

Developing translational products for adapting evidence-based physical activity interventions in rural communities

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Abstract

The development and distribution of educational materials is a key strategy to support the implementation of evidence-based interventions (EBIs). Rural communities have higher rates of physical inactivity and face higher burden of many diseases that increased physical activity can prevent. To support the translation of a developed physical activity intervention for adults in micropolitan communities (10,000-50,000 people), called Active Iowa, the University of Iowa Prevention Research Center for Rural Health (PRC-RH) created a toolkit and supplemental resources designed to guide implementers through the implementation of the intervention. Through a community-engaged process, the PRC-RH underwent three phases of review and evaluation of the developed products. The first phase involved the Community Advisory Board from the pilot intervention, the second involved the PRC-RH State Advisory Board and public health practitioners from across the state, and the third involved micropolitan leaders and micropolitan health department staff. The feedback received through these three phases resulted in changes to the developed products to improve usability, readability, and clarity. The feedback also resulted in the development of additional materials to further support the implementation of the intervention. The success the PRC-RH experienced in the review process can be attributed to the strong, established partnerships with practitioners across the state who represented a variety of community roles and organizations. The developed materials can be used to improve physical activity rates in rural and micropolitan communities, in turn reducing chronic diseases and improving the quality of life for rural residents.

Keywords: Evidence-based interventions, physical activity, micropolitan, rural, community collaboration

A key strategy to support implementation of evidence-based interventions (EBIs) is the development and distribution of educational materials (Powell et al., 2015), which can also assist in translating and scaling up interventions (Hemple et al., 2019; Powell et al., 2015; Thole et al., 2020). Researchers at the University of Iowa Prevention Research Center for Rural Health (PRC-RH) created such a toolkit in 2016, in the process of assisting a rural community in southeast Iowa to increase adult residents' physical activity levels (more information on that project can be found in Baquero et al., 2018).

The Active Iowa toolkit addresses the need for translatable interventions supporting physical activity uptake and obesity prevention that can be implemented in rural areas (Petrovskis, Baquero, Bekemeier, et al., 2022; Harris et al., 2016). People who live in rural areas have higher rates of physical inactivity compared to their urban counterparts (Matthews et al., 2017; Whitfield et al., 2019) and simultaneously face a higher burden of many preventable diseases (e.g., heart disease, hypertension, and multiple cancers) that can be prevented or reduced through increased physical activity (Afifi et al., 2022; O'Connor & Wellenius, 2012; Garcia et al., 2017; Moy et al., 2017; Matthews et al., 2017). Barriers to physical activity for rural residents relate to the physical environment and can include a lack of investment in infrastructure, like sidewalks, and spaces to be physically active as well as a lack of physical activity programs and organized opportunities in rural areas (Casanave et al., 2021).

The pilot community selected by the PRC-RH research team, Ottumwa, is an example of a unique aspect of rural demography: the "micropolitan" community of 10,000-50,000 people (US Census Bureau, 2023) that serves as a hub for surrounding, even smaller rural communities by providing access to healthcare and social services, employment, and community events (Lichter & Brown, 2011). Micropolitan communities are home to 8.3% of the US population, and 61.1% of rural residents live in them (US Census Bureau, 2024), making them valuable sites for EBIs that can positively influence the health outcomes and/or behaviors of this population (Brownson et al., 2016).

Multiple EBIs to assist communities in increasing physical activity levels have been developed and tested, and one important resource is The Community Guide, which was developed by the Community Preventive Services Taskforce, a division of the US Department of Health and Human Services (The Community Guide, 2023). Unfortunately, EBIs are rarely implemented in rural areas (Afifi et al., 2022; Harris et al., 2016). Their public health departments and other community-based organizations too often cope with a limited staff, little funding for staff and other resources, and a lack of interventions tailored to rural contexts (Harris et al., 2016). The lack of staffing and resources stem from lower budgets in rural public health departments (Afifi et al., 2022; Leider et al., 2020), which is compounded by workforce recruitment and retention issues in rural communities (Rural Health Information Hub, 2024).

