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ABSTRACT

Context & Objective: Written a decade ago, the 2015 Rural Active Living: A Call to Action (published in 2016) described rural-specific efforts in the fields of active living and physical activity (PA) and identified 8 recommendations to guide rural active living research and practice. Given that rural populations continue to experience a higher burden of PA-related chronic health conditions, the objective of this review was to revisit the 8 Rural Active Living Calls to Action, reassess the evidence base, summarize advances in each area, and identify emerging areas that warrant examination or further study.

Methods: We leveraged expertise from researchers and practitioners within the CDC-funded Physical Activity Policy Research and Evaluation Network Rural Active Living Workgroup and reviewed literature published since the original call to action. Teams were formed for each of the original 8 calls to action. Each team reviewed the literature, synthesized findings, and developed recommendations for future research.

Results: Academic and practice-based progress was evident across multiple of the original calls to action. Despite these findings, the need persists for rural-specific national surveillance data scaled to small geographies (census tract and block group) that accounts for differences within and across rural communities, various forms of rural governance, and how these factors interplay with active living opportunities. Six emerging areas of research (best practices, social issues, COVID-19 effects, collaboration, implementation science, and implications of rural health-related funding changes) are discussed and warrant further study.

Conclusions: In summarizing progress since the original Call to Action, we recommend strategies to continue advancing rural active living and identify emerging focus areas.

KEY WORDS: physical activity, health, resource accessibility, policy, systems, environment, ecological model, rural, remote, small town, narrative review

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Introduction

People living in rural environments in the United States (US) experience higher rates of chronic conditions,¹ such as high cholesterol, high blood pressure, type 2 diabetes, and heart disease, compared to their urban counterparts.² For example, the obesity rate for US adults living in nonmetropolitan areas was 34.2% in 2016, with rates in metropolitan areas notably less (28.7%).³ Physical activity (PA) is an important modifiable risk factor for many chronic diseases, yet PA rates are low among rural residents of all ages.^{4–7} For instance, in 2017, only 19.6% of rural adults met US PA guidelines (engaging in at least 150 minutes of moderate or 75 minutes of vigorous intensity aerobic activity per week, with 2 days per week of muscle strengthening activities) compared to 25.3% of adults living in urban areas.^{8,9} Rural Healthy People 2030 also describes regional differences in PA across rural America, noting that these trends often follow obesity trends, with 14.7% of Southern, 19.9% of Midwestern, 24.2% of Northeastern, and 25.4% of Western rural-residing US adults meeting PA guidelines.¹⁰ Burgeoning research shows that lower PA rates in rural communities is likely due to lack of access to PA resources, spaces, and opportunities.^{10,11} To address rural–urban differences in PA and active living, rural-centered active living research and initiatives are needed.^{12–14}

Almost a decade has passed since the publication of “Rural Active Living: A Call to Action,” which assessed the evidence base for an ecological model of active living for rural populations and outlined key scientific gaps that inhibited the development and application of solutions.¹⁵ Results of this work described existing rural-specific efforts in the active living field, identified areas that needed to be addressed to mobilize rural

active living researchers and practitioners,¹⁵ and refined and expanded conceptual models by Sallis et al¹⁶ and Yousefian et al¹⁷ to advance a more comprehensive rural active living research model. At the time of writing this paper, Google Scholar identified 118 published articles citing the “Rural Active Living: A Call to Action,” supporting its utility in the fields of rural active living and rural health research. Given its use to date, continued development of PA interventions in rural America,¹⁸ and widening rural–urban, PA-related chronic disease differences,^{19–21} there is a need to provide an updated review on advancements in the rural active living field. Therefore, the objective of this 10-year review was to reassess the evidence-base of an ecological model of active living for rural populations, summarize advances in each area, and identify emerging rural active living research and practice opportunities that warrant further study and collaboration.

Methods

Narrative review with expert consultation and assessment of emerging evidence

Experts were recruited from the Rural Active Living Workgroup of the Physical Activity Policy Research and Evaluation Network (PAPREN) to develop and update each call to action (hereafter: section) from the original *Call to Action*.¹⁵ These section leads were selected based on topical expertise and involvement in past efforts to develop rural active living recommendations. Supporting authors were invited through the PAPREN Workgroup listserv or by recommendation of the section lead. Each section lead convened

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We selected a priori methodology to harness the vast expertise of the Rural Active Living Work Group of PAPREN to summarize the 10-year review and provide contextual expertise, resulting in 31 active coauthors. Each coauthor was involved in at least one paper section, some multiple paper sections, summarizing current literature and advances in that section, while also identifying emerging areas for future consideration. In addition, all coauthors provided a critical content review of the finalized paper prior to this submission. The first author (MRUM), the second author (MEW), and last author (CGA) each co-lead at least one section of the paper; collaborated to write the introduction, methods, and initial discussion drafts; synthesized and structured the entirety of the paper; provided iterative critical reviews throughout the manuscript development process to ensure consistency; and led requested revisions.

