and reported. This includes the objectives calling for increased screening for postpartum depression and increased screening for osteoporosis in older adults.

Among objectives with sufficient tracking data, five preventive care objectives are trending worse, six have little to no change, three are improving, and the target for one objective has been achieved.[16] That particular objective is related to increased use of the oral healthcare system, where the Healthy People 2030 target of 45% compliance to guidelines was exceeded, at 46.2%, by 2018.[34]

Specific Healthy People 2030 objectives, that are related to this chapter's discussion on prevention, are:

Overall
- Increase the number of community organizations that provide prevention services – ECBP-D07[35]

Routine Screenings for Children
- Increase the proportion of newborns who get screened for hearing loss by age 1 month – HOSCD-01[36]
- Increase the proportion of children aged 3 to 5 years who get vision screening – V-01[37]
- Increase portion of children who received a developmental screening – MICH-17[38]

Prenatal and Maternal Care
- Increase the proportion of pregnant women who receive early and adequate prenatal care – MICH-08[39]
- Increase the proportion of women who get screened for postpartum depression – MICH-D01[40]

Oral Health
- Increase use of oral health care system – OH-08[41]
- Increase the proportion of low-income youth who have a preventive dental visit – OH-09[42]
- Increase the proportion of children and adolescents who have dental sealants on 1 or more molars – OH-10[43]

## ROUTINE SCREENINGS

***Newborn and Early Life.*** The American Academy of Pediatrics (AAP) Bright Futures provides evidence-based guidelines for preventive health screenings from infancy through adolescence.[44] Their recommendations, a representative consensus of all pediatric specialists, are published annually as the *Periodicity Table.*[45] This publication emphasizes the importance of early and regular comprehensive screening. Recommendations by the AAP concerning routine newborn exams through nine months encompass standard measurements such as infant length, height, weight, and head circumference, as well as sensory screenings. Emphasis is placed on prenatal assessment, and early (i.e., newborn) and regular pediatric preventive care with specific blood tests for certain genetic, endocrine, and metabolic disorders.[45,46] Additionally, testing for congenital heart defects and hearing loss is considered part of standard care.[45,46]

Early detection of sensory and developmental deficits and congenital conditions is a U.S. secondary prevention priority. In 2019, congenital hearing loss was detected in 1.7 of every 1,000 newborns screened.[47] Although 98.4% of infants were screened in 2019, states that were predominantly rural had the lowest newborn hearing exam rates.[48] Bush et al. (2015) reported that very rural healthcare practices were significantly less likely to perform hearing evaluations compared with less rural practices.[49] They also noted that rural primary care providers have reported communication challenges receiving results of infant hearing screenings, and may be less confident coordinating hearing services for their young patients.[49] In a study conducted in Kentucky, 23.8% of Appalachian newborns compared with 17.3% of non-Appalachian children failed to obtain follow-up diagnostic testing.[50] Children from Appalachia were significantly delayed in obtaining a final diagnosis of hearing loss compared with children from non-Appalachian regions.[50]

***Infant Mortality.*** The National Center for Health Statistics data website on infant mortality shows mortality rates by state from 2005-2021,[51] with several of the most rural states (e.g., Mississippi, Alabama, Arkansas, Alaska) having relatively high infant mortality rates. A 2020 study by Ehrenthal and colleagues found that rural infant mortality was significantly higher in both noncore (rural) and micropolitan (adjacent rural) counties than in urban counties.[52] The authors determined that the greater socioeconomic disadvantage seen in rural areas contributed more to this difference, than lack of access to care or even lifestyle factors.[52] In a commentary addressing infant mortality, Dr. Katy Kozhimannil noted that structural inequities, such as a lack of pediatricians, emergency care, and obstetric services, are particularly noteworthy in focusing attention on infant mortality.[53]

***Children, Youth, and Adolescents.*** The use of Extension for Community Healthcare Outcomes (ECHO) has positively impacted the way education and information are delivered to those in rural and underserved communities.[54] For example, child development screenings recommended by the Centers for Disease Control and Prevention (CDC),[55] and those specifically for autism spectrum disorders (ASD),[56] were noted to improve when rural providers enrolled in ECHO Autism, a virtual learning network for primary care providers. Following participation in the virtual learning network, general developmental and autism screening rates increased from 53.3% and 68.3% to 88.6% and 99.0%, respectively.[56] Healthy People 2030 reports that the percent of children aged nine through 35 months who were screened for ASD has increased from 31.1% in 2016-17 to 34.8% in 2020-2021.[38]

Pediatric preventive services for youth are often focused on various risk reduction services, targeting health issues such as pregnancy prevention, substance use, human immunodeficiency virus (HIV) prevention, mental health, and sexually transmitted infections (STIs). Early detection of HIV and STIs contributes to prompt treatment and, therefore, reduced transmissions. It has been reported that rurality, adolescence, and being female is associated with increased days to treatment for STIs.[57] A discussion on adolescent and youth behaviors, and prevention programs, is discussed more fully in *Rural Healthy People 2030's* Chapter 1 on Mental Health and Mental Disorders.

***Adults.*** Routine health care for all adults should include routine annual screenings, as recommended by the U.S. Preventive Services Taskforce (USPSTF) for blood pressure, weight, vaccine status, diet, depression, cancer (e.g., colorectal, breast, cervical, prostate, liver, lung, blood, and skin), as well as heart disease, sexually transmitted diseases, and metabolic disease and obesity.[58,59] Recommended prevention services specific to women include screenings for gestational diabetes after 24-weeks gestation, breast cancer for average-risk women, anxiety disorder in adolescent and adult women, domestic violence, obesity, sexually transmitted diseases, and HIV, among other things.[60] Of note, a discussion specific to *cancer* screening is found in *Rural Healthy People 2030's* Chapter 12 on Cancer.

Older adults living in rural U.S. communities face significant challenges to accessing routine care for chronic conditions. During the 22 months of the COVID-19 pandemic, older adults faced particular challenges accessing healthcare services, as well as accessing both routine prescriptions and monitoring supplies for such things as type 2 diabetes. As a general rule, Medicare-age adults visit with a healthcare provider for ambulatory care sensitive conditions at a rate of 900 visits per 1,000 Medicare beneficiaries with type 2 diabetes mellitus.[61] During the beginning of the pandemic, the number of visits made by Medicare-age adults to a healthcare provider decreased by 50%.[61] With significantly fewer primary care providers available in rural areas, rural older adults need to be mindful of the need for careful planning and alternative means of accessing routine medical supplies and access to providers with laboratories.[61] More information on the health status of older adults can be found in Chapter 7 of *Rural Healthy People 2030.*

***Immunizations.*** Literature confirms that a gap exists in immunization rates for rural residents compared to their urban counterparts.[10,11,29] Immunizations have been the most cost-effective and overall superior source for avoidance of vaccine-preventable diseases. Unfortunately, individuals who reside outside of metropolitan areas receive

recommended immunizations at lower rates.[10,11,29] A 2018 CDC report demonstrated that rural children less than three years old were 2.6 to 6.9 percentage points lower in receiving recommended vaccines than their urban counterparts. Adolescent uptake of the human papillomavirus (HPV) vaccine and the second dose of meningococcal conjugate vaccine were even lower for rural residents (15.4%) compared to their metropolitan counterparts (19.7%).[29] A study comparing rates of chlamydia, gonorrhea, and syphilis, showcased the higher likelihood of these infections in the more rural counties of the Mississippi Delta region.[62] Barriers to preventive care and testing, and lack of access to comprehensive sexual education, are common factors among rural residents.[62]

***Addressing Barriers to Prevention Services.*** Significant barriers to receiving preventive services in rural areas are multifocal, but include limited access to services, transportation issues, cost, lack of insurance, and lack of primary care providers.[3-9,63] Examples of creativity in developing access-related alternatives to preventive healthcare services include school-based health services,[64] mobile clinical services,[65] and telehealth.[66] Indeed, many promising programs focused on rural school-based health services have been launched with the U.S. Department of Health and Human Services awarding nearly $25M to strengthen access to preventive health services.[64] In addition, federal programs of the Health Resources & Services Administration (HRSA)[67] exist to help rural and underserved areas improve access to health care by helping to address the shortage of primary care providers. Strategies to address workforce shortages include loan forgiveness programs, state recognition of nurse practitioners as primary care providers, and subsequent easing or removal of physician oversight requirements. A list of HRSA Bureau of Health Workforce programs and funding opportunities, to assist in reducing rural healthcare shortages, is available online.[67]

A majority of states and the Veterans Health Administration (VHA) now recognize nurse practitioners as independent providers without the need for physician oversight and as a cost-effective alternative to physicians. Several studies have demonstrated that nurse practitioners practice as safely and cost-effectively as physicians.[68-71] Acting on this evidence, 27 states have removed physician oversight restrictions to address primary healthcare workforce shortages. Similarly, in the VHA, a recent study analyzing nurse practitioners compared to physicians found that patients assigned to nurse practitioners experienced similar health outcomes at costs similar to physician-managed patients.[72] In a study focused on Texas, Bolin and colleagues reported that removing oversight restrictions on nurse practitioners would eliminate the primary care provider shortage in rural areas by 2,376 providers (32%), and reduce psychiatric provider shortage by 13%, while saving the state of Texas up to $47.7 million in the first biennium, climbing to $4.6 billion over a 10-year period.[69]

## MATERNAL CARE

***Importance of Prenatal Care.*** A healthy mother and newborn should be the number one priority for obstetrical, prenatal, and newborn care programs. The federal Title V Maternal and Child Fee-For-Service Program recognizes the need for low-income women, who may not be eligible for Medicaid, to have access to prenatal care services for the safe delivery of a healthy newborn. Unfortunately, in rural areas, access to maternal, obstetric, early newborn, and pediatric care has become more difficult with the continuing closures of rural hospitals and emergency departments.[73-77]

Maternal care services should include a complete medical history, physical examination, clinical assessment, postpartum family planning, counseling and education, laboratory and diagnostic testing, and follow-up as appropriate to monitor potential risks such as abuse of mother and/or child.[21,22,78] The Title V Maternal Child Block Grants (i.e., Title V), gives all states flexibility for designing their own systematic approach to improve health access and outcomes for women, children, youth, and families. However, Title V delegation of responsibility for prenatal and postpartum care to the states continues to leave significant coverage gaps and needs in states which have not adopted Medicaid expansion (predominantly in the South).[26-28]

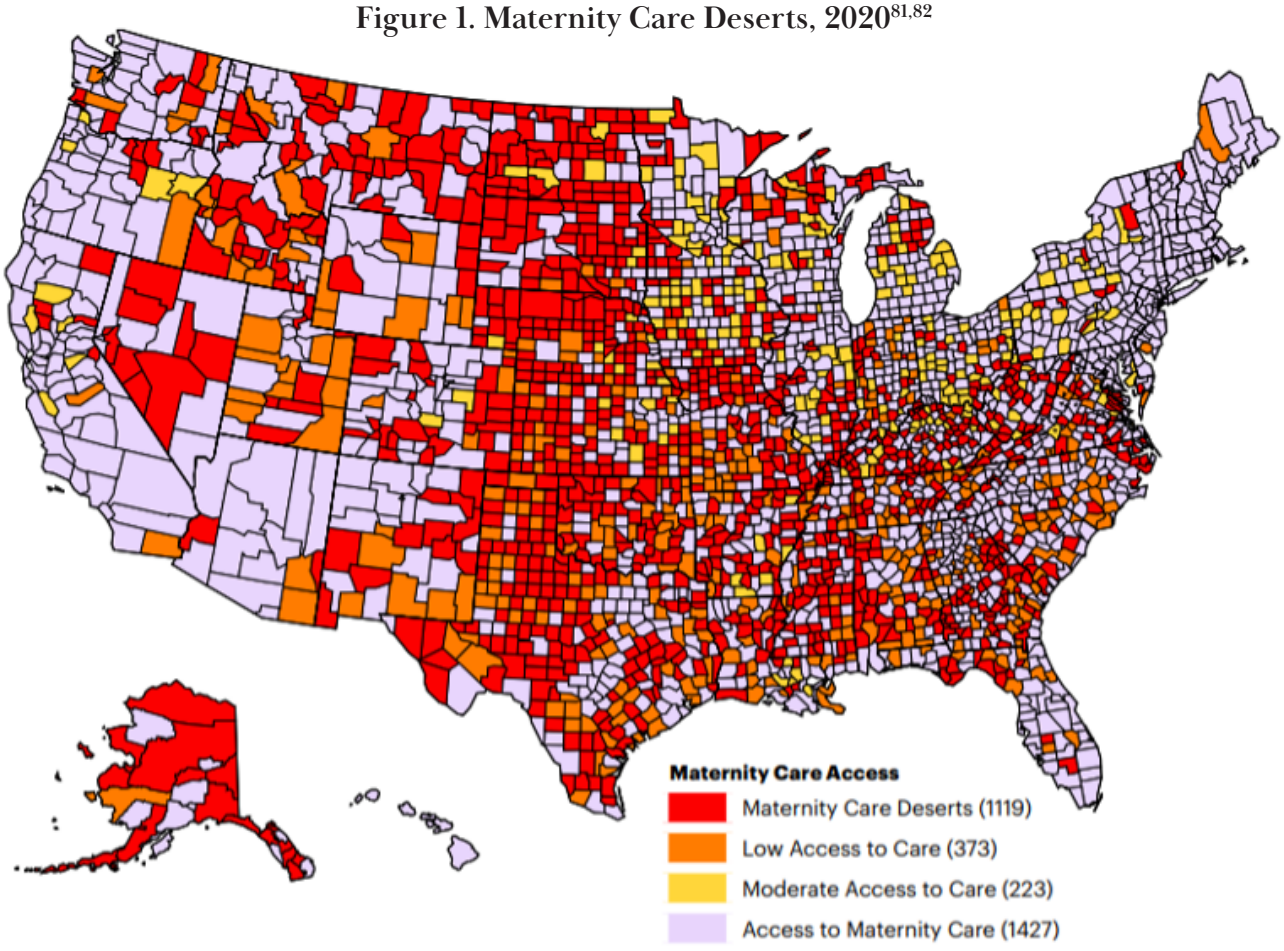
***Immunizations.*** Immunization rates for influenza and Tdap (i.e., tetanus, diptheria, and pertussis) during pregnancy are lower for rural women

(especially when uninsured), as compared to women in urban areas.[79] This effect was compounded by rural areas with significantly reduced access to care, (such as non-Medicaid expansion states), and/or for persons with limited access to primary care providers. While pregnant women in rural areas are more likely to rely on Medicaid for prenatal care coverage, they are less likely to have access to expanded coverage, contributing to lower vaccination rates and higher communicable disease rates that could be prevented by vaccines.[79] Also, COVID-19 vaccination rates have shown lower uptake rates among pregnant women, but especially those living in rural areas.[80]

***Disparities in Care.*** One barrier to prenatal care in rural areas is the lack of obstetric care resources or providers. As shown in **Figure 1**, "maternity care deserts" are prevalent across the U.S. but most profoundly so in the midwest, south, and across Ohio, West Virginia, Kentucky and Tennessee.[81,82] Maternity care deserts mean there are no obstetric providers per 10,000 U.S. births. In the U.S., nearly 36% of all counties are in this category.[82] In an effort to address these persistent "maternity care deserts", the current Biden Administration has outlined actions the federal government will take to reduce coverage gaps, improve access to care, and address geographical access barriers for prenatal, delivery and postpartum care for women including perinatal addiction services.[83] A contributing factor to the dearth of maternity care is the high rate of obstetric unit closures in rural hospitals.[77] Rural areas across the U.S. have been especially hard-hit by the closure of hospital-based obstetric services and complete hospital closures.[77]

***Maternal Mortality.*** There are stark racial disparities in both maternal and infant mortality. Widely reported data show that Black women in the U.S. are nearly three times more likely to die than white women during pregnancy and the first year

**Figure 1. Maternity Care Deserts, 2020[81,82]**




*Source: U.S. Health Resources and Services Administration (HRSA), Area Health Resources Files, 2021.*

postpartum.[84] Systemic factors such as implicit bias and structural racism may contribute to these disparities.[85] Social determinants of health such as access to care, transportation, and food security also play a large part and require investments at the systemic level to improve outcomes.[85]

The U.S. Government Accountability Office (GAO) issued a report in October 2022 documenting a list of several factors associated with lack of access to maternity care in rural areas including: closure of obstetric services in rural hospitals; counties with a majority of Black or African American residents; and counties with lower income, fewer specialized health care providers, and difficulties in recruiting providers to rural areas.[77] Adding to the complexity of the problem, Medicaid reimbursement rates are also considered inadequate for compensating for the higher costs associated with rural maternity care.[77]

***Postpartum Considerations.*** Considering that more than half (52%) of maternal deaths occur in the first year after birth, it is essential that women continue to receive coordinated, follow-up care during this critical phase.[86] Attendance rates for postpartum visits with maternal healthcare providers are low, especially in vulnerable populations that are low income, uninsured, minorities, socially isolated, and residents of rural areas.

Mental health conditions are leading factors that contribute to maternal mortality and morbidity.[87] Suicide and overdose are often implicated in pregnancy-associated deaths which can occur up to 12 months after delivery of the infant.[87] Opioid use and intimate partner violence, experienced by pregnant women living in rural areas and resulting in adverse pregnancy outcomes, are critically important areas to address.[88] The Texas Maternal Mortality and Morbidity Review Committee has identified community-level factors, such as lack of family/friend/support system, as one of the top contributing factors of underlying cause of pregnancy-related death.[89] Lack of social support and isolation can be especially pronounced in rural areas where pregnant individuals may face social isolation or stigma related to mental health or substance use. Successful community approaches to addressing health disparities in rural areas require the formation of unique shared partnerships and leadership, along with continuous bi-directional community engagement. This requires a community of informed stakeholders to establish area health coalitions that can forge critical links for healthcare delivery.[90,91]

## ORAL HEALTH

***Rural/Urban Disparities.*** Disparities in oral health access, utilization, and health outcomes exist in U.S. rural communities.[92,93] The 2000-2016 data from the Medical Expenditure Panel Survey revealed that while rural adult residents were more likely than urban residents to receive restorative and oral surgery services, they were less likely to receive diagnostic and preventive services [AOR= 1.11; 95%, 95% CI: 1.02 to 1.21) and diagnostic services (AOR= 0.82; 95% CI: 0.72 to 0.93).[94] Similar findings were also reported for children.[95,96] On the national level, according to the data from the 2017 to 2018 National Survey of Children's Health (NSCH), rural children were less likely to have a preventive dental visit than urban children (84.9% versus 87.5%, P = 0.03), less likely to have received fluoride treatment (46.6 percent versus 52.5 percent, P = 0.0022), and less likely to have received a dental sealant (19.5% versus 22.5%, P = 0.0147).[97] Despite an increase in preventive dental services and a decrease in surgical procedures, significant disparities in oral health care exist between rural and urban residents in the U.S.[94,98]

***Disparity by Region.*** Access to dental care and, as a result, oral health outcomes vary by region. According to the literature, disadvantaged areas, such as Appalachia and the Mississippi Delta, have significant and persistent disparities in tooth loss.[99] Across the four census regions of the U.S., rural residents in the South were the least likely to visit a dentist.[100] Many of these regional disparities observed can be attributed to rapidly aging populations, lower fluoride levels in drinking water, and lower socioeconomic status.[100] In a study to estimate supply and demand of preventive dental care for children in Georgia, and identify dental care shortage areas, more pediatric dental care shortage areas were found in rural than urban Georgia (60% versus 39%).[101]

***Variation by Race/Ethnicity.*** Oral health disparities among subpopulations are worsened by rurality.

People of color who live in rural areas, such as Black adults and children, face more barriers to accessing dental care and retaining their teeth than those who live in suburban or urban areas.[100] Rural Black adults were also less likely than urban Black adults to have received a preventive procedure (AOR=0.55, 95% CI: 0.35-0.87). In addition, only 34% of rural Blacks had a dental visit, compared to 62% of Whites, and 28% of rural Blacks experienced tooth loss, compared to 17.5% of Whites.[100] Other factors that influenced the likelihood of receiving preventive or treatment procedures were race/ethnicity, socioeconomic status, and dental insurance (P= 0.01 and P= 0.05, respectively).[13]

***Impact on Morbidity and Mortality.*** Routine dental care enables early detection of oral diseases and delivery of preventive care which may help to avoid more extensive dental treatment. Caries, periodontal disease, and tooth loss are associated with adverse health outcomes like pain, decreased chewing, lower self-esteem, negative social perceptions, and reduced quality of life and overall health.[102] Dental providers recommend routine preventive dental care to maintain optimal oral health and avoid these negative outcomes. A study found that prior year preventive dental visits are associated with fewer subsequent treatment dental visits and lower dental expenditures among Medicaid-enrolled adults.[102] Routine dental care and regular screening can reduce the burden of the most common forms of oral health mortality in which nearly 30,000 annual cases of oral and pharyngeal cancers are detected, approximately 7,500 of which result in death.[103]

Oral health is now well understood to be a foundational and fundamental component of overall good general health. Impaired oral health may cause many problems and negatively affect quality of life. Systematic literature reviews have shown that both tooth loss and periodontal diseases negatively impact the quality of life.[104,105] Atherosclerotic disease, pulmonary disease, diabetes, pregnancy, birth weight, osteoporosis, and kidney disease are among the systemic conditions impacted by oral conditions.[106] Complications from these conditions cause significant morbidity and mortality and are extremely costly to the healthcare system.

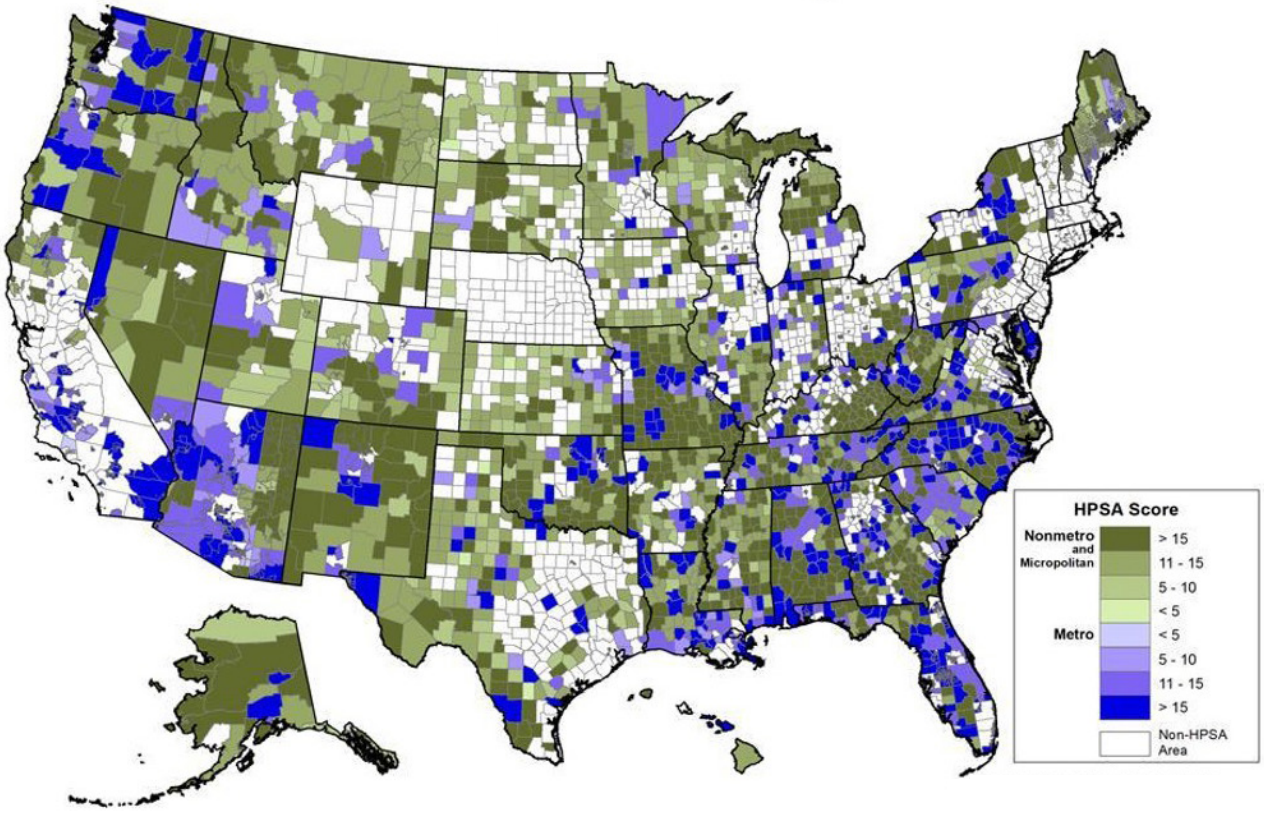
Unfortunately, a lack of access to primary medical or dental care prevents some patients from receiving routine/regular care until an adverse outcome occurs. One study found an association between preventive dental visits and improved healthcare outcomes and cost savings among patients with diabetes mellitus, implying an overall health benefit associated with preventive dental care for people with diabetes.[107]

***Barriers and Causes of Rural-Urban Disparities.*** The National Advisory Committee on Rural Health and Human Services, 2018, reported that among the existing barriers to oral health care were: inadequate number of dentists who accept Medicaid and the Children's Health Insurance Program or who have discounted fee schedules, insufficient or lack of dental insurance benefits, lack of transportation, insufficient levels or lack of access to water fluoridation, lack of awareness and education about oral health, geographic barriers to care, poverty, cultural barriers, and stigma.[108]

Oral health professionals are frequently scarce in rural communities. According to HRSA, 4,633 of the 6,927 Dental Health Professional Shortage Areas (HPSAs) in the U.S. were in rural or partially rural areas as of March 31, 2022 (**Figure 2**).[109] More than 60 million Americans (18%) reside in rural areas; of these, 34 million live in a dental health provider shortage area.[108] This deficiency negatively impacts access to preventive dental care and exacerbates the disparities in rural areas.[108,110] In rural areas with a dental health providers shortage, a higher proportion of tooth extraction and a lower proportion of dental visits or teeth cleaning were found.[110] Most dental school graduates, even those who were raised in rural areas, choose to work in more urban settings.[111] Therefore, rural communities have fewer dentists and require longer travel times to reach dental care.[101,108]

Moreover, residents of rural areas have higher unemployment and poverty rates. They also have lower rates of insurance coverage and Medicaid eligibility.[95] According to a 2021 report from the American Dental Association's Health Policy Institute, Medicaid reimbursed only 61.4% of the private insurance reimbursement rate on average for children and 53.3% for adults in 2020.[112] A 2021 study in the *Journal of Rural Health* found that rural residents are 20% less likely to have

**Figure 2. Health Professional Shortage Areas Dental Health[109]**




*Note: Alaska and Hawaii not to scale. HRSA scores HPSAs on a scale of a whole number (0-26 for dental health), with higher scores indicating greater need.*

*Source(s): data.HRSA.gov, U.S. Department of Health and Human Services, November 2022.*

dental insurance than those in urban areas or areas adjacent to urban-populated areas.[13] Adding to that, cultural beliefs, dental anxiety and lower levels of oral health literacy, also may contribute to rural-urban disparities in access to preventive dental care.[113,114]

Rural populations have less access to the preventive benefits of fluoridated water.[115-117] This might be attributed to the fact that it is proportionally more expensive to fluoridate small community water supplies than large ones. However, every $1 spent on fluoridation saves $38 in treatment costs in a community with a population of 20,000+.[109,118,119] For communities with fewer than 5,000 people, the ratio is $6 saved to every $1 spent. In addition, most of the 12.6% of U.S. residents using private wells are located in rural areas. [109,118,119] These wells are typically unfluoridated.

***Proven Solutions or Interventions.*** Opportunities to decrease oral health disparities in preventive dental care among rural populations have emerged and have been prioritized by different national agencies and institutions.[108] Several of these interventions, or potential solutions, are described below.

Oral Health Integration into Primary Care. Because primary care providers generally have more regular contact with underserved populations, integrating oral health care into a primary care setting may contribute to better oral health outcomes. General practitioners and pediatricians can act as initial screeners and points of access and provide referrals for oral health screenings and prevention services. In most states, primary care for children is more prevalent than pediatric dentistry or hygiene.[100] In the primary care-oral health integrated care model, families receive preventive oral healthcare services and important prophylaxis screening within the primary care setting.[120,121]

Teledentistry. For preventive oral care, teledentistry could be as effective as in-person screening and examinations, particularly in school-based programs, remote areas with poor

access to care, long-term care facilities, and rural areas. It is a feasible and legitimate tool to identify oral diseases, refer patients, and conduct teleconsultations.[66] Evidence shows that teledentistry improved cost effectiveness, accuracy and efficient remote assistance for clinicians.[66]

Workforce. Opportunities to improve access through workforce measures, thereby strengthening the safety net for dental care in rural areas, are being investigated and developed as they relate to the scope of practice and the oral health workforce.[122] One model is the use of expanded duty auxiliary dental personnel such as certified dental hygienists to give care in a range of public health settings without the supervision or consent of a dentist.[123] Another promising model is the adoption of dental therapy in the U.S. to address persistent issues with the rural dental workforce which is one of the biggest innovations with potential to impact rural residents.[123-126] Dental therapists offer preventive and restorative dental care as part of a dental team. According to Chi and colleagues' 2018 evaluation of the Alaska program, villages with therapists had improved access to dental care and prevention services, fewer extractions, and needed less general anesthesia for treatment.[127]

Training Rural Practitioners. Programs intended to recruit and train rural dentists also have the potential to create major improvements in rural access. This includes programs developed by dental schools, and the National Health Service Corps (NHSC) scholarship and loan repayment programs. National rural primary care training programs such as the HRSA-funded academic unit, Rural Primary Care Research, Education, and Practice may also serve as potential models for rural oral health expansion.[128,129]

Education and Community Outreach Programs. Other oral health interventions to reduce preventive oral health disparities in rural areas are community outreach programs delivered in a variety of settings and incorporating a variety of oral healthcare services in the community (e.g., oral health education, interprofessional care, school-based sealants program, and delivering care through mobile dental vehicles).[130] A study found that community-based oral health promotion interventions that combine oral health education with supervised toothbrushing or professional preventive oral care can reduce dental caries in children in rural areas.[131] Another effective strategy to supplement traditional oral health care in rural areas is use of mobile dental vehicles (MDV),[65,130] since traditional strategies such as the construction of dental clinics or hospitals, are neither practical nor cost-effective in very rural settings. The MDVs have usually been utilized in school-based oral health programs providing screening and other preventive dental care such as oral health education, fluoride varnish, and sealants.

## SUMMARY AND CONCLUSIONS

Solutions to improve preventive healthcare services in rural areas include: (1) expanding Medicaid in states that have not adopted that provision of the ACA; (2) removing physician oversight requirements for nurse practitioners in the 23 remaining states that continue to place this financial burden and restriction on nurse practitioners; (3) utilizing school-based primary care clinics; (4) educating rural residents on the importance of and need for USPSTF-recommended screenings; and (5) providing continuing education for rural providers on updates in preventive guidelines. More than ever, rural health policymakers need to be monitoring potential gaps in access to health care, as well as providing support for social determinants of health, with the goal of improving access to routine health screenings for rural residents. By increasing access to regular preventive care, we can significantly improve the health of rural communities in America.

## REFERENCES

1. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: new decade, new challenges. *Prev Med Rep.* 2023;33:102176. doi:10.1016/j.pmedr.2023.102176

2. Kassabian M, Shrestha A, Callaghan T, et al. Rural healthy people 2030: common challenges, rural nuances. May 2023. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

3. Rural-urban Disparities in Cancer. Cancer Map Stories. GIS Portal for Cancer Research. National Cancer Institute. 2023. Accessed May 1, 2023. https://gis.cancer.gov/mapstory/rural-urban/index.html

4. Douthit N, Kiv S, Dwolatzky T, Biswas S. Exposing some important barriers to health care access in the rural USA. *Public Health*. 2015;129(6):611-620. doi:10.1016/j.puhe.2015.04.001

5. Germack HD, Kandrack R, Martsolf GR. When rural hospitals close, the physician workforce goes. *Health Aff (Millwood)*. 2019;38(12):2086-2094. doi:10.1377/hlthaff.2019.00916

6. Health Professional Shortage Areas -- Primary Care. Health Resources & Services Administration. Updated May 2023. Accessed May 15, 2023. https://data.hrsa.gov/topics/health-workforce/shortage-areas

7. Akinlotan M, Khodakarami N, Primm K, Bolin J, Ferdinand AO. Travel for medical or dental care by race/ethnicity and rurality in the U.S.: findings from the 2001, 2009 and 2017 National Household Travel Surveys. *Prev Med Rep*. 2023;35:102297. doi:10.1016/j.pmedr.2023.102297.

8. Kirby JB, Yabroff KR. Rural-urban differences in access to primary care: beyond the usual course of care provider. *Am J Prev Med*. 2020;58(1):89-96. doi:10.1016/j.amepre.2019.08.026

9. What Is Shortage Designation? Health Resource & Services Administration, HRSA Health Workforce. Updated June 2023. Accessed June 15, 2023. https://bhw.hrsa.gov/workforce-shortage-areas/shortage-designation#hpsas

10. Zhai Y, Santibanez TA, Kahn KE, Srivastav A, Walker TY, Singleton JA. Rural, urban, and suburban differences in influenza vaccination coverage among children. *Vaccine*. 2020; 38(48):7596-7602. doi:10.1016/j.vaccine.2020.10.030

11. Flu Vaccination Coverage Update. Centers for Disease Control and Prevention, National Center for Immunization and Respiratory Diseases. January 11, 2023. Accessed: November 23, 2023. https://www.cdc.gov/flu/spotlights/2022-2023/flu-vaccine-update.htm#:~:text=Flu%20vaccination%20coverage%20among%20adults,in%20urban%20areas%20(38.7)

12. Harrington KA, Cameron NA, Culler K, Grobman W, Khan SS. Rural-urban disparities in adverse maternal outcomes in the United States, 2016-2019. *Am J Public Health*. 2023;113(2):224-227. doi:10.2105/AJPH.2022.307134

13. Luo H, Wu Q, Bell RA, et al. Rural-urban differences in dental service utilization and dental service procedures received among US adults: results from the 2016 Medical Expenditure Panel Survey. *J Rural Health*. 2021;37(3): 655-666. doi:10.1111/jrh.12500

14. Singh GK, Daus GP, Allender M, et al. Social determinants of health in the United States: addressing major health inequality trends for the nation, 1935-2016. *Int J MCH AIDS*. 2017;6(2):139-164. doi:10.21106/ijma.236

15. Borsky A, Zhan C, Miller T, Ngo-Metzger Q, Bierman AS, Meyers D. Few Americans receive all high-priority, appropriate clinical preventive services. *Health Aff (Millwood)*. 2018;37(6):925-928. doi:10.1377/hlthaff.2017.1248

16. Healthy People 2030 Objectives – Preventive Care. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Accessed October 28, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/preventive-care

17. Preventive Services. Healthcare.gov. Accessed October 28, 2023. https://www.healthcare.gov/glossary/preventive-services/

18. Health Benefits and Coverage: Preventive Health Services. Healthcare.gov. Accessed October 28, 2023. https://www.healthcare.gov/coverage/preventive-care-benefits/

19. Background: The Affordable Care Act's New Rules on Preventive Care. CMS.gov. Centers for Medicare and Medicaid Services. September 6, 2023. Accessed November 23, 2023. https://www.cms.gov/cciio/resources/fact-sheets-and-faqs/preventive-care-background

20. Patient Protection and Affordable Care Act, Public Law 148, U.S. Statutes at Large 124 (2010):119-1024. https://www.govinfo.gov/app/

details/STATUTE-124/STATUTE-124-Pg119/summary

21. Title V Maternal and Child Health (MCH) Block Grant. HRSA Maternal & Child Health. Health Resources & Services Administration. June 2023. Accessed November 23, 2023. https://mchb.hrsa.gov/programs-impact/title-v-maternal-child-health-mch-block-grant

22. Subchapter V-Maternal and Child Health Services Block Grant. Title 42-The Public Health and Welfare. Page 2313. https://www.govinfo.gov/link/uscode/42/701

23. Coronavirus Disease 2019 (COVID 19) Vaccine. Medicare.gov. Accessed November 23, 2023. https://www.medicare.gov/coverage/coronavirus-disease-2019-covid-19-vaccine

24. Medicaid Policy Issues Related to the COVID-19 Vaccine. Medicaid and CHIP Payment and Access Commission. March 2021. Accessed October 28, 2023. https://www.macpac.gov/publication/medicaid-policy-issues-related-to-the-covid-19-vaccine/

25. Biden-Harris Administration Requires Insurance Companies and Group Health Plans to Cover the Cost of At-Home COVID-19 Tests, Increasing Access to Free Tests. U.S. Department of Health and Human Services. January 10, 2022. Accessed November 23, 2023. https://www.hhs.gov/about/news/2022/01/10/biden-harris-administration-requires-insurance-companies-group-health-plans-to-cover-cost-at-home-covid-19-tests-increasing-access-free-tests.html

26. Foutz J, Artiga S, Garfield R. The Role of Medicaid in Rural America. Kaiser Family Foundation. April 25, 2017. Accessed January 30, 2023. https://www.kff.org/medicaid/issue-brief/the-role-of-medicaid-in-rural-america/

27. Kaiser Family Foundation. Status of State Medicaid Expansion Decisions: Interactive Map. October 4, 2023. Accessed November 15, 2023. https://www.kff.org/medicaid/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map/

28. State Medicaid Expansion Decisions, March 2023. Medicaid and CHIP Payment and Access Commission. Accessed November 23, 2023. https://www.macpac.gov/subtopic/medicaid-expansion/

29. Acampora A, Grossi A, Barbara A, et al. Increasing HPV vaccination uptake among adolescents: a systematic review. *Int J Environ Res Public Health*. 2020;17(21):7997. doi:10.3390/ijerph17217997

30. Bolin JN, Bellamy GR, Ferdinand A, et al. Rural Healthy People 2020: new decade, same challenges. *J Rural Health*. 2015;31(3):326-333. doi:10.1111/jrh.12116

31. McMaughan D, DeSalvo B, Creel L. Maternal and Child Health in Rural United States: Updates and Challenges. Chapter 9. In: Bolin JN, Bellamy G, Ferdinand AO, et al. eds. *Rural Healthy People 2020. Volume 1*. 2015. College Station, TX: The Texas A&M University Health Science Center, School of Public Health, Southwest Rural Health Research Center.

32. Kash BA, Hutchison L, Kaul S, Appiah P, Challa S. Oral Health. Chapter 13. In: Bolin JN, Bellamy G, Ferdinand AO, et al. eds. *Rural Healthy People 2020. Volume 2*. 2015. College Station, TX: Texas A&M University Health Science Center, School of Public Health, Southwest Rural Health Research Center.

33. Ferdinand AO, Hutchison L. Immunization and Infectious Diseases. Chapter 15. In: Bolin JN, Bellamy G, Ferdinand AO, et al. eds. *Rural Healthy People 2020. Volume 2*. 2015. College Station, TX: Texas A&M University Health Science Center, School of Public Health, Southwest Rural Health Research Center.

34. Increase use of the oral health care system – OH-08. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Healthy People 2030 Objectives – Preventive Care. Accessed October 5, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care/increase-use-oral-health-care-system-oh-08

35. Increase the number of community organizations that provide prevention services – ECBP-D07. Healthy People 2030. Office of Disease Prevention and Health Promotion. Published

2021. Accessed October 5, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/community/increase-number-community-organizations-provide-prevention-services-ecbp-d07

36. Increase the proportion of newborns who get screened for hearing loss by age 1 month – HOSCD01. Healthy People 2030. Office of Disease Prevention and Health Promotion. Published 2021. Accessed October 5, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/sensory-or-communication-disorders/increase-proportion-newborns-who-get-screened-hearing-loss-age-1-month-hoscd-01

37. Increase the proportion of children aged 3 to 5 years who get vision screening – V-01. Healthy People 2030. Office of Disease Prevention and Health Promotion. Published 2021. Accessed October 5, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/preventive-care/increase-proportion-children-aged-3-5-years-who-get-vision-screening-v-01

38. Increase portion of children who received a developmental screening – MICH-17. Healthy People 2030. Office of Disease Prevention and Health Promotion. Published 2021. Accessed October 5, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/children/increase-proportion-children-who-receive-developmental-screening-mich-17

39. Increase the proportion of pregnant women who receive early and adequate prenatal care – MICH-08. Healthy People 2030. Office of Disease Prevention and Health Promotion. Published 2021. Accessed October 5, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/pregnancy-and-childbirth/increase-proportion-pregnant-women-who-receive-early-and-adequate-prenatal-care-mich-08

40. Increase the proportion of women who get screened for postpartum depression – MICH-D01. Healthy People 2030. Office of Disease Prevention and Health Promotion. Published 2021. Accessed October 5, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/pregnancy-and-childbirth/increase-proportion-women-who-get-screened-postpartum-depression-mich-d01

41. Increase use of oral health care system – OH-08. Healthy People 2030. Office of Disease Prevention and Health Promotion. Published 2021. Accessed October 5, 2023.https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care/increase-use-oral-health-care-system-oh-08

42. Increase the proportion of low-income youth who have a preventative dental visit – OH-09. Healthy People 2030. Office of Disease Prevention and Health Promotion. Published 2021. Accessed October 5, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/oral-conditions/increase-proportion-low-income-youth-who-have-preventive-dental-visit-oh-09

43. Increase the proportion of children and adolescents who have dental sealants on 1 or more molars – OH-10. Healthy People 2030. Office of Disease Prevention and Health Promotion. Published 2021. Accessed October 5, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/oral-conditions/increase-proportion-children-and-adolescents-who-have-dental-sealants-1-or-more-molars-oh-10

44. Bright Futures. American Academy of Pediatrics. Accessed November 23, 2023. https://www.aap.org/brightfutures

45. Recommendations for Preventive Pediatric Health Care. Bright Futures/American Academy of Pediatrics. Updated March 1, 2023. Accessed October 28, 2023. https://downloads.aap.org/AAP/PDF/periodicity_schedule.pdf

46. Newborn Screening Portal. Centers for Disease Control and Prevention. Last reviewed November 29, 2021. Accessed October 28, 2023. https://www.cdc.gov/newbornscreening/index.html#:~:text=Each%20year%2C%20millions%20of%20babies,a%20hospital%20or%20birthing%20center

47. Data and Statistics about Hearing Loss in Children. National Center on Birth Defects and Developmental Disabilities. Centers for Disease Control and Prevention. Last reviewed August 4,

2023. Accessed October 28, 2023. https://www.cdc.gov/ncbddd/hearingloss/data.html

48. 2019 Summary of Diagnostics Among Infants Not Passing Hearing Screening. National Center on Birth Defects and Developmental Disabilities. Centers for Disease Control and Prevention. Last reviewed August 3, 2023. Accessed October 28, 2023. https://www.cdc.gov/ncbddd/hearingloss/2019-data/06-diagnostics.html

49. Bush ML, Alexander D, Noblitt B, Lester C, Shinn JB. Pediatric hearing healthcare in Kentucky's Appalachian primary care setting. *J Community Health*. 2015;40(4):762-768. doi:10.1007/s10900-015-9997-0

50. Bush ML, Bianchi K, Lester C, et al. Delays in diagnosis of congenital hearing loss in rural children. *J Pediatr*. 2014;164(2):393-397. doi:10.1016/j.jpeds.2013.09.047

51. Infant Mortality Rates by State. National Center for Health Statistics. Centers for Disease Control and Prevention. Accessed November 23, 2023. https://www.cdc.gov/nchs/pressroom/sosmap/infant_mortality_rates/infant_mortality.htm

52. Ehrenthal DB, Daphne Kuo H-H, Kirby RS. Infant mortality in rural and nonrural counties in the United States. *Pediatrics*. 2020;146:(5):e20200464. doi:10.1542/peds.2020-0464

53. Kozhimannil KB. Keeping rural infants alive: combatting structural inequities. *Pediatrics*. 2020;146(5):e2020025486. doi:10.1542/peds.2020-025486

54. Project ECHO. Agency for Healthcare Research and Quality. Accessed November 23, 2023. https://www.ahrq.gov/patient-safety/settings/multiple/project-echo/index.html#:~:text=Project%20ECHO%20(Extension%20for%20Community,to%20patients%20wherever%20they%20live

55. Child Development Basics. Centers for Disease Control and Prevention. February 23, 2023. Accessed November 23, 2023. https://www.cdc.gov/ncbddd/childdevelopment/facts.html

56. Bellesheim KR, Kizzee RL, Curran A, Sohl K. ECHO Autism: integrating maintenance of certification with extension for community healthcare outcomes improves developmental screening. *J Dev Behav Pediatr*. 2020;41(6):420-427. doi:10.1097/DBP.0000000000000796

57. Amiri S, Pham CD, Amram O, et al. Proximity to screening site, rurality, and neighborhood disadvantage: treatment status among individuals with sexually transmitted infections in Yakima County, Washington. *Int J Environ Res Public Health*. 2020;17(8):2679. doi:10.3390/ijerph17082679

58. Preventive Care Benefits for Adults. HealthCare.gov. Accessed November 23, 2023. https://www.healthcare.gov/preventive-care-adults/

59. Recommendations. United States Preventive Services Task Force. https://www.uspreventiveservicestaskforce.org/uspstf/topic_search_results?topic_status=P&type%5B%5D=5&searchterm=

60. Women's Preventive Services Guidelines: Affordable Care Act Expands Prevention Coverage for Women's Health and Well-Being. Health Resources & Services Administration. December 2022. Accessed October 4, 2023. https://www.hrsa.gov/womens-guidelines

61. Zhou X, Andes LJ, Rolka DB, Imperatore G. Changes in health care utilization among Medicare beneficiaries with diabetes two years into the COVID-19 pandemic. *AJPM Focus*. 2023;2(3):100117. doi:10.1016/j.focus.2023.100117

62. Barger AC, Pearson WS, Rodriguez C, Crumly D, Mueller-Luckey G, Jenkins WD. Sexually transmitted infections in the Delta Regional Authority: significant disparities in the 252 counties of the eight-state Delta Region Authority. *Sex Transm Infect*. 2018;94(8):611-615. doi:10.1136/sextrans-2018-053556

63. Albers AN, Thaker J, Newcomer SR. Barriers to and facilitators of early childhood immunization in rural areas of the United States: a systematic review of the literature. *Prev Med Rep*. 2022;27:101804. doi:10.1016/j.pmedr.2022.101804

64. HHS Awards Nearly $25 Million to Expand Access to School-Based Health Services. U.S. Department of Health and Human Services. May

3, 2022. Accessed November 23, 2023. https://www.hhs.gov/about/news/2022/05/03/hhs-awards-nearly-25-million-expand-access-school-based-health-services.html

65. Gao SS, Yon MJY, Chen KJ, Duangthip D, Lo ECM, Chu CH. Utilization of a mobile dental vehicle for oral healthcare in rural areas. *Int J Environ Res Public Health.* 2019;16(7):1234. doi:10.3390/ijerph16071234

66. Alabdullah JH, Daniel SJ. A systematic review on the validity of teledentistry. *Telemed J E Health.* 2018;24(8):639-648. doi:10.1089/tmj.2017.0132

67. Who We Are. HRSA Health Workforce. Health Resources & Services Administration. November 2023. Accessed November 23, 2023. https://bhw.hrsa.gov/about-us

68. Abraham CM, Norful AA, Stone PW, Poghosyan L, Fish ED. Cost-effectiveness of advanced practice nurses compared to physician-led care for chronic diseases: a systematic review. *Nurs Econ.* 2019;37(6):293-305.

69. Bolin JS, Cline K, Carruth L, Horel S. Financial & Public Health Benefits of Full Practice Authority for APRNs. TLL Temple Foundation. February 2023. https://cdn.ymaws.com/www.texasnp.org/resource/resmgr/media/tnpf_research_study_2023_fin.pdf

70. Conover C, Richards R. Economic benefits of less restrictive regulation of advanced practice nurses in North Carolina. *Nurs Outlook.* 2015;63:585-592. doi:10.1016/j.outlook.2015.05.009

71. Simpson R. Nursing the US Primary Care System: Deregulating SOP Laws for Nurse Practitioners. Brown Political Review. June 30, 2021. Accessed October 28, 2023. https://brownpoliticalreview.org/2021/06/nursing-us-primary-care/

72. Liu C-F, Hebert PL, Douglas JH, et al. Outcomes of primary care delivery by nurse practitioners: utilization, cost, and quality of care. *Health Serv Res.* 2020;55(2):178-189. doi:10.1111/1475-6773.13246

73. Andreyeva E, Kash B, Averhart Preston V, Vu L, Dickey N. Rural hospital closures: effects on utilization and medical spending among commercially insured individuals. *Med Care.* 2022;60(6):437-443. doi:10.1097/mlr.0000000000001711

74. Burns R, Keomany J, Okut H, Ablah E, Montgomery H. Preventive care utilization among rural versus urban women 12 months prior to pregnancy. *Kans J Med.* 2022;15:278-284. doi:10.17161/kjm.vol15.16221

75. McCarthy S, Moore D, Smedley WA, et al. Impact of rural hospital closures on health-care access. *J Surg Res.* 2021;258:170-178. doi:10.1016/j.jss.2020.08.055

76. Rural Hospital Closures. The Cecil G. Sheps Center for Health Services Research. Updated 2023. Accessed January 3, 2023. https://www.shepscenter.unc.edu/programs-projects/rural-health/rural-hospital-closures/

77. Maternal Health: Availability of Hospital-Based Obstetric Care in Rural Areas. GAO-23-105515. U.S. Government Accountability Office. October 19, 2022. Accessed November 23, 2023. https://www.gao.gov/products/gao-23-105515#:~:text=The%20number%20of%20hospitals%20providing,problems%20such%20as%20premature%20births

78. Omnibus Budget Reconciliation Act of 1981. Public Law 97–35; Understanding Title V of the Social Security Act. 1981. Health Resources & Services Administration, Maternal and Child Health Bureau, 2002.

79. Kaur R, Callaghan T, Regan AK. Disparities in prenatal immunization rates in rural and urban US areas by indicators of access to care. *J Rural Health.* 2023;39(1)142-152. doi:10.1111/jrh.12647

80. Regan AK, Kaur R, Nosek M, Swathi PA, Gu NY. COVID-19 vaccine acceptance and coverage among pregnant persons in the United States. *Prev Med Rep.* 2022;29:101977. doi:10.1016/j.pmedr.2022.101977

81. Maternity Care Desserts, 2020. U.S. Health Resources & Services Administration, Area Health Resources Files, 2021

82. Brigance C, Lucas R, Jones E, et al. Nowhere to Go: Maternity Care Deserts Across the U.S.: 2022 Report (Report No 3). March of Dimes. 2022. Accessed October 28, 2023. https://onprem.marchofdimes.org/materials/2022_Maternity_Care_Report.pdf

83. White House Blueprint for Addressing the Maternal Health Crisis. The White House, Washington. June 2022. Accessed October 28, 2023. https://www.whitehouse.gov/wp-content/uploads/2022/06/Maternal-Health-Blueprint.pdf

84. Hoyert DL. Maternal Mortality Rates in the United States, 2020. National Center for Health Statistics (NCHS) Health E-Stats. 2022. doi:10.15620/cdc:113967

85. The Uneven Burden of Maternal Mortality in the US. NIHCM Foundation Data Insights. August 2, 2022. Accessed October 28, 2023. https://nihcm.org/publications/the-uneven-burden-of-maternal-mortality-in-the-us?utm_source=NIHCM+Foundation&utm_campaign=28625a9040-womens_health_2023&utm_medium=email&utm_term=0_6f88de9846-28625a9040-360300542

86. Optimizing Post-Partum Care. Committee Opinion. Number 736. American College of Obstetricians and Gynecologists. May 2018. Accessed October 28, 2023. https://www.acog.org/clinical/clinical-guidance/committee-opinion/articles/2018/05/optimizing-postpartum-care

87. Mental Health Conditions Leading Cause of Pregnancy-related Deaths. Quick Safety. The Joint Commission, Division of Health Improvement. Issue Brief No 67. January 2023.

88. Henninger MW, Clements AD, Kim S, Rothman EF, Bailey BA. Prevalence of opioid use and intimate partner violence among pregnant women in South-Central Appalachia, USA. *Subst Use Misuse*. 2022;57(8):1220-1228. doi:10.1080/10826084.2022.2076872

89. Texas Maternal Mortality and Morbidity Review Committee and Department of State Health Services Joint Biennial Report 2022. December 2022. Updated October 2023. https://www.dshs.texas.gov/sites/default/files/legislative/2022-Reports/2022-MMMRC-DSHS-Joint-Biennial-Report.pdf

90. Horowitz C, Lawlor EF. Community approaches to addressing health disparities. *J Particip Med*. 2022;14(1):e37657. doi:10.2196/37657

91. Rice K, Seidman J, Mahoney O. A health equity-oriented research agenda requires comprehensive community engagement. *J Particip Med*. 2022;14(1):e37657. doi:10.2196/37657

92. Lutfiyya M Nawal, Gross AJ, Soffe B, Lipsky MS. Dental care utilization: examining the associations between health services deficits and not having a dental visit in past 12 months. *BMC Public Health*. 2019;19(1):265. doi:10.1186/s12889-019-6590-y

93. Reda SF, Reda SM, Thomson WM, Schwendicke F. Inequality in utilization of dental services: a systematic review and meta-analysis. *Am J Public Health*. 2018;108(2):e1-e7. doi:10.2105/AJPH.2017.304180

94. Luo H, Wu Q, Bell RA, Wright WG, Garcia RI, Quandt SA. Trends in use of dental care provider types and services in the United States in 2000-2016: rural-urban comparisons. *J Am Dent Assoc*. 2020;151(8):596-606. doi:10.1016/j.adaj.2020.04.026

95. Martin AB, Vyavaharkar M, Veschusio C, Kirby H. Rural-urban differences in dental service utilization among an early childhood population enrolled in South Carolina Medicaid. *Matern Child Health J*. 2012;16:203-211. doi:10.1007/s10995-010-0725-1

96. Simon L, Karhade DS, Fox K, Barrow J, Palmer N. Dental services utilization by rurality among privately insured children in the United States. *Pediatr Dent*. 2020;42(5):387-391.

97. Crouch E, Nelson J, Merrell MA, Martin A. The oral health status of America's rural children: an opportunity for policy change. *J Public Health Dent*. 2021;81(4):251-260. doi:10.1111/jphd.12444

98. Geiger CK, Kranz AM, Dick AW, Duffy E, Sorbero M, Stein BD. Delivery of preventive oral health services by rurality: a cross-sectional analysis. *J Rural Health*. 2019;35(1):3-11. doi:10.1111/jrh.12340

99. Gorsuch M Mileo, Sanders SG, Wu B. Tooth loss in Appalachia and the Mississippi Delta relative to other regions in the United States, 1999–2010. *Am J Public Health*. 2014;104(5):e85-91. doi:10.2105/AJPH.2013.301641

100. Caldwell JT, Lee H, Cagney KA. The role of primary care for the oral health of rural and urban older adults. *J Rural Health*. 2017;33(4):409-18. doi:10.1111/jrh.12269

101. Cao S, Gentili M, Griffin PM, et al. Estimating demand for and supply of pediatric preventive dental care for children and identifying dental care shortage areas, Georgia, 2015. *Public Health Rep*. 2017;132(3):343-349. doi:10.1177/0033354917699579

102. Taylor HL, Sen B, Holmes AM, Schleyer T, Menachemi N, Blackburn J. Does preventive dental care reduce nonpreventive dental visits and expenditures among Medicaid-enrolled adults? *Health Serv Res*. 2022;57(6):1295-1302. doi:10.1111/1475-6773.13987

103. Institute of Medicine (US) Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing, at the Institute of Medicine. *The Future of Nursing: Leading Change, Advancing Health*. Washington (DC): National Academies Press (US); 2011.

104. Ferreira MC, Dias-Pereira AC, Branco-de-Almeida LS, Martins CC, Paiva SM. Impact of periodontal disease on quality of life: a systematic review. *J Periodontal Res*. 2017;52(4):651-665. doi:10.1111/jre.12436

105. Gerritsen AE, Allen PF, Witter DJ, Bronkhorst EM, Creugers NH. Tooth loss and oral health-related quality of life: a systematic review and meta-analysis. *Health Qual Life Outcomes*. 2010;8:126. doi:10.1186/1477-7525-8-126

106. Kane SF. The effects of oral health on systemic health. *Gen Dent*. 2017;65(6):30-34.

107. Lamster I, Malloy K, DiMura P, et al. Preventive dental care is associated with improved health care outcomes and reduced costs for Medicaid members with diabetes. *Frontiers in Dental Medicine*. 2022;3. doi:10.3389/fdmed.2022.952182

108. National Advisory Committee on Rural Health and Human Services. Improving Oral Health Care Services in Rural America. Policy Brief and Recommendations. December 2018. Accessed January 31, 2023. https://www.hrsa.gov/sites/default/files/hrsa/advisory-committees/rural/2018-oral-health-policy-brief.pdf

109. Oral Health in Rural Communities. Rural Health Information Hub. July 18, 2022. Accessed November 25, 2023. https://www.ruralhealthinfo.org/topics/oral-health

110. Doescher MP, Keppel GA. Dentist Supply, Dental Care Utilization, and Oral Health Among Rural and Urban U.S. Residents. Final Report #135. Seattle, WA: WWAMI Rural Health Research Center, University of Washington, Jun 2015.

111. Vujicic M, Sarrett D, Munson B. Do dentists from rural areas practice in rural areas? *J Am Dent Assoc*. 2016;147(12):990-992. doi:10.1016/j.adaj.2016.08.007

112. Reimbursement Rates for Child and Adult Dental Services in Medicaid by State. Healthy Policy Institute. American Dental Association. Accessed November 23, 2023. https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/resources/research/hpi/hpigraphic_1021_1.pdf

113. Badran A, Keraa K, Farghaly MM. The impact of oral health literacy on dental anxiety and utilization of oral health services among dental patients: a cross sectional study. *BMC Oral Health*. 2023;23(1):146. doi:10.1186/s12903-023-02840-3

114. VanWormer JJ, Tambe SR, Acharya A. Oral health literacy and outcomes in rural Wisconsin adults. *J Rural Health*. 2019;35(1):12-21. doi:10.1111/jrh.12337

115. Griffin SO, Jones K, Tomar SL. An economic evaluation of community water fluoridation. *J Public Health Dent*. 2001;61(2):78-86. doi:10.1111/j.1752-7325.2001.tb03370.x

116. O'Connell J, Rockell J, Ouellet J, Tomar SL, Maas W. Costs and savings associated with community water fluoridation in the United States. *Health Aff (Millwood)*. 2016;35(12):2224-2232. doi:10.1377/hlthaff.2016.0881

117. Roberts ME, Doogan NJ, Kurti AN, et al. Rural tobacco use across the United States: how rural and urban areas differ, broken down by census regions and divisions. *Health Place.* 2016; 39:153-159. doi:10.1016/j.healthplace.2016.04.001

118. Ran T, Chattopadhyay SK. Economic evaluation of community water fluoridation: a community guide systematic review. *Am J Prev Med.* 2016;50(6), 790-796. doi:10.1016/j.amepre.2015.10.014

119. 10 Reasons to Fluoridate Public Water. American Dental Association. Accessed November 25, 2023. https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/community-initiatives/fluoridation-ten-reasons-to-fluoridate.pdf?rev=129923070927441f9a9be2b73cb5d219&hash=E3128014177FE5F2532F05F4D7B29D7

120. Blackburn J, Morrisey MA, Sen B. Outcomes associated with early preventive dental care among Medicaid-enrolled children in Alabama. *JAMA Pediatr.* 2017;171(4):335-341. doi:10.1001/jamapediatrics.2016.4514

121. Geiger CK, Kranz AM, Dick AW, Duffy E, Sorbero M, Stein BD. Delivery of preventive oral health services by rurality: a cross-sectional analysis. *J Rural Health.* 2019;35(1):3-11. doi:10.1111/jrh.12340

122. Contreras OA, Stewart D, Valachovic RW. Examining America's Dental Safety Net. American Dental Education Association. ADEA Data Brief. 2018. Accessed January 31, 2023. https://www.adea.org/policy/white-papers/Dental-Safety-Net.aspx

123. Koppelman J, Vitzthum K, Simon L. Expanding where dental therapists can practice could increase Americans' access to cost-efficient care. *Health Affairs (Millwood).* 2016;35(12):2200-2206. doi:10.1377/hlthaff.2016.0844

124. Fish-Parcham C, Burroughs M, Tranby EP, Brow AR. Addressing rural seniors' unmet needs for oral health care. Health Affairs Forefront. May 6, 2019. Accessed January 31, 2023. https://www.healthaffairs.org/content/forefront/addressing-rural-seniors-unmet-needs-oral-health-care

125. Friedman JW, Mathu-Muju KR. Dental therapists: improving access to oral health care for underserved children. *Am J Public Health.* 2014;104(6):1005-1009. doi:10.2105/AJPH.2014.301895

126. Simon L, Donoff RB, Friedland B. Dental therapy in the United States: are developments at the state level a reason for optimism or a cause for concern? *J Public Health Dent.* 2021;81(1):12-20. doi:10.1111/jphd.12388

127. Chi DL, Lenaker D, Mancl L, Dunbar M, Babb M. Dental therapists linked to improved dental outcomes for Alaska Native communities in the Yukon-Kuskokwim Delta. *J Public Health Dent.* 2018;78(2):172-182. doi:10.1111/jphd.12263

128. Pathman DE, Konrad TR. Growth and changes in the National Health Service Corps (NHSC) workforce with the American Recovery and Reinvestment Act. *J Am Board Fam Med.* 2012;25(5):723-733. doi:10.3122/jabfm.2012.05.110261

129. Rural PREP (Primary Care Research, Education, and Practice). 2019. Accessed November 23, 2023. https://ruralprep.org/about/#:~:text=Rural%20PREP%E2%80%99s%20mission%20is%20to%20improve%20and%20sustain,areas%20and%20prepare%20them%20better%20for%20rural%20practice

130. Delta Dental Mobile Program [online]. Rural Health Information Hub. 2023. Updated March 14, 2023. https://www.ruralhealthinfo.org/project-examples/626

131. de Silva AM, Hegde S, Akudo Nwagbara B, et al. Community-based population-level interventions for promoting child oral health. *Cochrane Database Syst Rev.* 2016;9(9):CD009837. doi:10.1002/14651858.CD009837.pub2

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*Related Chapters:*

Chapter 3. Rural Healthcare Access and Quality
Chapter 7. Rural Healthy People: Older Adults
Chapter 12. Disparities and Opportunities Across the Cancer Continuum in Rural America
Chapter 15. An Examination of the Workforce in Rural America
Chapter 18. Rural Health Issues in Child and Adolescent Development

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# THE IMPACT OF DIABETES ON RURAL AMERICANS

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## SCOPE OF THE PROBLEM

- Diabetes ranks as the 8th leading cause of death in the United States, with nearly 103,000 diabetes-related deaths per year.[1]
- Diabetes has a disproportionate impact on rural Americans with geographic variability noted in incidence, prevalence, and mortality. Over the last decade, rates did not improve overall in the rural U.S. and, in fact, increased in the rural South.[2-4]
- The Healthy People 2020 nationwide goals for diabetes were achieved or surpassed for objectives pertaining to diabetes prevention, diagnosis, and glucose monitoring.[5]
- Since 2009, rural rates of minor lower extremity amputations (LEA) increased across both rural and urban populations, as well as racial/ethnic categories and census regions.[6] Likewise, overall risk of a major LEA increased with rurality and was also higher among residents of the South than among those of the Northeast. A steep decline in major-to-minor amputation ratios was observed, especially among Native Americans.[6]
- Diabetes is an ambulatory care sensitive condition. Caring for persons with diabetes is challenging for healthcare providers because they have limited time with patients and diabetes self-management may not be an insurance benefit or a priority for the patient.[7,8]

**Rural disparities and challenges include:**

- Lack of access to medications, supplies, and regular primary care is the number one contributor to diabetes health disparities, poorer health outcomes, and higher mortality rates.[6,9-17]
- Rural-dwelling persons are more likely to report a diagnosis of diabetes than urban adults, 12.6% versus 9.9%.[18]
- People with diabetes who live in rural areas have significantly higher morbidity from diabetes-related complications compared to those living in more urban areas.[19]
- Limited access to health care and resources for diabetes self-management exist in rural areas.[11,19,20]
- Individuals in rural areas have a 12.4% higher diabetes mortality rate than those residing in urban areas, particularly in the southern U.S.[21,22]

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The United States population continues to reflect life-style factors and social determinants of health associated with obesity, metabolic syndrome, and diabetes.[23] Although diabetes prevention and care has been improving,[5] disparities still exist between rural and urban areas of the U.S. Persistent disparities observed among rural populations show that they experience more negative health consequences related to diabetes.[1,24] Limited access to health care and resources for diabetes self-management persist in rural areas, and there are large degrees of variation in disease burden among racial and ethnic groups.[6,9-17]

## RELEVANT HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

Every ten years, the U.S. Department of Health and Human Services identifies collective goals to

improve the health and well-being of Americans through an initiative called Healthy People. Among its current priorities, Healthy People 2030 states that its overall goal for diabetes is to "reduce the burden for those lacking access to care and medications as well as improve quality of life for all people who have, or are at risk for, diabetes."[5] Healthy People 2030 objectives related to diabetes call for reducing the consequences of diabetes – namely amputations, A1c values >9.0, vision loss, emergency department visits for insulin overdose, diabetes-related hospital admissions, and deaths due to diabetes.[5] The objectives also call for an increase in diabetes education and daily blood sugar monitoring, yearly eye exams for adults with diabetes, and yearly urinary albumin testing to determine liver function in those with diabetes.[5]

This literature review addresses diabetes as an identified priority for *rural America*. Some of the specific objectives of the Healthy People 2030 diabetes goal that will be addressed include:

- D-01 Reduce the number of diabetes cases diagnosed yearly.[5]
- D-03 Reduce the proportion of adults with diabetes who have an A1c value above 9%.[5]
- D-06 Increase the proportion of people with diabetes who receive formal diabetes education.[5]
- D-07 Increase the proportion of adults with diabetes using insulin who monitor their blood sugar daily.[5]
- D-08 Reduce rates of foot and leg amputations in adults with diabetes.[5]
- D-09 Reduce the rate of diabetes-associated mortality from any cause in adults with diabetes.[5]

## RURAL HEALTHY PEOPLE 2030 SURVEY

Selecting from the 62 Healthy People 2030 leading health indicators, a total of 1,291 rural stakeholders responded to a nationally disseminated web-based survey to determine the 20 most important health priorities for rural Americans.[25] A total of 32.2% of respondents to the Rural Healthy People 2030 survey identified diabetes as one of their top 10 health-related priorities; nearly 10% (i.e., 9.2%) of those surveyed identified diabetes as one of their top three priorities.[25] This ranked diabetes as the 9th most important national rural health priority overall.[25] Other types of health conditions found in the top 20 rankings were mental health, addiction, cancer, overweight/obesity, and chronic pain. When comparing responses by U.S. census regions, diabetes was ranked highest by respondents living in the South. The survey also reported that diabetes "was selected as a 'top 10' priority more frequently by respondents residing in states which had not expanded Medicaid (rank=6) than those who resided in states that did (rank=11)."[26]

## KNOWN RISK FACTORS FOR THE CONDITION

Factors known to be associated with the risk of developing diabetes include being overweight or obese, lack of physical activity, poor diet, and lack of access to healthy foods with reduced calories.[27] Lack of access to medical care, preventive care, medications, and monitoring are associated with higher rates of the condition going undetected, as is living in the southern and midwestern regions of the U.S.

According to the Centers for Disease Control and Prevention, people are at risk for type 2 diabetes (T2DM) if they:

- Have prediabetes defined as persistent mildly elevated blood sugar.[27]
- Are overweight or obese, with a body mass index of 25 and above.[27]
- Are 45 years or older.[27]
- Have a first-degree relative, including parent, brother, or sister with T2DM.[27]
- Engage in physical activity fewer than three times a week.[27]
- Have a history of gestational diabetes (i.e., diabetes during pregnancy) or have given birth to a baby weighing over 9 pounds.[27]
- Are an African American, Hispanic or Latino, American Indian, Alaskan Native, Pacific Islander, or Asian American.[27]
- Have non-alcoholic fatty liver disease.[27]

## PREVALENCE AND DISPARITIES IN RURAL AREAS

Disparities surrounding diabetes also reflect that rural Americans have a higher prevalence of

diabetes compared to their urban counterparts.[19] In 2016, within nonmetropolitan counties, 12.6% of the population had diagnosed diabetes, while in metropolitan areas 9.9% of the population had diabetes.[18] Furthermore, rural-urban disparities exist for diabetes-related mortality. In rural America from 1999 to 2015, individuals residing in noncore areas (the most rural classification) had a 12.4% higher mortality rate compared to those residing in large central metropolitan areas.[21] Additionally, notable differences have been reported for rates of persons who die while hospitalized due to diabetes-related co-morbidities, with urban hospitals reporting deaths associated with diabetes at 2.63%, while rural hospitals reported diabetes-related deaths at 10% higher.[3] With regard to overall mortality, rural America also lags behind. By 2016, urban counties reported a 27% decline in mortality rates per 100,000 people (from 29 to 21 points), while rural or noncore areas reported only a 3% decline (from 29.3 to 28.6 points).[2]

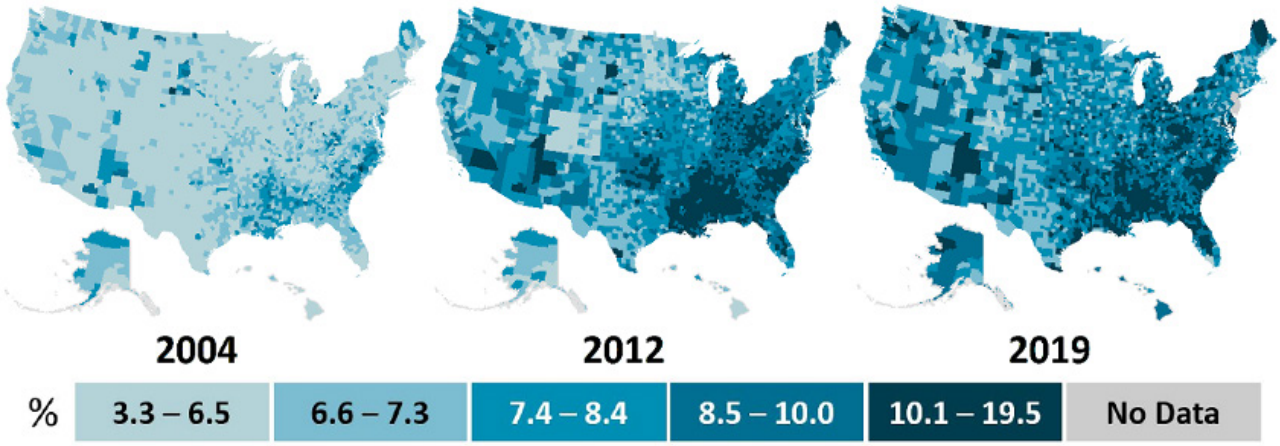
## VARIATION BY RURAL REGIONS

Diabetes mortality and morbidity also differ across census and geographic regions in the U.S., further adding to observed differences between rural and urban areas. **Figure 1** shows an increased percentage of diagnosed diabetes rates over time, especially in the South and Midwest regions.[30] Within the rural South, diabetes-related deaths were 7.5% higher compared to large metropolitan areas within the same region.[3] Like the South, the Midwest region experienced greater likelihood of diabetes-related death in rural counties than non-rural counties. The odds of death were 23% higher in both micropolitan (OR 1.23, 95% C.I. 1.18, 1.28) and noncore (OR 1.23, 95% C.I. 1.18, 1.28) areas of the Midwest, and they were 25% higher in micropolitan areas (OR 1.25, 95% C.I. 1.21, 1.28) and 29% higher in noncore areas of the South.[19] Along with these geographic disparities, there are disparities in the Appalachian region as well, where 13% of rural residents have been diagnosed with diabetes, while only 10.5% of residents living in metropolitan areas of Appalachia have been diagnosed.[31] Furthermore, the Appalachian region has a 1.4% increased burden of diabetes compared to their non-Appalachian state counterparts.[32]

## VARIATION BY RACE AND ETHNICITY

Diabetes prevalence and adverse health outcomes have striking racial and ethnic disparities in adults and children living in rural areas.[9] In the general population of adults aged 18 years and older, the likelihood of diabetes is higher among American Indians or Alaskan Natives (14.5%), non-Hispanic Blacks (12.1%), Hispanics (11.8%), and non-Hispanic Asians (9.5%) when compared to non-Hispanic Whites (7.4%).[30] In rural areas, historical minority individuals experience even more health disparities with regard to diabetes care and health outcomes, as well as higher mortality rates.[9-14] These disparities have contributed to pronounced variation of health equity outcomes between urban and rural populations.[19] For example, rural individuals are three times more likely to die from diabetes when compared to those living in

**Figure 1. Age-adjusted, County-level Prevalence of Diagnosed Diabetes Among Adults Aged 20 Years or Older in the United States, 2004, 2012, and 2019[30]**



urban settings.[9] However, there is a distinct need for future studies that focus on racial disparities among populations in rural areas. There is also an acute lack of research focusing on rural populations among Asian/Pacific Islanders, American Indians, and Alaskan Natives.

Rural non-White populations on average are diagnosed at younger ages with diabetes than their geographically similar White counterparts for both type 1 and type 2 diabetes.[15] Racial disparities in patients with diabetes living in rural areas also manifests in higher diabetes hospitalization rates and prevalence of diabetes-related complications. For example, African Americans in rural areas are reported to have a higher hospitalization rate and are more likely to have a higher percentage of uncontrolled A1c levels when compared to non-Hispanic Whites.[14,16] Although diabetes-related mortality rates have significantly decreased among African Americans who live in urban areas, the same improvements have not been seen in rural areas.[9] Among other historical minority groups in rural areas, Native Americans and Hispanics had a higher incidence of minor or major lower extremity amputations.[6] Also, Asians or Pacific Islanders in rural areas are more likely to die during a diabetes-related hospitalization.[17] These disparities are likely the result of a complex interplay of factors, including poverty, access to healthcare, health insurance coverage, access to healthy food options, and limited physical activity opportunities.[33-36] This mix of factors can contribute to higher rates of diabetes among minority populations.

## IMPACT ON MORTALITY AND MORBIDITY

Diabetes is ranked as the 8th leading cause of death in the U.S with nearly 103,000 diabetes-related deaths per year.[1] Type 2 diabetes mellitus is often observed in the presence of obesity, metabolic disorders, lipid disorders, and associated vascular inflammation. Other associated chronic conditions, such as renal disease and hypertension, lead to higher risks of mortality due to renal failure and cardiovascular events associated with comorbidities.[37] More recent studies have documented the significantly higher rates of COVID-19 mortality observed in patients who also have a diagnosis of diabetes.[38] This phenomenon has been observed worldwide, not just in rural areas. Perhaps most disturbing were significantly higher rates of COVID-19 associated mortality for patients admitted during the pandemic, while individuals with poorly controlled HbA1c had a significantly higher risk of *severe* COVID-19 and significantly higher rates of mortality.[39] In particular, rates of diabetes-associated deaths are generally higher in the southern U.S., with Mississippi and West Virginia, as well as states throughout the Midwest, reporting significantly higher rates of COVID-19 + T2DM-associated mortality.[22] For example, in largely rural southern states like Mississippi, Arkansas, Louisiana, and Oklahoma, age-adjusted death rates associated with T2DM as a primary condition range from 32% to 41%.[22] In general, rates of diabetes-associated deaths are higher in the southern U.S. The three states with the highest reported diabetes mortality rates — West Virginia, Mississippi, and Arkansas — all rank within the top 10 states for highest percentage of residents living in rural areas as defined by the U.S. Census Bureau.

Researchers are now observing that diabetes is a significant contributor to cancer mortality and morbidity, adding to the complexities and challenges of rural cancer prevention and treatment.[40] Inflammation, long known to be a contributor to cancer risk, is now being investigated as a connecting link between diabetes and cancer. Cancer risk is increased in persons with diabetes mellitus. There is a 10% increase in cancer risk with concurrent diabetes and it is estimated that between 8% and 18% of patients with cancer have diabetes.[41,42] Often, cancer symptom management includes glucocorticoid use which may inhibit cell function causing an increase in fatty acids, thereby increasing insulin sensitivity and inducing diabetes.[45] Targeted cancer therapies may also increase serum glucose levels and growth hormones, increasing hyperglycemia and subsequent insulin resistance.[43] Cancer treatment and therapeutic approaches are also associated with increased complications in individuals with diabetes.[44]

## BARRIERS

There are a variety of known barriers, associated with the previously noted rural disparities, which

can be characterized at different socioecological levels.[45] At the individual level, rural residents are less knowledgeable about risk factors for diabetes onset and progression, and often see diabetes as inevitable versus a preventable condition.[46] At the interpersonal level, rural residents often have fewer family and friend supports for diabetes management and control.[47] Organizationally, there are fewer stand-alone evidence-based self-management programs in rural communities. Likewise, national statistics reflect persistent and limited access to health care and healthcare providers. Combined primary care and availability of behavioral counseling is especially needed in clinical settings.[46] Rural communities and towns often lack parks, workout facilities, or walking areas. Therefore, rural residents may find it challenging to engage in healthy lifestyle behaviors due to insufficient access to safe places for being physically active or healthier food options.[48] At the public policy level, there are few legislative or policy initiatives to address disparities or the lack of resources for tackling major risk factors such as universal access to health care and the ability to afford insurance, medications, and healthy foods.[49]

## PROVEN SOLUTIONS OR INTERVENTIONS

The Association of Diabetes Care & Education Specialists has developed a framework of self-management activities which include healthy coping, healthy eating, being active, taking medication, monitoring, reducing risk, and problem solving.[49] Persons living with diabetes are often encouraged to perform these daily self-management activities to attain healthy blood glucose levels and to minimize or delay the onset of diabetes-related complications and comorbidities.[50] However, there is limited access to health care and resources for diabetes self-management in rural areas compared to urban settings.[11,20] In addition, cultural and societal factors may play a critical role in diabetes self-management behaviors in rural communities due to traditional illness beliefs and acceptance of diabetes.[46,47] Given the significant proportions of ethnically diverse populations in rural areas, significant barriers exist in finding culturally congruent healthcare providers.[13,34]

Diabetes Self-Management Education and Support (DSMES), and the more generic Chronic Disease Self-Management Programs for persons with diabetes, are recommended through public health agencies,[51] professional organizations,[52] and the aging services network.[53] For example, with funding from the Administration for Community Living (ACL), local Area Agencies on Aging are able to disseminate DSMES programs throughout the country to adults 50 years and older, including those in rural counties.[54] The ACL programs emphasize the importance of creating supportive networks to help older adults better manage their diabetes.[54]

In past decades, DSMES classes were limited to hospitals and health facilities where patients and their families participated. However, as patient needs have evolved and technology has developed, interventions are becoming more flexible. Now telehealth, online or through telephone interventions, and community-based practices (CBPR) with clear goal setting such as diet management, physical activities, and blood pressure management, have been shown to be effective in improving diabetes self-management behaviors and A1c levels among rural populations.[19,20,55] For rural persons who have immigrated recently, culturally tailored interventions, social support, diabetes education programs that include both patient and family members, and collaborating with lay educators or community health workers have demonstrated positive effects on patients' activation and diabetes self-management behaviors.[35,55-57] Digital storytelling, such as "Stories for Change-Diabetes" which is provided in Spanish and uses CBPR approaches, has been shown to improve rural Latino patients' confidence, motivation, and behavioral intentions for diabetes self-management.[58]

## SUMMARY AND CONCLUSIONS

While modest gains have been made, challenges associated with preventing T2DM or managing it well persist. Key to the prevention of diabetes, as well as appropriate management of diabetes, is an active lifestyle, access to primary health care, community-based approaches for prevention of diabetes, and assistance with appropriate management of diabetes for those people

with T2DM in rural areas. However, a person's demographic status, such as rurality, age, sex, and income play a role. Access to health care, including appropriate monitoring supplies, insulin, and nutrition education, as well as access to healthy food resources must be addressed and prioritized by state and national policy makers for diabetes care in rural areas.

## REFERENCES


1. Leading Causes of Death. Centers for Diabetes Control and Prevention. Updated January 18, 2023. Accessed April 26, 2023. https://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm

2. Callaghan T, Ferdinand AO, Akinlotan MA, Towne SD, Jr., Bolin J. The changing landscape of diabetes mortality in the United States across region and rurality, 1999-2016. *J Rural Health*. 2020;36(3):410-415. doi:10.1111/jrh.12354

3. Ferdinand AO, Akinlotan MA, Callaghan T, Towne SD, Jr., Bolin J. Diabetes-related hospital mortality in rural America: a significant cause for concern. March 2018. https://srhrc.tamu.edu/publications/srhrc-pb3-ferdinand-diabetes.pdf

4. Yaemsiri S, Alfier JM, Moy E, et al. Healthy People 2020: rural areas lag in achieving targets for major causes of death. *Health Aff (Millwood)*. 2019;38(12):2027-2031. doi:10.1377/hlthaff.2019.00915

5. U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. Healthy People 2020. Diabetes. Updated February 6, 2022. Accessed April 30, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/diabetes

6. Akinlotan MA, Primm K, Bolin JN, et al. Racial, rural, and regional disparities in diabetes-related lower-extremity amputation rates, 2009-2017. *Diabetes Care*. 2021;44(9):2053-2060. doi:10.2337/dc20-3135

7. *Department of Health and Human Services Agency for Healthcare Research and Quality*. AHRQ Quality Indicators- Guide to Prevention Quality Indicators: Hospital Admission for Ambulatory Care Sensitive Conditions. Updated April 17, 2022. Accessed March 7, 2023. https://www.ahrq.gov/downloads/pub/ahrqqi/pqiguide.pdf

8. Heisler M, Bouknight RR, Hayward RA, Smith DM, Kerr EA. The relative importance of physician communication, participatory decision making, and patient understanding in diabetes self-management. *J Gen Intern Med*. 2002;17(4):243-252. doi:10.1046/j.1525-1497.2002.10905.x

9. Kobo O, Van Spall HGC, Mamas MA. Urban-rural disparities in diabetes-related mortality in the USA 1999-2019. *Diabetologia*. 2022;65(12):2078-2083. doi:10.1007/s00125-022-05785-4

10. Ko J, Delafield R, Davis J, Mau MK. Characteristics of patients with type 2 diabetes mellitus in two rural, medically underserved communities. *Hawaii J Med Public Health*. 2013;72(6):191-196.

11. Kurani SS, Lampman MA, Funni SA, et al. Association between area-level socioeconomic deprivation and diabetes care quality in US primary care practices. *JAMA Netw Open*. 2021;4(12):e2138438. doi:10.1001/jamanetworkopen.2021.38438

12. Logan H, Guo Y, Dodd VJ, Muller K, Riley J, 3rd. The burden of chronic diseases in a rural North Florida sample. *BMC Public Health*. 2013;13:906. doi:10.1186/1471-2458-13-906

13. Rangel Gómez MG, López Jaramillo AM, Svarch A, et al. Together for Health: an initiative to access health services for the Hispanic/Mexican population living in the United States. *Front Public Health*. 2019;7:273. doi:10.3389/fpubh.2019.00273

14. Wan TTH, Lin YL, Ortiz J. Racial Disparities in Diabetes Hospitalization of Rural Medicare Beneficiaries in 8 Southeastern States. *Health Serv Res Manag Epidemiol*. 2016;3:1-10. doi:10.1177/2333392816671638

15. Bolin JN, Schulze A, Helduser J, Ory MG. The Burden of Diabetes in Rural America. In: Bolin JN, Bellamy G, Ferdinand AO, et al. eds. *Rural Healthy People 2020. Vol. 1*. College Station, TX: The Texas A&M University Health Science Center, School of

Public Health, Southwest Rural Health Research Center; 2015:43-53.