To assist local practitioners in implementing EBIs and utilizing supportive strategies, the PRC-RH team used a community-engaged planning process to co-design the Active Ottumwa toolkit for the selected pilot community. Active Ottumwa tested the adaptation of strategies from The Community Guide to a community-wide intervention to increase physical activity. The design and an overview of this project has been previously described in Baquero et al., 2018. In the project, a Lay Health Advisors model was used to train volunteers in the communities to lead free physical activities in spaces throughout the community. Campaign and informational approaches supported the promotion of these free physical activity opportunities. Furthermore, project staff worked to promote policy and environmental changes throughout the community that would further support community members participating in physical activity (Baquero et al., 2018). Developed materials to support this intervention were packaged into a toolkit—called a "manual of implementation" (MOI)—designed to guide implementers in their planning, operation, and monitoring of this community-wide physical activity program. The MOI offers guidance on how to gather community resources and select feasible and appropriate EBIs from The Community Guide to adapt to their communities (The Community Guide, 2022). Other materials cover the "how-tos" of the program, and for quality management there are tools for evaluation and enhancement of a successful program (Powell et al., 2012). Appendix items include resources to support data collection by program planners and example fact sheets and flyers that can be adapted to community specific needs. In 2022, the PRC-RH team created a series of 12 supplemental videos that presented foundational principals key to Active Ottumwa's success (i.e., social determinants of health, health equity, cultural humility, and accessibility), as well as tips and lessons learned that could help future implementers of a similar project overcome potential hurdles and pitfalls. Together these materials include the lessons learned from the pilot project and program templates developed to save implementers much of the preliminary work needed to get a public health program off the ground.

An extensive evaluation of the Active Ottumwa intervention used actigraphs to monitor activity levels of a random cohort of residents and revealed a significant increase in their physical activity from baseline to 24 months post-intervention. This significance was specifically seen in participants who were the most sedentary, who showed the most growth in participating in light physical activity (Baquero et al., 2024).

The objective of this study was to create usable and translatable tools to replicate the success in other micropolitan communities. To achieve this, the PRC-RH team followed a process using principles of co-design with community partners to develop translational products that can scale up the Active Ottumwa intervention, rebranded as Active Iowa, for statewide use. Feedback was sought, in three phases, from a variety of community leaders and members, engaging them in the assessment and refinement of intervention and translation supports. Studies have

shown the benefits of this type of engagement, including an increased understanding of local resources and needs, improved relevance of program activities, and increased program adoption (Potthoff et al., 2023). A community-engaged process also creates a paradigm shift, as researchers move away from paternalistic models of sharing science to actively incorporating the knowledge and lived experiences of community members into the scientific literature (Potthoff et al., 2023).

Methods

To support the development of easy to use materials to replicate the successes of Active Ottumwa to other communities, the review and evaluation of the Active Iowa

translational products involved three phases of co-design and collaboration with an array of community partners: 1) review by the Active Ottumwa Community Advisory Board (CAB) and Active Ottumwa project coordinator; 2) review by public health practitioners from across the state, including the PRC-RH State Advisory Board (SAB); and 3) evaluation by micropolitan leaders and health department staff from the 17 communities across the state classified as micropolitan. Table 1 presents the organizational roles of the participating reviewers. These leaders from Iowa’s micropolitan communities were asked to evaluate both the MOI and the supplemental videos. The activities of this research project were reviewed by the University of Iowa Institutional Review Board and deemed exempt.

Table 1: Reviewers of Active Iowa translational products by type of organization

Phase/Reviewer Type	Organization of Reviewer	Number of Participants from this type of Organization
Phase 1: CAB (n=3)	YMCA	1
	Local Public Health Department	1
	Community School District	1
Phase 1: Project Coordinator (n=1)	Grocery Store Dietitian	1
Phase 2: SAB and Practitioner Partners (n=11)	Local Public Health Department	4
	State Health Department	2
	American Cancer Society	1
	Primary Care Association	1
	County Extension Agency	1
	Center for Disabilities	1
	Local Health Clinic	1
Phase 3: Micropolitan Community Leaders—MOI review (n=10)	Local Public Health Department	3
	Mayor	1
	County Emergency Management	1
	Local United Way	1
	County Disability Services	1
	Community College	1
	County Extension Agency	1
	Local Church Leader	1
Phase 3: Micropolitan Community Leaders—Supplemental Video Review (n=5)	Local Public Health Department	2
	Mayor	1
	Local Church Leader	1
	County Emergency Management	1