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meetings with coauthors to refine the original *Call to Action* and identify emerging areas of research and practice by conducting a narrative review of the academic and gray literature.

Combined with expert consultation, a narrative review was conducted for each *Call to Action* section in this manuscript using PubMed and Google Scholar to include academic and gray literature published since the original *Call to Action* was written in 2015 (accepted in June 2015, published in January 2016).²²⁻²⁴ A narrative (nonsystematic) approach was selected to allow for a comprehensive synthesis of diverse types of literature, including empirical studies, theoretical frameworks, and practice-based insights, that may not easily be captured using strict systematic methods.²⁴ This approach allowed experts in rural active living to interpret and synthesize key developments since the original *Call to Action* and to highlight practical policy-relevant insights that may not yet be reflected in the peer-reviewed literature. Within each of the 8 call to action sections, workgroups included combinations of the following search topics: PA, rural, rural active living, urban-rural health differences in PA, research methods for conducting rural health and PA research (including participatory and qualitative approaches), recruitment of underserved populations experiencing low access to health resources, rural classification systems, and ecological models for active living. Search results were sent to all section members, who reviewed and identified relevant studies and provided additional references for consideration. Findings from existing studies were synthesized by section members, overseen by section leads.

Recommendations for research and practice application

Members of each section assessed and synthesized the existing evidence for each *Call to Action* and then identified salient knowledge gaps. Future directions for each section were determined via discussion and consensus. Specifically, consensus was used to identify areas where additional research and practice-based evidence were needed to advance rural active living, and to identify established methods for conducting such research.

Document development

Section leads sent drafts to the first 2 authors who assembled and edited each group's section drafts into a single document. The final manuscript was returned to all authors for review. Iterative cycles of revision and feedback followed until all authors reached consensus.

Results

The original "Rural Active Living: A Call to Action" concluded with 8 recommendations to inform future research and practice (see Table 1).¹⁵

In each of the following sections, one for each of the original 8 *Call to Action* recommendations,¹⁵ we outline updates and advancements and summarize the literature since the original article was written and provide updated recommendations for each call.

Call to action 1: refine rural definitions

The precise definition of "rurality" remains elusive in rural active living research, with most rural classification systems defining rural according to their proximity to urban areas or centers.¹⁵ However, rural life is not merely the inverse of urban existence; it is a complex composition of low population density, distinctive social systems, and economic dependence on agriculture, resource extraction, or natural amenities.^{25,26} The scholarly dialogue thus pivots toward an imperative question: Is it possible to achieve a comprehensive operationalization of rurality that encompasses its rich and varied dimensions? There is an emerging consensus that we should seek innovative, multilayered methodological frameworks that respect the rural-urban continuum and offer more than mere proximity to metropolitan thresholds as a measure of rurality. Moving beyond simplistic and often inconsistent classifications, these frameworks aim to authentically represent rural America's complexity and provide context-specific insights for active living research.

Since the original *Call to Action*, minimal progress has been made in achieving consensus on a definition of rural places and populations, with many continuing to rely on vague or binary definitions based on a residual "not urban" status often based on definitions used in national datasets.^{27,28} Practitioners and researchers often fail to acknowledge evidence that the classification system used can lead to sub-optimal access to and differences in the distribution of resources or the identification of resources.²⁹ Some studies rely on arbitrary thresholds, such as population size or density, to define rural, further limiting the nuanced understanding of rurality.²⁸ In addition, it is common for scientific studies to define settings as "rural" arbitrarily and fail to apply any rural classification system.³⁰⁻³² This limits the ability to effectively compare scientific studies in rural settings.

Several systems classify rural areas, including the US Census Bureau's urban-rural classification, the Office of Management and Budget's (OMB) metropolitan/

TABLE 1
2016 Rural Active Living: Calls to Action¹⁵

1.	The concept of “rurality” for active living research needs to be systematically defined, operationalized, and empirically tested.
2.	The practice of treating rural settings as “less populated urban areas” does not accurately reflect the unique social, cultural, and environmental contexts of rural communities and thus needs to end.
3.	Rural active living researchers and practitioners need to recognize, understand, and plan for the diversity that exists within the continuum of rurality.
4.	Qualitative studies are needed to better identify and characterize the unique, influential variables in rural environments.
5.	Rural-specific environmental assessment measures need to be developed and empirically tested and validated (eg, Rural Active Living Assessment [RALA] tools, Rural Active Living Perceived Environmental Support Scale [RALPESS]).
6.	Objective measures need to be employed to assess physical activity and sedentary behaviors of rural residents (eg, accelerometers).
7.	Ecological models such as that of Sallis et al ¹⁸ should be used to guide the establishment of a rural-specific evidence base to validate many of the active living domains that have yet to be tested in rural communities.
8.	Rural active living researchers need to partner with local government and other groups to capitalize on natural experiments when they present themselves in rural settings (eg, policy implementation, trail construction) in order to assess the impact of such events before and after implementation.