16. Walker RJ, Neelon B, Davis M, Egede LE. Racial differences in spatial patterns for poor glycemic control in the Southeastern United States. *Ann Epidemiol.* 2018;28(3):153-159. doi:10.1016/j.annepidem.2018.01.008

17. Ferdinand AO, Akinlotan MA, Callaghan T, Towne Jr SD, Bolin J. Diabetes-related hospital mortality in the US: a pooled cross-sectional study of the National Inpatient Sample. *J Diabetes and its Complications.* 2019;33(5):350-355. doi:10.1016/j.jdiacomp.2019.01.007

18. Why Diabetes is a Concern for Rural Communities. Rural Health Information Hub. Updated September 23, 2020. Accessed April 30, 2023. https://www.ruralhealthinfo.org/toolkits/diabetes/1/rural-concerns

19. Dugani SB, Mielke MM, Vella A. Burden and management of type 2 diabetes in rural United States. *Diabetes Metab Res Rev.* 2021;37(5):e3410. doi:10.1002/dmrr.3410

20. Pullyblank K, Scribani M, Wyckoff L, et al. Evaluating the implementation of the diabetes self-management program in a rural population. *Diabetes Spectr.* 2022;35(1):95-101. doi:10.2337/ds21-0002

21. Callaghan T, Towne SD, Jr., Bolin J, Ferdinand AO. *Diabetes Mortality in Rural America: 1999-2015.* August 2017. https://srhrc.tamu.edu/publications/diabetes-mortality-in-rural-america-policy-brief.pdf

22. Diabetes Mortality by State. Centers for Disease Control and Prevention. Updated March 1, 2022. Accessed April 30, 2023. https://www.cdc.gov/nchs/pressroom/sosmap/diabetes_mortality/diabetes.htm

23. Lee A, Cardel M, Donahoo WT. Social and environmental factors influencing obesity. In: Feingold KR, Anawalt B, Blackman MR, et al., editors. *Endotext [Internet].* South Dartmouth. 2019; https://www.ncbi.nlm.nih.gov/books/NBK278977/

24. Richman L, Pearson J, Beasley C, Stanifer J. Addressing health inequalities in diverse, rural communities: an unmet need. *SSM-popul health.* 2019;7:100398. doi:10.1016/j.ssmph.2019.100398

25. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: new decade, new challenges. *Prev Med Rep.* 2023;33:102176. doi:10.1016/j.pmedr.2023.102176

26. Kassabian M, Shrestha A, Callaghan T, et al. Rural healthy people 2030: common challenges, rural nuances. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

27. Diabetes Risk Factors. Centers for Diabetes Control and Prevention. Updated December 30, 2022. Accessed April 26, 2023. https://www.cdc.gov/diabetes/basics/risk-factors.html

28. Eat Well. Centers for Diabetes Control and Prevention. Updated September 20, 2022. Accessed April 26, 2023. https://www.cdc.gov/diabetes/managing/eat-well.html

29. Get Moving To Manage Your Diabetes. Centers for Diabetes Control and Prevention. Updated November 3, 2022. Accessed April 26, 2023. https://www.cdc.gov/diabetes/library/features/get-moving-to-manage-diabetes.html

30. Prevalence of Diagnosed Diabetes. Centers for Disease Control and Prevention. Updated September 30, 2022. Accessed April 30, 2023. https://www.cdc.gov/diabetes/data/statistics-report/diagnosed-diabetes.html

31. Appalachian Region Endures Dramatic Health Challenges Compared with Nation, New Research Shows. Appalachian Regional Commission. August 24, 2017. https://www.arc.gov/wp-content/uploads/2020/07/AppRegionHealthDisparitiesKeyFindings8-17.pdf

32. Carpenter R, Smith MJ. Living with diabetes in Appalachia: a focus group study. *Holist Nurs Pract.* 2018;32(4):196-201. doi:10.1097/hnp.0000000000000273

33. Apostolopoulos Y, Lemke MK, Hosseinichimeh N, Harvey IS, Lich KH, Brown J. Embracing causal complexity in health disparities: metabolic

syndemics and structural prevention in rural minority communities. *Prev Sci*. 2018;19(8):1019-1029. doi:10.1007/s11121-018-0924-3

34. Benavides-Vaello S, Brown SA. Sociocultural construction of food ways in low-income Mexican-American women with diabetes: a qualitative study. *J Clin Nurs*. 2016;25(15-16):2367-2377. doi:10.1111/jocn.13291

35. Brown SA, Perkison WB, García AA, et al. The Starr County border health initiative: focus groups on diabetes prevention in Mexican Americans. *Diabetes Educ*. 2018;44(3):293-306. doi:10.1177/0145721718770143

36. Probst JC, Bellinger JD, Walsemann KM, Hardin J, Glover SH. Higher risk of death in rural blacks and whites than urbanites is related to lower incomes, education, and health coverage. *Health Aff (Millwood)*. 2011;30(10):1872-1879. doi:10.1377/hlthaff.2011.0668

37. Huang ES, Laiteerapong N, Liu JY, John PM, Moffet HH, Karter AJ. Rates of complications and mortality in older patients with diabetes mellitus: the diabetes and aging study. *JAMA Intern Med*. 2014;174(2):251-258. doi:10.1001/jamainternmed.2013.12956

38. Lv F, Gao X, Huang AH, et al. Excess diabetes mellitus-related deaths during the COVID-19 pandemic in the United States. *eClinicalMedicine*. 2022;54:101671. doi:10.1016/j.eclinm.2022.101671

39. Singh AK, Khunti K. Assessment of risk, severity, mortality, glycemic control and antidiabetic agents in patients with diabetes and COVID-19: a narrative review. *Diabetes Res Clin Pract*. 2020;165:108266. doi:10.1016/j.diabres.2020.108266

40. Charlton M, Schlichting J, Chioreso C, Ward M, Vikas P. Challenges of rural cancer care in the United States. *Oncology (Williston Park)*. 2015;29(9):633-640.

41. Tsilidis KK, Kasimis JC, Lopez DS, Ntzani EE, Ioannidis JP. Type 2 diabetes and cancer: umbrella review of meta-analyses of observational studies. *BMJ*. 2015;350:g7607. doi:10.1136/bmj.g7607

42. Suh S, Kim KW. Diabetes and cancer: cancer should be screened in routine diabetes assessment. *Diabetes Metab J*. 2019;43(6):733-43. doi:10.4093/dmj.2019.0177

43. Zhu B, Qu S. The relationship between diabetes mellitus and cancers and its underlying mechanisms. *Front Endocrinol (Lausanne)*. 2022;13:800995. doi:10.3389/fendo.2022.800995

44. Shahid RK, Ahmed S, Le D, Yadav S. Diabetes and cancer: risk, challenges, management and outcomes. *Cancers (Basel)*. 2021;13(22): 5735. doi:10.3390/cancers13225735

45. Richman L, Pearson J, Beasley C, Stanifer J. Addressing health inequalities in diverse, rural communities: an unmet need. *SSM Popul Health*. 2019;7:100398. doi:10.1016/j.ssmph.2019.100398

46. Beverly EA, Ritholz MD, Cook K, et al. Diabetes in Appalachia: providers' perspectives. *Prim Health Care Res Dev*. 2020;21:e11. doi:10.1017/S1463423620000134

47. Della LJ. Exploring diabetes beliefs in at-risk Appalachia. *J Rural Health*. 2011;27(1):3-12. doi:10.1111/j.1748-0361.2010.00311.x

48. Trivedi T, Liu J, Probst J, Merchant A, Jhones S, Martin AB. Obesity and obesity-related behaviors among rural and urban adults in the USA. *Rural Remote Health*. 2015;15(4):3267.

49. Practice Resources. Association of Diabetes Care & Education Specialists. Practice Resources. Accessed April 26, 2023. https://www.diabeteseducator.org/practice/practice-tools/app-resources/the-aade7-self-care-behaviors-the-framework-for-optimal-self-management

50. Association of Diabetes Care and Education Specialists, Kolb L. An effective model of diabetes care and education: the ADCES7 self-care behaviors™. *Sci Diabetes Self Manag Care*. 2021;47(1):30-53. doi:10.1177/0145721720978154

51. Chronic Diabetes Self-Management Program (CDSMP). Centers for Disease Control and Prevention. Updated October 18, 2019. Accessed April 26, 2023. https://www.cdc.gov/arthritis/interventions/programs/cdsmp.htm

52. American Diabetes Association. https://diabetes.org/

53. ACL Grants Overview Administration for Community Living. Updated November 25, 2022. Accessed April 26, 2023. https://acl.gov/grants

54. Diabetes. Nutrition and Aging Resource Center. Updated January 9, 2023. Accessed April 26, https://acl.gov/senior-nutrition/diabetes

55. Jarvandi S, Roberson P, Greig J, Upendram S, Grion J. Effectiveness of diabetes education interventions in rural America: a systematic review. *Health Educ Res.* 2022;cyac039. doi:10.1093/her/cyac039

56. Glenn LE, Nichols M, Enriquez M, Jenkins C. Impact of a community-based approach to patient engagement in rural, low-income adults with type 2 diabetes. *Public Health Nurs.* 2020;37(2):178-187. doi:10.1111/phn.12693

57. Soto SC, Louie SY, Cherrington AL, Parada H, Horton LA, Ayala GX. An ecological perspective on diabetes self-care support, self-management behaviors, and hemoglobin A1C among Latinos. *Diabetes Educ.* 2015;41(2):214-223. doi:10.1177/0145721715569078

58. Carlson LM, Ridgeway JL, Asiedu GB, et al. Facilitated stories for change: digital storytelling as a tool for engagement in facilitated discussion for reduction of diabetes-related health disparities among rural latino patients with diabetes. *J Transcult Nurs.* 2021;32(6):707-715. doi:10.1177/1043659620980816

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# RURAL ECONOMIC STABILITY

*By Elena Andreyeva, PhD, and Brad Wang, MPH*

## SCOPE OF THE PROBLEM

- Economic stability has risen to the top 10 public health priorities in a nationwide survey of rural stakeholders.[1]
- There are currently 353 persistently poor counties in the United States (comprising 11.2% of all U.S. counties), with 301 of them (85.3%) located in nonmetropolitan areas.[2]
- More than five million rural households spend more than 30% of their monthly incomes in housing-associated costs, while 2.1 million rural households spend more than 50% of their income on housing costs making them severely cost-burdened.[3]
- While rural communities make up approximately 63% of all U.S. counties, they make up 87% of counties with the highest food insecurity rates.[4]
- Children residing in rural areas have fewer educational opportunities, which may prevent them from launching successful careers.[5]
- Economic stability, including access to stable employment, housing, education, and nutritious food has significant effects on community health.

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Economic stability affords households an opportunity to access safe housing, nutritious foods, healthcare services, stable schooling, and other necessities to remain productive workers and active community members.[6] However, 37.9 million Americans (11.6%) lived in poverty or below the federal poverty limit (FPL) in 2021. This measure is higher for individuals under 18 years (15.3%), those living in families with female head of household (25.3%), Black and Hispanic individuals (19.5% and 17.1%, respectively), and individuals with no high school diploma (27.2%).[7] Household economic instability has worsened in previous decades affected by periods of significant economic downturn during the Great Recession, COVID-19 pandemic, and subsequent inflation. Families of color, and those with already lower socioeconomic status, have experienced larger increases in economic instability thus widening the instability gap.[8-10] Shocks to economic stability have had negative effects on economic, educational, and health outcomes of adults and children, including increases in mortality.[11-14]

One of those shocks, the Great Recession, caused the poverty rate to increase from 12.5% to 15% between 2007 and 2010, while unemployment rates increased from 5% to 10% during the same time period.[15] Foreclosures also rose by 800% between 2007 and 2010. However, the proportion of people living in poverty had been on the decline since the end of the Great Recession, decreasing from 15% to 10% between 2015 and 2019.[16] At the same time, the unemployment rate decreased to its historic low of 3.5% by 2019.

Despite these improvements in economic stability through 2019, the COVID-19 pandemic and subsequent recession caused substantial disruptions to households' finances. An unprecedented share of adults lost their jobs in 2020 with 14% being laid off. Black and Hispanic individuals, as well as individuals with less than a bachelor's degree, were more likely to be laid off (20%) compared to White individuals or college graduates (12%). Black and Hispanic people were also more likely to report an income of less than $25,000 in 2020 relative to White individuals (40% vs. 20%).[17] While the unemployment rate returned to its pre-pandemic level by the end of 2022, the number of persons living in poverty is still higher than the pre-pandemic level of 10%.[16]

The dialogue about factors influencing health and health disparities has centered on barriers to quality healthcare access among individuals from certain socioeconomic, ethnic, racial, and geographic characteristics. However, other crucial factors related to economic stability affect health outcomes of American families. Some of these factors include, but are not limited to:

- Availability of financial resources to afford stable housing options
- Availability of financial resources to ensure food security
- Access to educational and job training opportunities
- Quality of education
- Socioeconomic status (residence in low-income neighborhoods)
- Stable career opportunities

In 2022, over 40% (19 million) of renter households were considered housing cost-burdened because they spent more than 30% of their gross income on housing costs.[18] At the same time, approximately 20% of American adults reported household food insecurity, and 25% of adults with children reported food insecurity.[19] Absence of stable housing due to high costs and food insecurity may harm children's developmental and educational opportunities, as well as preventing adults from maintaining stable employment.

## RELEVANT HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

The goal of Healthy People 2030's economic stability objectives is to "help people earn steady incomes that allow them to meet their health needs." The U.S. Department of Health and Human Services (DHHS) has noted that individuals with stable employment prospects are less likely to live below the poverty level and are more likely to remain healthy. However, even people with steady work might not make enough money to afford healthcare services due to the high cost of other essentials, such as housing and fuel.[20]

The DHHS focus on economic stability is important for several reasons. First, individuals residing in poverty are less likely to have access to safe housing, nutritious foods, and healthcare services putting them at a higher risk of undertreated preventable diseases. Second, unemployment is associated with adverse health outcomes.[21] As a result, interventions to increase schooling and help people establish successful careers are crucial to improve physical and mental health. Third, when households are forced to spend a large percentage of their income on housing, they may underspend on nutritious foods and healthcare services. Ensuring that households do not spend more than 30% of their income on housing will allow them to improve their health behaviors. Fourth, poverty and limited employment opportunities lead to food insecurity, which is linked with adverse health outcomes in adults and especially children, staving off their developmental and education opportunities.[20]

The Healthy People 2030 objectives that are aimed at addressing economic stability are captured under five main headings: (1) economic stability - general, (2) arthritis, (3) housing and homes, (4) nutrition and healthy eating, and (5) workplace. Because a focus on economic stability was not included in previous iterations of Healthy People, most of the objectives for the current decade serve to capture baseline measures. Some of the specific objectives that will be addressed in this chapter include:

- **SDOH-01** Reduce the proportion of people living in poverty
- **SDOH-02** Increase employment in working-age people
- **SDOH-04** Reduce the proportion of families that spend more than 30% of income on housing
- **NWS-01** Reduce household food insecurity and hunger
- **AH-09** Reduce the proportion of adolescents and young adults who aren't in school or working

## RURAL HEALTHY PEOPLE 2030 SURVEY

A national survey was conducted from 2021-2022 to determine how rural stakeholders ranked the Healthy People 2030 leading health indicators when considering their importance for rural communities. Overall, rural stakeholders recognized "Economic Stability" as the 10th most important priority for rural Americans. Findings were similar across the Northeast, South, and West U.S. census regions; however, economic

stability ranked relatively high in importance in the Midwest (rank=6) and in states that have not expanded Medicaid (rank=9). Economic stability was also ranked higher by male rural stakeholders (rank=8), respondents ages 18-34 (rank=7), respondents who identified as White (rank=8), and respondents employed in both the Government and Public Administration sector (rank=7), as well as Human Services sector (rank=6). Finally, among rural stakeholders working in health-related fields, those based in Federally Qualified Health Centers (FQHCs) identified economic stability as the sixth most important health issue.[22]

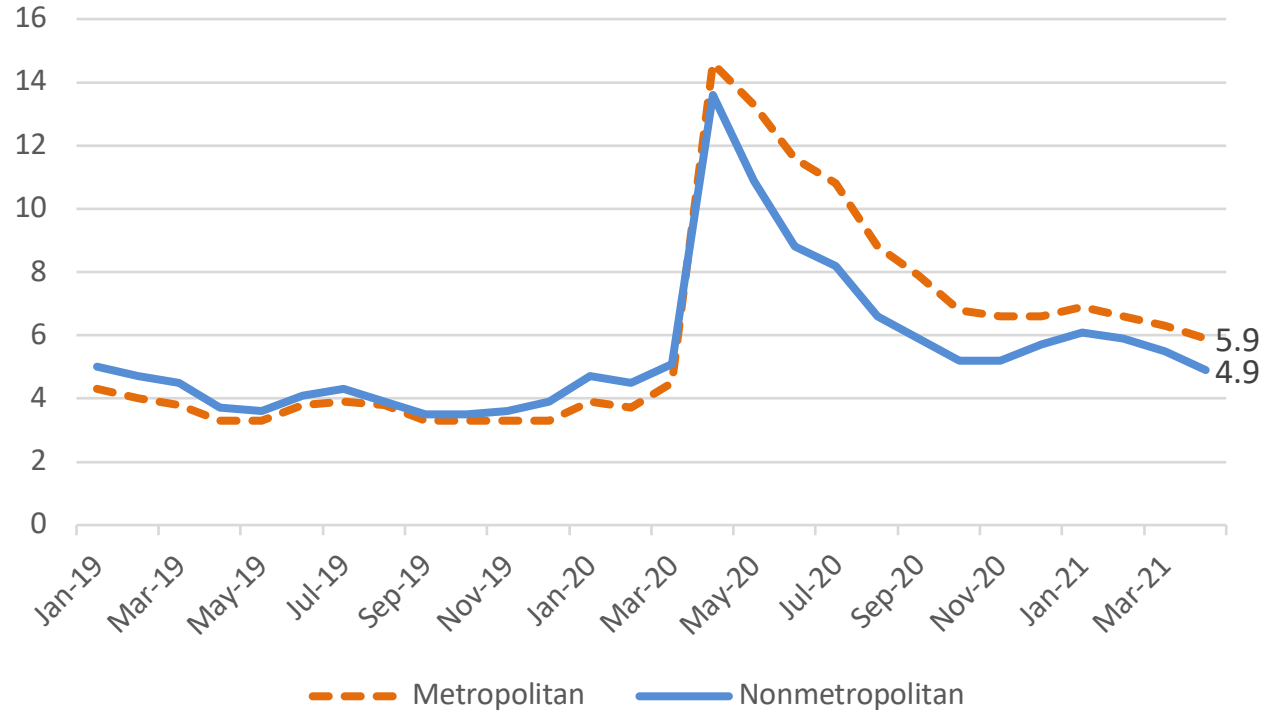
## PREVALENCE AND DISPARITIES IN RURAL AREAS

### *Unemployment Disparities*

The COVID-19 pandemic caused the most significant disruption to household finances since the Great Recession. At the start of the pandemic, the U.S. unemployment rate surged to levels not seen since the Great Depression of the 1930s. The unemployment rate rose rapidly in both urban and rural areas, reaching its peak in April 2020. At its highest, the unemployment rate reached 15% in metropolitan areas and 14% in nonmetropolitan areas. Impacted by the Coronavirus Aid, Relief, and Economic Security (CARES) Act, the unemployment rate declined to 5% in nonmetropolitan areas and 6% in metropolitan areas by the fourth quarter of 2020 (**Figure 1**).[23]

While the unemployment rate in rural areas returned to its pre-pandemic levels, the overall employment rate remained 2.6% below its pre-pandemic levels due to declines in labor force participation – a trend which is harder to reverse.[23] Overall, only 57.8% of adults in rural areas and 41.2% of adults in urban areas were able to work with no COVID-19 related disruptions compared to pre-pandemic times. In the first year of the pandemic, urban workers were more likely to be unpaid for missed hours and be unable to work or look for work due to several factors including the pandemic's initial peak in major urban areas and more aggressive COVID-19-related counter measures, such as social distancing and stay-at-home orders. However, rural workers had fewer opportunities to work remotely in part due to less prevalent home internet access. These disparities between urban and rural areas can be attributed to differences

**Figure 1. U.S. Unemployment Rates in Metropolitan and Nonmetropolitan Areas, 2019-2021[20]**




*Source: USDA Economic Research Service using data from the U.S. Census Bureau, American Community Survey.*

in socioeconomic composition and state-level policies suggesting the need to avoid one-size-fits-all recovery policies.[24]

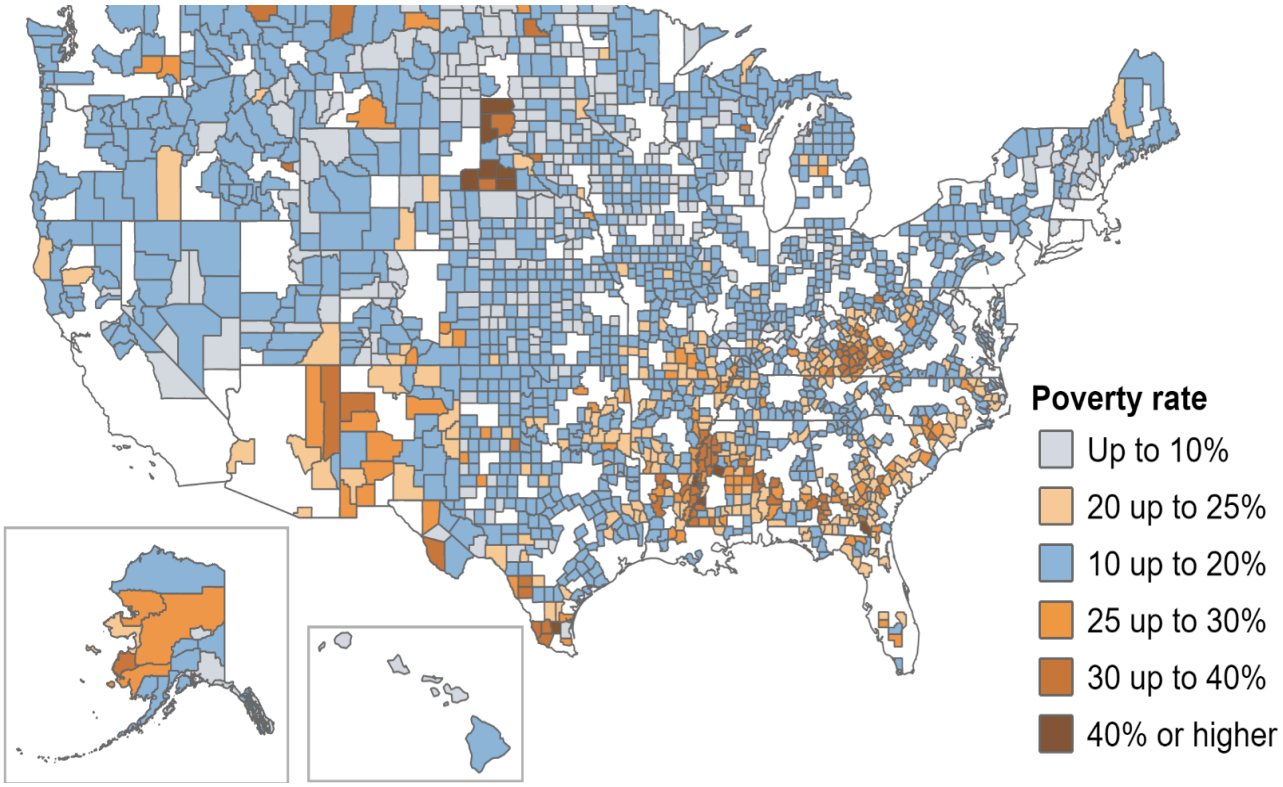
Other long-term issues affecting rural labor force participation include a decline in population growth and an increase in average age in rural areas. In the past decade, the rural working-age population declined by 4.9%, while the population over 65 years old grew by 22%. Outmigration of younger adults to metropolitan areas and in-migration of older adults to nonmetropolitan areas has helped accelerate population aging in rural communities. A decline in the working-age population may hinder attempts to meet labor demands in some rural industries and regional labor markets and adversely affect tax revenue leading to insufficient resources to fund healthcare services, community centers, and other services for an aging population.[25]

*Income Disparities*

Higher incidence of rural poverty relative to urban poverty has existed since the 1960s, with the difference declining over time to the most recent estimate of a 3.1 percentage point gap. Rural poverty reached its 30-year peak of 18.4% in 2013 following the Great Recession, declining to 15.4% in 2019 compared to 11.9% in urban areas.[26] The Economic Research Service (ERS) at the United States Department of Agriculture (USDA) highlights persistence over time as an important dimension of poverty. The ERS classifies counties as being in persistent poverty if 20% or more of their populations have lived in poverty over the last 30 years. Using this definition, the ERS has determined that there are currently 353 persistently poor counties in the U.S. (comprising 11.2% of all U.S. counties), with 301 of them (85.3%) located in nonmetropolitan areas and accounting for over 15% of all nonmetropolitan counties (**Figure 2**). Furthermore, approximately 89% of persistently poor counties are located in the U.S. South census region (**Figure 3**).[26]

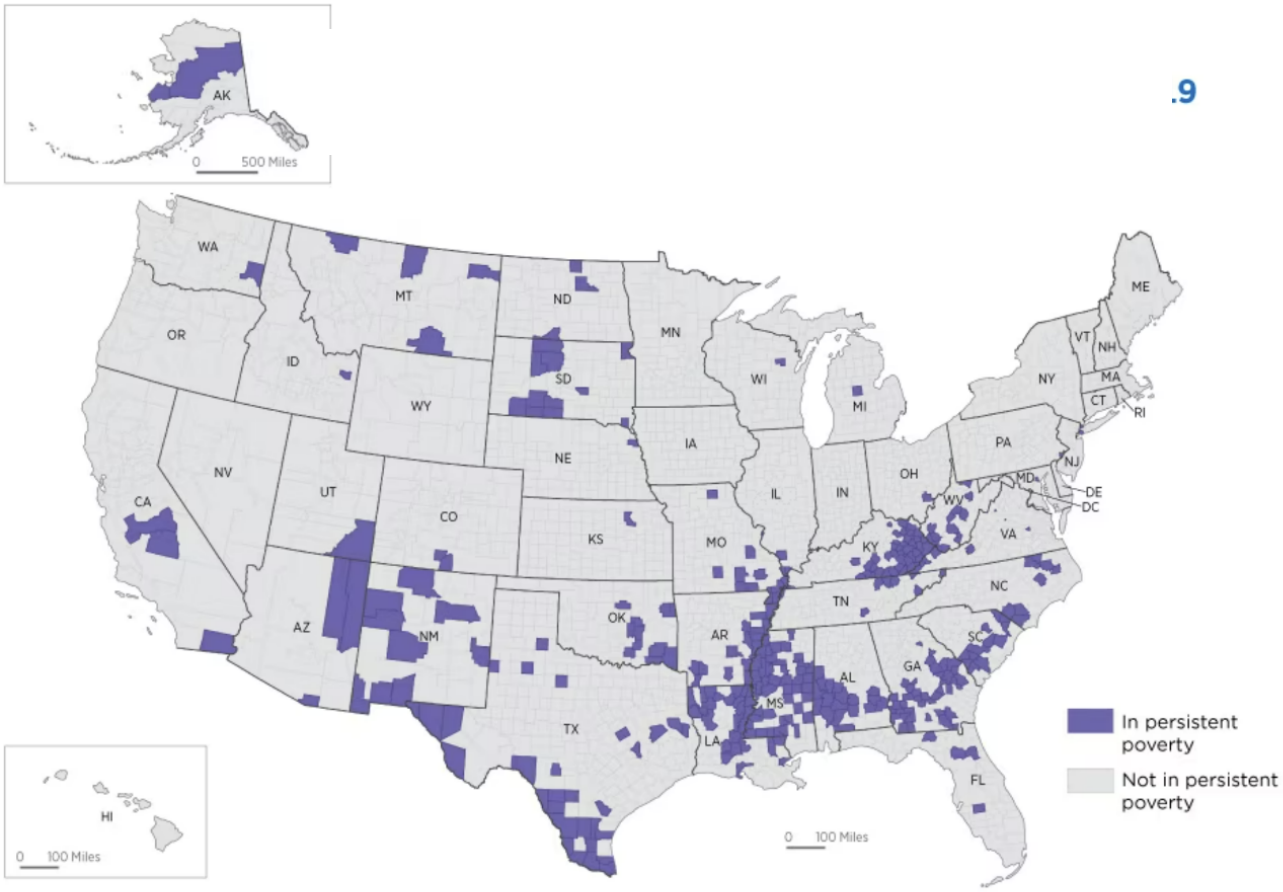
Children in rural areas are more likely to live in poverty than their urban counterparts. Across the U.S., 21.1% of children residing in rural areas were considered poor compared to 16.1% of urban

**Figure 2. Poverty Rate in Nonmetropolitan Counties, 2015-2019 average[23]**




*Source: USDA Economic Research Service using data from the U.S. Census Bureau, American Community Survey.*

**Figure 3. Counties in Persistent Poverty, 1989 to 2015-2019 average[27]**




*Source: U.S. Census Bureau, 1990 and 2000 Censuses, 2005-2009 and 2015-2019 American Community Survey, 5-year estimates.*

children.[26] Rural children are not only more likely to be poor, they are also more likely than urban children to live in both poor households and poor neighborhoods. A decrease in earnings is the most important factor in rising rural poverty rates, an effect that is twice as large for rural versus urban households.[28] Persistently high child poverty is disproportionately concentrated in rural counties that have low labor force participation and high unemployment, low rates of educational attainment, and high proportions of single-mother families and low-wage employment.[29] The ERS has determined that there are 708 persistent child poverty counties in the U.S. (comprising 22.5% of all U.S. counties), with most of them located in southern nonmetropolitan areas.[30]

The high proportion of persistently poor counties located in rural areas creates several long-term issues. Previous research has demonstrated that low-income individuals living in communities where poverty is prevalent face barriers beyond those of their individual financial circumstances.[26] Concentrated poverty contributes to sub-optimal housing and health conditions, higher crime and school dropout rates, and fewer stable employment opportunities. As a result, economic conditions in persistently poor areas create limited opportunities for poor residents to move up in income distribution.[26]

### *Housing and Food Access Disparities*

As of 2021, there were approximately 29 million homes in rural America, comprising a quarter of the housing units in the U.S.[31] Rural residents are more likely to own a home (80%) than their urban counterparts (60%), in part, due to cheaper housing options.[32] However, residents of rural counties tend to pay slightly higher interest rates on average and are less satisfied with the conditions of their mortgage, than borrowers in other areas.[33]

The U.S. Department of Housing and Urban Development (HUD) defines households as housing cost-burdened if they spend more than

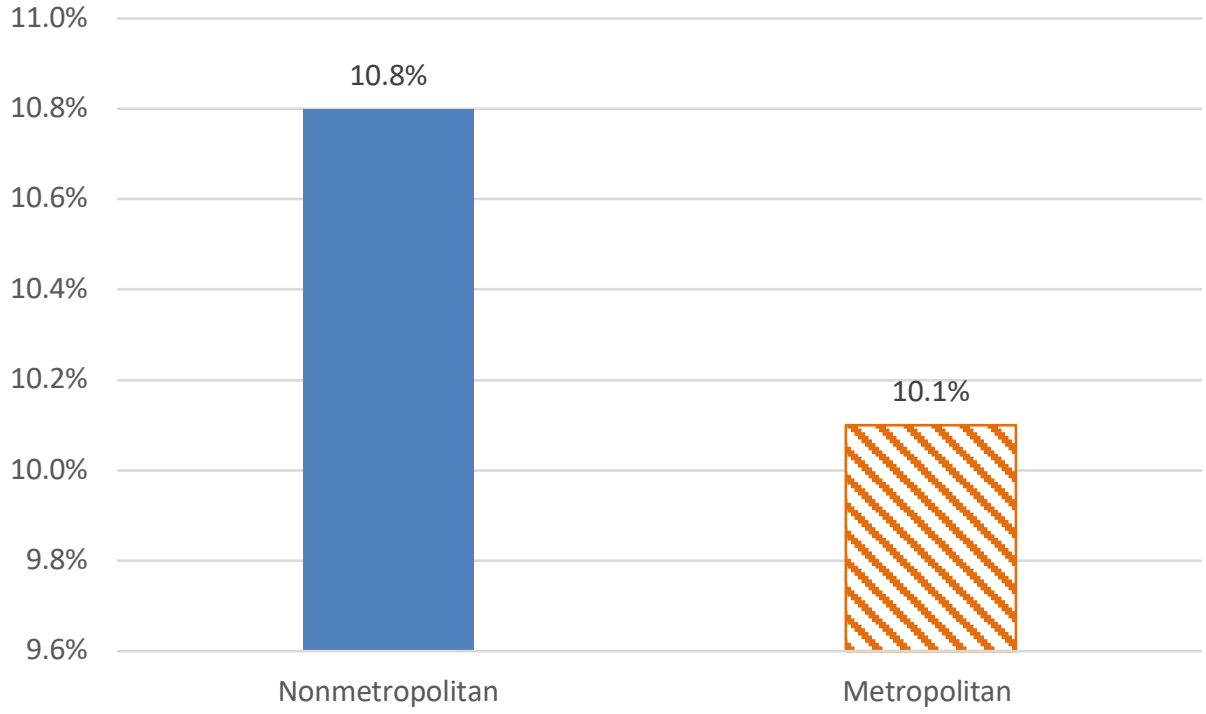
30% of gross household income on housing thus making it unaffordable.[34] The HUD estimated that over five million rural households spend more than 30% of their monthly incomes in housing-associated costs, while 2.1 million rural households spend more than 50% of their income on housing costs making them severely cost-burdened.[3] High housing costs can lead to foreclosure or eviction.[35] Both events are traumatic and may lead to further financial losses.[36] Individuals may be forced to move in with friends or relatives resulting in overcrowding or relocate to lower-income neighborhoods with higher crime rates.[35,37] Multiple moves as a result of unstable housing options have especially severe effects on children leading to poor physical health and a higher likelihood of developing chronic health conditions.[38] At its extreme, the inability to afford housing may lead to homelessness. While rural homelessness is hard to precisely quantify, HUD's most recent estimates suggest that approximately 14% of all homeless individuals across the U.S. reside in rural areas.[31]

Cost-burdened households have fewer resources to spend on other necessities including nutritious food. According to the most recent USDA estimates, approximately 11% of rural households were considered food insecure (**Figure 4**).[4] While rural communities make up approximately 63% of all U.S. counties, they make up 87% of counties with the highest food insecurity rates (top decile of counties).[4] Rural communities are more likely to be disproportionately affected by food insecurity due to lower incomes, transportation barriers, and limited access to affordable nutritious foods.[39]

### *Educational Disparities*

Over the last half century, rural areas experienced remarkable improvements in educational attainment, increasing high school graduation rates from 40% in the 1960s to 87% in 2019, which is only slightly lower than the 2019 urban high school graduation rate of 89%. At the same time, the proportion of college graduates in rural areas increased from 5% to 21%. However, the rural college graduation rate is still significantly lower than the urban graduation rate, estimated to be 35% in 2019.[41] Overall, disparities in educational attainment between urban and rural areas persist, although the gap has narrowed over

**Figure 4. Food Insecure Households (%), 2021[40]**




*Source: USDA Economic Research Service using data from the U.S. Census Bureau, American Community Survey.*

time (**Figure 5**). Factors contributing to these disparities include lower household incomes in rural areas (which trail those in urban areas by 20-25% and make college less affordable) and longer commuting distances to colleges.[41]

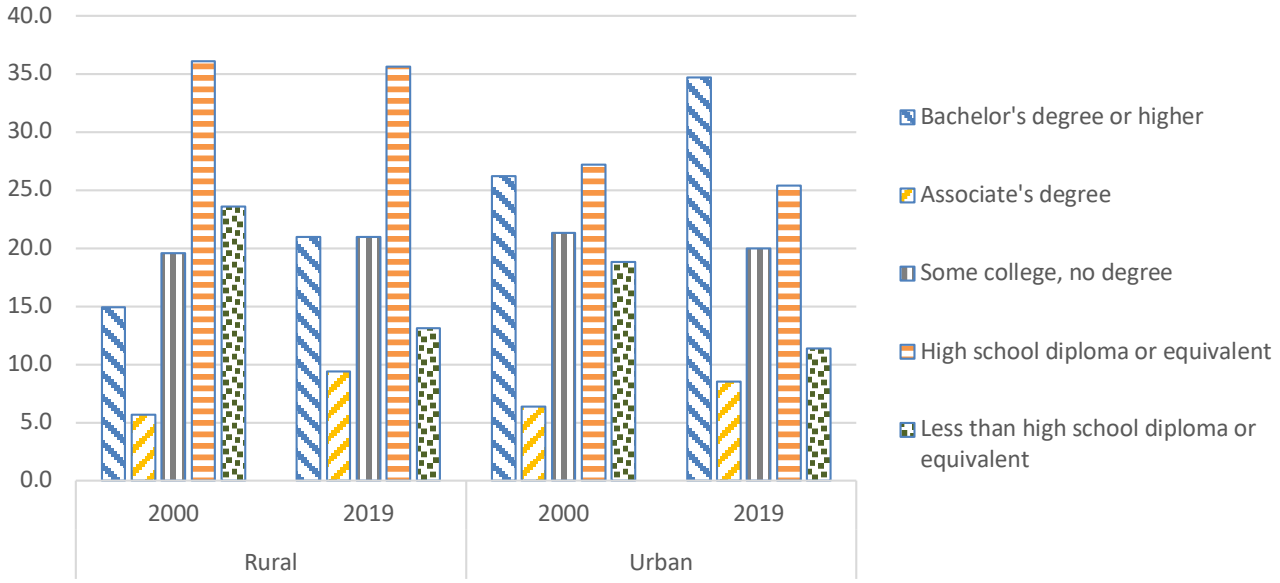
Rural schools face significant income and racial/ethnic disparities. More than one quarter of U.S. public schools are rural, educating about nine million students. Approximately half of all rural students are eligible for free or reduced-price lunches, and about a quarter of those are students of color. Rural schools and students face significant disparities in resources and learning outcomes. While a quarter of U.S. schools are considered rural, only 17% of state educational funds go to rural districts.[42] Rural school districts face numerous challenges including declining enrollments, inability to hire and retain qualified teachers, limited broadband access, and transportation difficulties.[43] All of these challenges limit educational opportunities for rural children including reduced access to STEM subjects (i.e., science, technology, engineering, and mathematics) and advanced and college-level courses.[42] Meanwhile, rural students are also less likely to continue their post-secondary education leading to disparities in college graduation rates.[41] Access to post-secondary education has a significant effect on future earnings potential with rural college graduates making on average $21,000 more than the average rural earner.[41]

## VARIATION BY RURAL REGIONS

While there are disparities in economic stability across rural and urban areas, certain rural regions have fared worse than others. During the height of the COVID-19 pandemic, the unemployment rate was highest in the Northeast, northern Midwest, lower Mississippi Delta, and the West.[24] The poverty rate historically has been the largest in the rural South, reaching 19.7% in 2019 or six percentage points higher than in southern metropolitan areas (**Figure 6**).[28] The South census region also has the highest food insecurity rates in the U.S., with 11.4% of households reporting being food insecure in 2021. Of those households, 7.1% report low food security and 4.3% report very low food security.[40]

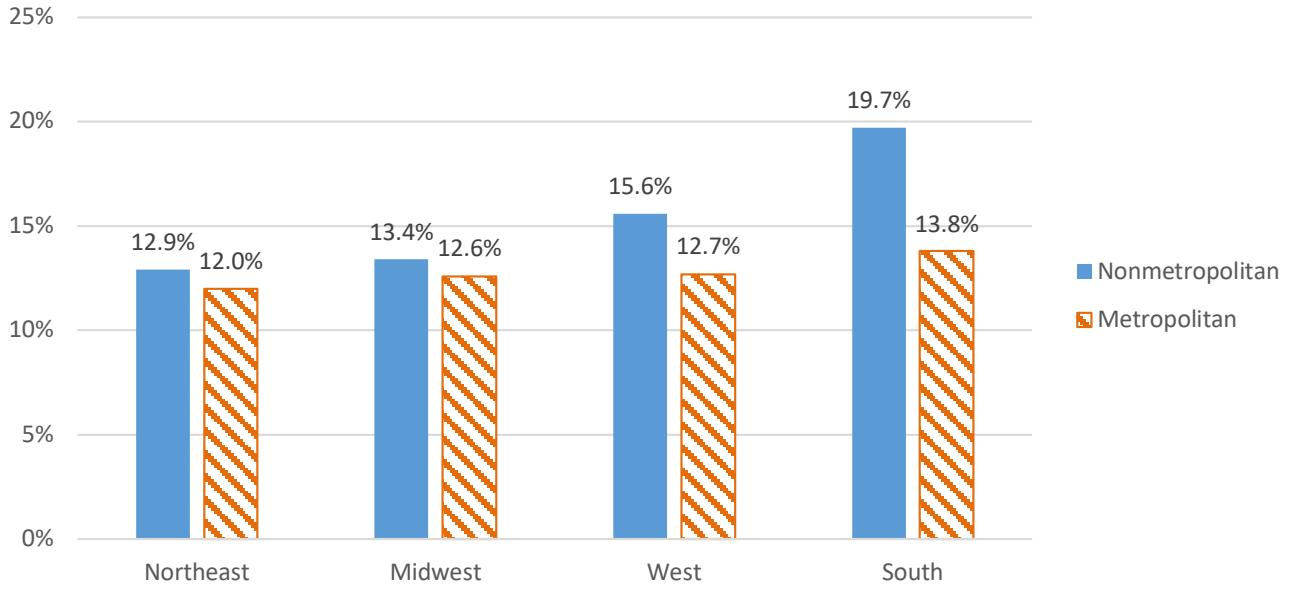
There is also a wide geographic variation in educational attainment within the rural U.S. Rural areas with lower educational attainment tend to be clustered in the South. Four out of five counties with at least 20% of adults age 25-64 lacking a high school diploma or equivalent are located in rural areas; 70% of those counties are clustered in the South.[41] There are substantial differences in student achievement across different rural regions suggesting that disparities in educational opportunities for rural students are more pronounced in some areas. For instance, rural students in New England are scoring a grade level above the

**Figure 5. Educational Attainment in Rural and Urban Areas (%), 2000 and 2019[41]**




*Source: USDA Economic Research Service using data from the U.S. Census Bureau, American Community Survey.*

**Figure 6. Poverty Rates by U.S. Census Region and Nonmetropolitan/Metropolitan Status (%), 2015-2019 Average[28]**




*Source: USDA Economic Research Service using data from the U.S. Census Bureau, American Community Survey.*

national average, while rural students in the West Coast region are scoring a grade level below the national average.[43]

## VARIATION BY RACE AND ETHNICITY

Over the past decade, the rural workforce has become more diverse.[26] Employment grew faster for non-White and Hispanic individuals in every type of industry except for agriculture, making all other races as well as non-Hispanic workers a more prominent proportion of the rural workforce.[26] Specifically, the non-White workforce grew 56.9% in the transportation industry, 49.2% in professional services, and 30% in construction, finance and insurance, real estate, and administrative services. However, nonmetropolitan areas continue to have a higher share of White workers relative to metropolitan areas. The ERS estimates that White workers constitute 81% of the workforce in nonmetropolitan areas, but only 60% in metropolitan areas. At the same time, Hispanic workers make up 8.3% of the nonmetropolitan workforce, Black workers make up 7.2%, and Asian and Alaska Native workers make up approximately 1.5% each. These ratios are substantially below those in metropolitan areas where Black workers make up 13% of the labor force and Asian workers make up 7% of the labor force.[26] American Indian or Alaska Native workers are the only ones, besides White workers, to make up a smaller proportion of metropolitan workforce than nonmetropolitan workforce, 1.5% and 0.4%, respectively.[26]

While the unemployment rate in metropolitan areas declined for Whites, Blacks, and Hispanics before 2019, in nonmetropolitan areas it declined only for Whites, increasing for the other two groups.[44]

According to the USDA, there are vast racial disparities in poverty levels across racial/ethnic groups in rural areas. Black rural residents had the highest incidence of poverty before COVID-19 (31%), followed by American Indian or Alaska Natives (30%) and Hispanics (22%). The 2019 poverty rate for the rural White population was the lowest (13%), with the exception of the Appalachian region where Whites face higher levels of poverty.[28,42] Alarmingly, child poverty rates remained persistently high, especially among African Americans in the rural South and Native Americans in the rural Midwest.[28]

The USDA also found that White households had the lowest food insecurity level in 2021 (8%). That is significantly lower than the prevalence of food

insecurity among Black households (23%), Hispanic households (18%), and other households (11.5%).

Seventy percent of rural counties with low educational attainment are counties where Black and Hispanic individuals comprise at least 20% of the overall population. Less educated rural Hispanics are clustered in the Southwest as well as Midwest.[41] Rural White and Native American students tend to score at least half a grade lower than their urban counterparts, while the difference in performance between Hispanic rural and urban students is small.[43] With respect to educational resources, more than 42% of Native American rural students, 36% of Black rural students, and 30% of Hispanic rural students are enrolled in high poverty school districts, compared to 7% of White rural students.[42]

## IMPACT ON MORTALITY AND MORBIDITY

Multiple studies have highlighted the relationship between economic stability and health outcomes. Residents of low-income communities have an increased risk of mental illness, chronic diseases, disability, and mortality.[45-47] They are more likely to deal with obesity, chronic stress, and substance abuse disorders.[48] Childhood poverty is especially associated with developmental delays and chronic conditions that persist into adulthood.[49-52] Older adults living in poverty experience higher incidents of disability and mortality, as well as significantly lower life expectancy than their higher income counterparts.[53,54]

High rates of unemployment also have significant adverse effects on health status with the effects varying by the unemployment duration. While short spells of unemployment are associated with poor access to healthcare services due to loss of health insurance, longer unemployment spells may lead to poor self-reported physical health status including higher rates of obesity, hypertension, high cholesterol, and poor self-reported mental health status such as diagnosed depression and stress.[55]

Housing instability arising from cost-burdened housing or homelessness is associated with significant adverse physical and mental health outcomes.[56] Several studies exploring the link between housing instability and health report that households faced with high housing costs relative to income have a higher prevalence of cardiovascular diseases.[57] Residence in subpar housing conditions may also lead to an array of diseases. Mold and pests can cause asthma, presence of lead can lead to severe developmental deficiencies in children, and poor construction can lead to unintentional injuries, especially in older adults.[58] Extreme housing instability, such as homelessness, can also lead to substance abuse disorders.[56]

Food insecurity and lack of access to affordable nutritious foods can also cause an array of chronic conditions including diabetes, obesity, cardiovascular disease, and mental health disorders, such as depression, anxiety, and suicidal ideation, especially among younger adults.[59,60] Food-insecure children are twice as likely to report fair or poor health and 1.4 times more likely to suffer from asthma, compared to food-secure children. Food-insecure older adults report more limitations in daily activities relative to older food-secure seniors.[61] Food insecurity also results in significantly higher annual healthcare expenditures.[62]

Well-resourced rural schools are crucial not only for educational attainment. They play an important role in the health of students and the community. Schools provide essential nutrition to lower income students, promote health initiatives, and serve as points of healthcare access.[63] Access to physical education and healthy snacks throughout the school day may reduce prevalence of obesity among children.[64] Insufficient access to counseling and behavioral school-based health services may also contribute to higher prevalence of mental, behavioral, and developmental disorders in rural areas.[63] Educational attainment itself is a crucial factor driving improvements in health over the past decades.[65] Less-educated individuals experience significant inequalities in health, including higher prevalence of heart disease, cancer, diabetes, and other chronic conditions as well as mortality relative to their more educated counterparts.[66,67]

## KNOWN CAUSES OF THE CONDITION/ PROBLEM

Several factors affect long-term economic stability prospects in rural areas. Some of the specific

factors include, but are not limited to:

- Decline in population growth
- Population aging
- Less diversified economy in some rural communities
- Limited access to broadband
- Inferior housing stock
- Lack of reliable transportation

Over the past decade, the rural working-age population has declined by almost 5%, while the population of seniors has grown by over 20%.[26] While COVID-19 led to an increase in net migration into rural areas, adding to the working population, the increase was not enough to offset rapid rural population aging. Declines in the working-age population may make it harder to meet labor demands in rural labor markets forcing employers to relocate to more suburban areas.[44] In addition, transition of jobs to remote work during the COVID-19 pandemic left behind certain rural communities that did not have reliable high-speed internet.

While the rural economy has become more diversified over the past decades, some rural communities still rely heavily on such industries as farming, mining, and manufacturing.[33] As a result, rural communities are more sensitive to changes in energy or agricultural prices and are less isolated from economic shocks than more economically diversified areas.[33]

Limited access to broadband in rural areas causes several additional challenges for rural populations. First, poor connectivity hurts rural school districts by denying them an opportunity to expand virtual learning and other enrichment opportunities for students – opportunities that can help improve students' chances of attending college.[43] Second, absence of high-speed internet prevents rural residents from enrolling in online higher education courses, which provide learning opportunities and job training leading to more stable employment.[31] Third, better internet access prevents skilled workers from relocating to more rural communities and engaging in their jobs via telecommunicating.[31] While 90% of all U.S. residents have access to moderate- or high-speed broadband, only 63% of rural residents in persistent poverty counties have moderate- or high-speed broadband available in their area.[68]

Although rural residents receive their share of housing assistance from the federal government, they face unique challenges related to inferior housing stock. Rural residents are more likely to face physical housing issues including inadequate plumbing, heating, or electricity. More than 30% of homes without hot and cold piped water are located in rural communities.[69]

Lack of reliable transportation presents another challenge for rural communities. A combination of limited public transportation and long commuting distances force rural residents to spend a higher percentage of their income on fuel.[42] Long commuting distances also cause rural school districts to spend a significant amount of their resources on transportation. Rural households may also be forced to rely on more expensive, less nutritious foods purchased at local convenience stores if a fully stocked grocery store requires a long drive.[70]

## PROVEN SOLUTIONS OR INTERVENTIONS

Improvements in the conditions that afford households an opportunity to find stable employment, escape poverty, and access safe housing, nutritious foods, stable schooling, and other necessities require the joint efforts of community leaders, researchers, business enterprises, and policymakers. Given the complex and deep-rooted relationships between economic stability and health status, multiple interventions are needed. To that end, various organizations and levels of government have been implementing programs and strategies aimed at addressing the economic stability of rural Americans.

**ReConnect Program** funded from President Biden's Bipartisan Infrastructure Law and announced in July of 2022, is a USDA program aimed at making additional investments in affordable high-speed internet in rural communities.[71] It is also expected to lower costs for existing internet service. According to the USDA Rural Development agency, improved broadband access can expand economic opportunities, create jobs, and support infrastructure development such as housing and schools.[71] Increased communications technology would also enable online education and jobs

training in remote rural areas.[31]

**The Child Tax Credit and the Earned Income Tax Credit (EITC)** allow low- to moderate-income households to get a tax break and retain more of their disposable income.[72,73] Both are considered to be powerful anti-poverty tools, especially in rural communities, where they have helped to reduce poverty and boost incomes.[74] Recent research has shown that expanding both programs to certain households currently excluded from the benefits (i.e. childless adults and adults not raising children in the home) would disproportionately impact rural communities, benefiting 45% of rural children through the Child Tax Credit and 23% of childless adults through EITC.[75]

The **USDA's Rural Housing Service** offers rural communities a variety of programs to improve existing housing facilities or build affordable housing for low- and moderate-income rural Americans.[76,77] In 2021, the USDA provided 139,221 loans and grants totaling about $24.2 billion.[77] It also provided 291,455 annual units of tenant assistance representing about $1.54 billion.[77] Through the USDA's programs, rural households can buy or build single family homes with no down payment, repair their current homes, or refinance their existing mortgage with better terms.[78] The USDA also provides loans and grants to owners of multifamily buildings to subsidize rents for low-income tenants who cannot afford to pay the full rent.[79]

**The Supplemental Nutrition Assistance Program (SNAP)** is a federal nutrition program that helps millions of low-income American families afford healthier foods.[80] SNAP reduces poverty and food insecurity leading to long-term improvements in health and economic outcomes, especially for low-income children.[81] Apart from that, the ERS found that household spending of SNAP benefits disproportionately benefitted the rural economy, supporting local jobs and increasing economic output through stimulated consumption.[82]

## SUMMARY AND CONCLUSIONS

Recognition that economic stability has a significant impact on individual health status has become more pronounced over the last decade, especially since the COVID-19 pandemic and its disruption to the household finances of many Americans. While residents of inner cities have historically been affected by economic instability, rural residents have not been exempt from unique challenges accessing safe housing, nutritious foods, healthcare services, stable schooling, and other necessities. In fact, some of the challenges may be more striking in rural communities due to pockets of persistent poverty, limited employment opportunities, food insecurity, aging population, limited housing stock, lack of transportation, and underfunded schools. As recognition of the importance of economic stability continues to strengthen, future research should examine the impact current policy initiatives have not only on the financial health of rural Americans, but also on their physical and mental health. The relationship between rural poverty and health is multifaceted, further complicated by regional disparities in economic stability, concentrated in the U.S. South, and racial disparities concentrated among non-White rural residents. To succeed, policymakers, public health professionals, researchers, businesses, community groups, and other stakeholders should continue to work together to implement interventions directed at addressing disparities in access to employment opportunities, affordable housing, nutritious foods, and schooling in rural communities.

## REFERENCES

1. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: new decade, new challenges. *Prev Med Rep*. 2023 Mar 21;33:102176. doi:10.1016/j.pmedr.2023.102176

2. Persistence of Poverty Varies Across the U.S. USDA Economic Research Service U.S. Department of Agriculture. November 5, 2013. Accessed July 13, 2023. https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=77045

3. Mathur, S. Are Renters and Homeowners in Rural Areas Cost-Burdened? Joint Center for Housing Studies. August 11, 2016. Accessed January 30, 2023. https://www.jchs.harvard.edu/blog/are-renters-and-homeowners-in-rural-areas-cost-burdened

4. Hunger in Rural Communities. Feeding America. Accessed January 30, 2023. https://

www.feedingamerica.org/hunger-in-america/rural-hunger-facts#:~:text=According%20to%20the%20USDA%2C%20in,the%20highest%20food%20insecurity%20rates

5. Dalton R, Tejeda M. Want to Help Rural Kids Become College and Career Ready? Harvard Graduate School of Education. November 22, 2021. Accessed July 13, 2023. https://www.gse.harvard.edu/news/uk/21/11/want-help-rural-kids-become-college-and-career-ready

6. Family Economic Stability: Work Supports and Tax Credits. Robert Wood Johnson Foundation. April 1, 2019. Accessed January 23, 2023. https://www.rwjf.org/en/insights/our-research/2019/04/family-economic-stability.html

7. Poverty in the United States: 2021. United States Census Bureau Website. September 13, 2022. Accessed January 25, 2023. https://www.census.gov/library/publications/2022/demo/p60-277.html

8. Ha Y, Thomas M, Byrne T, Miller DP. Patterns of multiple instability among low-income families with children. *Social Service Review*. 2020;94(1):129-168. doi:10.1086/708180

9. Wolf S, Morrissey TW. Economic instability, food insecurity, and child health in the wake of the Great Recession. *Social Service Review*. 2017;91(3):534-570. doi:10.1086/694111

10. Wrigley-Field E, Seltzer N. Unequally Insecure: Rising Black/White Disparities in Job Displacement, 1981–2017. Working Paper: Washington Center for Equitable Growth. February 13, 2020. Accessed January 25, 2023. https://equitablegrowth.org/working-papers/unequally-insecure-rising-black-white-disparities-in-job-displacement-1981-2017/

11. Hardy BL. Childhood income volatility and adult outcomes. *Demography*. 2014;51(5):1641-1665. doi:10.1007/s13524-014-0329-2

12. Hill HD, Morris PA. Gennetian LA, Wolf S, Tubbs C. The consequences of income instability for children's well-being. *Child Dev Perspect*. 2013;7(2):85-90. doi:10.1111/cdep.12018

13. Pryor L, Strandberg-larsen K, Andersen AN, Rod NH, Melchior M. Trajectories of family poverty and children's mental health: results from the Danish National Birth Cohort. *Soc Sci Med*. 2019;220:371-378. doi:10.1016/j.socscimed.2018.10.023

14. Pool LR, Burgard SA, Needham BL, Elliott MR, Langa KM, Mendes de Leon CF. Association of a negative wealth shock with all-cause mortality in middle-aged and older adults in the United States. *JAMA*. 2018;319(13):1341-1350. doi:10.1001/jama.2018.2055

15. Great Recession, Great Recovery? Trends from the Current Population Survey. U.S. Bureau of Labor Statistics. April 2018. Accessed January 25, 2023. https://www.bls.gov/opub/mlr/2018/article/great-recession-great-recovery.htm

16. National Poverty in America Awareness Month: January 2023. U.S. Census Bureau. December 20, 2022. Accessed January 25, 2023. https://www.census.gov/newsroom/stories/poverty-awareness-month.html

17. Economic Well-Being of U.S. Households in 2020 - May 2021. Board of Governors of the Federal Reserve System. May 24, 2022. Accessed January 25, 2023. https://www.federalreserve.gov/publications/2021-economic-well-being-of-us-households-in-2020-executive-summary.htm

18. More Than 19 Million Renters Burdened by Housing Costs. U.S. Census Bureau. December 8, 2022. Accessed January 25, 2023. https://www.census.gov/newsroom/press-releases/2022/renters-burdened-by-housing-costs.html#:~:text=8%2C%202022%20%E2%80%94%20Over%2040%25,by%20the%20U.S.%20Census%20Bureau

19. Waxman E, Salas J, Gupta P, Karpman M. *Food Insecurity Trended Upward in Midst of High Inflation and Fewer Supports*. Urban Institute; 2022. https://policycommons.net/artifacts/2679417/food-insecurity-trended-upward-in-midst-of-high-inflation-and-fewer-supports/3702752/

20. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Healthy People 2030 Objectives - Economic Stability. HealthyPeople.gov. Accessed January 23, 2023. https://health.gov/

healthypeople/objectives-and-data/browse-objectives/economic-stability

21. Antonisse L, Garfield R. The Relationship Between Work and Health: Findings from a Literature Review. Kaiser Family Foundation. August 7, 2018. Accessed February 13, 2023. https://www.kff.org/medicaid/issue-brief/the-relationship-between-work-and-health-findings-from-a-literature-review/

22. Kassabian M, Shrestha A, Callaghan T, et al. Rural healthy people 2030: common challenges, rural nuances. May 2023. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

23. The Covid-19 Pandemic and Rural America. USDA Economic Research Service U.S. Department of Agriculture. July 12, 2021. Accessed January 28, 2023. https://www.ers.usda.gov/covid-19/rural-america/

24. Brooks MM, Mueller JT, Thiede BC. Rural-urban differences in the labor-force impacts of COVID-19 in the United States. *Socius*. 2021;7. doi:10.1177/23780231211022094

25. Davis J, Rupasingha A, Cromartie J, Sanders A. *Rural America at a Glance: 2022 Edition*. U.S. Department of Agriculture Economic Research Service; 2022. https://www.ers.usda.gov/publications/pub-details/?pubid=105154

26. Rural Poverty & Well-Being. USDA Economic Research Service U.S. Department of Agriculture. November 29, 2022. Accessed January 28, 2023. https://www.ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being/

27. Benson C, Bishaw A, Glassman B. Persistent Poverty: Identifying Areas With Long-Term High Poverty. United States Census Bureau. May 22, 2023. Accessed July 13, 2023. https://www.census.gov/library/stories/2023/05/persistent-poverty-areas-with-long-term-high-poverty.html

28. Rothwell D, Thiede B. Child Poverty in Rural America. December 2018. Accessed January 28, 2023. IRP Focus. 34(3):20-29. https://www.irp.wisc.edu/wp/wp-content/uploads/2019/02/Focus-34-3d.pdf

29. Many Rural Americans Are Still "Left Behind". Institute for Research on Poverty. January 2020. Accessed January 28, 2023. https://www.irp.wisc.edu/resource/many-rural-americans-are-still-left-behind/

30. Description and Maps. USDA Economic Research Service U.S. Department of Agriculture. October 23, 2019. Accessed July 13, 2023. https://www.ers.usda.gov/data-products/county-typology-codes/descriptions-and-maps/#pcpov

31. Rural America at a Glance. Housing Assistance Council. January 5, 2022. Accessed January 30, 2023. https://ruralhome.org/our-work/r-and-i/rural-america-at-a-glance/

32. Scott A, Labonte M, Casey A, et al. *An Overview of Rural Credit Markets*. Congressional Research Service; 2021. https://crsreports.congress.gov/product/pdf/R/R46914

33. Critchfield T, Dey J, Mota N, Patrabansh S. NMDB Staff Working Paper 18-01: Mortgage Experiences of Rural Borrowers in the United States: Insights from the National Survey of Mortgage Originations. NMDB Staff Working Paper 18-01: Mortgage Experiences of Rural Borrowers in the United States: Insights from the National Survey of Mortgage Originations | Federal Housing Finance Agency. March 14, 2018. Accessed January 30, 2023. https://www.fhfa.gov/PolicyProgramsResearch/Research/Pages/NMDB-Staff-Working-Paper-18-01.aspx

34. U.S. Department of Housing and Urban Development. Affordable housing. Accessed January 30, 2023. http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/affordablehousing/

35. Soaring Home Prices, Tight Supply, and Millions Face Risk of Eviction or Foreclosure: The State of the Nation's Housing 2021. Joint Center for Housing Studies. June 16, 2021. Accessed July 15, 2023. https://www.jchs.harvard.edu/press-releases/soaring-home-prices-tight-supply-and-millions-face-risk-eviction-or-foreclosure

36. Saegert S, Fields D, Libman K. Mortgage foreclosure and health disparities: serial displacement as asset extraction in African

American populations. *J of Urban Health.* 2011;88(3):390-402. doi:10.1007/s11524-011-9584-3

37. Desmond M, Shollenberger T. Forced displacement from rental housing: prevalence and neighborhood consequences. *Demography.* 2015;52(5):1751-1772. doi:10.1007/s13524-015-0419-9

38. Busacker A, Kasehagen L. Association of residential mobility with child health: an analysis of the 2007 National Survey of Children's Health. *Matern Child Health J.* 2012;16 Suppl 1:S78-S87. doi:10.1007/s10995-012-0997-8

39. Rural Hunger. Feeding America. Accessed January 30, 2023. https://www.feedingamerica.org/research/rural-hunger-research#:~:text=Rural%20Hunger,-There%20are%20individuals&text=In%20rural%20communities%2C%20many%20people,limited%20access%20to%20affordable%20food

40. Coleman-Jensen A, Rabbitt MP, Gregory CA, Singh A. *Household Food Security in the United States in 2021.* U.S. Department of Agriculture Economic Research Service; 2022. https://www.ers.usda.gov/webdocs/publications/104656/err-309.pdf?v=4697.6

41. Rural Education. USDA Economic Research Service U.S. Department of Agriculture. April 23, 2021. Accessed January 30, 2023. https://www.ers.usda.gov/topics/rural-economy-population/employment-education/rural-education/

42. Tieken M. *Educational Justice and Sustainability for Rural Schools.* Brandeis; 2020. https://heller.brandeis.edu/sillerman/pdfs/opportunity-briefs/sillermansocjustfundoppbriefno.4-2020rev.pdf

43. Drescher J, Torrance G. What is the Status of Educational Opportunity in Rural America? Brookings. July 20, 2022. Accessed January 30, 2023. https://www.brookings.edu/blog/brown-center-chalkboard/2022/07/13/what-is-the-status-of-educational-opportunity-in-rural-america/

44. Rural Employment and Unemployment. USDA Economic Research Service U.S. Department of Agriculture. May 10, 2022. Accessed February 8, 2023. https://www.ers.usda.gov/topics/rural-economy-population/employment-education/rural-employment-and-unemployment/

45. Mode NA, Evans MK, Zonderman AB. Race, neighborhood economic status, income inequality and mortality. *PLoS One.* 2016;11(5):e0154535. doi:10.1371/journal.pone.0154535

46. Caughy MO, O'Campo PJ, Muntaner C. When being alone might be better: neighborhood poverty, social capital, and child mental health. *Soc. Sci. Med.* 2003;57(2):227-237. doi:10.1016/S0277-9536(02)00342-8

47. Braveman PA, Cubbin C, Egerter S, Williams DR, Pamuk E. Socioeconomic disparities in health in the United States: what the patterns tell us. *Am J Public Health.* 2010;100(Suppl 1):S186-S196. doi:10.2105/AJPH.2009.166082

48. Khullar D, Chokshi D. Health, Income, & Poverty: Where We Are & What Could Help. Health Affairs. Health Policy Brief. October 4, 2018. Accessed February 10, 2023. https://www.healthaffairs.org/do/10.1377/hpb20180817.901935/

49. Eamon MK. The effects of poverty on children's socioemotional development: an ecological systems analysis. *Soc Work.* 2001;46(3):256-266. doi:10.1093/sw/46.3.256

50. Evans GW, Kim P. Childhood poverty, chronic stress, self-regulation, and coping. *Child Dev Perspect.* 2013;7(1):43-48. doi:10.1111/cdep.12013

51. Justice LM, Jiang H, Purtell KM, et al. Conditions of poverty, parent-child interactions, and toddlers' early language skills in low-income families. *Matern Child Health J.* 2019;23(7):971-978. doi:10.1007/s10995-018-02726-9

52. Council on Community Pediatrics. Poverty and child health in the United States. *Pediatrics.* 2016;137(4):e20160339. doi:10.1542/peds.2016-0339

53. Minkler M, Fuller-Thomson E, Guralnik JM. Gradient of disability across the socioeconomic spectrum in the United States. *N Engl J Med.* 2006;355(7):695-703. doi:10.1056/NEJMsa044316

54. Chetty R, Stepner M, Abraham S, et al. The association between income and life expectancy in the United States, 2001-2014 [published correction appears in JAMA. 2017 Jan 3;317(1):90].

*JAMA*. 2016;315(16):1750-1766. doi:10.1001/jama.2016.4226

55. Silver SR, Li J, Quay B. Employment status, unemployment duration, and health-related metrics among US adults of prime working age: Behavioral Risk Factor Surveillance System, 2018-2019. *Am J Ind Med*. 2022;65(1):59-71. doi:10.1002/ajim.23308

56. Sims M, Kershaw KN, Breathett K, et al. Importance of housing and cardiovascular health and well-being: a scientific statement from the American Heart Association. *Circ Cardiovasc Qual Outcomes*. 2020;13(8):e000089. doi:10.1161/HCQ.0000000000000089

57. Charkhchi P, Fazeli Dehkordy S, Carlos RC. Housing and food insecurity, care access, and health status among the chronically ill: an analysis of the Behavioral Risk Factor Surveillance System. *J Gen Intern Med*. 2018;33(5):644-650. doi:10.1007/s11606-017-4255-z

58. Temple KM. Exploring the Intersection of Rural Housing Quality and Health: Healthcare Providers and Housing Experts Provide Insight. Rural Health Information Hub. March 31, 2021. Accessed February 10, 2023. https://www.ruralhealthinfo.org/rural-monitor/housing-quality-and-health/

59. Nagata JM, Palar K, Gooding HC, et al. Food insecurity is associated with poorer mental health and sleep outcomes in young adults. *J Adolesc Health*. 2019;65(6):805-811. doi:10.1016/j.jadohealth.2019.08.010

60. Seligman HK, Bindman AB, Vittinghoff E, Kanaya AM, Kushel MB. Food insecurity is associated with diabetes mellitus: results from the National Health Examination and Nutrition Examination Survey (NHANES) 1999-2002. *J Gen Intern Med*. 2007;22(7):1018-1023. doi:10.1007/s11606-007-0192-6

61. Gundersen C, Ziliak J. Food insecurity and health outcomes. *Health Aff (Millwood)*. 2015;34(11):1830-1839. doi:10.1377/hlthaff.2015.0645

62. Berkowitz SA, Basu S, Meigs JB, Seligman HK. Food insecurity and health care expenditures in the United States, 2011-2013. *Health Serv Res*. 2018;53(3):1600-1620. doi:10.1111/1475-6773.12730

63. Rural Schools and Health. Rural Health Information Hub. March 16, 2021. Accessed February 10, 2023. https://www.ruralhealthinfo.org/topics/schools

64. How Can Rural Schools Address Obesity? Rural Health Information Hub. July 24, 2017. Accessed February 10, 2023. https://www.ruralhealthinfo.org/toolkits/obesity/5/schools/how-can-rural-schools-address-obesity

65. Martin LG, Schoeni RF, Andreski PM. Trends in health of older adults in the United States: past, present, future. *Demography*. 2010;47 Suppl (Suppl 1):S17-S40. doi:10.1353/dem.2010.0003

66. Montez JK, Zajacova A. Trends in mortality risk by education level and cause of death among US White women from 1986 to 2006. *Am J Public Health*. 2013;103(3):473-479. doi:10.2105/AJPH.2012.301128

67. Sasson I. Diverging trends in cause-specific mortality and life years lost by educational attainment: evidence from United States vital statistics data, 1990-2010. *PLoS One*. 2016;11(10):e0163412. doi:10.1371/journal.pone.0163412

68. Racial and Social Equity Research Resources. USDA Economic Research Service U.S. Department of Agriculture. March 2, 2023. Accessed March 10, 2023. https://www.ers.usda.gov/newsroom/trending-topics/racial-and-social-equity-research-resources/

69. Mazzara A. *Federal Rental Assistance Provides Affordable Homes for Vulnerable People in All Types of Communities*. Center on Budget and Policy Priorities; 2017. https://www.cbpp.org/research/housing/federal-rental-assistance-provides-affordable-homes-for-vulnerable-people-in-all

70. Rural Hunger and Access to Healthy Food. Rural Health Information Hub. January 18, 2022. Accessed February 10, 2023. https://www.ruralhealthinfo.org/topics/food-and-hunger

71. USDA Press. Biden-Harris Administration

Announces $401 Million for High-Speed Internet Access in Rural Areas. Rural Development U.S. Department of Agriculture. July 28, 2022. Accessed February 13, 2023. https://www.rd.usda.gov/newsroom/news-release/biden-harris-administration-announces-401-million-high-speed-internet-access-rural-areas

72. Earned Income Tax Credit (EITC). Internal Revenue Service. January 25, 2023. Accessed February 13, 2023. https://www.irs.gov/credits-deductions/individuals/earned-income-tax-credit-eitc

73. Child Tax Credit. Internal Revenue Service. March 8, 2023. Accessed March 10, 2023. https://www.irs.gov/credits-deductions/individuals/child-tax-credit

74. Durst R, Farrigan T. *Federal Tax Policies and Low-Income Rural Households.* Economic Research Service; 2011. https://www.ers.usda.gov/webdocs/publications/44547/7445_eib76_reportsummary.pdf?v=1952.6

75. Marr C, Hingtgen S, Cox K, Sherman A, Windham K. *Expanding Child Tax Credit and Earned Income Tax Credit Would Benefit More Than 10 Million Rural Residents, Strongly Help Rural Areas.* Center on Budget and Policy Priorities; 2020. https://www.cbpp.org/sites/default/files/atoms/files/8-6-20tax.pdf

76. Rural Housing Service. USDA Rural Development U.S. Department of Agriculture. Accessed February 13, 2023. https://www.rd.usda.gov/about-rd/agencies/rural-housing-service

77. Housing Assistance Council. USDA Rural Development Housing Funding Activity. April 2022. Accessed February 2023. https://ruralhome.org/wp-content/uploads/2022/04/USDA-Housing-Activity-Report-FY-2021.pdf

78. Single Family Housing Programs. Rural Development U.S. Department of Agriculture. Accessed February 13, 2023. https://www.rd.usda.gov/programs-services/single-family-housing-programs

79. Multifamily Housing Programs. Rural Development U.S. Department of Agriculture. Accessed February 13, 2023. https://www.rd.usda.gov/programs-services/all-programs/multi-family-housing-programs

80. Why Lawmakers Must Strengthen SNAP. Feeding America. 2023. Accessed February 13, 2023. https://www.feedingamerica.org/take-action/advocate/snap

81. Center on Budget and Policy Priorities. Chart Book: SNAP Helps Struggling Families Put Food on the Table. Updated November 7, 2019. Accessed February 13, 2023. https://www.cbpp.org/sites/default/files/atoms/files/3-13-12fa-chartbook.pdf

82. Miller C, Ralston K, Vogel S. USDA's Supplemental Nutrition Assistance Program (SNAP) Contributed to Rural Economic Output, Jobs Following the Great Recession. USDA Economic Research Service U.S. Department of Agriculture. December 7, 2021. Accessed February 13, 2023. https://www.ers.usda.gov/amber-waves/2021/december/usda-s-supplemental-nutrition-assistance-program-snap-contributed-to-rural-economic-output-jobs-following-the-great-recession/

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*Related Chapters:*
Chapter 3. Rural Healthcare Access and Quality
Chapter 6. Nutrition and Healthy Eating in Rural America
Chapter 14. Housing and Homes: Implications for Rural Americans' Housing Conditions, Mental Health Outcomes, and Overall Well-being
Chapter 16. Rural Education Access and Quality

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# TRANSPORTATION IN RURAL AMERICA

*By Marvellous Akinlotan, PhD, MPH, BDS; Emesomhi Eboreime, MPH; Fiyinfolu Kolade, BDS; and Mercy Udeh, MBBS, MPH*

## SCOPE OF THE PROBLEM

- About 23% of rural stakeholders who responded to a national survey identified transportation as a top priority for rural America; transportation was ranked as the 11th most important health-related priority.[1]
- The fatality rate per 100 vehicle miles traveled (VMT) in rural areas has remained almost twice as high as urban areas. However, the rural fatality rate per 100 million VMT increased by only 1% from 1.83 in 2014 to 1.84 in 2020, while that of urban areas increased by 46% from 0.74 in 2011 to 1.08 in 2020.[2]
- Rural residents account for 19% of the population in the United States, and 31% of the total vehicle miles traveled, yet four out of every ten motor vehicle crash (MVC) fatalities occurred in rural areas in 2020.[2]
- Rural crashes are usually more severe, and rural drivers involved in MVC fatalities are more likely to die at the scene of the crash, compared to urban drivers.[2]

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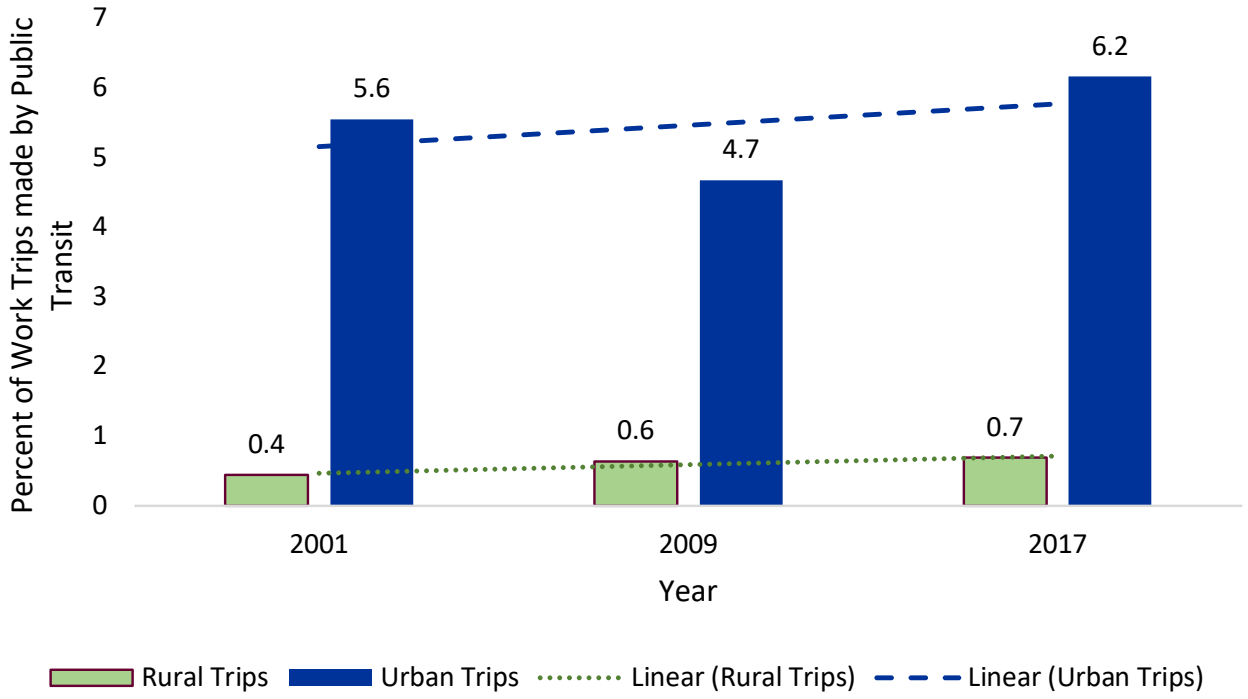
Rural and urban residents rely on transportation to commute to work, access essential services, obtain education and healthcare, attend social and recreational activities, and move goods and products from one location to another. Due to limited public transit options, historically, rural residents have always relied more on private vehicles for transportation. Reports from the United States (U.S.) Census Bureau show that only 0.5% of workers in nonmetropolitan areas used public transit systems to get to work in 2019, compared to 5.6% of workers in metropolitan areas.[3] Despite the low utilization, rural public transit is valuable and relied upon particularly by the elderly, disabled persons, veterans, adolescents, and low-income earners.[4] Rural areas with mass transit systems attract more tourists, new residents, and new businesses, which increases economic activities and employment opportunities. The demand for mass transit systems has grown steadily over the past two decades and is expected to continue to increase as more Americans get older and the need for alternative transportation increases.[4] Analysis of the 2001, 2009, and 2017 National Household Travel Surveys showed that the proportion of rural residents commuting to work via public transit systems increased from 0.4% in 2001 to 0.7% in 2019 (**Figure 1**).

Over the past decade, very little progress has been made toward achieving the objectives of reducing motor vehicle crash (MVC) deaths nationally. Data from the U.S. National Highway Traffic Safety Administration (NHTSA) show that MVC deaths increased by 19.5% between 2011 and 2020. Within this time frame, annual increases in fatalities were observed between 2014 and 2016, followed by a decrease between 2017 and 2019, and a recent increase in 2020. The fatality rate per 100 million vehicle miles traveled (VMT) increased from 1.08 in 2014 to 1.34 in 2020. This fell short of the Healthy People 2020 objective aiming for a reduction to 1.2 deaths per 100 million VMT.[5] The fatality rate per 100 million VMT is a more accurate measure of traffic safety that considers the amount of driving in a particular area. Nonetheless, both the fatality rate per 100 million VMT and the fatality rate per 100,000 population are useful measures of road safety.

Even though there has been a nationwide increase in MVC deaths, comparison of data from rural and urban MVCs show that rural traffic fatalities

**Figure 1. Percentage of Work Trips Made by Public Transit**




*Source: Authors' Analysis of the 2001, 2009, and 2017 National Household Travel Surveys*

decreased by 6% between 2011 and 2020, while urban traffic fatalities increased by 49%.[2] However, the fatality rate per 100 million VMT in rural areas remained almost twice as high as urban areas. Further, the rural fatality rate per 100 million VMT increased by only 1% from 1.83 in 2014 to 1.84 in 2020, while that of urban areas increased by 46%, from 0.74 in 2011 to 1.08 in 2020.

Rural areas have seen reductions in MVC deaths involving drunk drivers. The proportion of MVC deaths involving a drunk driver decreased by 7% between 2011 and 2020, while that of urban areas increased by 46%. However, a significant uptick was observed for both urban and rural dwellers in 2020, which was attributed to increased drinking during the pandemic.[2] For seat belt use, data from the 2020 National Occupant Protection Use Survey (NOPUS) showed that seat belt use was slightly lower in rural areas (89.9%) compared to urban areas (90.5%).[6] Even though there has been an increasing trend in seat belt use in both urban and rural areas,[6] both fell below the Healthy People 2020 objective of increasing seat belt use to 92%.[6] In 2020, 52% of persons in passenger vehicle occupant deaths in rural areas were unrestrained, compared to 49% in urban areas. Even though there are no reliable methods to determine the precise number of crashes from drowsy driving, it is estimated that 1.6% of total MVC fatalities in 2020 can be attributed to drowsy driving, which is equivalent to 663 deaths.[7]

## HEALTHY PEOPLE 2030 OBJECTIVES

The overarching goal of Healthy People 2030 is to "attain healthy, thriving lives and well-being free of preventable disease, disability, injury, and premature death."[8] One of 62 leading health indicators, the goal for transportation in Healthy People 2030 is to "promote safe and active transportation." Access to public transit systems is important because it increases opportunities for physical activity (e.g., walking or biking to bus stops), reduces the rates of air pollution from private vehicles, and reduces the risk of injury and death from MVCs. Overall, it reduces health inequities, which have direct impacts on morbidity and mortality. Healthy People 2030 has seven core objectives related to five transportation areas: transportation in general, physical activities, MVC deaths due to drug and alcohol use, lack of restraints, and drowsy driving. Progress towards five of these objectives will be discussed in this chapter.

1. Transportation – General
   - Increase trips to work made by mass transit – EH-02
2. Drug and alcohol use
   - Reduce the proportion of motor vehicle crash deaths that involve a drunk driver – SU-11
3. Injury prevention
   - Reduce deaths from motor vehicle crashes – IVP-06
   - Reduce the proportion of deaths of car passengers who weren't buckled in – IVP-07
4. Physical activity
   - Increase the proportion of adults who walk or bike to get places – PA-10
   - Increase the proportion of adolescents who walk or bike to get places – PA-11
5. Sleep
   - Reduce the rate of motor vehicle crashes due to drowsy driving – SH-01

## RURAL HEALTHY PEOPLE 2030 SURVEY

The importance of transportation to rural America was reflected in the nationwide Rural Healthy People (RHP) 2030 Survey.[1] About 23% of rural stakeholders who responded to the survey identified transportation as a top priority for rural America. When responses to the question of priority objectives were collated, transportation was ranked as the 11th priority for rural America. Almost half (45.6%) of the survey participants selected drug and alcohol abuse as their top priority for rural America, resulting in a ranking of fifth as the most frequently cited health priority. Compared by U.S. census region, transportation ranked relatively high in the Northeast (7th) and Midwest (9th); less so, in the South (12th) and West (17th). There was little difference in the ranking of transportation when comparing age groups, gender, and states that had/had not expanded Medicaid. Of note, those survey respondents that worked in education ranked transportation the lowest (16th), compared to those working in healthcare (11th), human services (7th), and government or public administration (also 7th).[9]

## PREVALENCE AND DISPARITIES IN RURAL AREAS

### *Trips to Work Made by Mass Transit*

The rural-urban disparities in the proportion of trips to work via public transit may be attributed to factors intrinsic to rural communities. These include a geographic landscape which may not facilitate transportation, dispersed and isolated small communities, and low population density.[10] There are also policy-related factors such as underdeveloped transportation infrastructure, fewer fixed routes for transit, and inadequate funding for transportation services. These factors increase the home-to-work travel burden. For the same reasons cited above, rural residents have not realized the gains of ride-hailing services such as Uber or Lyft that have eased the transportation burden in urban areas. The rural home-to-work distance is greater than in urban areas, which may result in longer wait times for riders and higher fares for longer trips. The high cost of ride-hailing services may be more prohibitive for low-income earners. Analysis from the Pew Research Center showed that, in 2019, almost half of workers who used public transit systems earned less than $25,000 annually.[11] Where public transit systems are available, services may be limited on evenings and weekends, which may restrict mobility for low-income workers with non-typical work schedules.[12] Black and Hispanic people, particularly those of low socioeconomic status, are more likely to use public transportation.[11] Low-income earners are more likely to live far away from work so that they can live in affordable housing.[11] In contrast, people with higher incomes may find it easier to purchase private vehicles, thus shortening their commute to work and increasing their access to a wider variety of economic opportunities.

### *Motor Vehicle Crashes*

Fatalities from MVC occur disproportionately on rural roads. Rural residents account for 19% of the U.S. population and 31% of the total VMT, yet four out of every ten MVC fatalities occurred in rural areas in 2020, according to the NHTSA.[2] The rural fatality rate per 100 million VMT has remained almost double that of urban areas over the past 10 years. In year 2020, the fatality rate

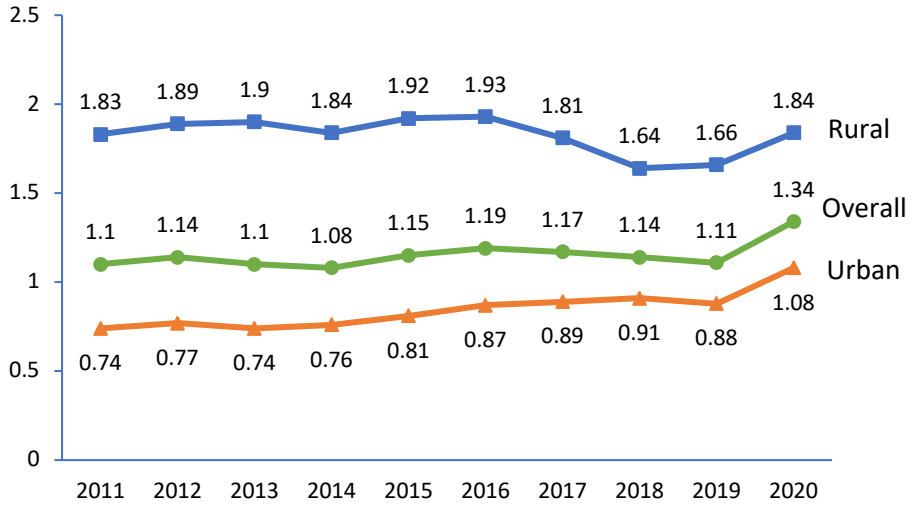
per 100 million VMT was 1.84 in rural areas, and 1.08 in urban areas. In the same year, 15,033 (42%) fatal crashes occurred in rural areas, resulting in 16,665 (43%) traffic fatalities. See **Figure 2**.