Phase One: Review by the Ottumwa CAB and Project Coordinator

The MOI was sent to the 10 CAB members as a text document that included a few pictures of Ottumwa community members participating in activities. That format put the primary focus on the readability of the content but also allowed some of the highlights of Active Ottumwa to be showcased. CAB members were asked for their overall impressions of the document, if their colleagues would find it helpful, and what was missing. They were also asked for more specific feedback on project descriptions and whether the MOI adequately and accurately represented their view of their community and the project. CAB members provided their feedback in a 90-minute Zoom meeting, which three of the 10 attended.

Phase Two: Review by the PRC-RH SAB and Practitioner Partners

After edits were made to MOI content based on CAB feedback, the team worked with a graphic designer to add graphics and images. Next, the PRC-RH called on practitioner partners from across the state, including its 11-member SAB, to review the updated document. Emailed invitations went to SAB members and six public health practitioners who were strong partners of the University of Iowa College of Public Health and supporters of community-engaged public health programming throughout the state. Six of the 11 SAB members and five of the six practitioners participated, for a total of 11 reviewers. These reviewers received the updated MOI document and a letter explaining the purpose of the review and some “big picture” questions for reviewers to answer: Can you gather what the MOI is about? Is Active Ottumwa as a case study represented adequately? What would your colleagues like or dislike about the MOI? What’s missing and/or needs to

be changed? Reviewers could submit their feedback as comments in the MOI document or as emailed responses to each of the questions. After the written review, PRC-RH staff set up meetings over Zoom or phone with each of the 11 reviewers to go over their feedback and clarify any questions the staff had.

Phase Three: Evaluation by Micropolitan Community Leaders and Health Department Staff

In all 17 micropolitan communities across the state of Iowa, the research team identified community leaders with expertise in physical activity interventions (n=100). These individuals had reported in a previous survey being ready to implement such an intervention in their community (Gauthreaux et al., 2024). These community leaders were invited via email to participate in an evaluation of the revised Active Iowa MOI and the supplemental videos. Additionally, public health directors (n=17) in each micropolitan community were emailed an invitation to be forwarded to a staff person in their department with experience implementing physical activity interventions. Invitation emails included information about the evaluation, its voluntary nature, and a link to exempt information for participants to review before agreeing to participate.

To ensure adequate participation, public health directors received a reminder invitation email, while community leaders received an email, phone call, and a final reminder invitation email. After consenting, 16 leaders and four public health staff were emailed directions and a link to a Qualtrics survey for the MOI review. Compensation for completing the survey was a \$100 Amazon e-gift card. After this survey email, the study team sent a reminder email every two weeks (for a total of four emails) to return the survey.

The PRC-RH staff then reached out to those who completed the MOI review (seven leaders, three public health staff) to schedule focus groups for feedback on the supplemental training videos (description of the supplemental training found in Table 2). Participants were invited to four one-hour-long Zoom sessions (once a week for four weeks) and asked to review two or three assigned videos (45 minutes of content) prior to attending each session. A \$20 Amazon e-gift card was offered for each focus group session attended. The first focus group had four participants, the second had two, the third had three, and the fourth had four.

Table 2: Description of the Active Iowa topics covered in the supplemental training video series