nonmetropolitan designations, and the USDA’s Urban Influence Codes (UIC) and Rural–Urban Commuting Area (RUCA) codes. Although RUCA codes provide the most granular classification, at the Census tract or ZIP code level, most definitions operate at broader geographic units, limiting their ability to capture local variation.^{33,34} However, efforts to refine rural definitions are emerging.^{30–32} For instance, the Census Bureau classifies rural counties based on the percentage of the county population living in a rural area, and some research has expanded on this by breaking percentiles into categories using quartiles or tertiles.^{14,35} Similarly, John et al (2017) began with a population threshold, but incorporated additional criteria, such as geographic region, poverty concentration, and isolation level.³⁶ These approaches resonate with new policy perspectives suggesting that rural definitions might benefit from being more qualitative and reflective of community-level variations. For example, Smart Growth America categorizes rural communities into 7 types based on a range of characteristics, acknowledging the complexity within rural environments.³⁷ Furthermore, the conceptualization of rurality is evolving with an increased recognition that it is a socially constructed concept.²⁹ Tools like Kim et al’s (2023) “Rural Perceptions Scale,”³⁸ Oser et al’s (2022) “Rural Identity Scale”³⁹ and Nguyen et al’s (2019)⁴⁰ proposed use of machine learning with Google Street View imagery highlight innovative methods to capture the complexity of rural spaces and move towards more nuanced and grounded definitions of rurality. The evolving landscape of rural active living research suggests a pivot towards methodologies that are contextually rich and attuned to the heterogeneity of rural America.

Future directions

- Researchers should intentionally select and clearly report the rural classification system used (eg, RUCA, RUCC, UIC), ensuring alignment between the system and the research questions. Transparent reporting allows for meaningful comparison across studies and could reduce misclassification bias.
- Greater use of granular, context-sensitive measures (eg, census tract or block group level, qualitative community-informed definitions) is needed to capture the heterogeneity of rural communities. This level of specificity is critical for identifying differences and targeting resources appropriately.
- Studies should explicitly consider the equity implications of classification choices to resource access and distribution, as differing definitions influence eligibility for funding, surveillance accuracy, and recognition of need.
- Continued innovation is encouraged, including the integration of novel tools (eg, Rural Perceptions Scale, Rural Identity Scale, data storytelling, and geospatial/machine learning methods) to supplement traditional definitions and better reflect the experiences of rural residents.⁴¹

Call to action 2: consider rural-specific characteristics

Rural communities have unique social norms, policies, and infrastructure, which may contribute to different barriers of PA than those experienced in urban communities.^{42–45} The original *Call to Action* implored that rural communities not be treated as “less populated urban areas.”¹⁵

Since the original *Call to Action*, system-level changes have been made to account for rural differences at the federal level.⁴⁶ These changes include rural-specific fiscal resources for built environment changes (eg, Infrastructure Investment and Jobs Act [IIJA; 2021], Centers for Disease Control and Prevention [CDC] High Obesity Program), informational resources (eg, Federal Highway Administration rural active transportation infrastructure recommendations, measurement of rural differences through the Justice40 initiative, and CDC epidemiological research publications), organizational resources (eg, establishing the CDC Office of Rural Health), and human resources (eg, trainings and support for Cooperative Extension staff provided through CDC HOP).

However, many rural communities lack the capacity to apply for federal funding, provide required matching funds, or manage projects if grants are received.⁴⁷ Despite progress, rural communities remain at a distinct disadvantage in acquiring resources to fund and maintain infrastructure supportive of active living.⁴²⁻⁴⁵ For a rural community to become more conducive to active living, trust between partners (including researchers), a shared belief that change is needed and possible, and community involvement are critical. Although rural communities may have reputations of being behind or slow to progress, when change is desired, supported, and understood, a rural community can pivot quickly.^{48,49}

Future directions

- Focus attention on communities that have not seen gains in PA (eg, majority Hispanic or Black rural communities in the South),⁹ those with low access to transportation options, and those lacking built PA infrastructure.⁴⁸
- Identify and understand how different levels of rural governance and capacity interplay with active living opportunities and resources (eg, transportation, recreation, safety).⁴⁴
- Identify and assess barriers rural communities experience when applying for and implementing grants.
- Identify and assess impacts of IIJA funding on PA infrastructure.
- Tailor and evaluate implementation strategies that increase rural communities' capacity for maintaining active living-supportive infrastructure.
- Develop and disseminate data stories that capture the unique assets, needs, and voices of rural communities.
- Utilize existing, trusted community-based partners (such as Cooperative Extension) to build capacity for rural research and implementation.