In terms of crash characteristics, time of day, location, and driver's age play a role in rural MVCs. Fatal rural crashes are more likely to occur during the day and be characterized as roadway departure crashes (56%) compared to urban crash fatalities (43%). Roadway crashes are defined by the Federal Highway Administration as "a crash in which a vehicle crosses an edge line, a centerline, or leaves the traveled way."[2] In contrast, urban MVC fatalities (70%) are more likely to occur at intersections, while only 28% of rural traffic fatalities occur in such areas. With regard to age, rural drivers aged 15-20 and 45-84 had higher MVC fatalities compared to their urban counterparts in year 2020. However, the highest number of fatalities were seen among drivers aged 25-34 in both urban and rural areas.[2] A national study of U.S. counties reported that rural counties with low population density, and males between the ages of 15-34, accounted for the highest number of cases of crash mortality.[13] Other research has also shown that rural traffic fatalities are higher in counties with a high proportion of younger or older adults.[14]

Rural crashes are usually more severe, and rural drivers involved in MVC fatalities are more likely to die at the scene of the crash compared to urban drivers. Among drivers who are transported to hospitals, rural drivers were also more likely to die enroute, compared to urban drivers.[2] Fatal crashes in rural areas are slightly less likely to be speed related compared to that of urban areas. In 2020, data from the NHTSA show that 28% of rural traffic fatalities were speed related, compared to 30% in urban areas. However, an important distinction to note is that in 2020, a majority (71%) of the rural traffic fatalities occurred on high-speed roads, where the posted speed limit was 55 mph or greater, while 65% of those in urban areas occurred in low-speed roads with posted speed limits of 50 mph or less. It has also been reported that states with higher maximum speed limits have more traffic fatalities attributable to speeding on their rural roads.[15]

Severe MVC fatalities occur in rural areas due to high traveling speed, prolonged emergency response time, and longer distances to medical care.[16] Other factors contributing to the severity of crashes include inappropriate gap selection (a driver's estimation of the space needed from other motorists to complete a maneuver safely) at rural stop-controlled intersections,[17] failure to yield (which may be related to the driver's age, particularly for young drivers),[18] vision obstruction, and inattention/distraction.[19] Further, the high prevalence of risk factors such as adolescent and adult smoking, alcohol consumption, obesity, physical inactivity, and issues such as serious mental illness, unintentional injury, and suicide directly or indirectly impact rural road safety.[20,21] It is also important to note that a disproportionate amount

**Figure 2. Fatality Rates per 100 Million VMT, by Land Use, 2011-2020**




*Source:*[2]

of distracted driving occurs on rural roads, where situational awareness may be lower due to low traffic congestion.[22]

Unlike urban roads, rural roads lack safety barriers and are characterized by a large presence of heavy-duty vehicles, caravans, and agricultural vehicles.[23] Rural roads have poor surface quality and are unlikely to be sealed with tar, bitumen, or concrete despite the presence of large vehicular movement.[23] In the U.S., a majority of the rural roads have two lanes which increases the risk of MVC due to the lack of passing lanes, narrow lanes and shoulders, lack of barriers, and limited visibility.[24] Other road quality issues include unsignalized intersections, which account for 30% of rural area crashes.[25] Reports from the American Association of State Highway and Transportation Officials show that 42% of lane departure crashes happened at horizontal curves, of which half were in rural areas.[26]

Vehicles play a major role in rural traffic fatalities and are critical to the severity of injuries sustained. Rural residents generally drive older vehicles, which may lack safety features such as airbags to reduce the risk of head and neck injuries and prevent ejection from the vehicle during a crash.[27] Vehicle types such as all-terrain vehicles (ATVs), motorcycles, and farm vehicles are more commonly used in rural areas and consequently, there are more crashes involving these vehicle types in rural areas. Crashes involving farm vehicles contribute to occupational injury and mortality and are a major threat to other road users, especially when the crashes involve passenger vehicles.[28,29] Crashes involving ATVs are more likely to occur in isolated rural areas which have large terrains that are conducive to driving ATVs. Drivers of such vehicles are less likely to wear helmets at the time of the crash than those who drive regular vehicles, resulting in head injuries. Children are at particular risk of being involved in crashes involving ATVs, and a report from the Consumer Product Safety Commission shows that every hour, four children are seen in emergency departments with ATV-related crash injuries. Notably, there are more casualties related to ATV crashes than bicycle crashes. Between 1982 and 2016, children under age 16 accounted for 22% of all ATV-related fatalities.[30]

The prevalence of motorcycle usage has grown exponentially in the past decade,[31] as have motorcyclist fatalities. Loss of control on turns is responsible for 50% of powered two-wheel crashes.[32] Although motorcycles make up approximately 3% of all registered motor vehicles in the U.S., and travel only 4% of miles, they account for approximately 10% of all MVC deaths. Motorcycle accidents are more than 37 times more severe than automobiles crashes. Motorcycle crashes are also more likely to involve alcohol, especially in rural areas. In 2019, 32% of fatal motorcycle crashes involved alcohol impairment, compared to 26% of urban motorcycle crashes.[33]

***Motor Vehicle Crashes Related to Drug and Alcohol Use***

Over 10,000 lives are lost each year to alcohol-impaired driving, but more lives are lost in rural areas. In the year 2020, one in five fatal crashes involved driver alcohol impairment and, of these, 42% were rural while 57% were urban. When VMT is considered, the risk of alcohol-related MVC is three times higher in rural than urban areas.[33] Drivers aged 21 to 35 are more likely to be involved in alcohol-impaired traffic fatalities in both urban and rural areas. It is well established that rural adults are more likely to report heavy drinking and binge drinking,[34] and have higher rates of illicit drug and prescription drug abuse. Factors such as poverty, social isolation, unemployment, limited access to mental healthcare, and limited transportation options make substance use and misuse more difficult to combat in rural areas.[35] Further, alcohol-impaired drivers in rural areas are more likely to die in MVCs than those in urban areas. Limited resources in rural areas have hindered the implementation of certain interventions such as sobriety checkpoints, and there are limited alternative means of transportation, especially after 5 p.m. when social drinking is likely to occur.[36] Further, data from Maryland show that in rural fatal crashes, drivers were more likely to be under the influence of opioids, especially among middle-aged and White drivers. Drivers under the influence of alcohol are more likely to sustain severe injuries, and the level of drug impairment increases the severity of the injuries.[37]

*Variation by Rural Region*

The use of public transit systems varies across U.S. census regions. Research from the Pew Research Center shows that 25% of adults use public transit systems in the Northeast compared to 7%, 8%, and 9% of adults in the South, Midwest, and West, respectively.[11] However, analysis of the 2019 American Community Survey showed that 1.3% of workers living outside metropolitan areas in the West used public transit to travel to work compared to 0.6% of workers in the Northeast, 0.4% in the Midwest, and 0.3% in the South.[3]

Factors such as road quality, traffic volumes, driver behaviors, and weather conditions vary across the four census regions in the U.S. For example, rural areas of the Northeast region have more windy roads and hilly terrains, and crashes are more likely to occur due to reduced visibility, narrow lanes, and sharp turns. Icy roads in the winter season also increase the risk of crashes. The roads in the rural Midwest and West regions are long, straight and have high speed limits. Drivers on these roads are at higher risk of driver fatigue, distracted driving, and speeding. Tornadoes and blizzards also increase the risk of MVC in these areas. Rural roads in the South are narrow and have small shoulder space and may be difficult to maneuver. Other factors affecting the number of MVC deaths include population density, road conditions, travel speed, traffic laws, available emergency services, and weather conditions.[38]

Data from the U.S. Department of Transportation's Fatality Analysis Reporting System show that in 2021, deaths from MVCs were highest in Mississippi (29.4 per 100,000 persons) and lowest in Massachusetts (6.6 per 100,00 persons).[39] For MVCs by rurality, death rates are highest in the most rural, central regions of the U.S., where driving distances tend to be longer.[40] Crash fatalities in rural counties of West Virginia are also among the highest for rural counties nationally.[41]

## OTHER FACTORS ASSOCIATED WITH TRANSPORTATION

*Traffic Fatalities and Risky Driver Behavior*

Data from the 2018 Fatality Analysis Reporting System show that there are racial/ethnic disparities in traffic fatalities, even after accounting for travel volume and mode. In 2018, American Indian and Alaska Native (AI/AN) people had the highest number of traffic fatalities (24.75 fatalities per 100,000 population), followed by Black (13.47), non-Hispanic Pacific Islanders (13.31), White (10.92) and Hispanic people (9.44). Asian people had the lowest rates – three fatalities per 100,000 population. Between 2014 and 2018 however, relative to White individuals, the number of traffic fatalities lessened for AI/AN people but doubled for the Black population.[42]

Some factors have been attributed to the observed disparities. These include risky driver behaviors such as alcohol-impaired driving, restraint use, and distracted driving. Others include road infrastructure that makes walking or cycling riskier for Blacks, Hispanics,[43] and AI/AN.[42] For driver behaviors, data from the Fatality Analysis Reporting System showed that AI/AN people had the highest travel volume and the highest percentages of alcohol-involved traffic fatalities (57%).[42] Alcohol-involved traffic fatalities contributed to roughly one in three crash fatalities among Black and Hispanic people in 2018.[42]

*Restraint Use*

For restraint use, analysis of the Fatality Analysis Reporting System showed that AI/AN, Black and non-Hispanic Pacific Islanders were more likely to be unrestrained at the time of a crash fatality compared to White people, while Asian vehicle occupants used restraint systems more. Similar trends were observed for child restraint use.

In 2018, 44% of Black people were restrained in MVC fatalities involving passengers, compared to 55% of White people. In addition, speeding contributed to over 30% of traffic fatalities among non-Hispanic Pacific Islanders, AI/AN and Blacks. The NHTSA cautions that there are limitations to the race/ethnicity data collected and some caution should be used when interpreting these findings.[42]

## PROVEN SOLUTIONS OR INTERVENTIONS

Improving mass transit in rural areas can be challenging due to low population density, dispersed residential patterns, and limited funding options. However, several initiatives have been undertaken to improve transportation

options for rural communities. Community transportation programs transport individuals who are unable to use public transportation due to physical, cognitive, or financial limitations. The Transportation Reimbursement Incentive Program (TRIP) is a community program that reimburses friends and neighbors for taking older adults and disabled persons to medical care and other approved purposes. For more than 20 years, the program has provided over 1.6 million free rides to over 5,000 adults.[44] Ride sharing platforms such as Uber and Lyft are taking on new roles and expanding their services to provide transportation specifically for medical appointments. However, whether rural residents will use these services if they become available remains uncertain.[45]

Several efforts have been made to reduce deaths from MVCs in rural areas, some of which are described below:

*Improving Infrastructure.* Traffic safety interventions include sealing shoulders, providing turning lanes at intersections, separating opposing traffic with wide medians, and installing warning signs on lengthy rural two-lane highways.[23,46] A study using multiple data sources from Idaho showed that installing rumble strips on two-lane rural roads reduces crashes on highways with and without horizontal curves.[47] Other interventions include installing streetlights near intersections to increase visibility and reduce the severity of crashes, particularly when it is dark.[48]

*Enforcement programs.* These programs include reducing speed limits, mandating seat belt and car seat use, enforcing helmet use for ATV riders, and implementing alcohol consumption limits. It is well established that reducing speed limits improves traffic safety and reduces MVCs,[49] including those from motorcycles.[50] Reducing speed limits have been shown to increase the reaction time of drivers, thus, allowing them to make last-minute maneuvers before an impact occurs. Consistent use of seat belts on rural roads offsets fatalities from MVCs often caused by poor road quality, unenforced speed limits, narrow lanes, and lack of road shoulders.[51] Further, evidence shows that correct placement of age-appropriate child safety seats increases safety and reduces the risk of crash death by about 54%,[52] and also reduces the severity of traumatic injuries experienced by children ages one to four.[53] It has been suggested that laws that enforce use of helmets among ATV drivers also reduce the severity of ATV-related MVCs.[54] Approaches to reducing alcohol-impaired MVCs include enforcing laws that prohibit driving with blood alcohol levels of greater than 0.08, prohibiting open containers of alcohol in vehicles, and increasing sobriety police checkpoints.[55] Limited research suggests that delaying school start time to 8:30 a.m. might reduce drivers' fatigue and drowsiness.[56]

*Public education campaigns.* This refers to campaigns that are highly visible and targeted towards specific groups, such as males, pick-up truck drivers, or rural residents. Such campaigns have been quite effective at increasing seat belt use, especially when combined with publicized intentions for primary enforcement.[57,58] Thus, public awareness campaigns regarding seat belt use that contain messages specific to rural life experiences and culture are more likely to increase the knowledge, attitude, and beliefs towards seat belt use among rural drivers.[59] Regarding deaths from ATVs, an ATV safety education program in rural central Illinois proved to be an effective community intervention toward improving the safety knowledge and riding behavior of rural youth in the area.[60]

## SUMMARY AND CONCLUSIONS

Motor vehicle crashes remain a public health threat. Public policies and programs that improve rural road infrastructure, enforce speed limit laws, ensure alternative means of transportation, especially for the intoxicated, and make targeted public education campaigns are critical to reducing MVCs and saving lives.

As private and governmental entities work to improve public transportation that will support rural residents' well-being by providing transportation to employment, schools, as well as social and recreational destinations, efforts must be made to encourage ridership. Public transportation systems are critical for those who are historically considered racial/ethnic minorities, those who earn less, and for the elderly. The consequences of poor access to public transit might mean residents forgo

economic, educational, recreational, and healthcare opportunities. Maintaining viable community transportation services will involve the input of federal, state, local and not-for-profit organizations. Technological advancements may reduce the need for commuting as more rural residents are able to work and receive healthcare remotely, thus reducing the need for more frequent transportation.

## REFERENCES


1. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: new decade, new challenges. *Prev Med Rep.* 2023;33:102176. doi:10.1016/j.pmedr.2023.102176

2. National Center for Statistics and Analysis. Rural/urban comparison of traffic fatalities: 2020 data (traffic safety facts. report no. DOT HS 813 336). *National Highway Traffic Safety Administration.* 2022. Accessed March 31, 2023. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813336

3. Burrows M, Burd C, McKenzie B. Commuting by Public Transportation in the United States: 2019. American Community Survey Reports. April 2021. Accessed June 2, 2023. https://www.census.gov/content/dam/Census/library/publications/2021/acs/acs-48.pdf

4. Litman T, Hughes-Cromwick M. Public transportation's impact on rural and small towns: a vital mobility link. 2017. Accessed June 2, 2023. https://www.apta.com/wp-content/uploads/Resources/resources/reportsandpublications/Documents/APTA-Rural-Transit-2017.pdf

5. Office of Disease Prevention and Health Promotion. 2020 topics & objectives: Injury and violence prevention. HealthyPeople.gov website. Updated February 6, 2022. Accessed March 31, 2023. https://wayback.archive-it.org/5774/20220414130425/https://www.healthypeople.gov/2020/topics-objectives/topic/injury-and-violence-prevention/objectives#4725

6. Office of Disease Prevention and Health Promotion. Disparities overview by geographic location. Updated October 27, 2021. Accessed April 1, 2023. https://wayback.archive-it.org/5774/20211121044852/https:/www.healthypeople.gov/2020/data/disparities/summary/Chart/4735/10.1

7. Stewart T. Overview of motor vehicle crashes in 2020 (Report No. DOT HS 813 266). National Highway Traffic Safety Administration. March 2022.

8. Office of Disease Prevention and Health Promotion. Healthy people 2030 framework. Accessed June 2, 2023. https://health.gov/healthypeople/about/healthy-people-2030-framework

9. Kassabian M, Shrestha A, Callaghan T, et al. Rural healthy people 2030: common challenges, rural nuances. May 2023. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

10. Henning-Smith C, Evenson A, Corbett A, Kozhimannil K, Moscovice I. Rural transportation: challenges and opportunities. November 2017. Policy Brief. University of Minnesota Rural Health Research Center. http://rhrc.umn.edu/wp-content/files_mf/1518734252UMRHRCTransportationChallenges.pdf

11. Anderson M. Who relies on public transit in the US. Pew Research Center. April 7, 2016. Accessed June 2, 2023. https://www.pewresearch.org/short-reads/2016/04/07/who-relies-on-public-transit-in-the-u-s/

12. Patterson RF, Richardson C, Sahor F, Wagner S. New routes to equity: the future of transportation in the Black community. September 2020. Accessed June 2, 2023. https://www.cbcfinc.org/wp-content/uploads/2020/10/NewRoutestoEquity-Final5.pdf

13. Byrne JP, Mann NC, Dai M, et al. Association between emergency medical service response time and motor vehicle crash mortality in the United States. *JAMA Surg.* 2019;154(4):286-293. doi:10.1001/jamasurg.2018.5097

14. Carrie Henning-Smith and Katy B. Kozhimannil. Rural–urban differences in risk factors for motor vehicle fatalities. *Health Equity.* 2018;2(1):260-263. doi:10.1089/heq.2018.0006

15. Friedman LS, Hedeker D, Richter ED, "Long-term effects of repealing the national maximum speed limit in the United States". *Am J Public Health*. 2009;99(9):1626-1631. doi:10.2105/AJPH.2008.153726

16. Jones AP, Bentham G. Emergency medical service accessibility and outcome from road traffic accidents. *Public Health*. 1995;109(3):169-77. doi:10.1016/S0033-3506(05)80049-6

17. Preston H, Storm R, Donath M, Shankwitz C. Review of Minnesota's rural intersection crashes: methodology for identifying intersections for intersection decision support (IDS). March 1, 2004. Accessed June 2, 2023. https://hdl.handle.net/11299/795

18. Keay L, Jasti S, Munoz B, et al. Urban and rural differences in older drivers' failure to stop at stop signs. *Accid Anal Prev*. 2009;41(5):995-1000. doi:10.1016/j.aap.2009.06.004

19. Campbell BN, Smith JD, Najm W. Analysis of fatal crashes due to signal and stop sign violations. U.S. Department of Transportation, National Highway Traffic Safety Administration; 2004. https://rosap.ntl.bts.gov/view/dot/4288

20. Meit M, Knudson A, Gilbert T, et al. The 2014 update of the rural-urban chartbook. October 2014. North Dakota and NORC Reform Policy Research Center. https://ruralhealth.und.edu/projects/health-reform-policy-research-center/pdf/2014-rural-urban-chartbook-update.pdf

21. McAndrews C, Beyer K, Guse CE, Layde P. How do the definitions of urban and rural matter for transportation safety? Re-interpreting transportation fatalities as an outcome of regional development processes. *Accid Anal Prev*. 2016;97:231-241. doi:10.1016/j.aap.2016.09.008

22. Raymond P. America's rural roads: beautiful and deadly. September 2022. Accessed June 2, 2023. https://www.ghsa.org/sites/default/files/2022-09/America%E2%80%99s%20Rural%20Roads%20-%20Beautiful%20and%20Deadly%20FNL.pdf

23. Franklin RC, King JC, Riggs M. A systematic review of large agriculture vehicles uses and crash incidents on public roads. *J Agromedicine*. 2020; 25(1):14-27. doi:10.1080/1059924X.2019.1593275

24. Wu J, Xu H. Driver behavior analysis on rural 2-lane, 2-way highways using SHRP 2 NDS data. *Traffic Inj Prev*. 2018;19(8):838-843. doi:10.1080/15389588.2018.1524142

25. Golembiewski G, Chandler BE. Intersection safety: a manual for local rural road owners. United States. Federal Highway Administration. Office of Safety. January 1, 2011. Accessed June 2, 2023. https://rosap.ntl.bts.gov/view/dot/42607/dot_42607_DS1.pdf

26. Fitzsimmons EJ, Kvam V, Souleyrette RR, Nambisan SS, Bonett DG. Determining vehicle operating speed and lateral position along horizontal curves using linear mixed-effects models. *Traffic Inj Prev*. 2013;14(3):309-321. doi:10.1080/15389588.2012.701356

27. National Highway Traffic Safety Administration. Air bags. Accessed April 1, 2023. https://www.nhtsa.gov/equipment/air-bags

28. Bureau of Labor Statistics. Census of fatal occupational injuries summary, 2021. December 16, 2022. Accessed February 17, 2023. https://www.bls.gov/news.release/cfoi.nr0.htm

29. Costello TM, Schulman MD, Mitchell RE. Risk factors for a farm vehicle public road crash. *Accid Anal Prev*. 2009;41(1):42-47. doi:10.1016/j.aap.2008.08.029

30. Jennissen CA, Denning GM, Aitken ME. American Academy of Pediatrics recommendations for the prevention of pediatric ATV-related deaths and injuries. *Pediatrics*. 2022;150(4):e2022059279. doi:10.1542/peds.2022-059279

31. Barron S, Falank C, Ontengco J, Chung B, Carter DW. Severity and patterns of injury in helmeted vs. non-helmeted motorcyclists in a rural state. *J Safety Res*. 2021;77:212-216. doi:10.1016/j.jsr.2021.03.004

32. Smaiah S, Sadoun R, Elouardi A, et al. A practical approach for high precision reconstruction of a motorcycle trajectory using a low-cost multi-sensor system. *J Sens*. 2018;18(7):2282. doi:10.3390/s18072282

33. DiMaggio C, Wheeler-Martin K, Oliver J. Alcohol-Impaired Driving in the United States: Review of Data Sources and Analyses. In: National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Population Health and Public Health Practice; Committee on Accelerating Progress to Reduce Alcohol-Impaired Driving Fatalities; Negussie Y, Geller A, Teutsch SM, editors. Getting to Zero Alcohol-Impaired Driving Fatalities: A Comprehensive Approach to a Persistent Problem. Washington (DC): National Academies Press (US); 2018. https://www.ncbi.nlm.nih.gov/books/NBK500064/

34. Marlenga B, Berg RL, Pickett W. National public health data systems in the United States: applications to child agricultural injury surveillance. *J Rural Health*. 2018;34(3):314-321. doi:10.1111/jrh.12292

35. Rural Health Information Hub. Substance Use and Misuse in Rural Areas. Updated 2020. Accessed June 5, 2023. https://www.ruralhealthinfo.org/topics/substance-use

36. Pressley JC, Hines LM, Bauer MJ, Oh SA, Kuhl JR, Liu C, Cheng B, Garnett MF. Using rural–urban continuum codes (RUCCS) to examine alcohol-related motor vehicle crash injury and enforcement in New York State. *Int J Environ Res Public Health*. 2019;16(8):1346. doi:10.3390/ijerph16081346

37. Behnood A, Mannering FL. The effects of drug and alcohol consumption on driver injury severities in single-vehicle crashes. *Traffic Inj Prev*. 2017;18(5):456-462. doi:10.1080/15389588.2016.1262540

38. Insurance Institute for Highway Safety. Fatality facts 2020: State by state. IIHS-HLDI crash testing and highway safety website. Updated 2022. Accessed April 4, 2023. https://www.iihs.org/topics/fatality-statistics/detail/state-by-state

39. National Safety Council. Motor-vehicle deaths by state. *Injury Facts*. 2023. Accessed June 5, 2023. https://injuryfacts.nsc.org/state-data/motor-vehicle-deaths-by-state/

40. Wallace M, Sharfstein JM, Kaminsky J, Lessler J. Comparison of US County-Level Public Health Performance Rankings with County Cluster and National Rankings: Assessment Based on Prevalence Rates of Smoking and Obesity and Motor Vehicle Crash Death Rates. *JAMA Netw Open*. 2019;2(1):e186816. doi:10.1001/jamanetworkopen.2018.6816

41. Plants KB, Rudisill TM, Zhu M. Traffic fatalities in West Virginia and the remaining United States, 2008-2012. *W V Med J*. 2017;113(2):42-47.

42. Glassbrenner D, Herbert G, Reish L, Webb C, Lindsey T. Evaluating disparities in traffic fatalities by race, ethnicity, and income (report no. DOT HS 813 188). *National Highway Traffic Safety Administration*. 2022. Accessed April 4, 2023. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/813188

43. Raifman MA, Choma EF. Disparities in activity and traffic fatalities by race/ethnicity. *Am J Prev Med*. 2022;63(2):160-167. doi:10.1016/j.amepre.2022.03.012

44. U.S. Department of Transportation. Rural public transportation systems. Updated 2019. Accessed May 8, 2023. https://www.transportation.gov/mission/health/Rural-Public-Transportation-Systems

45. Villwock-Witte N. New mobility opportunities in a rural context. Western Transportation Institute. December 2019. Accessed May 8, 2023. https://westerntransportationinstitute.org/wp-content/uploads/2020/03/4W6590_RuralRidesharing_12202019_FINAL.pdf

46. Wu Q, Chen F, Zhang G, Liu XC, Wang H, Bogus SM. Mixed logit model-based driver injury severity investigations in single- and multi-vehicle crashes on rural two-lane highways. *Accid Anal Prev*. 2014;72:105-115. doi:10.1016/j.aap.2014.06.014

47. Khan M, Abdel-Rahim A, Williams CJ. Potential crash reduction benefits of shoulder rumble strips in two-lane rural highways. *Accid Anal Prev*. 2015;75:35-42. doi:10.1016/j.aap.2014.11.007

48. Jafari Anarkooli A, Hadji Hosseinlou M. Analysis of the injury severity of crashes by considering different lighting conditions on

two-lane rural roads. *J Safety Res.* 2016;56:57-65. doi:10.1016/j.jsr.2015.12.003

49. De Pauw E, Daniels S, Thierie M, Brijs T. Safety effects of reducing the speed limit from 90 km/h to 70 km/h. *Accid Anal Prev.* 2014;62:426-431. doi:10.1016/j.aap.2013.05.003

50. Lemonakis P, Eliou N, Karakasidis T. Investigation of speed and trajectory of motorcycle riders at curved road sections of two-lane rural roads under diverse lighting conditions. *J Safety Res.* 2021;78:138-145. doi:10.1016/j.jsr.2021.05.009

51. Notrica DM, Sayrs LW, Krishna N. The effect of verified pediatric trauma centers, state laws, and crash characteristics on time trends in adolescent motor vehicle fatalities, 1999-2015. *J Trauma Acute Care Surg.* 2018;85(5):944-952. doi:10.1097/TA.0000000000001972

52. National Highway Traffic Safety Administration. Revised Estimates of Child Restraint Effectiveness. December 1996. Accessed May 8, 2023. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/96855

53. Sauber-Schatz EK, Thomas AM, Cook LJ. Motor vehicle crashes, medical outcomes, and hospital charges among children aged 1–12 years—Crash outcome data evaluation system, 11 states, 2005–2008. *MMWR Surveill Summ.* 2015;64(8):1-32. https://www.jstor.org/stable/24806308

54. Holt MF, Testerman GM. Trauma surgeon-led and funded injury prevention program decreases admission for motorcycle crash injuries. *Am Surg.* 2021;88(4):740-745. doi:10.1177/00031348211050837

55. Lenk KM, Erickson DJ, Joshi S, Calvert C, Nelson TF, Toomey TL. An examination of how alcohol enforcement strategies by sheriff and police agencies are associated with alcohol-impaired-driving fatal traffic crashes. *Traffic Inj Prev.* 2021;22(6):419-424. doi:10.1080/15389588.2021.1934829

56. Foss RD, Smith RL, O'Brien N,P. School start times and teenage driver motor vehicle crashes. *Accid Anal Prev.* 2019;126:54-63. doi:10.1016/j.aap.2018.03.031

57. Goodwin AH, Thomas L, Kirley B, Hall W, O'Brien NP, Hill K. Countermeasures that work: A highway safety countermeasure guide for state highway safety offices, *2015.* 2015. United States. Department of Transportation. National Highway Traffic Safety Administration; 2015 Nov 1. doi:10.21949/1525785

58. Dinh-Zarr TB, Sleet DA, Shults RA, et al. Reviews of evidence regarding interventions to increase the use of safety belts. *Am J Prev Med.* 2001;21(4):48-65. doi:10.1016/S0749-3797(01)00378-6

59. Watson CE, Austin RA. Differences in rural and urban drivers' attitudes and beliefs about seat belts. *Accid Anal Prev.* 2021;151:105976. doi:10.1016/j.aap.2021.105976

60. Novak JA, Hafner JW, Aldag JC, Getz MA. Evaluation of a standardized all-terrain vehicle safety education intervention for youth in rural central Illinois. *J Prim Care Community Health.* 2013;4(1):8-13. doi:10.1177/2150131912446374

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*Related Chapters:*

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Chapter 10. Rural Economic Stability
Chapter 14. Housing and Homes: Implications for Rural Americans' Housing Conditions, Mental Health Outcomes, and Overall Well-being

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# DISPARITIES AND OPPORTUNITIES ACROSS THE CANCER CONTINUUM IN RURAL AMERICA

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## SCOPE OF THE PROBLEM

- Cancer was identified as the 12th most highly ranked priority from the Rural Healthy People 2030 survey.[1]
- On average, rural residents live more than two to five hours from most cancer services ranging from fundamental screening services to clinical trials, survivorship care, and end-of-life care.[2]
- Cancer-associated mortality rates for persons living in rural counties are much higher compared to cancer-associated mortality for urban residents.[3,4]
- Mortality rates for many cancers are higher in rural areas than in urban areas including: 10% higher for cancers of the lung and bronchus, 2% higher for female breast cancer, 5% higher for colorectal cancer and 1% higher for pancreatic cancer.[4]
- Across all geographic designations (rural and urban), mortality rates associated with breast cancer and prostate cancer for Black individuals are significantly higher, while Hispanic individuals have the highest incidence of late-stage cervical cancer. In addition to cervical cancer, the incidence rate of liver cancer is particularly high among Hispanics in the U.S.[5]
- Colorectal cancer incidence rates are higher in men, and these rates are significantly higher in rural areas due to delayed screening in comparison to urban individuals.[4,5]

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Despite significant progress made in overall awareness of rural versus urban health disparities across our nation, awareness has not resulted in specific goals and strategies to improve cancer in many areas of the United States. Approximately 68% of comprehensive cancer control plans across the U.S. and territory/tribal areas include the word "rural" in their plan; however more than two-thirds of the plans do not have rural-specific strategies.[6]

In addition, when it comes to accessing cancer providers, shortages have improved over the last decade growing from 3% to 12-15% of oncologists living in rural areas.[7,8] However, 42% of non-metropolitan counties still have no oncologists.[7]

## 1. RELEVANT HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

In Healthy People 2030, the overall goal for cancer is to "reduce new cases of cancer and cancer-related illness, disability, and death."[9] Specific Healthy People 2030 cancer objectives call for decreasing death rates from female breast cancer, prostate cancer, colorectal cancer, and lung cancer. Improved communication with providers and increased genetic counseling are specific objectives to contribute to cancer prevention. Early detection of oral/pharyngeal cancers, and increased cancer screening, are additional objectives aimed at reducing cancer incidence and mortality. Healthy People 2030 also seeks to improve five-year cancer survival rates. Some of the following Healthy People 2030 objectives are discussed in this chapter relevant to the published rural-focused literature on cancer screening, incidence, mortality, and survivorship in the U.S.

Five objectives related to cancer mortality have been improving over the last decade. Although 149.1 cancer deaths per 100,000 persons occurred nationally in 2018, a continuing decrease (144.1) in

overall cancer deaths per 100,000 was seen in 2020.[10] The target goal for 2030, established in Healthy People, is 122.7 or fewer cancer deaths per 100,000.[9]

- C-01 Reduce the overall cancer death rate
- C-02 Reduce the lung cancer death rate
- C-04 Reduce the female breast cancer death rate
- C-06 Reduce the colorectal cancer death rate
- C-08 Reduce the prostate cancer death rate

To establish reliable baseline data and identify an evidence base for interventions, additional research is needed for these two Healthy People 2030 objectives related to survivorship.[9]

- C-R01 Increase quality of life for cancer survivors
- C-11 Increase the proportion of cancer survivors who are living five years or longer after diagnosis

These seven Healthy People 2030 objectives are related to cancer prevention and screening, and are discussed in this chapter, relative to rural disparities.

- C-R02 Increase the proportion of people who discuss interventions to prevent cancer with their providers
- OH-07 Increase the proportion of oral and pharyngeal cancers detected at the earliest stage
- C-03 Increase the proportion of adults who get screened for lung cancer
- C-05 Increase the proportion of females who get screened for breast cancer
- C-07 Increase the proportion of adults who get screened for colorectal cancer
- C-09 Increase the proportion of females who get screened for cervical cancer
- C-D01 Increase the proportion of females who get genetic counseling for breast and/or ovarian cancer

## 2. RURAL HEALTHY PEOPLE 2030 SURVEY

Selecting from 62 Healthy People 2030 leading health indicators, 1,291 rural stakeholders responded to a web-based survey to determine the most important health priorities for rural Americans.[11] The respondents consisted of rural stakeholders including government officials, healthcare providers, agency heads, academicians, and community leaders. A total of 25.3% of respondents to the Rural Healthy People 2030 survey identified cancer as one of the top 10 priorities for rural Americans. This ranked cancer as the 12th most important rural health priority. Ten years earlier, in response to a similar survey conducted by Texas A&M University, cancer was similarly identified by rural stakeholders as the 11th highest-ranking rural health priority.[12,13]

To address this priority health issue and improve cancer outcomes, rural health should be examined through primary, secondary, and tertiary prevention. **Primary** cancer prevention strategies examine the known causes of cancer and help to identify modifiable risk factors that can be improved to prevent disease.[14] **Secondary** prevention involves strategies to screen and identify cancer early.[15] **Tertiary** prevention involves access to cancer treatment and minimizing the complications and mortality resulting from a cancer diagnosis, in other words cancer control.[16] In this chapter we will examine the disparities in primary, secondary and tertiary prevention and identify proven interventions and solutions for rural populations.

## 3. MOST PREVALENT AND/OR PREVENTABLE CANCERS

To align with the Healthy People 2030 goals, this chapter will focus on the six most prevalent and/or preventable cancers: breast, cervical, colorectal, lung, oral/pharyngeal and prostate cancer.

### 3.A. Primary Prevention: Environmental Exposures and Known Causes of Cancer

In historically marginalized communities, exposures such as second-hand smoke, water contamination due to industrial zoning, and factory byproducts increase the risk of cancer diagnoses and deaths.[17] Due to redlining (financially discriminatory practices based on the racial/ethnic demographics and/or low socio-economic status of a neighborhood) and other political processes, Black Americans often live in areas where there is a high rate of exposure to toxins, industrial facilities, and pollution levels.[17]

In rural areas, the chemical combinations used in agriculture and farming to address pests and

weeds are considered human carcinogens.[18,19] In addition, limited employment opportunities in rural areas may increase exposure to toxic chemicals, pollution, and carcinogens.[20] These carcinogens affect hormone production and increase the inflammatory process, contributing to the incidence and burden of cancer in these populations.[21]

In addition to environmental exposures, modifiable behavioral risk factors such as obesity, diet, sun exposure, tobacco and alcohol use are linked to increased cancer incidence.[22] Per the 2030 Rural Healthy People rankings, all of these modifiable risk factors, with the exception of sun exposure, are in the top 10 priority problems for rural communities (i.e., 4th - Overweight and Obesity, 5th - Drug and Alcohol Use, and 6th - Nutrition and Healthy Eating).

Obesity rates are higher in rural communities.[23] Dietary intake is influenced by the lower socioeconomic status of rural individuals who are less able to afford healthy foods and access healthy foods.[24-26] In addition, individuals living in rural areas report less physical activity than those in more suburban or urban settings.[26]

Smoking rates continue to be higher in rural areas than urban settings, which is reflected in higher rural incidence and mortality rates.[27-29] Smokeless tobacco use is also higher in rural areas.[27] Excessive alcohol use in rural areas of the U.S. is variable by region.[30] Higher rates of alcohol use have been reported in some regions of the U.S., with the largest concentrations of counties in the upper Midwest and scattered clusters of counties throughout the Mountain West, Alaska and Nevada.[30] In comparison, the Southeast reported lower levels of excessive alcohol use in rural counties.[30] However, variation exists within states' rural areas, with individual rural counties in many states reporting different levels of alcohol use.[30]

### 3.B. Incidence

Cancer incidence rates in rural areas from 2011 to 2019, varied across the six most prevalent and/or preventable cancers (**Figures 1a through 1f**). The levels of rurality shown are based on the United States Department of Agriculture Economic Research Service (USDA-ERS) Rural-Urban Continuum Codes (RUCC) 2013 criteria. The RUCC classification includes nine levels of rurality. For Figures 1a through 1f, the three RUCC metropolitan categories were kept as is while RUCC 4 and 5 were combined to indicate urban counties with a population ⩾ 20,000, RUCC 6 and 7 were combined to indicate urban counties with a population of 2,500-19,999, and RUCC 8 and 9 were combined to indicate rural counties with <2,500 population.

There were important differences in breast cancer incidence trends across levels of rurality.[31] Although breast cancer incidence increased among all women from 2011 to 2019, this increase has not been equal across levels of rurality.[31] For example, age-adjusted female breast cancer incidence increased by 5.1 points in metropolitan counties with >1 million population and in metropolitan counties with 250,000-1 million population, by 8.4 points in urban counties <250,000 population, by 10.3 points in urban counties with >20,000 population, by 6.7 points in urban counties of 2,500-19,999 population, and by 3.1 points in rural counties with <2,500 population.[31]

Improvements in cervical cancer incidence were limited to those residing in the most urban counties (metropolitan counties >1 million population) and the most rural counties (rural counties with <2,500 population), with declines of 0.3 points in both areas.[31] In contrast, cervical cancer incidence increased by 1.6 points in urban counties with 2,500-19,999 population. Much smaller increases in cervical cancer incidence were observed in metropolitan counties with 250,000-1 million population, metropolitan counties <250,000, and urban counties of >250,000.[31]

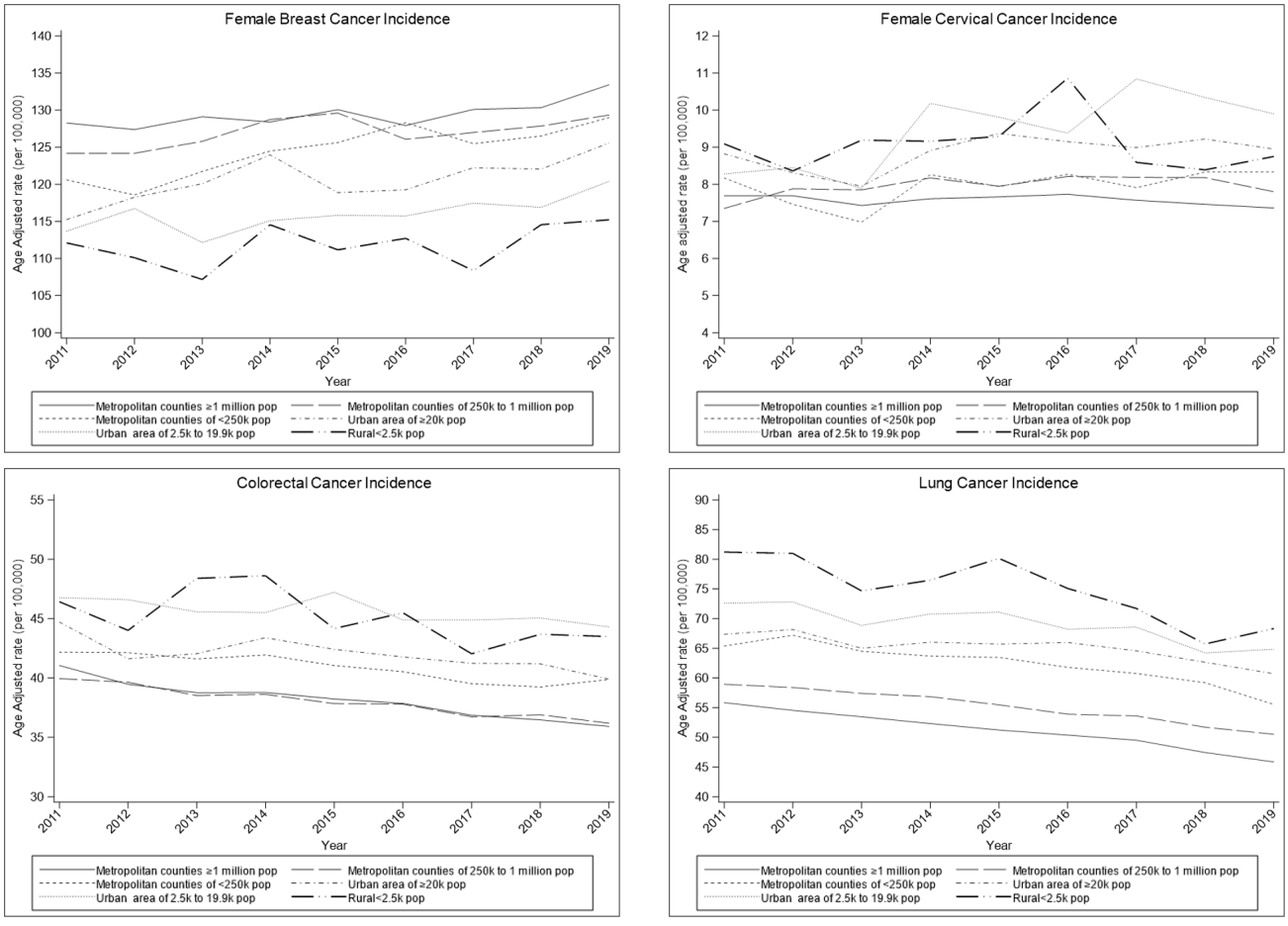
In contrast to breast and cervical cancer, the incidence of colorectal cancer has declined across all levels of rurality from 2011 to 2019. However, the decrease in incidence has not been equal across all rurality levels. For example, from 2011-2019 colorectal cancer incidence dropped by 5.2 and 3.7 points in metropolitan areas of >1 million population and metropolitan areas of 250,000-1 million population, respectively. Whereas, colorectal cancer incidence rates in urban counties of 2,500-19,999 population and rural counties with <2,500 population declined by 2.5 and 2.9 points, respectively.[31] Furthermore, urban-rural disparities in colorectal cancer persist.[31] As of 2019,

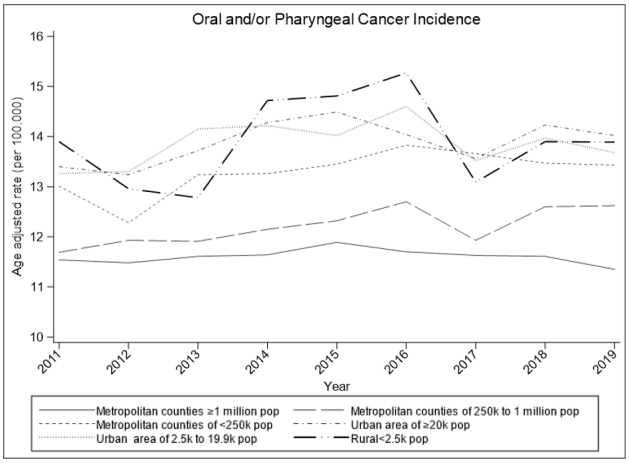
colorectal cancer incidence in metropolitan areas of >1 million population was 35.9 per 100,0000 population compared to 43.5 per 100,000 in rural counties with <2,500 population.[31]

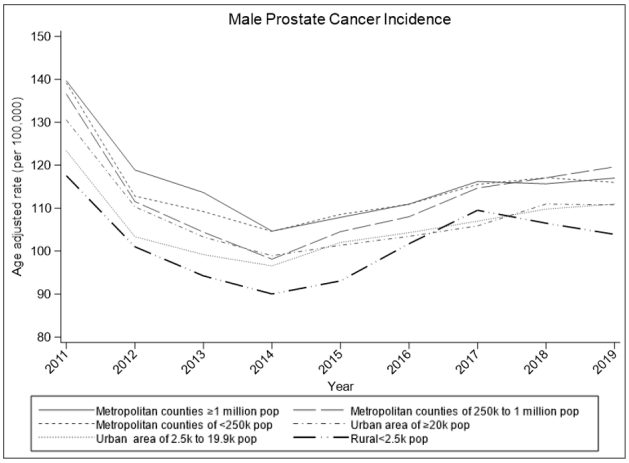
In addition to colorectal cancer, the incidence of lung cancer has also declined across all levels of rurality from 2011 to 2019.[31] Interestingly, unlike colorectal cancer, rural counties experienced the greatest improvement in lung cancer incidence over time.[31] For example, age-adjusted lung cancer incidence rates dropped by 12.9 points in rural counties, whereas a decline of 9.9 points was observed in metropolitan counties of >1 million population.[31] Unlike colorectal and lung cancer incidence, no such improvements were observed in incidence of oral/pharyngeal cancer.[31] The incidence of oral/pharyngeal cancer increased marginally over the last decade across all levels of rurality except in metropolitan counties with >1 million, which showed a slight decrease of 0.1 points (from 11.4 in 2011 to 11.3 in 2019).[31] Furthermore, urban-rural disparities in oral/pharyngeal cancer incidence were observed.[31] As of 2019, the age-adjusted incidence rate of oral/pharyngeal cancer was 13.8 per 100,000 population in rural counties with <2,500 population compared to 11.3 per 100,000 population in metropolitan areas of >1 million population.[31]

Similar to trends observed for colorectal cancer and lung incidence, the incidence of prostate cancer also declined across all levels of rurality from 2011 to 2019.[31] However, declines in prostate cancer incidence were larger in metropolitan areas compared to rural.[31] For example, prostate cancer incidence dropped by 22.9 points in metropolitan areas with >1 million population while rural counties with <2,500 population experienced a much smaller decrease of 13.1 points.[31] Despite showing slower declines, rural counties with <2,500 population had the lowest incidence of prostate cancer from 2011 to 2019.[31] In contrast, metropolitan areas had the highest prostate cancer incidence rates.[31] This higher incidence of prostate cancer in urban areas has been attributed to a greater proportion of the population being screened and earlier detection.[31]

**Figures 1.a. through 1.f. Cancer Incidence by Population area, 2011-2019 SEER Data[31]**






### 3.C. Secondary Prevention: Barriers in Access to Cancer Screening

Barriers to cancer screening exist at both the individual and system level. Examples of individual barriers include fear of cancer detection, distrust of the healthcare system, race/ethnicity, culture, socioeconomic status, employment status, lack of health insurance, and cost.[32,33] Systemic barriers include geographic location and limited access to healthcare and screening services.[32,33] These barriers vary demographically as well as regionally, an indication that it is crucial that strategies to improve cancer screening rates be culturally relevant.

***Breast Cancer.*** Breast cancer tends to be more common in urban areas rather than rural areas; however, this may be due to increased access to mammography in urban centers.[1] Individuals living in areas with higher Area Deprivation Index scores (ADI, a measure of social determinants of health), as well as those who live in more rural areas, were less likely to be screened for breast cancer.[34,35] Barriers to mammography were more often reported by rural dwellers when compared to their urban counterparts.[35] The barriers most often reported by rural dwellers were lack of insurance coverage or the cost of care; however, rural individuals also reported caregiving and other work-related responsibilities prevented them from receiving their mammogram.[35] Although breast cancer is most common in non-Hispanic Black women (32%),[36] this same population is also more likely to report barriers to mammography compared to White women.[35]

***Cervical Cancer.*** Higher ADI scores and living in a rural area were predictors for reduced cervical cancer screening rates.[34,37] Rural women were less likely to be screened through standard Papanicolaou (pap) smear and less likely to be screened for human papilloma virus (HPV).[37] Vaccination for HPV was lower in rural teen girls and boys versus their urban counterparts, and completion of the series of vaccinations was also lower for rural teens.[38] White women are more likely to have received HPV vaccines than non-Hispanic Black, Hispanic and Asian women.[39]

When surveyed in the health care setting, knowledge of the HPV vaccine was lower among American Indian women receiving care in a rural tribal clinic in comparison to a non-rural clinic serving primarily White women. A favorable attitude toward HPV vaccination depended upon knowledge of the vaccine among all women.[40]

In a large, longitudinal cohort of low-income and uninsured women, those who were older than 50 years, American Indian/Alaska Native, multiracial, living in nonmetropolitan areas, or living in the South or a territory were more likely to report being never or rarely screened for cervical cancer.[41] When screened, the incidence of an abnormal pap smear was highest in all of the aforementioned groups.[41]

Cervical cancer screening rates in 2020 among American Indian/Alaska Native women were below the national average of 73.5% (ranging between 57.1% - 65.0%) with the lowest rates among those women 50-64 years of age.[42] In the first year of the COVID-19 pandemic, American Indian/Alaska Native and Asian/Pacific Islander women had the greatest decline in cervical cancer screening.[43]

It has been reported that more than half of rural-dwelling women traveled 60 miles to reach an oncologist for gynecological cancer care compared to eight miles for their urban counterparts.[44]

Similarly, rural non-Hispanic Black women also had higher rates of regional and distant-stage cancers and were more likely at diagnosis to have an unknown stage of disease.[45]

***Colorectal Cancer.*** Uninsured individuals with colorectal cancer were more likely than insured individuals to have stage IV disease at diagnosis.[46] Access to paid sick leave and health insurance were positive predictors of colorectal screening while living in a higher ADI area and/or rural area was associated with reduced rates of colorectal screening.[34,47] Patient-reported barriers to colorectal screening include transportation, cost of screening, fear of colonoscopy procedure and lacking symptoms.[48]

Colorectal cancer is the fourth most commonly diagnosed cancer for non-Hispanic Black men and women.[1] Hispanic adults are less likely to be screened than White adults.[49] Rural American Indian/Alaska Native are more likely to travel a great distance for colorectal cancer care compared to urban dwellers.[44] Across many types of health systems, American Indian/Alaska Native people are less likely to have completed colorectal cancer screening when compared to non-Hispanic Whites.[50] In addition, the quality of colonoscopy screening in rural areas for American Indian/Alaska Native and other populations is lower, although there is variability across providers.[49] Both urban and rural American Indians/Alaska Natives have a significantly lower adherence to timely colon cancer screening compared to non-Hispanic Whites.[51-53]

***Lung Cancer.*** For both non-Hispanic Black men and women, lung is the third most common cancer.[6] In an urban setting, lung cancer screening appointments were more likely to be missed when individuals identified as Black or were insured by Medicaid.[54] In addition, those who reported housing insecurity were less likely to follow up after their initial exam.[54] Rural individuals were less likely to follow-up for annual screening after their initial screening.[55]

***Oral and Pharyngeal Cancers.*** While there is no standard recommended screening for oropharyngeal cancers, due to a lack of evidence on improved mortality, regular dental or physical exams that include visual oral exams may help diagnose cancers.[56] Accessibility to regular oral care is challenging as oral health insurance for adult Medicaid patients varies by state implementation and Medicare has limited coverage for some dental procedures.[57,58]

In the U.S., HPV is estimated to be the cause of nearly three of every four oropharyngeal cancer diagnoses.[59] As addressed above in the cervical cancer section, rural teens are less likely to receive HPV vaccines and less likely to complete the series of vaccinations.[38]

***Prostate Cancer.*** Similarly to breast cancer, prostate cancer tends to be more common in urban areas rather than rural areas; however, this may be due to increased screening in urban centers.[1] Prostate cancer is the most common cancer in non-Hispanic Black men (37%).[1] While prostate cancer is the most common cancer in Hispanic men, the rates of prostate cancer are lower than in non-Hispanic White men.[1] However, Hispanic men in Puerto Rico have significantly higher (70% higher) rates than Hispanic men living in the continental United States.[1]

**3.D. Mortality**

While the incidence of cancers in rural areas tends to be lower than, or at similar rates as, larger urban areas, cancer-related mortality rates are higher across all six cancers discussed in this chapter. The U.S. Black population is disproportionately impacted by both cancer incidence and mortality. Non-Hispanic Black adults have the highest mortality rates of all cancer sites combined in the U.S.[1,2] Prostate, breast, lung, and colorectal cancers have the highest mortality accounting for approximately 44% of all cancer deaths in non-Hispanic Black women and 50% in non-Hispanic Black males.[1,4-9] Please see **Figures 2a through 2f** for cancer mortality by population area from the 2011-2020 Centers for Disease Control and Prevention (CDC) Wide-ranging ONline Data for Epidemiologic Research (WONDER) data.[60] The CDC Wonder mortality data defines rurality using the 2013 National Center for Health

Statistics urban-rural classification scheme which includes six levels (i.e., large central metro, large fringe metro, medium metro, small metro, micropolitan, noncore).

Evidence over the past decade reveals important differences in cancer mortality trends across both types of cancer and across levels of rurality. In the case of breast cancer, data from the CDC WONDER database shows that cancer mortality has declined across all levels of rurality over the past decade. Importantly, however, improvements in mortality have not been consistent across levels of rurality. While the age-adjusted mortality rate dropped by 3.6 points in large central metropolitan areas, it has only dropped by 1.7 points from 2011-2020 in rural noncore areas, suggesting that mortality gains have been more modest in rural communities.[60]

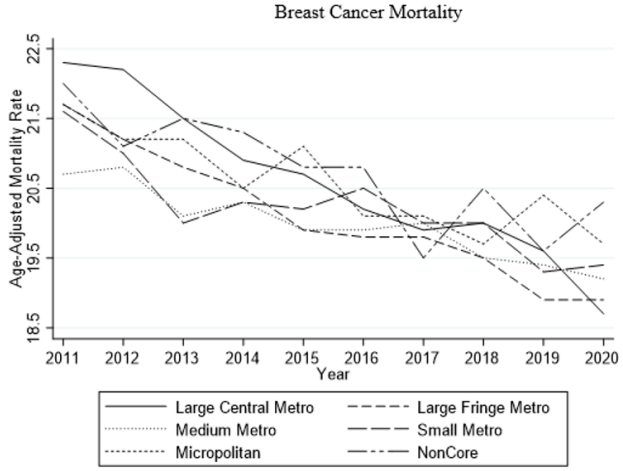
Even as improvements have been seen in breast cancer, these consistent improvements have not been seen in other areas like cervical cancer. For cervical cancer, improvements in mortality were seen between 2011-2020 in large central metropolitan, small metropolitan, and noncore areas but not in large fringe metropolitan, medium metropolitan, or micropolitan areas. In fact, cervical cancer mortality rates have increased in micropolitan areas and even in areas where improvements in mortality have been seen, those improvements have been quite small, never surpassing a drop in the age-adjusted mortality rate by more than 0.3.[60]

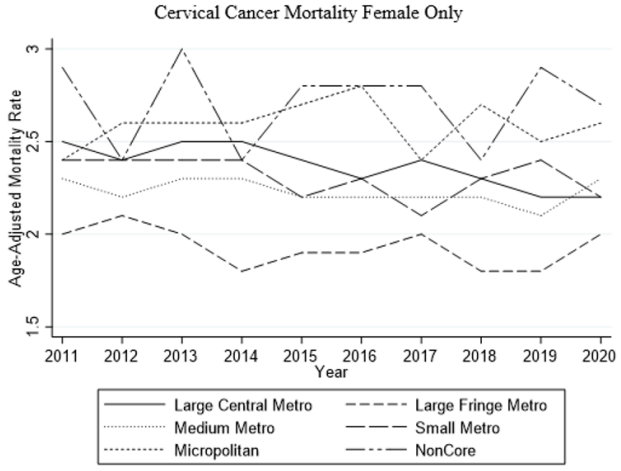
In stark comparison, massive improvements in mortality rates have been seen for lung cancer. For example, age-adjusted mortality rates have dropped by 14.4 points in large central metropolitan areas, by 14.5 points in large fringe metropolitan areas, by 13.5 points in micropolitan areas, and by 13.1 points in noncore areas. Critically however, consistent disparities in mortality rates for lung cancer remain between urban and rural areas. By 2020, the age-adjusted mortality rate for lung cancer was only 26.4 in large central metropolitan areas and increased steadily across levels of rurality, reaching a peak of 41.9 in rural noncore communities. These results suggest that while important strides in lung cancer mortality have been seen, disparities across levels of rurality in outcomes that were observed at the start of the last decade, remained by 2020.[60]

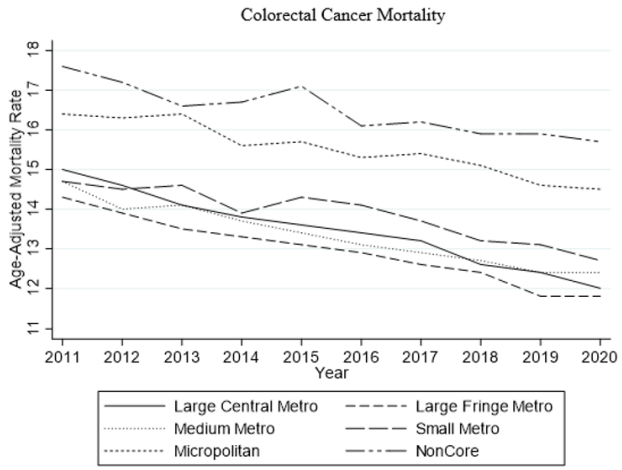
While important reductions in mortality rates have been seen for lung cancer, oral cancer has not seen similar improvement. Instead, oral cancer rates did not decline across any level of rurality from 2011-2020. In fact, oral cancer rates increased marginally over the last decade across all levels of rurality except in large central metropolitan areas. Equally troubling, rural-urban disparities exist for oral cancer. While the age-adjusted mortality rate was 2.4 in large central metropolitan areas and 2.3 in large fringe metropolitan areas in 2020, it was 3 in micropolitan areas and 3.2 in rural noncore communities.[60]

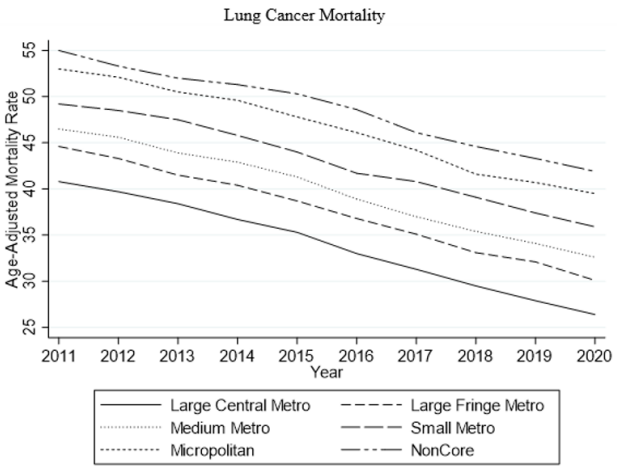
Finally, when examining prostate cancer mortality using CDC WONDER data, we see evidence that prostate cancer mortality declined across all levels of rurality from 2011-2020. Notably however, rural-

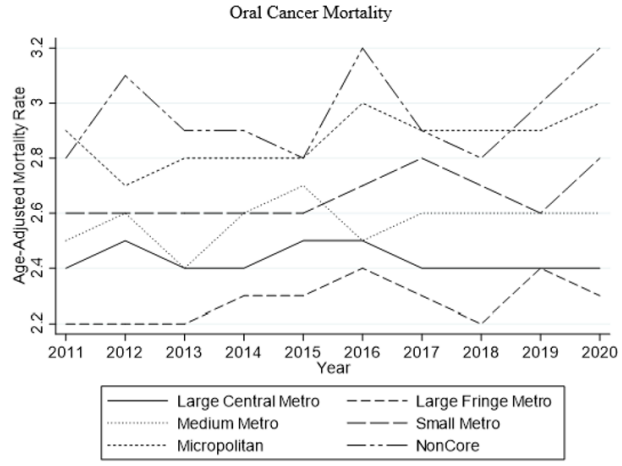
**Figures 2.a. through 2.f. Cancer Mortality by Population area, 2011-2020 CDC WONDER Data[60]**

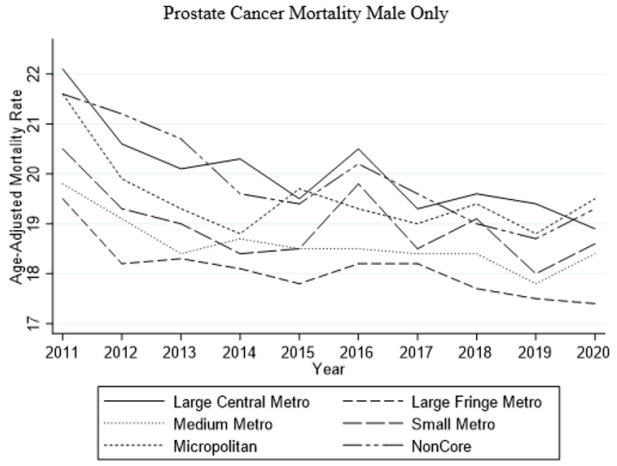





urban disparities in prostate cancer mortality persist. Mortality rates are lowest in large central and large fringe metropolitan areas and highest in micropolitan and noncore areas. In addition, while mortality rates have dropped across levels of rurality, declines in mortality have been larger in large central metropolitan areas than in noncore areas.[60]

### 3.E. Tertiary Prevention: Disparities in Access to Cancer Control: Treatment/Survivorship

Over the past decade most cancer care has moved to the outpatient setting. However, as costs of outpatient and prescription medications increase, cost-related medication adherence increases with the bulk of expenditures coming from outpatient treatment.[61] Increasing out-of-pocket costs of care have led to reduced adherence to medications for both rural and urban cancer survivors.[61] Regardless of where a person resides, non-Hispanic Black survivors and survivors with multiple comorbidities were more likely to experience cost-related medication nonadherence.[61]

Per a survey of Medicare recipients, rural non-Hispanic Black and Hispanic survivors of breast, colorectal, lung, and prostate cancer reported lower ratings for accessing needed care versus their rural White counterparts.[62] Rural White Medicare recipient survivors of breast, colorectal, lung and prostate cancer were more likely to report they received care quickly and accessed needed care than urban White cancer survivors.[62] Rural Medicare recipients who identified as non-Hispanic Asian/Pacific Islanders also reported higher ratings for receiving care quickly versus their urban counterparts; however, it was not a statistically significant difference.[62]

Disparities in cancer control services continue to exist and persist in rural areas. Rural non-Hispanic Blacks have decreased/shorter survival rates for breast, lung, and colorectal cancer.[17] Similarly, rural non-Hispanic Black women also had higher rates of regional and distant stage cancers and were more likely at diagnosis to have an unknown stage of disease.[45] These increased cancer rates may be attributed to an increase in

cancer-related behavior and conditions such as smoking, excessive weight, alcohol consumption, poor diet, and poor physical activity. The lack of health-promoting behaviors creates an increased risk for cancer.[1]

For non-Hispanic Black adults, barriers such as inadequate access to and availability of health care services, lack of knowledge of cancer prevention and screening recommendations, culturally inappropriate or insensitive cancer control care and services, low health literacy, access to technology, and historically rooted medical distrust all impact the association between race and cancer mortality.[63-68] Social and built environments are other factors that contribute to disparate cancer outcomes. Neighborhood characteristics such as socioeconomic status, educational attainment, residential segregation, availability of fresh food, and public services intersect with cancer health disparities.[1,2,69] One additional risk factor that is unique to the non-Hispanic Black population is psychological stress, particularly in breast cancer.[1,70] The compounding factors, along with persistent poverty in rural areas, are the catalyst for the increase in cancer-related mortality in at-risk populations and rural populations. Systemic barriers in cancer care exist including limited access to rural cancer providers, lack of integration of care between cancer providers and primary care, and a paucity of connections between cancer centers and primary care providers.[71]

***Breast Cancer.*** While disparities in breast cancer mortality are improving,[1] they are still prevalent due to treatment-related barriers especially in certain populations.[72-75] Non-Hispanic Black women were more likely to have delays in receiving breast cancer treatments (hormone therapy, chemotherapy, surgery, and radiation) compared to White women and rural non-Hispanic Black women were more likely to have chemotherapy delayed versus rural White women.[72-75]

***Cervical Cancer.*** In the U.S., Black, American Indian/Alaska Native and Hispanic women are more likely to die from cervical cancer than White or Asian/Pacific Islander women.[76] Non-Hispanic Black women, the group with the highest mortality rates, are one and a half times more likely to die from cervical cancer than White women.[76] Cervical cancer mortality rates are lowest for Asian/Pacific Islander women, who are the only group with lower mortality rates than White women.[76] Hispanic women and non-Hispanic Black women are more likely to be diagnosed with cervical cancer at an advanced stage and at older ages than White women.[77] A large disparity exists with Black women having lower five-year survival rates than all other ethnicities.[76]

***Colorectal Cancer.*** Research on access to surgery has had varied results. In one study, insured rural and non-Hispanic Black individuals were less likely to receive surgery for colorectal cancer.[46] However, in an alternate study, rural Medicare patients had surgery sooner than their urban counterparts and traveled an average of 32.2 miles, primarily having surgery in a metropolitan area.[78] In the Medicare study, surgeries were more likely to be emergent and more invasive than the surgeries their urban counterparts experienced.[78] When rural non-Hispanic Black individuals were able to have surgery they were more likely to experience postoperative mortality when compared to urban dwelling non-Hispanic Black individuals; whereas, rural White individuals were less likely to experience postoperative mortality when compared to urban dwelling White individuals.[78] Non-Hispanic Black and Hispanic Medicare patients were more likely to live in a higher ADI area than White Medicare patients.[78]

***Lung Cancer.*** Uninsured individuals with lung cancer were more likely to have stage IV disease at diagnosis and were less likely to have surgery for lung cancer.[46] This may be due to late-stage disease at diagnosis as surgery is generally recommended as treatment for early-stage lung cancer.[79] Rural individuals are more likely to be uninsured which puts them at risk for late-stage disease. Rural patients, Black patients and patients receiving Medicaid were less likely to receive surgery from a specialist (i.e. a thoracic surgeon).[46]

***Oral and Pharyngeal Cancers.*** Rural patients with HPV-positive oropharyngeal cancers have poorer survival rates when compared to urban patients with HPV-positive cancer.[80]

***Prostate Cancer.*** A greater than 90-day treatment delay in receiving prostate cancer treatment was

more likely to occur in Black individuals rather than White individuals.[81] Delays were also more common for individuals with early-stage disease, those not requiring surgery and younger patients (18- to 54-year-olds) however rural patients were more likely to receive timely treatment.[81]

## 4. HEALTH CARE EXPANSION AND IMPACT ON POLICY

Enacted in 2010, the Patient Protection and Affordable Care Act (ACA) aimed to increase insurance coverage and improve access to care through several mechanisms, including the expansion of Medicaid eligibility, extending dependent coverage to young adults until age 26, and establishment of the Health Insurance Marketplace.[82-84] The policy also required all insurers to provide coverage for preventive care services (including cancer screenings) with no cost-sharing.[82,83] The ACA also included a *$15 billion* investment into proven prevention and public health programs such as smoking cessation and obesity treatment.[85]

Medicaid expansion started in January of 2014 with 24 states adopting and implementing the expansion immediately.[86] Since 2014, Medicaid expansion has continued to be adopted and as of January 2023, of the 39 states who have adopted expansion, 38 have implemented and the remaining state will implement in July 2023. While expansion has been adopted in many states with rural populations, many of the states who have not expanded Medicaid have significant rural populations.[86]

Extensive evidence suggests that the ACA improved insurance coverage and increased access to care for millions of Americans, including rural residents.[87-90] Other studies have found the ACA to be associated with increased mammography, cervical, and colorectal cancer screening in the general population.[91-93] Evidence also suggests that the ACA increased early stage diagnosis for lung, ovarian, colon, and breast cancers, likely as a result of improved access to screening services.[89,90,94,95] Although the positive effects of the ACA on healthcare access and outcomes are well documented, the majority of research is focused on the general population, and very few have examined policy impacts among rural residents.[96-98] It is possible that the ACA may not have impacted individuals living in rural areas to the same extent as those in urban areas, because access to health services in rural areas are limited due to geographic isolation, provider shortages, high rates of uninsurance, and economic stagnation. Thus, more work is needed to better understand if the ACA has impacted rural and urban populations equally.

## 5. PROVEN SOLUTIONS OR INTERVENTIONS

Several interventions/solutions have been shown to increase cancer screening. Individuals are more likely to receive colorectal screening if they have regular access to their health care provider and have spoken to their provider about their risk factors.[47,48] They are also more likely to know their family health history when they regularly see their provider.[99] Evidence shows that nurse practitioners, working in medically underserved and rural areas where there are few physicians, can provide quality, cost-effective care particularly cancer screening and prevention.[100] In addition, community health workers (CHWs) are able to address several critical barriers to cancer screening, while providing culturally relevant education and navigation, resulting in increased screening rates.[101,102] A simple, low-cost text messaging intervention for American Indian/Alaska Native people demonstrated improved colorectal cancer screening rates.[103]

Cancer control strategies from treatment through survivorship are being piloted across the nation. To improve cancer care in rural communities, National Cancer Institute-designated cancer centers can provide support with accreditation of rural community hospitals.[104] A pilot study of a survivorship CHW education intervention was shown to be feasible and may benefit survivors complex care needs and those with low health literacy.[105]

## 6. SUMMARY AND CONCLUSIONS

Rural cancer health disparities persist in the U.S. Barriers exist across the cancer continuum from primary prevention to cancer screening and cancer control. As cancer costs continue to grow, effective primary prevention should target interventions to

reduce pollution and toxins, obesity, smoking and alcohol disparities. Continued implementation and development of secondary prevention screening strategies that improve access to providers and screening services are needed. Tertiary cancer control interventions need to be created and piloted for rural communities. Rather than a small subset of states, all fifty states need rural-specific cancer strategies in their comprehensive cancer control plans.

## REFERENCES


1. American Association for Cancer Research. *Cancer Disparities Progress Report.* 2022. Accessed April 5, 2023. http://www.CancerDisparitiesProgressReport.org/

2. Moore JX, Tingen MS, Coughlin SS, et al. Understanding geographic and racial/ethnic disparities in mortality from four major cancers in the state of Georgia: a spatial epidemiologic analysis, 1999–2019. *Sci Rep.* 2022;12(1). doi:10.1038/s41598-022-18374-7

3. Yaemsiri S, Alfier JM, Moy E, et al. Healthy People 2020: Rural areas lag in achieving targets for major causes of death. *Health Aff (Millwood).* 2019;38(12):2027-2031. doi:10.1377/hlthaff.2019.00915

4. Rural-Urban Disparities in Cancer. National Cancer Institute GIS Portal for Cancer Research. Accessed March 10, 2023. https://gis.cancer.gov/mapstory/rural-urban/index.html

5. U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute. Accessed April 5, 2023. https://www.cdc.gov/cancer/dataviz, released in November 2022.

6. Murphy C, Evans S, Askelson N, Eberth JM, Zahnd WE. Extent of inclusion of "rural" in comprehensive cancer control plans in the United States. *Prev Chronic Dis.* 2021;18:E86. Published 2021 Sep 2. doi:10.5888/pcd18.210091

7. Kirkwood MK, Bruinooge SS, Goldstein MA, Bajorin DF, Kosty MP. Enhancing the American Society of Clinical Oncology workforce information system with geographic distribution of oncologists and comparison of data sources for the number of practicing oncologists. *J Oncol Pract.* 2014;10(1):32-38. doi:10.1200/JOP.2013.001311

8. Levit LA, Byatt L, Lyss AP, et al. Closing the rural cancer care gap: three institutional approaches. *JCO Oncol Pract.* 2020;16(7):422-430. doi:10.1200/OP.20.00174

9. Office of Disease Prevention and Health Promotion, Office of the Assistant Secretary for Health, Office of the Secretary, U.S. Department of Health and Human Services. Cancer. Cancer - Healthy People 2030. Accessed March 10, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/cancer

10. Xu J, Murphy SL, Kochanek KD, Arias E. Mortality in the United States, 2018. NCHS Data Brief, no 355/ Hyattsville, MD: National Center for Health Statistics. 2020. Accessed April 8, 2023. https://www.cdc.gov/nchs/products/databriefs/db355.htm

11. Callaghan T, Kassabian M, Johnson N, et al. Rural Healthy People 2030: new decade, new challenges. *Prev Med Rep.* 2023;33:102176. doi:10.1016/j.pmedr.2023.102176

12. Bolin JN, Bellamy GR, Ferdinand AO, et al. Rural Healthy People 2020: new decade, same challenges. *J Rural Health.* 2015;31(3):326-333. doi:10.1111/jrh.12116

13. Ojinnaka C, Bolin J, Nash P, Ory M, McClellan D. Cancer in Rural America. Chapter 11 in: Bolin JN, Bellamy G, Ferdinand AO, Kash BA, Helduser JW, eds. *Rural Healthy People 2020.* Vol. 2. College Station, TX: Texas A&M University Health Science Center, School of Public Health, Southwest Rural Health Research Center; 2015:1-14.

14. Division of Cancer Prevention and Control, Centers for Disease Control and Prevention. National Comprehensive Cancer Control Program: Program Priorities: Emphasizing primary prevention of cancer. Updated July 30, 2021. Accessed March 1, 2023. https://www.cdc.gov/cancer/ncccp/priorities/primary-prevention.htm

15. Division of Cancer Prevention and Control, Centers for Disease Control and Prevention. National Comprehensive Cancer Control Program: Program Priorities: Promoting Early Detection and Treatment of Cancer. Updated July 30, 2021. Accessed March 3, 2023. https://www.cdc.gov/cancer/ncccp/priorities/early-detection-treatment.htm

16. Outwater AH, Sebalda C, Leshabari EN. Disease Prevention: An Overview, Editor(s): Stella R. Quah, International Encyclopedia of Public Health (Second Edition), Academic Press, 2017, Pages 338-349, https://doi.org/10.1016/B978-0-12-803678-5.00117-X

17. Zahnd WE, Murphy C, Knoll M, et al. The intersection of rural residence and minority race/ethnicity in cancer disparities in the United States. *Int J Environ Res Public Health*. 2021;18(4):1384. doi:10.3390/ijerph18041384

18. NTP (National Toxicology Program). 2021. Report on Carcinogens, Fifteenth Edition. Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service. Accessed March 2, 2023. https://ntp.niehs.nih.gov/go/roc15 doi:10.22427/NTP-OTHER-1003

19. International Agency for Research on Cancer, World Health Organization. List of classifications by cancer sites with sufficient or limited evidence in humans, IARC Monographs Volumes 1–133. Updated 2022. Accessed March 2, 2023. https://monographs.iarc.who.int/wp-content/uploads/2019/07/Classifications_by_cancer_site.pdf

20. Doede MS. Black Jobs Matter: Racial inequalities in conditions of employment and subsequent health outcomes. *Public Health Nurs*. 2016;33(2):151-158. doi:10.1111/phn.12241

21. Soto AM, Sonnenschein C. Environmental causes of cancer: endocrine disruptors as carcinogens. *Nat Rev Endocrinol*. 2010;6(7):363-370. doi:10.1038/nrendo.2010.87

22. Centers for Disease Control and Prevention, U.S. Department of Health & Human Services, National Center for Chronic Disease Prevention and Health Promotion. Cancer. Cancer - Healthy People 2030. Accessed March 10, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/cancer

23. Okobi OE, Ajayi OO, Okobi TJ, et al. The burden of obesity in the rural adult population of America. *Cureus*. 2021;13(6):e15770. June 20, 2021. doi:10.7759/cureus.15770

24. Tomayko EJ, Mosso KL, Cronin KA, et al. Household food insecurity and dietary patterns in rural and urban American Indian families with young children. *BMC Public Health*. 2017;17(1):611. June 30, 2017. doi:10.1186/s12889-017-4498-y

25. Valdez Z, Ramírez AS, Estrada E, Grassi K, Nathan S. Community perspectives on access to and availability of healthy food in rural, low-resource, Latino communities. *Prev Chronic Dis*. 2016;13:E170. December 15, 2016. doi:10.5888/pcd13.160250

26. Cohen SA, Greaney ML, Sabik NJ. Assessment of dietary patterns, physical activity and obesity from a national survey: Rural-urban health disparities in older adults. *PLoS One*. 2018;13(12):e0208268. December 5, 2018. doi:10.1371/journal.pone.0208268

27. Doogan NJ, Roberts ME, Wewers ME, et al. A growing geographic disparity: Rural and urban cigarette smoking trends in the United States. *Prev Med*. 2017;104:79-85. doi:10.1016/j.ypmed.2017.03.011

28. Parker MA, Weinberger AH, Eggers EM, Parker ES, Villanti AC. Trends in rural and urban cigarette smoking quit ratios in the US from 2010 to 2020. *JAMA Netw Open*. 2022;5(8):e2225326. August 1, 2022. doi:10.1001/jamanetworkopen.2022.25326

29. Atkins GT, Kim T, Munson J. Residence in rural areas of the United States and lung cancer mortality. Disease incidence, treatment disparities, and stage-specific survival. *Ann Am Thorac Soc*. 2017;14(3):403-411. doi:10.1513/AnnalsATS.201606-469OC

30. Pro G, Gilbert PA, Baldwin JA, Brown CC, Young S, Zaller N. Multilevel modeling of county-level excessive alcohol use, rurality, and COVID-19 case fatality rates in the US. *PLoS*

*One*. 2021;16(6):e0253466. Published 2021 Jun 17. doi:10.1371/journal.pone.0253466

31. Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov) SEER*Stat Database: Incidence - SEER Research Data, 8 Registries, Nov 2021 Sub (1975-2019) - Linked To County Attributes - Time Dependent (1990-2019) Income/Rurality, 1969-2020 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, released April 2022, based on the November 2021 submission.

32. Benavidez GA, Zgodic A, Zahnd WE, Eberth JM. Disparities in meeting USPSTF breast, cervical, and colorectal cancer screening guidelines among women in the United States. *Prev Chronic Dis*. 2021;18:E37. April 15, 2021. doi:10.5888/pcd18.200315

33. Ferreira CS, Rodrigues J, Moreira S, Ribeiro F, Longatto-Filho A. Breast cancer screening adherence rates and barriers of implementation in ethnic, cultural and religious minorities: A systematic review. *Mol Clin Oncol*. 2021;15(1):139. doi:10.3892/mco.2021.2301

34. Kurani SS, McCoy RG, Lampman MA, et al. Association of neighborhood measures of social determinants of health with breast, cervical, and colorectal cancer screening rates in the US Midwest. *JAMA Network Open*. 2020;3(3):e200618. Published 2020 Mar 2. doi:10.1001/jamanetworkopen.2020.0618

35. Henderson LM, O'Meara ES, Haas JS, et al. The role of social determinants of health in self-reported access to health care among women undergoing screening mammography. *J Womens Health (Larchmt)*. 2020;29(11):1437-1446. doi:10.1089/jwh.2019.8267

36. AACR Cancer Disparities Progress Report. Cancer Progress Report. June 9, 2022. Accessed March 13, 2023. https://cancerprogressreport.aacr.org/disparities/

37. Locklar LRB, Do DP. Rural-urban differences in HPV testing for cervical cancer screening. *J Rural Health*. 2022;38(2):409-415. doi:10.1111/jrh.12615

38. Swiecki-Sikora AL, Henry KA, Kepka D. HPV vaccination coverage among US teens across the rural-urban continuum. *J Rural Health*. 2019;35(4):506-517. doi:10.1111/jrh.12353

39. McElfish PA, Narcisse MR, Felix HC, et al. Race, nativity, and sex disparities in human papillomavirus vaccination among young adults in the USA. *J Racial Ethn Health Disparities*. 2021;8(5):1260-1266. doi:10.1007/s40615-020-00886-5

40. Buchwald D, Muller C, Bell M, Schmidt-Grimminger D. Attitudes toward HPV vaccination among rural American Indian women and urban White women in the northern plains. *Health Educ Behav*. 2013;40(6): 704-711. doi:10.1177/1090198113477111

41. Benard VB, Royalty J, Saraiya M, Rockwell T, Helsel W. The effectiveness of targeting never or rarely screened women in a national cervical cancer screening program for underserved women. *Cancer Causes Control*. 2015;26(5):713-719. doi:10.1007/s10552-015-0542-3

42. Bruegl AS, Emerson J, Tirumala. Persistent disparities of cervical cancer among American Indians/Alaska natives: Are we maximizing prevention tools? *Gynecol Oncol*. 2023;168:56-61. doi:10.1016/j.ygyno.2022.11.007

43. DeGroff A, Miller J, Sharma K, et al. COVID-19 impact on screening test volume through the National Breast and Cervical Cancer early detection program, January-June 2020, in the United States. *Prev Med*. 2021;151:106559. doi:10.1016/j.ypmed.2021.106559

44. Hung P, Deng S, Zahnd WE, et al. Geographic disparities in residential proximity to colorectal and cervical cancer care providers. *Cancer*. 2020;126(5):1068-1076. doi:10.1002/cncr.32594

45. Bowen D, Fernandez Poole S, White M, et al. The role of stress in breast cancer incidence: risk factors, interventions, and directions for the future. *Int J Environ Res Public Health*. 2021;18(4):1871. doi:10.3390/ijerph18041871

46. Leech MM, Weiss JE, Markey C, Loehrer AP. Influence of race, insurance, rurality, and socioeconomic status on equity of lung and colorectal cancer care. *Ann Surg Oncol*.

2022;29(6):3630-3639. doi:10.1245/s10434-021-11160-1

47. Mitchell JA, Watkins DC, Modlin CS Jr. Social determinants associated with colorectal cancer screening in an urban community sample of African-American men. *J Mens Health*. 2013;10(1):14-21. doi:10.1016/j.jomh.2012.09.003

48. Zoellner J, Porter K, Thatcher E, et al. A multilevel approach to understand the context and potential solutions for low colorectal cancer (CRC) screening rates in rural Appalachia clinics. *J Rural Health*. 2021;37(3):585-601. doi:10.1111/jrh.12522

49. Centers for Disease Control and Prevention 2021. Health United States, 2019. Table 35. Accessed March 2, 2023. https://www.cdc.gov/nchs/data/hus/hus19-508.pdf

50. Burnett-Hartman AN, Mehta SJ, Zheng Y, et al. Racial/ethnic disparities in colorectal cancer screening across healthcare systems. *Am J Prev Med*. 2016;51(4):e107-e115. doi:10.1016/j.amepre.2016.02.025

51. Reif de Paula T, Haas EM, Keller DS. Colorectal cancer in the 45-to-50 age group in the United States: a National Cancer Database (NCDB) analysis. *Surg Endosc*. 2022;36(9):6629-6637. doi:10.1007/s00464-021-08929-6

52. Cole AM, Jackson JE, Doescher M. (2013). Colorectal cancer screening disparities for rural minorities in the United States. *J Prim Care Community Health*. 2013;4(2):106-111. doi:2150131912463244

53. Johnson-Jennings MD, Tarraf W, Hill KX, Gonzalez HM. United States colorectal cancer screening practices among American Indians/Alaska Natives, Blacks, and Non-Hispanic Whites in the new millennium (2001 to 2010). *Cancer*. 2014;120(20):3192-3199. doi:10.1002/cncr.28855

54. Shin D, Fishman MDC, Ngo M, Wang J, LeBedis CA. The impact of social determinants of health on lung cancer screening utilization. *J Am Coll Radiol*. 2022;19(1 Pt B):122-130. doi:10.1016/j.jacr.2021.08.026

55. Bodily B, Ashurst J, Fredriksen J, et al. Results of lung cancer screening in a rural setting: a retrospective cohort study. *Cureus*. 2022;14(3):e23299. doi:10.7759/cureus.23299

56. Warnakulasuriya S, Kerr AR. Oral cancer screening: past, present, and future. *J Dent Res*. 2021;100(12):1313-1320. doi:10.1177/00220345211014795

57. Centers for Medicare and Medicaid Services. Dental care. Medicaid.gov. Accessed March 3, 2023. https://www.medicaid.gov/medicaid/benefits/dental-care/index.html

58. Centers for Medicare and Medicaid Services. Dental services. Medicare.gov.Accessed March 3, 2023. https://www.medicare.gov/coverage/dental-services

59. HPV and Oropharyngeal Cancer. Centers for Disease Control and Prevention. October 3, 2022. Accessed March 10, 2023. https://www.cdc.gov/cancer/hpv/basic_info/hpv_oropharyngeal.htm

60. Centers for Disease Control and Prevention, National Center for Health Statistics. National Vital Statistics System, Mortality 1999-2020 on CDC WONDER Online Database, released in 2021. Data are from the Multiple Cause of Death Files, 1999-2020, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at http://wonder.cdc.gov/ucd-icd10.html on Nov 21, 2022

61. Williams CP, Davidoff A, Halpern MT, et al. Cost-related medication nonadherence and patient cost responsibility for rural and urban cancer survivors. *JCO Oncol Pract*. 2022;18(8):e1234-e1246. doi:10.1200/OP.21.00875

62. Mollica MA, Weaver KE, McNeel TS, Kent EE. Examining urban and rural differences in perceived timeliness of care among cancer patients: A SEER-CAHPS study. *Cancer*. 2018;124(15):3257-3265. doi:10.1002/cncr.31541

63. Adams LB, Richmond J, Corbie-Smith G, Powell W. Medical mistrust and colorectal cancer screening among African Americans. *J Community Health*. 2017;42(5):1044-1061. doi:10.1007/s10900-017-0339-2

64. Bazargan M, Cobb S, Assari S. Discrimination and medical mistrust in a racially and ethnically diverse sample of California adults. *Ann Fam Med*. 2021;19(1):4-15. doi:10.1370/afm.2632

65. Benkert R, Cuevas A, Thompson HS, Dove-Medows E, Knuckles D. Ubiquitous yet unclear: a systematic review of medical mistrust. *Behav Med*. 2019;45(2):86-101. doi:10.1080/08964289.2019.1588220

66. Benkert R, Peters RM, Clark R, Keves-Foster K. Effects of perceived racism, cultural mistrust and trust in providers on satisfaction with care. *J Natl Med Assoc*. 2006;98(9):1532-1540.