Video	Content covered in supplemental training video
Introduction to Active Iowa Supplemental Training	Provides a brief overview of the content of the training series, introduces the presenters for the series, and gives an overview of Active Iowa
Module 1: The Social Determinants of Health	Defines the core concept of Social Determinants of Health and explores how these social determinants can impact a person's ability to access resources to be physically active
Module 2: Health Equity	Defines the core concept of health equity and explains how to incorporate health equity within the Active Iowa program
Module 3: Cultural Humility	Defines the core concept of cultural humility and covers why and how it should be built into the Active Iowa program
Module 4: Accessibility and Health	Discusses inclusive and accessible physical activity programs, and provides strategies to consider to make the Active Iowa program more inclusive and accessible for people of all abilities
Module 5: Recruiting Physical Activity Leaders	Defines the role of Physical Activity Leaders (PALs) and their importance to Active Iowa, and discusses ways to recruit PALs to the Active Iowa program
Module 6: Training Physical Activity Leaders	Provides strategies to keep recruited PALs engaged prior to the PAL training, and covers tips and tricks for training PALs
Module 7: Retaining Physical Activity Leaders	Covers strategies to keep PALs engaged and excited about Active Iowa over the long-term after they have been trained in the program
Module 8: The Role of Active Iowa Ambassadors	Defines the role of ambassadors in the Active Iowa program, ways to identify potential ambassadors, and how to get ambassadors trained and involved in supporting Active Iowa
Module 9: Gathering Community Support	Covers ways to establish community and organizational support for the Active Iowa program, and identify and uplift community resources to utilize as potential locations for Active Iowa activities
Module 10: Engaging your Community	Discusses ways to engage the community in promoting and marketing the Active Iowa program to community members through community partnerships, participant incentives, and social media
Module 11: Technology and Active Iowa Programming	Offers ways to adapt the Active Iowa program to a virtual format, discusses potential virtual platforms to use, and covers the benefits of leading virtual physical activity classes

Two PRC-RH staff served as group facilitators, and participants discussed what was helpful in the videos, what was difficult to understand, what information was unnecessary, and what needed to be changed. They were also asked to rate the overall quality of video content and production. Focus group sessions were recorded, and transcribed using Rev, a third-party transcription service.

Results

The feedback from all three phases and the resulting changes that the PRC-RH team made to the Active Iowa translational products are presented in Table 3.

Table 3: Reviewer input and resulting changes to Active Iowa materials by review phase

Phase/Reviewer Type	Input Received on Change Needed	Change Made to Materials
Phase 1: CAB	Get an outsider’s perspective to ensure materials were useful to potential future implementers	-UI PRC-RH team conducted phases 2 and 3 to obtain feedback from SAB and other public health practitioners
	Add executive summary and more information about program costs and importance of planning for sustainability	-Added an executive summary -Included appendix item on program costs -Added more text in the maintenance section of the MOI about sustainability of the program
Phase 1: Project Coordinator	Make documents modifiable and have them in one place where all documents for the project could be easily accessed	-Ensured PDF documents were modifiable -Created website to house all materials in a format that practitioners could use
Phase 2: SAB and Practitioner Partners	Add clarity on the Active Ottumwa case studies	-Inserted more text and results about the Active Ottumwa case study throughout the MOI
	Show how socioecological model fits within the evidence	-Added information on the socioecological model levels targeted by the MOI strategies
	Add potential CAB members and organizations	-Included a list of potential partners under “Establishing a CAB”
	Suggestions for resources in the supplemental materials section	-Added suggested resources on physical activity, social media, accessibility, and success stories
Phase 3: Metropolitan Community Leaders—MOI review	Integrate information about the COVID-19 pandemic’s implications for the Active Iowa project	-Created the COVID-19 addendum discussing tips for creating safe physical activity spaces -Created signage to support COVID-19 vaccination, mask wearing, and safety practices -Created the Virtual Addendum to support implementation of virtual physical activity -Created instructional videos for running virtual physical activity classes on Zoom, Google Meet, Facebook Live, and Instagram Live
	Update graphics for clarity and to reflect safe activity habits	-Ensured highest quality resolution for pictures -Ensured bicycle riders were wearing helmets
	Improve ease of readability of the MOI	-Decreased the use of acronyms -Improved phrasing as suggested
Phase 3: Metropolitan Community Leaders—Supplemental Training Video Review	Include supports for social media efforts	-Included more links to support social media usage by practitioners in the supplemental materials section of the MOI
	Create social media posts and graphic examples to be used by Active Iowa practitioners	-Created 2-4 graphics associated with topics from the supplemental training video series -Ensured each graphic is appropriate for Facebook, LinkedIn, X (formerly Twitter), and Instagram -Created toolkit with associated text for each graphic and alternative text for screen readers
	Include an introductory video for the series	-Created a short introductory video discussing the purpose and an overview of the series
	Improve readability and understanding of videos	-Incorporated suggested changes to wording on specific slides

Phase One: Review by the Ottumwa CAB and Project Coordinator

The main feedback received from the CAB members highlighted that the materials “were written in a way that people could pick this up and run with it” and that we had accurately and fairly represented the Ottumwa community with photos that would be engaging to rural audiences.