Call to action 3: account for rural diversity

Since the first edition of the US PA guidelines were published in 2008,⁸ the overall prevalence of meeting PA guidelines has increased in rural America; however, research shows considerable differences and disadvantages persist within rural settings.^{9,50,51} This is manifested across several domains, including geography; socio-environmental resource access; and demographic, health, and behavioral characteristics.⁵² For example, proximity to an urban area is related to PA, and PA patterns in the rural South differ from those in rural frontier states.³⁵ Demographic representation varies within rural contexts. Although some areas remain largely non-Hispanic White, like the rural Midwest, New England, and Northern Great Lakes regions, the demographic composition of the rural South and West is growing, including among federally or state-recognized tribal populations. Differences in PA by demographics have also been demonstrated in rural areas to have differences in PA barriers and supports.^{10,53}

Intersectional social differences can affect PA within rural populations. For instance, recent studies highlighted that differences in sex and associated identities shape youth's experiences of social and physical environments and impact PA, with males and females having different PA patterns, barriers, and supports in rural areas.^{28,54} Male and female adolescents are more likely to participate in PA and sports than those not identifying with their sex at birth; thus, the lack of non-sport activities in rural areas might present a unique PA challenge.⁵⁵ As such, intersectional differences and varying abilities should be considered when identifying supports and barriers to PA. A study of Arizona lower-income areas noted highly variable PA resource conditions, attractiveness, and perceived safety across sites, indicating opportunities for advocates to address PA resource conditions where low PA and barriers to accessing optimal health may coexist, and convene partners to tackle contextual changes.⁵⁶

Future directions

- Extend collaborations beyond state-county governments and sectors (eg, within the context of tribal sovereignty and solidarity,⁵⁷ pursue research partnerships engaging with tribal governments).⁵⁸
- Present disaggregated data⁵⁹ and use these data to identify action steps reflecting population and place priorities.
- Design and implement community-driven active living programs.⁶⁰
- Incorporate both barrier and asset-based frameworks into rural active living research and practice.⁶¹

Call to action 4: prioritize qualitative study

Given the variation and uniqueness of each rural community, qualitative studies are still needed to explore important variables specific to each community. Qualitative methods have been especially valuable in revealing system challenges to optimal access and giving voice to marginalized and under-resourced populations.⁶²

Since the original *Call to Action*, qualitative work has found that the social environment in rural communities plays a significant role in active living.^{53,63-68} One strength of many rural communities is the close ties that members feel—some from having lived in the community for a long time and others from regularly interacting with each other in multiple settings (eg, schools, faith-based institutions, local businesses, etc).⁶⁹ In the past decade, qualitative studies have also revealed there are substantial variations in rural community capital.^{48,53,70-73} Some rural communities are thriving while others are struggling, and this does not always depend on the size of the community. Although qualitative methods encompass a myriad of study techniques, the primary methods used in this body of qualitative work since the original *Call to Action*, even in mixed-methods studies, were focus groups and interviews.

Future directions

- Be intentional about who is recruited for studies and how, consider unique perspectives from different populations (eg, different ages, demographics, values, abilities).
- In the research process (eg, recruitment and participation), include individuals and groups who may already have strong relationships and possess positions of trust in the community (eg, County Extension offices, schools, faith-based organizations, libraries, local businesses).⁷⁴
- Use qualitative methods, beyond just conducting research, to engage community members, assess and build community capacity, and increase community capital.
- Use a greater variety of qualitative methods (eg, photovoice, systems approach activities: card sorting, prototyping, group model building) to gain unique insights into the structure of rural communities, share impactful stories, engage community members, and alleviate pressure for socially desirable responses.
- Study partnerships, coalitions, and community economic drivers. For example, consider citizen science methods that engage community members in community assessment and problem-solving.⁶⁸