67. Coughlin SS. Social determinants of breast cancer risk, stage, and survival. *Breast Cancer Res Treat*. 2019;177(3):537-548. doi:10.1007/s10549-019-05340-7

68. Washington A, Randall J. "We're Not Taken Seriously": describing the experiences of perceived discrimination in medical settings for Black women. *J Racial Ethn Health Disparities*. 2023;10(2):883-891. doi:10.1007/s40615-022-01276-9

69. Zahnd WE, Murphy C, Knoll M, et al. The intersection of rural residence and minority ace/ethnicity in cancer disparities in the United States. *Int J Environ Res Public Health*. 2021;18(4):1384. doi:10.3390/ijerph18041384

70. Bowen DJ, Fernandez Poole S, White M, et al. The role of stress in breast cancer incidence: risk factors, interventions, and directions for the future. *Int J Environ Res Public Health*. 2021;18(4):1871. doi:10.3390/ijerph18041871

71. Crabtree-Ide C, Sevdalis N, Bellohusen P, et al. Strategies for improving access to cancer services in rural communities: a pre-implementation study. *Front Health Serv*. 2022;2:818519. doi:10.3389/frhs.2022.818519

72. Babatunde OA, Eberth JM, Felder TM, et al. Racial disparities and diagnosis-to-treatment time among patients diagnosed with breast cancer in South Carolina. *J Racial Ethn Health Disparities*. 2022 Feb;9(1):124-134. doi:10.1007/s40615-020-00935-z

73. George P, Chandwani S, Gabel M, et al. Diagnosis and surgical delays in African American and white women with early-stage breast cancer. *J Women's Health (Larchmt)*. 2015;24(3):209-217. doi:10.1089/jwh.2014.4773

74. Liederbach E, Sisco M, Wang C, et al. Wait times for breast surgical operations, 2003-2011: a report from the National Cancer Data Base. *Ann Surg Oncol*. 2015;22(3):899-907. doi:10.1245/s10434-014-4086-7

75. Sheppard VB, Oppong BA, Hampton R, et al. Disparities in breast cancer surgery delay: the lingering effect of race. *Ann Surg Oncol*. 2015;22(9):2902–2911. doi:10.1245/s10434-015-4397-3

76. Cohen CM, Wentzensen N, Castle PE, et al. Racial and ethnic disparities in cervical cancer incidence, survival, and mortality by histologic subtype. *J Clin Oncol*. 2023;41(5):1059-1068. doi:10.1200/JCO.22.01424

77. Yu L, Sabatino SA, White MC. Rural-urban and racial/ethnic disparities in invasive cervical cancer incidence in the United States, 2010-2014. *Prev Chronic Dis*. 2019;16:E70. doi:10.5888/pcd16.180447

78. Ramkumar N, Colla CH, Wang Q, O'Malley AJ, Wong SL, Brooks GA. Association of rurality, race and ethnicity, and socioeconomic status with the surgical management of colon cancer and postoperative outcomes among Medicare beneficiaries. *JAMA Netw Open*. 2022;5(8):e2229247. doi:10.1001/jamanetworkopen.2022.29247

79. National Comprehensive Cancer Network. (2023). Non-Small Cell Lung Cancer (version 1.2023). Accessed January 18, 2023. https://www.nccn.org/professionals/physician_gls/pdf/nscl.pdf

80. Marks JA, Switchenko JM, Steuer CE, et al. Socioeconomic factors influence the impact of tumor HPV status on outcome of patients with oropharyngeal squamous cell carcinoma. *JCO Oncol Pract*. 2021;17(3):e313-e322. doi:10.1200/OP.20.00671

81. Montiel Ishino FA, Odame EA, Villalobos K, et al. Sociodemographic and geographic

disparities of prostate cancer treatment delay in Tennessee: a population-based study. *Am J Mens Health*. 2021;15(6):15579883211057990. doi:10.1177/15579883211057990

82. Zhao J, Mao Z, Fedewa SA, et al. The Affordable Care Act and access to care across the cancer control continuum: a review at 10 years. *CA Cancer J Clin*. 2020;70(3):165-81. doi:10.3322/caac.21604

83. Moss HA, Wu J, Kaplan SJ, Zafar SY. The Affordable Care Act's Medicaid expansion and impact along the cancer-care continuum: a systematic review. *J Natl Cancer Inst*. 2020;112(8):779-791. doi: 10.1093/jnci/djaa043

84. Moy B, Polite BN, Halpern MT, et al. American Society of Clinical Oncology policy statement: opportunities in the patient protection and affordable care act to reduce cancer care disparities. *J Clin Oncol*. 2011;29(28):3816-3824. doi:10.1200/JCO.2011.35.8903

85. Leopold C, Park ER, Nekhlyudov L. The impact of the Affordable Care Act on cancer survivorship. *Cancer J*. 2017;23(3):181-189. doi:10.1097/PPO.0000000000000263

86. Status of State Medicaid Expansion Decisions: Interactive Map. Kaiser Family Foundation. May 8, 2023. Accessed March 15, 2023. https://www.kff.org/medicaid/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map/

87. Agarwal A, Katz AJ, Chen RC. The Impact of the Affordable Care Act on Disparities in Private and Medicaid Insurance Coverage Among Patients Under 65 With Newly Diagnosed Cancer. *Int J Radiat Oncol Biol Phys*. 2019;105(1):25-30. doi:10.1016/j.ijrobp.2019.05.033

88. Courtemanche C, Marton J, Ukert B, Yelowitz A, Zapata D. Early impacts of the Affordable Care Act on health insurance coverage in Medicaid expansion and non-expansion states. *J Policy Anal Manage*. 2017;36(1):178-210. doi: 10.1002/pam.21961

89. Takvorian SU, Oganisian A, Mamtani R, et al. Association of Medicaid expansion under the Affordable Care Act with insurance status, cancer stage, and timely treatment among patients with breast, colon, and lung cancer. *JAMA Netw Open*. 2020;3(2):e1921653. doi:10.1001/jamanetworkopen.2019.21653

90. Lee G, Dee EC, Orav EJ, et al. Association of Medicaid expansion and insurance status, cancer stage, treatment and mortality among patients with cervical cancer. *Cancer Rep*. 2021;4(6):e1407. doi:10.1002/cnr2.1407

91. Toyoda Y, Oh EJ, Premaratne ID, Chiuzan C, Rohde CH. Affordable Care Act state-specific Medicaid expansion: impact on health insurance coverage and breast cancer screening rate. *J Am Coll Surg*. March 3, 2020. doi:10.1016/j.jamcollsurg.2020.01.031

92. Fedewa SA, Yabroff KR, Smith RA, Sauer AG, Han X, Jemal A. Changes in breast and colorectal cancer screening after Medicaid expansion under the Affordable Care Act. *Am J Prev Med*. 2019;57(1):3-12. doi:10.1016/j.amepre.2019.02.015

93. Hendryx M, Luo J. Increased cancer screening for low-income adults under the Affordable Care Act Medicaid expansion. *Med Care*. 2018;56(11):944-949. doi:10.1097/MLR.0000000000000984

94. Jemal A, Lin CC, Davidoff AJ, Han X. Changes in insurance coverage and stage at diagnosis among nonelderly patients with cancer after the Affordable Care Act. *J Clin Oncol*. 2017;35(35):3906-3915. doi:10.1200/JCO.2017.73.7817

95. Han X, Zang Xiong K, Kramer MR, Jemal A. The Affordable Care Act and cancer stage at diagnosis among young adults. *J Natl Cancer Inst*. 2016;108(9):djw058. doi:10.1093/jnci/djw058

96. Soni A, Hendryx M, Simon K. Medicaid expansion under the Affordable Care Act and insurance coverage in rural and urban areas. *J Rural Health*. 2017;33(2):217-226. doi:10.1111/jrh.12234

97. Look KA, Kim NH, Arora P. Effects of the Affordable Care Act's dependent coverage mandate on private health insurance coverage in urban and rural areas. *J Rural Health*. 2017;33(1):5-11. doi:10.1111/jrh.12183

98. Mandal B. Rural–urban differences in health care access and utilization under the Medicaid expansion. *Appl Econ Perspect Policy.* 2022;44(2):702-721. doi:10.1002/aepp.13111

99. Hughes Halbert C, Welch B, Lynch C, et al. Social determinants of family health history collection. *J Community Genet.* 2016;7(1):57-64. doi:10.1007/s12687-015-0251-3

100. Yang BK, Johantgen ME, Trinkoff AM, Idzik SR, Wince J, Tomlinson C. State nurse practitioner practice regulations and U.S. health care delivery outcomes: a systematic review. *Med Care Res Rev.* 2021;78(3):183-196. doi:10.1177/1077558719901216

101. Williams LB, Looney SW, Joshua T, McCall A, Tingen MS. Promoting community awareness of lung cancer screening among disparate populations: results of the cancer Community Awareness Access Research and Education Project. *Cancer Nurs.* 2021;44(2):89-97. doi:10.1097/NCC.0000000000000748

102. Elder JP, Haughton J, Perez LG, et al. Promoting cancer screening among churchgoing Latinas: Fe en Acción/faith in action. *Health Educ Res.* 2017;32(2):163-173. doi:10.1093/her/cyx033

103. Muller CJ, Robinson RF, Smith JJ, et al. Text message reminders increased colorectal cancer screening in a randomized trial with Alaska Native and American Indian people. *Cancer.* 2017;123(8):1382-1389. doi:10.1002/cncr.30499

104. Wahlen MM, Schroeder MC, Johnson EC, et al. Identifying core functions of an evidence-based intervention to improve cancer care quality in rural hospitals. *Front Health Serv.* 2022;2:891574. doi:10.3389/frhs.2022.891574

105. Duggan C, Cushing-Haugen KL, Cole AM, et al. Feasibility of delivering survivorship care via lay health educators: A pilot randomized controlled trial among rural cancer survivors. *J Rural Health.* January 2, 2023. doi:10.1111/jrh.12736

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# PUBLIC HEALTH INFRASTRUCTURE IN RURAL AMERICA: ELEVATING QUALITY IMPROVEMENT, ACCREDITATION, AND CORE COMPETENCIES

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## SCOPE OF THE PROBLEM

- Financing rural public health is a cornerstone challenge per current and historic reliance on declining federal and state dollars and limited local revenue.[1,2] Strategies to overcome chronic underfunding include intergovernmental transfers, as well as cross-sector and cross-jurisdictional partnerships.[3]
- Resource limitations often compromise rural local health departments' (LHDs) access to current information on evidence-based practices,[4] and to various forms of technology.[5,6] Without sufficient information technology, rural LHD performance management and quality improvement can be undermined.[7]
- Accreditation is a powerful tool for improving rural LHDs' staff competencies, partner relations, and capacity to provide high-quality services. However, only 8% of small LHDs apply for accreditation due to capacity challenges.[8,9]
- Community Health Assessments (CHAs) and Community Health Improvement Plans (CHIPs) are foundational to community wellbeing.[10] However, a minority of LHDs serving small jurisdictions conducted a CHA in the previous five years,[11] and the odds of rural LHDs conducting a CHA have decreased over time.[12]
- Resource limitations and remote geography yield challenges with recruiting, retaining and developing the rural public health workforce.[3] These challenges intensified amidst the COVID-19 pandemic.[13] Bolstering the rural public health workforce can occur via educational,[14] financial,[3] and/or regulatory[1] strategies.

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Public health in the rural United States has been crucial to advancing rural wellness despite considerable capacity challenges. In the 2030 Rural Healthy People survey (see **Table 1**), 24.5% of respondents identified public health infrastructure within their top ten priorities for rural public health.[15]

The need for rural public health infrastructure improvement is not a reflection of rural public health workers' and their community partners' diligence. Rather, this reality reflects rural public health's status as a nuanced and underfunded enterprise.[3]

Local health departments (LHDs) in the U.S. are core units of public health infrastructure across the rural-urban continuum. Their core functions entail (1) community-level policy development, (2) assessment, and (3) assurance of public health services. The assurance core function differentiates LHDs: those that provide needed health services internally, and those that partner with external entities to assure these services are provided elsewhere.[1] Community needs, as well as the partnerships, organizational resources, and structures available within LHDs' jurisdictions inform which public health services LHDs prioritize.[1]

Approximately half of all 2,400 LHDs are rural,[3] and their jurisdictions serve 13% of the U.S. population. On average, rural LHDs have nine full-time staff members and an annual budget of $500,000 with which to serve 15,000 people.[16] It is important to note that not all small LHDs

**Table 1. Comparison of top 20 Rural Healthy People priorities selected overall vs U.S. census region.[15,52]**

| Priority | Overall | | Midwest (n = 326) | Northeast (n = 129) | South (n = 339) | West (n = 224) |
|---|---|---|---|---|---|---|
| | No. | % | No. | No. | No. | No. |
| Mental Health and Mental Disorders | 1 | 75.2% | 1 | 1 | 1 | 1 |
| Addiction | 2 | 63.5% | 2 | 2 | 2 | 2 |
| Health Care Access and Quality | 3 | 50.1% | 3 (tie) | 4 | 4 | 3 |
| Overweight and Obesity | 4 | 48.4% | 3 (tie) | 5 | 3 | 6 (tie) |
| Drug and Alcohol Use | 5 | 45.6% | 5 | 3 | 5 | 4 |
| Nutrition and Health Eating | 6 | 38.3% | 6 (tie) | 6 | 6 (tie) | 5 |
| Older Adults | 7 (tie) | 32.5% | 10 | 8 | 9 | 6 (tie) |
| Preventive Care | 7 (tie) | 32.5% | 8 | 10 | 8 | 8 (tie) |
| Diabetes | 9 | 32.2% | 11 | 12 (tie) | 6 (tie) | 13 |
| Economic Stability | 10 | 29.7% | 6 (tie) | 9 | 10 | 11 |
| Transportation | 11 | 26.3% | 9 | 7 | 12 | 17 |
| Cancer | 12 | 25.3% | 12 | 12 (tie) | 11 | 19 |
| Public Health Infrastructure | 13 | 24.5% | 14 | 12 (tie) | 15 | 10 |
| Housing and Homes | 14 | 23.0% | 15 (tie) | 11 | 17 | 8 (tie) |
| Workforce | 15 | 22.2% | 13 | 16 | 21 | 11 |
| Education Access and Quality | 16 | 21.2% | 20 (tie) | 15 | 13 | 15 (tie) |
| Health Insurance | 17 | 20.9% | 17 | 20 (tie) | 19 | 15 (tie) |
| Child and Adolescent Development | 18 | 20.6% | 23 | 17 (tie) | 18 | 18 |
| Hospital and Emergency Services | 19 | 19.0% | 19 | 17 (tie) | 16 | 20 |
| Chronic Pain | 20 | 17.7% | 20 (tie) | 34 (tie) | 24 (tie) | 14 |

are rural, but almost all rural LHDs are small.[17] Some rural jurisdictions lack an LHD, and are therefore served only by a regional or state health department.[3] Rural LHDs strive to address rural communities' disproportionately poor health outcomes, and limited health service access, despite understaffing and fewer resources than their suburban and urban peers.[1,3,18,19] Rural challenges with health services access have often historically rendered, and continue to render, a need for LHDs to directly provide clinical services to their community members. For example, primary care and maternal and child health services are still frequently offered by rural and small health departments in the South.[1] In many instances, these services would be otherwise unavailable due to shortages in the supply of primary care services.[3] In fulfilling their assurance function this way, however, rural LHDs have less capacity to support population-focused activities than their urban peers.[1] There is some evidence that this capacity continues

to decline. Between 2014 and 2018, the scope of the 20 recommended public health activities implemented declined 3.4 percentage points in rural areas, whereas it increased by 1.4 percentage points in urban settings.[12] This set of 20 activities are those recommended by the Public Health Accreditation Board (PHAB), the U.S. Department of Health and Human Services (HHS), and the Institute of Medicine. Examples include assessments of community health needs and risks, planning and priority setting across sectors, engaging community members in selecting and implementing health strategies, and evaluating progress.[12]

As summarized in **Table 2**, other works confirm LHDs serving smaller, often rural, populations tend to perform more poorly than their larger or urban counterparts on some or all of the three aforementioned core functions, and on the 10 essential public health services.[1,18,19]

**Table 2. Studies comparing small/rural and large/urban health department performance.[1]**

| Core Function | Essential Service | Number of studies indicating: | | |
|---|---|---|---|---|
| | | Small/Rural performs better | No large/significant difference | Large/Urban performs better |
| Assessment | 1. Monitor health status to identify and solve community health problems | 0 | 2 | 10 |
| | 2. Diagnose and investigate health problems and health hazards in the community | 0 | 3 | 9 |
| Policy Development | 3. Inform, educate, and empower people about health issues | 0 | 4 | 7 |
| | 4. Mobilize community partnerships and action to identify and solve health problems | 0 | 5 | 7 |
| | 5. Develop policies and plans that support individual and community health efforts | 0 | 5 | 11 |
| Assurance | 6. Enforce laws and regulations that protect health and ensure safety | 0 | 2 | 9 |
| | 7. Link people to needed personal health services and assure the provision of health care when otherwise unavailable | 1 | 5 | 7 |
| | 8. Assure competent public and personal health care workforce | 1 | 8 | 9 |
| | 9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services | 0 | 5 | 5 |
| | 10. Research new insights and innovative solutions to health problems | 0 | 3 | 9 |

Small/rural LHDs are significantly less likely to report using evidence-based decision making,[20] have lower compliance rates,[21] and report applying fewer strategies to address health disparities[22] than their larger/urban peers. The more rural an LHD's state is, the less likely they are to exhibit policy behaviors at the local level (i.e., prepare issue briefs for policy makers, participate on a health policy board, testify publicly to policy makers, communicate with policy makers regarding proposed actions, and/or provide technical assistance to policy makers drafting proposed actions).[23] Further, small/rural LHDs are significantly less likely to seek accreditation[24] or be accredited[25] than LHDs serving larger/urban communities.[1] This is detrimental as accreditation offers an effective means for creating positive change in public health departments.[7] The rural-urban accreditation disparity is another consequence of aforementioned challenges with financing and staffing in rural LHDs.[7,26] The lack of rural LHD accreditation impacts rural LHD participation in Community Health Assessments (CHAs), and translation of CHA findings into Community Health Improvement Plans (CHIPs). This is because CHAs and CHIPs have been required components of the public health accreditation process since its inception in 2011.[10]

Community health assessments are meant to guide the direction of a public health department's efforts, and generally involve collecting and reporting information on various health indicators,[27] while a CHIP operationalizes these priorities. The odds of urban LHDs conducting a CHA have increased since 2014 (OR of 1.79 in 2016, OR of 2.04 in 2018); however, the odds of rural LHDs conducting a CHA have decreased since that time (OR of 0.76 in 2014, OR of 0.74 in 2016, OR of 0.55 in 2018).[12] Without the community-specific insights a CHA affords, it is a challenge for rural LHDs to know how best to allocate their very limited resources.

Previous works have highlighted the importance of tailored public health system improvement for rural communities.[12] This chapter considers Healthy People 2030 Public Health Infrastructure objectives[28] in the context of rural public health infrastructure. Particular salience to rural wellbeing was observed in the objectives related to financing (PHI-R08) and technology access (PHI-D05), accreditation (PHI-R01, PHI-R02, PHI-R03, PHI-R10), use of community health assessments and improvement plans (PHI-R04, PHI-R05, PHI-R08, PHI-R09), and workforce development (PHI-R02).

## FINANCING

Healthy People 2030 objectives with salience to rural health by way of public health infrastructure financing include:

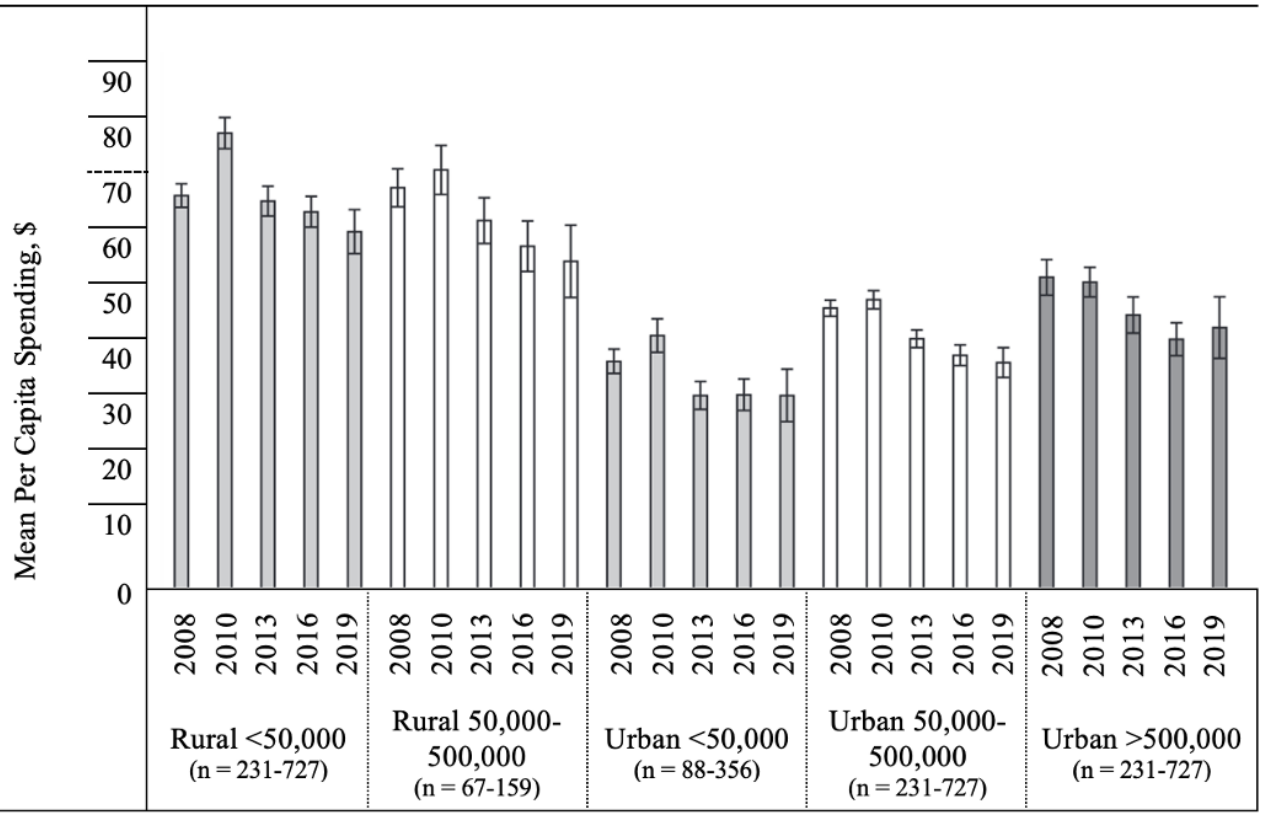
- Explore financing of the public health infrastructure (PHI-R08)
- Increase the proportion of state PH labs that use emerging technology to provide enhanced services (PHI-D05)

Funding for local health and social services is primarily a function of an area's tax base, fiscal policies, and economic condition.[3] Local health departments tend to perform better when they have greater total expenditures, greater expenditures per capita, and jurisdictions over 100,000 so as to benefit from economies of scale.[1,29] Unfortunately, revenue streams differ significantly for rural LHDs relative to their larger counterparts (see **Table 3**).[3]

The revenue stream challenges are compounding in nature as higher state and federal funding generally begets higher funding from local sources.[1,2] Rural LHDs' disproportionate reliance on limited federal, state, and clinical service revenues make it challenging to increase local revenues, and in turn make rural LHDs less financially equipped to meet local needs.[17]

Many rural communities face a low and declining tax base, as well as populations that are too small to reach economies of scale benefits.[3] With respect to economies of scale challenges, the fixed costs for operating health departments of any size are considerable. The financial structures that create disadvantage for rural LHDs then may impede their ability to pay for basic infrastructure, sufficient staff, and/or fulfill their three core functions and the 10 essential public health services.[30] This may also keep certain forms of public health technology out of reach for rural LHDs. Rural

Table 3. Mean per capita spending in local health departments by rurality, 2008-2019.[3]




| Population Served | Mean Per Capita Spending Range, $ | | | | |
|---|---|---|---|---|---|
| | 2008 | 2010 | 2013 | 2016 | 2019 |
| **< 50,000** | | | | | |
| Rural | 66 (64-68) | 76 (74-79) | 65 (63-68) | 63 (61-66) | 60 (56-64) |
| Urban | 38 (36-40) | 43 (40-45) | 32 (30-35) | 33 (30-35) | 32 (28-37) |
| **50,000 – 500,000** | | | | | |
| Rural | 67 (64-70) | 70 (66-74) | 62 (58-66) | 57 (53-62) | 55 (49-61) |
| Urban | 47 (46-48) | 49 (47-50) | 42 (40-43) | 39 (37-41) | 38 (35-40) |
| **> 500,000** | | | | | |
| Urban | 52 (49-55) | 51 (49-54) | 46 (43-49) | 42 (39-45) | 44 (39-49) |

LHDs often have limited access to electronic information, as well as software for transferring information, scheduling and monitoring patients, adopting social media, and developing educational content for patients and community members.[5,6] Access to current information on evidence-based public health practices is also less likely to be held by smaller LHDs relative to their larger counterparts.[4] Without sufficient information technology, rural LHD performance management and quality improvement can be undermined.[7] In March 2022, the Rural Public Health Workforce Training Network (RPHWTN) Program commenced with the aim of investing in virtual and telehealth systems, and the electronic health record workforce.[13] The impact of these investments in rural public health technology has yet to be assessed.

Overcoming long-standing financial barriers and the challenges that stem from them, like technology access, is crucial to improving rural public health infrastructure. Without a foundation of resources for programs and services led by rural LHDs and their partners, meaningful investments by local governments will remain

unlikely. Intergovernmental transfers are one pathway federal and state governments can use to address differences in local-level resource availability. These constitute payments from one government to another, and can take the form of grants, or categorical support for specific areas or programs. For example, federal-level funds from the Centers for Disease Control and Prevention (CDC) can be transferred to states, and then to LHDs to invest in public health; or the Department of Housing and Urban Development's federal dollars can be transferred to more local jurisdictions or community development departments to invest in housing.[3] While intergovernmental transfers are a salient tool for overcoming the local revenue gap, these are not being widely allocated in a way that reflects this opportunity.[3] Other works have highlighted the need to explore new mechanisms for allocating resources to communities such that rural–urban differences in fiscal capacity are minimized, and opportunities for collaboration are maximized.[12]

## ACCREDITATION AND CORE COMPETENCIES

The financial underpinnings of rural public health also have implications for accreditation of rural public health entities. A majority (56%) of small LHDs (defined as those serving jurisdictions under 50,000) report limited funding or financial constraints as a challenge of accreditation, relative to 36% and 39% for medium and large health departments, respectively.[8] Creating pathways to accreditation is consequential as accreditation acts as a vehicle for strengthening public health infrastructure,[10] accountability, consistency, and aligning services with community needs.[24] Evidence suggests that accredited public health departments are more likely to yield significant reductions in mortality and medical costs in traditionally underserved communities via more comprehensive public health systems.[31] In a cross-sectional survey of 350 LHDs, approximately half of which were rural, accredited health departments were more likely to report higher capacity for evidence-based decision making, and for evaluation capacity, than health departments not yet pursuing accreditation.[32] Other published works have found that small LHDs are particularly likely to report the accreditation process conferred improvements in staff competencies, partner relations, and capacity to provide high-quality services. For these and other reasons, nearly all (96%) small, accredited LHDs believe applying for national accreditation through the Public Health Accreditation Board (PHAB) was a favorable decision.[8]

Healthy People 2030 objectives with salience to rural public health by way of accreditation include:

- Increase the proportion of accredited state (PHI-R01), local (PHI-R02), tribal (PHI-R03), and territorial (PHI-D05) public health agencies
- Explore the impact of public health accreditation and national standards (PHI-R10)
- Increase the proportion of local public health agencies that use core competencies in continuing education (PHI-07)

The PHAB was established in 2007 to implement and oversee voluntary public health accreditation within the U.S. This voluntary process was launched in 2011, and calls for a review of health departments' performance against national standards. The aim of accreditation is to systematically improve public health processes and outcomes. Accreditation requires health departments to demonstrate that they meet specific criteria (e.g., analysis and monitoring of trends, review of laws, development of policy and advocacy efforts, and demonstration of partnerships).[31]

As of 2022, 306 LHDs have been accredited. This constitutes a minority of LHDs: as of 2019, 16% of LHDs were accredited, 5% had applied, and 2% had registered an intent to apply.[17] Local health departments serving a population of less than 50,000 are underrepresented; that is, only 8% of these LHDs applied for accreditation.[8,9] Previous research has found that the strongest predictor for seeking PHAB accreditation is the urbanicity/rurality of an LHD's jurisdiction. The LHDs in urban settings (jurisdictions of 50,000 or more) were 16.6 times more likely, and micropolitan LHDs (jurisdictions of 10,000 - 49,999) were 3.4 times more likely to seek PHAB accreditation than rural LHDs (those with jurisdictions under 10,000).[7] Frequently cited reasons for small or rural LHDs

not applying for accreditation include: insufficient finances, insufficient staff time, insufficient technical support, and high staff turnover.[7,8,24,33]

The inclusion of core competencies for training and education needs of LHDs are key to the accreditation process.[34] The Council on Linkages Between Academia and Public Health Practices created 56 core competencies that fall into eight domains. These domains include: (1) Data Analytics and Assessment Skills, (2) Policy Development and Program Planning Skills, (3) Communication Skills, (4) Health Equity Skills, (5) Community Partnership Skills, (6) Public Health Sciences Skills, (7) Management and Finance Skills, and (8) Leadership and Systems Thinking Skills.[35] Very few studies have examined the extent to which competency attainment occurs at the same or varying levels among rural and urban public health professionals. Most studies examining competency attainment among LHD employees have focused on large and medium-sized departments, while capacity and skills assessments among rural LHD employees remain understudied.[36,37]

A recent study by Kett and colleagues, summarized graphically in **Figures 1 and 2**, set out to explore training needs and comfort with competencies among rural and urban LHD employees.[38] Despite limited workforce capacity, limited investments in infrastructure and training, and dependence on an area's tax base for funding, rural LHD staff had higher odds of reporting proficiencies in systems and strategic thinking, cross-sectoral partnerships, and community engagement.[38] Importantly, critical training needs in using data to inform decision making (tied to the Data Analytics and Assessment Skills domain) and in diversity, equity and inclusion (the Health Equity Skills domain) were noted.[38] Other competencies for which rural public health staff were less likely to indicate proficiencies included: identifying and ensuring the use of appropriate sources of data, identifying or applying evidence-based approaches, describing how social determinants of health impact health, targeting communications effectively, describing relationships between policies and public health problems, and determining the feasibility of a policy.[36,37] These needs and competencies are critical to addressing mistrust in the government, science, and public health interventions among rural communities.[39] Previous work has noted the importance of including residents from historically marginalized groups in all efforts to enhance the credibility of public health work, interventions, and infrastructure.[39]

Given accreditation's crucial benefits, creating a more equitable landscape across LHDs will require that even small and rural LHDs develop the capacity to meet accreditation performance standards.[33] In addition to the previously stated need for improved funding, rural LHDs will also need to receive clear messaging around accreditation's benefits, as well as additional technical support to achieve accreditation.[7] Requirements that reaccreditation be sought every five years[31] create a means for rural LHDs to continue to evolve with the changing needs and capabilities of the public health field. Accreditation and subsequent reaccreditation is a meaningful pathway to advance rural public health infrastructure. However, making use of this opportunity will require connecting rural LHDs to the necessary supports.

## COMMUNITY HEALTH ASSESSMENTS & IMPROVEMENT PLANS

Accreditation has also acted as a catalyst for the uptake of CHAs, CHIPs, community engagement in planning, partnership formation, and evaluation of department services.[31] The efficiency and responsiveness of rural public health actors is contingent on their sense of community needs and priorities, and the presence of strategies and partnerships to fulfill these. The CHAs offer insight into the former, while CHIPs guide the latter. Recognizing how foundational these are to improving community wellbeing, the PHAB designated CHA and CHIP submissions as two of the three prerequisites within the original 2011 voluntary accreditation process.[10] Healthy People 2030 objectives with salience to rural public health by way of CHA and CHIP participation include:

- Increase the proportion of tribal (PHI-08), local (PHI-05), state and territorial (PHI-04) jurisdictions that have a health improvement plan

**Figure 1. Rural vs Urban Skill Proficiency Among Non-supervisors and Supervisors/ Executives in Local Health Departments by Tier 1 Skill Proficiency: United States, 2021**[38]

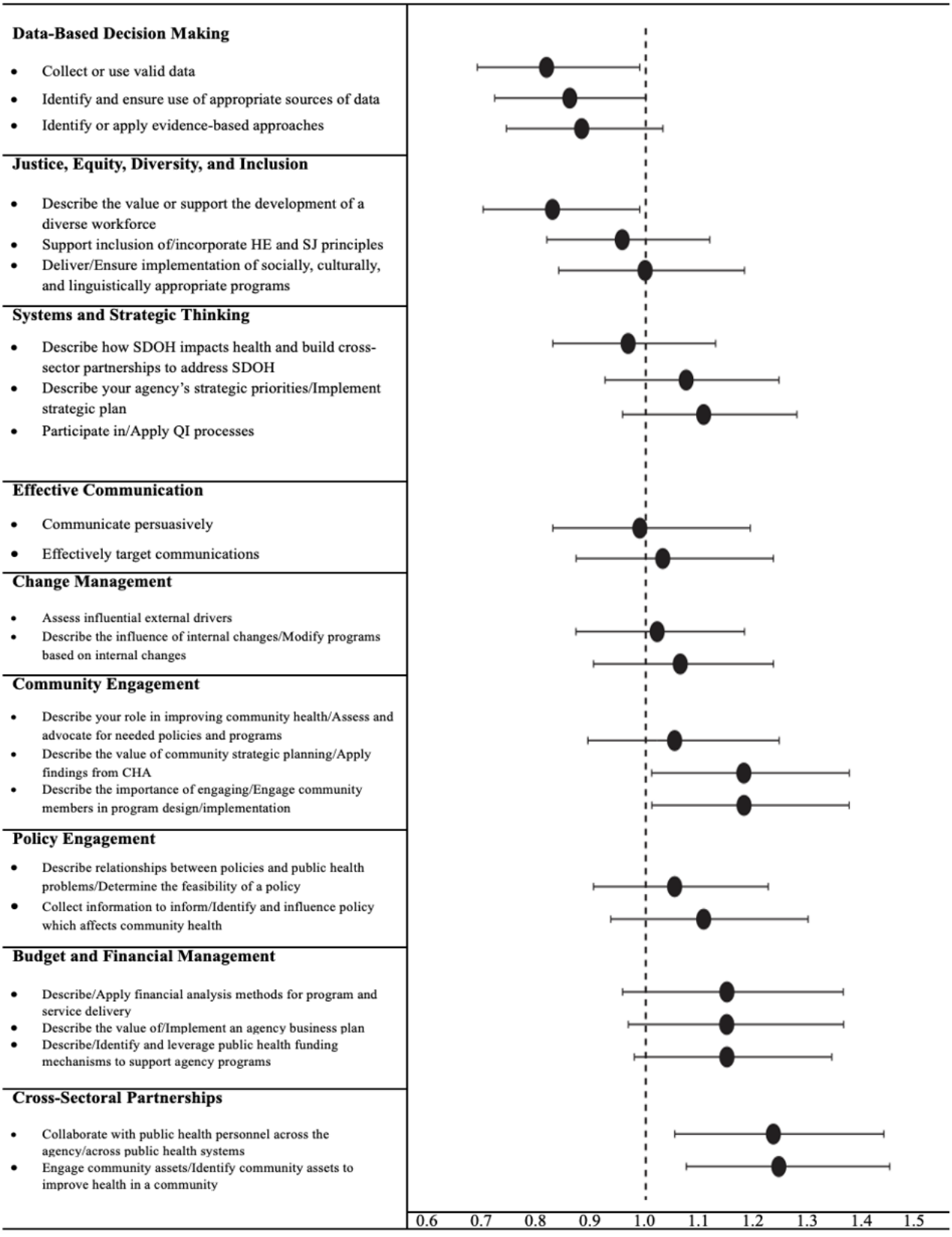
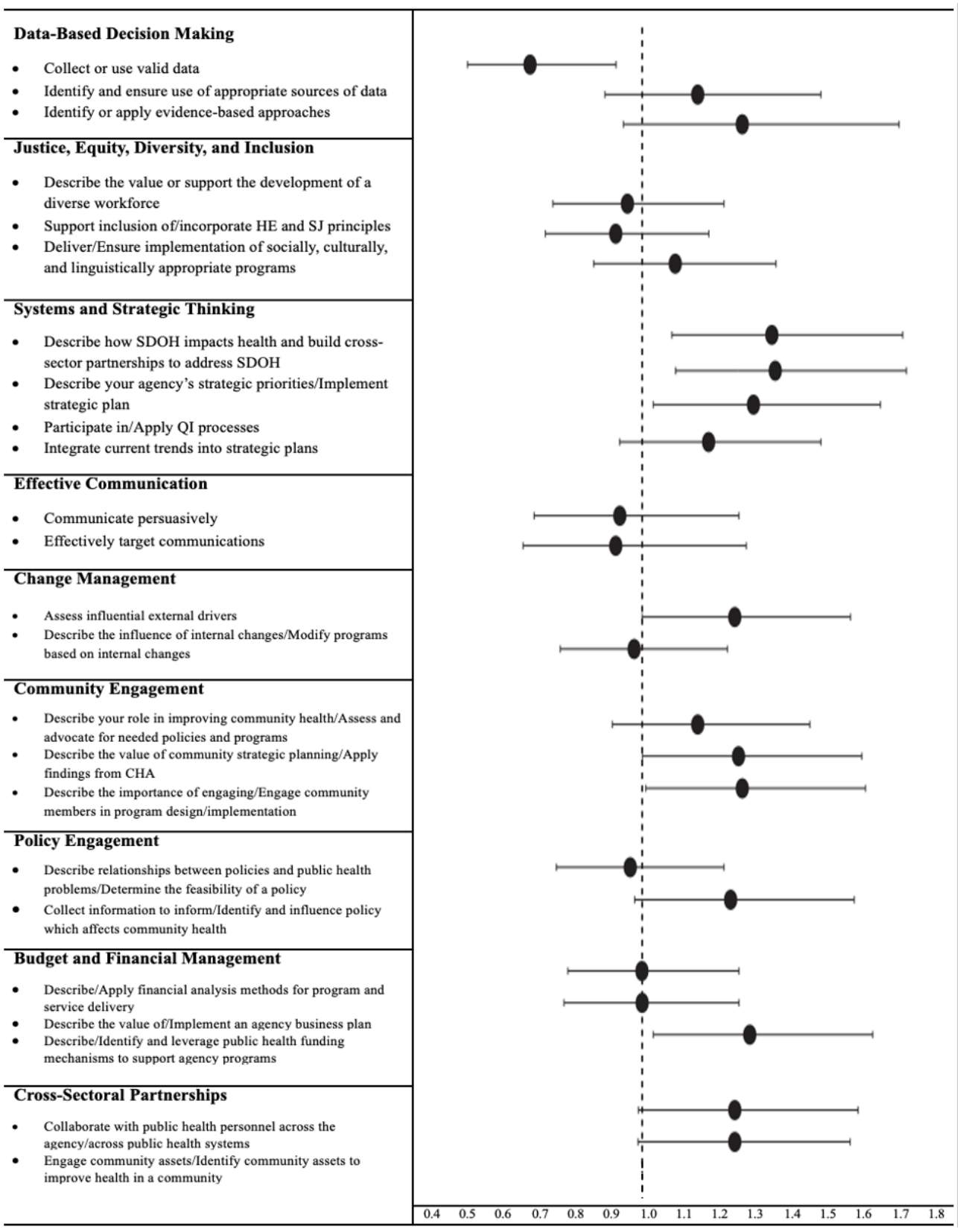


Figure 2. Rural vs Urban Skill Proficiency Among Non-supervisors and Supervisors/ Executives in Local Health Departments by Tier 2/3 Skill Proficiency: United States, 2021[38]



- Explore the impact of community health assessment and improvement planning efforts (PHI-R09)

The proportion of LHDs conducting CHAs and CHIPs has increased over time: from 61% and 50%, respectively, in 2010, to 78% and 67%, respectively, in 2016.[17] Completing the required CHA, an accompanying CHIP, and departmental strategic plan is significantly associated with an increased likelihood of performing activities to overcome health disparities.[31,40,41] Despite these benefits, conducting CHAs and CHIPs has been more challenging for rural LHDs. A minority (39%) of LHDs serving jurisdictions with populations under 50,000 had conducted a CHA in the previous five years,[11] and the odds of rural LHDs conducting a CHA have decreased over time (OR of 0.76 in 2014, OR of 0.74 in 2016, OR of 0.55 in 2018) relative to urban LHDs (see **Table 4**).[12] Jurisdictional size has also been associated with how an LHD approaches CHIP development.[42]

Cross-sectoral partnerships are required in the accreditation standards related to the CHA and CHIP.[10] In this way, CHAs and CHIPs also act as conduits for establishing community partnerships. Collaboration between health departments and other community groups for CHA purposes bolsters CHA-CHIP completion,[43] ensures that a local public health system is in place,[44] and allows partners to accomplish mutual goals.[45] The CHA-CHIP processes have been shown to involve a wider array of partners than may be typical in other types of LHD partnerships.[10,46] For example, law enforcement partnerships were listed in a majority (59%) of the CHAs-CHIPs representing small jurisdictions and in only 43% of larger jurisdictions' CHAs/CHIPs.[10] Engaging a broad set of community partners throughout the CHA development process is noted by other works as critical for ensuring the relevance and long-term impact of resulting efforts.[11]

While partnerships can benefit LHDs of any size, prior research indicates that partnerships may

**Table 4. Changes over time in public health activities by rurality: United States, 2014-2018.[12]**

| Variable | Conducted Community Needs Assessment ( n = 1,658) OR (95% CI) | Identified Community Health Priorities ( n = 1,658) OR (95% CI) | Developed Community Health Action Plan ( n = 1,658) OR (95% CI) |
|---|---|---|---|
| Rurality and period | | | |
| Urban 2014 (Reference) | 1 | 1 | 1 |
| Urban 2016 | 1.79 (0.95, 3.34) | 1.33 (0.75, 2.38) | 1.00 (0.63, 1.58) |
| Urban 2018 | 2.04 (1.03, 4.05) | 1.42 (0.75, 2.71) | 1.38 (0.83, 2.30) |
| Rural 2014 | 0.76 (0.33, 1.74) | 0.57 (0.26, 1.24) | 0.83 (0.43, 1.60) |
| Rural 2016 | 0.74 (0.32, 1.68) | 0.54 (0.24, 1.20) | 0.56 (0.29, 1.10) |
| Rural 2018 | 0.55 (0.23, 1.34) | 0.28 (0.12, 0.65) | 0.56 (0.28, 1.15) |
| Poverty Rate (%) | 0.91 (0.86, 0.98) | 0.95 (0.89, 1.01) | 0.96 (0.91, 1.02) |
| Populations of Color (%) | 0.99 (0.97, 1.00) | 0.99 (0.97, 1.01) | 1.00 (0.98, 1.01) |
| Population Older than 65 (%) | 0.94 (0.88, 1.00) | 0.96 (0.93, 1.06) | 0.98 (0.93, 1.03) |
| Uninsured rate (%) | 1.03 (0.96, 1.10) | 0.99 (0.93, 1.06) | 1.00 (0.95, 1.05) |
| Income per capita ($10,000) | 0.91 (0.72, 1.15) | 0.91 (0.75, 1.11) | 0.94 (0.79, 1.11) |
| Unemployment rate (%) | 1.23 (1.01, 1.50) | 1.14 (0.95, 1.37) | 1.08 (0.94, 1.24) |
| 4-year college degree (%) | 0.98 (0.95, 1.02) | 0.99 (0.96, 1.02) | 1.00 (0.97, 1.02) |
| Multicounty | 1.47 (0.70, 3.05) | 1.55 (0.79, 3.03) | 0.90 (0.51, 1.58) |

play a particularly important role in helping small or rural LHDs offset capacity limitations, and bring accreditation (including related CHA and CHIP requirements) within reach.[1,10] Facilitators identified for the CHA-CHIP process in rural counties include a functioning 501(c)(3) community health coalition, and perceived self-efficacy.[43] Even if these facilitators are present, and additional necessary supports are provided to rural LHDs, those constrained by limited staff are unlikely to develop the capacity needed to effectively support the CHA-CHIP process.[43]

## WORKFORCE

Effective fulfillment of CHAs, CHIPS, and other core functions of LHDs are contingent upon sufficient workforce in rural public health. While workforce challenges in rural public health are longstanding, these have intensified amidst the COVID-19 pandemic.[13] Creating pipelines in which emerging professionals and practitioners learn, work, and live in rural contexts may well be crucial to recruiting and retaining workers sufficient in volume and competency. Healthy People 2030 objectives with salience to rural public health by way of workforce development include:

- Expand public health pipeline programs that include service or experiential learning (PHI-R02)

Small/rural health departments employ comparatively fewer full-time employees than do large/urban departments. The 1,500 smallest and most rural LHDs have fewer staff than the 25 largest urban LHDs combined.[39] These realities yield a narrower range of public health skills in rural LHDs.[1,29] Budget constraints also shape the type of positions and professionals LHDs hire; that is, jurisdictions serving fewer than 100,000 residents are increasingly served by a part-time workforce, and by LHDs with nursing professionals rather than MD professionals in their executive roles.[4] Remote geographic locations and less than competitive pay scales result in greater challenges for small/rural LHDs to recruit and retain leadership, nurses, and other allied health professionals.[3] For example, nurses could earn $15,000 more annually for a parallel position in a private health care setting relative to one in an LHD.[47] Clinical service roles are particularly essential in rural LHDs as these often act as clinical care safety nets for their respective communities.[3]

To compensate for recruitment and retention challenges, rural LHDs often reduce position qualification requirements. However, this approach contributes to great variation in personnel capacity across jurisdictions.[14] Prior works have found that rural LHD staff have minimal incentive to continue their education,[14] and LHDs in rural jurisdictions were much less likely than those in urban jurisdictions to have a continuing education budget.[1] Executives from rural LHDs frequently report difficulty accessing trainings on health disparities.[22] Taken together, these factors impede the ability of rural LHD professionals to expand their ability to meet the needs of their community in an equitable way.

PHAB accreditation also requires evidence of LHD efforts to recruit a workforce that is representative of the population served, to maintain procedures for health equity-centric interventions, and to train staff on cultural competency.[40] Understanding the community-specific context rural public health workers are operating in can be furthered by experiential learning. Rural professional experience placements for students can be an influential mechanism for addressing workforce shortages in rural health facilities by immersing students within real-world service environments, and promoting rural facilities as potential employers.[48]

Developing a rural public health workforce that is well trained in both the public health discipline, and in the nuanced needs of an individual rural community will require both financial investment and strategic action. Strategies for consideration include: loan repayment and tax incentive programs,[3] developing more partnerships across sectors and neighboring agencies, exploring formal and informal cross-jurisdictional sharing,[1] and increasing access to continuing education opportunities.[14] Regionalization (combining small, adjacent jurisdictions) has also been considered as a pathway to increase the capacity of rural LHDs. However, the heterogeneity of communities in size, circumstance, and priorities could impede the performance of entities attempting to serve multiple jurisdictions. Accordingly, this recommendation should be undertaken with caution.[1,49]

The 2022 RPHWTN Program's investments aimed to cross-train community health workers and case management staff, and increase the number of both rural community paramedics and health care providers.[13] Other federal awards for resilience and mental health training programs have been made to mitigate rural and underserved healthcare worker burnout since the COVID-19 pandemic.[13] The impact of these investments in the rural public health workforce has yet to be assessed. The COVID-19 pandemic was a catalyst for exploring telehealth as a vehicle for reducing rural public health workforce challenges by creating new remote access to certain services. However, initial barriers inherent to this strategy include limited rural broadband access,[50] and rural patient preferences for in-person services.[51]

## SUMMARY AND CONCLUSIONS

Attunement to the needs and preferences of the community one aims to serve is central to the public health approach. This applies to access to services, and all other public health challenges rural LHDs confront. Placing select Healthy People 2030 objectives in the context of the current rural public health landscape better positions the field to make equitable progress. The rural public health infrastructure remains under-resourced. Rural areas have not experienced the public sector investments, workforce investments, nor economic recovery held commonly by urban peers since the Great Recession.[3]

Overcoming challenges with financial reliance on declining state and federal funding would minimize capacity challenges that impede accreditation, participation in the CHA-CHIP process, and workforce recruitment, retention, and development in rural public health. Positioning rural public health actors to engage successfully with each of these activities stands to advance health equity, and reduce morbidity, mortality, and costs. Literature suggests financial collaborations like cross-jurisdictional sharing arrangements, in which resources are pooled across neighboring communities, and operational collaborations with community partners, may be crucial in expanding rural public health capacity.[12] Despite the challenges in rural public health, rural communities boast certain social and structural conditions that are protective for community health and wellbeing, such as social connectedness and self-reliance.[3] Said strengths lay a promising foundation for effective partnerships and tailored solutions within rural public health.

## REFERENCES


1. Harris JK, Beatty K, Leider JP, Knudson A, Anderson BL, Meit M. The double disparity facing rural local health departments. *Annu Rev Public Health.* 2016;37(1):167-184. doi:10.1146/annurev-publhealth-031914-122755

2. Bernet PM. Local Public Health Agency Funding: Money Begets Money. *J Public Health Manag Pract.* 2007;13(2):188-193. doi:10.1097/00124784-200703000-00016

3. Leider JP, Meit M, McCullough JM, et al. The state of rural public health: enduring needs in a new decade. *Am J Public Health.* 2020;110(9):1283-1290. doi:10.2105/AJPH.2020.305728

4. Brownson RC, Reis RS, Allen P, et al. Understanding administrative evidence-based practices. *Am J Prev Med.* 2014;46(1):49-57. doi:10.1016/j.amepre.2013.08.013

5. Turner AM, Stavri Z, Revere D, Altamore R. From the ground up: information needs of nurses in a rural public health department in Oregon. *J Med Libr Assoc.* 2008;96(4):335-342. doi:10.3163/1536-5050.96.4.008

6. Harris JK, Mueller NL, Snider D. Social media adoption in local health departments nationwide. *Am J Public Health.* 2013;103(9):1700-1707. doi:10.2105/AJPH.2012.301166

7. Beatty KE, Erwin PC, Brownson RC, Meit M, Fey J. Public health agency accreditation among rural local health departments: influencers and barriers. *J Public Health Manag Pract.* 2018;24(1):49-56. doi:10.1097/PHH.0000000000000509

8. Heffernan M, Melnick M, Siegfried AL, Papanikolaou M. Benefits and impacts of public health accreditation for small local health departments. *J Public Health Manag Pract.* 2023;29(3):E108-E114. doi:10.1097/PHH.0000000000001678

9. Leider JP, Kronstadt J, Yeager VA, et al. Application for public health accreditation among US local health departments in 2013 to 2019: impact of service and activity mix. *Am J Public Health*. 2021;111(2):301-308. doi:10.2105/AJPH.2020.306007

10. Kronstadt J, Chime C, Bhattacharya B, Pettenati N. Accredited health department partnerships to improve health: an analysis of community health assessments and improvement plans. *J Public Health Manag Pract*. 2018;24(3):S35-S43. doi:10.1097/PHH.0000000000000735

11. Kwan K, Do-Reynoso V, Zarate-Gonzalez G, Goldman-Mellor S. Development and implementation of a community health survey for public health accreditation: case study from a rural county in California. *Eval Program Plann*. 2018;67:47-52. doi:10.1016/j.evalprogplan.2017.11.004

12. Owsley KM, Hamer MK, Mays GP. The growing divide in the composition of public health delivery systems in US rural and urban communities, 2014–2018. *Am J Public Health*. 2020;110(S2):S204-S210. doi:10.2105/AJPH.2020.305801

13. Oster NV, Patterson DG, Skillman SM, Frogner BK. *COVID-19 and the Rural Health Workforce: The Impact of Federal Pandemic Funding to Address Workforce Needs*. University of Washington; 2022.

14. Sopko J. *Protecting Public Health and Preparing for the Next Pandemic*. The Massachusetts Health Policy Forum; 2022.

15. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: new decade, new challenges. *Prev Med Rep*. 2023;33:102176. doi:10.1016/j.pmedr.2023.102176

16. Leep CJ. 2005 National profile of local health departments. *J Public Health Manag Pract*. 2006;12(5):496-498. doi:10.1097/00124784-200609000-00019

17. National Profile of Local Health Departments - NACCHO. Accessed August 7, 2023. https://www.naccho.org/resources/lhd-research/national-profile-of-local-health-departments

18. Harris JK, Mueller NL. Policy activity and policy adoption in rural, suburban, and urban local health departments. *J Public Health Manag Pract*. 2013;19(2):E1-E8. doi:10.1097/PHH.0b013e318252ee8c

19. Mays GP, McHugh MC, Shim K, et al. Institutional and economic determinants of public health system performance. *Am J Public Health*. 2006;96(3):523-531. doi:10.2105/AJPH.2005.064253

20. Lovelace KA, Aronson RE, Rulison KL, Labban JD, Shah GH, Smith M. Laying the groundwork for evidence-based public health: why some local health departments use more evidence-based decision-making practices than others. *Am J Public Health*. 2015;105(S2):S189-S197. doi:10.2105/AJPH.2014.302306

21. Zahner SJ, Vandermause R. Local health department performance: compliance with state statutes and rules. *J Public Health Manag Pract*. 2003; 9(1):25-34. doi:10.1097/00124784-200301000-00004

22. Yang Y, Bekemeier B. Using more activities to address health disparities: local health departments and their "top executives." *J Public Health Manag Pract*. 2013;19(2):153-161. doi:10.1097/PHH.0b013e318252ee41

23. Meyerson BE, Sayegh MA. State size and government level matter most: a structural equation model of local health department policy behaviors. *J Public Health Manag Pract*. 2016;22(2):157-163. doi:10.1097/PHH.0000000000000244

24. Shah GH, Leep CJ, Ye J, Sellers K, Liss-Levinson R, Williams KS. Public health agencies' level of engagement in and perceived barriers to PHAB national voluntary accreditation. *J Public Health Manag Pract*. 2015;21(2):107-115. doi:10.1097/PHH.0000000000000117

25. Beatty KE, Mayer J, Elliott M, Brownson RC, Abdulloeva S, Wojciehowski K. Patterns and predictors of local health department accreditation in Missouri. *J Public Health Manag Pract JPHMP*. 2015;21(2):116-125. doi:10.1097/PHH.0000000000000089

26. Myers N. Rurality versus readiness: the relationship between state-level connection and capacity variables and the management of medical stockpiles for a public health emergency. *State Local Gov Rev*. 2021;53(4):281-297. doi:10.1177/0160323X211061352

27. Conley AM, Vagi S, Horney JA. Use of the community assessment for public health emergency response to conduct community health assessments for public health accreditation. *J Public Health Manag Pract*. 2014;20(5):490-497. doi:10.1097/PHH.0b013e3182a99918

28. Office of Disease Prevention and Health Promotion, Office of the Assistant Secretary for Health, Office of the Secretary, U.S. Department of Health and Human Services. Public Health Infrastructure - Healthy People 2030. Health People 2030 Objectives and Data. Accessed September 12, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/public-health-infrastructure

29. Erwin PC. The performance of local health departments: a review of the literature. *J Public Health Manag Pract*. 2008;14(2):E9. doi:10.1097/01.PHH.0000311903.34067.89

30. DeSalvo K, Parekh A, Hoagland GW, et al. Developing a financing system to support public health infrastructure. *Am J Public Health*. 2019;109(10):1358-1361. doi:10.2105/AJPH.2019.305214

31. Ebekozien O, Henry A. Advancing health equity through public health department accreditation in the United States. *Perspect Public Health*. 2019;139(1):17-18. doi:10.1177/1757913918815866

32. Allen P, Mazzucca S, Parks RG, Robinson M, Tabak RG, Brownson R. Local health department accreditation is associated with organizational supports for evidence-based decision making. *Front Public Health*. 2019;7:374. doi:10.3389/fpubh.2019.00374

33. Gregg A, Bekmuratova S, Palm D, et al. Rurality, quality improvement maturity, and accreditation readiness: a comparison study of Colorado, Kansas, and Nebraska local health departments. *J Public Health Manag Pract*. 2018;24(6):E15-E22. doi:10.1097/PHH.0000000000000678

34. Grimm B, Ramos AK, Maloney S, et al. The most important skills required by local public health departments for responding to community needs and improving health outcomes. *J Community Health*. 2022;47(1):79-86. doi:10.1007/s10900-021-01020-0

35. Core Competencies for Public Health Professionals: Domains. Public Health Foundation. Accessed September 5, 2023. https://www.phf.org/programs/corecompetencies/Pages/Core_Competencies_Domains.aspx

36. McFarlane TD, Dixon BE, Grannis SJ, Gibson PJ. Public health informatics in local and state health agencies: an update from the public health workforce interests and needs survey. *J Public Health Manag Pract*. 2019;25(2 Suppl):S67-S77. doi:10.1097/PHH.0000000000000918

37. Sainkhuu S, Cunha-Cruz J, Rogers M, Knerr S, Bekemeier B. Evaluation of training gaps among public health practitioners in Washington state. *J Public Health Manag Pract*. 2021;27(5):473-483. doi:10.1097/PHH.0000000000001184

38. Kett PM, Bekemeier B, Patterson DG, Schaffer K. Competencies, training needs, and turnover among rural compared with urban local public health practitioners: 2021 public health workforce interests and needs survey. *Am J Public Health*. 2023;113(6):689-699. doi:10.2105/AJPH.2023.307273

39. Lister JJ, Joudrey PJ. Rural mistrust of public health interventions in the United States: a call for taking the long view to improve adoption. *J Rural Health*. 2023;39(1):18-20. doi:10.1111/jrh.12684

40. Wooten WJ, Julien JA, Werth J. How public health accreditation helped one local health department integrate and promote health equity. *J Public Health Manag Pract*. 2018;24 Suppl 3:S60-S65. doi:10.1097/PHH.0000000000000777

41. Shah GH, Sheahan JP. Local health departments' activities to address health disparities and inequities: are we moving in the right direction? *Int J Environ Res Public Health*. 2016;13(1):44. doi:10.3390/ijerph13010044

42. Carroll LD, Wetherill MS, Teasdale TA, Salvatore AL. Community health improvement plans: an analysis of approaches used by local health departments. *J Public Health Manag Pract.* 2022;28(1):E291-E298. doi:10.1097/PHH.0000000000001279

43. Wetta RE, Dong F, LaClair B, Pezzino G, Orr SA. Factors affecting the progress of community health assessment and improvement activities in Kansas. *J Public Health Manag Pract.* 2015;21(4):E1-E9. doi:10.1097/PHH.0000000000000086

44. Barnes P, Erwin P, Moonesinghe R, Brooks A, Carlton EL, Behringer B. Functional characteristics of health coalitions in local public health systems: exploring the function of county health councils in Tennessee. *J Public Health Manag Pract.* 2017;23(4):404-409. doi:10.1097/PHH.0000000000000477

45. Wilson KD, Mohr LB, Beatty KE, Ciecior A. Describing the continuum of collaboration among local health departments with hospitals around the community health assessments. *J Public Health Manag Pract.* 2014;20(6):617-625. doi:10.1097/PHH.0000000000000030

46. McCullough JM, Eisen-Cohen E, Salas SB. Partnership capacity for community health improvement plan implementation: findings from a social network analysis. *BMC Public Health.* 2016;16(1):566. doi:10.1186/s12889-016-3194-7

47. Yeager VA, Leider JP. The role of salary in recruiting employees in state and local governmental public health: PH WINS 2017. *Am J Public Health.* 2019;109(5):683-685. doi:10.2105/AJPH.2019.305008

48. Coe S, Marlow A, Mather C. Whole of community facilitators: an exemplar for supporting rural health workforce recruitment through students' professional experience placements. *Int J Environ Res Public Health.* 2021;18(14):7675. doi:10.3390/ijerph18147675

49. Chen LW, Xu L, Yu F, Jacobson J, Roberts S, Palm D. The relationship between county variation in macro contextual factors and the performance of public health practice in regional public health systems in Nebraska. *J Public Health Manag Pract.* 2012;18(2):132-140. doi:10.1097/PHH.0b013e3182294e66

50. Hirsch Q, Davis S, Stanford M, Reiter M, Goldman M, Mallow J. Beyond broadband: equity, access, and the benefits of audio-only telehealth. *Health Aff Forefr.* doi:10.1377/forefront.20210916.819969

51. Predmore ZS, Roth E, Breslau J, Fischer SH, Uscher-Pines L. Assessment of patient preferences for telehealth in post–COVID-19 pandemic health care. *JAMA Netw Open.* 2021;4(12):e2136405. doi:10.1001/jamanetworkopen.2021.36405

52. Kassabian M, Shrestha A, Callaghan T, et al. Rural healthy people 2030: common challenges, rural nuances. May 2023. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

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# HOUSING AND HOMES: IMPLICATIONS FOR RURAL AMERICANS' HOUSING CONDITIONS, MENTAL HEALTH OUTCOMES, AND OVERALL WELL-BEING

*By Alva O. Ferdinand, DrPH, JD and Emesomhi Eboreime, MPH*

## SCOPE OF THE PROBLEM

- For the first time in the history of the U.S. Department of Health and Human Services' Healthy People initiative, specific objectives tied to reducing health and safety risks in homes have been established.[1]
- In the Rural Healthy People 2030 national survey, rural stakeholders ranked "Housing and Homes" as the 14th most important health priority for rural Americans in the upcoming decade.[2,3]
- While homeownership has historically been higher among rural residents in the U.S., the structures that they own tend to be older, more expensive to heat and cool,[4,5] and may contain lead, which is especially concerning for the health and development of rural children.[6]
- Homelessness among rural residents is difficult to accurately capture in terms of proportionality due to the phenomenon being less visible than it is in urban contexts.[7,8]

Housing and home environments have direct and indirect implications for individual and population health.[9,10] Housing is a key social determinant of health, with poor housing found to be associated with diseases such as typhoid, pneumonia, cholera, depressive symptoms, fair overall health, and increased mortality.[11,12] It is now more broadly appreciated that the quality of one's dwelling is closely linked to physical and mental wellbeing.[11] This is not only true for unstably housed adults, but for infants,[13] children,[12] youth,[11] and the elderly[14] as well. While the social determinants of health (SDoHs) were included in in the U.S. Department of Health and Human Services' (HHS) last iteration of Healthy People (Healthy People 2020), they were primarily focused on economic stability, education, neighborhood and built environments, as well as social and community contexts.[15] In that iteration, housing cost burdens were the only objective closely tied to the realities of housing affordability and experiences.[15]

In Healthy People 2030, HHS included a goal of promoting healthy and safe home environments for the first time.[1] This represents a more in-depth and targeted look at a critical determinant of health – one that many researchers in the U.S. have been examining with greater intensity over the last decade. Importantly however, a large proportion of the research done on the associations between housing and health in the U.S. have been centered in urban contexts with fewer studies comparing or focusing on these associations in rural environments.[11]

## HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

In this iteration of Healthy People, HHS included a specific focus on decreasing safety and health risks that occur in homes, with an overarching goal to "promote healthy and safe home environments."[1] This goal became particularly salient with the emergence of the COVID-19 pandemic as lockdowns and stay-at-home orders were employed by local and state governments in the quest to halt the rapid spread of the disease. During the pandemic, many U.S. residents had to do a lot more from home than they previously did, including working. According to results of the American Time Use Survey, the share of employed individuals who spent time working at home decreased marginally from 38% in 2021 to 34% in 2022.[16] Nevertheless, the percentage of individuals

working from home in 2022 was still much higher than it was in 2019 (pre-pandemic).[16]

Access to safe, healthy, and stable housing is critical because of the profound impact it has on physical and mental health in children, adults, and the elderly. Healthy People 2030 included seven core objectives that are tied to housing and homes issues. In this chapter, progress towards five of those objectives will be discussed. These objectives are grouped into four categories below: housing and homes in general, mental health and mental disorders, people with disabilities, and tobacco use.[17]

1. Housing and Homes – General
    - Reduce blood lead levels in children aged 1 to 5 years old – EH-04
    - Reduce the proportion of families that spend more than 30 percent of income on housing – SDOH-04

2. Mental Health and Mental Disorders
    - Increase the proportion of homeless adults with mental health problems who get mental health services – MHMD-R01

3. People with Disabilities
    - Reduce the proportion of people with intellectual and developmental disabilities who live in institutional settings with 7 or more people – DH-03

4. Tobacco Use
    - Increase the number of states, territories, and D.C. that prohibit smoking in multiunit housing – TU-R01

## RURAL HEALTHY PEOPLE 2030 SURVEY

In the survey conducted by the Southwest Rural Health Research Center at the Texas A&M University School of Public Health to gauge population health priorities for rural America, "Housing and Homes" was deemed to be a top 20 priority health topic among stakeholders across all census regions.[2,3] Overall, the health topic of Housing and Homes ranked 14th among priority areas for the current decade.[2,3] Importantly, the placement of Housing and Homes among the top 20 priority areas varied by census region. Specifically, survey respondents from the West and the Northeast ranked Housing and Homes as the 8th and 11th priority areas respectively, while respondents from the Midwest and South ranked the same topic as 15th and 17th, respectively. When looking at the responses of stakeholders in states that expanded Medicaid and states that did not, there was no ranking variation for housing and homes. Nevertheless, there were slight variations in the ranking of housing and homes by field of employment, with Human Services personnel ranking it as the 5th top priority, while personnel employed in agriculture (25th), health care (19th), and business management/administration (14th) ranked it as a lower priority. In terms of work settings, respondents employed within Federally Qualified Health Centers (FQHCs) (9th) and rural public health agencies (9th) ranked housing and homes as a higher priority than those employed at critical access hospitals (20th), rural health clinics (27th), and rural hospitals (17th).

## PREVALENCE AND DISPARITIES IN RURAL AREAS

### *Housing Affordability and Insecurity*

The survey upon which this publication is based was disseminated at an unprecedented time in U.S. history with respect to housing. At the time of this writing, the U.S. Department of Agriculture (USDA), which provides competitively priced mortgage options to those living in designated rural areas, had a loan rate of 7.644% for a 30-year fixed loan and a 30-year refinance rate of 7.573%.[18] These rates are in stark contrast to those announced by the USDA on August 30, 2016. In that year, the USDA reduced the interest rate for home mortgages to 2.875%.[19] This considerable rise in interest rates over the last decade has significantly contributed to challenges to housing affordability and increases in housing insecurity.

Housing insecurity has been defined by the U.S. Department of Housing and Urban Development as encompassing several dimensions of housing problems that people may experience, including steep housing costs in proportion to income, overcrowding, unstable neighborhoods, substandard housing, or loss of housing.[20]

One of the goals tied to housing and homes over the next decade is to reduce the proportion of families that spend more than 30% of

their household income on a dwelling place. Achievement of this goal would significantly improve housing security and stability for both urban and rural residents in the U.S. Moreover, it would contribute to overall health and wellness. Previous researchers have noted that the affordability and condition, as well as access to housing all contribute to health and well-being.[9,11]

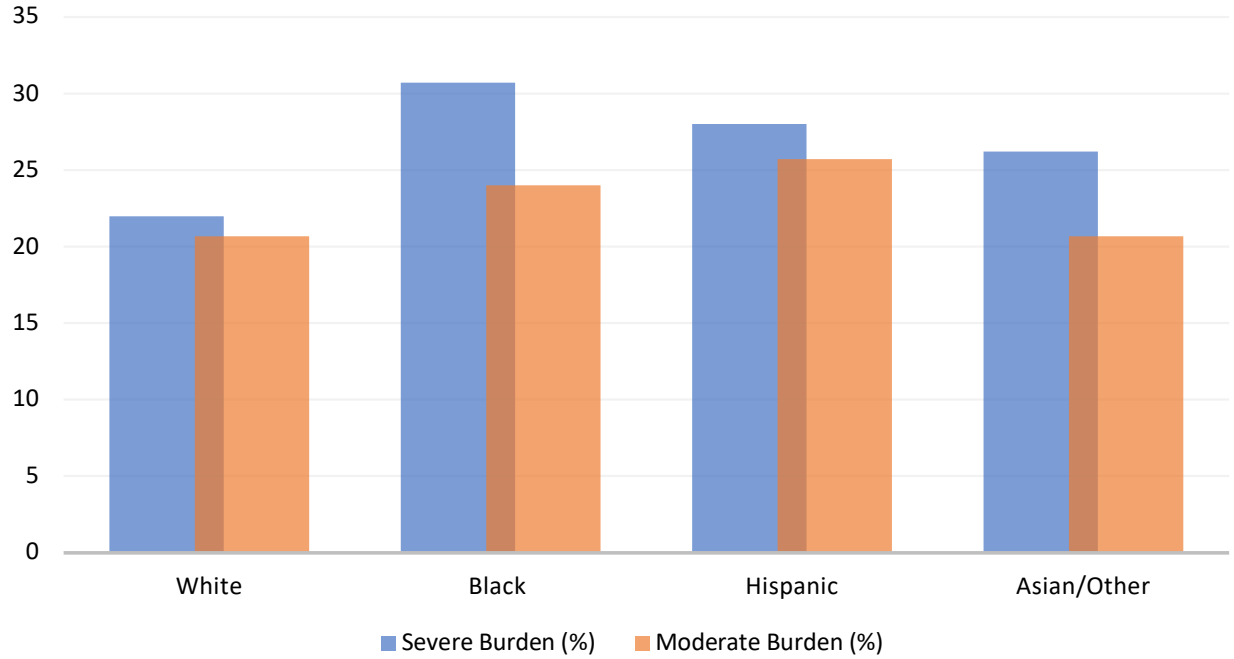
### *Variations in Housing Cost Burdens for Rural and Urban Americans*

Rural Rental Housing. According to a 2016 report by the Joint Center for Housing Studies of Harvard University, housing costs that exceed 30% of gross household income – which is deemed as unaffordable – are a reality for 41% of all rural renters.[21] In the same report, it was noted that 21% of these renters are considered severely cost burdened, spending over 50% of their gross household income on housing.[21] Thus, while cost burdens are often discussed and examined in the urban context, a sizeable proportion of rural residents face these affordability challenges each year.

In a study published in 2020 by researchers at the University of Georgia, the cost burden of rural rental housing was further explored.[4] In this study, the authors sought to critically examine utility costs and their contribution to overall rental housing burdens among rural Americans.[4] More specifically, the authors argued that simply calculating mortgage or rent payment in determining housing cost burden is not reflective of total housing costs.[4] Instead, they suggested that recurring costs of occupying housing units should also be included, as the costs of cooling, heating, and other energy costs have steadily increased over time.[4,5] In this quantitative study, the authors found that utilities constitute a large share of housing costs burdens for rural residents, particular rural residents who rent.[4] They found that the share of overall household income that goes toward utilities is more likely to drive rural renters over the 30% threshold.[4]

Critically, the Joint Center for Housing Studies of Harvard University found that renter cost burdens were not evenly distributed across race/ethnicity, with higher severe burdens borne by those identifying as Black, Hispanic, Asian, or 'Other' and higher moderate burdens for these subpopulations as well.[22] These variations are depicted in **Figure 1**.

**Figure 1. Renter Cost Burden by Race and Ethnicity, 2017[22]**




*Notes: Moderately cost-burdened households pay 30-50% of income on housing. Severely cost-burdened households pay more than 50% of income on housing.*

*Source: Joint Center for Housing Studies of Harvard University. Renter Cost Burdens by Race and Ethnicity. Accessed September 25, 2023. https://www.jchs.harvard.edu/ARH_2017_cost_burdens_by_race*

Demographic and economic differences in cost of living are thought to be a reflection of variations in the types of jobs that urban and rural Americans work, educational attainment levels, racial and ethnic makeup, transportation time and costs, as well as overall levels of poverty and affluence.[23,24] In a study published by Pacas and Rothwell in 2020, it was noted that there are significant differences in housing costs not only between states, but within states as well, particularly when looking at metropolitan and nonmetropolitan counties.[25] Social scientists have long recognized that poverty in the U.S. has tended to be clustered in rural parts of the country,[25] specifically in Native American lands, Appalachia, the Southern "Black Belt," the Mississippi Delta, and the Rio Grande Valley.[25]

### *Rural Home Ownership*

According to the U.S. Census Bureau, home ownership is higher in rural areas than it is in rural areas.[26] This holds true across all census regions with the most notable difference between urban and rural homeownership rates in the Northeast (83.8% versus 58.2%).[26] Approximately 16.5 million occupied homes in rural America are owner-occupied. This represents 71.4% of occupied homes.[27] **Figure 2** shows a well-established trend of higher homeownership among rural residents of the U.S. relative to urban residents.[27] Notably however, homeownership primarily trended downwards between 2010 and 2018 with factors such as the Great Recession playing a role in the decline.[27] Modest improvements in homeownership rates started to occur in 2016. Nevertheless, many rural individuals and families still face challenges obtaining affordable housing and owning their homes.[21,27]

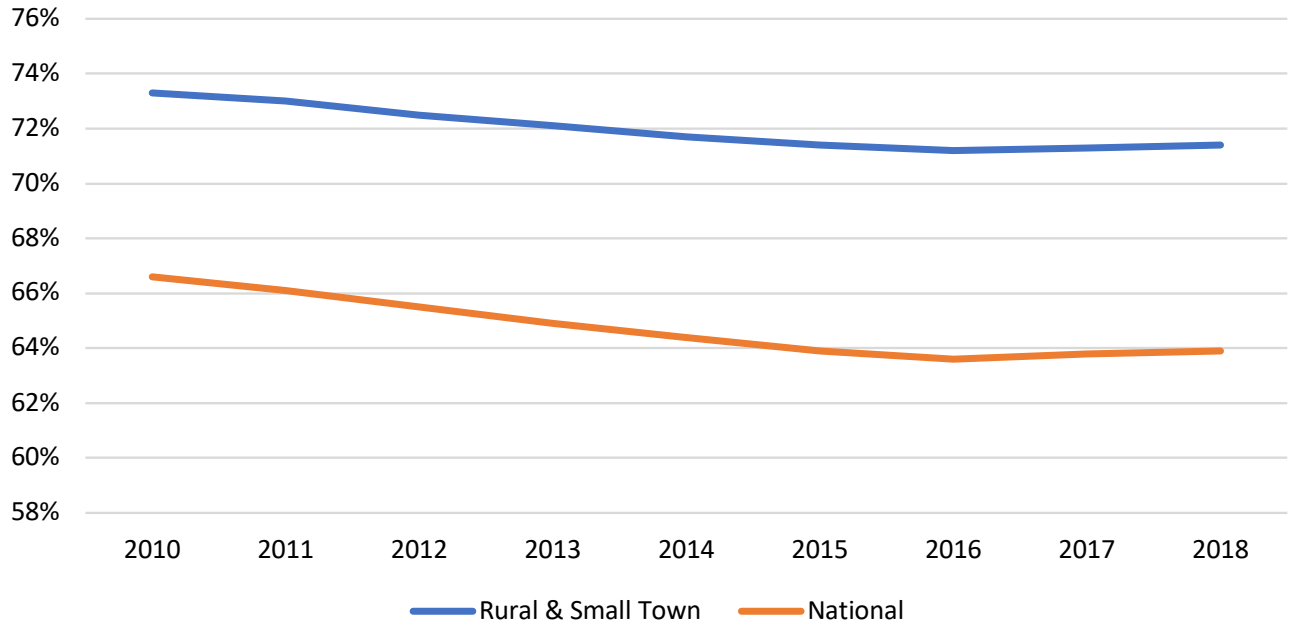
Despite these higher trends of homeownership and owner-occupied residences in rural America, the distribution of these trends is not equal when demographic factors such as race and ethnicity are considered. According to the Housing Assistance Council (HAC), White, non-Hispanic rural residents have higher ownership rates (75%) than their minority counterparts (55%).[27] Home ownership rates for various races and Hispanic ethnicity are depicted in **Figure 3**.

## MENTAL HEALTH PROBLEMS AND MENTAL HEALTH SERVICES

### *Homeless Adults with Mental Health Problems*

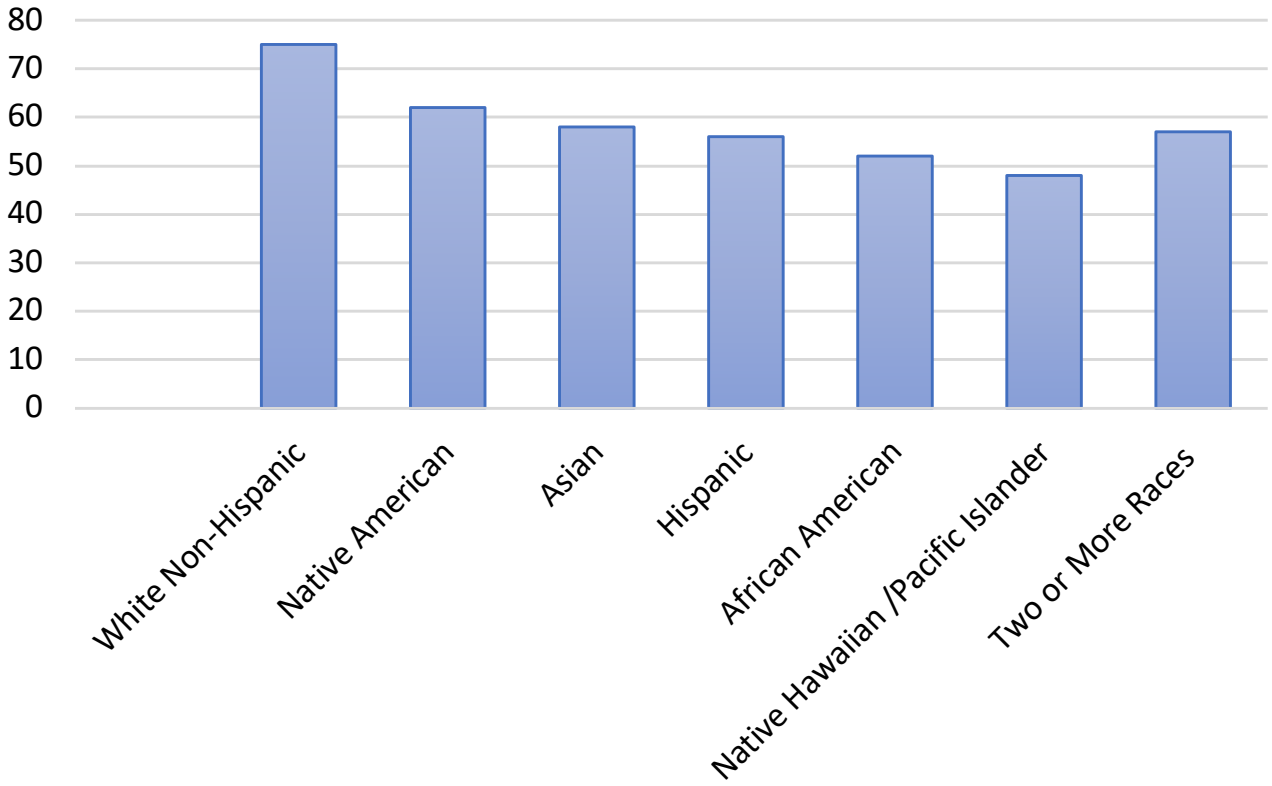
Homeless individuals experience health problems similar to those faced by individuals who are housing secure. However, poor mental health is often notably more prominent among those

**Figure 2: Homeownership Rates by Residence, 2010 – 2018[27]**




*Source: Feinberg M. Home Ownership in Rural America. Accessed March 21, 2023. https://ruralhome.org/wp-content/uploads/2021/05/Homeownership_in_Rura_America_web.pdf*

**Figure 3: Rural and Small Town Home Ownership By Race/Ethnicity[27]**




*Source: Feinberg M. Home Ownership in Rural America. Accessed March 21, 2023. https://ruralhome.org/wp-content/uploads/2021/05/Homeownership_in_Rura_America_web.pdf*

that are homeless.[28] Previous research has noted that access to safe, affordable housing combined with robust and consistent support services that assist the homeless in acquiring housing and remaining housed are critical in meeting the needs of homeless individuals who live with mental illnesses.[28,29] Although homelessness is generally thought to be an urban dilemma, rural homelessness is a very real and growing problem as well. According to a national poll conducted by National Public Radio (NPR), the Robert Wood Johnson Foundation, and the Harvard T. H. Chan School of Public Health in 2019, one-third of rural Americans expressed that homelessness is a problem in their community.[30] Notably, it is largely thought that estimates of the rural homeless are undercounted,[7,8] as it is common for the rural homeless to be in out-of-sight locations such as forest campgrounds, desert canyons, and mountain hollows and therefore not detected.[31]

Previous qualitative research has noted a strong disinclination on the part of those experiencing homelessness in rural areas to move away from their places of origin.[32] This is because social connectivity and support networks remain critical despite the experience of homelessness.[32] For this reason, it is very important that efforts to combat rural homelessness and housing insecurity be centered around local infrastructure and capacity.