After incorporating the CAB’s review, the revised MOI was used to train the newly chosen Project Coordinator of Active Ottumwa. She provided feedback on the usefulness of the information and stressed the importance of having all toolkit resources available and modifiable in one easy-to-access place for future program implementers.

Phase Two: Review by the PRC-RH SAB and Practitioner Partners

Most of the Phase Two participants felt the materials were understandable (seven out of eight answered that question). Reviewers specifically liked the materials’ visual appeal, easy-to-follow layout, and useful appendix items and templates. One practitioner partner was an accessibility expert who provided input on making the translational products and the program itself more accessible to people with disabilities. Practitioner input improved the MOI content about the Active Ottumwa project, with more specifics on the program outcomes and on how community organizations were involved in program activities.

Unusual circumstances halted the review process at this point. The outbreak of the COVID-19 pandemic occupied our micropolitan community partners and practitioners, as they shifted their focus to respond to this unprecedented crisis. Not surprisingly, SAB members requested added toolkit information on how to implement Active Iowa in the wake of the pandemic, which led to the creation of two documents (COVID-19 Addendum and Virtual Addendum) and four instructional videos (Table 3).

Phase Three: Evaluation by Micropolitan Community Leaders and Health Department Staff

Of the micropolitan practitioners (n=10) who reviewed the Active Iowa MOI, 90% were confident they could implement the intervention with the MOI as a guide, and all said the information was presented in a way that made sense for their organization. Other review comments included “The Active Ottumwa examples were crucial in helping in understanding [the Active Iowa project]”, the “appendix material was great,” and “these all look like good examples and a good place for folks to start.” Improvements were suggested, all of which the PRC-RH team addressed (Table 3).

Focus group participants, who reviewed the Active Iowa videos, appreciated that the videos were short and to the point, aesthetically pleasing, and “approachable” (i.e., not intimidating, were easy to understand). They felt the content was “well-done, easy to understand, got down to the basic points so that anybody could absorb it.” One participant, referring to being part of the focus group process, added, “I appreciate how the information taken from [these] conversations were included in the

trainings...it helps me feel like my participation is being reflected in the presentation, so thank you for doing that.”

After incorporating the suggestions from each phase, the Active Iowa materials are ready to be widely translated to support implementation in micropolitan communities. All materials are being distributed through a webpage (<https://prc.public-health.uiowa.edu/active-iowa-manual-implementation-and-supplemental-resources>), including the MOI; the supplemental videos (also housed on a YouTube playlist); downloadable templates of flyers, fact sheets, tracking documents, a shared-use agreement, and newsletters; and program training materials and evaluation documents. Special pandemic-related materials have been added, along with the downloadable social media toolkit geared to four platforms (LinkedIn, Facebook, Instagram, and X/formerly Twitter).

Discussion

Few descriptions of the process of creating EBI implementation tools or adapting them to different settings can be found in the literature (Hemple et al., 2019). This paper described our process of co-designing and refining implementation support materials through reiterative rounds of feedback from community members and public health practitioners. A key factor in the success of our review process was the flexibility of the research team in allowing the feedback at one stage to guide the next step in the process. Through this process of co-design, we involved the end-users and key partners in the study’s development and planning phase as has previously shown success in the development of implementation tools (Slattery et al., 2020; Tay et al., 2021). During their review, the CAB said we needed to hear from potential implementers of the project who were not previously involved in it, leading us to reach out to our SAB and the other partner contacts. After the Phase Two review, discussion with our SAB about the next steps inevitably included the emerging and evolving COVID-19 pandemic. The PRC-RH staff and SAB all agreed that the project could not be taken into the field when it would not be ethical or feasible to have groups of people together for physical activity. In lieu of this implementation step, the SAB guided us to ask leaders and public health practitioners in micropolitan communities (our ultimate target audience) to provide feedback on the toolkit materials. This added step allowed us to continue to adapt this project during a confusing and uncertain time. Not only were our products further improved, but we also created translational supports that take into account the impacts of a pandemic on communities and public health programming with specific focus on mitigating these impacts in rural and micropolitan areas (i.e., digital divide, transportation, et cetera).