Rural call to action 5: refine and develop rural-specific environment measures

Since the original *Call to Action*, several advancements have been made toward the measurement of rural active living environments using rural-specific measures. First, audit tools like the Rural Active Living Assessment (RALA)⁷⁵ have become more feasible to complete in rural areas by conducting audits virtually using Google Street View images, where Google images are up to date and complete.⁷⁶ Ratings conducted virtually show good reliability with in-person human ratings⁷⁷ while raters are not exposed to safety hazards during time and resource-intensive in-person audit sessions. In addition, environmental audits can be conducted on larger scales with less burden on human raters by automating environmental audits of streetscape images, which is crucial for scaling up environmental audits across expansive rural landscapes. Second, there has been an expansion of Geographic Information Systems (GIS) mapping of active transportation infrastructure, but this is rarely applied outside of urban areas.⁷⁸⁻⁸⁰ Third, rural and low-income communities have increasingly used audit tools to justify increased state and federal funding for PA infrastructure (eg, sidewalks, park signage).⁸¹ Environmental audits of settings where community members engage in PA are important for conducting needs assessments and offer opportunities to engage communities in advocacy and planning processes.⁸¹ For instance, the Auburn Extension “PARTNER” and Louisiana State University AgCenter Healthy Communities programs have helped small, rural towns conduct environmental audits of walking resources and provided additional technical assistance. In Louisiana, this includes supporting the submission of applications for state and federal funding that is supported through the Louisiana Department of Transportation and Development.⁸²⁻⁸⁴

Future directions

- Continue to use and refine rural-specific audit tools and measures (eg, RALA tool⁷⁵ and the Rural Active Living Perceived Environment Support Scale [RALPESS])⁸⁵ to assess environmental supports for active living in rural areas, ensure that these tools include unique barriers faced by rural residents.⁸⁶⁻⁸⁹
- Make use of Artificial intelligence (AI) (deep learning combined with computer vision) to increase the availability of virtual street-level environmental audit data.^{80,90-92}

- Examine environmental conditions in more isolated rural areas that may be in most need of intervention.
- Utilize GIS-compatible, publicly available data tools such as PLACES and the Climate Vulnerability Index to add data layers pertaining to extreme weather, susceptibility to increasing extreme weather trends, and environmental determinants of health factors.^{93,94}

Rural call to action 6: increase use of objective PA measures

The original *Call to Action* noted overreliance on self-reported PA measures in the literature. This challenge is not unique to rural active living research, given objective measures are often more challenging (eg, cost, complexity) than self-reported measures.^{95,96} Even the largest CDC datasets monitoring population adherence to the PA Guidelines for Americans are based on self-reported data.⁹⁷ When compared, subjective and objective measures of PA often vary widely, with individuals generally self-reporting more activity and less sedentary time.⁹⁸ Therefore, there remains an imperative to use objective measures in rural PA research to increase precision, decrease error, and allow for direct comparisons (eg, meta-analyses).

Since the original *Call to Action*, the use of objective PA measures in research has increased; however, not in rural-based studies.^{99,100} The variety of methods and products available for objective PA measurement have also increased. Research-grade accelerometers remain the “gold standard” for direct measurement of individual PA. However, given the cost of accelerometers, several commercially available devices (eg, FitBit, Apple Watch, Oura Rings) have been found to be sufficiently accurate and reliable in many research applications; although accuracy of commercial algorithms and newer devices is often unknown.¹⁰¹⁻¹⁰³

Future directions should

- Increase the use of device-based PA measurement in rural research, addressing the delay in adoption in rural contexts and associated challenges (eg, cost).
- Plan for and address the increasing use of commercially available devices in research, given lower costs, and their unknown accuracy.
- Explore and examine solutions to logistical challenges (eg, physical distance from research university) salient in rural communities.
- Generate surveillance data of PA prevalence at more granular levels (eg, census tract level), so that rural classification systems (eg, RUCA) and measures of PA outcomes can be linked more precisely.

Call to action 7: further develop rural ecological models

The original *Call to Action* noted that ecological models should be used to help establish a rural-specific evidence base across the active living domains. Rural adults lag in meeting leisure-time PA guidelines (ie, recreational domain),¹⁰⁴ those who acquire substantial occupational PA may not have the energy or desire to engage in leisure-time PA.¹⁰⁵ Recent findings show the negative association of cardiovascular health and high amounts of occupational PA,^{106,107} suggesting that emphasis should be placed on increasing LTPA among rural populations.