### *Housing and Mental Health Problems – Implications for Children*

The relationship between health and poverty among rural children has largely been understudied. Researchers have noted that rural children experience significant limitations in terms of accessing primary and specialty care due to geographical and transportation-related barriers, as well as an inadequate number of health care providers.[7] Mental, behavioral, and developmental disorders typically originate in early childhood and can have lifelong health and well-being implications.[33]

A 2017 study using the National Survey of Children's Health (NSCH) showed that a higher percentage of children residing in rural areas had parents who reported having financial difficulties that impacted their ability to meet basic needs such as housing.[33] Additionally, the

study indicated that children in rural areas were more likely to report living in a neighborhood in poor conditions that lacked amenities than urban children.[33] Importantly, after adjusting for poverty among children with mental, behavioral, and developmental disorders as well as race and ethnicity, the study showed that children in rural areas more often had a parent living with poor mental health.[33]

## LEAD EXPOSURE IN HOUSING

Lead exposure in U.S. housing continues to exist despite the residential use of lead-based paint being banned in 1978. According to findings from the American Healthy Homes Survey II (AHHS II) which were released in October 2021, 34.6 million homes (29.4% of all housing units) still contain lead-based paint.[34] This survey was conducted by the U.S. Department of Housing and Urban Development's Office of Lead Hazard Control and Healthy Homes. The AHHS II also revealed that 21.9 million homes (18.6%) have dust lead hazards, 18.2 million (15.4%) have substantially deteriorated lead-based paint, and 2.5 million homes (2.0%) have soil lead hazards.[34] The survey's findings are important because lead exposure has been found to be associated with growth delays, brain damage, as well as learning and behavioral issues, among other health challenges.[35]

Lead exposure in children is particularly problematic because it often goes undetected due to a lack of immediate symptoms.[35] The AHHS II noted that housing units in urban areas are more likely to have lead-based paint than rural housing units.[34] Nevertheless, the burden of lead exposure among rural children is important to explore as opportunities for detection and treatment are limited. Researchers have noted that there is a paucity of literature on elevated blood lead levels among rural children.[6] In a study examining elevated blood lead levels in rural and urban newborns in Iowa, it was shown that elevated blood lead in newborns was associated with residence in areas with pre-1940s housing, as well as women with low educational status in both urban and rural settings.[6] Though no differences were detected in terms of the proportion of children with elevated blood levels, a spatial cluster of elevated blood lead was found in rural counties in the study.[6] The authors concluded that though the density of children exposed to lead is lower in rural areas than it is in urban areas, the potential for exposure is still high for rural children.[6]

Another study published in 2022 assessed neighborhood poverty, older housing and their associations with adverse birth outcomes in Texas.[36] The authors specifically operationalized older housing as that built before 1975 because they were constructed before the lead-based paint ban.[36] The researchers linked population-level birth certificate data for White, Black, Hispanic, and 'Other' women in Texas to tract-level median housing age and poverty level from the American Community Survey. Children were more likely to be born under adverse birth circumstances (e.g. being small-for-gestational age, having low birth weight, or being born before full term) when their mothers lived in high-poverty neighborhoods with housing built before the lead-based paint ban.[36]

## SMOKING PROHIBITIONS IN MULTIUNIT HOUSING

Despite overall downward trends in cigarette smoking in the U.S., it continues to be the leading cause of preventable disease, disability and death.[37] Researchers have noted that cigarette smoking is more prevalent among rural residents than it is among urban residents, with this disparity having increased over time.[38] Using data from the National Survey on Drug Use and Health (NSDUH) from 2010 – 2020, researchers explored trends in cigarette smoking and quit ratios for those aged 18 and older in rural and urban settings.[38] The researchers found that in 2020, smoking prevalence was significantly higher in rural areas than in urban areas, but that quit ratios were similar along the urban-rural continuum.[38] Additionally, over the study period, the likelihood of quitting was lower in rural areas than it was in urban areas despite quit ratios increasing over time.[38]

The aforementioned information is contextually important for understanding how smoke-free policies have been differentially impactful between rural and urban residents. In a study published in the *American Journal of Public Health* in 2019, the authors set out to explore access to smoke-free laws and policies and uneven

adoption of the policies in single-family and multiunit housing in rural regions by thoroughly examining the literature published on this topic through 2018.[39] Importantly, the authors noted that subpopulations that have disproportionately borne the undesirable consequences of tobacco use have historically been rural residents, those living with low incomes, and people with mental health or substance use disorders, among others.[38] Notably, strong smoke-free laws have not been robustly passed in rural regions due to political resistance to tobacco-control policies and because of alliances between manufacturers and farmers.[38] This is especially true in the South.[38] Nevertheless, the authors found that multiunit residents in both rural and urban settings expressed strong support for smoke-free public housing.[38] Smoke-free multiunit housing would particularly lower exposure to second-hand smoke for individuals who live in these settings and do not smoke.[38]

## OTHER FACTORS RELEVANT TO HOUSING AND HOMES

### *Housing Conditions*

There is an established relationship between poverty and housing conditions. Results from the 2019 American Community Survey (ACS) indicate that the rural poverty rate was 15.4% in 2019, whereas the urban poverty rate was 11.9%. According to the Economic Research Service (ERS) of the USDA, "concentrated poverty contributes to poor housing and health conditions."[40] The ERS has further stated that more than 85% of the 353 persistently poor counties in the U.S. can be found in rural areas.[40] Notably, over 80% of counties identified in persistent poverty by the U.S. Census Bureau are located in the South.[41] Moreover, though housing may be less expensive in rural areas than in urban ones, the quality of housing may be particularly lower due to a higher rate of substandard housing units.[40] According to the Urban Institute, rural dwellings are generally older than average, with upwards of 6.7 million rural households lacking either complete kitchen facilities or complete plumbing.[42] This is of particular concern for rural adults, who tend to favor aging in place more so than urban adults.[43]

### *Farmworker Housing*

Previous researchers have noted that farmworkers are one of the few occupational groups for whom housing may be directly tied to employment.[44] Historically, this housing has not met local zoning standards.[44] In their work summarizing the literature on farmworker housing, Quandt and colleagues described farm labor dwellings as having exposure to agricultural chemicals (e.g. in rugs and other furnishings) and pest infestations.[44] Additionally, they noted widespread structural deficiencies such as leaky roofs, holes in walls and floors, unsafe drinking water, and dysfunctional electrical, plumbing, air conditioning or heating systems.[44]

Separate from the physical condition of farmworkers' dwellings, previous literature has investigated their compositional quality, that is the extent to which the dwellings were crowded or overcrowded.[31,42,44,45] Generally, dwellings are considered crowded when there is more than one person per room,[44,46] and considered overcrowded or severely crowded when there are more than 1.5 persons per room.[46,47] A study examining housing characteristics among farmworker families in North Carolina utilized interviews of mothers with at least one child aged two to four years in farmworker families over two years.[48] The researchers found that about 40% of the interviewed mothers reported that six or more individuals resided in their home.[48] Twenty percent of the 221 participants in the study reported that three or more persons occupied one bedroom, with approximately 6% of the represented households having four or more individuals per bedroom.[48] The study suggested that the large number of residents in these homes may include adults who are not members of the nuclear family that the interviewed mothers belonged to.[48] The authors noted that housing scenarios like this have been shown to be associated with undesirable health effects such as stress among adults and developmental delays among children.[48]

## VARIATION BY RACE AND ETHNICITY

Studies have shown that minority populations in rural areas encounter disparate housing experiences. Minority populations often face

pervasive health disparities compared to their White counterparts,[49] and this is no different in the context of housing. In a recent study that utilized a nationally representative sample, it was shown that 48% of rural Native Americans reported experiencing major housing problems relative to 26% of rural Whites.[50] Moreover, in this same study, it was shown that 20% or rural Native Americans experienced major problems paying for housing versus 9% of rural Whites.[50]

A qualitative study exploring the experiences of foreign-born Latinos specifically focused on Mexicans and Central Americans who settle along the borderlands between the United States and Mexico.[51] The study, which was published in 2018, noted that many Central Americans and Mexicans in these areas reside in communities that lack basic resources and are characterized by abject poverty.[51] Impermanent housing was also found to be very common, with seasonal and non-contractual employment being major contributors.[51] The study's authors noted that situational life events coupled with persistent and daily chronic strain tied to low social status, limited access to healthcare, lack of employment and housing instability furthered stress and subsequent poor mental health outcomes such as depression.[51]

In another study, researchers explored the associations of poor housing with mental health among Latino migrant farmworkers in North Carolina.[52] The authors conducted both housing inspections and interviews with 371 farmworkers residing in 186 camps. When conducting housing inspections and interviews, the researchers explored the number of people per sleeping room, having a key to a dwelling's door, perceived security of self and belongings, number of housing regulation violations, having access to bedroom storage, and toilet privacy.[52] In terms of mental health outcomes, the researchers investigated the prevalence of alcohol misuse, anxiety, and depression among the study sample.[52] Of the 371 Latino migrant farmworkers included in the study, 185 (50%) had the potential for alcohol misuse, 60 (16%) had substantial depressive symptoms, and 31 (8%) had substantial anxiety. Importantly, in terms of housing circumstances, those without a key to their dwelling, those who did not feel safe or that their belongings were protected, and those who lacked bedroom storage exhibited substantial depression and anxiety scores.[52] The authors noted the distinct links between inferior housing and Latino farmworkers' mental health and suggested that the study's findings could be used to inform strategies for preventing and treating poor mental health among migrant farmworkers and for strategies on farmworker housing regulations.[52]

## PROVEN SOLUTIONS OR INTERVENTIONS

### *Medicaid Demonstration Waivers*

Scholars have noted that housing is a critical component in empowering people living with mental illnesses to successfully live in their communities.[29,53] Yet, securing housing for those being treated for serious mental health illnesses often remains an evasive task. Unlike other essential community-based services such as skilled nursing and hospice care that can be covered by Medicaid programs, housing cannot currently be covered.[53] This then forces agencies and advocates serving those with mental illnesses to rely on various federal state, and local housing subsidy options where available. One suggestion that has been made to address this problem has been for Medicaid demonstration waivers to be created that would cover housing.[53] The hypothesis behind this suggestion is that housing could be made more widely available if mental health service systems could use Medicaid funds for housing.[53] Contingent on a showing that Medicaid financing for housing improves mental health outcomes and reduced reliance on more costly services and perhaps less effective outcomes, the results could inform strategies for modifying Medicaid to allow reimbursement for housing where appropriate.[53]

### *Home Repairs*

Previous research has noted that resources targeted toward home repairs can have a profound impact on health.[54] A study conducted in rural East Tennessee qualitatively explored the impact of home repairs on physical, mental, and social health.[54] Twenty-eight interviews were conducted and themes from them were extracted for inference. The interviewees resided in four counties that are classified as 'at-risk' or 'distressed' and are a part of the Appalachian region, where poverty rates increase as rurality

increases.[54] The Appalachia Service Project (ASP), a nonprofit organization, has been on a mission to repair homes for low-income families in rural Central Appalachia since 1969.[55] Each year, ASP provides critical repairs for more than 350 families with the help of upwards of 15,000 volunteers.[55] It has been posited that the efforts of private or nonprofit organizations, such as ASP, may be more effective in improving housing among rural residents due to resistance to governmental authority and assistance programming, as well as a desire to preserve autonomy and self-sufficiency.[54]

Researchers explored the extent to which the ASP's repairs impacted environmental risk reduction, physical health, mental health, financial well-being, and willingness to receive assistance from service organizations.[54] Interviewees reported reduced mold, pests, leaks, moisture, and fall risk, as well as improved climate control.[54] Interviewees also noted that the repairs made coping with health problems such as arthritis, cancer, and chronic obstructive pulmonary disease (COPD) more bearable.[54] The following quotes are representative of the feedback the researchers received with respect to physical health: "We're not getting sick as often because it's not cold in the house," and "We have been less prone to get sick, just because of the lack of the leaky roof, the new sheet rock on the walls,... the insulation in the ceiling."[54] Importantly, the researchers noted that the most frequently reported impacts centered on mental health. Two of the quotes from those interviewed were, "[The house] was stressing us out and we don't worry about that now...it lifted a great burden," and "Family and friends come in and visit and we're not embarrassed or anything about how our house looks...so [we] socialize more."[54] Financial impacts such as reduced utility costs and increased property value were also described during the interviews. Taken together, the impacts of this program's efforts on physical, environmental, and mental health, as well as financial well-being, provide some insights into the outcomes that can be achieved through service organizations' focus on housing repairs.

### *Self-Direction in Treatment for Serious Mental Health Conditions*

Mental health researchers and clinicians have placed increasing emphasis on self-direction or self-directed care as a form of person-centered treatment in recent years.[56] Self-direction in mental health treatment typically involves patients purchasing goods and services and controlling an individualized budget in ways that support their personal recovery and overall mental health goals.[56] Self-directing patients typically have a coach or broker that assists with the development of person-centered plans, the tracking or progress toward goals and objectives, and assistance with financial management.[57]

In a quasi-experimental study published by Croft and colleagues in 2018, the outcomes of self-directing and non-self-directing individuals were explored, particularly in the contexts of employment and housing independence.[58] This study lasted approximately four years, and specifically explored employment status, income from paid employment in the past 30 days, and days worked for pay in the last 30 days. Moreover, the authors explored the transition from dependent housing (i.e. group home settings, assisted living, living with others, etc.) or homelessness to living independently, or maintaining independent housing status.[58] The study's findings were promising. They showed that self-directing individuals were more likely to have had positive 'days worked for pay' outcomes than the non-self-directing participants in the study.[58] Moreover, self-directing individuals were more than twice as likely to attain or maintain independent housing compared to those in the non-self-directing group.[58] The authors suggested that future work should involve mixed methods and implementation science approaches to explore the complex issues associated with the reach of these kinds of programs and the key characteristics of support personnel that are key for achieving gains in independence.[58]

### *Permanent Supportive Housing and Housing First Programs*

It is now understood that housing stability and community reintegration are critical components of mental health and addiction treatment. This is especially true for individuals who experience chronic homelessness. In a column describing a mixed methods study conducted by the Southeast Mental Health Technology Transfer Center to

identify regional mental health priorities in eight states of the southeastern United States, supported housing was highlighted as a critical priority area.[59] The authors of the column further explained that based on their mixed methods study, areas of need to achieve robust supported housing programs included financing, expanded housing programs and improved integration and coordination between mental health services and supported housing.[59]

Permanent Supportive Housing (PSH) is one such program that has been designed to expand and integrate mental health services and housing efforts. Permanent Supportive Housing has been defined by the U.S. Department of Housing and Urban Development (HUD) as "community based housing without a designated length of stay in which formerly homeless individuals and families live as independently as possible."[60] Critical to PSH are supportive services to assist homeless individuals with disabilities or families living with an adult or child with disabilities.[60,61]

Smelson and colleagues conducted a pilot study to examine the feasibility of integrating permanent supportive housing and an evidence-based intervention called Maintaining Independence and Sobriety Through Systems Integration, Outreach, and Networking (MISSION).[29] The researchers recruited 107 individuals with co-occurring mental, substance use, and other disorders who were living in chronic homelessness from inner-city and rural areas of Massachusetts.[29] The evidence-based intervention (MISSION) included case managers and peer support specialists who served approximately 15 clients at a time.[29] The program employed a gradual reduction strategy in which clients received 2.5 hours of individual or group sessions per week for 10 months, and two 2.5 hour sessions per month for the remaining two months of the 12-month program.[29] This reduction was intentional and was aimed toward assisting clients with the transition from MISSION to community-based services.[29] While the study did not stratify results by rural and urban residence, the findings showed that 79% of the participants who were placed in permanent supportive housing during the study remained housed at the end of the study.[61] This was particularly notable, as each of the participants had co-occurring mental and substance use disorders and had been chronically homeless upon entering the program. The researchers attributed the success of the program to case managers who were both trained in MISSION and in permanent supportive housing, which meant that clients were receiving services and support from the same care teams as opposed to fragmented services from various providers.[29]

Another study published in 2022 examined PSH among a sample of adults with disabilities.[62] This study was based in North Carolina and included individuals who began participating in a PSH program between 2015 and 2018.[62] Specifically, the researchers involved in the study set out to explore retention in the PSH program and sought to identify factors associated with housing retention and duration.[62] The findings showed that older age, female gender, and non-Hispanic Black race/ethnicity were associated with lower risk of PSH departure.[62] Furthermore, having a severe mental illness was associated with greater risk of departure from the PSH program.[62] Importantly, rurality of the PSH placement and level of socioeconomic deprivation were not associated with greater PSH program departure risk, indicating that this approach is promising in rural settings.[62]

Housing First is similar to PSH in that it provides subsidized permanent housing to people with disabilities experiencing homelessness. However, in Housing First programs, there is no requirement that clients undertake treatment for their disability or in the case of those living with substance use disorder (SUD), attain, and maintain sobriety.[63] In a study published in 2020, researchers conducted a systematic review to assess the effectiveness of Housing First programs.[63] In this systematic review, Housing First programs were compared to Treatment First programs, which require clients to be 'housing ready' and substance free before receiving support toward permanent housing.[63] The study's results showed that Housing First programs reduced homelessness more than Treatment First programs.[63] Moreover, the study found that Housing First programs strengthened housing stability among participants in that the number of days and the proportion of time the participants were stably housed increased.[63] Additionally, for clients living with a human immunodeficiency

virus (HIV) infection, Housing First clients had 63% greater housing stability across included studies relative to Treatment First clients and 38% less homelessness.[63] Housing First clients living with an HIV infection also saw improved physical health, as well as lower perceived stress and depression.[63] Importantly, the systematic review's authors noted the lack of specific inclusion of rural clients among the included studies.[63] In another more recent systematic review, it was shown that while evidence from studies published in the United States revealed that the economic benefits of Housing First Programs outweigh the cost of the programs, no included studies examined the economic impact of the program for rural residents.[64] Thus, while Housing First could potentially be an effective solution for rural residents experiencing homelessness and health disorders, this solution has been understudied for this subpopulation. Rural providers, funders, and stakeholders interested in increasing the proportion of homeless adults with mental health programs who receive mental health services could explore the feasibility and impact of Housing First programs in remote settings.

***Screening for Housing Needs***

With increasing awareness and acknowledgement of the importance of connecting social circumstances to health outcomes, more healthcare providers are screening for social needs and exploring referral interventions in their practices.[65] In a 2023 study published by investigators in Oregon, patients' willingness to participate in social needs navigation following remote and in-person screening was assessed.[65] Rural patients were represented in the study. The investigators found that there was no statistical difference in willingness to accept social needs navigation (e.g. referral interventions) based on whether the patient was seen in person or remotely, indicating that remote screening may not adversely impact willingness to agree to assistance with services tied to stable housing acquisition, among others.

Notably, researchers also recently set out to estimate the costs of intervening in health-related social needs, including housing needs that were identified during primary care visits.[66] Data on the social needs of patients seen in primary care settings were obtained from the National Center for Health Statistics from 2015 to 2018, with patients seen in rural non-FQHCs in high-poverty areas represented in the study. The investigators found that 78% of patients with housing needs were eligible for assistance, but only 24% of them were enrolled in programs that provide aid.[66] They additionally estimated that on average, $60 per patient per month was needed to provide evidence-based interventions for housing, transportation, food and care coordination needs.[66] Importantly, the researchers noted that less than half of this cost ($27 on average) is currently covered by federal funds, indicating that substantial state, local, and private resources are still needed to address social needs such as adequate housing.[66] With the country's continued efforts toward quality improvement in healthcare delivery, several entities, including those that provide care to rural residents, have included screening for housing insecurity in their efforts. Despite this, there is evidence that suggests that rural clinicians are often not aware of housing and other SDoH-related resources that could support and best meet the needs of their patients.[67] This suggests that improved program implementation and communication between rural clinicians and agencies providing support services should be addressed.

***Solutions for Lead Exposure***

Window Replacements and Lead Paint Mitigation. In the previously mentioned 2022 study finding – that neighborhood poverty combined with older housing is associated with adverse birth outcomes – it was noted that allocated funds for place-based interventions that address lead paint mitigation in high-poverty neighborhoods with older housing stock may reduce the risk of undesirable birth outcomes.[36] One such intervention was described by Jacobs and colleagues in a paper published in 2016 wherein window replacement was explored.[68] This window replacement intervention took place in Illinois and was funded by a state bond-financed pilot program aimed at replacing old lead-contaminated windows with new lead-free energy efficient ones.[68] While the study included urban residences, it also included rural ones. The findings of the study showed that lead dust from the start of the study to one year post window replacement was reduced by 44%, 88%, and 98%

for interior floors, interior sills, and exterior troughs respectively.[68] These findings were consistent for both urban and rural households. In addition to average lead dust findings, households for which window were replaced by the state bond-financed pilot program reported reduced occurrences of uncomfortable indoor temperatures and improvements in various health outcomes such as mental health, headaches, respiratory illnesses, and ear infections.[68] The authors of the study concluded that a major source of childhood lead exposure could be eliminated by state and local governments' funding and operating window replacement programs.[68] In addition to reduced lead exposure, the authors suggested that window replacement programs would increase home market values, create local construction and industrial jobs, as well as improve energy bills for residents.[68]

In-Hospital Environmental Consults. Another strategy aimed at detecting lead exposure and subsequent unwanted health outcomes that has been recently studied is that of environmental health consults for children hospitalized with respiratory infections.[69] This study was based in Alaska and included children from 12 tribal health service areas, five of which are considered rural or remote.[69] Crucially, accessing rural and remote regions required travel by airplane, riverboat, or snow machine.[69] During hospitalization, environmental health specialists from Alaska Native Tribal Health Consortium's (ANTHC) Community Environment and Health (CEH) provided environmental health consults for parents or legal guardians of Alaska Native children.[69] During these consults CEH personnel educated parents and legal guardians on best practices for woodstove burning, optimal ventilation system operation and maintenance, best practices for house cleaning, mold and moisture control, and proper chemical storage, among other things.[69] The CEH staff additionally provided Healthy Homes Toolkits that included lead test kits.[69] Once households with lead and other exposures were identified, local authorities completed low-cost home modifications.[69] At follow-up, respiratory symptoms were reduced among children whose homes received modifications.[69] Based on these findings, the authors suggested that these in-hospital environmental consults, mailed toolkits, and arranged and targeted home modifications are cost-effective strategies for reducing unwanted exposure-based respiratory outcomes in children.[69]

***Polices that Support Farmworkers***

The USDA's Economic Research Service (ERS) has estimated that approximately 50% of hired farmworkers in the U.S. lacks legal immigration status, with many being foreign-born individuals from Mexico and Central America.[70] The ERS has also estimated that immigrant farmworkers make up 73% of agriculture workers in the U.S.,[70] making them critically important to food production and supply capacity in the nation. Additionally, in 2022, the average farm wage for nonsupervisory farmworkers, such as field crop workers, was $16.62 per hour – about 60% of the average non-farm wage.[70] Previous work has noted that the agricultural sector is exempt from several of the federal laws that were put in place to protect workers.[71,72] These facts, coupled with lower levels of educational attainment among farmworkers[70] set the stage for limited self-advocacy within this group.[72] Scholars who have conducted studies on farmworker housing have called for policies that provide mechanisms through which farmworkers could report substandard housing conditions or perceived housing regulation violations to a third party or agency.[72] This mechanism would equip farmworkers with an option separate from reporting to their employers, who may not be incentivized to fully address their concerns. Additionally, calls have been made for agricultural exclusions from existing labor protections, such as those provided in the Occupational Safety Act of 1970, the National Labor Relations Act, and the Fair Labor Standards Act, to be reversed in support of housing and health among farmworkers.[72] Moreover, allocative policies that boost state and federal agencies' ability to enforce current housing regulations, train health care providers and agency personnel on identifying and addressing housing needs and related health challenges, and educate farmworkers on housing requirements should be adopted and implemented.[72] Furthermore, adequate federal and state resources that support standardized evaluation of the impact of housing-related policies on farmworkers at regular intervals should be set aside to assess and meet future needs.[72]

## SUMMARY AND CONCLUSIONS

Rural residents in the U.S. face unique challenges in ensuring residence in housing that is structurally sound and supportive of overall physical, mental, and emotional health. This is because some rural residents are older and less equipped to repair and maintain residential structures, have lower median incomes, and reside in houses that are older relative to urban housing stock. Investments in affordable housing in rural America have not kept pace with the housing needs, and this has had important implications for mental health, blood lead levels, second-hand smoke exposure and financial well-being for rural communities. Notably, these implications have been profound for children, the elderly, the homeless, and historically marginalized subpopulations such as those belonging to a racial or ethnic minority group.

Despite the challenges, there are promising strategies that private and governmental entities at local, state, and federal levels can employ to achieve the overall goal of promoting healthy and safe home environments in rural contexts in the upcoming decade. These strategies include more robust use of wraparound services that make it easier for housing needs to be identified and addressed, and partnerships with service organizations who may be more trusted by rural residents than governmental entities for housing repairs and lead abatement efforts. Additionally, greater awareness among clinicians of social support programs that address housing needs has the potential to significantly improve mental health outcomes for rural residents, particularly those who experience chronic homelessness. There are also opportunities in the upcoming decade for jurisdictions to consider the passage of robust smoke-free policies that protect multiunit rural residents from disadvantageous exposure to second-hand smoke.

## REFERENCES


1. U.S. Department of Health and Human Services. Housing and Homes. 2020. Accessed January 3, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/housing-and-homes.

2. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: New decade, new challenges. *Prev Med Rep.* 2023;33:102176. doi:10.1016/j.pmedr.2023.102176

3. Kassabian M, Shrestha A, Callaghan T, et al. Rural Healthy People 2030: Common Challenges, Rural Nuances. May 2023. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

4. Gawrys MR, Carswell AT. Exploring the cost burden of rural rental housing. *Journal of Rural Studies.* 2020;80:372-379.

5. Hernandez D. Understanding 'energy insecurity' and why it matters to health. *Soc Sci Med.* 2016;167:1-10. doi:10.1016/j.socscimed.2016.08.029

6. Carrel M, Zahrieh D, Young SG, et al. High prevalence of elevated blood lead levels in both rural and urban Iowa newborns: Spatial patterns and area-level covariates. *PloS one.* 2017;12(5):e0177930. doi:10.1371/journal.pone.0177930

7. Bettenhausen JL, Winterer CM, Colvin JD. Health and poverty of rural children: an under-researched and under-resourced vulnerable population. *Acad Pediatr.* 2021;21(8S):S126-S133. doi:10.1016/j.acap.2021.08.001

8. Hart K. Homelessness Isn't Just a Big City Problem. February 5, 2020. Accessed September 25, 2023. https://www.axios.com/2020/02/05/homelessness-rural-america-cities#

9. Swope CB, Hernandez D. Housing as a determinant of health equity: a conceptual model. *Soc Sci Med.* 2019;243:112571. doi:10.1016/j.socscimed.2019.112571

10. Garrison V, Pollack C. The Health-Housing Nexus: New Answers to Key Questions. Building Healthy Places Network. December 13, 2018. Accessed July 29, 2023. https://buildhealthyplaces.org/sharing-knowledge/blogs/expert-insights/the-health-housing-nexus-new-answers-to-key-questions/

11. Taylor L. Housing and Health: An Overview of the Literature. Health Affairs. Health

Policy Brief. June 2018. Accessed July 28, 2023. https://www.healthaffairs.org/do/10.1377/hpb20180313.396577/full/hpb_2018_rwjf_01_w-1686236365825.pdf

12. Sandel M, Sheward R, Ettinger de Cuba S, et al. Unstable housing and caregiver and child health in renter families. *Pediatrics*. 2018;141(2):e20172199. doi:10.1542/peds.2017-2199

13. Cutts D, Bovell-Ammon A, Ettinger de Cuba S, et al. Homelessness During Infancy: Associations with Infact and Maternal Health and Hardship Outcomes. *Cityscape: A Journal of Policy Development and Research*. 2018;20(2):119-132. https://www.huduser.gov/portal/periodicals/cityscpe/vol20num2/ch8.pdf

14. Joint Center for Housing Studies of Harvard University. Housing America's Older Adults 2019. 2019. Accessed July 28, 2023. https://www.jchs.harvard.edu/sites/default/files/reports/files/Harvard_JCHS_Housing_Americas_Older_Adults_2019.pdf

15. Ferdinand A. Social Determinants of Health: Implications for Rural America. Chapter 19. In: *Rural Healthy People 2020. Volume 2*. 2015. Accessed July 28, 2023. https://srhrc.tamu.edu/documents/rhp2020-volume-2.pdf.

16. U.S. Bureau of Labor Statistics. Economic News Release: American Time Use Survey Summary. June 22, 2023. Accessed November 20, 2023. https://www.bls.gov/news.release/atus.nr0.htm

17. U.S. Department of Agriculture. Housing Programs. Accessed March 24, 2023. https://www.rd.usda.gov/programs-services/all-programs/housing-programs

18. USDAloans.com. Compare USDA Rates for Purchase or Refinance. 2023. Accessed October 31, 2023. https://www.usdaloans.com/program/rates/

19. U.S. Department of Agriculture. Record Low Interest Rate Announced for USDA Rural Development Home Mortgage Loans. 2016. Accessed November 19, 2023. https://www.rd.usda.gov/newsroom/news-release/record-low-interest-rate-announced-usda-rural-development-home-mortgage-loans

20. U.S. Department of Housing and Urban Development. Measuring Housing Insecurity in the American Housing Survey. November 19, 2018. Accessed August 10, 2023. https://www.huduser.gov/portal/pdredge/pdr-edge-frm-asst-sec-111918.html

21. Mathur S. Are renters and homeowners in rural areas cost-burdened? Joint Center for Housing Studies of Harvard University. August 11, 2016. Accessed July 29, 2023. https://www.jchs.harvard.edu/blog/are-renters-and-homeowners-in-rural-areas-cost-burdened#:~:text=Indeed%2C%20fully%2041%20percent%20of,of%20their%20income%20on%20housing)

22. Joint Center for Housing Studies of Harvard University. Renter Cost Burdens by Race and Ethnicity (1B). 2016. Accessed September 25, 2023. https://www.jchs.harvard.edu/ARH_2017_cost_burdens_by_race

23. Mueller JT, Brooks MM, Pacas JD. Cost of living variation, nonmetropolitan America, and implications for the Supplemental Poverty Measure. *Popul Res Policy Rev*. 2022;41(4):1501-1523. doi:10.1007/s11113-022-09702-w

24. Hamidi S, Ewing R, Renne J. How affordable is HUD affordable housing? *Housing Policy Debate*. 2016;26(3):437-455. doi:10.1080/10511482.2015.1123753

25. Pacas JD, Rothwell DW. Why is poverty higher in rural America according to the Supplemental Poverty Measure? An Investigation of the geographic adjustment. *Population Research and Policy Review*. 2020;39(5):941-975.

26. Mazur C. Rural Residents More Likely to Own Homes than Urban Residents. September 27, 2017. Accessed March 26, 2023. https://www.census.gov/library/stories/2017/09/rural-home-ownership.html#:~:text=Rural%20Residents%20More%20Likely%20to%20Own%20Homes%20Than%20Urban%20Residents&text=If%20owning%20a%20home%20is,percent%20compared%20to%2059.8%20percent

27. Feinberg M. Home Ownership in Rural America. Rural Research Brief. June 2020. Accessed March 21, 2023. https://ruralhome.

org/wp-content/uploads/2021/05/Homeownership_in_Rura_America_web.pdf

28. Onapa H, Sharpley CF, Bitsika V, et al. The physical and mental health effects of housing homeless people: a systematic review. *Health Soc Care Community*. 2022;30(2):448-468. doi:10.1111/hsc.13486

29. Smelson DA, Zaykowski H, Guevermont N, et al. Integrating permanent supportive housing and co-occurring disorders treatment for individuals who are homeless. *J Dual Diagn*. 2016;12(2):193-201. doi:10.1080/15504263.2016.1174010

30. Robert Wood Johnson Foundation. Poll: Rural Americans Report Problems Paying for Medical Bills, Housing, or Food. 2019. Accessed September 25, 2023. https://www.rwjf.org/en/about-rwjf/newsroom/2019/05/four-in-ten-rural-americans-report-problems-paying-for-medical-bills-housing-or-food.html

31. Summers P, Quandt SA, Talton JW, Galvan L, Arcury TA. Hidden farmworker labor camps in North Carolina: an indicator of structural vulnerability. *Am J Public Health*. 2015;105(12):2570-2575. doi:10.2105/AJPH.2015.302797

32. Gleason KD, Dube M, Bernier E, Martin J. Using geographic information systems to assess community-level vulnerability to housing insecurity in rural areas. *J Community Psychol*. 2022;50(4):1993-2012. doi:10.1002/jcop.22589

33. Robinson LR, Holbrook JR, Bitsko RH, et al. Differences in Health Care, Family, and Community Factors Associated with Mental, Behavioral, and Developmental Disorders Among Children Aged 2-8 Years in Rural and Urban Areas - United States, 2011-2012. Surveillance Summaries. MMWR. 2017;66(8):1-11. https://www.cdc.gov/mmwr/volumes/66/ss/ss6608a1.htm

34. U.S. Department of Housing and Urban Development Office of Lead Hazard Control and Healthy Homes. American Healthy Homes Survey II: Lead Findings. October 29, 2021. Accessed September 26, 2023. https://www.hud.gov/sites/dfiles/HH/documents/AHHS%20II_Lead_Findings_Report_Final_29oct21.pdf

35. Centers for Disease Control and Prevention. Health Effects of Lead Exposure. September 2, 2022. Accessed September 27, 2023. https://www.cdc.gov/nceh/lead/prevention/health-effects.htm

36. Wood BM, Cubbin C. Neighborhood poverty in combination with older housing is associated with adverse birth outcomes: a study on ubiquitous lead risk among 1 million births in Texas. *Int J Environ Res Public Health*. 2022;19(3):1578. doi:10.3390/ijerph19031578

37. Centers for Disease Control and Prevention. Current Cigarette Smoking Among Adults in the United States. May 4, 2023. Accessed November 19, 2023. https://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/index.htm

38. Parker MA, Weinberger AH, Eggers EM, Parker ES, Villanti AC. Trends in rural and urban cigarette smoking quit ratios in the US from 2010 to 2020. *JAMA Netw Open*. 2022;5(8):e2225326. doi:10.1001/jamanetworkopen.2022.25326

39. Hafez AY, Gonzalez M, Kulik MC, Vijayaraghavan M, Glantz SA. Uneven access to smoke-free laws and policies and its effect on health equity in the United States: 2000-2019. *Am J Public Health*. 2019;109(11):1568-1575. doi:10.2105/AJPH.2019.305289

40. U.S. Department of Agriculture. Rural Poverty & Well-Being. November 15, 2023. Accessed June 28, 2023. https://www.ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being/

41. Benson C, Bishaw A, Glassman B. 341 U.S. Counties Experiencing Persistent Poverty. United States Census Bureau. Identifying Areas with Long-Term High Poverty. May 22, 2023. Accessed June 29, 2023. https://www.census.gov/library/stories/2023/05/persistent-poverty-areas-with-long-term-high-poverty.html#:~:text=Native%20tribal%20lands.-,Counties%20identified%20as%20being%20in%20persistent%20poverty%20were%20typically%20less,during%20the%2030-%2Dyear%20period

42. Pendall R, Goodman L, Zhu J, Gold A. The Future of Rural Housing. Research

Report. October 2016. Accessed June 28, 2023. https://www.urban.org/sites/default/files/publication/85101/2000972-the-future-of-rural-housing_6.pdf

43. Lee SJ, Parrott KR, Lee M, Robinson SR, Owusu RN. Residential satisfaction of rural older adults aging in place. *Gerontol Geriatr Med*. 2021;7:2333721421997190. doi:10.1177/2333721421997190

44. Quandt SA, Brooke C, Fagan K, Howe A, Thornburg TK, McCurdy SA. Farmworker housing in the United States and its impact on health. New Solut. 2015;25(3):263-286. doi:10.1177/1048291115601053

45. Camarota S, Zeigler K. Overcrowded Housing Among Immigrant and Native-Born Workers. October 2020. Center for Immigration Studies. Accessed July 5, 2023. https://cis.org/sites/default/files/2020-10/overcrowding-2020-final_1.pdf

46. United States Census Bureau. Historical Census of Housing Tables: Crowding. 2000. Accessed August 12, 2023. https://www.census.gov/data/tables/time-series/dec/coh-crowding.html

47. Torshizian E, Grimes A. Household crowding measures: a comparison and external test of validity. *Journal of Happiness Studies*. 2020;22(4):1925-1951.

48. Arcury TA, Trejo G, Suerken CK, Ip EH, Quandt SA. Stability of household and housing characteristics among farmworker families in North Carolina: implications for health. *J Immigr Minor Health*. 2017;19(2):398-406. doi:10.1007/s10903-016-0369-3

49. Meit M, Knudson A. Leveraging interest to decrease rural health disparities in the United States. *Am J Public Health*. 2017;107(10):1563-1564. doi:10.2105/AJPH.2017.304025

50. Findling MTG, Blendon RJ, Benson JM, Miller C. The unseen picture: issues with health care, discrimination, police and safety, and housing experienced by Native American populations in rural America. *J Rural Health*. 2022;38(1):180-186. doi:10.1111/jrh.12517

51. Cheney AM, Newkirk C, Rodriguez K, Montez A. Inequality and health among foreign-born Latinos in rural borderland communities. *Social Sci Med*. 2018;215:115-122. doi:10.1016/j.socscimed.2018.09.011

52. Mora DC, Quandt SA, Chen H, Arcury TA. Associations of poor housing with mental health among North Carolina Latino migrant farmworkers. *J Agromedicine*. 2016;21(4):327-334. doi:10.1080/1059924X.2016.1211053

53. Mathis J. Housing is mental health care: a call for Medicaid demonstration waivers covering housing. *Psychiatr Serv*. 2021;72(8):880-884. doi:10.1176/appi.ps.202000252

54. O'Connell B, Sloop A, Intagliata N, Quinn M. They built my soul: a qualitative analysis of the impacts of home repairs in rural Tennessee. *J Appalach Health*. 2022;4(1):9-19.

55. Appalachia Service Project. About Appalachia Service Project. 2020. Accessed September 26, 2023. https://asphome.org/about/

56. Croft B, Wang K, Cichocki B, Weaver A, Mahoney K. The emergence of mental health self-direction: an international learning exchange. *Psychiatr Serv*. 2017;68(1):88-91. doi:10.1176/appi.ps.201600014

57. Croft B, Parish S. Participants' assessment of the impact of behavioral health self-direction on recovery. *Community Ment Health J*. 2016;52(7):781-792. doi:10.1007/s10597-016-9999-0

58. Croft B, Isvan N, Parish SL, Mahoney KJ. Housing and employment outcomes for mental health self-direction participants. *Psychiatr Serv*. 2018;69(7):819-825. doi:10.1176/appi.ps.201700057

59. Walker ER, Moore E, Tapscott S, Alperin M, Cummings JR, Druss BG. Developing regional mental health priorities: mixed-methods needs assessment of eight states in the Southeastern United States. *Psychiatr Serv*. 2021;72(3):358-361. doi:10.1176/appi.ps.202000141

60. U.S. Department of Housing and Urban Development. HUD Exchange. Continuum of Care (CoC) Program Eligibility Requirements. 2023. Accessed November 14, 2023. https://www.

hudexchange.info/programs/coc/coc-program-eligibility-requirements/

61. The National Academies of Sciences Engineering Medicine. Permanent Supportive Housing: Evaluating the Evidence for Improving Health Outcomes Among People Experiencing Chronic Homelessness. 2018. Accessed November 14, 2023. https://www.ncbi.nlm.nih.gov/books/NBK519594/pdf/Bookshelf_NBK519594.pdf

62. Grove LR, Berkowitz SA, Cuddeback G, Pink GH, Stearns SC, Domino ME. Permanent supportive housing tenure among a heterogeneous population of adults with disabilities. *Popul Health Manag.* 2022;25(2):227-234. doi:10.1089/pop.2021.0348

63. Peng Y, Hahn RA, Finnie RKC, et al. Permanent supportive housing with Housing First to reduce homelessness and promote health among homeless populations with disability: a Community Guide systematic review. *J Public Health Manag Pract.* 2020;26(5):404-411. doi:10.1097/PHH.0000000000001219

64. Jacob V, Chattopadhyay SK, Attipoe-Dorcoo S, et al. Permanent supportive housing with Housing First: findings from a Community Guide systematic economic review. *Am J Prev Med.* 2022;62(3):e188-e201. doi:10.1016/j.amepre.2021.08.009

65. Steeves-Reece AL, Davis MM, Hiebert Larson J, et al. Patients' willingness to accept social needs navigation after in-person versus remote screening. *J Am Board Fam Med.* 2023;36(2):229-239. doi:10.3122/jabfm.2022.220259R1

66. Basu S, Berkowitz SA, Davis C, Drake C, Phillips RL, Landon BE. Estimated costs of intervening in health-related social needs detected in primary care. *JAMA Intern Med.* 2023;183(8):762-774. doi:10.1001/jamainternmed.2023.1964

67. Williams D, Eckstrom J, Avery M, Unutzer J. Perspectives of behavioral health clinicians in a rural integrated primary care/mental health program. *J Rural Health.* 2015;31(4):346-353. doi.org/10.1111/jrh.12114

68. Jacobs DE, Tobin M, Targos L, et al. Replacing windows reduces childhood lead exposure: results from a state-funded program. *J Public Health Manag Pract.* 2016;22(5):482-491. doi:10.1097/PHH.0000000000000389

69. Nelson A, Salkoski AJ, Richards B, et al. Environmental health consults in children hospitalized with respiratory infections. *J Community Health.* 2021;46(2):324-333. doi:10.1007/s10900-020-00886-w

70. Economic Research Service U.S. Department of Agriculture. Farm Labor. 2023; https://www.ers.usda.gov/topics/farm-economy/farm-labor/. Accessed September 25, 2023.

71. Sattler B. Farmworkers: Environmental Health and Social Determinants. *Annu Rev Nurs Res.* 2019;38(1):203-222.

72. Heine B, Quandt SA, Arcury TA. "Aguantamos": Limits to Latino Migrant Farmworker Agency in North Carolina Labor Camps. *Hum Organ.* 2017;76(3):240-250.

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# AN EXAMINATION OF THE WORKFORCE IN RURAL AMERICA

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## SCOPE OF THE PROBLEM

- Workforce shortages in primary care and behavioral health are high-priority public health issues as demonstrated by Healthy People 2030 (HP 2030) objective AHS-R01.[1]
- Persistent shortages of primary care nurse practitioners and family medicine physicians exist across rural and underserved regions of the United States, leading to difficulty for patients to access primary care (HP2030 objective AHS-R01).[1]
- Public health workforce priorities elevated to "research status" include improving the quality of health departments, (HP2030 objective PHI-R01),[2] improving the financing of public health infrastructure (HP2030 objective PHI-R08),[3] and increasing the use of telehealth to improve access to health services (HP2030 AHS-R02).[4]
- Employer-based worksite wellness programs may provide a means of improving the health of the rural American workforce (HP 2030 ECBP-D03).[5]

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Rural communities face challenges in recruiting and retaining a sufficient supply of workers. This is especially true for the rural *healthcare* workforce of the United States (U.S.). This chapter will explore the current literature related to the workforce needs of rural America. Data are examined according to rural versus urban differences, regional differences, racial and ethnic disparities, and barriers to educating, training, and improving the rural workforce. We also report on possible solutions to primary care workforce shortages, such as telehealth, and recommend needed policy modifications. Information presented in this chapter will address Health People 2030's overarching goals of creating social, physical, and economic environments that promote attaining the full potential for health and well-being for all.[1] Public health infrastructure has emerged as a high-priority area, particularly preventive health services such as vaccines and a workforce prepared to respond to emergencies and disasters.

## HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

Every decade, the U.S. Department of Health and Human Services (DHHS) establishes goals and objectives that, if accomplished, will contribute to making Americans healthier. The current initiative, known as Healthy People 2030, has – for the first time – identified "Workforce" as a leading health indicator. Workforce had not been independently discussed in earlier iterations of Healthy People, where it fell as a specific objective under the Health Care Access and Quality goal.

The overall goal for workforce in Healthy People 2030 is to "strengthen the workforce by promoting health and well-being." The following Healthy People 2030 objectives are relevant to this chapter:

- AHS-R01: Increase the ability of primary care and behavioral health professionals to provide more high-quality care to patients who need it.
- AHS-R02: Increase the use of telehealth to improve access to health services.
- ECBP-D03: Increase the proportion of worksites that offer an employee health promotion program.
- PHI-R04: Monitor and understand the public health workforce.

## RURAL HEALTHY PEOPLE 2030 SURVEY OUTCOMES

Selecting from 62 Healthy People 2030 leading health indicators, 1,291 rural stakeholders responded to a web-based survey to determine the most important health priorities for rural Americans.[6] The respondents consisted of rural stakeholders including government officials, healthcare providers, agency heads, academicians, and community leaders. A total of 25.3% of respondents to the Rural Healthy People 2030 survey identified workforce as a top 10 health concern, making it the 15th highest ranked priority for rural Americans. This is the first time the survey identified workforce independently of health care access and quality, or public health infrastructure.

Results of the survey were evaluated by stakeholder census region, gender, age group, race, field of employment, and by whether they resided in a state with or without Medicaid expansion.[7] Overall, rural stakeholders recognized the workforce as the 15th most frequently ranked health priority for rural Americans, whether respondents lived, or did not live, in a Medicaid expansion state. Workforce ranked relatively high in the West (11th), Midwest (13th), and Northeast (16th), but did not rank in the top 20 in the South (21st). Workforce was ranked higher by male respondents (12th) than by females (15th), and by non-White respondents (11th) compared to those who identified as White (15th). Rankings by field of employment varied from 7th, for respondents working in federally qualified health centers, to 22nd for employees of rural health clinics.[7]

## OVERVIEW OF THE RURAL AND RURAL HEALTHCARE WORKFORCE

The U.S. Department of Agriculture (USDA) in its 2022 Edition of Rural America at a Glance addressed the changing rural demography of the country.[8] While the percentage of the population aged 65 and older living in nonmetropolitan areas has increased to 20% from 2010 to 2021, during the same period, the nonmetropolitan working-age population declined by 4.9%.[8] Along with economic diversity, this period also saw increased employment in five major industries: government, manufacturing, retail, health care, and social assistance. Rural employment in health care and social assistance experienced significant growth of 21.5% between 2001 and 2019. While in 2012 more than half of rural American workers held middle-skill jobs, driven by the service sector like healthcare,[9] over the last decade there has been an increasing number of rural college-educated workers, creating a shift in rural industries that employ high-skilled workers.[8]

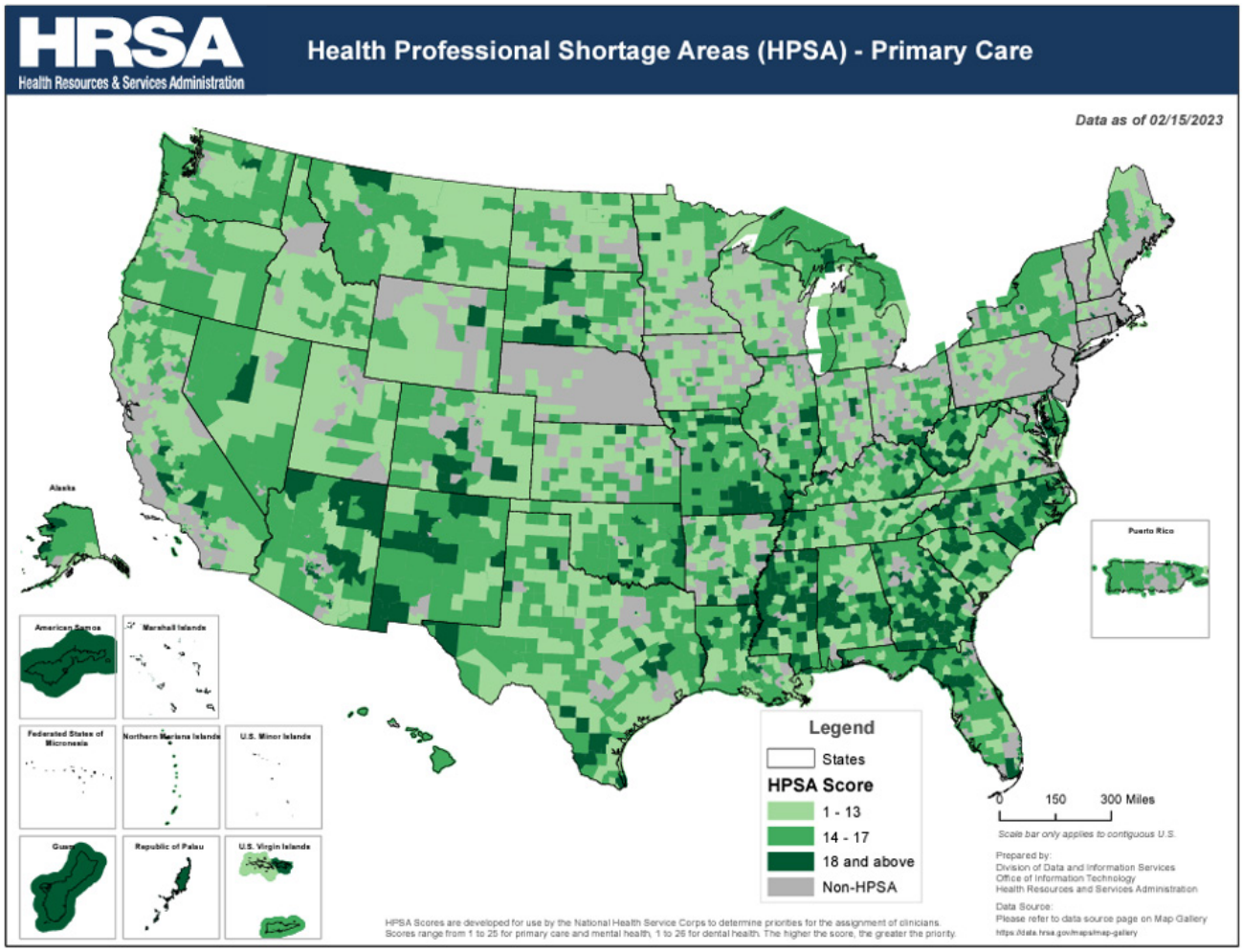
Health professional shortages in rural areas of the country persist. **Figure 1** provides an up-to-date overview of rural counties in the U.S. that are health professional shortage areas (HPSAs) for primary care. A HPSA is defined as a geographic area, population, or facility that has a shortage of primary, dental, or mental health care providers.[10] The Bureau of Health Workforce, Health Resources and Services Administration (HRSA) reports that 61.52% of primary medical HPSAs are rural, 31.87% are nonrural and 6.61% are partially rural.[11] There is a greater need for primary care health professionals in rural counties as compared to urban areas (See **Figure 1**). In the 2023 HRSA Health Professional Shortage Areas report, HRSA predicts a shortage of 17,303 primary care practitioners, 12,582 dental practitioners, and 8,253 mental health practitioners.[12]

The American Association of Medical Colleges (AAMC) estimates a 12% increase in physician demand between 2019 and 2032 in rural areas of the U.S., equating to the need for approximately 95,900 additional full-time physicians in rural areas.[13]

Estimated needs for advanced practice professionals (APPs), both nurse practitioners (NPs) and physician assistants (PAs), call for an additional 22,700 NPs and 12,800 PAs. Eliminating full practice authority restrictions for NPs, which has been accomplished in 27 states, led to improved healthcare access for rural and underserved populations without affecting quality of care.[14]

According to HRSA, 24% of licensed practical or vocational nurses and 16% of the registered nurse workforce practice in rural areas.[15] Approximately half of the rural healthcare workforce is comprised of registered nurses. HRSA's Health

Figure 1. Map of Health Professional Shortage Areas (HPSAs)




*Source: HPSAs of 02/15/2023*[10]

Workforce Simulation Model projected a national licensed practical or vocational nurse deficit of 13% by 2030.[15]

National estimates and projections of the registered nurse workforce supply and demand mask geographic workforce disparities (as noted in **Table 1**). In addition, the estimates fail to consider the ability to recruit and retain nurses in rural areas. In light of these difficulties, some rural healthcare settings have entered into collaborative agreements with colleges and universities to create a pipeline to rural hospitals to increase recruitment and retention.[16]

Despite the American Dental Association's determination that the supply of dentists is adequate to meet population needs across the U.S., the major problem is that not enough dentists are working in *rural* areas.[17] Less than 2% of male dentists, and less than 1% of female dentists, practice in rural areas. While Surdu et al. (2021) reported that men are more likely than women to practice as rural dentists, there is still a paucity of rural dental care.[17] As such, teledentistry is becoming more prevalent in rural areas, but state policies and regulations have not kept pace with emerging technologies. The typical model is a dental hygienist and an assistant on-site, while a dentist is available remotely.[18]

There are major disparities between rural and urban areas of the U.S. in the supply of behavioral health professionals, including psychiatrists, psychologists, psychiatric/mental health NPs, social workers, and counselors.[19,20] Behavioral health needs are increasingly addressed through the co-location of behavioral health workers with primary care providers. There are rural and urban differences in access to co-located professionals that reflect a significant disparity as seen in data from the National Provider Identifier.[21] Rural

primary care providers were significantly less likely to have a co-located behavioral health worker than their urban counterparts (26% vs. 46%, respectively). The fewer primary and specialty care providers associated with a practice setting, the less likely there will be a co-located behavioral health professional.[21,22] Projections for the nation suggest that the number of behavioral health professionals will not be enough to meet needs by 2030.[20]

Differences in the number of health professionals per 10,000 people exist in rural versus urban areas.[22] Data from the Area Health Resources Files are publicly available from HRSA. **Table 1** demonstrates the differences in supply for select professions.

## VARIATIONS BY RACE/ETHNICITY

In rural America, economic diversity has not been reflective of workforce diversity. In 2012, middle-skill employment (some training, but less than college degree) in rural areas was reportedly held by 51% of all workers compared to 42% in urban areas.[9] Hispanics in rural areas were more likely to hold middle-skill jobs than Blacks or Whites.[9] Older workers in rural areas were more likely to hold middle-skill jobs compared to younger workers.[9] Between 2012 and 2019, rural job growth was highest for Hispanics, and for all races other than White, in almost every industry except agriculture.[8] Although there has been improvement in the past decade, much remains to be done to achieve gender and racial parity in rural communities and to address the changing demographic and economic needs.

In rural health professions, several racial, ethnic, and disability groups remain underrepresented.[23] To better address health inequities and disparities, one recommendation is for organizations to commit to hiring individuals that reflect the diversity of their communities. However, the lack of interest in rural placements makes recruiting and retaining healthcare professionals from diverse backgrounds difficult. The Rural Healthcare Workforce review by the Rural Health Information Hub (2023) acknowledges that 83.2% of rural Licensed Practical Nurses (LPNs) are White individuals, compared to 56.9% in urban

**Table 1. Per capita rates of health professionals rural and urban differences – selected occupations**

| Occupation | Health professionals per 10K, Rural | Health professionals per 10K, Urban |
|---|---|---|
| Dentists | 3.1 | 4.8 |
| Registered Nurses | 64.5 | 93.9 |
| Licensed Practical Nurses/Licensed Vocational Nurses | 24.2 | 20.0 |
| Physician Assistants | 9.4 | 11.9 |
| Physicians (MDs) | 11.0 | 31.5 |
| Physicians (DOs) | 1.8 | 2.4 |
| Primary Care Physicians | 5.2 | 8.0 |
| Total Physicians | 12.7 | 33.9 |
| Nurse Practitioners | 7.8 | 9.6 |
| Total Advanced Practice Registered Nurses | 9.4 | 11.9 |
| Nurse Anesthetists | 1.2 | 1.7 |

*Source:*[22]

areas.[22] Minority physicians are more likely to practice in underserved areas than their White counterparts.[24] However, the percentage of White family physicians practicing in rural areas is still higher than those practicing in urban areas. (90.5% vs. 82.7%).[25] The American Hospital Association recommends the creation of programs that develop a strong sense of community between health professionals and the rural community they serve, in order to increase recruitment and retention of a diverse workforce.[26]

## RURAL WORKSITE WELLNESS

Rural workplace brings unique healthcare challenges associated with unhealthy lifestyles. Worksite wellness and employee health are affected by cultural factors and the demography of the workforce. A study in rural Kentucky identified the barriers to integration of health protection and health promotion, concluding that time, job demands, attitude, and knowledge level hamper integration.[27] However, there was greater awareness of Total Worker Health, increased understanding of the need for wellness, and plans in place to undergo the integration.[27] Work by Hibbs-Shipp et al. (2015) in Colorado investigated the motivators and barriers to healthy workplace behavior and found significant interest and need among staff members for wellness programs. Motivators included stress relief, health, and weight concerns, while barriers included time, fatigue, and money.[28] Although states like Massachusetts are working on wellness programs and developing protocols for worksites,[29] there is a need for developing similar programs across rural America. Continued uptake, integration, and implementation of wellness programs in rural areas would contribute to a healthier workforce and higher productivity.

Rural work sites are appropriate settings for understanding workforce health and promoting preventive healthcare. Assessing worker participation in wellness programs is pivotal to the success of such programs. Findings by Middlestadt et al. (2011) described greater willingness to participate in wellness programs among younger, health-conscious, and physically active employees, who are already more likely to be healthy and require less clinical intervention.[30] Lower uptake of health risk assessments among employees is associated with less utilization.[31] This highlights the need for greater penetration of wellness initiatives among rural employees.

In the rural workforce, improvements in worksite assessment uptake hinge on the development of goals, creating workplace wellness committees, assessing employee needs, providing financial incentives, and creating structured programs, along with healthy competition, cohesion, and camaraderie among the workers.[32,33] While health assessment tools like the Centers for Disease Control and Prevention (CDC) Worksite Health ScoreCard enable employers to assess their implementation of health promotion strategies,[34] major challenges such as lack of policies, system-level improvements, and stakeholder engagement and support remain a hindrance for the rural workforce.

## BARRIERS/CHALLENGES

The rural workforce faces multiple economic, financial, and demographic barriers. The rural American workforce is older, less diverse, and poorer compared to their urban counterparts. Almost a quarter of rural businesses struggle to find qualified workers. Rural areas also have limited or no access to quality childcare and broadband.[35] Workforce development faces interrelated challenges. Globalization, technological advancements, economic shifts with job re-classification and training, along with political changes and demographic shifts have resulted in a growing gap between rural and urban areas.[36] There is a need for employers and workforce development stakeholders to develop strategies that take into consideration the specific needs of individual groups.

There are many barriers to the wide adoption of telehealth in rural America, most notably the digital divide highlighted during COVID-19, with large areas of rural and underserved communities lacking affordable and reliable broadband access. Infrastructure services like broadband can help increase educational and training opportunities for the rural workforce. The inequities discovered over the past three years have pushed broadband or internet access to be recognized as a social determinant of health. Access to technology affects a myriad of other factors impacting

economic stability, access to education, and social cohesion. As recently as 2023, the Federal Communications Commission (FCC) reported 8.3 million homes and businesses still lack access to high-speed broadband.[37] As an essential service, affordable internet access could potentially improve rural workforce diversity.

In addition to broadband access and affordability, other barriers to telehealth access to rural populations include patient privacy, provider licensure, and attitudes toward technology among patients and providers. Patient privacy requirements and compliance are complicated, yet important to maintain. Similarly, licensure requirements vary by state, and it is even more complicated to be licensed in multiple states. Other challenges include online prescribing and the threat of malpractice. In addition, high annual turnover rates of mental health services providers are threatening the advances made in telehealth.[38] A 2023 study by Thomas, et al, identified several factors important to greater adoption and acceptance of telehealth and virtual healthcare delivery. These include consideration of existing practices and processes, equitable access, and workforce perceptions.[39]

Rural and frontier living may mean difficulty in accessing the tools and resources needed for successful telehealth practice. But as it increasingly plays a vital role in accessing health and health-related services, we must eliminate the digital divide. Reliable connectivity can decrease distrust and frustration in patients who already are unsure of telehealth validity and reliability. Physicians confirm this digital divide exists, seeing their patients struggle with virtual care (i.e., gaps in understanding and accessing technology). As rural and frontier community demographics shift to older residents, telehealth may be daunting or confusing given lower levels of digital literacy among older populations.

**Recent efforts to improve access to healthcare through telehealth services at the national level include[8,40]:**

1. Increased access to broadband and availability of high-speed internet;
    a. The FCC's Rural Healthcare program for broadband adoption increased the annual cap by $171 million[8,40]
    b. HRSA's Office for the Advancement of Telehealth's Telehealth Broadband Pilot Program, assesses broadband capacity available to rural healthcare providers and patient communities to improve their access to telehealth services[39,40]
    c. Universal Service Fund[39,40]
    d. Rural Healthcare Program[39,40]
    e. Connected Care Pilot Program[39,40]
    f. Federal Affordable Connectivity Program[39,40]

2. Increased flexibility for providing services via telehealth and provider eligibility for Medicare reimbursement by DHHS;

3. Building evidence that supports care delivery through telehealth across the CDC, including both short- and long-term impacts such as access to care, healthcare quality, healthcare utilization, health outcomes, and health equity.

## SOLUTIONS AND INTERVENTIONS

### *Workforce Development*

Developing a stronger rural workforce requires a comprehensive, multifaceted approach. The USDA Resources Guidebook recommends extensive workforce development planning which requires the local workforce development board to leverage regional resources to increase community participation. The USDA also recommends the development of a rural workforce resource guide matrix to better provide information for rural workforce stakeholders.[41] Alignment of employer needs with the development of cross-sector strategies and governance can positively influence rural areas' growth. Infrastructure development initiatives like high-speed internet, transportation services, and waste management are critical for rural industry growth. Building partnerships with minority and disadvantaged groups, and consulting industry partners in designing educational and apprenticeship programs can help address the workforce shortage issue.[41,42] There is a need to identify gaps and make strategic investments in the development of these underserved regions.

Investment in rural entrepreneurship to spark innovation must take priority.

Establishing workforce development programs in high schools helps develop skilled individuals who can go on to receive the necessary skills for employer areas of need. Collaboration between companies, communities, governments, and stakeholders is required for workforce development.[36,42,43] Developing rural sector networks where employers identify needs, and a collaborative approach with training providers, can help develop a pipeline of skilled workers and mitigate the workforce challenges in underserved areas. Workforce Intermediaries help build partnerships and networks in regional development strategies and ensure workers are prepared for sectors with high growth.[36,43,44]

***Worksite Wellness Programs***

Worksite wellness programs are essential for the rural workforce to access critical services. One such example is the Montana Worksite Wellness program.[45] The program ensures employees at participating worksites have access to personal and health resources such as physical activity and nutrition programs, tobacco cessation help, cancer as well as chronic disease prevention and management, access to health coaches, and school wellness programs.[45] In addition, hospitals participating in the Montana worksite wellness program may be eligible for additional funding support for worksite wellness initiatives.[45] This is a replicable and sustainable model for worksite wellness for the rural workforce.

***Workforce Issues***

Sustainable solutions to rural workforce issues are urgently needed. For example, to increase the supply of healthcare workers during the COVID-19 pandemic, many states, including New Jersey, instituted temporary licensure reciprocity policies, allowing healthcare workers from other states to provide care in their state. Most of their patient encounters were via telehealth.[47] Patients and off-site providers reported positive experiences with this telehealth-driven solution to meeting patient needs.[46]

The use of technology by social workers helps reduce health disparities and improve rural health outcomes. There is a need for digital literacy and training for social workers, especially minorities. Historically Black Colleges and Universities are uniquely positioned to provide training to a diverse community due to their long-standing connections with marginalized communities and populations.[48]

***Partnerships and Collaborations***

In rural communities, it is especially important to reflect on resource inequities, but at the same time recognize that many issues rural communities face are often like those of urban communities. Population health issues in any community can be complex,[49,50] but are often made more challenging in a rural setting due to a potential lack of resources. With rural hospital closures, and a continued shortfall of available staff to address population health, collaboration with a variety of community sectors can provide opportunities to collectively address complex health issues, as opposed to a single agency having sole responsibility. The importance of keeping rural hospitals open cannot be underestimated. Rural hospitals can take the lead in capacity-building activities for health improvement as a key partner in resource development, training, technical assistance, and information dissemination when attempting to address community population health issues.[51] Building on existing relationships, or establishing new ones, is at the core of such collaborative efforts.[52,53] Relationship-building is a key component in increasing a community's collective capacity to improve population health, including social determinants of health.[54-61]

Partnership or collaboration can unite community resources for a common, shared purpose, such as better coordination of services, improved relationships, reduction in duplication of services/efforts, and merging and/or leveraging skills and resources of the collaborative group.[57,58,62-64] Healy discusses working from an asset-based approach for community development where change comes from within the community.[65] These existing capacities and assets within the community are enhanced and used in collaboration with changes driven by relationships. Ultimately, this community change is oriented toward sustainable community growth.[65]

Building upon and developing new relationships among network members can generate trust and confidence in collaborating entities and individuals. The Brazos Valley Health Partnership in Central Texas engaged in a community health development process in the early 2000s to increase access to health and health-related care for low-income residents of a rural seven-county region that faced the typical rural health issues related to healthcare access. Enhancing existing and establishing new relationships among local providers with limited resources and staff, led to a unified, shared purpose through the implementation of county health resource centers. As a locally driven effort to address population health issues in small rural counties with limited resources, positive changes in inter-organizational relationships were noted in the project's evaluation.[58] By addressing the limited access to health and health-related care through a unified, yet diverse group of local stakeholders (such as the regional hospital system, non-profit organizations, governmental health organizations, county and city government officials, and educational entities) nearly 20 years later, each of the seven counties still has locally sustained health resource centers to address their local community's needs.

Another strategy to build and develop new relationships that generate trust and confidence is the utilization of community health workers. According to the American Public Health Association (2023), community health workers play a key role as they are frontline lay workers, generally trusted members of the community, and have a unique understanding of the community served.[66] This trusting relationship enables the community health worker to serve as a liaison between health/social services and the community to facilitate access to services and improve the quality and cultural competence of service delivery. In rural environments, community/lay health workers are essential to healthcare delivery. Community health workers provide culturally appropriate information and health services including care coordination, advocacy, social services, and prevention and management of chronic diseases.

***Telehealth Technology***

Technology advancements increase the opportunity for rural communities to have easier access to external resources, such as telehealth, which is used more often to increase the availability of services to rural areas that lack an adequate number of, or access to, specially trained health professionals.[67] Two excellent examples of the use of telehealth in Texas are the Texas Child Health Access Through Telemedicine (TCHATT) and the Texas Teleforensic Remote Assistance Center (Tex-TRAC). Through legislative funding, TCHATT leverages the expertise of the state's institutions of higher education to provide in-school behavioral telehealth care to at-risk children and adolescents. With approximately 80% of 254 counties in Texas designated mental health professional shortage areas, TCHATT bridges communities with limited or no access to mental health services to external resources.[68]

To support rural hospital clinicians, Tex-TRAC connects rural community hospitals to expert Sexual Assault Nurse Examiners (SANE) to provide support and guidance during a medical forensic exam following sexual assault. Because sexual assault can occur anywhere, yet access to a SANE is primarily concentrated in urban centers, the Tex-TRAC project helps bridge the gap by supporting nurses and survivors in medically underserved and rural areas with experts in trauma-informed care utilizing telehealth technology.[69]

Other states have taken similar technological initiatives to address rural healthcare needs. The Pediatric Access to Telemental Health Services (PATHS) program in Alabama provides behavioral health consultation and treatment to rural children and adolescents. Connecting these rural communities to primary care and behavioral health professionals brings much-needed care through the implementation of telehealth technology.[70] Similarly, upper Midwestern and frontier states of North Dakota, South Dakota, Nebraska, Wyoming, and Minnesota benefited from telehealth initiatives like eEmergency and eCare that connected rural patients with trained physicians and registered nurses funded through organizations like the Helmsley Trust and Avera Health. Helping more than 7,200 patients and enabling 11,000 patient transfers, the initiative provided remote telehealth access to more than 495,000 square miles of rural U.S.[71]

Telehealth technology (also known as telemedicine and digital health) presents an opportunity to increase access to critical healthcare services in rural and frontier communities. With approximately 46 million people living in rural and frontier areas and 80% of the rural U.S. designated as medically underserved areas, telehealth technology can be a strategic tool used to improve health equity.[72]

Telehealth can improve the quality of care for patients, especially those in rural and underserved communities, by increasing access to physicians, specialists, and other healthcare and critical support services for patients in rural, frontier, and underserved areas. Potentially an even more critical benefit, patients may be able to stay close to home when seeking care via telehealth, decreasing travel time and costs, as well as decreasing the time taken off work or out of school. The technology also presents remote providers with access to additional resources, increasing access to experts or specialists for consultation or supplemental services.[73] Telehealth has been shown to reduce primary care provider isolation by fostering collaboration and learning between those practicing in rural areas and those in larger medical centers.[74]

The Rural Health Information hub cites several examples of evidence-based approaches to address health profession shortages as quoted below[22]:

- Using interprofessional teams to provide coordinated and efficient care for patients and to extend the reach of each provider,
- Increasing the supply and placement of licensed vocational/practical nurses and registered nurses in rural areas,
- Ensuring that all professionals are practicing to the full extent of their training and scope of practice,
- Removing state and federal barriers to professional practice, where appropriate,
- Changing policy to allow expansions to existing scopes of practice if evidence shows that the healthcare workers can provide comparable or better care,
- Removing barriers to the use of telehealth to provide access to remote healthcare providers,
- Introducing pipeline programs and funding mechanisms, and
- Increasing incentives and compensation for rural health professionals.[22]

## SUMMARY AND CONCLUSIONS

It is important to leverage the healthcare workforce in new and innovative ways, with more care taking place outside of traditional settings. Flexibility in the way individuals connect with and engage in care is critical.

Relationships are central to the development, forward progress, and collective action of community-based partnerships and collaborations. Often, evaluation of partnerships or community collaborative efforts focuses on achieving outcomes and effectiveness; however, community capacity building has many dimensions including[58]: skills and resources, nature of social relations, structures and mechanisms for community dialogue, civic participation, value systems, and learning culture.

Continued expansion of telehealth as a means of healthcare provision means identifying evidence-based practices and policy changes to address challenges. There is a need to improve the quality and standardization of data to fully demonstrate and understand the impact of telehealth and identify where disparities persist. Telehealth plays a key role in helping to address workforce issues by enhancing access and reducing burnout.

## REFERENCES

1. Increase the ability of primary care and behavioral health professionals to provide more high-quality care to patients who need it — AHS-R01. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed May 15, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care/increase-ability-primary-care-and-behavioral-health-professionals-provide-more-high-quality-care-patients-who-need-it-ahs-r01

2. Explore and expand practice-based continuing education for public health professionals — PHI-R01. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed May 15, 2023. https://health.gov/healthypeople/objectives-and-data/

browse-objectives/public-health-infrastructure/explore-and-expand-practice-based-continuing-education-public-health-professionals-phi-r01

3. Explore financing of the public health infrastructure — PHI-R08. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed May 15, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/public-health-infrastructure/explore-financing-public-health-infrastructure-phi-r08

4. Increase the use of telehealth to improve access to health services — AHS-R02. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed May 15, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-it/increase-use-telehealth-improve-access-health-services-ahs-r02

5. Increase the proportion of worksites that offer an employee health promotion program — ECBP-D03. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed August 2, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/workplace/increase-proportion-worksites-offer-employee-health-promotion-program-ecbp-d03

6. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: new decade, new challenges. *Prev Med Rep.* 2023;33:102176. doi:10.1016/j.pmedr.2023.102176

7. Kassabian M, Shrestha A, Callaghan T, et al. Rural healthy people 2030: common challenges, rural nuances. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

8. Davis J, Rupasingha A, Cromartie J, Sanders A. Rural America at a Glance 2022. Economic Research Service. U.S. Department of Agriculture. November 2022. Accessed June 25, 2023. https://www.ers.usda.gov/webdocs/publications/105155/eib-246.pdf?v=5748.3

9. Young J. Middle-Skill Jobs Remain More Common Among Rural Workers. Issue Brief No 63. Carey Institute. University of New Hampshire. 2013. Accessed June 25, 2023. https://scholars.unh.edu/cgi/viewcontent.cgi?article=1195&context=carsey

10. What Is Shortage Designation? Health Resource Services and Services Administration. Updated June 2023. Accessed June 15, 2023. https://bhw.hrsa.gov/workforce-shortage-areas/shortage-designation#hpsas

11. Bureau of Health Workforce Health Resources and Services Administration. Cancer Map Stories. GIS portal for cancer research – rural-urban disparities in cancer. 2023. Accessed May 1, 2023. https://gis.cancer.gov/mapstory/rural-urban/index.html

12. Health Professional Shortage Areas -- Primary Care. Health Resources & Services Administration. Updated May 2023. Accessed May 15, 2023. https://data.hrsa.gov/topics/health-workforce/shortage-areas

13. The Complexities of Physician Supply and Demand: Projections from 2019 to 2034. Association of American Medical Colleges. June 2021 Accessed May 15, 2023. https://www.aamc.org/media/54681/download

14. Yang BK, Johantgen ME, Trinkoff AM, Idzik SR, Wince J, Tomlinson C. State nurse practitioner practice regulations and U.S. health care delivery outcomes: a systematic review. *Med Care Res Rev.* 2021;78(3):183-196. doi:10.1177/1077558719901216

15. U.S. Nursing Workforce: Trends in Supply and Education. Health Resource Services and Services Administration. October 2013. Accessed May 15, 2023. https://bhw.hrsa.gov/sites/default/files/bureau-health-workforce/data-research/nursing-workforce-trendsoct2013.pdf

16. Mester JS. Rural nurse recruitment. *Nurs Manage.* 2018;49(12):51-53. doi:10.1097/01.NUMA.0000544468.98484.b7

17. Surdu S, Mertz E, Langelier M, Moore J. Dental workforce trends: a national study of gender diversity and practice patterns. *Med Care Res Rev.* 2021;78(1_suppl):30S-39S. doi:10.1177/1077558720952667

18. Nichols K. Teledentistry overview: United States of America. *J Int Soc Telemed eHealth.* 2019;7(e9):1-6. doi:10.29086/JISfTeH.7.e9

19. Andrilla CHA, Patterson, D. G., Garberson, L. A., Coulthard, C., & Larson, E. H. Geographic variation in the supply of selected behavioral health providers. *Am J Prev Med.* 2018;54(6 Suppl 3):S199-S207. doi:10.1016/j.amepre.2018.01.004

20. Behavioral workforce projections, 2017-2030. Health Resources and Services Administration. Accessed May 15, 2023, https://bhw.hrsa.gov/sites/default/files/bureau-health-workforce/data-research/bh-workforce-projections-fact-sheet.pdf

21. Richman EL, Lombardi B, Zerden L, Randolph R. University of Michigan Behavioral Health Workforce Research Center. Where is behavioral health integration occurring? Mapping national co-location trends using national provider identifier data. University of Michigan; 2018.

22. Rural health workforce. Rural Health Information Hub. February 24, 2023. Accessed May 15, 2023. https://www.ruralhealthinfo.org/topics/health-care-workforce

23. Health workforce Strategic Plan 2021. U.S. Department of Health and Human Services. 2021. Accessed May 15, 2023. https://bhw.hrsa.gov/sites/default/files/bureau-health-workforce/about-us/hhs-health-workforce-strategic-plan-2021.pdf

24. Xierali IM, Nivet MA. The racial and ethnic composition and distribution of primary care physicians. *J Health Care Poor Underserved.* 2018;29(1):556-570. doi:10.1353/hpu.2018.0036

25. Peterson LE, Morgan ZJ. The Racial and Ethnic Diversity of the Family Physician Workforce in Non-Metropolitan and Metropolitan Counties. Rural & Underserved Health Research Center. Prepared for the Federal Office of Rural Health Policy. June 2022. Accessed May 15, 2023. https://uknowledge.uky.edu/ruhrc_reports/21

26. Rural health System Prioritizes Workforce Diversity to Meet Community Needs. American Hospital Association. February 12, 2020. Accessed May 15, 2023. https://www.aha.org/news/insights-and-analysis/2020-02-12-rural-health-system-prioritizes-workforce-diversity-meet

27. Watkins C, Macy G, Golla V, Lartey G, Basham J. The "Total Worker Health" concept: a case study in a rural workplace. *J Occup Environ Med.* 2018;60(5):387-391. doi:10.1097/JOM.0000000000001273

28. Hibbs-Shipp SK, Milholland M, Bellows L. Barriers and facilitators to healthy eating and activity in Head Start staff: an opportunity for worksite wellness. *Am J Health Educ.* 2015;46(6):347-350. doi:10.1080/19325037.2015.1077488

29. Ryan M, Erck L, McGovern L, et al. "Working on Wellness:" protocol for a worksite health promotion capacity-building program for employers. *BMC Public Health.* 2019;19:111. doi:10.1186/s12889-019-6405-1

30. Middlestadt SE, Sheats JL, Geshnizjani A, Sullivan MR, Arvin CS. Factors associated with participation in work-site wellness programs: implications for increasing willingness among rural service employees. *Health Educ Behav.* 2011;38(5):502-509. doi:10.1177/1090198110384469

31. Merrill RM, Aldana SG. Completing a worksite health risk assessment correlates with continuing employment, lower health care costs and utilization. *Int J Occup Med Environ Health.* 2022;35(4):449-457. doi:10.13075/ijomeh.1896.01895

32. Lane C, Brady O, Mayer J. Comprehensive assessment of implementation factors related to worksite exercise in firefighters. *J Occup Environ Med.* 2022;64(1):e13-e19. doi:10.1097/JOM.0000000000002418

33. Ablah E, Kellogg M, Okut H, Usher J, Lester R. Reliability of an assessment tool and outcomes of a comprehensive worksite wellness intervention. *J Occup Environ Med.* 2020;62(9):724-727. doi:10.1097/JOM.0000000000001947

34. Lang JE, Mummert A, Roemer EC, Kent KB, Koffman DM, Goetzel RZ. The CDC Worksite Health ScoreCard: an assessment tool to promote employee health and well-being. *Am J Health Promot.* 2020;34(3):319-321. doi:10.1177%2F0890117119898026c

35. Addressing the Rural Workforce Challenge. Association of Equipment Manufacturers. March 31, 2023. Accessed June 25, 2023. https://www.aem.org/news/addressing-the-rural-workforce-challenge

36. Rural Workforce Development Strategies. Selkirk College Columbia Basin Rural Development Institute. 2017. Accessed June 25, 2023. http://datacat.cbrdi.ca/sites/default/files/attachments/RuralWorkforceDevelopmentKnowledgeBriefSpring2017_0.pdf

37. Sanborn BJ. AHA urges more funding and fewer limitations for rural healthcare program. July 19, 2018. Accessed May 15, 2023. https://www.healthcarefinancenews.com/news/aha-urges-more-funding-and-fewer-limitations-rural-health-care-program

38. Canady VA. As MH workforce evolves during COVID-19, telehealth seen as new normal. *Mental Health Weekly*. 2020;30(19):1-4. doi:10.1002/mhw.32354

39. Thomas LT, Lee CMY, McClelland K, Nunis G, Robinson S, Norman R. Health workforce perceptions on telehealth augmentation opportunities. *BMC Health Serv Res*. 2023;23(1):182. doi:10.1186/s12913-023-09174-4

40. Connecting Americans to Health Care. Federal Communications Commission. FCC.gov. Accessed August 22, 2023. https://www.fcc.gov/connecting-americans-health-care

41. USDA Resource Guide for Rural Workforce Development. U.S. Department of Agriculture. January 2022. Accessed June 25, 2023. https://www.rd.usda.gov/sites/default/files/usdard_ruralworkforceguide508.pdf

42. Coghill JG. Rural broadband internet access: the key to rural workforce development. *Journal of Electronic Resources in Medical Libraries*. 2021;18(4):204-212. doi:10.1080/15424065.2021.2003279

43. Bozarth A, Strifler W. Federal Reserve Bank of Atlanta. Strengthening Workforce Development in Rural Areas. 2019. Accessed June 25, 2023. https://www.investinwork.org/-/media/70C24C40AC3C48E988C314CD82C9C180.ashx

44. Workforce Development and Human Capital. Rural Health Information Hub. 2020. Accessed June 25, 2023 https://www.ruralhealthinfo.org/toolkits/sdoh/2/economic-stability/workforce-development

45. Worksite Wellness: Transform Corporate Culture and Change Lives. Montana Department of Public Health and Human Services. July 2022. Accessed August 2, 2023. https://dphhs.mt.gov/assets/publichealth/Worksite%20Wellness/WorksiteWellnessPrograms2022.pdf

46. Calleja Z, Job J, Jackson C. Offsite primary care providers using telehealth to support a sustainable workforce in rural and remote general practice: a rapid review of the literature. *Aust J Rural Health*. 2023;31:5-18. doi:10.1111/ajr.12920

47. Frogner BK. Patients receive flexible and accessible care when state workforce barriers are removed. *Health Affairs (Millwood)*. 2022;41(8):1139-1141. doi:10.1377/hlthaff.2022.00759

48. Nelson DD, Lang-Lindsey K. Rural healthcare and telehealth: the importance of social work departments at HBCUs in developing a competent workforce in the rural south. *J Community Engagem Scholarsh*. 2020;12(3):39-46. doi:10.54656/PQRE6833

49. Trickett EJ, Beehler S, Deutsch C, et al. Advancing the science of community-level interventions. *Am J Public Health*. 2011;101(8):1410-1419. doi:10.2105/AJPH.2010.300113

50. Schensul JJ. Community, culture and sustainability in multilevel dynamic systems intervention science. *Am J Community Psychol*. 2009; 43(3-4):241-256. doi:10.1007/s10464-009-9228-x

51. Burdine J, Felix M, Wendel M. The basics of community health development. *Tex Public Health J*. 2007;59(2):10-11.

52. Nowell B. Profiling capacity for coordination and systems change: the relative contribution of stakeholder relationships in interorganizational collaboratives. *Am J Community Psychol*. 2009;44(3-4):196-212. doi:10.1007/s10464-009-9276-2

53. Foster-Fishman PG, Berkowitz SL, Lounsbury DW, Jacobson S, Allen NA. Building collaborative capacity in community coalitions: a review and integrative framework. *Am J Community Psychol.* 2001;29(2):241-261. doi:10.1023/A:1010378613583

54. Goodman R, Speers M, McLeroy K, et al. Identifying and defining the dimensions of community capacity to provide a basis for measurement. *Health Educ Behav.* 1998;25(3):258-278. doi:10.1177/109019819802500303

55. Wallerstein N, Duran B. Community-based participatory research contributions to intervention research: the intersection of science and practice to improve health equity. *Am J Public Health.* 2010;100(Suppl 1):S40-S46. doi:10.2105/AJPH.2009.184036

56. McLeroy KR, Bibeau D, Steckler A, Glanz K. An ecological perspective on health promotion programs. *Health Educ Q.* 1988;15(4):351-377. doi:10.1177/109019818801500401

57. Butterfoss FD, Goodman RM, Wandersman A. Community coalitions for prevention and health promotion: factors predicting satisfaction, participation, and planning. *Health Educ Q.* 1996;23(1):65-79. doi:10.1177/109019819602300105

58. Wendel ML, Prochaska JD, Clark HR, Sackett S, Perkins K. Interorganizational network changes among health organizations in the Brazos Valley, Texas. *J Prim Prev.* 2010;31(1-2):59-68. doi:10.1007/s10935-010-0203-y

59. Provan KG, Leischow SJ, Keagy J, Nodora J. Research collaboration in the discovery, development, and delivery networks of a statewide cancer coalition. *Eval Program Plann.* 2010;33(4):349-355. doi:10.1016/j.evalprogplan.2009.12.005

60. Provan KG, Nakama L, Veazie MA, Teufel-Shone N, Huddleston C. Building community capacity around chronic disease services through a collaborative interorganizational network. *Health Educ Behav.* 2003;30(6):646-662. doi:10.1177/1090198103255366

61. Maclellan-Wright MF, Anderson D, Barber S, et al. The development of measures of community capacity for community-based funding programs in Canada. *Health Promot Int.* 2007;22(4):299-306. doi:10.1093/heapro/dam024

62. Butterfoss FD, Goodman RM, Wandersman A. Community coalitions for prevention and health promotion. *Health Educ Res.* 1993;8(3):315-330. doi:10.1093/her/8.3.315

63. McLeroy KR, Kegler M, Steckler A, Burdine JM, Wisotzky M. Community coalitions for health promotion: summary and further reflections. *Health Educ Res.* 1994;9(1):1-11. doi:10.1093/her/9.1.1

64. Green L, Daniel M, Novich L. Partnerships and coalitions for community-based research. *Public Health Rep.* 2001;116(Suppl 1):20-31. doi:10.1093/phr/116.S1.20

65. Healy KE. Asset Based Community Development. Chapter in: O'Hara A, Weber Z, eds. Working with Individuals, Communities, and Organisations. Melbourne, Australia: Oxford University Press; 2006: 247-258

66. Community Health Workers 2023. American Public Health Association. 2023. Accessed May 1, 2023. https://www.apha.org/apha-communities/member-sections/community-health-workers

67. What is Telehealth? Health Resource Services and Services Administration. March 2022. Accessed May 15, 2023. https://www.hrsa.gov/rural-health/topics/telehealth/what-is-telehealth

68. TCHATT. Texas A&M Medicine. Accessed May 15, 2023. https://medicine.tamu.edu/psychiatry/clinical/tchatt/index.html

69. Tex-TRAC. Texas A&M Health Center of Excellence in Forensic Nursing. Accessed May 15, 2023. https://forensic-nursing.tamu.edu/tex-trac/index.html

70. PATHS (Pediatric Access to Telemental Health Services). Children's of Alabama. 2023. Accessed July 13, 2023. https://www.childrensal.org/services/behavioral-health-ireland-center/paths-pediatric-access-telemental-health-services

71. Stingley S, Schultz H. Helmsley trust support for telehealth improves access to care in

rural and frontier areas. *Health Aff (Millwood).* 2014;33(2):336-341. doi:10.1377/hlthaff.2013.1278

72. Dobis EA, Krumel TP, Cromartie J, Conley KL, Sanders A, Ortiz R. Rural America at a Glance: 2021 Edition. U.S. Department of Agriculture. November 2021. Accessed May 15, 2023. https://www.ers.usda.gov/webdocs/publications/102576/eib-230.pdf?v=9577.1

73. Bashshur RL, Shannon GW, Krupinski EA, et al. National telemedicine initiatives: essential to healthcare reform. *Telemed J E Health.* 2009;15(6):600-610. doi:10.1089/tmj.2009.9960

74. Telemedicine: Changing the Landscape of Rural Physician Practice. The New England Journal of Medicine. May 17, 2013. Accessed May 15, 2023. https://resources.nejmcareercenter.org/article/telemedicine-changing-the-landscape-of-rural-physician-practice/

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*Related Chapters:*
Chapter 3. Rural Healthcare Access and Quality
Chapter 8. Preventive Care for Rural Populations and Providers: Routine Screenings, Prenatal Care, and Oral Health
Chapter 13. Public Health Infrastructure in Rural America: Elevating Quality Improvement, Accreditation and Core Competencies
Chapter 17. Health Insurance for Rural Americans

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# RURAL EDUCATION ACCESS AND QUALITY

*By Andrew L. Kipp, EdD*

## SCOPE OF THE PROBLEM

- Adults with higher educational attainment (e.g., high school graduation, college attendance) have better health and life spans compared to their less-educated peers.[1]
- The estimated average graduation rate for rural students is 88.7%, which is four percentage points higher than the United States national average for all locales.[2]
- Rural students perform better than nonrural (i.e., suburban or urban) students on reading and math state standardized tests initially, in kindergarten, but fall behind nonrural students by the 8th grade.[3]
- Despite the gap narrowing, rural students continue to have lower college enrollment rates in the first fall after high school graduation when compared to their suburban or urban peers.[4-6]
- Rural students of color lag behind rural White students in educational attainment and student achievement (i.e., student performance across all subjects).[4,7-9]

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The Education Access and Quality topic includes goals that are new to Rural Healthy People and expands upon the Social Determinants of Health topic from previous iterations. Education is a vital component to healthy living. Adults with higher educational attainment have better health and life spans compared to their less-educated peers.[1] Additionally, the role of post-secondary education positively influences infant mortality, life expectancy, and child vaccination rates.[1] People with higher educational attainment, for example, had a reduced risk of COVID-19 severity and hospitalization due to lower levels of vaccination hesitancy and better engagement in health-protective behaviors.[10] Moreover, people with higher educational attainment have a stronger belief that they control their health and better understand health professionals' recommendations.[11] Finally, healthy children learn better.[12] These facts illustrate the interdependence between education and health where meeting the needs of schools can help improve public health.[12]

The goals of this Rural Healthy People 2030 chapter are:

1. identify educational disparities between rural and nonrural school environments, variations by race and ethnicity, and region;
2. recognize contemporary educational barriers within rural schools in the U.S.;
3. illustrate school structures, interventions, and community efforts to mitigate the problems/ barriers, improve educational outcomes, and elevate rural health.

The Education Access and Quality topic within Healthy People 2030 illustrates the national trends in meeting goals to improve education.[13] Three objectives improved from their previous (i.e., Healthy People 2020) baselines:

- increase the proportion of high school students who graduate in 4 years;
- increase the proportion of students with disabilities who are usually in regular education programs;
- increase the proportion of 4th-graders with math skills at or above the proficient level.[13]

Two objectives regressed from their previous baselines:

- increase the proportion of high school graduates in college the October after graduating;
- increase the proportion of 4th-graders with reading skills at or above the proficient level.[13]

The remaining objectives in the topic are either developmental objectives or objectives currently being researched.[13] Of these objectives, one objective – increase the proportion of 4th-graders with reading skills at or above the proficient level – was recently classified as a leading health indicator (i.e., a high-priority area to drive action).[14] The objectives, however, do not differentiate between rural and nonrural settings.