Commonly used methods for research co-design involve focus groups, interviews, and surveys, and typically involve multiple rounds of engagement to improve the feasibility and acceptability of intervention tools (Slattery et al., 2020; Tay et al., 2021; Brown et al., 2020; Viprey et al., 2023; Claborn et al., 2022). Our CAB review was a similar structure to a focus group, our SAB and other partner

contact review reflected an individual interview format, and our micropolitan leader review combined through survey and focus group methodologies to gather input and elicit feedback on tool improvement.

Our process of co-design aligns with prior research recommending multiple rounds of feedback from key partners to assess and improve the acceptability and feasibility of materials (Brown et al., 2020; Viprey et al., 2023).

Our ability to allow the structure of the review process to develop organically was supported by the large pool of potential reviewers that we had access to. We were fortunate to have strong, trusting, and established partnerships, many of them made during the Active Ottumwa project. Other connections came from engagement with practitioners across the state, through our SAB, and with partners who had previously supported The University of Iowa College of Public Health initiatives (many were alumni of the College). The third phase of our evaluation utilized the contacts we had with micropolitan leaders from our previous study investigating community readiness for physical activity interventions (Gauthreaux et al., 2024). Other studies have found the existence of trusting relationships between researchers and co-design participants as crucial to creating tools that are useful and usable for practitioners (Slattery et al., 2020; Claborn et al., 2022).

The relatively large number of contacts also mitigated the inability of many individuals to participate in the review. For instance, CAB members were very engaged throughout the process of developing the Active Ottumwa materials, but when it came to the final review step, seven of the 10 members had time constraints and competing priorities that made them unable to participate. Phase Two reviewers faced similar challenges, and in Phase Three we saw the largest shortfall in participation, with only 10 of the 100 invited practitioners able to complete the review of the materials. Fortunately, the willing Phase Three participants were very motivated, which was one of the drivers of our decision to invite only those who completed the MOI review to join the focus groups. Given their level of engagement with the print materials, we felt confident that they would be willing to do the extra “homework” (watching the videos) ahead of each focus group session. In such deeply engaged co-designed reviews like this study, lower participation numbers with high involvement reflect strong community-researcher relationships (Tay et al., 2021).

The breadth of our partnerships also ensured that Active Iowa reviewers represented a variety of community roles and organizations. A key component co-design is the involvement of end-users of the developed intervention in the process, thus it was crucial that we engaged reviewers from a variety of different roles that we believed would be implementers of the Active Iowa program (Tay et al., 2021). Public health departments would clearly be potential implementers of this intervention, but we wanted these translational products to be as useful to other organizations.

By including reviewers in public health-adjacent roles, valuable changes and additions were made to the Active Iowa tools, a good example being the greater focus on people with disabilities. Many of the adults who participated in Active Ottumwa activities were living with one or multiple disabilities, and much of the inclusion of these adults came from the activity leaders devising accessibility solutions individually. Feedback from those activity leaders led us to invite a disability expert to review our translational products (in Phase Two), and the incorporation of this expert’s feedback greatly improved the products’ usefulness and inclusivity.

A limitation to the study is that much of this review process took place during the COVID-19 pandemic when getting groups of people together to be physically active was not advisable. Therefore, we have not been able to test whether the implementation supports developed through this process will successfully replicate the positive outcomes of Active Ottumwa. This could be something a future study could test. Additional limitations could be the small numbers of participants at each stage and that we did not hear from individuals who were less familiar with physical activity interventions. Though that is a potential limitation, implementers of a successful Active Iowa project will most likely be individuals who are aware of and excited about the promise of evidence-based physical activity interventions. Additionally, as mentioned above, the number of participants engaged in our co-design process is relatively similar to that of other studies (Tay et al., 2021).