Since the original *Call to Action*, there has been limited use of ecological models to examine PA factors and to guide PA interventions in rural communities. The most cited ecological model was the Social Ecological Model (SEM),^{108,109} or an adapted SEM.^{44,110,111}

Additional research is needed to make strong conclusions about rural-specific PA influences through a social ecological lens, but existing literature can help inform future directions. For example, at the interpersonal and community levels, community support, cohesion, and perceptions were shown to be related to PA behavior and/or the use of PA-related resources (eg, greenspaces) in rural areas.^{68,73,112-114} Studies highlighted the importance of community assessment and planning to leverage community resources that support PA.^{70,111,114} The built environment (eg, walkability, transportation, distance to destinations) was also associated with rural PA levels.^{35,44,113} Although the CDC recommends active transportation by connecting activity-friendly routes to everyday destinations as a PA promotion strategy,¹¹⁵ efforts to support walking for transportation must incorporate contextual differences in rural versus urban areas, including infrastructure supports (eg, roads, trails), destination types (eg, utilitarian, relaxation), and susceptibility to extreme weather.^{43,116} The application of implementation science methods may also prove useful to elucidate the factors that support active living policy and programming initiatives across the levels of ecological influence (ie, from intrapersonal to policy, systems, and environment [PSE] change) and across domains of activity (ie, transportation, recreation, household, occupational).¹¹⁷⁻¹¹⁹ Burgeoning research also explores the important role of natural environments in promoting PA and health, and explores why higher levels of greenness do not necessarily correlate with improved health outcomes in rural contexts.¹²⁰⁻¹²³

Future directions

- Tailor social ecological models to rural communities.
- Conduct qualitative research to investigate rural-specific active living domains and the most influential factors.
- Utilize social ecological models beginning at study conceptualization.
- Explore how PA influences interact across levels of the social ecological model.
- Consider systems-thinking and community development models alongside social ecological models.

Call to action 8: prioritize natural experiments

The original *Call to Action* stated that researchers must build partnerships with local institutions to capitalize on natural experiments when they present themselves in rural settings. Natural experiments are defined as “events, interventions, or policies which are not under the control of researchers, but which are amenable to research which uses the variation in exposure that they generate to analyze their impact” (eg, new policies, environmental changes, community-led programming).¹²⁴ In marginalized and under-resourced rural communities, it is crucial to take advantage of naturally occurring interventions to evaluate impact and justify investment in health-promoting resources. For example, assessing the impacts of Safe Streets & Roads for All, Transportation Alternatives Program funding, or similar active transportation programs designed to be accessible by rural communities.¹²⁵

Since the original *Call to Action*, there has been limited published research using natural experiment methods to evaluate health promotion efforts in rural areas. Though some studies have evaluated the effects of environmental and policy changes in rural environments,^{126–128} a disproportionate number of natural experiment studies occur in urban compared to rural locations.^{129–132} This may be due to many studies and gray literature sources failing to explicitly classify the communities they are working with as “rural,” or the fact that many researchers work and develop community connections in urban locations. Although there is limited research employing natural experiments in rural areas, many researchers have outlined methods and techniques for conducting rigorous natural experiment studies in recent years.^{124,133–136} One example is the public release of a protocol to evaluate Safe Routes to Schools efforts in rural communities.¹³⁷ We can also draw on natural experimental designs from outside the US to develop flexible evaluation strategies in rural US contexts.^{138–142}

Finally, stronger connections between researchers and rural community health workers are vital for natural experiments, and collaborating with Extension Offices can help facilitate this work.

Future directions

- Establish initiatives focused on building partnerships to facilitate natural experiment research and regular surveillance efforts to ensure that natural experimental evaluations are possible even before naturally occurring or community-led interventions occur.
- Build trust and sustainable connections between research institutions/partners and rural community partners to allow for collaboration when natural experiments arise.
- Increase engagement of researchers in evaluating state-level Cooperative Extension policy, systems, and environmental change efforts.
- Conduct natural experiment studies to evaluate the substantial impacts of critical incidents like natural disasters and COVID-19 on rural active living and the impact of changes to federal policies and priorities on rural active living investments.

Emerging areas

As part of this 10-year review, we identified additional emerging areas beyond the 8 original calls to action that warrant examination and further study in the coming years. Table 2 provides information on 6 emerging areas that have implications for research, policy, and practice pertaining to active living in rural America.

Discussion and Conclusion

By embracing complexity and variation in the conceptualization of rurality, scholars can more effectively contribute to inclusive research, policies, and practices that promote active living across the rural–urban continuum. Though there are limitations to this paper, especially the use of a narrative review without the rigor of systematic review methods, a notable strength of our approach was the incorporation of rural-focused active living practitioners, academics, researchers, and advocates from across the US via the PAPREN Rural Active Living Workgroup.