Within the U.S., about one in every five students (more than 9.3 million) attend a rural school, which increases the urgency to address deficits in this context.[2] Nearly half of all rural students live in Texas, North Carolina, Georgia, Ohio, Tennessee, New York, Pennsylvania, Virginia, Alabama, and Indiana.[2] The needs within each educational context (i.e., urban, suburban, and rural contexts) vary greatly,[15,16] and we need to differentiate between the distinct educational contexts to understand the pressing concerns in rural schools and address their unique needs.

## HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

The Healthy People 2030 goal for the Education Access and Quality topic area is to "increase educational opportunities and help children and adolescents do well in school."[13] To meet this goal, our chapter aims to provide an overview of a select number of Healthy People 2030 objectives within a rural setting, compare the data and trends to their urban, suburban, national, or nonrural counterparts, identify rural barriers that resist progress, and discuss research-based approaches to overcome these barriers. The chapter addresses the following objectives:

- **AH-08** Increase the proportion of high school students who graduate in 4 years
- **SDOH-06** Increase the proportion of high school graduates in college the October after graduating
- **AH-06** Increase the proportion of 4th-graders with math skills at or above the proficient level
- **AH-05** Increase the proportion of 4th-graders with reading skills at or above the proficient level
- **AH-R05** Increase the proportion of 8th-graders with math skills at or above the proficient level
- **AH-R04** Increase the proportion of 8th-graders with reading skills at or above the proficient level

## RURAL HEALTHY PEOPLE 2030 SURVEY

In a nationwide survey of rural stakeholders, Education Access and Quality was ranked as the 16th most frequently cited health priority for rural communities.[17] The Midwest (n = 326), Northeast (n = 129), West (n = 224), and South (n = 339) regions ranked Education Access and Quality 20th, 15th, 15th, and 13th respectively.[17]

Respondents in states that had not adopted Medicaid expansion (n = 298) ranked Education Access and Quality 20th while respondents residing in states which had adopted Medicaid expansion (n = 720) ranked it 16th.[17] Both male (n = 205) and female (n = 725) groups ranked Education Access and Quality as the 16th most important priority.[17]

Different age groups prioritized the Education Access and Quality topic quite differently.[17] Eighteen- to 34-year-olds (n = 113) ranked Education Access and Quality 9th.[17] Thirty-five- to 64-year-olds (n = 652) ranked Education Access and Quality 17th.[17] Respondents age 65 years and older ranked Education Access and Quality 13th.[17] Further variations were demonstrated between White respondents (n = 867) and respondents of color (n = 63), as White people ranked Education Access and Quality 16th and people of color ranked Education Access and Quality 11th.[17]

Variations in rankings were also found based on the profession of the respondent.[17] Practitioners in education (n = 129), government and public administration (n = 56), health care (n = 602), human services (n = 96), and other fields (e.g., agriculture, business management and administration, housing, etc.) (n = 107) ranked Education Access and Quality 9th, 27th, 21st, 11th, and 15th respectively.[17]

Finally, rural stakeholders in critical access hospitals (n = 162), federally qualified health

centers (n = 56), rural health clinics (n = 281), rural hospitals (n = 213), and rural public health agencies (n = 89) ranked Education Access and Quality 23rd, 20th, 25th, 15th, and 21st respectively.[17]

## PREVALENCE AND DISPARITIES IN RURAL AREAS

This section identifies and assesses the statistics, data, and trends between rural and nonrural schools to understand the contextual disparities in high school graduation rates, number of high school graduates in college the October after graduating, and the rate of proficiency in reading and math at the 4th and 8th grade levels.

Rural high school graduation rates range from 76.4% in New Mexico to 94.2% in Connecticut with the estimated average being 88.7%, which is four percentage points higher than the national average for all locales.[2] It is important to note, however, that both urban and rural schools have had declines in graduation rates between the 1980s and 2000s.[18] Factors that result in successful high school graduation in rural areas include socioeconomic status and academic progress through the 9th grade, which illustrate the interrelationship between graduation rates, academic achievement, and socioeconomic status.[19,20] However, rural schools experience higher rates of poverty compared to their suburban peers.[15,18] The U.S. Department of Health and Human Services creates benchmarks to define poverty based on the following factors: persons per household, pre-tax income, and locale (i.e., the 48 contiguous states/ the District of Columbia, Alaska, and Hawaii).[21,22] In 2023, for example, a four-person household within the 48 contiguous states/ District of Columbia has a poverty threshold of $30,000.[22] The rate of rural poverty is problematic and pervasive.

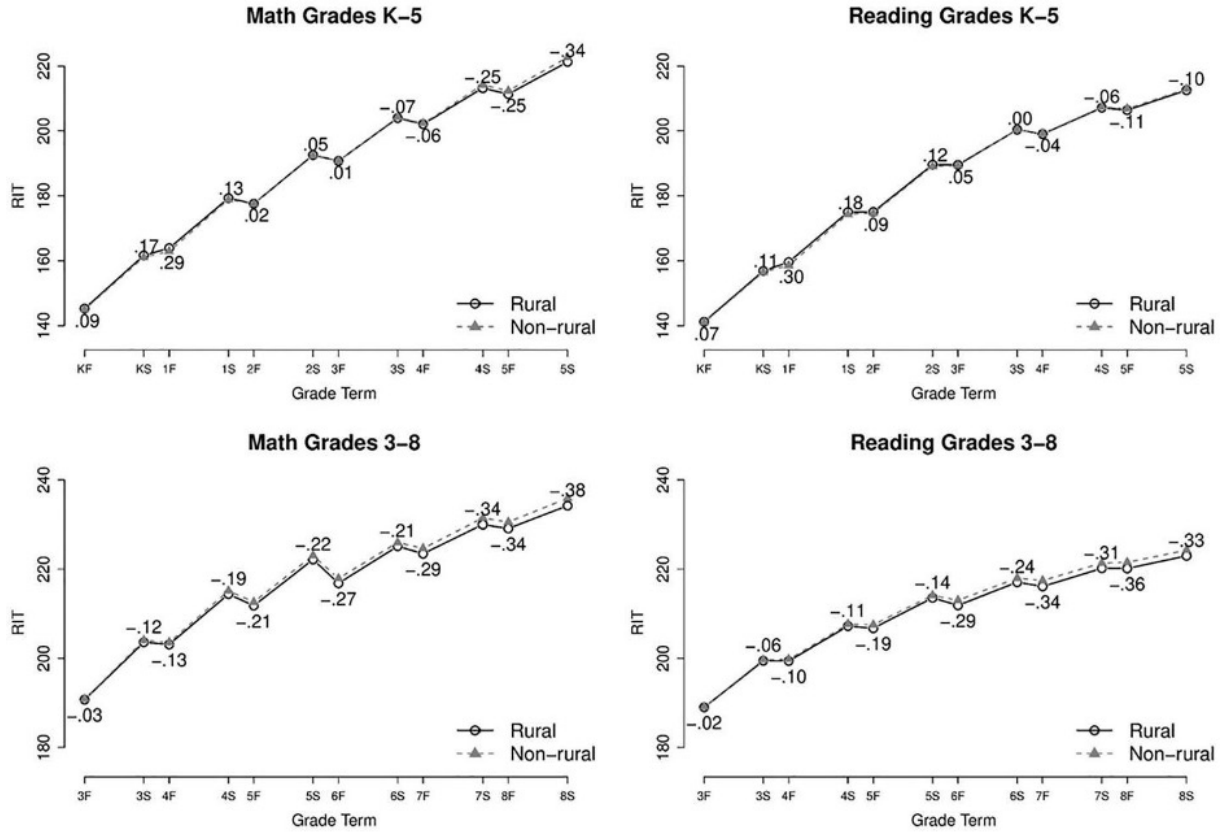
Poverty negatively impacts per-pupil funding since local funding sources (i.e., property taxes) are lower in these school districts compared to wealthier districts.[23] The disparity in funding sources creates inequities between districts.[23] Student enrollment drives school funding too.[24] Rural schools receive less funding than their urban peers by 20-50% because of their relatively low student enrollment numbers.[24] The disparity of funding harms rural schools; as an example, the funding disparity between rural and urban schools results in lower teacher salaries in rural schools compared to their urban counterparts.[4,15] This impacts rural teacher recruiting and retainment.[4] Consequently, schools are unable to fill vacancies leading to fewer course offerings and teacher shortages in hard-to-fill vacancies like STEM (science, technology, engineering, math) and ELL (English language learners) areas.[4]

Furthermore, mental health disorders negatively impact high school graduation rates.[25] Compared to urban students, rural students have higher rates of suicide and display more mental health symptoms.[26,27] Inadequate funding and access to mental health professionals prevent rural schools from better addressing the mental health needs of their students.[28]

Rural schools perform marginally better than nonrural schools on the National Assessment of Educational Progress (NAEP), which measures student proficiency in reading and math at the 4th and 8th grade levels, by 0.018 standard deviations.[2] However, rural students have a lower rate of improvement compared to the national mean for the same set of NAEP exams.[2] Interestingly, rural students perform better than nonrural students on reading and math state tests initially, in kindergarten, but fall behind nonrural students by the 8th grade.[3] Learning rates during non-summer months are similar within rural and nonrural contexts, but rural students experience larger learning losses during the summer months than nonrural students. This suggests the need to allocate resources during the summer months in forms of academic enrichments, interventions, and programs to improve reading and math assessment scores.[3] **Figure 1** demonstrates the widening math and reading achievement gap between rural and nonrural school contexts. Please note that the values refer to the differences in standard deviation between rural and nonrural students; a positive difference favors rural students, and a negative difference favors nonrural students.[3] **Figure 2** compares the rate of learning during the summer and non-summer months for rural and nonrural school contexts.

To maximize funding and improve teacher recruitment, an increasing number of rural

**Figure 1. Math and Reading Scores from Fall Kindergarten to the Spring Eighth Grade[3]**




districts are opting to go to a four-day work week schedule, which may influence student performance in math and reading test scores.[29] Rural schools make up 90% of the school districts adopting a 4-day work week schedule.[29] Math and reading achievement scores in grades 4 and 8 are lower in 4-day work week schools compared to 5-day work week schools.[29] However, when comparing the weekly hours in school, the "middle" and "high" time 4-day work week schools (i.e., 31.03 and 32.14 weekly hours respectively) had no significant differences in 4th and 8th grade math and reading achievement scores compared to 5-day work week schools.[29] The correlation between 4th and 8th grade reading and math achievement scores on tests relates more to the hours per week in school rather than the days per week in school.[29]

Students who attend rural schools have lower college enrollment rates in the first fall after high school graduation than their suburban or urban peers though the gap between them is narrowing.[4-6] Rural students also delay their college attendance more than nonrural students.[30] These gaps grow when considering differences in socioeconomic status.[30] College recruiters may neglect to engage in rural schools due to their small student enrollments and remote nature.[31,32] Further, rural students may travel long distances to colleges for preliminary visits as there are typically fewer colleges nearby their homes compared to their urban peers.[31,32] The limited course offerings and programs, as mentioned earlier, make the transition into college more difficult due to the lack of rigorous courses that emulate the expectations of college coursework.[30, 32-34] Students can connect with higher education institutions and earn post-secondary credits online (which may increase college attendance).[35] However, there is a digital divide between rural and nonrural communities as fewer families have access to technology in rural communities compared to nonrural communities.[36] School budgets limit the addition of technology into the classroom, which illustrates the connection between funding, technological resources, and college enrollment rates.[35-37] Finally, there is a relationship between 8th grade student achievement and rates of initial college enrollment and attendance.[38]

Therefore, improving student achievement in reading and math in the 8th grade, as this chapter discusses, also improves the rate of initial college enrollment.[38]

## VARIATIONS BY RACE AND ETHNICITY

Poverty is the single best predictor of student achievement.[39] The rural Black poverty rate is 32%.[7] The rural Native American poverty rate is 31%.[7] The rural Hispanic poverty rate is 24.5%.[7] The rural White poverty rate is 13.5%, and the urban resident poverty rate is 12.9%.[7] These statistics demonstrate a problematic poverty gap between White students and students of color, which we need to address.

To specifically expand upon the consequences of poverty for students of color, the higher rates of poverty result in differences within student achievement as students of color, specifically Hispanic and Black students, underperform at higher rates on standardized tests compared to their White counterparts; this may go unnoticed due to the small population of students of color in predominantly White rural areas.[4,7,15] However, Black and Hispanic students perform closer to their White peers compared to their nonrural schools as demonstrated in **Figures 3a and 3b.**[3]

While students of color continue to increase in educational attainment, there remains a persistent disparity in educational attainment between White students and students of color in rural communities as demonstrated by **Figure 4.**[8]

## VARIATIONS BY REGION

Student achievement scores in grade 3 and learning rates between grades 3-8 demonstrate the variation of educational access and quality in different U.S. regions.[40] For example, "In New England, the average rural student is performing one grade level higher than the national average for all students; the opposite is true for the West Coast, where the average rural student is performing one grade level below the national average. Rural districts in the South and West U.S. regions tend to have low test scores."[40] Further, more geographically isolated rural regions have lower 3rd grade student achievement scores and learning rates compared to their less isolated rural peers. Interestingly, when accounting for socioeconomic status, the slower learning rates

**Figure 2. Non-summer vs Summer Learning Trends in Rural vs. Nonrural Populations**[3]

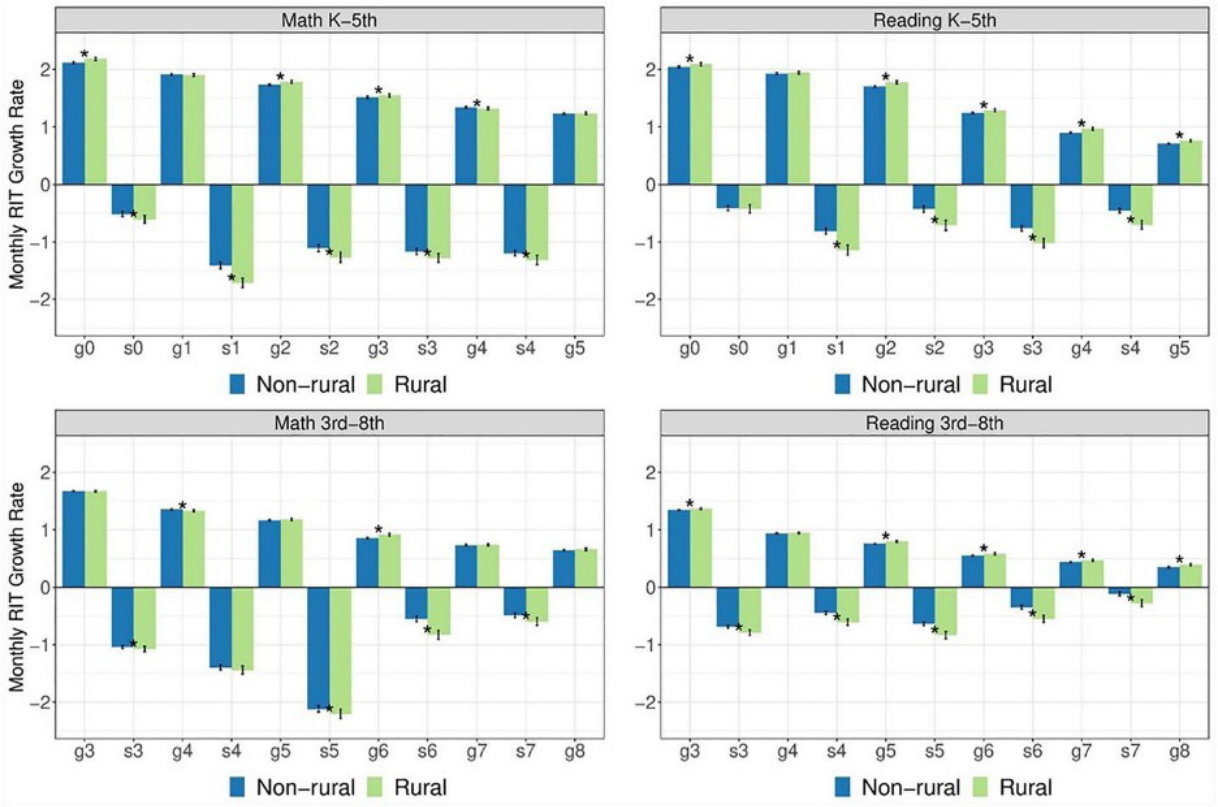


**Figure 3a. Achievement Gap between White and Black Students in Rural/Nonrural Schools[3]**

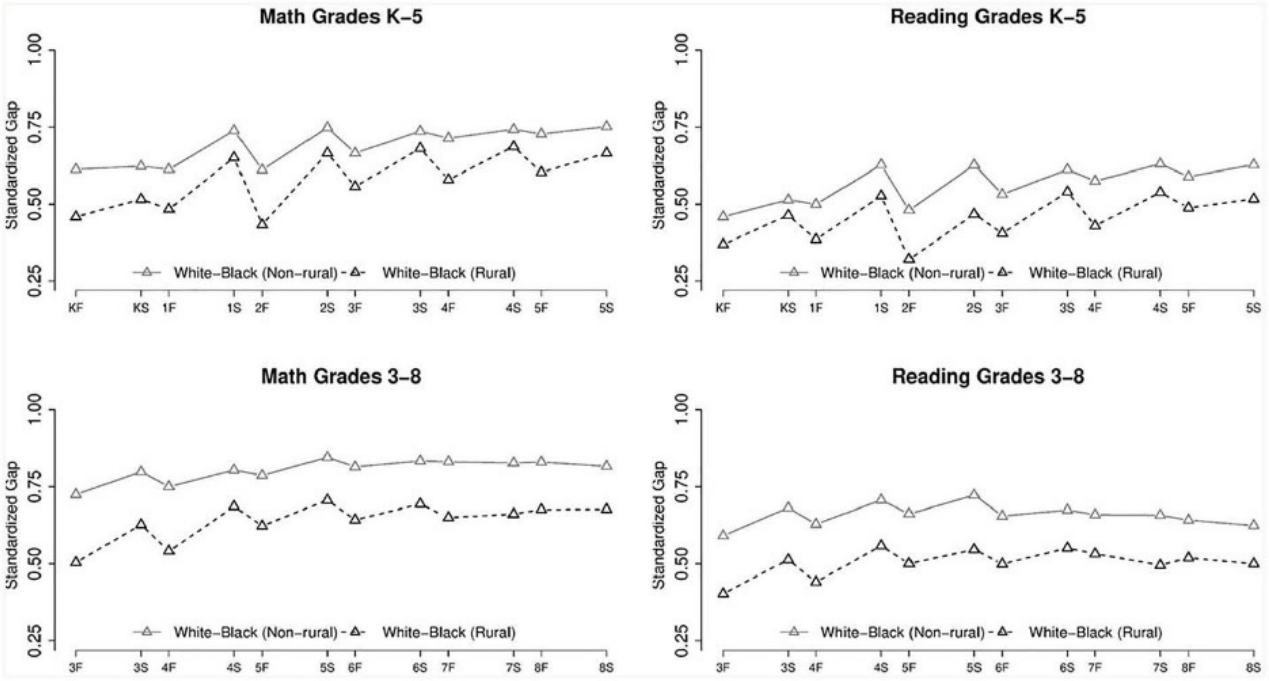
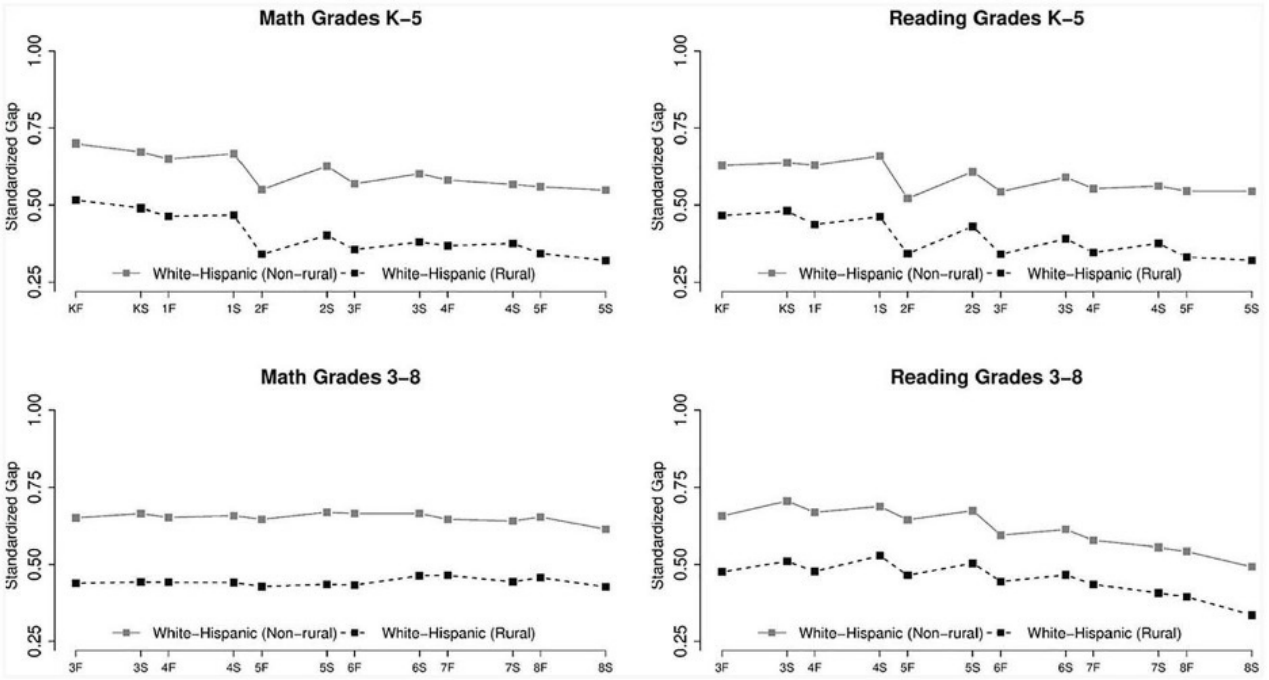



**Figure 3b. Achievement Gap between White and Hispanic Students in Rural/Nonrural Schools[3]**




are attributable to fewer available resources.[40] Barriers, such as economic deprivation, regional policies, racism, fewer opportunities/resources for differentiated instruction, and difficulties employing teachers with high levels of education, also explain the differences with student achievement in more isolated regions.[40]

Finally, different states have different rates of poverty, which influence student achievement as previously discussed.[39,41] **Figure 5** presents the percentage of students by state eligible for free or reduced lunch during the 2013-2014 school year; these statistics illustrate the different rates of poverty for each state.[41]

Thus, different rural regions have different educational achievement and learning rates because of their unique regional conditions. This chapter provides two examples of the differences between rural regions.

The first example is a case study of an Appalachian school, which experiences a high rate of poverty and lags in high school and college graduation rates when compared to the national average.[42] Specifically, the lack of parental involvement, poverty, failed practices of grade retention by districts, lack of role models, disconnection between home and school expectations, lack of educational resources to meet students' basic needs, and perception of education being inconsequential in daily lives are barriers to high school graduation within this case setting.[42] For students that wanted to attend college, they either failed college entrance requirements or were required to take remedial math and reading courses.[42] The latter resulted in more barriers to earn a college degree, which could motivate student attrition in college.[42]

Conversely, Illinois has more rural students than the national average but performs better than their national and rural counterparts.[2] Low racial diversity, low poverty rates, and stable residencies characterize rural schools in Illinois.[2] They perform better than the national and rural averages on NAEP reading and math tests in grades 4 and 8, despite high transportation costs, inequitable school funding, and low teacher salaries relative to the rest of the U.S.[2]

## BARRIERS

This section summarizes and builds upon the constraints found in rural schools that inhibit the growth of the following metrics: high school graduation rates, high school graduates in college the October after graduating, and proficiency in reading/ math skills at the 4th and 8th grade levels. Schools in rural communities face challenges in recruiting and retaining highly qualified teachers including specialized areas, such as ELL and STEM.[41] To fill high-need roles, schools hire less qualified or new teachers that can negatively impact student achievement and attainment.[41] Teachers in rural schools have limited access to professional development.[41] Furthermore, administration must take on multiple roles and capacities that would be delegated to other professionals in larger schools.[41]

**Figure 4. Education Attainment Disparities between White Students and Students of Color in Rural Communities[8]**

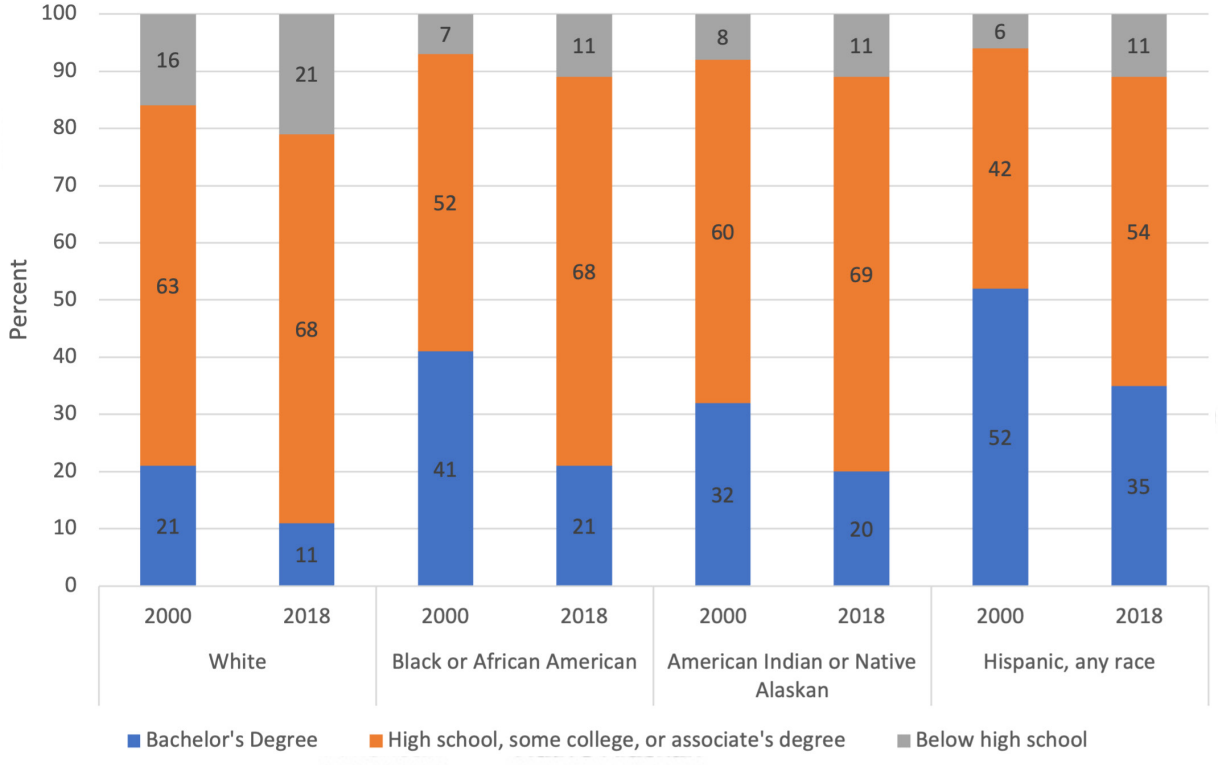
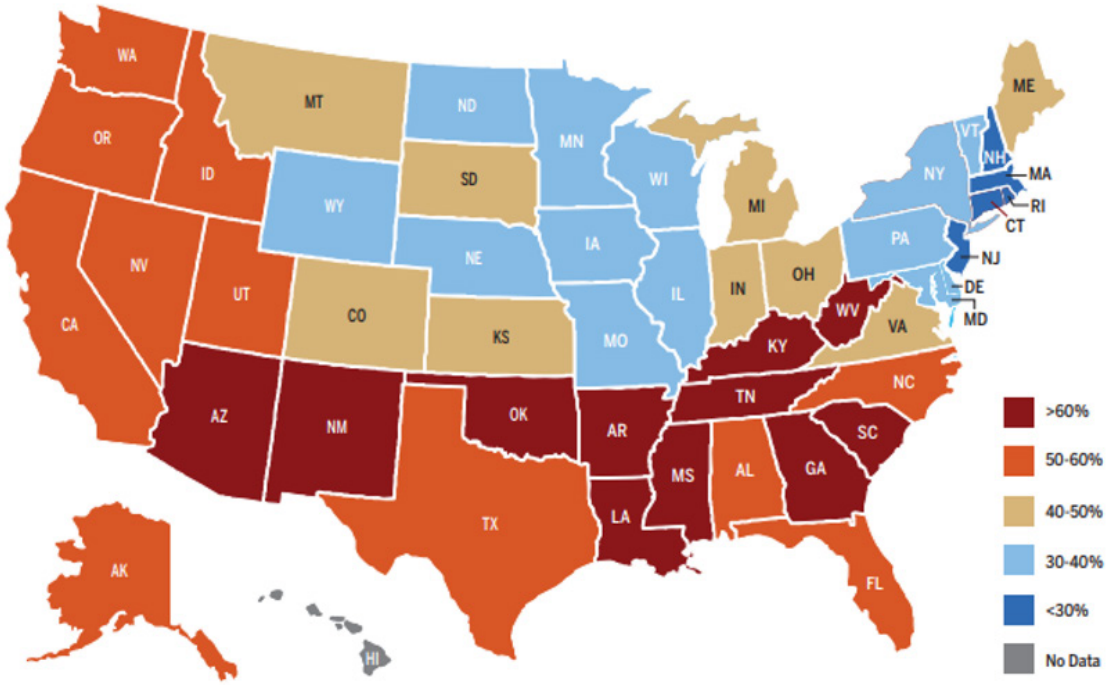


**Figure 5. Percentage of Students Eligible for Free/Reduced Lunch by State in 2013-2014 School Year[41]**




Rural schools have less funds to address student and school needs, which impact the decision-making and delegation of resources in the school.[4,15,23,24,34] Another barrier is the lack of attention rural schools attract in research and state/national policy discourses, which minimize the published solutions, guidelines, or recommendations that schools can utilize to address barriers or needs.[41]

Rural students and/or families have limited access to advanced coursework and digital resources, live further from colleges and other amenities compared to nonrural settings, and experience both higher rates of poverty and deep poverty (i.e., income falling below half of the poverty line).[30-34,36,41] These factors negatively influence academic achievement and attainment.[41] Further, students of color typically experience higher rates of poverty, which influence their academic achievement and educational attainment.[4,7,8,15] Finally, rural students present more mental health issues, including higher rates of suicide, than their urban peers but also have fewer resources to address their mental health needs.[26-28]

Globally, student achievement and attainment declined during the COVID-19 pandemic especially in low-income areas.[43-46] Rural schools fill a larger role in students' lives within their communities, and during COVID-19, these schools, for example, provided and transported meals to local families, navigated the tension between conducting school within remote or in-person learning environments, and designed supports for students' mental health needs.[43] Lower socioeconomic students were more severely affected during COVID-19 (e.g., learning loss, fewer remote resources, etc.).[44,47] Additionally, people experienced more mental health needs during COVID-19; however, rural people had fewer accessible remote resources to address their needs, such as telehealth, due to the digital gap within rural and nonrural communities.[47] Due to rural communities' high concentrations of poverty, the problems and barriers during COVID-19 may continue to widen the educational gap for years following the pandemic.[48]

## PROPOSED INTERVENTIONS

Despite pervasive and systemic issues in rural schools, rural communities have more agency in creating positive changes due to the larger influence individuals, schools, and community stakeholders have regarding decision-making in low population areas.[4,49] This section offers solutions and interventions to address the needs of rural schools and elevate the educational opportunities and outcomes for rural students.

Improvement in teacher recruitment and retention can help elevate student achievement.[50] Strategies to improve teacher recruitment and retention in rural schools include:

- active recruitment (e.g., administrators attending college fairs, word of mouth, personal contacts, grassroot efforts, highlighting rural advantages like smaller class sizes, closer networks of support, teacher autonomy);
- context-specific training ;
- hiring local teachers;
- incentives for retention;
- collaboration between rural schools and universities;
- administrative/ peer mentorship and support;
- induction programs/ supports (e.g., beginners' seminars, collaborations with colleagues and administrators, teacher aides, reduced course load).[41,51-54]

Instructional strategies to improve math and reading achievement scores in grades 7-12 include project-based learning, small group instruction, and progress monitoring.[55,56] For grades 4-12, strategies to improve literacy skills include active monitoring, graphic organizers, questioning, summarizing, and paraphrasing.[57] Academic performance in math and reading can be elevated through instructional activities that implement student self-reflection components (i.e., students develop awareness of their current knowledge and create goals to address academic deficits).[58]

Providing access to guidance counselors and financial aid information can make college more attainable for students in poverty.[30] Further, the use of blended or online learning can provide opportunities for dual credit or advanced placement courses to help provide more collegiate access for rural students.[59]

To improve professional development within a rural context, rural school leaders should situate the learning goals of the session within their context (e.g., cultural dynamics and meaning, everyday life), develop and maintain open and sustained dialogue (e.g., professional learning communities, collaboration between teachers and school leadership), and promote self-reflection (e.g., data-based evaluation, reflective inquiry).[60] Together, these features can serve to improve the instructional capacity of teachers, which may result in better student learning and achievement outcomes.[60] Putting teachers into school improvement or leadership roles can help build teacher agency, afford teachers a voice in school changes, foster collaboration and shared decision-making, help address school needs, and build teachers' sense of support. The use of these professionally-supported strategies may help improve school-based outcomes, such as educational attainment.[61]

Rural schools need to be creative in managing their costs since they have fewer funds than urban schools to address their needs.[23,24] Navigating student transportation options is one such avenue to reduce total costs. Advocating for more public transportation options and routes, encouraging pre-existing public transportation vehicles to stop by schools throughout the day, and recruiting volunteers to drive buses can reduce school costs associated with student transportation to and from school.[62]

To improve the structural inequities faced by minoritized racial and ethnic groups, school leaders must:

- listen to local experts, including experts of color;
- address the unique social, political, historical, and economic challenges of the region;
- advocate for resource distribution toward the most needed populations;
- collaborate with organizations that combat poverty;
- organize leadership and representation for all racial and ethnic constituents in the community;
- advocate for rural organizations that support communities of color;
- consider indicators of success that focus on the unique inequities in the region.[7]

School-based health centers focusing on mental health have a positive impact on graduation rates.[63] Features of effective school-based health centers include staff and student trainings on identifying signs of mental health problems, referral systems to receive help, strategies for crisis intervention, and outlets to receive mental

health assistance.[64] To further address issues of mental health, rural schools must:

- raise awareness of mental health issues in the school and community;
- use universal screenings to identify and treat students with early indicators of mental health issues;
- refrain from the use of punitive measures (e.g., Zero Tolerance);
- provide an option for mental health screening/ treatment as an alternative to punitive measures;
- implement systematic student support programs, like the Multi-Tiered System of Supports framework, to involve practitioners that collaboratively target and resolve the academic, social, and emotional needs of the school's most vulnerable students.[65]

Rural schools historically are underrepresented in research and policy.[41] Thus, this chapter recommends advocating for resource equalization (e.g., improved funding) as the continued investment into the discussed barriers improves the conditions associated with educational attainment and student achievement.[66]

## COMMUNITY MODELS KNOWN TO WORK

This section presents three promising community models whose use may improve the constituents and/or metrics associated with K-12 student achievement, graduation rates, and/or initial college attendance after high school graduation.

### *Maslow's Hierarchy to Support Struggling Schools*

Fairway Elementary School in Kapp County is in the South-Central region of the U.S. Kapp County is one of the 100 poorest counties in the U.S.[67] The school underwent a turnaround with academic performance between the years of 2008-2016.[67] School leadership built upon Maslow's Hierarchy of Needs framework as demonstrated by **Figure 6**.[67] Their conceptual framework aims to rank and support the most essential student needs.[67] The lowest level of the pyramid represents the most essential needs; the next lowest level presents the next set of the most essential needs, and so on.[67]

To address the specific and essential needs of their students, the school leaders also conceptualized the Educational Intervention System, which aims to:

- involve all stakeholders in diagnosing issues and implementing classroom interventions;
- provide schoolwide intervention groups to improve the academic, emotional, or social deficits;
- create one-on-one engagement opportunities;
- tackle community and familial problems
- improve school climate.[67]

In 2008, they were in the bottom 10th percentile in academic performance in their state.[67] By 2016, the school ranked in the 90th percentile in academic performance within their state.[67]

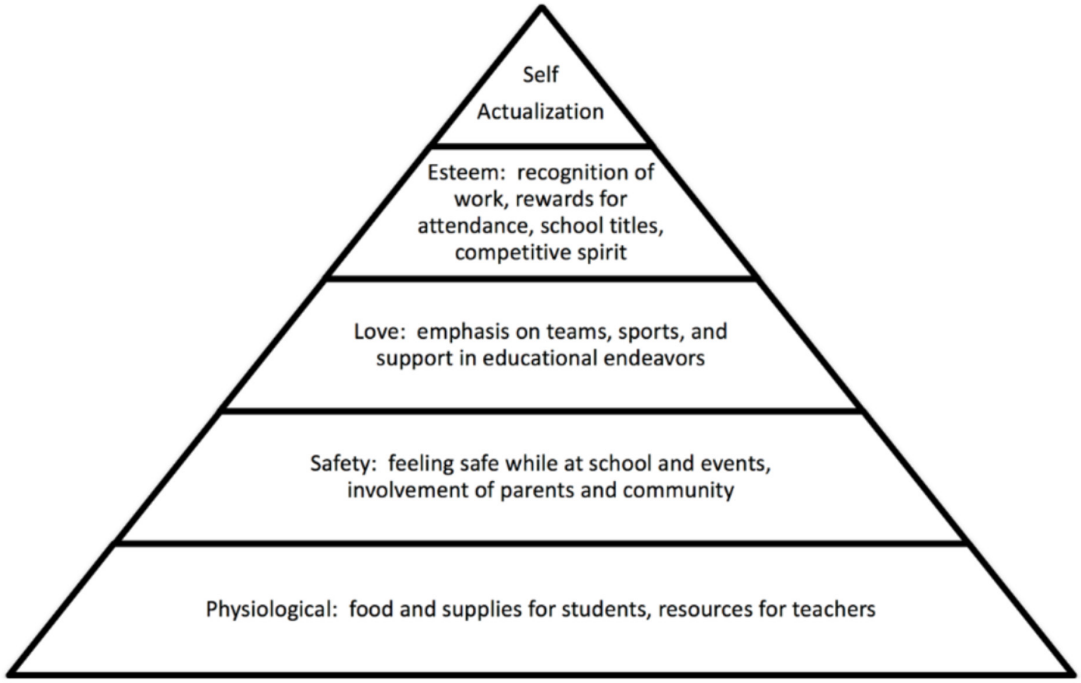
### *Professional Learning Communities*

Increasing the number of collaborative interactions between educators improves student achievement.[68] One model to integrate more teacher interactions is through professional learning communities (PLC). This model involves groups of teachers who collaborate to identify student problems and test solutions.[69] A rural Texas elementary school implemented a PLC system to improve instructional and institutional practices.[69] Having a PLC system in the school provided insight into problematic teaching practices that inhibited student achievement.[69] They conceptualized an action plan to reduce the deficits.[69]

### *Summer Literacy Academy*

To mitigate summer learning loss, a Title I rural school district in Minnesota implemented the Summer Literacy Academy to improve student literacy skills for students in grades 4-7.[70] In groups of 10-12 students, the classes engaged in research-based literacy pedagogy (e.g., teacher read-alouds with writing, small group shared reading, independent reading with teacher conferencing, readers' theater) over the course of four weeks.[70] Each week introduced a new genre (i.e., fiction, nonfiction, poetry, and biography).[70] To ensure equity, the program provided transportation and meals (i.e., breakfast and lunch) to students.[70] Students received two additional books upon the conclusion of the program to further promote reading outside of the school context.[70] Each grade level in the

Figure 6. Maslow's Hierarchy to Support Struggling Schools[67]




Summer Literacy Academy either experienced learning gain or smaller amounts of learning loss in literacy compared to previous student cohorts.[70]

## SUMMARY AND CONCLUSION

There are encouraging trends in rural schools when compared to nonrural schools. For example, rural schools outperform urban schools in graduation rates. They outperform nonrural schools in the NAEP 4th and 8th grade math and reading achievement test scores.

However, other trends are less encouraging, such as higher poverty rates in rural schools compared to suburban schools, fewer students attending college the first October after high school graduation, fewer course offerings and interactions with colleges, larger learning losses during the summer months compared to nonrural schools as a result of fewer summer learning opportunities, higher rates of mental health crises compared to their urban counterparts, and fewer opportunities to access technology when compared to nonrural schools. There are disparities with students of color compared to White students in rural regions as students of color experience higher rates of poverty, lower educational attainment, and lower student achievement compared to rural White students.

Finally, the South and West regions in the U.S. tend to have higher rates of rural poverty compared to the other U.S. regions, which compromises educational attainment and student achievement.

Rural barriers, such as isolation, high rates of poverty, and fewer funds to recruit/ retain quality teachers and address the school's deficits, create difficulties to reverse the problematic trends in student achievement and attainment. The interventions and community models aim to overcome these barriers to ensure that our rural students have better educational access and quality. In turn, these improvements may result in a healthier rural community.

## REFERENCES

1. Raghupathi V, Raghupathi W. The influence of education on health: an empirical assessment of OECD countries for the period 1995–2015. *Arch Public Health*. 2020;78:20. doi:10.1186/s13690-020-00402-5

2. Showalter D, Hartman S, Johnson J, Klein B. Why rural matters 2018-2019. The Rural School and Community Trust. November 2019. Accessed January 27, 2023. https://www.ruraledu.org/WhyRuralMatters.pdf

3. Johnson A, Kuhfeld M, Soland J. The forgotten 20%: achievement and growth in rural schools across the nation. *AERA Open*. 2021;7. doi:10.1177/23328584211052046

4. Tieken MC, Montgomery MK. Challenges facing schools in rural America. National Association of State Boards of Education. *Equity Rural Educ*. 2021;21(1):6-11. Accessed January 27, 2023. https://www.nasbe.org/challenges-facing-schools-in-rural-america/

5. National Student Clearinghouse Research Center. High school benchmarks – 2016. October 27, 2016. Accessed January 27, 2023. https://nscresearchcenter.org/hsbenchmarks2016/

6. Wells RS, Manly CA, Kommers S, Kimball E. Narrowed gaps and persistent challenges: examining rural-nonrural disparities in postsecondary outcomes over time. *The U Chicago Press J*. 2019;126(1):1-31. doi:10.1086/705498

7. Tieken MC. Educational justice and sustainability for rural schools. Sillerman Center for the Advancement of Philanthropy. February 5, 2020. Accessed January 27, 2023. https://heller.brandeis.edu/sillerman/pdfs/opportunity-briefs/sillermansocjustfundoppbriefno.4-2020rev.pdf

8. Farrigan T. Racial and ethnic disparities in educational attainment persist in rural America. USDA Economic Research Service. November 2, 2020. Accessed January 27, 2023. https://www.ers.usda.gov/amber-waves/2020/november/racial-and-ethnic-disparities-in-educational-attainment-persist-in-rural-america/

9. Texas Education Agency. Understanding the student achievement domain. Published date unknown. Accessed January 27, 2023. https://tea.texas.gov/sites/default/files/Student%20Achievement%20Domain_final.pdf

10. Li GH-Y, Lam SK-K, Wong I C-K, Chu JK-P, Cheung C-L. Education attainment, intelligence, and COVID-19: a Mendelian randomization study. *J Clin Med*. 2021;10(21):4870. doi:10.3390/jcm10214870

11. Park CL, Cho D, Moore PJ. How does education lead to healthier behaviours? Testing the mediational roles of perceived control, health literacy and social support. *Psychol Health*. 2018;33(11):1416-1429. doi:10.1080/08870446.2018.1510932

12. Kolbe L. School health as a strategy to improve both public health and education. *Annu Rev Public Health*. 2018;40:443-463. doi:10.1146/annurev-publhealth-040218-043727

13. US Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Healthy People 2030 - Education access and quality. Published date unknown. Accessed January 27, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/education-access-and-quality

14. US Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Healthy People 2030 - Leading health indicators. Published date unknown. Accessed January 27, 2023. https://health.gov/healthypeople/objectives-and-data/leading-health-indicators

15. Logan J, Burdick-Will JB. School segregation and disparities in urban, suburban, and rural areas. *Ann Am Acad Pol Soc Sci*. 2017;674(1):199-216. doi:10.1177/0002716217733936

16. McCracken JD, Barcinas JDT. Differences between rural and urban schools, student characteristics, and student aspirations in Ohio. *J Res Rural Educ*. 1991;7(2):29-40. https://eric.ed.gov/?id=EJ424925

17. Kassabian, M, Shrestha A, Callaghan T, et al. Rural healthy people 2030: common challenges, rural nuances. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

18. Jordan JL, Kostandini G, Mykerezi E. Rural and urban high school dropout rates: are they different? *J Res Rural Educ*. 2012;27(12):1-21. Accessed January 27, 2023. https://jrre.psu.edu/sites/default/files/2019-08/27-12.pdf

19. Ritter B. Factors influencing high school graduation. Washington Student Achievement Council. 2015. Accessed January 27, 2023. https://wsac.wa.gov/sites/default/files/2015.12.3.Ritter.Graduation.Issue.Brief.pdf

20. Jackson CK. (2018). Does school spending matter? The new literature on an old question. In Tach, L, Dunifon, R, Miller, DL. *Confronting inequality: how policies and practices shape children's opportunities*. American Psychological Association; 2020:165-186. doi:10.1037/0000187-008

21. Institute for Research on Poverty. How is poverty measured? Published date unknown. Accessed February 28, 2023. https://www.irp.wisc.edu/resources/how-is-poverty-measured/#:~:text=The%20Census%20Bureau%20determines%20poverty,and%20adjusted%20for%20family%20size

22. Office for the Assistant Secretary for Planning and Evaluation. Poverty guidelines. Publish date unknown. Accessed February 28, 2023. https://aspe.hhs.gov/topics/poverty-economic-mobility/poverty-guidelines

23. Howell PL, Miller BB. Sources of funding for schools. *Future Child*. 1997; 7(3):39-50. Accessed January 27, 2023. https://pubmed.ncbi.nlm.nih.gov/10892464/

24. Gutierrez D. Little school on the prairie: the overlooked plight of rural education. Harvard Kennedy School Institute of Politics. Published date unknown. Accessed January 27, 2023. https://iop.harvard.edu/get-involved/harvard-political-review/little-school-prairie-overlooked-plight-rural-education#:~:text=Funding%20Disparities&text=In%20states%20like%20Connecticut%2C%20Michigan,funding%20than%20their%20rural%20counterparts

25. von Simson K, Brekke I, Hardoy I. The impact of mental health problems in adolescence on educational attainment. *Scandinavian J Educ Res*. 2022;66(2):306-320. doi:10.1080/00313831.2020.1869077

26. HRSA Maternal & Child Health. Rural/urban differences in children's health. mchb.hrsa.gov. October 2020. Accessed January 27, 2023. https://mchb.hrsa.gov/sites/default/files/mchb/data-research/rural-urban-differences.pdf

27. Ivey-Stephenson AZ, Crosby AE, Jack SPD, Haileyesus T, Kresnow-Sedacca M. Suicide trends among and within urbanization levels by sex, race/ethnicity, age group, and mechanism of death – United States, 2001-2015. *MMWR Surveill Summ*. 2017;66(No. SS-18):1-16. doi:10.15585/mmwr.ss6618a1

28. Graves JM, Abshire DA, Mackelprang, JL, et al. Geographic disparities in the availability of mental health services in US public schools. *Am J Prev Med*. 2023;64(1):1-8. doi:10.1016/j.amepre.2022.09.003

29. Thompson PN, Gunter K, Schuna J, Tomayko EJ. Are all four-day school weeks created equal? A national assessment of four-day school week policy adoption and implementation. *Educ Finance & Policy*. 2021;16(4):558-583. doi:10.1162/edfp_a_00316

30. Soo-yong B, Irvin MJ, Meece JL. Rural-nonrural differences in college attendance patterns. *Peabody J Educ*. 2015;90(2):263-279. doi:10.1080/0161956X.2015.1022384

31. Hardy T. Unpacking the rural opportunity gap: a literature review of factors impacting college access & choice for rural students. *J Stud Affairs*. 2021;17:32-41. Accessed January 27, 2023. https://steinhardt.nyu.edu/sites/default/files/2021-05/JoSA%20XVII%20Publication_FINAL.pdf

32. Gettinger A. One reason rural students don't go to college: colleges don't go to them. National Public Radio. March 6, 2019. Accessed January 27, 2023. https://www.npr.org/2019/03/06/697098684/one-reason-rural-students-dont-go-to-college-colleges-don-t-go-to-them

33. Goldman A-M. Interpreting rural students' stories and access to a flagship university. *Rural Educ*. 2019;40(1):29-44. doi:10.35608/ruraled.v40i1.531

34. Echazarra A, Radinger T. Learning in rural schools: insights from PISA, TALIS, and the literature. OECD. March 12, 2019. Accessed January 27, 2023. https://www.oecd-ilibrary.org/docserver/8b1a5cb9-en.pdf?expires=1674848495&id=id&accname=ocid177419&checksum=47F7CBF1BC61B5C8672A114CC2993747

35. Garbee KT. College credit in high school: an examination of the impact of dual credit on college success and completion in Texas. [Doctoral dissertation]. Austin, TX: University of

Texas at Austin; 2015. https://repositories.lib.utexas.edu/handle/2152/31003

36. Vogels E. Some digital divides persist between rural, urban and suburban America. Pew Research Center. August 19, 2021. Accessed January 27, 2023. https://www.pewresearch.org/fact-tank/2021/08/19/some-digital-divides-persist-between-rural-urban-and-suburban-america/

37. Kormoas E, Wisdom K. Rural schools and the digital divide. *Theory Pract Rural Educ*. 2021;11(1). doi:10.3776/tpre.2021.v11n1p25-39

38. Strategic Data Project. Do college enrollment rates differ across high schools? Fall 2012. Accessed January 27, 2023. https://hwpi.harvard.edu/files/sdp/files/sdp-spi-v2-hs-effect-memo.pdf

39. Silvernail DL, Sloan JE, Paul CR, et al. The relationships between school poverty and student achievement in Maine. Maine Education Policy Research Institute. January 2014. Accessed January 27, 2023. https://digitalcommons.usm.maine.edu/cgi/viewcontent.cgi?article=1000&context=cepare_funding#:~:text=Thus%2C%20when%20all%20Maine%20schools,poverty%20levels%20increase%20performance%20decreases

40. Drescher J, Podolsky A, Reardon S, Torrance G. The geography of rural educational opportunity. *RSF: The Russell Sage Foundation J Soc Sci*. 2022;8(3):123-149. doi:10.7758/RSF.2022.8.3.05

41. Lavalley M. Out of the loop. National School Boards Association, Center for Public Education. January 2018. Accessed January 27, 2023. https://www.nsba.org/-/media/NSBA/File/cpe-out-of-the-loop-report-january-2018.pdf

42. Lyttle-Burns A. *Factors that contribute to student graduation and dropout rates: an in-depth study of a rural Appalachian school district*. [Doctoral dissertation]. Richmond, KY: Eastern Kentucky University; 2011. https://encompass.eku.edu/etd/13/

43. Nicola T, Gabl A, Ash J. The response of rural districts to the COVID-19 pandemic. National Center for Rural Education Research Networks. July 2020. Accessed January 27, 2023. https://cepr.harvard.edu/files/cepr/files/ncrern_report.pdf

44. Hanushek EA, Woessmann L. The economic impacts of learning loss. OECD. September 2020. Accessed January 27, 2023. https://www.oecd.org/education/The-economic-impacts-of-coronavirus-covid-19-learning-losses.pdf

45. Reimers FM. Learning from a pandemic, the impact of COVID-19 on education around the world. In Reimers, FM. *Primary and secondary education during COVID-19: disruptions to educational opportunity during a pandemic*. Springer; 2022. 1-37. Accessed January 27, 2023. https://library.oapen.org/bitstream/handle/20.500.12657/50965/978-3-030-81500-4.pdf?sequence=1%23page=376%C2%A0#page=7

46. Hammerstein S, Konig C, Dreisorner T, Frey A. Effects of COVID-19 related school closures on student achievement – a systematic review. *Front Psychol*. (2021);16. doi:10.3389/fpsyg.2021.746289

47. Summers-Gabr NM. Rural-urban mental health disparities in the United States during COVID-19. *Psychol Trauma*. 2020;12(S1):222-224. doi:10.1037/tra0000871

48. Hoofman J, Secord E. The effect of COVID-19 on education. *Pediatr Clin North Am*. 2021;68(5):1071-1079. doi:10.1016/j.pcl.2021.05.009

49. Tieken MC. *Why rural schools matter*. The University of North Carolina Press; 2014. https://uncpress.org/book/9781469618487/why-rural-schools-matter/

50. Darling-Hammond L. Keeping good teachers: why it matters, what leaders can do. *Educ Leadersh*. 2003;60(8):1-13. Accessed January 27, 2023. https://www.researchgate.net/publication/242663183_Keeping_Good_Teachers_Why_It_Matters_What_Leaders_Can_Do

51. Lyles AS. Recruiting and retaining teachers in remote rural school districts: strategies for success. [Doctoral dissertation]. Auburn, AL: Auburn University; 2016. https://etd.auburn.edu/bitstream/handle/10415/5452/Alicia%20Sumbry%20Lyles_%20Dissertation_final%2011-15-16.pdf?sequence=2

52. Tran H, Smith DA, Fox EC. Perspectives of potential and current teachers for rural teacher recruitment and retention.

University of South Carolina College of Education Center for Innovation in Higher Education. October 2018. Accessed January 27, 2023. https://static1.squarespace.com/static/5ab91858b40b9d3cf933b285/t/5c618f75e5e5f0eb4965c610/1549897590819/SC+Rural+Teacher+Staffing+Report.pdf

53. Tran H, Hardie S, Gause S, Moyi P, Ylimaki R. Leveraging the perspectives of rural educators to develop realistic job previews for rural teacher recruitment and retention. *Rural Educ.* 2020;41(2):31-46. doi:10.35608/ruraled.v41i2.866

54. Ornstein AC, Pajak EF, Ornstein SB. (2015). *Contemporary issues in curriculum*. 6th edition. Pearson; 2015.

55. Dietrichson J, Filges T, Klokker RH, Viinholt BCA, Bog M, Jensen UH. Targeted school-based interventions for improving reading and mathematics for students with, or at risk of, academic difficulties in grade 7-12: a systematic review. *Campbell Syst Rev.* 2020;16(2):1-52. doi:10.1002/cl2.1081

56. Cervantes BM. The impact of project-based learning of mathematics and reading achievement of 7th and 8th grade students in a south Texas school district. [Doctoral dissertation]. Corpus Christi, TX: Texas A&M University-Corpus Christi; 2013. https://tamucc-ir.tdl.org/bitstream/handle/1969.6/508/Dissertation%20Bernadine%20Munoz%20Cervantes.pdf?sequence=1

57. Torgesen JK. Five areas of instructional improvement to increase academic literacy. All About Adolescent Literacy. 2007. Accessed January 27, 2023. https://www.adlit.org/topics/curriculum-instruction/five-areas-instructional-improvement-increase-academic-literacy

58. Donker AS, de Boer H, Kostons D, van Ewijk CD, van der Werf M. Effectiveness of learning strategy instruction on academic performance: a meta-analysis. *Educ Res Rev.* 2014;11:1-26. doi:10.1016/j.edurev.2013.11.002

59. Werth E, Werth L, Kellerer E. Transforming K-12 rural education through blended learning: barriers and promising practices. International Association for K-12 Online Learning. October 2013. Accessed January 27, 2023. https://aurora-institute.org/resource/transforming-k-12-rural-education-through-blended-learning-barriers-and-promising-practices/

60. Howley A, Howley C. High-quality teaching: providing for rural teachers' professional development AEL policy brief. *Rural Educ.* 2005;26(n2). Accessed January 27, 2023. https://eric.ed.gov/?id=EJ783825

61. Anderson KD. Transformational teacher leadership in rural schools. *Rural Educ.* 2018;29(3):8-17. doi:10.35608/ruraled.v29i3.462

62. Henning-Smith C, Evenson A, Corbett A, Kozhimannil K, Moscovice I. Rural transportation: challenges and opportunities. University of Minnesota Rural Health Research Center. November 2017. Accessed January 27, 2023. http://rhrc.umn.edu/wp-content/files_mf/1518734252UMRHRCTransportationChallenges.pdf

63. Westbrook M, Martinez L, Mechergui S, Yeatman S. The influence of school-based health enter access on high school graduation: evidence from Colorado. *J Adolesc Health.* 2020;67(3):447-449. doi:10.1016/j.jadohealth.2020.04.012

64. Schmidt R, Iachini A, George MRW, Koller J, Weist M. Integrating a suicide prevention program into a school mental health system: a case example from a rural school district. *Children & Sch.* 2015;37(1):18-26. doi:10.1093/cs/cdu026

65. Wilger S. Special considerations for mental health services in rural schools. Now is the Time Technical Assistance Center. Published date unknown. Accessed January 27, 2023. https://rems.ed.gov/docs/resources/SAMHSA_Mental_Health_Services_Rural_Schools.pdf

66. Darling-Hammond L. Inequality in teaching and schooling: how opportunity is rationed to students of color in America. In Smedley, BD, Stith, AY, Colburn L, et al. *The right thing to do, the smart thing to do: enhancing diversity in the health professions.* National Academies Press; 2001. Accessed January 27, 2023. https://www.ncbi.nlm.nih.gov/books/NBK223640/

67. Fisher M, Crawford B. From school of crisis to distinguished. *Rural Educ*. 2020;41(1):8-19. doi:10.35608/ruraled.v41i1.831

68. Basileo LD. Did you know? Your school's PLCs have a major impact. Learning Sciences International Learning and Performance Management. 2016. Accessed January 27, 2023. https://www.hancock.stier.org/Downloads/PLC-Report.pdf

69. Parker JM. Improving teaching and learning: a case study of a rural Texas elementary school's implementation of professional learning communities and culturally responsive pedagogical practices. [Doctoral dissertation]. Lubbock, TX: Texas Tech University; 2019. https://ttu-ir.tdl.org/handle/2346/85553

70. O'Connell KM. Making summer learning equitable for students in a rural, Title I school district: turning on the faucet of resources. *Interactive J Glob Leadersh Learn*. 2020;1(1). doi:10.55354/2692-3394.1001

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# HEALTH INSURANCE FOR RURAL AMERICANS

*By Benjamin Ukert, PhD; Susmita Chakraborty, MPH; and Theodoros Giannouchos, PhD*

## SCOPE OF THE PROBLEM

- Access to health insurance has improved over the last decade, especially in the southeastern United States, but the Healthy People 2020 goal to increase the proportion of individuals with health insurance coverage was not met.
- More than 27 million people in the U.S. remained uninsured in 2022. Compared to 2012, this reflects a decrease in the number of uninsured by 46 million. The introduction of the Affordable Care Act in 2014, alone, has been credited with a decrease of 30 million uninsured individuals by 2020.
- The uninsurance rate remains elevated, particularly for rural populations, especially in the 10 states that have not expanded Medicaid.
- While disparities in health insurance coverage have declined for Hispanic and Black individuals compared to White individuals, these populations remain less likely to have health insurance coverage.

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The Affordable Care Act (ACA) passed in 2010 and its major components implemented in 2014 represent the largest change in the health insurance market since the inception of Medicaid and Medicare. The primary goal of the ACA was to reduce the number and proportion of uninsured individuals through the creation of individual health insurance marketplaces, a mandate to obtain health insurance coverage, and the expansion of Medicaid coverage for individuals with incomes up to 138% of the federal poverty level (FPL).[1-3] However, not all states expanded Medicaid. Starting in 2014, 25 states and the District of Columbia expanded Medicaid coverage, and 13 states expanded at a later date, leaving only 10 states who had not expanded Medicaid coverage by 2023.[4] These coverage expansions took effect in 2014, but earlier efforts such as the expansion of dependent coverage, which allowed individuals between 19 and 26 years of age to remain on their parents' health insurance plans, and early Medicaid expansions in six states already impacted the uninsurance rate in 2011 and beyond.[5-7]

It is estimated that the ACA decreased the uninsurance rate by twelve percentage points and provided health insurance coverage to about 15 million individuals below the age of 65 (**Figure 1**).[8-10] While estimates vary, the individual marketplace has been credited with about half of the increase in health coverage.[11] The dependent child coverage provision has also been credited with increased insurance for young adults.[11,12] In addition, it is estimated that of the approximately 52 million rural residents in 2015, 4.5 million gained coverage through the ACA.[13,14] However, efforts to reduce the number of rural uninsured persons remain important, as 12% of rural residents remain uninsured.[15]

The growth in health insurance coverage led to gains in access to primary care and further improvements in quality of care, given the requirement of marketplace plans to cover essential health benefits (as defined by each state). A growing body of studies have shown that the ACA improved access to primary care.[10,16-23] For example, a study by Wherry and Miller (2016) shows that ACA Medicaid expansion led to an increase in the probability of having an office visit.[20] As of 2021, about 88% of individuals report having access to primary care, though prevailing disparities between rural and urban areas still persist.[24,25]

The coverage gains also led to higher rates of dental insurance coverage, as more-than-emergency dental care is often included in

Medicaid benefits, and can also be purchased on the marketplace concurrently with medical plans.[26] Starting in 2014, dental coverage rates increased, as did the share of individuals who had a dental visit. While it is likely that these benefits also improved access to dental care and outcomes for rural residents, to date, there is limited evidence on how rural residents were affected.[26]

Challenges to accessing affordable insurance and healthcare remain. Medicaid and marketplace health plans often include only small provider networks, leading to longer commutes for individuals seeking care, especially for specialty care.[27-29] At the same time, many rural areas experience few health plan options, as insurers left the marketplace in many rural areas starting in 2016, thus limiting choice for consumers and competition among insurers.[30] This could be attributed to the fact that many rural areas have their own individual marketplace rating area separate from other more populous areas.[31] Rating areas are geographic areas that define consumer boundaries in which insurers can compete for business. To improve access to marketplace plans, some states, such as Texas, have begun to aggregate rural rating areas into urban rating areas starting in 2023. Increasing the size of the potential market may lead to a broader risk pool while providing more health plan options to rural individuals.[31]

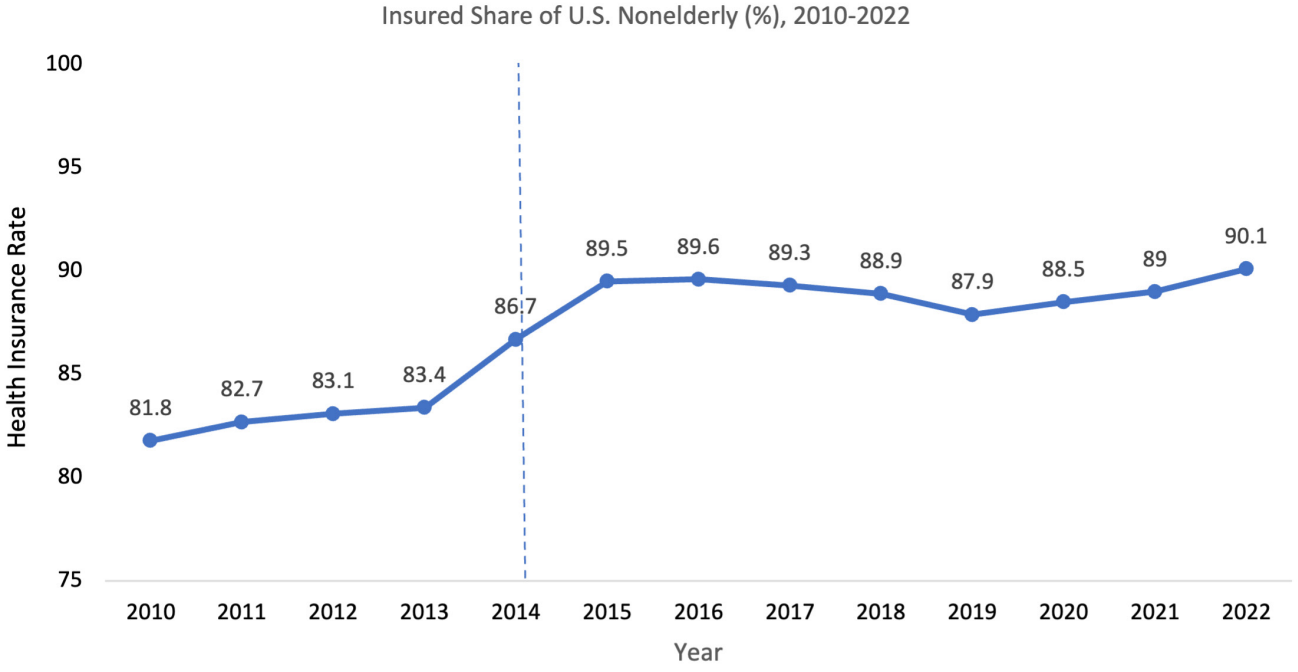
## RELEVANT HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

### *Healthy People 2030 Objectives*

Access to health insurance is critical to monitor health status and to obtain necessary medical care to treat acute and chronic diseases. The high cost of healthcare has encouraged people without health insurance to forego or delay preventive services and primary care.[36] They often seek care in the emergency department or in locations where charity care is available.[37] This suboptimal care-seeking behavior has dramatic consequences and produces inadequate disease management, poor health, and a higher risk of preventable morbidity.[36]

Through its Healthy People program, the U.S. Department of Health and Human Services establishes national goals and objectives, every decade, to improve the health of all Americans. The Healthy People 2030 objectives for the topic of Health Insurance, that will be addressed in this chapter, are:

**Figure 1. Display Trends in Health Insurance Coverage from 2010-2022, National Health Interview Survey[32-35]**



- **AHS-01** Increase the proportion of persons with health insurance
- **AHS-02** Increase the proportion of people with dental insurance
- **AHS-07** Increase the proportion of people with primary care providers

**AHS-01** - Health Insurance:

People who do not have health insurance are more prone to missing routine health check-ups and less likely to have a consistent healthcare provider, thus exposing themselves to greater health risks.[38] The objective of Healthy People 2030 is to increase the proportion of the insured population to a target of 92.4%. As of 2022, 90.1% of the population under 65 years of age have health insurance.[39]

**AHS-02** - Dental Insurance:

Individuals who have dental insurance are more likely to receive routine and preventive oral medical care.[40] Poor oral health has been associated with numerous health issues.[41] Fifteen objectives within Healthy People 2030 specifically focus on oral health and increasing the proportion of people with dental insurance. The target is to increase the proportion of individuals with dental insurance to 75% by 2030 from 72.5% in 2021. As of 2019, 20.2% of individuals delayed, or were unable to get, dental care due to high costs, lack of insurance, or access to dental care services.[42,43]

**AHS-07** - Primary Care Providers:

The maintenance of good health and effective management of serious medical conditions can be enhanced by having a dedicated primary care provider. A primary care provider can foster a long-term relationship with a patient and facilitate case management and collaboration between various healthcare providers. Improving access to primary care can be achieved through innovative approaches such as team-based care and alternative payment methods. Based on 2017 data from the Medical Expenditure Panel Survey, 76% of individuals said they have a usual primary care provider. The Healthy People 2030 target is to increase the proportion of people with regular access to primary care providers to 84% by 2030.[44,45]

***Affordable Care Act Continues to Address Disparities in Health Insurance Coverage, Dental Insurance, and Primary Care Access***

The ACA remains one of the most influential laws to increase insurance coverage rates since the introduction of Medicaid and Medicare in 1965. Nevertheless, 27.5 million individuals remain uninsured, and it is estimated that more than 3.5 million uninsured individuals would receive coverage if the remaining states expanded Medicaid for those making less than 138% of the FPL.[46,47] Future state Medicaid expansions could particularly enhance coverage gains for rural residents, as the remaining states that chose not to expand Medicaid to-date have disproportionately large rural populations.

Based on existing evidence, expanding health insurance coverage can lead to increases in primary care access.[10,18] Challenges remain, including a potential lack of primary care providers that accept new patients and getting appointments in a timely manner.[48,49] Expanding Medicaid coverage has shown to increase primary care access, even for newly covered individuals seeking an initial appointment.[50-52] The growth in access has been aided by the higher Medicaid reimbursement rates introduced with the ACA.[53,54] At the same time, the cost of primary care, especially in a healthcare market in which hospitals are vertically integrating primary care practices, has increased the out-of-pocket cost for patients.[55,56] Thus, it is imperative to view access to primary care concerns through the lens of growing cost pressures.

At the same time, dental coverage rates remain relatively low compared to medical insurance rates - about 70% of individuals have either private or public dental coverage while medical insurance rates are hovering around 90%.[57] While the ACA provides opportunities to purchase dental insurance (combined with medical insurance) on the marketplace, only about 9.8 million individuals gained dental insurance coverage.[57] Dental healthcare needs remain especially high among seniors.[58] A report by the Urban Institute suggests that only 27% of Medicare beneficiaries' dental costs are covered by insurance.[59] As such, lawmakers have proposed to expand dental coverage for all Medicare

beneficiaries. There is evidence indicating that access to dental care has disproportionately improved in states that expanded Medicaid and offered more generous dental benefits in Medicaid, compared to those that did not.[60-67] In addition, there is evidence suggesting that dental-related emergency department visits decreased only in Medicaid expansion states with more generous Medicaid dental benefits, while emergency department visits rose in both expansion states without dental benefits and non-expansion states, indicating that Medicaid expansion's impact on access to dental care is contingent on the provision of adult dental benefits.[68]

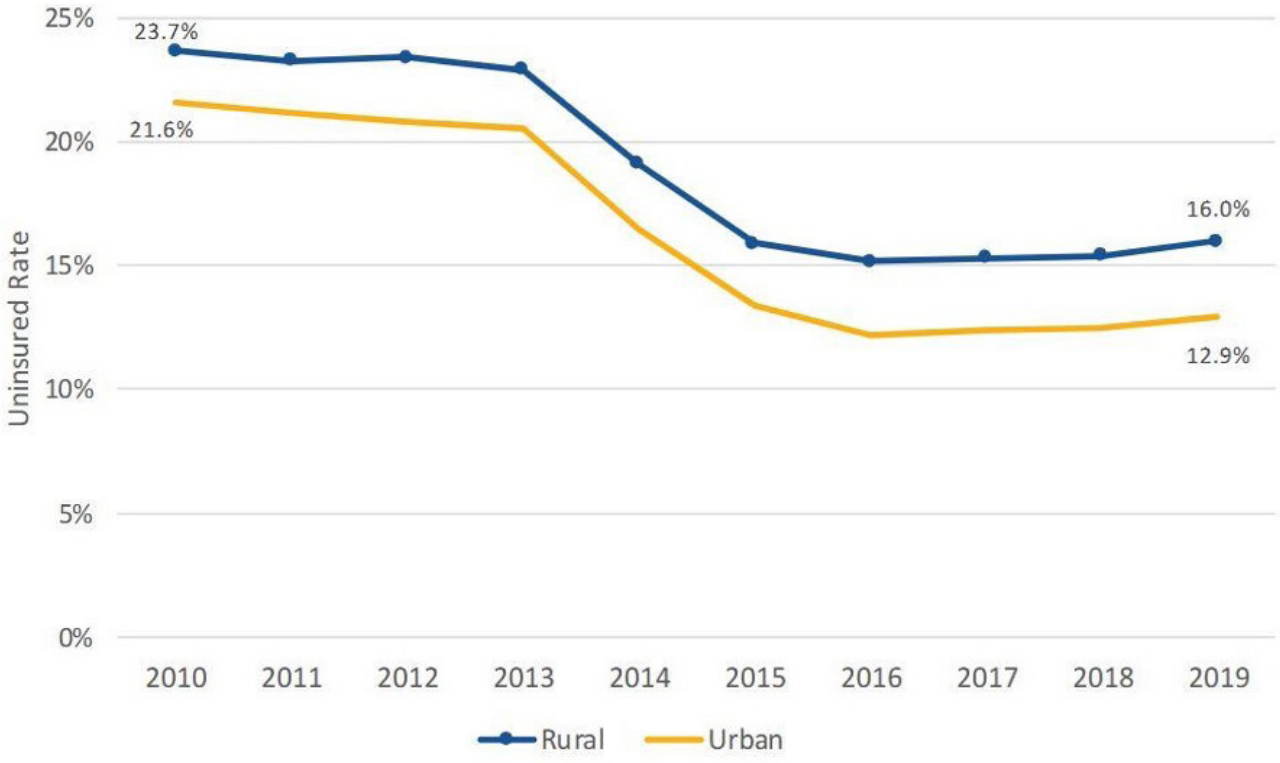
## RURAL HEALTHY PEOPLE 2030 SURVEY

In the Rural Healthy People 2030 survey, conducted in 2021-22 by Texas A&M University, health insurance was ranked as a top 20 health priority by rural stakeholders.[69] Access to regular quality medical and specialty care, such as addiction and mental health care services, were identified as the most important health priorities in all census regions. This is not surprising given the opioid and drug epidemic in the U.S.[70] Further, access to healthcare remains a top issue across demographic groups and fields of employment, reflecting the overall perception that healthcare access is not adequate. As such, it is important for stakeholders, insurers, and policymakers to focus on providing insurance products that provide broad access to care.

## PREVALENCE AND DISPARITIES IN RURAL AREAS

Urban-rural disparities in health insurance coverage have long been documented in the U.S.[71,72] The ACA provided uniform access to insurance for working-age adults making between 100 to 400% of the FPL, thereby reducing the non-elderly rural uninsurance rate from 24% in 2010 to 16% by 2019.[11] However, rural residents generally have lower insurance rates compared to urban residents (**Figure 2**), with a growing insurance disparity from highly urbanized areas to very rural areas. A 2014 Kaiser Family Foundation report outlines a number of important reasons for the disparity in insurance coverage.[73] A reason for coverage disparity can stem from the fact that rural populations tend to be less likely to have employer-sponsored health coverage.[73] Another driving force is the lack of Medicaid coverage for low-income individuals in

**Figure 2. Trends in Health Insurance for Urban and Rural Areas[75]**



non-Medicaid expansion states. The proportion of individuals qualifying for Medicaid coverage is large, as rural areas tend to have lower wages than urban areas. About 30% of uninsured individuals in rural areas may be eligible for Medicaid or CHIP, and 37% of uninsured rural individuals are within the income range to be eligible for premium tax credits in the marketplaces compared to 32% of metropolitan uninsured individuals.[73] As of 2016, in non-Medicaid expansion states the rural uninsurance rate stands at 32%, compared to 16% in rural areas of Medicaid expansion states. Nevertheless, the uninsured rate for low-income adults in rural areas and small towns dropped 19% in Medicaid expansion states and 6% in non-expansion states between 2009 and 2016.[74]

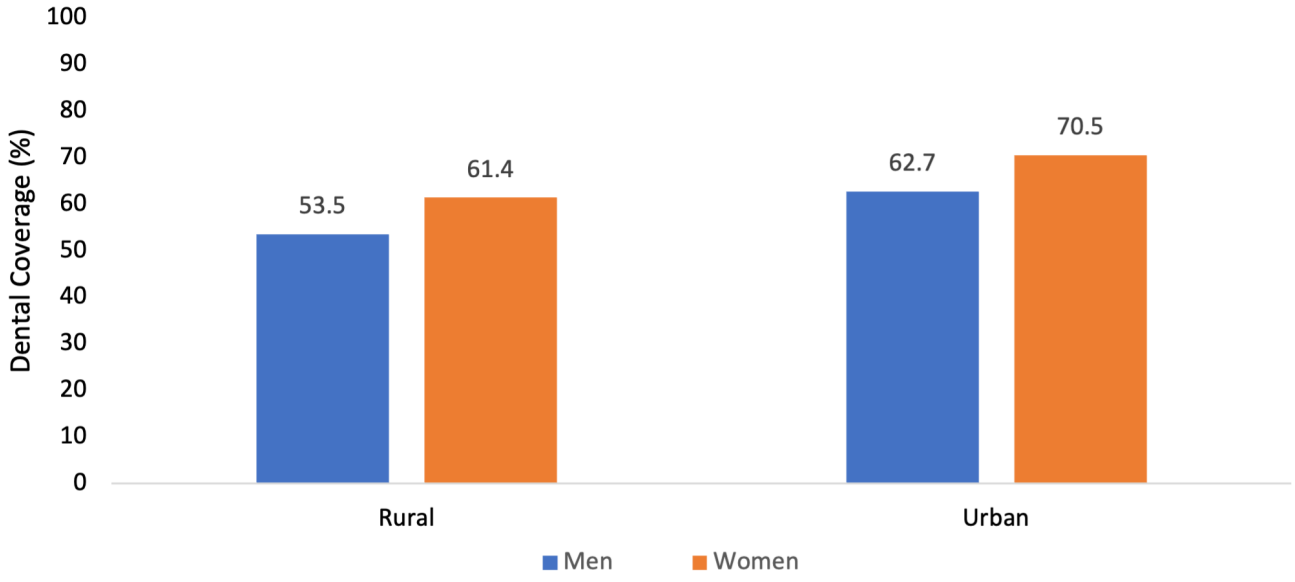
Disparities between urban and rural dental insurance coverage rates are large. This is demonstrated in **Figure 3** where 2019 data on adults with a dental visit in the past 12 months are presented by urbanicity and gender. More recently, a study by Luo et al. (2022) showed that 54% of urban residents had dental coverage, compared to only 35% in the most rural areas.[76] General dental visits and preventive procedures displayed a smaller gap for urban and rural areas. Urban residents were more likely to have preventive procedures than rural residents, but total dental visits were similar across geography. At the same time, large state-wide differences exist in the number of dental providers that accept Medicaid patients, which disproportionately negatively affects lower income and rural areas.[76]

Access to primary care is higher for urban residents than rural residents. Estimates suggest that about 81% of urban individuals have a regular source of care compared to 74% of rural individuals.[77] This disparity is partially driven by lack of primary care providers in rural areas. Nevertheless, the density of primary care physicians increased by 20.8% in urban counties, and 14.3% in rural counties from 2009 to 2017.[78,79] The disparity in access remains problematic as rural residents have a higher prevalence of stroke, coronary heart disease, and mortality.[80-82] Disparities in access to care could have been worse with the growing number of rural hospital closures, but rural residents benefit from the existence of rural health centers and federally qualified health centers (FQHCs) to provide primary care.[78,83]

## VARIATION BY RURAL REGIONS

Health insurance and dental coverage rates vary across the U.S. Generally, the South has the highest uninsurance rate, while the Northeast and the Midwest have the highest coverage rates (**Figures 4 and 5**). The proportion of individuals with low income is higher in the South, which can help to explain lower coverage rates.[85,86] **Figure 5** shows that regional percentages of dental coverage ranged from 45.6% to 57.1%, with individuals in the South having significantly

**Figure 3. Dental Coverage for Rural vs Urban Areas across U.S.**[84]



lower coverage rates than the U.S. average. After the implementation of the ACA marketplace and Medicaid expansions, insurance and dental coverage rates increased across all four geographic census regions, though somewhat stronger in areas with a history of low coverage rates.[86] The same can be said about primary care access (**Figure 6**).[85,87]

Within each census region, rural residents are more likely to be uninsured than urban residents and less likely to have a primary care provider. The rural-urban disparities within census regions became smaller after the ACA.[72]

Several factors can contribute to the difference in the remaining coverage rates, such as access to employer-sponsored health insurance, systematic differences in employment opportunities, and the aging of the rural population.[73]

## VARIATION BY RACE AND ETHNICITY

Generally, non-White residents are more likely to be uninsured compared to White residents.[6,72] White and Asian people have the highest insurance coverage rates, 94% and 93%, respectively. American Indian and Alaska Natives have the highest uninsurance rate with 21% being

**Figure 4. Health Insurance Coverage and Source of Nonelderly for Four Census Regions[85]**

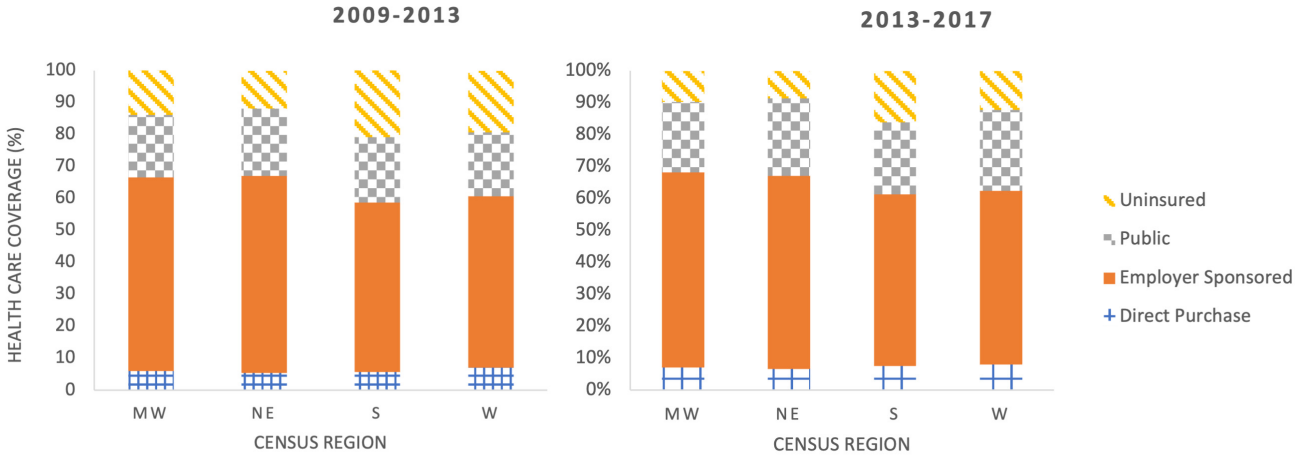



**Figure 5. Percentage of Adults 18-64 who had Dental Care Coverage between 2014 and 2017[86]**

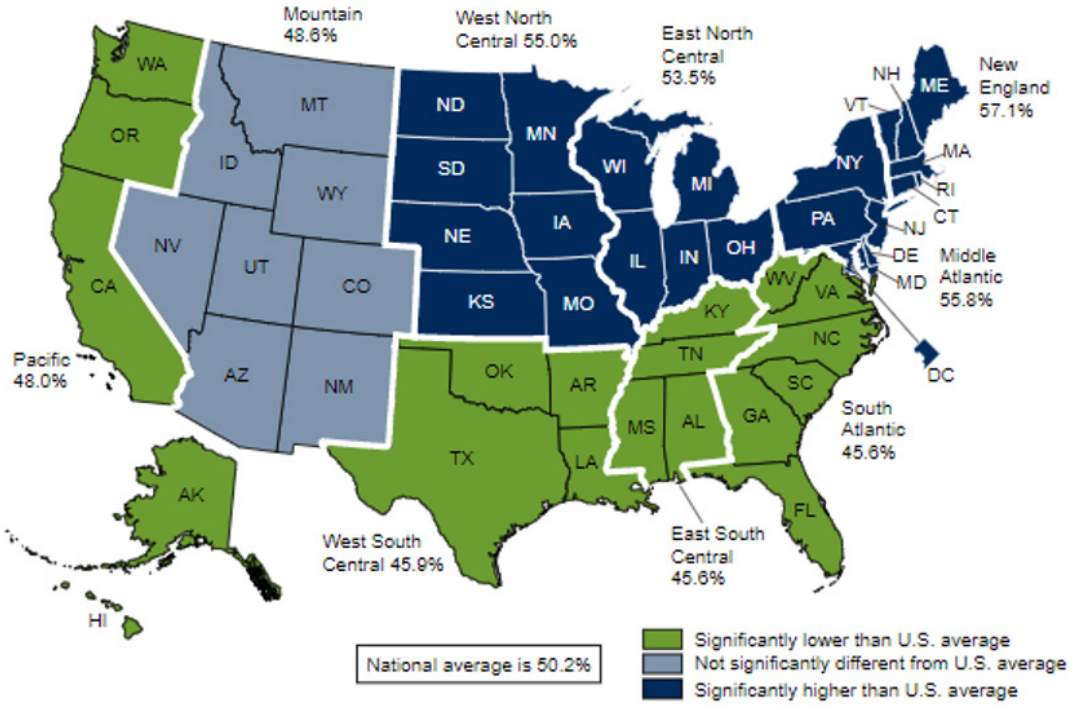
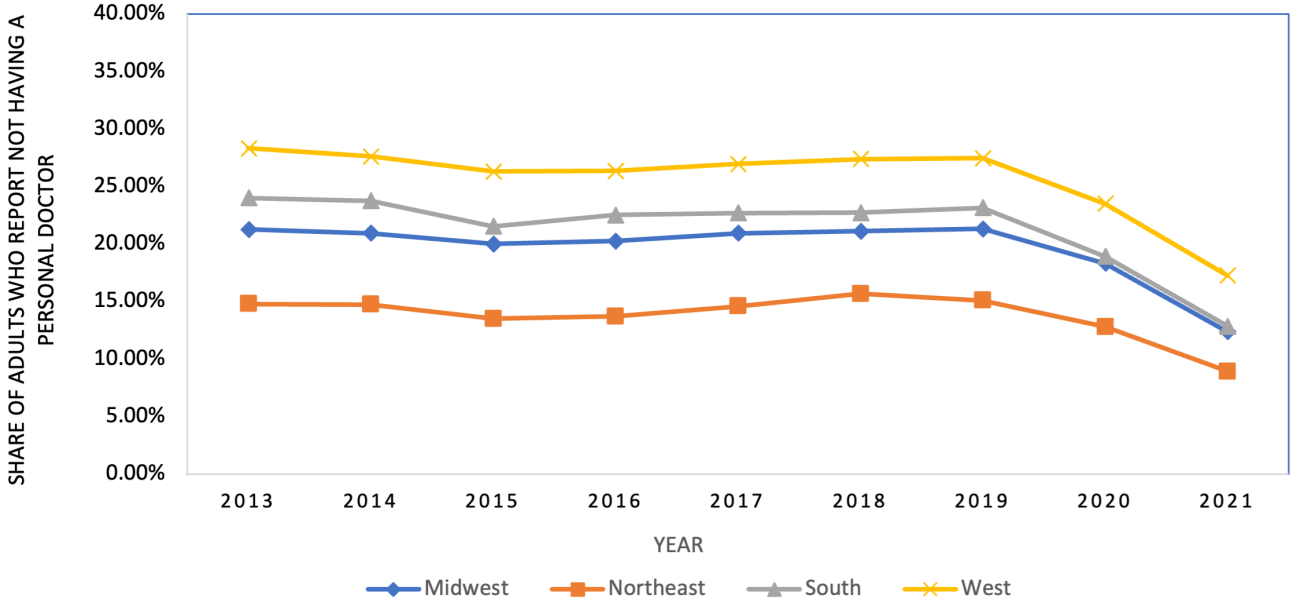


**Figure 6. Primary Care Access by Census Regions[88]**

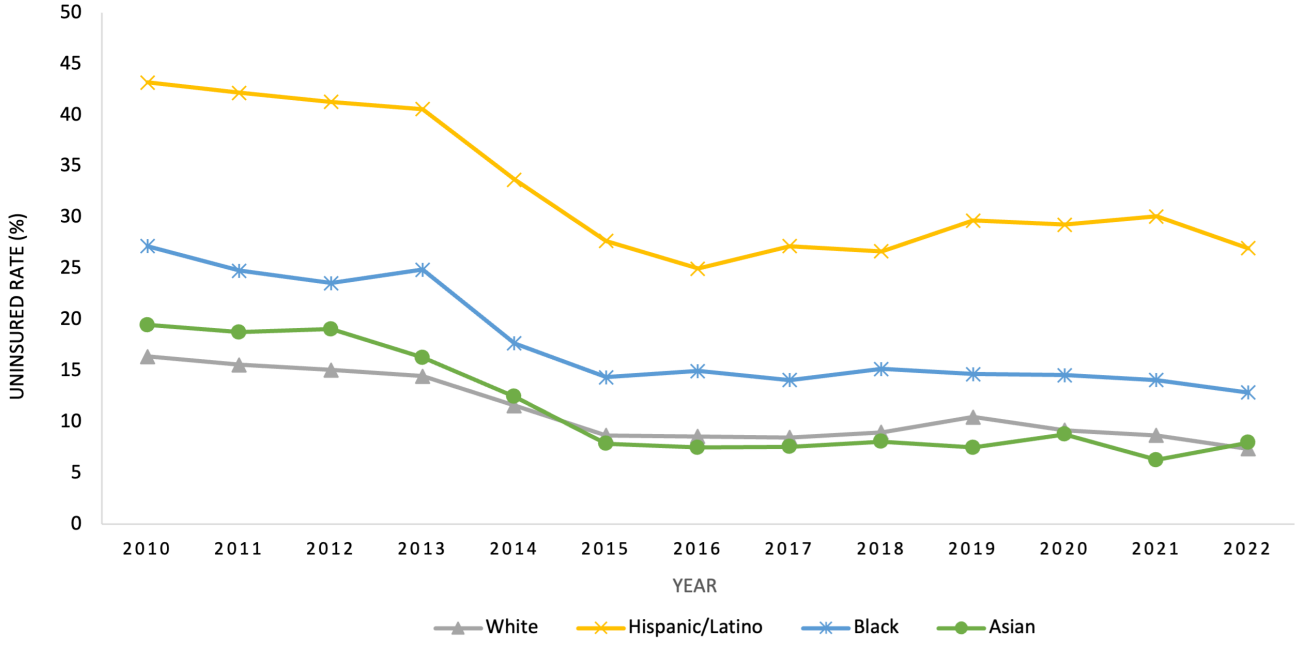



uninsured. When comparing ethnic groups, Hispanic people have the lowest rate of insurance coverage in the U.S. (79%).[89] Uninsurance rates were also similarly higher in rural areas compared to urban areas for minorities.[15] However, the gap in insurance rates between White and non-White populations and between non-Hispanic and Hispanic ethnicity has decreased after the ACA (**Figure 7**). This was the result of a large increase in insurance rates for all non-White residents.