In conclusion, progress has been made in the 10 years since the original “Rural Active Living: Call to Action” was written. In this paper, we summarize progress in some areas and identify ongoing needs

TABLE 2

Emerging Areas Identified to Advance Rural Active Living Research

Emerging Area	Rationale	Description	Future Directions
<i>Understand best practices in active living policy, systems, and environmental (PSE) change approaches in rural areas.</i>	In the past 10 years, federal and national agencies (eg CDC, Cooperative Extension) have increasingly focused efforts on PSE approaches. Our team determined that additional evidence is needed to inform efforts and resource allocation.	• Focused on modifying interconnected policies, systems, and environments to enhance population health.^{91,143} • Used in rural areas to promote community-based PA through supportive environments, active transportation policies, and community collaborations. • Creating parks, implementing active transportation policies, and organizing tailored PA programs. • SNAP-Ed focused efforts on PSE change work since 2016; however, major cuts to the program have occurred in 2025. • The Infrastructure Investment and Jobs Act (IIJA) increases funding for the Transportation Alternatives Program (TAP), which helps build sidewalks, bike lanes, and trails in rural areas and for Safe Streets and Roads for All (SS4A), which primarily funds planning and is designed to be accessible for rural communities.¹⁴⁴	• Continue effective PSE change strategies such as the High Obesity Program (HOP), and Infrastructure Investment and Jobs Act funding. • Acknowledge regional variations in implementation efforts. • Evaluate the impact of large-scale PSE approaches on PA and active transportation in rural communities.
<i>Examine intersections between rural active living and efforts to address increasing extreme weather trends, economic development, environmental quality, and other salient social issues.</i>	Research shows that weather conditions and environmental quality severely impact rural populations, especially considering the social and economic differences within and between rural communities; however, the extent of influence on health and active living has not been sufficiently examined.	• Rising temperatures, extreme weather events, and environmental degradation affect different locations in the US compared to others.⁹³ • Increasing extreme weather changes in rural communities leads to droughts, flooding, fires, crop and livestock loss, and infrastructure damage, significantly impacting rural health and well-being.^{116,145} • Rural areas facing increasing trends of extreme weather have heightened health challenges due to socioeconomic challenges, limited resources, and dependence on the natural environment.	• Develop conceptual frameworks for climate-centered physical PA/active living research centered on prevailing weather conditions. • Conduct research on how increasing trends in extreme weather events impacts active transportation infrastructure and green spaces, considering the role of green space in flood mitigation. • Research the role of nature-based solutions in supporting co-benefits for PA, increasing trends in extreme weather events and efforts to address these trends • Research the multi-directional relationships between increasing trends in extreme weather events, PA, mental health, and chronic disease outcomes. • Conduct natural experiment research on community-led efforts in rural areas, focusing on the effectiveness of resilient pedestrian networks. • Investigate how active living interventions can address increasing trends in extreme weather events. • Collaborate with researchers in social work, psychology, and other disciplines to study the co-benefits associated with trauma-informed practices and nature-based therapies in the context of PA research, practice, and policy.¹⁴⁶ • Develop policy-oriented research to enhance active living infrastructure and integrate extreme weather trend measures into public health evaluations.

(continues)

TABLE 2

Emerging Areas Identified to Advance Rural Active Living Research (Continued)

Emerging Area	Rationale	Description	Future Directions
Examine the profound and lasting effects of the COVID-19 pandemic and syndemic stress in rural areas.	Since the 2015 <i>Call to Action</i> , the COVID-19 pandemic had a severe impact on health globally and exacerbated existing urban-rural health differences.	- COVID-19 has intensified existing health differences and further reduced access to health resources in rural areas.^{147,148} - Some rural areas have experienced population loss while others have grown after the COVID-19 pandemic.^{149,150} - The pandemic has exacerbated mental health crises, highlighting the need for community-level interventions to manage stress and support well-being.	- Evaluate the long-term impacts of using incentives to attract remote workers to rural areas to counteract population decline (eg, West Virginia, Maine, Kansas). - Introduce community-level PA initiatives to promote mental and physical well-being as essential components of rural resilience and recovery. - Adapt models of minority stress and syndemics for community-level interventions, focusing on community-level PA interventions.
Continue to promote rural active living through creative partnerships and coalitions, including partnerships between researchers and federal and national organizations.	Partnerships have continued to surface as key for efforts to support or promote PA in rural communities, as has been evidenced in numerous qualitative reports since 2015. A better understanding of how to develop, support, evaluate, and replicate partnerships between research institutions and community organizations is needed. Additionally, increased understanding of how research is used by national and federal organizations is needed to guide the implementation and funding of active living infrastructure.	- Collaborative efforts like Voices for Healthy Kids, SNAP-Ed, and Cooperative Extension programs have advanced rural active living.¹⁵¹⁻¹⁵³ - Play Streets initiatives have created safe spaces for PA and social engagement in rural areas.^{154,155} - Intervention efforts must tackle limited access to recreational facilities and transportation barriers, aiming to improve rural health outcomes. - Researchers should consider how to better align study design to federal and national organization standards to support implementation of active living infrastructure.	- Strengthen partnerships with local businesses, schools, and healthcare providers to enhance rural active living initiatives. - Secure sustainable funding and resources for long-term success. - Integrate technology-driven interventions and virtual programming to overcome geographic barriers and reach underserved populations experiencing shortages in and access to health professionals and resources. - Focus on addressing differences in access to recreational spaces and embed asset-based health equity principles in rural active living interventions. - Encourage partnerships between active living researchers and transportation professionals. - Align research where possible to include study design elements required by the Federal Highway Administration (FHWA) and other federal/state entities, guided by resources such as A Guide to Developing Quality Crash Modification Factors¹⁵⁶ FHWA
Advance implementation science for rural active living research and practice.	The field of implementation science is increasingly focused on advancing methods, models, and measures that extend beyond clinical settings into community settings. These recent advancements may be important for speeding the translation of	- Implementation science focuses on efficiently translating evidence-based interventions into practice.¹⁵⁷⁻¹⁶⁰ - To speed the translation of research to practice, implementation science calls for researchers to “begin with the end in mind” by considering end users, engaging in participatory approaches, and testing interventions in real-world settings.¹⁶¹⁻¹⁶³ - Evidence-based rural active living interventions require implementation strategies to improve better adoption, implementation, and maintenance.¹⁶³⁻¹⁶⁶	- Apply implementation science methods to community settings to enhance the adoption, implementation, effectiveness and sustainability of evidence-based active living interventions. - Address rural community-specific implementation barriers and match them to relevant implementation strategies.¹⁶⁶ - Evaluate promising implementation strategies for rural settings, such as community partnerships, new funding sources, and toolkits.^{119,164,171} - Use implementation science to evaluate how individual or community-level interventions may