Dental coverage disparities by race and ethnicity are also prevalent. Racial and ethnic disparities in dental care use have persisted for decades. In 2017-18, 54.8% of White seniors visited a dentist; but only 40.5% of Asians, 31.8% of Hispanics, and 28.8% of Black seniors.[90] However, recent ACA Medicaid expansions that included coverage of dental services for adults have helped reduce these disparities.[91] **Figure 8** shows narrowed racial and ethnic disparities in dental care visits and use of preventive and treatment services after the ACA.

Disparities in access to primary care by race and ethnicity are also well documented (**Figure 9**). A report by the Centers for Disease Control and

**Figure 7. Uninsured Rate Among the Nonelderly Population by Race/Ethnicity, 2010-2022[9]**



Prevention, displaying trends in health care access and use from 2002-2015, reported that Hispanics were the least likely to have a primary care provider (61.5%), followed by American Indian and Alaska Native (63.7%). Low primary care access translated into Hispanics reporting a higher rate of foregone medical needs due to cost.[92] Given the growth in the non-White proportion of rural residents across the U.S., one can expect that access to care remains a challenge for Blacks, American Indians, Native Americans, and Hispanics.

## IMPACT ON MORTALITY & MORBIDITY

Both the young and healthy (generally under the age of 34), and individuals with morbidities, have historically seen higher rates of uninsurance.[72] The ACA provision to allow those under the age

**Figure 8. Dental Care Access by Race and Ethnicity Trend from 2005-2018[93]**

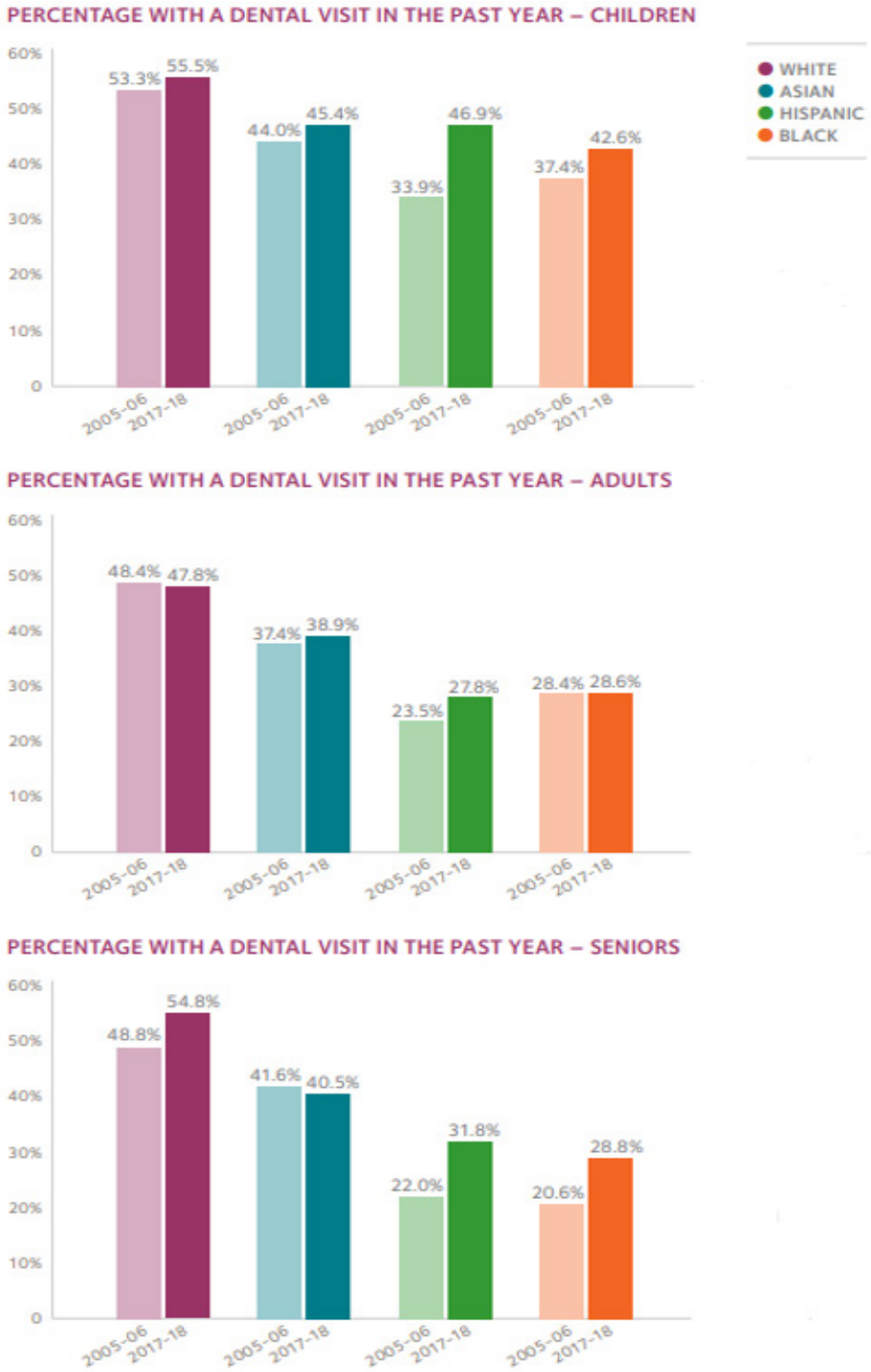
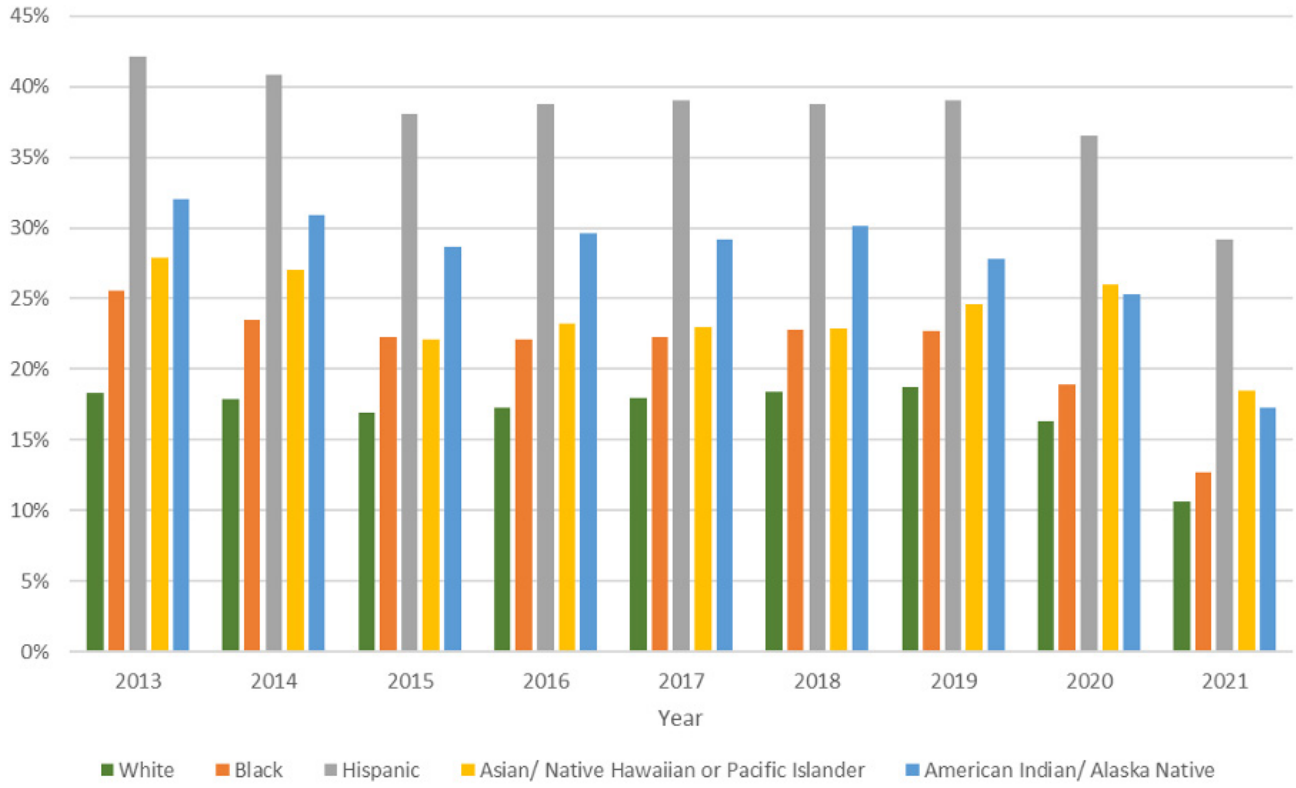


**Figure 9. Primary Care Access by Race and Ethnicity Trend from 2012-2021, Kaiser Family Foundation[88]**




of 26 to remain on their parents' plan, and the marketplace-guaranteed issue mandate, provided many young individuals and those with chronic disease access to insurance.[94,95] The lack of health insurance can have many health consequences that materialize over short- or long-term time periods. At the same time, growth in healthcare costs led employers to require larger employee contributions for health plan premiums.[96]

Lower preventative and primary care physician visits have been documented for the uninsured compared to the insured.[17,63] Growing access concerns for rural residents, especially in a healthcare system in which rural hospitals and health care systems are commonly closing, leads to an especially worrisome scenario.[97] Adequate preventative care can lead to early detection of disease that can preserve health and postpone negative health consequences.[98,99] Additionally, lack of outpatient access can lead to inadequate disease management, which increases the chance of lower quality of life, hospitalization, and death.[98,100-102] An analysis of 2016 state-level data shows, except for three states in the U.S. (Montana, Wyoming, and Colorado), that rural areas had a higher mortality rate than urban areas. However, these rates varied significantly across different states (**Figure 10**).[103] The primary causes of this higher mortality rate in rural areas at the state level were lack of health insurance, socioeconomic deprivation, and a shortage of physicians.

Further, the value of insurance has been well documented in a recent randomized trial by Goldin et al.[104] Within this trial, information pamphlets were randomly sent to uninsured individuals who qualified for a free health plan on the ACA marketplace. The researchers found that this outreach led to increased insurance coverage and reduced mortality among White individuals aged 45 to 54. Thus, insurance coverage can save lives in the near future. These findings may imply that similar outreach efforts to rural residents, who exhibit high healthcare needs, may lead to similar results.

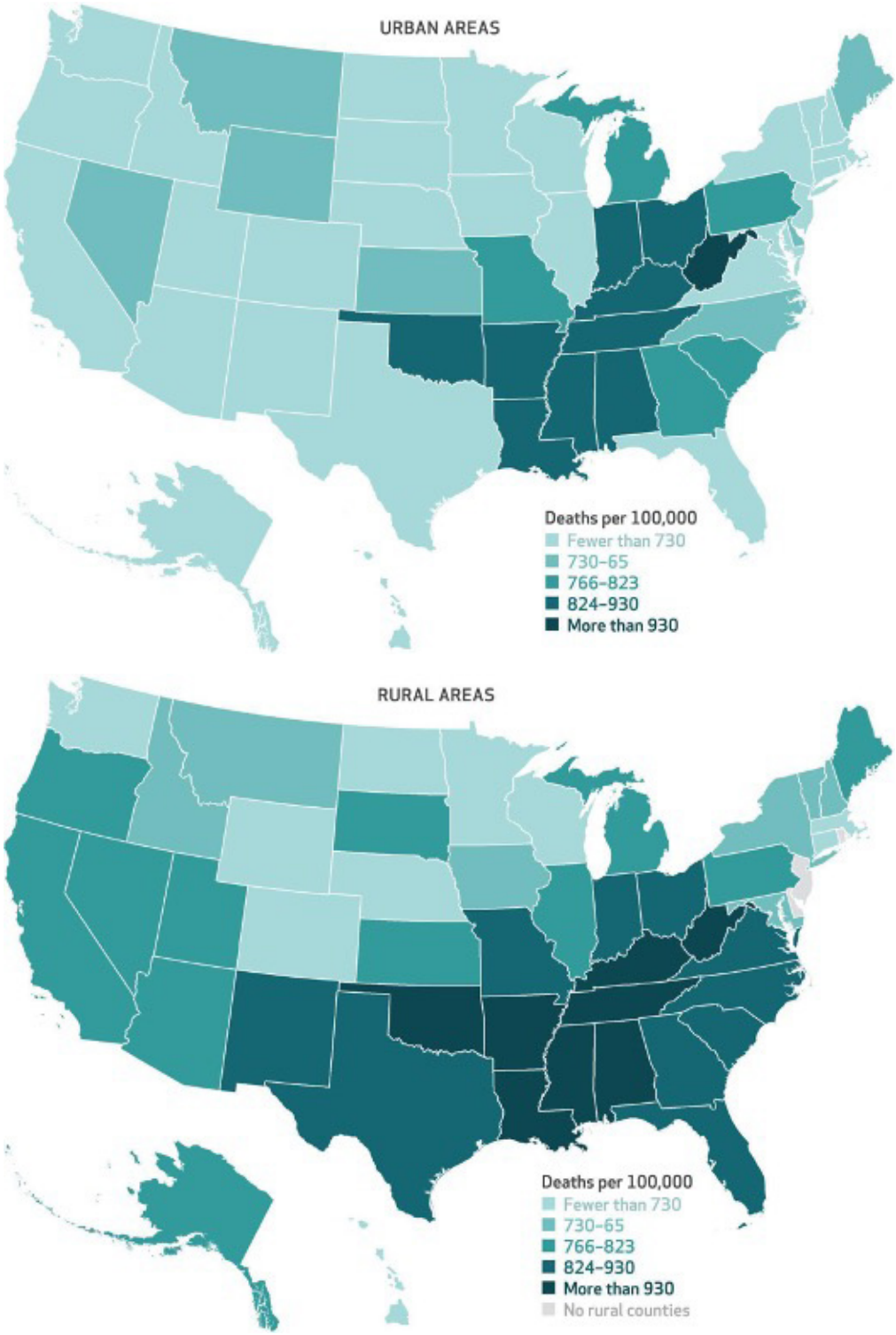
## BARRIERS

The ACA improved access and lowered cost barriers for insurance enrollment. For the first time, individuals without access to employer-sponsored health insurance were able to purchase

health plans that are highly subsidized by the federal government. Beginning with the 2021 calendar year, subsidies for these plans were expanded to levels not seen before. Specifically, individuals making less than 150% of the FPL qualified for a free health plan, and out-of-pocket premium contributions were evenly capped at 8.5% for the highest income households. As such, one of the largest access barriers to insurance, the cost of health plans, has been substantially reduced for urban and rural residents.[105]

At the same time, access to health insurance due to unemployment or job loss has been

**Figure 10. State Mortality Rates**[103]



eliminated, as individuals can qualify for the ACA marketplace plans following changes in job status.[106] Barriers to health insurance coverage remain for parents and single low-income individuals, especially those making less than 100% of FPL. In non-Medicaid expansion states they do not qualify for ACA marketplace subsidies, therefore making insurance coverage unaffordable on the exchange.[107]

Further, low-income individuals' employment generally does not offer health insurance or the plans are less generous.[108] This is the case due to part-time employment, self-employment, or employment at a small company, which are exempt from providing health coverage to employees.[109] Even when offered the same health plan, low-income individuals may underutilize care.[110,111] Rural residents are generally less likely to be employed full time and more likely to be employed by small employers, thereby automatically limiting access to health coverage from public programs, such as Medicaid, or the ACA marketplace.[112]

Competing barriers to health coverage can also be attributed to language barriers, educational attainment, health literacy, and trouble navigating the health insurance enrollment process. Research has also reported that these barriers are especially prevalent among rural residents when compared to urban residents.[112] At the same time, the benefit of buying health insurance for rural residents may be large, given the high cost of healthcare services and the low disposable income of rural residents.[94]

The growing share of out-of-pocket expenses for healthcare services is a growing problem for individuals. High-deductible health plans have been growing in popularity over the last 15 years. While they offer lower premiums, they are associated with substantially higher out-of-pocket costs. As such, a growing literature has shown that these health plans lead to lower healthcare utilization, even in instances where healthcare services are fully covered by the health plan without out-of-pocket cost to the patient.[113-115]

The growth in coverage led to increased access to primary care; however, distance and health plan network limitations remain barriers.[10,16-19,28,29] This is especially true for rural residents, who have higher likelihood of reporting that they have foregone care due to provider distance or lack of provider availability. Among adults ages 50 to 64, 15% living in rural areas had to forgo health care due to cost versus 13% of those living in urban areas.[116] While distance can be overcome with time commitment and adequate transportation, many rural residents report that they do not, in fact, have reliable transportation available to them.[14] Although the growth in telemedicine can alleviate needs for travel, a lack of broadband access in rural areas has slowed the growth of telemedicine use. Specifically, 39% of the rural population (compared to 4% of the urban population) do not have access to reliable internet and, therefore, cannot utilize the opportunity to get timely primary care through an electronic medium.[117]

Barriers for dental care remain large for those without access to employer-sponsored dental plans. The provision of adult dental benefits in Medicaid is optional, and only a few states offer comprehensive and generous dental benefits to Medicaid enrollees.[118]

In summary, affordability and limited benefits can all contribute to making health coverage less appealing for individuals. High premiums or deductibles can make health plans unaffordable for many people, particularly those with lower incomes. Plans with limited benefits may not adequately cover the healthcare needs of individuals, leading them to seek care elsewhere or forego necessary care altogether. These factors can result in lower rates of health and dental coverage, lower primary care access, and may negatively impact health outcomes in the long term.

## PROVEN SOLUTIONS OR INTERVENTIONS

There are several important suggestions aimed at improving health insurance coverage rates. First, the largest growth in insurance coverage was observed for states which expanded Medicaid. As such, expanding Medicaid should yield substantial growth in health insurance enrollment among low-income and rural populations. Second, outreach programs that provide awareness of existing health insurance resources have been shown to be effective in enrolling individuals

in Medicaid and marketplace health plans. For example, the ACA navigator program has been linked with increased enrollment in marketplace coverage.[119] Navigators are individuals affiliated with organizations that help consumers to review personalized health insurance options and navigate the enrollment process (including the completion of eligibility and enrollment forms).[120] Third, television and other advertisements of insurance plans available to individuals have been associated with increased enrollment.[121] Lastly, the largest and most important aspect to increasing enrollment has been the price of the health plan. The recent expansion of health plan subsidies for marketplace plans has led to an increase in coverage rates, especially in rural areas which have the highest rates of uninsurance. Thus, maintaining affordable premiums remains an important solution to enable individuals to purchase health insurance coverage.[122]

Improving access to primary care has been a longstanding policy priority for states and the federal government. Urban access to primary care is less of a concern, as the majority of health care providers tend to gravitate towards urban centers.[123] The establishment and growth of rural health clinics and FQHCs demonstrates an effort to provide timely and high-quality healthcare to rural residents.[124] Even in the perceived presence of adequate primary care access, network limitations may lead to limited access to specialty care. As such, it is important to require insurers to provide health plans with enough in-network providers that allow patients to seek timely care.[28,29]

An immediate opportunity to improve access to primary care, especially for rural residents, is the growing adoption of telemedicine by providers.[125,126] Telemedicine, the use of electronic devices, can be used to deliver health care services and transmit medical information between providers and patients. The benefit of telemedicine is that it reduces the distance burden to receive care and improves the opportunity to provide care for acute conditions without delay due to travel. Telemedicine allows hospitals and primary care providers to expand the scope of their services and potentially increase the number of patients seen. Telemedicine seems especially promising for rural residents, though barriers to telemedicine due to a lack of access to broadband services remain widespread.

Other promising avenues to improve access to primary care include improving existing channels of primary care delivery. The patient-centered medical home (PCMH) model relies on the idea of strengthening practice capabilities to expand access to care and delivering high quality primary care through an integrated care delivery model that focuses on improved care coordination, chronic condition management, and the expansion and use of health information technology. Evidence suggests that certain capabilities of the PCMH model are especially well suited to improve primary care, while also reducing overall healthcare spending.[127]

Reducing licensure requirements is also a potential avenue to increase access to healthcare professionals. The traditional model of requiring a physician to be responsible for patient care limits access to primary care services. To reduce primary care shortages and resulting long appointment times, the role of nurse practitioners and physician assistants has been expanded substantially through changes in state laws.[128,129,130] To improve their scope and autonomy, states have passed legislation to reduce licensing restrictions, allowing nurse practitioners and physician assistants to practice with less physician oversight. Given the lower rates of physicians in rural areas than urban areas, nurse practitioners and physician assistants could alleviate some of the unmet primary care needs in rural areas.[128,130]

Solutions to increase dental coverage rates and access to dental care include improved outreach and communication about subsidized preventive oral care available for low-income individuals and rural areas. In some states, only emergency dental benefits are available for those covered by Medicaid. This can lead to suboptimal care management and increase the total healthcare cost for oral care long term, as preventative treatment could have avoided the escalation of acute care needs. Therefore, states should consider the inclusion of more generous dental benefits in Medicaid plans.[65] Finally, the limited number of dentists who accept Medicaid enrollees can be addressed in part by increasing Medicaid payment rates. For Medicare members, expanding

affordable options to purchase dental coverage may come from federal policy considerations.[131] Options could include expanding Medicare to provide dental coverage plans in a similar fashion to the expansion of prescription coverage, i.e., Medicare Part D.

## SUMMARY AND CONCLUSIONS

The ACA expansion increased access to health insurance and led to the historically lowest rate of uninsured people in the United States. However, access issues remain, especially in states that did not expand Medicaid and which have much larger rural populations. Thus, many low-income and rural residents still face insurance access/uptake/enrollment issues. At the same time, improving access to primary care remains a challenge, especially for rural communities, as the number of primary care providers is not growing fast enough to provide access to urban and rural residents. New technologies and state licensure law changes have expanded the opportunity to improve access to care; however, whether these changes will meaningfully increase primary care access remains unknown. Finally, dental coverage rates are relatively low compared to health insurance rates, but dental needs remain high.

## REFERENCES


1. Frean M, Gruber J, Sommers BD. Premium subsidies, the mandate, and Medicaid expansion: coverage effects of the Affordable Care Act. *J Health Econ.* 2017;53:72-86. doi:10.1016/j.jhealeco.2017.02.004

2. Gruber J, Sommers BD. The Affordable Care Act's effects on patients, providers, and the economy: what we've learned so far. *J Policy Anal Manag.* 2019;38(4):1028-1052.

3. Courtemanche C, Marton J, Ukert B, Yelowits A, Zapata D. Early impacts of the Affordable Care Act on health insurance coverage in Medicaid expansion and non-expansion states. *J Policy Anal Manag.* 2017;36(1):178-210. doi:10.1002/pam.21961

4. Kaiser Family Foundation. Status of State Medicaid Expansion Decisions: Interactive Map. July 27, 2023. Accessed April 14, 2023. https://www.kff.org/medicaid/issue-brief/status-of-state-medicaid-expansion-decisions-interactive-map/

5. Busch SH, Golberstein E, Meara E. ACA dependent coverage provision reduced high out-of- pocket health care spending for young adults. *Health Aff (Millwood).* 2014;33(8):1361-1366. doi:10.1377/hlthaff.2014.0155

6. Buchmueller TC, Levinson ZM, Levy HG, Wolfe BL. Effect of the Affordable Care Act on racial and ethnic disparities in health insurance coverage. *Am J Public Health.* 2016;106(8):1416-1422. doi:10.2105/AJPH.2016.303155

7. Kaiser Family Foundation. States Getting a Jump Start on Health Reform's Medicaid Expansion. April 2, 2012. Accessed April 14, 2023. https://www.kff.org/health-reform/issue-brief/states-getting-a-jump-start-on-health/

8. Cohen RA, Martinez ME. *Health Insurance Coverage: Early Release of Estimates From the National Health Interview Survey, 2011.* June 2012. Accessed March 14, 2023. https://www.cdc.gov/nchs/data/nhis/earlyrelease/insur201206.pdf

9. Cohen RA, Cha AE. *Health Insurance Coverage: Early Release of Estimates From the National Health Interview Survey, January–June 2022.* National Center for Health Statistics. December 2022. Accessed March 14, 2023. https://www.cdc.gov/nchs/data/nhis/earlyrelease/insur202212.pdf

10. Courtemanche C, Marton J, Yelowitz A, Zapata D. The impact of the Affordable Care Act on health care access and self-assessed health in the Trump era (2017-2018 ). *Health Serv Res.* 2020;55(Suppl 2):841-850. doi:10.1111/1475-6773.13549

11. Chu R, Gonzales A. The Affordable Care Act and Its Accomplishments and Its Accomplishments. The Assistant Secretary for Planning and Evaluation (ASPE). Accessed April 14, 2023. https://aspe.hhs.gov/sites/default/files/documents/18cd655222dc3de64866b269143731ce/aca-briefing-book-aspe-03-2022.pdf

12. Barbaresco S, Courtemanche CJ, Qi Y. Impacts of the Affordable Care Act dependent coverage provision on health-related outcomes of young adults. *J Health Econ.* 2015;40:54-68. doi:10.1016/j.jhealeco.2014.12.004

13. Ajilore O. Repealing the ACA Would Devastate an Already Struggling Rural America. The

Center for American Progress. November 12, 2020. Accessed March 30, 2023. https://www.americanprogress.org/article/repealing-aca-devastate-already-struggling-rural-america/

14. Foutz J, Artiga S, Garfield R. The Role of Medicaid in Rural America. Kaiser Family Foundation. April 25, 2017. Accessed May 9, 2023. https://www.kff.org/medicaid/issue-brief/the-role-of-medicaid-in-rural-america/

15. United States Census Bureau. Rates of Uninsured Fall in Rural Counties, Remain Higher Than Urban Counties. Accessed April 14, 2023. https://www.census.gov/library/stories/2019/04/health-insurance-rural-america.html

16. Mazurenko BO, Balio CP, Agarwal R, Carroll AE, Menachemi N. The effects of Medicaid expansion under the ACA: a systematic review. *Health Aff (Millwood).* 2018;37(6):944-950. doi:10.1377/hlthaff.2017.1491

17. Courtemanche C, Marton J, Ukert B, Yelowitz A, Zapata D. Effects of the Affordable Care Act on Health Care Access and Self-Assessed Health After 3 Years. *Inquiry (United States).* 2018 Jan-Dec;55. doi:10.1177/0046958018796361

18. Courtemanche C, Marton J, Ukert B, Yelowitz A, Zapata D. Early effects of the Affordable Care Act on health care access, risky health behaviors, and self-assessed health. *Natl Bur Econ Res.* 2018;84:660-691. doi:10.1002/soej.12245

19. Hoodin D, Marton J, Ukert B. Do those with chronic health conditions benefit from the Affordable Care Act Medicaid expansion? *South Econ J.* 2022:1-45. doi:10.1002/soej.12566

20. Wherry LR, Miller S. Early coverage, access, utilization, and health effects associated with the Affordable Care Act Medicaid expansions: a quasi-experimental study. *Ann Intern Med.* 2016; 164(12):795-804. doi:10.7326/M15-2234

21. Benitez JA, Creel L, Jennings J. Kentucky's Medicaid expansion showing early promise on coverage and access to care. *Health Aff (Millwood).* 2016;35(3):528-534. doi:10.1377/hlthaff.2015.1294

22. Biener AI, Zuvekas SH, Hill SC. Impact of recent Medicaid expansions on office-based primary care and specialty care among the newly eligible. *Health Serv Res.* 2018;53(4):2426-2445. doi:10.1111/1475-6773.12793

23. Gotanda H, Kominski G, Tsugawa Y. Association between the ACA Medicaid expansions and primary care and emergency department use during the first 3 years. *J Gen Intern Med.* 2020;35(3):711-718. doi:10.1007/s11606-019-05458-w

24. National Center for Health Statistics. Centers for Disease Control and Prevention. Published 2021. Accessed March 20, 2023. https://wwwn.cdc.gov/NHISDataQueryTool/SHS_adult/index.html&sa=D&source=docs&ust=1680194297870363&usg=AOvVaw1TQatAx-MxAZnmJYxmadXs

25. Courtemanche C, Fazlul I, Marton J, Ukert B, Yelowitz A, Zapata D. The impact of the ACA on insurance coverage disparities after four years. *Natl Bur Econ Res.* 2019.

26. Lee WC, Li CY, Serag H, Tabrizi M, Kuo Y-F. Exploring the impact of ACA on rural-urban disparity in oral health services among US noninstitutionalized adults. *J Rural Health.* 2021;37(1):103-113. doi:10.1111/jrh.12418

27. Wallace BJ. What does a provider network do? Evidence from random assignment in Medicaid managed care. *Am Econ J.* 2023;15(1):473-509. doi:10.1257/pol.20210162

28. Haeder SF, Weimer DL, Mukamel D. California hospital networks are narrower in marketplace than in commercial plans, but access and quality are similar. *Health Aff.* 2015;34(5):741-748. doi:10.1377/hlthaff.2014.1406

29. Haeder SF, Weimer D, Mukamel DB. A consumer-centric approach to network adequacy: access to four specialties in California's Marketplace. *Health Aff (Millwood).* 2019;38(11):1918-1926. doi:10.1377/hlthaff.2019.00116

30. McDermott D, Cox C. Insurer Participation on the ACA Marketplaces, 2014-2021. Kaiser Family Foundation. November 23, 2020. Accessed March 31, 2023. https://www.kff.org/private-

insurance/issue-brief/insurer-participation-on-the-aca-marketplaces-2014-2021/

31. Centers for Medicare & Medicaid Services. Texas Geographic Rating Areas: Including State Specific Geographic Divisions. Centers for Medicare & Medicaid Services. Accessed March 31, 2023. https://www.cms.gov/CCIIO/Programs-and-Initiatives/Health-Insurance-Market-Reforms/tx-gra

32. Finegold K, Conmy A, Chu RC, Bosworth A, Sommers BD. *Trends in the U.S. Uninsured Population, 2010-2020*. 2021. https://aspe.hhs.gov/sites/default/files/private/pdf/265041/trends-in-the-us-uninsured.pdf

33. Cohen RA, Terlizzi EP, Martinez ME. *Health Insurance Coverage: Early Release of Estimates From the National Health Interview Survey, 2018*. 2019. https://www.cdc.gov/nchs/data/nhis/earlyrelease/insur201905.pdf

34. Bunch KK-S and LN. *Health Insurance Coverage in the United States: 2021, Current Population Reports*. 2022. https://www.census.gov/content/dam/Census/library/publications/2022/demo/p60-278.pdf

35. Cohen RA, Cha AE. *Health Insurance Coverage: Early Release of Estimates From the National Health Interview Survey, January–June 2022*. 2022. https://www.cdc.gov/nchs/data/nhis/earlyrelease/insur202212.pdf

36. Caraballo C, Massey D, Mahajan S, et al. Racial and Ethnic Disparities in Access to Health Care Among Adults in the United States: A 20-Year National Health Interview Survey Analysis, 1999 – 2018. 2020 Nov 4. doi:10.1101/2020.10.30.20223420

37. Giannouchos TV, Ukert B, Andrews C. Association of Medicaid expansion with emergency department visits by medical urgency. *JAMA Netw Open*. 2022;5(6):1-13. doi:10.1001/jamanetworkopen.2022.16913

38. Garfield R, Orgera K, Damico A. The Uninsured and the ACA: A Primer - Key Facts about Health Insurance and the Uninsured amidst Changes to the Affordable Care Act. Kaiser Family Foundation. January 25, 2019. Accessed April 15, 2023. https://www.kff.org/report-section/the-uninsured-and-the-aca-a-primer-key-facts-about-health-insurance-and-the-uninsured-amidst-changes-to-the-affordable-care-act-how-does-lack-of-insurance-affect-access-to-care/

39. Healthy People 2030. Office of Disease Prevention and Health Promotion. Published 2021. Accessed March 30, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care-access-and-quality/increase-proportion-people-health-insurance-ahs-01

40. Vujicic M, Fosse C. Time for dental care to be considered essential in US health care policy. *AMA J Ethics*. 2022;24(1):E57-63. doi:10.1001/amajethics.2022.57

41. Cigna Healthcare. Here Are 14 Medical Conditions with a Surprising Connection to Oral Health. Accessed May 1, 2023. https://newsroom.cigna.com/medical-conditions-with-surprising-connection-oral-health

42. Healthy People 2030. US Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed March 30, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care-access-and-quality/reduce-proportion-people-who-cant-get-dental-care-they-need-when-they-need-it-ahs-05

43. Healthy People 2030. US Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed March 30, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care-access-and-quality/increase-proportion-people-dental-insurance-ahs-02

44. Healthy People 2030. US Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed March 30, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care-access-and-quality/increase-proportion-people-usual-primary-care-provider-ahs-07

45. Agency for Healthcare Research and Quality. *Medical Expenditure Panel Survey (MEPS)*. September 2020. https://meps.ahrq.gov/mepsweb/data_stats/download_data_files_detail.jsp?cboPufNumber=HC-210

46. Tolbert J, Drake P, Damico A. Key Facts about the Uninsured Population. Kaiser Family Foundation. December 19, 2022. https://www.kff.org/uninsured/issue-brief/key-facts-about-the-uninsured-population/

47. Coleman A, Federman S. Where Do the States Stand on Medicaid Expansion? The Commonwealth Fund. doi:https://doi.org/10.26099/1rh0-pn64

48. Creadore A, Desai S, Li SJ, et al. Insurance acceptance, appointment wait time, and dermatologist access across practice types in the US. *JAMA Dermatol.* 2021;157(2):181-188. doi:10.1001/jamadermatol.2020.5173

49. Oostrom BT, Einav L, Finkelstein A. Outpatient office wait times and quality of care for Medicaid patients. *Health Aff (Millwood).* 2017;36(5):826-832. doi:10.1377/hlthaff.2016.1478

50. Rhodes KV, Basseyn S, Friedman AB, Kenney GM, Wissoker D, Polsky D. Access to primary care appointments following 2014 insurance expansions. *Ann Fam Med.* 2017:107-112. doi:10.1370/afm.2043

51. Polsky D, Candon M, Saloner B, et al. Changes in primary care access between 2012 and 2016 for new patients with Medicaid and private coverage. *JAMA Intern Med.* 2017;177(4):2016-2018. doi:10.1001/jamainternmed.2016.9386

52. Polsky D, Richards M, Basseyn S, et al. Appointment availability after increases in Medicaid payments for primary care. *N Engl J Med.* 2015;372(6):537-545. doi:10.1056/NEJMsa1413299

53. Zuckerman S, Skopec L, Epstein M. Medicaid physician fees after the ACA primary care fee bump: 19 states continue the Affordable Care Act's temporary policy change. *Urban Inst Res Rep.* 2017:1-13. https://www.urban.org/sites/default/files/publication/88836/2001180-medicaid-physician-fees-after-the-aca-primary-care-fee-bump_0.pdf

54. Callison K, Nguyen BT. The effect of Medicaid physician fee increases on health care access, utilization, and expenditures. *Health Serv Res.* 2018;53(2):690-710. doi:10.1111/1475-6773.12698

55. Whaley CM, Zhao X, Richards M, Damberg CL. Higher Medicare spending on imaging and lab services after primary care physician group vertical integration. *Health Aff (Millwood).* 2021;40(5):702-709. doi:10.1377/hlthaff.2020.01006

56. Curto BV, Sinaiko AD, Rosenthal MB. Price effects of vertical integration and joint contracting between physicians and hospitals in Massachusetts. *Health Aff (Millwood).* 2022;41(5):741-750. doi:10.1377/hlthaff.2021.00727

57. Nasseh K, Vujicic M. Dental Benefits Coverage Increased for Working-Age Adults in 2014. *Heal Policy Inst Res Brief Am Dent Assoc.* 2016. https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/resources/research/hpi/hpibrief_1016_2.pdf

58. American Dental Association. Medicaid Expansion and Dental Benefits Coverage. *Heal Policy Inst.* 2018. https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/resources/research/hpi/hpigraphic_1218_3.pdf

59. Shartzer A, Gangopadhyaya A, Holahan J, Garrett B, Rao N. Is a Dental Benefit Needed in Medicare? Robert Wood Johnson Foundation. September 1, 2021. Accessed August 21, 2023. https://www.rwjf.org/en/insights/our-research/2021/09/is-a-dental-benefit-needed-in-medicare.html

60. Elani HW, Kawachi I, Sommers BD. Dental outcomes after Medicaid insurance coverage expansion under the Affordable Care Act. *JAMA Netw Open.* 2021;4(9):e2124144. doi:10.1001/jamanetworkopen.2021.24144

61. Elani HW, Benjamin D. Sommers IK. Changes in coverage and access to dental care five years after ACA Medicaid expansion. *Health Aff (Millwood).* 2020;39(11):1900-1908. doi:10.1377/hlthaff.2020.00386

62. Lyu W, Wehby GL. The effects of Medicaid expansions on dental services at federally qualified health centers. *J Am Dent Assoc.* 2023;154(3):215-224.e.10. doi:10.1016/j.adaj.2022.11.005

63. Lyu W, Shane DM, Wehby GL. Effects of the recent Medicaid expansions on dental preventive

services and treatments. *Med Care*. 2020;58(8):749-755. doi:10.1097/MLR.0000000000001344

64. Wehby GL, Lyu W, Shane DM. The impact of the ACA Medicaid expansions on dental visits by dental coverage generosity and dentist supply. *Med Care*. 2019;57(10):781-787. doi:10.1097/MLR.0000000000001181

65. Singhal A, Damiano P, Sabik L. Medicaid adult dental benefits increase use of dental care, but impact of expansion on dental services use was mixed. *Health Aff (Millwood)*. 2017;36(4):723-732. doi:10.1377/hlthaff.2016.0877. Erratum in: *Health Aff (Millwood)*. 2017 Jun 1;36(6):1146. doi:10.1377/hlthaff.2017.0458

66. Nasseh K, Vujicic M. Early impact of the Affordable Care Act's Medicaid expansion on dental care use. *Health Serv Res*. 2017;52(6):2256-2268. doi:10.1111/1475-6773.12606

67. Elani HW, Kawachi I, Sommers BD. Dental outcomes after Medicaid insurance coverage expansion under the Affordable Care Act. *JAMA Netw open*. 2021;4(9):1-12. doi:10.1001/jamanetworkopen.2021.24144

68. Elani HW, Kawachi I, Sommers BD. Changes in emergency department dental visits after Medicaid expansion. *Health Serv Res*. 2020;55(3):367-374. doi:10.1111/1475-6773.13261

69. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: new decade, new challenges. *Prev Med Reports*. 2023;33:102176. doi:10.1016/j.pmedr.2023.102176

70. Centers for Disease Control and Prevention (CDC). Understanding Drug Overdoses and Deaths. 2022. Last Reviewed May 8, 2023. Accessed May 9, 2023. https://www.cdc.gov/drugoverdose/epidemic/index.html

71. Soni A, Hendryx M, Simon K. Medicaid expansion under the Affordable Care Act and insurance coverage in rural and urban areas. *J Rural Heal*. 2017;33(2):217-226. doi:10.1111/jrh.12234

72. Courtemanche CJ, Fazlul I, Marton J, Ukert BD, Yelowitz A, Zapata D. The Impact of the ACA on Insurance Coverage Disparities after Four Years (NBER Working Paper No. 26157). *Natl Bur Econ Res*. August 2019.

73. Newkirk V, Damico A. The Affordable Care Act and Insurance Coverage in Rural Areas. Kaiser Family Foundation. May 29, 2014. Accessed August 1, 2023. https://www.kff.org/uninsured/issue-brief/the-affordable-care-act-and-insurance-coverage-in-rural-areas/

74. Hoadley J, Alker J, Holmes M. Health Insurance Coverage in Small Towns and Rural America: The Role of Medicaid Expansion. *Georg Univ Heal Policy Inst*. 2018. https://ccf.georgetown.edu/2018/09/25/health-insurance-coverage-in-small-towns-and-rural-america-the-role-of-medicaid-expansion/

75. Turrini G, Branham DK, Chen L, et al. Access to Affordable Care in Rural America: Current Trends and Key Challenges. *Off Assist Secr Plan Eval*. July 9, 2021. https://aspe.hhs.gov/sites/default/files/2021-07/rural-health-rr.pdf

76. Luo H, Wu Q, Bell RA, et al. Rural-urban differences in dental service utilization and dental service procedures received among US adults: results from the 2016 Medical Expenditure Panel Survey. *J Rural Heal*. 2021;37(3):655-666. doi:10.1111/jrh.12500

77. Kirby JB, Yabroff KR. Rural-urban differences in access to primary care: beyond the usual source of care provider. *Am J Prev Med*. 2020;58(1):89-96. doi:10.1016/j.amepre.2019.08.026

78. Zhang D, Son H, Shen Y, et al. Assessment of changes in rural and urban primary care workforce in the United States from 2009 to 2017. *JAMA Netw Open*. 2020;3(10):e2022914. doi:10.1001/jamanetworkopen.2020.22914

79. Agency for Healthcare Research and Quality, Rockville M. The Distribution of the U.S. Primary Care Workforce: Primary Care Workforce Facts and Stats, No 3. 2012. Last Reviewed July 2018. Accessed March 31, 2023. https://www.ahrq.gov/research/findings/factsheets/primary/pcwork3/index.html

80. Leira EC, Hess DC, Torner JC, Adams Jr HP. Rural-urban differences in acute stroke management practices: a modifiable disparity.

*Arch Neurol*. 2008;65(7):887-891. doi:10.1001/archneur.65.7.887

81. O'Connor A, Wellenius G. Rural-urban disparities in the prevalence of diabetes and coronary heart disease. *Public Health*. 2012;126(10):813-820. doi:10.1016/j.puhe.2012.05.029

82. Kulshreshtha A, Goyal A, Dabhadkar K, Veledar E, Vaccarino V. Urban-rural differences in coronary heart disease mortality in the United States: 1999-2009. *Public Health Rep*. 2014;129(1):19-29. doi:10.1177/003335491412900105

83. Marthey DJ, 2022. *The Effect of Community Health Centers on Health Care Access, Crime, and Interactions with the Medicaid Program* (Doctoral dissertation, University of Maryland, College Park).

84. Cha AE, Cohen RA. Urban-rural Differences in Dental Care Use Among Adults Aged 18–64. *NCHS Data Brief*. 2021;(No. 412):1-8. https://www.cdc.gov/nchs/data/databriefs/db412-H.pdf

85. Li L, Najarian M, Barker AR, McBride TD, Mueller KJ. Sources of Insurance Coverage in Nonmetropolitan Areas: The Role of Public and Private Insurance Since 2009. *RUPRI Cent Rural Heal Policy Anal*. 2021;(Brief No. 2021-5). https://rupri.public-health.uiowa.edu/publications/policybriefs/2021/Sources of Insurance Coverage.pdf

86. Blackwell DL, Villarroel MA, Norris T. Regional Variation in Private Dental Coverage and Care Among Dentate Adults Aged 18–64 in the United States, 2014–2017. *NCHS Data Brief*. 2019;(No. 336):1-8. https://www.cdc.gov/nchs/data/databriefs/db336-h.pdf

87. United States Census Bureau. Geographic Levels. Accessed March 31, 2023. https://www.census.gov/programs-surveys/economic-census/guidance-geographies/levels.html

88. Kaiser Family Foundation. Adults Who Report Not Having a Personal Doctor/Health Care Provider by Race/Ethnicity. State Health Facts. 2021. Accessed March 31, 2023. https://www.kff.org/other/state-indicator/percent-of-adults-reporting-not-having-a-personal-doctor-by-raceethnicity/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D

89. Artiga S, Hill L, Damico A. Health Coverage by Race and Ethnicity, 2010-2021. Kaiser Family Foundation. December 20, 2022. Accessed March 31, 2023. https://www.kff.org/racial-equity-and-health-policy/issue-brief/health-coverage-by-race-and-ethnicity/

90. Solana K. HPI publishes findings into racial disparities in oral health. American Dental Association. April 19, 2021. Accessed August 21, 2023. https://www.ada.org/publications/ada-news/2021/april/hpi-publishes-findings-into-racial-disparities-in-oral-health

91. Wehby GL, Lyu W, Shane D. Racial And ethnic disparities in dental services use declined after Medicaid adult dental coverage expansions. *Health Aff (Millwood)*. 2022;41(1):44-52. doi:10.1377/hlthaff.2021.01191

92. James CV, Moonesinghe R, Wilson-Frederick SM, Hall JE, Penman-Aguilar A, Bouye K. Racial/Ethnic health disparities among rural adults — United States, 2012–2015. *MMWR Surveill Summ*. 2017;66(No. SS-23):1-9. doi:10.15585/mmwr.ss6623a1

93. American Dental Association. Dental Care Utilization Among the U.S. Population, by Race and Ethnicity. Health Policy Institute. Accessed April 1, 2023. https://www.ada.org/-/media/project/ada-organization/ada/ada-org/files/resources/research/hpi/hpigraphic_0421_4.pdf?rev=0ffe420839ed4c69aa8c9ca37eaaff92&hash=3101021432490F3385B835C4C0FF06E2

94. Liu C, Chhabra KR, Scott JW. Catastrophic health expenditures across insurance types and incomes before and after the Patient Protection and Affordable Care Act. *JAMA Netw Open*. 2020;3(9): e2017696. doi:10.1001/jamanetworkopen.2020.17696

95. 111th Congress. PUBLIC LAW 111–148. Accessed April 14, 2023. https://www.congress.gov/111/plaws/publ148/PLAW-111publ148.pdf

96. 2022 Employer Health Benefits Survey. Kaiser Family Foundation. October 27, 2022. Accessed April 14, 2023. https://www.kff.org/report-section/ehbs-2022-section-8-high-deductible-health-plans-with-savings-option/

97. Andreyeva E, Kash B, Averhart Preston V, Vu L, Dickey N. Rural hospital closures: effects on utilization and medical spending among commercially insured individuals. *Med Care*. 2022;60(6):437-443. doi:10.1097/MLR.0000000000001711

98. Tello-Trillo DS. Effects of losing public health insurance on preventative care, health, and emergency department use: evidence from the TennCare disenrollment. *South Econ J*. 2021;88(11):322-366. doi:10.1002/soej.12504

99. Gong G, Phillips SG, Hudson C, Curti D, Philips BU. Higher US rural mortality rates linked to socioeconomic status, physician shortages, and lack of health insurance. *Health Aff (Millwood)*. 2019;38(12):2003-2010. doi:10.1377/hlthaff.2019.00722

100. Brown DW, Kowalski AE, Lurie IZ. Long-term impacts of childhood Medicaid expansions on outcomes in adulthood. *Rev Econ Stud*. 2020;87(2):792-821. doi:10.1093/restud/rdz039

101. Ukert B, David G, Smith-McLallen A, Chawla R. Do payor-based outreach programs reduce medical cost and utilization? *Health Econ*. 2020;29(6):671-682. doi:10.1093/restud/rdz039

102. David, Guy, Smith-McLallen A, Ukert B. The effect of predictive analytics-driven interventions on healthcare utilization. *J Health Econ*. 2019;64:68-79. doi:10.1016/j.jhealeco.2019.02.002

103. Gong G, Phillips SG, Hudson C, Curti D, Phillips BU. Higher US rural mortality rates linked to socioeconomic status, physician shortages, and lack of health insurance. *Health Aff (Millwood)*. 2019;38(12):2003-2010. doi:10.1377/hlthaff.2019.00722

104. Goldin J, Lurie IZ, McCubbin J. Health insurance and mortality: Experimental evidence from taxpayer outreach. *Q J Econ*. 2021;136(1):1-49.

105. 117th Congress (2021-2022). *H.R.1319 - American Rescue Plan Act of 2021*. https://www.congress.gov/bill/117th-congress/house-bill/1319/text

106. Benitez J, Williams T, Goldstein E, Seiber EE. The relationship between unemployment and health insurance coverage: before and after the Affordable Care Act's coverage expansions. *Med Care*. 2021;59(9):768-777. doi:10.1097/MLR.0000000000001603

107. Assistant Secretary for Public Affairs. About the Affordable Care Act. U.S. Department of Health and Human Services. 2022. Last Reviewed March 17, 2022. Accessed April 14, 2023. https://www.hhs.gov/healthcare/about-the-aca/index.html

108. Measuring the generosity of employer-sponsored health plans: an actuarial-value approach. U.S. Bureau of Labor Statistics. June 2015. Accessed April 16, 2023. https://www.bls.gov/opub/mlr/2015/article/measuring-the-generosity-of-employer-sponsored-health-plans.htm

109. Cigna Healthcare. Employer Mandate under the Affordable Care Act (ACA). 2023. Accessed May 1, 2023. https://www.cigna.com/employers/insights/informed-on-reform/employer-mandate

110. Ukert B, Esquivel-Pickett S, Oza M, DeVries A, Sylwestrzak G. Disparities in health care use among low-salary and high-salary employees. *Am J Manag Care*. 2022;28(5):e170-e177. doi:10.37765/ajmc.2022.89148

111. Haviland AM, Sood N, McDevitt RD, Marquis MS. How do consumer-directed health plans affect vulnerable populations? *Forum Heal Econ Policy*. 2011; 14(2):1-12.

112. Rural Health Research Gateway. An Insurance Profile of Rural America: Chartbook. November 2, 2022. Accessed April 15, 2023. https://www.ruralhealthresearch.org/alerts/519

113. Agarwal R, Mazurenko O, Menachemi N. High-deductible health plans reduce health care cost and utilization, including use of needed preventive services. *Health Aff (Millwood)*. 2017;36(10):1762-1768. doi:10.1377/hlthaff.2017.0610

114. Wharam JF, Landon BE, Galbraith AA, Kleinman KP, Soumerai SB, Ross-degnan D. Emergency department use and subsequent hospitalizations among members of a high-deductible health plan. *JAMA*. 2007;297(10):1093-1102. doi:10.1001/jama.297.10.1093

115. Wharam JF, Galbraith AA, Kleinman KP, Soumerai SB, Ross-Degnan D, Lando BE. Cancer screening before and after switching to a high-deductible health plan. *Ann Intern Med.* 2008;148(9):647-655. doi:10.7326/0003-4819-148-9-200805060-00004

116. Carter B, Dean O. Rural–Urban Health Disparities among US Adults Ages 50 and Older. *AARP Public Policy Inst.* 2021. https://www.aarp.org/content/dam/aarp/ppi/2021/10/rural-urban-health-disparities-among-us-adults-50-older.doi.10.26419-2Fppi.00151.001.pdf

117. Federal Communications Commission. *2016 Broadband Progress Report.* 2016. https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2016-broadband-progress-report

118. Nasseh K, Fosse C, Vujicic M. Dentists who participate in Medicaid: who they are, where they locate, how they practice. *Med Care Res Rev.* 2023;80(2):245-252. doi:10.1177/10775587221108751

119. Myerson R, Li H. Information gaps and health insurance enrollment: evidence from the Affordable Care Act navigator programs. *Am J Heal Econ.* 2022;8(4):477-505.

120. Pollitz K, Tolbert J, Orgera K. Navigator Funding Restored in Federal Marketplace States for 2022. Kaiser Family Foundation. September 29, 2021. Accessed April 15, 2023. https://www.kff.org/private-insurance/issue-brief/navigator-funding-restored-in-federal-marketplace-states-for-2022/

121. Shafer PR, Anderson DM, Aquino SM, Baum LM, Fowler EF, Gollust SE. Competing public and private television advertising campaigns and Marketplace enrollment for 2015 to 2018. *Russell Sage Found J Soc Sci.* 2020;6(2):85-112. doi:10.7758/RSF.2020.6.2.04

122. Ortaliza J, Amin K, Cox C. As ACA Marketplace Enrollment Reaches Record High, Fewer Are Buying Individual Market Coverage Elsewhere. Kaiser Family Foundation. October 17, 2022. Accessed April 14, 2023. https://www.kff.org/policy-watch/as-aca-marketplace-enrollment-reaches-record-high-fewer-are-buying-individual-market-coverage-elsewhere/

123. Tsui J, Hirsch JA, Bayer FJ, Quinn JW, Cahill J. Patterns in geographic access to health care facilities across neighborhoods in the United States based on data from the National Establishment Time-Series between 2000 and 2014. *JAMA Netw Open.* 2020;3(5):1-14. doi:10.1001/jamanetworkopen.2020.5105

124. Boudreaux M, Choi YS, Xie L, Marthey D. Medicaid expansion at Title X clinics: client volume, payer mix, and contraceptive method type. *Med Care.* 2019;57(6):437-443. doi:10.1097/MLR.0000000000001120

125. Barnett ML, Huskamp HA, Busch AB, Uscher-Pines L, Chaiyachati KH, Mehrotra A. Trends in outpatient telemedicine utilization among rural Medicare beneficiaries, 2010 to 2019. *JAMA Health Forum.* 2021;2(10):1-12. doi:10.1001/jamahealthforum.2021.3282

126. Talbot JA, Burgess AR, Thayer D, Parenteau L, Paluso N, Coburn AF. Patterns of telehealth use among rural Medicaid beneficiaries. *J Rural Health.* 2019;35(3):298-307. doi:10.1111/jrh.12324

127. Saynisch PA, David G, Ukert B, Agiro A, Scholle SH, Oberlander T. Model homes: evaluating approaches to patient-centered medical home implementation. *Med Care.* 2021;59(3):206-212. doi:10.1097/MLR.0000000000001497

128. Traczynski J, Udalova V. Nurse practitioner independence, health care utilization, and health outcomes. *J Health Econ.* 2018;58:90-109. doi:10.1016/j.jhealeco.2018.01.001

129. Hooker RS, Muchow AN. Modifying state laws for nurse practitioners and physician assistants can reduce cost of medical services. *Nurs Econ.* 2015;33(2):88-94.

130. Gadbois EA, Miller EA, Tyler D, Intrator O. Trends in state regulation of nurse practitioners and physician assistants. *Med Care Res Rev.* 2015;72(2):200-219. doi:10.1177/1077558714563763

131. Freed M, Ochieng N, Sroczynski N, Damico A, Amin K. Medicare and Dental Coverage: A Closer Look. Kaiser Family Foundation. July 28, 2021. Accessed June 7, 2021. https://www.kff.org/medicare/issue-brief/medicare-and-dental-coverage-a-closer-look/

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Chapter 19. Hospital and Emergency Services in Rural Areas

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# RURAL HEALTH ISSUES IN CHILD AND ADOLESCENT DEVELOPMENT

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## SCOPE OF THE PROBLEM

- Rural youths have more missed days of school because of illness, including chronic illness, than their urban counterparts. Those with developmental delays are twice as likely than their urban peers to be chronically absent.[1] Children and adolescents with mental health conditions, such as anxiety or depression, miss more school.[2]
- Rural children and adolescents encounter unique barriers to healthcare, which may limit their ability to identify a medical home or access services regularly or on time.[3,4]
- Depression, behavior problems, and anxiety are prevalent in rural children[5] aged 3-17 compared to children from urban locations.[6]
- Adverse childhood experiences are prevalent in rural communities, yet care coordination, social support services, and access to healthcare are limited.[7]
- Rural children and adolescents are more likely to experience hunger and live in low-income households compared to their urban counterparts.[8] Children and adolescents living in poverty are more likely to experience poor health problems as adults, confront difficulties in school, and live in impoverished neighborhoods.[9,10]
- In rural dwellings, children are more likely to have an incarcerated parent, and rural adolescents are more likely to live with someone who smokes and live in low-income households, compared to those in urban areas.[11-13]
- Children and adolescents in rural areas experience higher rates of overweight and obesity, are at greater risk for misuse of tobacco, alcohol, and opioids, and have higher suicide rates compared to those in urban areas.[14-16]

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The growth and development of children and adolescents represents a critical stage in life for achieving human potential. During these developmental phases of life, young people gain physical, cognitive, emotional, and social skills that serve as a foundation for influencing their health and well-being.[17] Physical and social development affect the safety and health of this group, which reflects future challenges to society and our communities.

Receiving timely and regular healthcare services and developmental screening is key to identifying a child's health problems early, as well as creating opportunities to treat and promote positive health behaviors.[18] Adolescents may experience developmental challenges that affect their physical and mental health and are also at risk of preventable health problems. Addressing developmental concerns and promoting positive health behaviors can help children and adolescents stay safe and healthy and provide a pathway for a population of healthier adults.

The health behaviors, social supports, conditions, and systems in rural communities influence the development of children and adolescents, as well as their health-related quality of life. Young people living in rural communities are affected by multiple factors, including their health status, family income and poverty levels, housing, school, neighborhood environments, and access to developmental screening and health services. The U.S. Department of Health and Human Services'

Healthy People 2030 emphasis on children and adolescents supports the need to improve opportunities for the development and well-being of children and adolescents in the *rural* United States.[19]

## RELEVANT HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

Childhood and adolescence represent critical periods of a person's development and growth.[20] The federal government's Healthy People 2030 goal to "promote healthy development for children and adolescents" recognizes the need to focus on promoting physical, mental, emotional, and behavioral development.[19] Solutions for improving child and adolescent health include responding to problems and challenges early so children and adolescents can receive the support and resources they need as they develop. Specific objectives of Healthy People 2030, related to child and adolescent development and important for rural health, are addressed in this chapter:

***School Objectives***[19]

- AH-D01: Increase the proportion of trauma-informed early childcare settings and elementary and secondary schools
- EMC-D06: Increase the proportion of children and adolescents who get preventive mental health care in school
- EH-D01: Increase the proportion of schools with policies and practices that promote health and safety
- AH-R06: Increase the proportion of schools requiring students to take at least 2 health education courses from grade 6 to 12
- AH-R09: Increase the proportion of public schools with a counselor, social worker, and psychologist

***Social and Community Context Objectives***[19]

- EMC-D07: Increase the proportion of children and adolescents who show resilience to challenges and stress
- SDOH-05: Reduce the proportion of children with a parent or guardian who has served time in jail
- IVP-D03: Reduce the number of young adults who report 3 or more adverse childhood experiences

***Health Care Objectives***[19]

- MICH-17: Increase the proportion of children who receive a developmental screening
- MICH-19: Increase the proportion of children and adolescents who receive care in a medical home

To avoid duplication of objectives in other related chapters, this literature review does not cover the full scope of Healthy People 2030 Child and Adolescent Development objectives. Rather, it focuses on a limited subset that includes objectives influencing children and adolescent development in school, social and community context, and healthcare.

## RURAL HEALTHY PEOPLE 2030 SURVEY

Healthy People 2030 focuses on promoting healthy physical, mental, emotional, and behavioral development in children and adolescents. The emergence of this Healthy People 2030 goal to promote healthy development for children and adolescents as a ranked *rural* health priority area signifies the importance of young people in rural America. Of nearly 1,300 rural stakeholders recently surveyed, one-fifth (20.6%) ranked this Healthy People goal as a top ten priority for *rural* America, ranking it as the 18th highest overall rural health priority. The Healthy People special-population categories of "Children" and "Adolescents" also emerged in the rural stakeholder survey as the second and third (54.3% and 40.9%, respectively) priority populations, behind "Older Adults" (70.1%).[21]

A prior collection of rural health priority literature reviews, known as *Rural Healthy People 2020*, did not reveal child and adolescent development as a top 20 priority.[22] Therefore, this recent ranking as the 18th most important rural health priority represents a growing rural public health concern and a challenge for the next generation of public health professionals.

## PREVALENCE IN RURAL AREAS

Children and adolescents in the U.S. represent an important, and increasingly diverse, population with significant variance across social determinants of health (SDOH) status,

especially in relation to their race/ethnicity, socioeconomic status, and geography. About 13.4 million children and adolescents under 18 years old (22.1%) live in rural America.[23-25] Living in rural areas impacts young people's health outlook and transitions from childhood to adolescence to young adulthood. Young people living in rural communities are at risk for, and have a greater prevalence of, adverse childhood experiences (ACEs). Rural children and adolescents may be more likely to witness violence or have a family member attempt or die by suicide. They are also more likely to grow up in a household with substance misuse, mental health conditions, or instability problems. These ACEs are linked to children and adolescents developing chronic health problems, mental illness, and substance use by the time they transition to adulthood.

Children and adolescents in rural areas experience worse health outcomes than their urban counterparts. They are more likely to be overweight or obese.[26] The percentage of children with diagnosed mental, behavioral, and developmental disorders (MBDD) is consistently higher in rural areas, with 18.6% of children reporting an MBDD compared to 15.2% of urban children.[27,28] Beginning in early childhood, MBDDs such as anxiety, attention-deficit/hyperactivity disorder (ADHD), and language problems, can affect lifelong health and well-being. Adolescents in rural areas are more likely to misuse opioids and have higher suicide rates compared to urban youth.[29] In addition, adolescents in rural areas are four times more likely to be the victim of a violent crime, including rape, sexual assault, robbery, and aggravated or simple assault.[51]

## CHILD AND ADOLESCENT DEVELOPMENT BARRIERS AND GAPS

Significant barriers exist related to child and adolescent development in rural areas.[30,31] Gaps in educational and healthcare opportunities influence their access to, experience with, and timeliness of services.[32,33] Barriers to quality educational services create a literacy gap between rural and urban youth. Rural situations impact youth access to screening, which delays the onset and timeliness of services needed during childhood. For example, a screening gap exists for behavioral health, vision, and hearing, keeping low socioeconomic families with financial constraints further separated from screening services. Lack of screening and access to care constrain children and adolescents from receiving mental health treatment, compared to metropolitan and urban areas.[34]

The geographic and cultural context in which rural children and adolescents reside cannot be unlinked from the barriers and gaps they experience related to their development. One neighborhood factor is that rural communities tend to be comprised of families with housing that are long distances from school buildings, resulting in higher transportation costs for the schools and longer commute times for the students. Similarly, rural communities experience healthcare gaps due to a lack of rural primary care providers, behavioral health providers, health clinics, and community services. For children and adolescents, this may result in missing more days of school because of illness or the inability to access healthcare services.[3]

## RURAL DISPARITIES INFLUENCING CHILD AND ADOLESCENT DEVELOPMENT

Structural constraints, discrimination, and victimization are factors present in rural communities that influence family dynamics and thus, rural child and adolescent development. Black, Latinx, and LGBTQ populations in rural areas are at even greater risk for experiencing both discrimination and the aforementioned factors that impact rural young people and how they learn, grow, and develop.[34] Further, the ability of young people to adapt to racial and ethnic socialization or cultural isolation may influence how children and adolescents are communicated and interacted with, influencing their *belongingness* and skills to deal with the realities of racism and discrimination.[35] Given that one in four (25%) rural students are not White, disparities for young people based on race and ethnicity are relevant to their growth and development.[36]

Poverty in rural communities stems from limited access to education and healthcare, quality community and public infrastructure, employment, social class segregation as well

as the commercial market. Many factors contribute to the cycle of poverty experienced within rural communities, ranging from educational attainment and labor/ workforce participation. Constrained work opportunities and unemployment impacts children and adolescents from a family, household, and socio-economic perspective. Levels of unemployment and lack of job growth are tied to educational attainment represented by lack of diploma and high school completion.

Populations living in rural communities are more likely to experience contact with the legal system, time in jail, experience suicidality, use drugs illegally, and experience early parenthood among other outcomes that impact families and the children and adolescents around them.[15,37,38] These illegal or problematic behaviors decrease children and adolescents' protective factors and the opportunities to form healthy relationships with adults in rural communities. As a result, rural health initiatives stand to benefit from focusing on programs that aim to mitigate these factors in the lives of rural children and adolescents.

## INTERSECTION OF CHILD AND ADOLESCENT DEVELOPMENT, SOCIAL DETERMINANTS, AND RURAL HEALTH

### *Education*

The setting most accessed by rural children and adolescents is schools. Schools play a significant role in supporting healthy development and promoting the safety of students. Policies provide a foundation to expect and promote a healthy and safe school environment, and to ensure student access to developmental programs and services in the school setting. Intentional policies support school stakeholders and student development to notably improve literacy, health behaviors, and educational attainment.[39-45] Teachers and school stakeholders impact rural young people's access to education and quality of programs by providing a variety of resources, opportunities and interventions that improve math skills, literacy, behavioral health, and physical health. For example, reading and math programs for children and adolescents impact literacy skills and increase graduation rates.[39]

From a rural health perspective, School Health Advisory Councils (SHAC), which include a variety of members, work to promote a healthy and safe school environment that also supports child and adolescent development.[46] The SHAC members represent the community and provide insight into relevant policies and practices that influence school health and child and adolescent development. This council often has input from students, parents, teachers, and school administrators to identify barriers and solutions to improving the health and well-being of students. This provides local community input on education and health interventions determined to fit community needs and address the development of lifelong skills among children and adolescents.

Ideally, to address the health and development of young people, rural schools should also provide nutritious meals, encourage physical activity, contribute to healthy social-emotional development, and strive to maintain a safe physical environment where students can learn. These initiatives facililtate an environment for students to become better learners, achieve academically, and maintain lifelong health benefits. Despite efforts at both state and federal levels to address nutritional needs through the federal school lunch program, overweight and obesity rates for rural youth continue to remain significantly higher than their urban counterparts. Support for school programs and interventions to promote positive health behaviors and lessen negative health behaviors assists in reducing impacts caused by food deserts and overeating.[47]

Health education in both elementary and secondary schools can improve health and well-being and lead to the development of essential life skills.[48] By offering formal, structured health education lessons and courses from early childhood through secondary, young people are engaged in multiple opportunities to impact their learning and health. Health education reinforces health messages relevant for young people, but also should be tailored to meet the needs of rural students, especially as they age and developmentally progress through secondary school. At least two health education courses and planned learning experiences during 6th-12th grade provide the opportunity for young

people to develop and build the skills they need to make healthy decisions, achieve literacy, adopt healthy behaviors, and promote health within their community. By the time students reach high school, adolescents should engage in skill-building educational activities that help them develop life and transferable skills (e.g., communication, decision making).

Rural schools also impact the health of their students when they serve as a location for providing students with healthcare. Access to healthcare is a significant barrier for rural families and School Based Health Clinics (SBHCs) ensure access to first aid, emergency care, assessment, and the management of chronic conditions.[49] When the provision of care at an SBHC does not meet child or adolescent needs, services are then designed to ensure referrals to other medical homes. Having an SBHC in rural and low-resourced communities increases the ability of young people and their families to address health and chronic conditions and respond to social stressors like the economic or geographic barriers.[49]

Schools can also serve as a location for providing students with counseling and behavioral health services and are the most common location for children to receive mental health services. The prevention and intervention services provided through school-based counseling, psychological, and social services support the mental, behavioral, and social-emotional development of children and adolescents and promote their success in the learning process. Services supporting both child and adolescent development include health screening and assessments, interventions, and referrals to school and community support services.[27] School-employed professionals ensure that young people can receive early and timely screenings and treatment, which will reinforce development and learning for young people.

### *Neighborhood Support, Social and Community Engagement*

A healthy and safe community or neighborhood environment promotes a healthier child and adolescent development. Although the census defines a community by population count, others will describe the rural community not only by population, but also by housing density and the community's sense of identity and values.[23] The environment of a community and its members influences development and allows parents and families time and opportunity to focus on developmental factors for their children like education, parental employment, and family health. The rural community provides context for inequities attributed to their economic, historical, and social environments.[3,13]

Unique barriers attributable to residing in certain underserved rural communities may lead to a variety of disparities. For example, community members' access to mental health providers and the way people are treated based on racial or sexual orientation discrimination creates challenges for rural children and adolescents. Parents of children with mental, behavioral, and developmental disorders in rural communities more often experience financial difficulties, report monetary consequences, and rate their own mental health or their partner's mental health as "fair" or "poor."[50] Rural communities also experience infrastructure and transportation challenges including public areas with poor conditions and transportation challenges. Rural young people often live in a neighborhood without amenities that are more common in urban areas such as community parks, recreation centers, and libraries. Transportation, and distance to travel influences parents' ability to drive their dependent children to and attend healthcare appointments. These challenges make it harder for families to provide their children with opportunities to gain experience, grow, learn, and thrive.

The effect of social and economic positions within rural cultures and communities influences young people from childhood to adolescence and adolescence to young adulthood. The unique combinations of social status and living as a family or in a community that experiences the cycle of poverty can increase risk factors for young people. Children and adolescents living in poverty are more likely to be at risk for certain behaviors that are already more prevalent in rural communities (e.g., heavy drinking, drug use, marijuana use, cigarette smoking, opioid use).[15] Rural children and adolescents living

in poverty are more likely to experience and confront difficulties in school and develop into adults that experience poor health problems and live in impoverished neighborhoods.

Children and adolescents' environment, especially their home environment, can undermine their health and safety and cause threats that urban youth may not face, such as lack of police or fire protection. Rural children and adolescents are often at risk for conditions that challenge their sense of safety, stability, and bonding; therefore, placing them at risk and greater prevalence for ACEs. Rural children and adolescents may be more likely to witness violence, have incarcerated parents/guardians, or have a family member attempt or die by suicide. Rural communities may be comprised of households with substance misuse, mental health, or instability problems. Their ACEs are linked to children and adolescents developing chronic health problems, mental illness, and substance use by the time they transition to adulthood.

***Health and Health Care***

Rural children and adolescents are more likely to experience a healthcare access challenge in finding and accessing appropriate healthcare providers, behavioral health resources, and community services. These services are scarce in rural communities because of a shortage of providers, financial constraints, lack of internet access, and transportation challenges.[51] These gaps can lead to lack of a medical home and less usage of primary care, clinical, and prevention services.

Moreover, mental and behavioral health services, including developmental screening programs, are notably limited in rural areas. Mental and behavioral health often begin in early childhood and peak at adolescence and into young adulthood, yet the challenges can affect lifelong health and wellness. Finally, in addition to children and adolescents with mental, behavioral, and developmental disorders benefiting from better access to mental and behavioral healthcare, programs that support parents and caregivers would improve the rural healthcare gap.[5]

Collaboration among healthcare systems, primary care clinicians, early childhood learning programs, and family/caregiver support programs may offset the challenges faced by children and adolescents in rural areas. Given the shortage of providers, integrated care between behavioral health and primary care can break down barriers.[16,22] Opportunities for telehealth and telemedicine, or virtual healthcare clinics, are on the rise. Communities with broadband may offer virtual care as a potential solution for families establishing medical homes, thereby decreasing the travel back and forth on rural roads to clinic visits. Additionally, through collaborative care, healthcare providers can track children's physical, mental, emotional, and behavioral development through screenings and preventive care services.

## PRACTICE CONSIDERATIONS FOR RURAL CHILD AND ADOLESCENT DEVELOPMENT

Child and adolescent development affect a person's lifelong health and well-being. When the behaviors and factors that affect health and well-being later in life are ignored, children and adolescents' risk of not being safe or healthy increases. Unaddressed, young people become at risk for preventable health problems including substance use disorders, unplanned pregnancy, and violence. Rural health initiatives should decrease access gaps for children and adolescents to ensure they grow up in a safe and nurturing environment; have opportunities to experience their full education potential; and can access health screening, services, and treatment necessary to reach their full potential.[7,3]

Children and adolescents who experience ACEs may have a range of negative impacts. Most ACE interventions will focus on therapy and support interventions that mitigate harm and address social pathways. Additional mediation that can support rural young people is for schools, community organizations, and providers to utilize trauma-informed approaches. Although there is a lack of appropriate resources and research tailored to trauma-informed approaches and social-emotional learning for rural communities, rural community leaders and stakeholders can assist children and adolescents in developing skills in resiliency in order to meet challenges and stressors and to mitigate issues impacted by ACEs.[30,38]

Community engagement and enrichment opportunities offer protective conditions for rural children and adolescents to engage in their neighborhoods. Partnering with community stakeholders can support social connections and overall neighborhood experiences that support children and adolescents in their development. Community-level interventions normally incorporate families into the program and can help develop young people and keep them safe and healthy.

## PROVEN SOLUTIONS AND INTERVENTIONS

Federal, state and local investments in child and adolescent development bring significant and long-lasting benefits for rural young people, families and communities. Although programs addressing health disparities that are tailored for rural populations are scarce, communities can engage and invest in programs and interventions to keep their children and adolescents safe and healthy.

### *School Based Health Centers*

School Based Health Centers are a proven solution to rural child and adolescent development disparities that impact educational and health outcomes.[52] Rural communities are recommended to start and maintain SBHCs to provide health services to students in pre-K through grade 12, but can also serve others including school staff, family members, and community members. To operate, SBHCs develop policies and practices that promote health and safety, reduce gaps in education, and improve health equity. These SBHCs must provide school-based (on-site) or school-linked (off-site) primary health care and make community-informed decisions about when services are available. Single clinicians can provide primary care or healthcare teams can collaborate to provide more complex services such as developmental screening, mental health care, social services, dentistry, and health education.

### *Whole School, Whole Child, Whole Community Model*

The Whole School, Whole Child, Whole Community (WSCC) model is a framework for addressing health in schools that can meet the unique needs of rural communities.[53] The model focuses on the child or adolescent student and emphasizes the need for collaboration between schools, communities, and healthcare stakeholders to align resources, which are hard to access in rural settings, that support the whole child. Focused on multiple components, schools and rural communities can emphasize different services which meet their needs. Services may include: integrating school health services; identifying how to integrate nutritious meals; encouraging physical activity; and focusing on healthy social-emotional development through counseling, psychological, and social services. The WSCC strives to maintain a safe, youth-friendly physical environment with community input to address rural needs.

### *Screening for Anxiety, Depression and Suicide*

The U.S. Preventive Services Task Force (USPSTF) recommends screening for anxiety in children and adolescents ages eight to 18 years, and for major depressive disorder (MDD) in adolescents ages 12 to 18 years, even for those who are not showing recognized signs or symptoms of anxiety and depression.[54,55] Anxiety disorders in childhood and adolescents are associated with an increased likelihood of a future anxiety disorder or even depression - a leading cause of disability in the U.S. Children and adolescents with depression often have functional impairments in their performance at school or work, as well as in their interactions with families and peers. Depression can negatively impact development in affected youth. Screening, as part of child and adolescent health services, allows the opportunity for providers to detect issues early and help rural youth seek treatment that may prove scarce in their communities.

## SUMMARY AND CONCLUSION

It is noteworthy that the national Rural Healthy People 2030 survey respondents evaluated the inclusion of “Child and Adolescent Development” as an important and focused health area, highlighting the attention given to this population. This review demonstrates the need to consider rural children and adolescents as a priority population with a need for tailored, prioritized educational opportunities, community-focused programming, and health services. Children and adolescents have always

been a part of the rural landscape; however, they have greater health and developmental risks and experience social and health risks at higher levels compared to their urban counterparts. We underscore the importance of education and literacy development, and access to healthcare and mental health screening and treatment, as areas for focused attention to influence the health and development of rural young people.

Efforts to monitor the health and development and other interrelated trends among the child and adolescent population over time will improve health outcomes for both urban and rural children and adolescents. Monitoring the implementation and reach of evidence-based programs delivered in rural areas will help us better understand whether these resources are meaningful to, and utilized by, rural children and adolescents. Further, there is a great need to understand the array of implications for young people with multiple risk factors in rural areas, especially as this population grows into the young adult and adult age group.

## REFERENCES


1. Thies KM. Identifying the educational implications of chronic illnesses in school children. *J Sch Health*. 2009;69(10):392-397. doi:10.1111/j.1746-1561.1999.tb06354.x

2. Sullivan T, Weinert C, Cudney S. Management of chronic illness: voices of rural women. *J Adv Nurs*. 2003;44(6):566-574. doi:10.1046/j.0309-2402.2003.02846.x

3. Probst JC, Barker JC, Enders A, Gardiner P. Current state of child health in rural America: how context shapes children's health. *J Rural Health*. 2016;34(S1):s3-s12. doi:10.1111/jrh.12222

4. Elliot BA, Larson JT. Adolescents in mid-sized and rural communities: foregone care, perceived barriers, and risk factors. *J Adolesc Health*. 2004;35(4):303-309. doi:10.1016/j.jadohealth.2003.09.015

5. Lutfiyya MN, Bianco JA, Quinlan SK, Hall C, Waring SC. Mental health and mental health care in rural America: the hope of redesigned primary care. *Dis Mon*. 2012;58(11):629-638. doi:10.1016/j.disamonth.2012.08.004

6. Ghandour RM, Sherman LJ, Vladutiu CJ, et al. Prevalence and Treatment of Depression, Anxiety, and Conduct Problems in US Children. *J Pediatr*. 2019;206:256-267.e3. doi:10.1016/j.jpeds.2018.09.021

7. Radcliff E, Crouch E, Strompolis M. Rural-urban differences in exposure to adverse childhood experiences among South Carolina adults. *Rural Remote Health*. 2018;18(1):4434. doi:10.22605/RRH4434

8. Shanafelt A, Hearst MO, Wang Q, Nanney MS. Food insecurity and rural adolescent health, home, and academic environments. *J Sch Health*. 2016;86(6):472-480. doi:10.1111/josh.12397

9. Ngoma C, Mayimbo S. The negative impact of poverty on the health of women and children. *Ann Med Health Sci Res*. 2017;7:442-446. https://www.amhsr.org/articles/the-negative-impact-of-poverty-on-the-health-ofwomen-and-children.pdf

10. Paul-Sen Gupta R, de Wit ML, McKeown D. The impact of poverty on the current and future health status of children. *Paediatr Child Health*. 2007;12(8):667-672. doi:10.1093/pch/12.8.667

11. Child Welfare Information Gateway. Child Welfare Practice With Families Affected by Parental Incarceration. U.S. Department of Health and Human Services, Administration for Children and Families, Children's Bureau. January 2021. Accessed April 30, 2023. https://www.childwelfare.gov/pubPDFs/parental_incarceration.pdf

12. Zielinski P. Cigarette smoking more prevalent - and harder to quit - among rural vs. urban Americans. *Rutgers Today*. September 8, 2022. Accessed April 30, 2023. https://www.rutgers.edu/news/cigarette-smoking-more-prevalent-and-harder-quit-among-rural-vs-urban-americans#:~:text=The%20study%2C%20published%20in%20JAMA,19.2%20percent%20versus%2014.4%20percent

13. Bishaw A, Kirby G. A Comparison of Rural and Urban America: Household Income and Poverty. U.S. Census Bureau. December 8, 2016. Accessed April 30, 2023. https://www.census.gov/newsroom/blogs/random-samplings/2016/12/a_comparison_of_rura.html

14. Flattum C, Friend S, Horning M, Lindberg R, Beaudette J, Fulkerson JA. Family-focused obesity prevention program implementation in urban versus rural communities: a case study. *BMC Public Health*. 2021;21:1915. doi:10.1186/s12889-021-11967-3

15. Substance Use and Misuse in Rural Areas. Rural Health Information Hub. Updated June 28, 2023. Accessed April 30, 2023. https://www.ruralhealthinfo.org/topics/substance-use

16. Suicide in Rural Areas. Rural Health Information Hub. Updated May 9, 2022. Accessed April 30, 2023. https://www.ruralhealthinfo.org/toolkits/suicide/1/rural#:~:text=The%20rate%20of%20suicide%20among%20rural%20youth%20age%2015%2D19,their%20urban%20counterparts%20

17. Lifelong Health. Center on the Developing Child Harvard University. 2023. Accessed April 30, 2023. https://developingchild.harvard.edu/science/deep-dives/lifelong-health/

18. Newman L. Getting in early: identification of risk in early childhood. *Aust N Z J Psychiatry*. 2012;46(8):697-699. doi:10.1177/0004867412454341

19. Child and Adolescent Development - Health people 2030 Objectives. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Accessed April 30, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/child-and-adolescent-development

20. Backes EP, Bonnie RJ. Chapter 2 Adolescent Development in the Promise of Adolescence. Chapter 2. In: Backes EP, Bonnie RJ, eds. *Realizing all Opportunity for Youth*. Washington (DC): National Academies Press (US); 2019. https://www.ncbi.nlm.nih.gov/books/NBK545476/

21. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: new decade, new challenges. *Prev Med Rep*. 2023;33:102176. doi:10.1016/j.pmedr.2023.102176

22. Bolin J, Bellamy G, Ferdinand A, Ojinnaka C. Rural Access to Quality Health Insurance. Chapter In: Bolin JN, Bellamy G, Ferdinand AO, et al. eds. *Rural Healthy People 2020: Volume 1*. College Station, TX: Texas A&M University Health Science Center, School of Public Health, Southwest Rural Health Research Center; 2014:1-11.