(continues)

TABLE 2 Emerging Areas Identified to Advance Rural Active Living Research (Continued)			
Emerging Area	Rationale	Description	Future Directions
Understand the ramifications of current threats and cuts to rural health-related funding.	research findings into practice in rural settings.	Recently developed community-specific methods and models of implementation science (eg, compilations of implementation strategies) are relevant to advancing active living in rural communities.^{119,167-170}	- support or encourage broader PSE efforts through promoting recreation and/or transportation PA. - Use frameworks to adapt interventions to local settings (eg, rural-specific features) while maintaining fidelity to core components.^{169,170}
	Programs like SNAP-Ed and Medicaid are crucial community resources in rural areas, where SNAP-Ed served as an impetus for PSE change that increased access to active transportation and recreation. Medicaid cuts also disproportionately impact healthcare coverage and access in rural communities. ^{172,173} The proposed federal budget for 2026 currently includes significant cuts to active living infrastructure nationwide. ^{174,175}	- How will the loss of programs like SNAP-Ed impact active living initiatives in rural communities? - How will reduced Medicaid coverage and access to healthcare services impact rural health outcomes? - Will proposed budget cuts to active transportation and transit infrastructure disproportionately impact rural populations?	- Evaluate how/if communities can adjust to continue PSE-related work supported by programs previously receiving federal support. - Investigate how state Cooperative Extensions pivot to meet healthy community development priorities (eg, Complete Streets—will other Extension programs add active living PSE efforts?) - What are the collective impacts of the loss of these resources (eg, funds, trained workforce, programming) on the rural communities served?

Implications for Research, Policy & Practice

- Develop context-sensitive approaches to classify rurality.
- Share impactful stories to celebrate the assets of rural communities while acknowledging challenges.
- Incorporate different community perspectives to improve the implementation of evidence-based active living initiatives, including policies and environmental approaches.
- Increase the use of device-based measurement of PA in rural active living research.
- Promote the use of rural-specific environmental audit tools to increase the availability of street-level data, including artificial intelligence methods that perform well in rural contexts.
- Build trust and sustainable collaborations between research institutions and rural community partners to improve surveillance efforts and facilitate natural experiment research.
- Develop policy-oriented research to understand the relationships between prevailing weather conditions and active living.
- Address rural-specific barriers to the implementation of active living initiatives in rural communities that have persistently low rates of PA and inadequate access to health resources.
- Evaluate implementation strategies that improve the adoption, implementation, and sustainment of evidence-based interventions in rural communities.
- Consider system-thinking and community development models alongside social ecological models to better understand rural-specific factors that promote active living.

and directions in all 8 original calls to action. We also identified 6 additional emerging areas that warrant attention in the coming decade. Moving forward, researchers must continue building the evidence base to ensure that valid, reliable, and rural-specific data are available to inform decision-making, that rural-relevant evidence-based approaches are implemented, and that a guiding conceptual framework for rural active living is further developed. Sustained practice–policy–research collaborations are essential to bring practitioners, policymakers, researchers, and rural residents together to ensure that rural-specific data and lived experiences are used to inform decisions that shape active living opportunities in rural communities.

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