23. Dobis EA, Krumel TP, Cromartie J, Conley KL, Sanders A, Ortiz R. *Rural America at a Glance: 2021 Edition*. U.S. Department of Agriculture Economic Research Service; 2021. https://www.ers.usda.gov/webdocs/publications/102576/eib-230.pdf

24. 2021 ACS 1-year Estimates. U.S. Census Bureau. Updated September 7, 2022. Accessed April 30, 2023. https://www.census.gov/programs-surveys/acs/technical-documentation/table-and-geography-changes/2021/1-year.html

25. New Census Data Show Differences Between Urban and Rural Populations. U.S. Census Bureau. December 8, 2016. Accessed April 30, 2023. https://www.census.gov/newsroom/press-releases/2016/cb16-210.html

26. Maddock JE, Seguin-Fowler RA, Shrestha A, Ferdinand AO. Obesity and Physical Activity in Rural Settings. Chapter 4. In: Ferdinand AO, Callaghan T, Bolin JN, Rochford HI, Lockman A, Johnson NY, eds. *Rural Healthy People 2030*. College Station, TX: Texas A&M University School of Public Health, Southwest Rural Health Research Center; 2023.

27. McCord CE, Phillips Reindel KM, Sopchak K, Stickley M, Williamson M. Mental Health and Mental Disorders: A Rural Challenge. Chapter 1. In: Ferdinand AO, Bolin JN, Callaghan T, Rochford HI, Lockman A, Johnson NY, eds. *Rural Healthy People 2030*. College Station, TX: Texas A&M University School of Public Health, Southwest Rural Health Research Center; 2023.

28. Zablotsky B, Ng AE. Mental health treatment among children aged 5–17 years: United States, 2021. NCHS Data Brief, no 472. Hyattsville, MD: National Center for Health Statistics. 2023. doi:10.15620/cdc:128144

29. Gary JC, Burge D, Downing N, Hutchison L, Horel S. Addiction in Rural America. Chapter 2. In: Ferdinand AO, Bolin JN, Callaghan T, Rochford HI, Lockman A, Johnson NY, eds. *Rural Healthy People 2030*. College Station, TX: Texas A&M University School of Public Health, Southwest Rural Health Research Center; 2023.

30. Healthcare Access in Rural Communities. Rural Health Information Hub. Updated November 11, 2022. Accessed April 30, 2023. https://www.ruralhealthinfo.org/topics/healthcare-access

31. Douthit N, Kiv S, Dwolatzky T, Biswas S. Exposing some important barriers to health care access in the rural USA. *Public Health*. 2015;129(6):611-620. doi:10.1016/j.puhe.2015.04.001

32. Need for Improving Health Literacy in Rural Areas. Rural Health Information Hub. Accessed April 30, 2023. https://www.ruralhealthinfo.org/toolkits/health-literacy/1/need-in-rural

33. National Center for Education Statistics. Educational Attainment in Rural Areas. *Condition of Education*. U.S. Department of Education, Institute of Education Sciences. 2023. Accessed April 30, 2023. https://nces.ed.gov/programs/coe/indicator/lbc/educational-attainment-rural?tid=1000

34. Grundy S, Prusaczyk B. The complex intersection of race and rurality: the detrimental effects of race-neutral rural health policies. *Health Equity*. 2022;6(1):334-337. doi:10.1089/heq.2021.0136

35. Fenton MP, Forthun LF, Aristild S, Vasquez KB. The role of the rural context in the transition to adulthood: a scoping review. *Adolesc Res Rev*. 2022;7(1):101-126. doi:10.1007/s40894-021-00161-6

36. Tieken MC, Montgomery MK. Challenges Facing Schools in Rural America. National Association of State Boards of Education. January 2021. Accessed April 30, 2023. https://files.eric.ed.gov/fulltext/EJ1286832.pdf

37. Rural America Has Highest Jail Incarceration Rate in the U.S. Despite Low Crime Rates, New Report Reveals. Vera Institute of Justice. Accessed April 30, 2023. https://www.vera.org/newsroom/rural-america-has-highest-jail-incarceration-rates-in-the-u-s-despite-low-crime-rates-new-report-reveals

38. Hamilton BE, Rossen LM, Branum AM. Teen birth rates for urban and rural areas in the United States, 2007–2015. NCHS data brief, no 264. Hyattsville, MD: National Center for Health Statistics. 2016.

39. Kipp AL. Rural Education Access and Quality. Chapter 16. In: Ferdinand AO, Bolin JN, Callaghan T, Rochford HI, Lockman A, Johnson NY, eds. *Rural Healthy People 2030*. College Station, TX: Texas A&M University School of Public Health, Southwest Rural Health Research Center, 2023.

40. Busch V, Loyen A, Lodder M, Schrijvers AJP, van Yperen TA, de Leeuw JRJ. The effects of adolescent health-related behavior on academic performance: a systematic review of the longitudinal evidence. *Rev Educ Res*. 2014;84(2):245-274. doi:10.3102/0034654313518441

41. Basch CE. Healthier students are better learners: a missing link in school reforms to close the achievement gap. *J Sch Health*. 2011;81(10):593-598. doi:10.1111/j.1746-1561.2011.00632.x

42. Rasberry CN, Tiu GF, Kann L, et al. Health-related behaviors and academic achievement among high school students - United States, 2015. *MMWR Morb Mortal Wkly Rep*. 2017;66(35):921-927. doi:10.15585/mmwr.mm6635a1

43. Hawkins GT, Lee SH, Michael SL, et al. Individual and collective positive health behaviors and academic achievement among U.S. high school students, Youth Risk Behavior Survey 2017. *Am J Health Promot*. 2022;36(4):651-661. doi:10.1177/08901171211064496

44. Liburd LC. After the bell rings: looking beyond the classroom to reduce inequalities in educational achievement and health outcomes. *J Public Health Manag Pract*. 2019;25(6):581-583. doi:10.1097/PHH.0000000000000978

45. Hahn RA, Truman BI. Education improves public health and promotes health equity. *Int J Health Serv*. 2015;45(4):657-678. doi:10.1177/0020731415585986

46. NCHS Urban-Rural Classification Scheme for Counties. Centers for Disease Control and Prevention. Updated June 1, 2017. Accessed April 30, 2023. https://www.cdc.gov/nchs/data_access/urban_rural.htm

47. Okobi OE, Ajayi OO, Okobi TJ, et al. The burden of obesity in the rural adult population of America. *Cureus*. 2021;13(6):e15770. doi:10.7759/cureus.15770

48. Auld ME, Allen MP, Hampton C, et al. Health literacy and health education in schools: collaboration for action. *NAM Perspect*. 2020;2020:10.31478/202007b. doi:10.31478/202007b

49. Arenson M, Hudson PJ, Lee N, Lai B. The evidence on school-based health centers: a review. *Glob Pediatr Health*. 2019;6 2333794X19828745. doi:10.1177/2333794X19828745

50. Child Health in Rural America. Centers for Disease Control and Prevention. Updated April 21, 2023. Accessed June 1, 2023. https://www.cdc.gov/ruralhealth/child-health.html

51. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, Office of Population Affairs. America's Diverse Adolescents. HHS.gov. Accessed April 30, 2023. https://opa.hhs.gov/adolescent-health/adolescent-health-facts/americas-diverse-adolescents

52. Social Determinants of Health: Center-Based Early Childhood Education. Guide to Community Preventive Services. Updated November 30, 2016. Accessed April 30, 2023. https://www.thecommunityguide.org/findings/social-determinants-health-center-based-early-childhood-education.html

53. Lewallen TC, Hunt H, Potts-Datema W, Zaza S, Giles W. The Whole School, Whole Community Whole Child Model: a new approach for improving educational attainment and healthy development for students. *J Sch Health*. 2015;85(11):729-739. doi:10.1111/josh.12310

54. Anxiety in Children and Adolescents: Screening. U.S. Preventive Services Task Force. October 11, 2022. Accessed April 30, 2023. https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/screening-anxiety-children-adolescents

55. Depression and Suicide Risk in Children and Adolescents: Screening. U.S. Preventive Services Task Force. October 11, 2022. Accessed April 30, 2023. https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/screening-depression-suicide-risk-children-adolescents

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# HOSPITAL AND EMERGENCY SERVICES IN RURAL AREAS

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## SCOPE OF THE PROBLEM

- A recent survey of rural stakeholders identified "Hospital and Emergency Services" as the 19th leading rural health priority for 2030.[1]
- While the Healthy People 2020 goal for "reducing the proportion of people who can't get medical care when they need it" has not been met, it has improved to 7% in 2021 since the 2019 baseline of 8.5%.[2]
- Between 2015 and 2019, 59% of U.S. community hospitals that closed were rural hospitals.[3]
- Visits to rural emergency departments increased more than 50% between 2005 and 2016.[4]
- The Healthy People 2020 goal to reduce hospital-based infections (i.e., Clostridioides difficile) has been met.[5]
- Innovations in rural health services delivery could include aligning medical screening examinations with affiliated rural health clinics, designating rural emergency hospitals, and expanding telehealth.

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The Healthy People 2030 overarching goal for Hospital and Emergency Services is to "prevent hospital visits and improve emergency department and hospital care."[6] This chapter addresses four critical elements of hospital and emergency services, in a rural context, with contrasts made to nonrural (i.e., urban) hospital and emergency services as appropriate. We will first discuss accessible and preventable hospital and emergency department visits with a focus on the impact of rural hospital closures. Second, emergency department quality of care will be addressed, with a particular emphasis on emergency department wait times. The third focus area is rural inpatient hospital care, which includes efforts to reduce hospital-acquired infectious diseases as well as increase the role of health information technology. Lastly, follow-up services, particularly referrals for substance use treatment, will be examined.

A national survey of rural stakeholders found that the Healthy People 2030 category of Hospital and Emergency Services ranked as the 19th most important *rural* health priority.[1,7] Respondents from the four U.S. census regions ranked the topic similarly – from 16th in the South to 20th in the West.[7] Likewise, respondents ranked the topic similarly, regardless of whether their state had or had not adopted Medicaid expansion.[7] Not surprisingly, rural health stakeholders aged 65 years and older ranked hospital and emergency services as their 7th leading rural health concern, compared to 35 to 64 year-olds (19th) and 18 to 34 year-olds (21st).[7] Of note, in *Rural Healthy People 2020*, Hospital and Emergency Services was not offered as an individual category to be ranked, but was combined within the Healthcare Access and Quality category which then ranked as the *number one* priority for rural respondents.[8]

Specific to Healthy People 2030, the material in this chapter is relevant to the following goals important to hospital and emergency services:

- AHS-04 Reduce the proportion of people who can't get medical care when they need it[2]
- AHS-09 Reduce the proportion of emergency department visits with a longer wait time than recommended[9]
- HAI-01 Reduce C.diff infections that people get in the hospital[5]

- HAI-02 Reduce MRSA bloodstream infections that people get in the hospital[10]
- HC/HIT-D06 Increase the proportion of hospitals with access to necessary electronic information[11]
- SU-D02 Increase the proportion of people who get a referral for substance use treatment after an emergency department visit[12]

## PART 1. PREVENTABLE AND ACCESSIBLE HOSPITAL AND EMERGENCY SERVICES

***AHS-04 Reduce the proportion of people who can't get medical care when they need it[2]***

To place this chapter in context, it is important to describe the relationship between emergency services and hospital services. The American College of Emergency Physicians defines emergency services as "any health care service provided to evaluate and/or treat any medical condition such that a prudent layperson possessing an average knowledge of medicine and health, believes that immediate unscheduled medical care is required."[13] These emergency services are often provided in emergency departments within hospitals across the country. According to the Center for Disease Control's (CDC) National Center for Health Statistics, there were an estimated 145 million emergency department visits in 2016. Following 2016, there was a decrease until 2019 when emergency department visits reached an estimated 151 million annual visits, with a decrease in 2020 (likely due to the COVID-19 pandemic) and subsequent rise in visits to an estimated 140 million in 2021.[14] With this volume of annual visits, it is crucial that people who need care can access emergency services easily and with limited wait times as emergency department visits can also result in hospital admissions.

Many emergency department visits are preventable. Data from HCUP identified the leading cause of emergency department visits in 2018 (prior to COVID-19) as injuries and poisonings, with twice as many of those patients being treated and released as were admitted to the hospital.[15] The most common diagnoses recorded for 2018 emergency department visits *resulting in hospital admission* were reported to be ailments related to the circulatory, digestive, and respiratory systems (18.0%, 13.3%, and 11.9%, respectively).[15]

While prevention is a purposeful goal, concrete action is needed to reduce both the misuse (i.e., inappropriate use of the emergency department) and overuse (i.e., habitual use of the emergency department as the principal source of care) of emergency hospital services. It has been reported that vulnerable populations – as defined by socioeconomic characteristics – make more preventable visits to emergency rooms than others.[16] The social determinants of health that may influence frequency of preventable emergency department visits include lower income, lesser educational attainment, unemployment, lack of health insurance, and lack of access to transportation and/or internet service.[16] As suggested in Healthy People 2030, strategies to prevent unnecessary emergency department visits may need to include connecting people to a primary care provider and promoting healthy lifestyles and behaviors.[6] This is particularly applicable for vulnerable populations.

Concerningly, access to emergency services in rural areas is limited compared to urban areas, and has worsened as the rate of rural hospital closures has increased.[17] This is adding undue pressure on remaining rural and nearby hospitals, and their communities, with rural residents driving further to access important health services than their urban counterparts.[18] While the future of rural-based hospital and emergency services remains challenging, there are opportunities to mitigate and even improve access to these services.

The Office of the Inspector General of the U.S. Department of Health and Human Services (DHHS) defines a hospital closure as, "a facility that stopped providing general, short term, acute inpatient care."[17] This definition can be further refined into *converted* closures (i.e., closure of the hospital's inpatient care unit only) or *complete* closures (i.e., the hospital no longer provides any services whatsoever).[19] Both instances negatively impact access to health services in affected communities.

Currently, approximately 46 million people nationwide (i.e., 14% of the U.S. population ) live in rural areas that have a significant shortage

of health services.[20] Since 2010, there have been more than 77 complete rural hospital closures.[21] Reasons for these closures include declining patient volumes, low reimbursement, staffing shortages, and regulatory barriers.[22] According to researchers at the Cecil G. Sheps Center for Health Services these closures have been increasing since the 2008-2009 recession.[21] There are likely multiple contributing factors including: failure to recover from the recession; population demographic trends; market trends (e.g., increased rates of mergers and/or affiliations); decreased demand for inpatient services; and new models of care, such as accountable care organizations.[22,23-25] Long-standing trends, such as generally poorer financial performance in the South, may contribute to closure rates.[21] Along with these trends being seen as possible contributing factors to hospital closures, researchers have also suggested the possible effect of the Affordable Care Act (i.e., Obamacare) and its correlation with a state's decision on whether or not to expand Medicaid.[21]

These closures increase the burden on both remaining hospitals and those patients who are seeking care. As noted earlier, rural health settings are chronically understaffed which negatively impacts wait times and treatment of patients.[22] Rural patients also have significant travel barriers. The typical rural resident travels an average of 17.8 miles to access medical care, as compared to urban residents who travel 8.1 miles on average.[26]

The proportion of people who cannot get medical care when they need it has gradually improved from the 2019 baseline of 8.5% to 7% in 2021, but remains above the Healthy People 2030 target of 5.9%.[2] According to the Healthy People 2030 website, the most recent data (2021) shows that the proportion of people who can't get medical care *due to cost* is 6.7% for metropolitan populations, compared to 8.7% for nonmetropolitan (i.e., rural) populations.[2] Research shows that there are several reasons for the limited access to emergency medical services, especially in rural areas. These include rural hospitals reducing or eliminating services, and/or closing the hospital entirely, both of which increase travel distance to emergency care.[27]

## PART 2. QUALITY OF CARE FOR EMERGENCY DEPARTMENTS AND HOSPITALS

***AHS-09 Reduce the proportion of emergency department visits with a longer wait time than recommended***

Lengthy emergency department wait times indicate overcrowding as the demand for services (i.e., arrivals to an emergency department) exceeds the capability of the facility to provide services (e.g., number and type of medical providers, number of beds).[28] According to the CDC, the wait time for an emergency department visit varies by the volume of annual emergency department visits.[29]

Wait times, however, are not the sole determinant of emergency department quality of care. Emergency departments may reach capacity and quality of care may suffer as patients experience boarding (i.e., holding patients in the emergency department because an inpatient bed is unavailable) or diversion of their ambulance from one hospital to another.[31] The Agency for Healthcare Research and Quality (AHRQ) has reported that, "nearly half of emergency departments report operating at or above capacity, and nine out of 10 hospitals report holding or boarding admitted patients in the emergency department while they await inpatient beds."[32] Furthermore, this overcrowding is such an issue that it is estimated that half a million ambulances are diverted each year from the closest hospital to find one that has available space.[33]

Because of wide variability among hospitals and their associated wait times for care in the emergency department, the concept of average wait time must be qualified. Smalley et al. (2021), suggests there are other factors that should be considered including the quality of care provided, the behavior of patients in the emergency department (i.e., do they wait for care or leave before being seen), and the breadth of services available at the emergency department and its hospital,[34] including access to emergency services such as ambulances.[30] Related, where wait time has been measured, shorter wait times can be attributed to population density (i.e., lower population density implies fewer people visit

the emergency department), and the availability of alternative care venues such as urgent care facilities and primary care doctors.[35] Another unfortunate reason some states have shorter emergency department wait times is associated with higher rates of uninsured residents.[36] While a hospital cannot deny patients life-saving treatment if they do not have health insurance, some patients may avoid going to the hospital until absolutely necessary to avoid costly bills.[2]

## PART 3. INPATIENT HOSPITAL CARE

***HAI-01 Reduce C.diff infections that people get in the hospital***
***HAI-02 Reduce MRSA bloodstream infections that people get in the hospital***

Clostridioides difficile (C.diff) is a bacteria that causes severe, often life-threatening diarrhea.[37] Susceptibility to C.diff is usually a side-effect of taking antibiotics. In 2017, there were roughly 223,900 cases of C.diff among hospitalized patients and, subsequently, 12,800 deaths in the U.S.[38] Despite the prevalence of C.diff cases in 2017, rates of C.diff have actually decreased beginning in 2015.[38] When looking at 2016 C.diff cases by rurality, it was reported that rural hospitals had a lower prevalence of C.diff per 1,000 hospital discharges than urban hospitals.[39] Rural hospitals experienced a smaller decrease in C.diff prevalence (adjusted prevalence difference = -0.3) from 2016 to 2018, compared to both urban teaching and nonteaching hospitals (aPDs of -1.8 and -1.9, respectively).[39] It should be noted that the Healthy People 2030 goal for reducing C.diff has already been met in 2023.[5]

Along with the prevalence of C.diff, methicillin-resistant Staphylococcus aureus (MRSA) is another infection-related issue impacting hospitals in the U.S. The MRSA bacteria is resistant to multiple types of antibiotics and is spread by contact with infected people or things carrying the bacteria.[40,41] In the U.S., approximately 5% of patients in hospitals carry MRSA in their nose or on their skin.[41] However, the CDC reports a decrease in the estimated number of MRSA cases in hospitalized patients, from 401,000 cases in 2012 to 323,700 in 2017.[38]

Various efforts have been adopted with the goal of reducing both C.diff and MRSA in hospitals. Proper hand hygiene, antimicrobial stewardship, and environmental decontamination have proven successful in reducing C.diff.[42] In addition to these efforts to reduce C.diff, efforts have been implemented to reduce MRSA rates that go beyond the recommended hand washing, covering of wounds, and not sharing personal items.[41] With Universal ICU Decolonization, the primary protocol designed to reduce MRSA in the intensive care unit, patients are not tested for MRSA when they enter the unit, rather all patients are bathed daily with a 2% chlorhexidine cloth and receive mupirocin ointment twice a day for five days.[43] With the universal ICU decolonization approach, MRSA-positive clinical cultures have been reduced by 37% and all-cause bloodstream infection has been reduced by 44%.[43]

Despite the efforts in place to address C.diff, rural hospitals have reported barriers to adopting some prevention practices. For example, a survey of rural facilities in Wisconsin reported common barriers to implementing prevention practices included "insufficient resources to adequately implement recommended practices, lack of physician champion, and difficulty keeping up with new recommendations."[44] In addition to the barriers in addressing C.diff, rural hospitals also face barriers in addressing MRSA. In Iowa, rural hospitals reported lack of support from physicians as one of the most common reasons for not having an active surveillance for MRSA.[45] Addressing these barriers is essential to ensure that rural hospitals will be able to implement effective efforts to continue reducing both C.diff and MRSA.

***HC/HIT-D06 Increase the proportion of hospitals with access to necessary electronic information***

The limited availability and accessibility of health information technology poses a challenge for rural hospitals and emergency services. Meaningful use is of particular concern among rural hospitals. Meaningful use can be defined as meeting the staged requirements for providers to demonstrate progressively more integrated use of electronic health records (EHRs) in order to receive incentive payments from the Center for Medicare and Medicaid Services (CMS) under the HITECH Act.[46] It has been reported that small rural hospitals were 13% more likely to skip at

least one year of meaningful use, while critical access hospitals (CAHs, <25 acute care inpatient beds) were 16.4% more likely to skip.[47] Electronic health records uptake varies among rural and urban hospitals. Rural hospitals on average added three EHR functions between 2016 and 2019, compared to urban hospitals which reached almost full functionality by 2019.[48]

Beginning in 2018, CMS renamed the EHR Incentive Programs to the Medicare and Medicaid Promoting Interoperability Programs (PIPs).[49] The new name reflects a change in the program's emphasis away from meaningful use of EHR requirements to a focus on interoperability and improving patient access to health information.[49] Beginning in 2022, the program was renamed Medicare PIP after the Medicaid portion of the program ended.

Despite the benefits associated with health technology and EHR services, there are rural disparities present that stem from a variety of factors. According to the Government Accountability Office, rural providers are less likely to have the financial and technological resources to take part or even maintain electronic exchange capabilities.[50] Furthermore, these programs require a significant investment to purchase, upgrade, and maintain equipment and software.[22] In addition to financial barriers, rural hospitals may not have the available technological infrastructure, like broadband support to achieve meaningful use.[22] It is also worth noting that within rural America, there is a lack of individuals working in the health information technology field, thus resulting in additional barriers to achieving adoption of health technology and associated EHR services.[51]

It is crucial that efforts are in place within rural hospitals to address barriers in adopting and utilizing health information technology. Incorporating this technology has various benefits that would aid in addressing the challenges rural hospitals face. For example, health information technology is beneficial in reducing the barrier of long distances between medical providers by decreasing travel time and assisting rural hospitals in accessing remote clinicians.[52] It can be inferred that travel time decreases as patients' records become more accessible through technology. Likewise, health information technology can also aid in improving disease surveillance, compiling health data, and improving care coordination.[52]

## PART 4. FOLLOW-UP SERVICES

***SUD-02 Increase the proportion of people who get a referral for substance use treatment following emergency department visit***

The issue of substance use is a serious problem in the U.S and is a growing issue for rural Americans. From 1999 to 2019, drug overdose deaths in rural counties increased from four to 19.6 per 100,000 persons.[53] In 2020, the rate of drug overdose deaths was found to be 26.2 deaths per 100,000 population in rural counties.[54]

Along with the growing mortality rate, there has been an escalation in emergency department visits related to opioid misuse. From 2010 to 2017 in rural areas, emergency department visits related to opioid misuse increased from 95.8 to 99.2 per 100,000 population.[55] With the prevalence of substance use and overdose-associated deaths, efforts are needed to provide referrals for treatment following emergency department visits. However, to provide referrals, there are several barriers that must first be addressed, and these barriers can be specific to the parties intended to affect substance use. First, from the provider's perspective, the primary barriers to the referral process noted in a 2018 study were: determining patient eligibility, lack of transparent treatment capacity, knowledge or understanding of options, and communication challenges between the referral source and the substance use treatment facility.[58] Second, from the hospital perspective, among those hospitals that implemented emergency department-based peer services in response to the opioid epidemic their barriers included: integrating peer intervention in the emergency department culture and context, insufficient staffing to meet patient needs, logistical and legal barriers regarding patient privacy, and limited patient transportation options.[56] Lastly, individuals may not communicate their substance misuse to providers because of a fear of legal penalties as well as a lack of anonymity in small communities.[57] There remains considerable stigma for patients as a barrier to the referral process for substance

use disorder (SUD) treatment.[57] Compounding the barriers to the SUD referral process, is the shortage of rural healthcare providers and mental healthcare services.[56]

One way to potentially increase substance use treatment referrals is through the implementation of new information technologies. It has been found that leveraging health information technology as recommended by DHHS may address across-organization barriers to treatment.[58] An electronic platform will ultimately aid in the referral and placement of patients who are in need of treatment in a more efficient manner, and the sooner one enters treatment the likelihood of completing treatment increases.[55] Along with improving integration, telehealth may be seen as an effective tool in substance use treatment and addressing the issue of shortages of providers.[57] Partnering with an external telehealth hub that is continuously available is becoming more common in treatment for substance use disorder.[55]

## POTENTIAL SOLUTIONS

Given how challenging it is to provide healthcare in rural hospital and emergency settings, innovations in health services delivery are needed to overcome rural-based difficulties with access to emergency care, quality of care, and resource availability. Three promising approaches are: aligning medical screening examinations (MSEs) with rural health clinics (RHCs); the introduction of rural emergency hospitals (REHs) as a new provider designation established by the Consolidated Appropriations Act, 2021; and expanding the use of telehealth.

Medical screening examinations are intended to appropriately identify emergency department arrivals who can be treated in a non-emergent setting versus those arrivals who are truly emergent. These MSEs must be consistent with the Emergency Medical Treatment and Labor Act (EMTALA).[59] Aligning the emergency department's MSE to an on-site or affiliated outpatient clinic could improve appropriate access to care.[60] In rural settings, there may be cultural or behavioral shifts to overcome as residents may be accustomed to always seeking care at their local hospital-based emergency department, regardless of the level of care needed. A recent successful application of this initiative was reported for a large regional health system that serves rural communities in the state of Texas.[61]

The Consolidated Appropriations Act of 2021 began accepting applications in 2023 for REHs, a new type of health care provider.[62] The REH designation is available to CAHs and rural acute care hospitals with 50 or fewer beds that agree to eliminate acute care inpatient services. The purpose of the new designation is to provide opportunities for these hospitals to remain open and provide essential services, including emergency, observation, and outpatient services.

In a 2019 study of emergency departments in a group of CAHs, telehealth behavioral health patients experienced a 12-minute average wait time compared to an average of 27 minutes for patients seeing a local provider.[64] The adoption of telehealth is growing throughout the U.S. and became particularly important during the COVID-19 pandemic. Additionally, telemedicine has led to an overall decrease in mortality, inpatient length of stay, and improved patient and provider satisfaction.[65] With the growing benefits of telehealth and telemedicine in rural communities, efforts are needed to expand broadband access along with continued financing for telehealth in these communities.

Limited access to broadband poses a barrier to many rural Americans. Programs like Universal Service Fund, Connect America Fund, and telecommunication grants provide financial support to obtain broadband access.[66] Following the ending of the COVID-19 public health emergency designation, Medicare has continued to pay telehealth services, but starting January 1, 2024, Medicare will go back to the pre-emergency designation.[67] Continuing funding for telehealth services and improving access to broadband internet will allow rural communities to have continued access to telehealth services. Of note, telehealth is discussed in greater detail in Chapter 3 on Rural Healthcare Access and Quality.

## SUMMARY AND CONCLUSION

Rural America continues to face significant challenges in accessing hospital and emergency services. Through various combinations of policy and technology, considerable progress has been

made in the breadth and delivery of services in rural communities. Ironically, the barriers that persist are consequences of being associated with rural regions. The pursuit of improving rural-based hospital and emergency services is made more difficult by limited healthcare resources, low population density, and residents with limited or no health insurance who also tend to have generally poorer health status relative to those in other, primarily urban, geographic areas. Optimistically, the growing and persistent attention being paid to rural America may ultimately lead to lower disparities and fewer challenges. The recognition of the rural-urban gaps coupled with innovations in delivery, such as REHs and telehealth, represent important and significant progress.

## REFERENCES


1. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: new decade, new challenges. *Prev Med Rep*. 2023;33:102176. doi:10.1016/j.pmedr.2023.102176

2. Reduce the proportion of people who can't get medical care when they need it — AHS-04. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed June 1, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care-access-and-quality/reduce-proportion-people-who-cant-get-medical-care-when-they-need-it-ahs-04

3. Fast Facts: U.S Rural Hospitals. American Hospital Association. https://www.aha.org/system/files/media/file/2021/05/infographic-rural-data-final.pdf

4. Greenwood-Ericksen MB, Kocher K. Trends in Emergency Department Use by Rural and Urban Populations in the United States. *JAMA Netw Open*. 2019;2(4):e191919. doi:10.1001/jamanetworkopen.2019.1919

5. Reduce C. diff infections that people get in the hospital — HAI-01. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed June 1, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care-associated-infections/reduce-c-diff-infections-people-get-hospital-hai-01

6. Hospital and Emergency Services. U.S. Department AHA t of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed June 1, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/hospital-and-emergency-services

7. Kassabian M, Shrestha A, Callaghan T, et al. Rural healthy people 2030: common challenges, rural nuances. May 2023. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

8. Schulze A, Bolin JN, Radcliff T. Rural Access to Quality Emergency Services. In: Bolin JN, Bellamy G, Ferdinand AO, et al. eds. *Rural Healthy People 2020*. Vol. 1. College Station, TX: The Texas A&M University Health Science Center, School of Public Health, Southwest Rural Health Research Center; 2015:25-32. https://srhrc.tamu.edu/documents/rhp2020-volume-1.pdf

9. Reduce the proportion of emergency department visits with a longer wait time than recommended — AHS-09. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed June 1, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care-access-and-quality/reduce-proportion-emergency-department-visits-longer-wait-time-recommended-ahs-09

10. Reduce MRSA bloodstream infections that people get in the hospital — HAI-02. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed June 1, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-care-associated-infections/reduce-mrsa-bloodstream-infections-people-get-hospital-hai-02

11. Increase the proportion of hospitals with access to necessary electronic information — HC/HIT-D06. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed June 1, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/health-it/increase-proportion-hospitals-access-necessary-electronic-information-hchit-d06

12. Increase the proportion of people who get a referral for substance use treatment after an emergency department visit — SU-D02. U.S. Department of Health and Human Services Office of Disease Prevention and Health Promotion. Accessed June 1, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/drug-and-alcohol-use/increase-proportion-people-who-get-referral-substance-use-treatment-after-emergency-department-visit-su-d02

13. Definition of an Emergency Service. American College of Emergency Physicians. January 2021. Accessed June 1, 2023. https://www.acep.org/siteassets/new-pdfs/policy-statements/definition-of-an-emergency-service.pdf

14. Estimates of Emergency Department Visits in the United States, 2016-2021. Center for Disease Control and Prevention. National Center for Health Statistics. Last reviewed July 6, 2023. Accessed October 15, 2023. https://www.cdc.gov/nchs/dhcs/ed-visits/index.htm

15. Weiss AJ, Jiang HJ. Most frequent reasons for emergency department visits, 2018. Agency for Healthcare Research and Quality. Statistical Brief #286. December 2021. Accessed October 15, 2023. https://hcup-us.ahrq.gov/reports/statbriefs/sb286-ED-Frequent-Conditions-2018.pdf

16. Evaluating the Utility of Emergency Department Encounter Data and Examining Social Determinants of Emergency Department Utilization in Utah. U.S. Census Bureau. June 8, 2021. Accessed June 1, 2023. https://www.census.gov/library/working-papers/2021/demo/SEHSD-WP2021-07.html

17. Rehnquist J. Hospital Closure: 2000. Department of Health and Human Services. June 2002. Accessed June 1, 2023. https://oig.hhs.gov/oei/reports/oei-04-02-00010.pdf

18. Rural Hospital Closures: Affected Residents Had Reduced Access to Health Care Services. GAO-21-93. US Government Accountability Office. December 22,2020. Accessed October 15, 2023. https://www.gao.gov/products/gao-21-93

19. Villagrana MA, Heisler EJ, Romero PD. Closed, Converted, Merged, and New Hospitals with Medicare Rural Designations: January 2018-November 2022. Congressional Research Service. April 26, 2023. Accessed June 1, 2023. https://sgp.fas.org/crs/misc/R47526.pdf

20. Waldrop T, Gee E. How States Can Expand Health Care Access in Rural Communities. February 9, 2022. Accessed June 1, 2023. https://www.americanprogress.org/article/how-states-can-expand-health-care-access-in-rural-communities/

21. Rural Hospital Closures. Cecil G. Sheps Center for Health Services Research. The University of North Carolina at Chapel Hill. Accessed June 1, 2023. https://www.shepscenter.unc.edu/programs-projects/rural-health/rural-hospital-closures/

22. *Rural Hospital Closures Threaten Access Solutions to Preserve Care in Local Communities.* 2022:10. September 2022. https://www.aha.org/system/files/media/file/2022/09/rural-hospital-closures-threaten-access-report.pdf

23. Wishner J, Solleveld P, Rudowitz R, Paradise J, Antonisse L. A Look at Rural Hospital Closures and Implications for Access to Care: Three Case Studies. Kaiser Family Foundation. July 7, 2016. https://www.kff.org/medicaid/issue-brief/a-look-at-rural-hospital-closures-and-implications-for-access-to-care/

24. Falconnier J, Hecht M. Rural Counties Face Hospital Closures, The Economics of Medical Care Outside of Cities. Texas Comptroller of Public Accounts Office of Glenn Hegar. October 2022. Accessed June 1, 2023. https://comptroller.texas.gov/economy/fiscal-notes/2022/oct/hospitals.php

25. Carroll C, Euhus R, Beaulieu N, Chernew ME. Hospital survival in rural markets: closures, mergers, and profitability. *Health Aff (Millwood).* 2023;42(4):498-507. doi:10.1377/hlthaff.2022.01191

26. Akinlotan M, Primm K, Khodakarami N, Bolin J, Ferdinand A. Rural-urban variations in travel burdens for care: findings from the 2017 National Household Travel Survey. 2021. Policy Brief. Southwest Rural Health Research Center. https://srhrc.tamu.edu/publications/travel-burdens-07.2021.pdf

27. Levinson Z, Godwin J, Hulver S. Rural Hospitals Face Renewed Financial Challenges, Especially in States That Have Not Expanded Medicaid. Kaiser Family Foundation. February 23, 2023. Accessed June 16, 2023. https://www.kff.org/health-costs/issue-brief/rural-hospitals-face-renewed-financial-challenges-especially-in-states-that-have-not-expanded-medicaid/

28. Savioli G, Ceresa IF, Gri N, et al. Emergency department overcrowding: understanding the factors to find corresponding solutions. *J Pers Med.* 2022;12(2):279. doi:10.3390/jpm12020279

29. National Health Care Surveys. National Center for Health Statistics. NCHS Fact Sheet. June 2019. Accessed October 16, 2023. https://www.cdc.gov/nchs/data/factsheets/factsheet_nhcs.pdf

30. Mell HK, Mumma SN, Hiestand B, Carr BG, Holland T, Stopyra J. Emergency medical services response times in rural, suburban, and urban Areas. *JAMA Surg.* 2017;152(10):983-984. doi:10.1001/jamasurg.2017.2230

31. Morley C, Unwin M, Peterson GM, Stankovich J, Kinsman L. Emergency department crowding: a systematic review of causes, consequences and solutions. *PLoS One.* 2018;13(8):e0203316. doi:10.1371/journal.pone.0203316

32. McHugh M, VanDyke K, McClelland M, Moss D. Improving Patient Flow and Reducing Emergency Department Crowding: A Guide for Hospitals. Agency for Healthcare Research and Quality. Updated July 2018. Accessed June 1, 2023. https://www.ahrq.gov/research/findings/final-reports/ptflow/index.html

33. Tuller D. Ambulance diversion. Health Policy Brief. June 2, 2016. Accessed October 16, 2023. https://www.healthaffairs.org/do/10.1377/hpb20160602.353150/

34. Smalley CM, Meldon SW, Simon EL, Muir MR, Delgado F, Fertel BS. Emergency department patients who leave before treatment is complete. *West J Emerg Med.* 2021;22(2):148-155. doi:10.5811/westjem.2020.11.48427

35. Understanding Emergency Department Wait Times. Texas Health Resources. December 17, 2019. Accessed June 1, 2023. https://www.texashealth.org/areyouawellbeing/Health-and-Well-Being/Understanding-Emergency-Department-Wait-Times

36. Zhou RA, Baicker K, Taubman S, Finkelstein AN. The uninsured do not use the emergency department more-they use other care less. *Health Aff (Millwood).* Dec 2017;36(12):2115-2122. doi:10.1377/hlthaff.2017.0218

37. What is C. diff? Centers for Disease Control and Prevention. Updated September 2, 2022. Accessed June 1, 2023. https://www.cdc.gov/cdiff/what-is.html#:~:text=C.%20diff%20(also%20known%20as,the%20United%20States%20each%20year

38. Antibiotic Resistance Threats in the United States, 2019. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Atlanta, GA: 2019. https://www.cdc.gov/drugresistance/pdf/threats-report/2019-ar-threats-report-508.pdf

39. Petersen MR, Cosgrove SE, Klein EY, et al. Clostridioides difficile prevalence in the United States: National Inpatient Sample, 2016 to 2018. *Open Forum Infect Dis.* 2021;8(9):ofab409. doi:10.1093/ofid/ofab409

40. MRSA Infection. Mayo Clinic. November 8, 2022. Accessed June 1, 2023. https://www.mayoclinic.org/diseases-conditions/mrsa/symptoms-causes/syc-20375336

41. Methicillin-Resistant Staphylococcus Aureus General Information. Centers for Disease Control and Prevention. June 26, 2019. Accessed June 1, 2023. https://www.cdc.gov/mrsa/community/index.html#:~:text=Approximately%205%25%20of%20patients%20in,nose%20or%20on%20their%20skin.&text=Top%20of%20Page-,How%20can%20I%20prevent%20a%20MRSA%20Infection%3F,good%20hand%20and%20body%20hygiene

42. Stephenson B, Lanzas C, Lenhart S, et al. Comparing intervention strategies for reducing Clostridioides difficile transmission in acute healthcare settings: an agent-based modeling study. *BMC Infect Dis.* 2020;20(1):799. doi:10.1186/s12879-020-05501-w

43. Universal ICU Decolonization: An Enhanced Protocol. Content last reviewed September 2013. Agency for Healthcare Research and Quality, Rockville, MD. https://www.ahrq.gov/hai/universal-icu-decolonization/index.html

44. Haun N, Hofer A, Greene MT, et al. Prevention of Clostridium difficile infection in rural hospitals. *Am J Infect Control*. 2014;42(3):311-315. doi:10.1016/j.ajic.2013.09.011

45. McDanel JS, Ward MA, Leder L, et al. Methicillin-resistant Staphylococcus aureus prevention practices in hospitals throughout a rural state. *Am J Infect Control*. 2014;42(8):868-873. doi:10.1016/j.ajic.2014.05.004

46. The Office of the National Coordinator for Health Information Technology. Medicare and Medicaid EHR Incentive Programs Meaningful Use Core Objectives that Address Privacy and Security. Chapter 5. In: *Guide to Privacy and Security of Electronic Health Information*. U.S.: 32-34.

47. Heisey-Grove DM. Variation in rural health information technology adoption and use. *Health Aff (Millwood)*. 2016;35(2):365-370 doi:10.1377/hlthaff.2015.0861

48. Rhoades CA, Whitacre BE, Davis AF. Higher electronic health record functionality is associated with lower operating costs in urban-but not rural-hospitals. *Appl Clin Inform*. 2022;13(3):665-676. doi:10.1055/s-0042-1750415

49. Promoting Interoperability Programs. Center for Medicare and Medicaid Services. Updated September 6 2023. Accessed October 15, 2023. https://www.cms.gov/medicare/regulations-guidance/promoting-interoperability-programs

50. Electronic Health Information Exchange Use Has Increased, But Is Lower for Small and Rural Providers U.S. Government Accountability Office. April 2023. Accessed June 1, 2023. https://www.gao.gov/assets/gao-23-105540.pdf

51. Health Information Technology in Rural Healthcare. Rural Health Information Hub. 2023. https://www.ruralhealthinfo.org/topics/health-information-technology#hit-workforce-issues

52. The Office of the National Coordinator for Health Information Technology (ONC). Benefits for Critical Access Hospitals and Other Small Rural Hospitals. HealthIT.gov. August 30, 2017. Accessed June 1, 2023. https://www.healthit.gov/topic/health-it-health-care-settings/benefits-critical-access-hospitals-and-other-small-rural

53. Hedegaard H, Spencer MR. Urban–rural differences in drug overdose death rates, 1999–2019. NCHS Data Brief, no 403. Hyattsville, MD: National Center for Health Statistics. 2021. doi:10.15620/cdc:102891

54. Spencer MR, Garnett MF, Miniño AM. Urban–rural differences in drug overdose death rates, 2020. NCHS Data Brief, no 440. Hyattsville, MD: National Center for Health Statistics. 2022. doi:10.15620/cdc:118601

55. Need for Substance Use Disorder Programs in Rural Communities. Rural Health Information Hub. February 2016. Accessed June 1, 2023. https://www.ruralhealthinfo.org/toolkits/substance-abuse/1/need

56. Watson DP, Staton MD, Gastala N. Identifying unique barriers to implementing rural emergency department-based peer services for opioid use disorder through qualitative comparison with urban sites. *Addict Sci Clin Pract*. 2022;17(1):41. doi:10.1186/s13722-022-00324-3

57. Barriers to Preventing and Treating Substance Use Disorders in Rural Communities. Rural Health Information Hub. June 2014. Accessed June 1, 2023. https://www.ruralhealthinfo.org/toolkits/substance-abuse/1/barriers

58. Blevins CE, Rawat N, Stein MD. Gaps in the substance use disorder treatment referral process: provider perceptions. *J Addict Med*. 2018;12(4):273-277. doi:10.1097/adm.0000000000000400

59. Emergency Medical Treatment & Labor Act (EMTALA). Centers for Medicare and Medicaid Services. December 5, 2022. Accessed June 1, 2023. https://www.cms.gov/regulations-and-guidance/legislation/emtala

60. Wright B, Potter AJ, Trivedi AN, Mueller KJ. The relationship between rural health clinic use and potentially preventable hospitalizations and

emergency department visits among Medicare beneficiaries. *J Rural Health*. 2018;34(4):423-430.

61. Menser TL, Radcliff TA, Schuller KA. Implementing a medical screening and referral program for rural emergency departments. *J Rural Health*. 2015;31(2):126-134. doi:10.1111/jrh.12085

62. Rural Emergency Hospitals Proposed Rulemaking. Centers for Medicare and Medicaid Services. July 15, 2022. Accessed June 1, 2023. https://www.cms.gov/newsroom/fact-sheets/rural-emergency-hospitals-proposed-rulemaking

63. Gooch K. Texas hospital finds "new identity" as rural emergency hospital. Becker's Hospital CFO Report. June 30, 2023. Accessed October 16, 2023. https://www.beckershospitalreview.com/finance/texas-hospital-finds-new-identity-as-rural-emergency-hospital.html?origin=BHRE&utm_source=BHRE&utm_medium=email&utm_content=newsletter&oly_enc_id=0440E4852312C7U

64. Fairchild RM, Ferng-Kuo SF, Laws S, Rahmouni H, Hardesty D. Telehealth decreases rural emergency department wait times for behavioral health patients in a group of critical access hospitals. *Telemed J E Health*. 2019;25(12):1154-1164. doi:10.1089/tmj.2018.0227

65. Oest SER, Swanson MB, Ahmed A, Mohr NM. Perceptions and Perceived Utility of Rural Emergency Department Telemedicine Services: A Needs Assessment. *Telemed J E Health*. 2020;26(7):855-864. doi:10.1089/tmj.2019.0168

66. Connectivity Considerations for Telehealth Programs. Rural Health Information Hub. 2015. Accessed June 1, 2023. https://www.ruralhealthinfo.org/toolkits/telehealth/4/connectivity

67. Telehealth after the COVID-19 PHE: What's changing and what's staying the same for now. American Academy of Family Physicians. May 18, 2023. Accessed June 1, 2023. https://www.aafp.org/pubs/fpm/blogs/inpractice/entry/covid-phe-end-telehealth.html

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# THE ISSUE OF CHRONIC PAIN IN RURAL AMERICA

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## SCOPE OF THE PROBLEM

- Chronic pain is estimated to cost more than $550 billion dollars in direct medical costs and lost productivity annually.[1,2]
- Rural areas have higher rates of both chronic pain and high-impact chronic pain compared to urban areas.[3,4]
- Chronic pain carries with it a higher risk of mortality and numerous comorbidities, such as mood disorders, risk of addiction, and metabolic syndrome.[5]
- Patients in rural areas are less likely to receive multi-modality intervention for chronic pain, which is the current standard of care.[6]

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Chronic pain is one of the most common medical conditions in the United States (U.S.) and one of the most common reasons patients seek medical care.[7] In 2011, the Institute of Medicine (IOM) published a seminal statement discussing the importance of addressing chronic pain and its consequences. Pain was noted to be universal, affecting more than 100 million Americans, and costing greater than $560 million dollars annually in direct medical expenses and lost productivity.[1] The IOM statement called for improved research related to pain, as well as a population-based strategy for its prevention and management.[1] Chronic pain eclipses the individual annual costs of heart disease, diabetes, and cancer.[2]

Chronic pain is defined as pain lasting longer than three months, the time beyond which normal tissue has healed from an initially painful event.[8] Chronic pain is most commonly delineated as cancer and non-cancer related pain. Common types of non-cancer related pain include chronic low back pain, headache, and arthritis. Chronic pain can also be specified as high-impact chronic pain, which is pain that limits life or work activities on most days. The Healthy People 2030 objectives established for chronic pain target this type of limiting chronic pain.[9]

Chronic pain is a pressing medical issue due not only to the direct and indirect medical costs, but also due to the personal suffering of individuals. Chronic pain may uniquely affect *rural* residents due to specific demographic risk factors related to geographic location (e.g., older residents, lower socioeconomic status)[10] or reduced access to appropriate medical care (e.g., lack of transportation, increased travel distance, limited resources).[11,12] In a recent web-based survey of rural stakeholders, 17.7% of the 1,291 respondents identified chronic pain as one of the "top 10" priorities for rural Americans.[13,14] This ranked chronic pain as the 20th most important rural health priority. Related survey topics found in the top 20 rankings were mental health (1st), addiction (2nd), and drug and alcohol use (5th).

## RELEVANT HEALTHY PEOPLE 2030 GOALS AND OBJECTIVES

Through its Healthy People initiatives, the U.S. Department of Health and Human Services identifies collective goals every 10 years to improve the health and well-being of Americans. Among its current priorities, Healthy People 2030 states that its overall goal for the health condition **chronic pain** is to "reduce chronic pain and misuse of prescription pain relievers."[9] The specific Healthy People 2030 objectives related to this chronic pain goal can be categorized into three areas: (1) reducing chronic pain and its impacts (i.e., high-impact chronic pain), including arthritis pain; (2) increasing chronic pain self-management; and (3) reducing the proportion of people who misuse (or start misusing) opioids.[9]

This chapter will address chronic pain as it relates to *rural* Americans. Risk factors for chronic pain and arthritis are examined, and a robust historical perspective on chronic pain treatment in the U.S. concludes the chapter. (Of note, opioid use is covered more fully in Chapter 2 on addiction and Chapter 5 on drug and alcohol use.) The material provided may be relevant to the selected Healthy People 2030 objectives listed below.

- **CP-01**: Reduce the proportion of adults with chronic pain that frequently limits life or work activities
- **A-01**: Reduce the proportion of adults with arthritis who have moderate or severe joint pain
- **CP-D01**: Increase self-management of limiting chronic pain
- **SU-19**: Reduce the proportion of people who misused prescription opioids in the past year
- **SU-20**: Reduce the proportion of people who started misusing prescription opioids in the past year

## ARTHRITIS

In rural America, arthritis is a condition that impacts approximately one in three adults.[15] This condition is a leading cause of disability and a comorbidity to chronic pain.[15,16] The rates of arthritis in rural areas follow previous trends showing a higher prevalence among women, older adults, smokers, adults with less education, adults who are less physically active, and adults with higher body mass indices (BMI).[15] In rural communities, many of these risk factors are already higher than the national average.[17]

Health-related behaviors of rural populations make them more susceptible to arthritis. The prevalence of individuals with higher than recommended BMI, and lower than recommended rates of physical activity is highest in rural areas.[17,18] As mentioned previously, rural areas have a larger aging population than urban areas.[19,20] Aging is a significant risk factor for arthritis as the bones, cartilage, and muscles in the body naturally wear down with time.[21]

The occupations common to rural populations tend to be more physically demanding (e.g., farming and agriculture).[22] The musculoskeletal system wears down drastically with manual labor.[23] Arthritis is the result of this wear and tear and is one of the most prevalent conditions diagnosed to agriculture workers.[24,25] One in three American farmers are affected by arthritis.[26] Further, farmers often have a need to work well past retirement age. This is due to connections with their land and the notion that the longer they work, the longer they will be healthy.[22] As the body naturally degrades, joint issues can happen more easily and more frequently in high intensity work environments.[22]

Arthritis-attributable activity limitation, known as AAAL, impacts 55.3% of persons living in the most rural areas.[15] This measure examines how arthritis impacts exercise, job performance, usual daily activities, or social activities. Not only does arthritis impact these activities, arthritis can lead to further health complications. Joint-related illnesses can decrease physical activity.[27] Subsequently, a sedentary lifestyle due to joint issues may increase risk for cancer, heart disease, diabetes, and other serious conditions.[28]

**Table 1** indicates responses to five arthritis-related questions, stratified by rural-urban residence,[29] from the 2021 Behavioral Risk Factor Surveillance System (BRFSS).[30] Of those BRFSS respondents living in rural areas, just over 38% reported that they have been told by a healthcare professional that they have one of five diseases – arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia (HAVARTH5) – compared to 32% of the respondents that lived in urban areas. Fewer of the rural respondents (63.25%), compared to urban respondents (67.41%), reported that a healthcare professional had suggested exercise to relieve their arthritis or joint symptoms (ARTHEXER). More urban dwellers (14.57%) reported that they had taken a class to learn about managing their arthritis than people living in rural areas (12.38%).

## RISK FACTORS FOR CHRONIC PAIN IN SPECIFIC POPULATIONS

Best viewed as its own clinical disease entity, as opposed to only a syndrome, chronic pain is a biopsychosocial disease with complex interplay between physical injury, psychological risk factors, substance use disorders, developmental

Table 1. Rural-Urban Responses to Arthritis-related Questions from the 2021 BRFSS Survey

| Variable | % of Rural Respondents Who Said "Yes" | % of Urban Respondents Who Said "Yes" |
|---|---|---|
| **HAVARTH5**: Has a doctor, nurse or other health professional ever told you that you had some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia? | 38.04% | 32.01% |
| **ARTHEXER**: Has a doctor or other health professional ever suggested physical activity or exercise to help your arthritis or joint symptoms? | 63.25% | 67.41% |
| **ARTHEDU**: Have you ever taken an educational course or class to teach you how to manage problems related to your arthritis or joint symptoms? | 12.38% | 14.57% |
| **LMTJOIN3**: Are you now limited in any way in any of your usual activities because of arthritis or joint symptoms? | 42.61% | 41.35% |
| **ARTHDIS2**: Do arthritis or joint symptoms now affect whether you work, the type of work you do or the amount of work you do? | 30.51% | 27.22% |

*Source: Original analyses of the 2021 BRFSS*

experiences, and current life stressors. In terms of prevalence, population-based studies demonstrate that 11% to 40% of adults in the U.S. suffer from chronic pain,[4,7] with the best estimate being 20.4% of adults, or approximately 50 million people. An estimated 8% of adults, or 19.6 million people, report high-impact chronic pain.[4,7]

Chronic pain is more common in women than men (34.3% versus 26.7% according to one study)[31] and seems to increase with age.[32-34] In agreement with these findings, a 2020 study by Zelaya et al. demonstrated that chronic pain was highest among women, non-Hispanic White adults, and adults over age 65 years of age.[3] The same study showed high-impact chronic pain was highest among women and geriatric patients.[3]

Persons with lower household income have greater odds of reporting chronic pain compared to persons with higher reported income.[34] In agreement, patients with financial concerns are significantly more likely to suffer from chronic pain.[35] Related risk factors included: poverty, rurality, previously but not currently employed, and those with public health insurance.[4] Household wealth and socioeconomic status are inversely related to prevalence of high-impact chronic pain, regardless of race.[36] People with a bachelor's degree or higher education are less likely to report chronic pain.[4]

Mental illness is also a significant risk factor for chronic pain. Those suffering from mental disorders are more likely to report chronic pain compared with the general population.[37] Depression and anxiety, for example, are common psychological disorders experienced by persons with chronic pain lasting longer than one year.[38,39]

## RURAL-URBAN DISPARITIES

A study of North Carolina residents demonstrated a higher prevalence of chronic pain in rural patients compared with urban residents.[20] Estimates of chronic pain and high-impact chronic pain have been reported to increase in prevalence as location becomes progressively more rural.[3] There are multiple factors that may contribute to this increased rural prevalence. Chronic pain can be the result of employment in jobs that place workers at higher rates of both acute and overuse injuries, such as manufacturing and agriculture, which support many rural residents and communities.[40] Residents in rural areas are more likely to work these or other manual labor jobs that are physically demanding, injury-prone, and therefore more likely to lead to chronic pain.[41] Rural populations are, on average, older than

urban populations, increasing the age-related risk for prevalence of chronic pain.[42]

In addition, rural populations suffer from significant primary care shortages that may lead to neglected injuries and subsequent chronic pain.[41] In terms of treatment for chronic pain, residents in rural areas were less likely to use nonpharmacologic strategies and multimodality therapies for chronic pain compared with urban residents.[20] Of concern, rural residents are more likely to be prescribed opiates for chronic pain compared to urban counterparts.[43-45]

## VARIATION BY RACE AND ETHNICITY

Recent data suggests chronic pain and high-impact chronic pain have the highest incidence in White populations.[3] In terms of management of acute pain, multiple studies conclude that there are racial disparities in care.[46-48] Evidence in chronic pain is contradictory, however, with many studies suggesting disparity,[49-51] some demonstrating that ethnic minorities are less likely to be prescribed opiates,[49,52-54] and another study demonstrating increased prescribing for ethnic minorities.[43]

Regardless of the current data, the Centers for Disease Control (CDC) notes that there are long-standing disparities in the treatment of pain for communities of color and that there is "substantial opportunity" for the improvement of care in this area.[8] Further research should be undertaken related to this critical issue. New research utilizing electronic health record data would help overcome the limitations of patient-reported data[43] in accordance with the National Institute of Health's National Pain Strategy.[7]

## MORBIDITY AND MORTALITY

Patients with chronic pain suffer from multiple comorbidities. Mental health disorders, for example, are significantly more prevalent in patients with chronic pain.[55] Risk of suicide is increased in patients with chronic pain.[56] Besides psychiatric comorbidity, at least one large study demonstrated increased numbers of cardiovascular risk factors in patients with chronic pain.[57]

Multiple studies demonstrate that various types of chronic pain are associated with increased mortality.[58-63] This increased risk of mortality may be influenced by lifestyle factors associated with chronic pain, such as smoking, obesity, sedentary lifestyle, and stress.[64] Functional limitations and inactivity seem to mediate the increased risk.[61]

## BARRIERS TO CARE

There are multiple barriers for the care of chronic pain in rural areas. Patients are less likely to have higher educational attainment, more likely to be of lower socioeconomic status, less likely to be insured, and may have difficulties with transportation.[8] Medical services may simply not be available in some rural areas,[8] and the ability to utilize nonpharmacologic therapies is often impossible.[8,43] There is a lack of complementary self-management options for chronic pain in rural settings[6] which further detracts from the availability of multimodality treatments.

## HISTORY OF CHRONIC PAIN TREATMENT

In order to understand the current status of chronic pain treatment in rural America, it is important to first understand the history of chronic pain and its treatment in the U.S., especially as it relates to opioid use.[65]

Multidisciplinary pain treatment has been the main tenet of chronic pain management since the mid-1900s after John Bonica, an anesthesiologist, noted that his own individual management of chronic pain was unsatisfactory and began including other specialties.[65] This subsequently led to a recommendation for the establishment of interdisciplinary pain centers for management of chronic pain.[66] These guidelines recommended staffing with at least two physicians, a psychologist, a physical therapist, and any additional providers needed to serve the specific needs of the local population.[67]

These multidisciplinary pain clinics were deemed a success and had durable results for up to 13 years.[68-71] However, due to changing reimbursements related to the requirement of current procedural terminology (CPT) codes, multidisciplinary care became markedly less lucrative than both procedural care and free-standing opioid-based clinics.[65] Primarily due to the financial issues, the majority of

multidisciplinary pain centers were closed in the 1970s and 1980s.

At the same time that multidisciplinary care was decreasing, the long-standing skepticism among physicians concerning the use of opioids in chronic pain was waning. "Pain, the Fifth Vital Sign" was a campaign by the American Pain Society (APS) and called for a change around the use of opioids; the Veterans Health Administration adopted the initiative and lent credence to the campaign.[72] Subsequently, the Joint Commission on the Accreditation of Healthcare Organizations mandated the assessment and treatment of pain in all patients as a prerequisite for receiving federal healthcare dollars.[73-75]

The APS campaign was combined with several other factors that lead to increases in opioid prescribing. The Federation of State Medical Boards and the Drug Enforcement Agency issued statements to be more permissive concerning the prescription of opioids as a way to address the fifth vital sign. Two studies, both of which were inadequate to evaluate for the addictive potential of opioids, were used by industry to attempt to address the long-held concern that the use of opioids in the setting of chronic pain would lead to a substance use disorder.[76,77]

Opioid prescribing and opioid use subsequently increased exponentially, with the number of Oxycontin prescriptions going from less than a million per year to over six million per year in the span of five years.[65] Rates of opioid use disorder and opioid overdose subsequently reached epidemic proportions in the U.S. (for additional information see Chapter 2: Addiction). As attempts to curb opioid prescribing were initiated, the number of patients turning to illicit opioids further increased.

In 2016, the CDC released opioid-prescribing guidelines which had unintended consequences for patients. Many health systems, states, and pharmacies enacted new policies that limited opioid prescribing or mandated pain management specialist referral. This led to patients being rapidly tapered off of opioids, or prescriptions simply not being renewed, with significant health risks and consequences such as overdose and mental health disorders.[8] During this time, opioid prescribing decreased significantly for both cancer- and non-cancer-related chronic pain.[78]

In 2022, the CDC released updated guidelines for prescribing opioids for pain. The recommendations concerning chronic pain were significant and directed clinicians to maximize nonopioid and nonpharmacologic treatment options for chronic pain prior to considering opioids. When opioids are being considered, the risks of the treatment must be included in the decision, such as history of overdose, substance use disorder, sleep-disordered breathing, and risk of use concurrent with other sedating medications. The risk versus benefit to the patient should be consistently re-evaluated and if the trial of opioid does not result in the attainment of preset patient goals they should be discontinued in a tapered fashion if physiologic dependence has occurred.

It is important to note that the prescribing of opioids has significant risks. The careful selection of patients who are started on this class of medication is of paramount importance moving forward. Opioids are associated with overdose deaths, other substance use disorders, sexual dysfunction, and fractures.[79] As the dose of these medications increases, so do the risks of overdose, development of a use disorder, and death. There is no definitively safe minimum dosage.[80] Long-term use of opioids (>90 days) significantly increases the risk of opioid use disorder.[81]

Besides the risks, a 2018 study demonstrated that opioids are no more efficacious than nonopioid pharmacologic options in the setting of chronic pain.[82] Indeed, one review noted that no placebo-controlled trial had been conducted to evaluate the effectiveness of long-term opioids.[83]

## EVIDENCE-BASED INTERVENTIONS

Despite the clinical challenge of prescribing opioids, there are excellent multidisciplinary options for patients experiencing chronic pain.

A six-week self-management training program demonstrated good results in a rural, predominantly geriatric, Hispanic population with chronic pain. Sessions were focused on nonpharmacological interventions such as

stretching, self-monitoring, goal setting, massage, nutrition and health literacy, and exercise.[84]

An additional six-week chronic disease self-management program based in rural New York was evaluated and demonstrated similar results. A cohort of more than 300 participants with chronic pain were enrolled. The participants were majority female with some college education and an average age of 65 years. The sessions focused on improving self-efficacy in pain management through physical activity, emotional regulation, and communication skills, as well as pain-specific content such as pacing, stretching, and medication usage. The intervention demonstrated durable improvements at six months in pain disability, depression, and self-efficacy.[85]

A rural study in Alabama of patients with diabetes and chronic pain demonstrated improved pain self-efficacy, functional limitations, and intensity over the 12-month follow up. The cluster-randomized trial included a predominantly African American and female population that received eight telephone-delivered sessions from a peer advisor over 12 weeks. Sessions focused on healthy eating, physical activity, stress management, medication adherence, social support, and interaction with the medical system. The intervention also involved cognitive behavioral therapy directed at replacing negative thoughts.[86]

The use of eHealth technology has become a worthwhile option to explore for providing alternative interventions to reach underserved populations, as well as educate and train professionals in effective chronic pain management.[87]

Other self-management or nonpharmacologic interventions have been noted in the literature and recommended.[88-92] As stated above, many of these interventions, such as small group therapy, cognitive behavioral therapy, physical therapy services, acupuncture, yoga, and chiropractic services are not available in many rural communities and provide actionable goals for the future of care in those settings.

## CONCLUSION

Chronic pain remains a devastatingly common disease in the U.S., with higher prevalence and greater severity in rural areas. Treatment of chronic pain in rural settings presents many challenges, including patient demographics, a lack of available medical resources, a lack of multidisciplinary options, and limitations on current epidemiologic knowledge related to rurality and chronic pain.

Future directions should focus on training providers to not initiate opioid medications inappropriately and to avoid abrupt cessation in patients who have been on opioids for long periods of time without careful counseling and follow up. Availability of multimodality treatment options should be developed in rural areas and additional research related to chronic pain will help elucidate prevention strategies and care solutions effective for rural communities as a vulnerable patient population.

## REFERENCES


1. Institute of Medicine. *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research*. Washington, DC: The National Academies Press; 2011. doi:10.17226/13172

2. Gaskin DJ, Richard P. The economic costs of pain in the United States. *J Pain*. 2012;13(8):715-724. doi:10.1016/j.jpain.2012.03.009

3. Zelaya CE, Dahlhamer JM, Lucas JW, Connor EM. Chronic pain and high-impact chronic pain among U.S. adults, 2019. *NCHS Data Brief*. 2020;(390):1-8.

4. Dahlhamer J, Lucas J, Zelaya, C, et al. Prevalence of chronic pain and high-impact chronic pain among adults — United States, 2016. *MMWR Morb Mortal Wkly Rep*. 2018;67:1001-1006. doi:10.15585/mmwr.mm6736a2

5. Sibille KT, Steingrímsdóttir ÓA, Fillingim RB, et al. Investigating the burden of chronic pain: an inflammatory and metabolic composite. *Pain Res Manag*. 2016;2016:7657329. doi:10.1155/2016/7657329

6. Eaton LH, Langford DJ, Meins AR, Rue T, Tauben DJ, Doorenbos AZ. Use of self-management interventions for chronic pain management: a comparison between rural and

nonrural residents. *Pain Manag Nurs*. 2018;19(1):8-13. doi:10.1016/j.pmn.2017.09.004

7. National Institute of Medicine Interagency Pain Research Coordinating Committee. National Pain Strategy, A Comprehensive Population Health-Level Strategy for Pain. 2016. Accessed April 30, 2023. https://www.iprcc.nih.gov/sites/default/files/documents/NationalPainStrategy_508C.pdf

8. Dowell D, Ragan KR, Jones CM, Baldwin GT, Chou R. CDC clinical practice guideline for prescribing opioids for pain - United States, 2022. *MMWR Recomm Rep*. 2022;71(No. RR-3):1-95. doi:10.15585/mmwr.rr7103a1

9. U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Healthy People 2030 Objectives - Chronic Pain. Accessed April 30, 2023. https://health.gov/healthypeople/objectives-and-data/browse-objectives/chronic-pain

10. Andreyeva E, Wang B. Rural Economic Stability. Chapter 10 in: Ferdinand AO, Bolin JN, Callaghan T, Rochford HI, Lockman A, Johnson NY, eds. *Rural Healthy People 2030*. College Station, TX: Texas A&M University School of Public Health, Southwest Rural Health Research Center; 2023.

11. Callaghan T, Trujillo KL, Lockman A, Falia G. Rural Healthcare Access and Quality. Chapter 3 in: Ferdinand AO, Callaghan T, Bolin JN, Rochford HI, Lockman A, Johnson NY, eds. *Rural Healthy People 2030*. College Station, TX: Texas A&M University School of Public Health, Southwest Rural Health Research Center; 2023.

12. Akinlotan M, Emesomhi E, Kolade F, Udeh M. Transportation in Rural America. Chapter 11. In: Ferdinand AO, Bolin JN, Callaghan T, Rochford HI, Lockman A, Johnson NY, eds. *Rural Healthy People 2030*. College Station, TX: Texas A&M University School of Public Health, Southwest Rural Health Research Center; 2023.

13. Kassabian M, Shrestha A, Callaghan T, et al. Rural healthy people 2030: common challenges, rural nuances. May 2023. Policy Brief. Southwest Rural Health Research Center. Prepared for the Federal Office of Rural Health Policy. https://srhrc.tamu.edu/publications/srhrc-rhp-2030.pdf

14. Callaghan T, Kassabian M, Johnson N, et al. Rural healthy people 2030: new decade, new challenges. *Prev Med Rep*. 2023;33:102176. doi:10.1016/j.pmedr.2023.102176

15. Boring MA, Hootman JM, Liu Y, et al. Prevalence of arthritis and arthritis-attributable activity limitation by urban-rural county classification — United States, 2015. *MMWR Morb Mortal Wkly Rep*. 2017;66:527–532. doi:10.15585/mmwr.mm6620a2

16. Barbour KE, Helmick CG, Boring M, Brady TJ. Vital signs: prevalence of doctor-diagnosed arthritis and arthritis-attributable activity limitation — United States, 2013–2015. *MMWR Morb Mortal Wkly Rep*. 2017;66:246–253. doi:10.15585/mmwr.mm6609e1

17. Matthews KA, Croft JB, Liu Y, et al. Health-related behaviors by urban-rural county classification — United States, 2013. *MMWR Surveill Summ*. 2017;66(No. SS-5):1–8. doi:10.15585/mmwr.ss6605a1

18. Lundeen EA, Park S, Pan L, O'Toole T, Matthews K, Blanck HM. Obesity prevalence among adults living in metropolitan and nonmetropolitan counties - United States, 2016. *MMWR Morb Mortal Wkly Rep*. 2018;67(23):653-658. doi:10.15585/mmwr.mm6723a1

19. Cohen SA, Greaney ML. Aging in Rural Communities [published online ahead of print, 2022 Nov 9]. *Curr Epidemiol Rep*. 2022;1-16. doi:10.1007/s40471-022-00313-9

20. Rafferty AP, Luo H, Egan KL, Bell RA, Gaskins Little NR, Imai S. Rural, suburban, and urban differences in chronic pain and coping among adults in North Carolina: 2018 Behavioral Risk Factor Surveillance System. *Prev Chronic Dis*. 2021;18:E13. doi:10.5888/pcd18.200352

21. Roberts S, Colombier P, Sowman A, et al. Ageing in the musculoskeletal system. *Acta Orthop*. 2016;87(sup363):15-25. doi:10.1080/17453674.2016.1244750

22. Tonelli S, Culp K, Donham K. Work-related musculoskeletal disorders in senior farmers: safety and health considerations. *Workplace Health Saf*. 2014;62(8):333-341. doi:10.1177/216507991406200804.

23. Lunde, LK., Koch, M., Knardahl, S. et al. Musculoskeletal health and work ability in physically demanding occupations: study protocol for a prospective field study on construction and health care workers. *BMC Public Health*. 2014;14:1075. doi:10.1186/1471-2458-14-1075

24. Webber EJ, Tran T, June R, et al. WOMAC score and arthritis diagnosis predict decreased agricultural productivity. *BMC Musculoskelet Disord*. 2021;22(1):181. doi:10.1186/s12891-021-04041-x

25. Grisso R, Mariger SC. Virginia Cooperative Extension, Virginia State University. Arthritis and Farming. 2020. Accessed May 16, 2023. https://vtechworks.lib.vt.edu/bitstream/handle/10919/98296/BSE-317.pdf?sequence=1&isAllowed=y

26. Gibson ES. Arthritis Pain: All Too Common Among Farmers. The University of Maine AgrAbility Blog. September 8, 2020. Accessed May 16, 2023. https://extension.umaine.edu/agrability/2020/09/08/arthritis-pain-all-too-common-among-farmers/#:~:text=In%20simplest%20terms%2C%20arthritis%20is,and%20one%20in%20three%20farmers

27. Guglielmo D, Murphy LB, Boring MA, et al. State-specific severe joint pain and physical inactivity among adults with arthritis — United States, 2017. *MMWR Morb Mortal Wkly Rep*. 2019;68:381-387. doi:10.15585/mmwr.mm6817a2

28. Patterson R, McNamara E, Tainio M, et al. Sedentary behavior and risk of all-cause, cardiovascular and cancer mortality, and incident type 2 diabetes: a systematic review and dose response meta-analysis. *Eur J Epidemiol*. 2018;33(9):811-829. doi:10.1007/s10654-018-0380-1

29. NCHS Urban-Rural Classification Scheme for Counties. Centers for Disease Control and Prevention. Updated June 1, 2017. Accessed April 30, 2023. https://www.cdc.gov/nchs/data_access/urban_rural.htm

30. 2021 BRFSS Questionnaire. Centers for Disease Control and Prevention. June 8, 2022. Accessed April 30, 2023. https://www.cdc.gov/brfss/questionnaires/pdf-ques/2021-brfss-questionnaire-1-19-2022-508.pdf

31. Johannes CB, Le TK, Zhou X, Johnston JA, Dworkin RH. The prevalence of chronic pain in United States adults: results of an Internet-based survey. *J Pain*. 2010;11(11):1230-1239. doi:10.1016/j.jpain.2010.07.002

32. Rustoen T, Wahl AK, Hanestad BR, Lerdal A, Paul S, Miaskowski C. Age and the experience of chronic pain: differences in health and quality of life among younger, middle-aged, and older adults. *Clin J Pain*. 2005;21(6):513-523. doi:10.1097/01.ajp.0000146217.31780.ef

33. Tsang A, Von Korff M, Lee S, et al. Common chronic pain conditions in developed and developing countries: gender and age differences and comorbidity with depression-anxiety disorders. *J Pain*. 2008;9(10):883-891. doi:10.1016/j.jpain.2008.05.005

34. Shmagel A, Foley R, Ibrahim H. Epidemiology of chronic low back pain in U.S. adults: data From the 2009-2010 National Health and Nutrition Examination Survey. *Arthritis Care Res (Hoboken)*. 2016;68(11):1688-1694. doi:10.1002/acr.22890

35. Weissman JD, Russell D, Taylor J. The relationship between financial stressors, chronic pain, and high-impact chronic pain: findings from the 2019 National Health Interview Survey. *Public Health Rep*. 2023;138(3):438-446. doi:10.1177/00333549221091786

36. Janevic MR, McLaughlin SJ, Heapy AA, Thacker C, Piette JD. Racial and socioeconomic disparities in disabling chronic pain: findings from the health and retirement study. *J Pain*. 2017;18(12):1459-1467. doi:10.1016/j.jpain.2017.07.005

37. McWilliams LA, Cox BJ, Enns MW. Mood and anxiety disorders associated with chronic pain: an examination in a nationally representative sample. *Pain*. 2003;106(1):127-133. doi:10.1016/S0304-3959(03)00301-4

38. Oliveira DS, Vélia Ferreira Mendonça L, Sofia Monteiro Sampaio R, Manuel Pereira Dias de Castro-Lopes J, Ribeiro de Azevedo LF. The impact of anxiety and depression on the outcomes of chronic low back pain multidisciplinary pain management-a multicenter prospective cohort study in pain clinics with one-year follow-up. *Pain*

*Med*. 2019;20(4):736-746. doi:10.1093/pm/pny128

39. IsHak WW, Wen RY, Naghdechi L, et al. Pain and depression: a systematic review. *Harv Rev Psychiatry*. 2018;26(6):352-363. doi:10.1097/HRP.0000000000000198

40. Laughlin L. Beyond the Farm: Rural Workers in America. United States Census Bureau. December 8, 2016. Accessed April 30, 2023. https://www.census.gov/newsroom/blogs/random-samplings/2016/12/beyond_the_farm_rur.html

41. Rigg KK, Monnat SM, Chavez MN. Opioid-related mortality in rural America: geographic heterogeneity and intervention strategies. *Int J Drug Policy*. 2018;57:119-129. doi:10.1016/j.drugpo.2018.04.011

42. Kusmin L. Rural America at a Glance, 2013 Edition. United States Department of Agriculture Economic Research Service. November 2013. Accessed April 30, 2023. https://www.ers.usda.gov/publications/pub-details/?pubid=42887

43. Prunuske JP, St Hill CA, Hager KD, et al. Opioid prescribing patterns for non-malignant chronic pain for rural versus non-rural U.S. adults: a population-based study using 2010 NAMCS data. *BMC Health Serv Res*. 2014;14:563. doi:10.1186/s12913-014-0563-8

44. Goode AP, Freburger JK, Carey TS. The influence of rural versus urban residence on utilization and receipt of care for chronic low back pain. *J Rural Health*. 2013;29(2):205-214. doi:10.1111/j.1748-0361.2012.00436.x

45. Hoffman PK, Meier BP, Council JR. A comparison of chronic pain between an urban and rural population. *J Community Health Nurs*. 2002;19(4):213-224. doi:10.1207/S15327655JCHN1904_02

46. Johnson JD, Asiodu IV, McKenzie CP,et al. Racial and ethnic inequities in postpartum pain evaluation and management. *Obstet Gynecol*. 2019;134(6):1155-1162. doi:10.1097/aog.0000000000003505

47. Goyal MK, Kuppermann N, Cleary SD, Teach SJ, Chamberlain JM. Racial disparities in pain management of children with appendicitis in emergency departments. *JAMA Pediatr*. 2015;169(11):996-1002. doi:10.1001/jamapediatrics.2015.1915

48. Lee P, Le Saux M, Siegel R, et al. Racial and ethnic disparities in the management of acute pain in U.S. emergency departments: meta-analysis and systematic review. *Am J Emerg Med*. 2019;37(9):1770-1777. doi:10.1016/j.ajem.2019.06.014

49. Hausmann LRM, Gao S, Lee ES, Kwoh KC. Racial disparities in the monitoring of patients on chronic opioid therapy. *Pain*. 2013;154(1):46-52. doi:10.1016/j.pain.2012.07.034

50. Majedi H, Dehghani SS, Soleyman-Jahi S, et al. Assessment of factors predicting inadequate pain management in chronic pain patients. *Anesth Pain Med*. 2019;9(6):e97229. doi:10.5812%2Faapm.97229

51. Schieber LZ, Guy GP Jr, Seth P, Losby JL. Variation in adult outpatient opioid prescription dispensing by age and sex - United States, 2008-2018. *MMWR Morb Mortal Wkly Rep*. 2020;69:298-302. doi:10.15585/mmwr.mm6911a5

52. Shavers VL, Bakos A, Sheppard VB. Race, ethnicity, and pain among the U.S. adult population. *J Health Care Poor Underserved*. 2010;21(1):177-220. doi:10.1353/hpu.0.0255

53. Pletcher MJ, Kertesz SG, Kohn MA, Gonzales R. Trends in opioid prescribing by race/ethnicity for patients seeking care in U.S. emergency departments. *JAMA*. 2008;299(1):70-78. doi:10.1001/jama.2007.64

54. Terrell KM, Hui SL, Castelluccio P, Kroenke K, McGrath RB, Miller DK. Analgesic prescribing for patients who are discharged from an emergency department. *Pain Med*. 2010;11(7):1072-1077. doi:10.1111/j.1526-4637.2010.00884.x

55. Gjerede LC, Skurtveit S, Handal M, et al. Mental disorder prevalence in chronic pain patients using opioid versus non-opioid analgesics: a registry-linkage study. 2023;27(7):884-895. doi:10.1002/ejp.2121

56. Pergolizzi JV, Passik S, LeQuang JA, et al.

The risk of suicide in chronic pain patients. 2018;3(3):1-11. doi:10.15761/NPC.1000189

57. Goodson NJ, Smith BH, Hocking LJ, et al. Cardiovascular risk factors associated with the metabolic syndrome are more prevalent in people reporting chronic pain: results from a cross-sectional general population study. *Pain*. 2013;154(9):1595-1602. doi:10.1016/j.pain.2013.04.043

58. Vartiainen P, Roine RP, Kalso E, Heiskanen T. Worse health-related quality of life, impaired functioning and psychiatric comorbidities are associated with excess mortality in patients with severe chronic pain. *Eur J Pain*. 2022;26(5):1135-1146. doi:10.1002/ejp.1938

59. Macfarlane GJ, Barnish MS, Jones GT. Persons with chronic widespread pain experience excess mortality: longitudinal results from UK Biobank and meta-analysis. *Ann Rheum Dis*. 2017;76(11):1815-1822. doi:10.1136/annrheumdis-2017-211476

60. McBeth J, Symmons DP, Silman AJ, et al. Musculoskeletal pain is associated with a long-term increased risk of cancer and cardiovascular-related mortality. *Rheumatology*. 2009;48(4):459. doi:10.1093/rheumatology/ken424

61. Smith D, Wilkie R, Croft P, Parmar S, McBeth J. Pain and mortality: mechanisms for a relationship. *Pain*. 2018;159(6):1112-1118. doi:10.1097/j.pain.0000000000001193

62. Torrance N, Elliott AM, Lee AJ, Smith BH. Severe chronic pain is associated with increased 10 year mortality. A cohort record linkage study. *Eur J Pain*. 2010;14(4):380-386. doi:10.1016/j.ejpain.2009.07.006

63. Zhu K, Devine A, Dick IM, Prince RL. Association of back pain frequency with mortality, coronary heart events, mobility, and quality of life in elderly women. *Spine (Phila Pa 1976)*. 2007;32(18):2012-2018. doi:10.1007/s11606-021-06732-6

64. Andersson HI. Increased mortality among individuals with chronic widespread pain relates to lifestyle factors: a prospective population-based study. *Disabil Rehabil*. 2009;31(24):1980-1987. doi:10.3109/09638280902874154

65. Tompkins DA, Hobelmann JG, Compton P. Providing chronic pain management in the "Fifth Vital Sign" Era: historical and treatment perspectives on a modern-day medical dilemma. *Drug Alcohol Depend*. 2017;173(Suppl 1):S11-S21. doi:10.1016/j.drugalcdep.2016.12.002

66. Gatchel RJ, McGeary DD, McGeary CA, Lippe B. Interdisciplinary chronic pain management: past, present, and future. *Am Psychol*. 2014;69(2):119-130. doi:10.1037/a0035514

67. International Association for the Study of Pain. Task Force on Guidelines for Desirable Characteristics for Pain Treatment Facilities. *Desirable Characteristics for Pain Treatment Facilities; And, Standards for Physician Fellowship in Pain Management*. The Association; 1990.

68. Flor H, Fydrich T, Turk DC. Efficacy of multidisciplinary pain treatment centers: a meta-analytic review. *Pain*. 1992;49(2):221-230. doi:10.1016/0304-3959(92)90145-2

69. Kamper SJ, Apeldoorn AT, Chiarotto A, et al. Multidisciplinary biopsychosocial rehabilitation for chronic low back pain: cochrane systematic review and meta-analysis. *BMJ*. 2015;350:h444. doi:10.1136/bmj.h444

70. Roberts AH, Sternbach RA, Polich J. Behavioral management of chronic pain and excess disability: long-term follow-up of an outpatient program. *Clin J Pain*. 1993;9(1):41-48. doi:10.1097/00002508-199303000-00006

71. Patrick LE, Altmaier EM, Found EM. Long-term outcomes in multidisciplinary treatment of chronic low back pain: results of a 13-year follow-up. *Spine (Phila Pa 1976)*. 2004;29(8):850-855. doi:10.1097/00007632-200404150-00006

72. Mularski RA, White-Chu F, Overbay D, Miller L, Asch SM, Ganzini L. Measuring pain as the 5th vital sign does not improve quality of pain management. *J Gen Intern Med*. 2006;21(6):607-612. doi:10.1111/j.1525-1497.2006.00415.x

73. Manchikanti L, Datta S, Derby R, Wolfer LR, Benyamin RM, Hirsch JA, American Pain Society. A critical review of the American Pain Society

clinical practice guidelines for interventional techniques: part 1. Diagnostic interventions. *Pain Physician*. 2010;13(3):E141-E174.

74. Manchikanti L, Fellows B, Ailinani H, Pampati V. Therapeutic use, abuse, and nonmedical use of opioids: a ten-year perspective. *Pain Physician*. 2010;13(5):401-435.

75. Ahmedani BK, Peterson EL, Wells KE, Lanfear DE, Williams LK. Policies and events affecting prescription opioid use for non-cancer pain among an insured patient population. *Pain Physician*. 2014;17(3):205-216.

76. Porter J, Jick H. Addiction rare in patients treated with narcotics. *N Engl J Med*. 1980;302:123. doi:10.1056/NEJM198001103020221

77. Portenoy RK, Foley KM. Chronic use of opioid analgesics in non-malignant pain: report of 38 cases. *Pain*. 1986;25(2):171-186. doi:10.1016/0304-3959(86)90091-6

78. Bandara S, Bicket MC, McGinty EE. Trends in opioid and non-opioid treatment for chronic non-cancer pain and cancer pain among privately insured adults in the United States, 2012-2019. *PLoS One*. 2022;17(8):e0272142. doi:10.1371/journal.pone.0272142

79. Chou R, Turner JA, Devine EB, et al. The effectiveness and risks of long-term opioid therapy for chronic pain: a systematic review for a National Institutes of Health Pathways to Prevention Workshop. *Ann Intern Med*. 2015;162(4):276-286. doi:10.7326/m14-2559

80. Coyle DT, Pratt CY, Ocran-Appiah J, Secora A, Kornegay C, Staffa J. Opioid analgesic dose and the risk of misuse, overdose, and death: a narrative review. *Pharmacoepidemiol Drug Saf*. 2018;27(5):464-472. doi:10.1002/pds.4366

81. Edlund MJ, Martin BC, Russo JE, DeVries A, Braden JB, Sullivan MD. The role of opioid prescription in incident opioid abuse and dependence among individuals with chronic noncancer pain: the role of opioid prescription. *Clin J Pain*. 2014;30(7):557-564. doi:10.1097/ajp.0000000000000021

82. Krebs EE, Gravely A, Nugent S, et al. Effect of opioid vs nonopioid medications on pain-related function in patients with chronic back pain or hip or knee osteoarthritis pain: the SPACE Randomized Clinical Trial. *JAMA*. 2018;319(9):872-882. doi:10.1001/jama.2018.0899

83. Chou R, Hartung D, Turner J, et al. *Opioid Treatments for Chronic Pain*. Rockville (MD): Agency for Healthcare Research and Quality (US); April 2020.

84. Yin Z, Li S, Ortega C, Bobadilla R, Winkler PL, Hernandez AE, Simmonds MJ. Impacts on patient-centered outcomes of a chronic pain self-management program in a rural community: a feasibility study. *Geriatr Nurs*. 2021;42(5):1198-1203. doi:10.1016/j.gerinurse.2021.06.026

85. Pullyblank K, Brunner W, Scribani M, Krupa N, Wyckoff L, Strogatz D. Evaluation of a peer led chronic pain self-management program in a rural population. *J Prim Care Community Health*. 2022;13:21501319221121464. doi:10.1177/21501319221121464

86. Khodneva Y, Richman, J, Andreae S, Cherrington A, Safford MM. Peer support intervention improves pain-related outcomes among rural adults with diabetes and chronic pain at 12-month follow-up. *J Rural Health*. 2021;37(2):394-405. doi:10.1111/jrh.12422

87. DeMonte CM, DeMonte WD, Thorn BE. Future implications of eHealth interventions for chronic pain management in underserved populations. *Pain Manag*. 2015;5(3):207-214. doi:10.2217/pmt.15.9

88. Sherman KJ, Cherkin DC, Wellman RD, et al. A randomized trial comparing yoga, stretching, and a self-care book for chronic low back pain. *Arch Intern Med*. 2011;171(22):2019-2026. doi:10.1001/archinternmed.2011.524

89. Wetherell JL, Afari N, Rutledge T, et al. A randomized, controlled trial of acceptance and commitment therapy and cognitive-behavioral therapy for chronic pain. *Pain*. 2011;152(9):2098-2107. doi:10.1016/j.pain.2011.05.016

90. Williams AC, Eccleston C, Morley S. Psychological therapies for the management of chronic pain (excluding headache) in adults. *Cochrane Database Syst Rev*. 2012;11(11):CD007407.

doi:10.1002/14651858.cd007407.pub3

91. Skelly AC, Chou R, Dettori JR, et al. *Noninvasive Nonpharmacological Treatment for Chronic Pain: A Systematic Review Update.* Rockville (MD): Agency for Healthcare Research and Quality (US); April 2020.

92. Allen KD, Woolson S, Hoenig HM, et al. Stepped exercise program for patients with knee osteoarthritis: a randomized controlled trial. Ann Intern Med. 2021;174(3):298-307. doi:10.7326/m20-4447

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