Improving physical activity rates in rural and micropolitan communities is important to reducing chronic diseases and improving rural residents’ quality of life. We pursued this goal through a partnership of academic researchers, with their knowledge of implementation science, and community members, with their lived experience in micropolitan settings. This partnership produced effective planning, design, and implementation of a successful EBI in one community, and the extension of this community-engaged process has led to the development of translational products for scale up of the intervention for rural residents all across the state.

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Conflicts of Interest

There are no conflicts of interest to disclose.

Author Contributions

Conceptualization, R.B., M.L., and N.A.; Methodology, R.B., M.L., and N.A.; Investigation, R.B., S.E., A.C., M.G., and N.A.; Project administration, R.B. and N.A.; Writing-Original Draft, R.B. and N.A.; Writing-Reviewing and Editing R.B., S.E., A.C., M.G., M.L., and N.A.; Funding Acquisition, R.B., M.L., and N.A.; Resources, N.A.; Supervision, R.B. and N.A.

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References

- Affi, R.A., Parker, E.A., Dino, G., Hall, D.M., & Ulin, B. (2022). Reimagining rural: Shifting paradigms about health and well-being in the rural United States. *Annual Review of Public Health, 43*, 135-154. DOI: [10.1146/annurev-publhealth-052020-123413](https://doi.org/10.1146/annurev-publhealth-052020-123413)
- Baquero, B., Kava, C.M., Ashida, S., Daniel-Ulloa, J., Laroche, H.H., Haines, H., Bucklin, R., Maldonado, A., Coronado Garcia, M., Berto, S., Sewell, D., Novak, N., Janz, K., Gates, C., & Parker, E.A. (2018). Active Ottumwa: Adapting evidence-based recommendations to promote physical activity in a micropolitan new destination community. *International Journal of Environmental Research and Public Health, 15*(5), 917. DOI: [10.3390/ijerph15050917](https://doi.org/10.3390/ijerph15050917)
- Baquero, B., Novak, N., Sewell, D. K., Kava, C. M., Daniel-Ulloa, J., Pham, H., Askelson, N., Ashida, S., Laroche, H., Maldonado Gonzalez, A., Bucklin, R., Haines, H., Parker, E. A., & Active Ottumwa Community Advisory Board (2024). Effectiveness of implementing evidence-based approaches to promote physical activity in a Midwestern micropolitan area using a quasi-experimental hybrid type I study design. *BMC public health, 24*(1), 1082. <https://doi.org/10.1186/s12889-024-18523-9>
- Brown, M.C., Araújo-Soares, V., Skinner, R., Glaser, A.W., Sarwar, N., Saxton, J.M., Montague, K., Hall, J., Burns, O., & Sharp, L. (2020). Using qualitative and co-design methods to inform the development of an intervention to support and improve physical activity in childhood cancer survivors: A study protocol for Being Active after Childhood Cancer (BEACON). *BMJ Open, 10*(12), e041073. DOI: 10.1136/bmjopen-2020-041073
- Brownson, R.C., Colditz, G.A., & Proctor, E.K. (2017). Dissemination and implementation research in health: Translating science to practice. *Oxford University Press*.
- Casanave, K., Gabbert, K., O'Hara Tompkins, N., Murphy, E., Elliott, E., & Zizzi, S. (2021). Environmental factors affecting rural physical activity behaviors: Learning from community partners. *Progress in Community Health Partnerships: Research, Education, and Action, 15*(3), 349-359. DOI: 10.1353/cpr.2021.0037

- Claborn, K.R., Creech, S., Whittfield, Q., Parra-Cardona, R., Daugherty, A., & Benzer, J. (2022). Ethical by design: Engaging the community to co-design a digital health ecosystem to improve overdose prevention efforts among highly vulnerable people who use drugs. *Frontiers in Digital Health, 4*, 880849. DOI: [10.3389/fdgth.2022.880849](https://doi.org/10.3389/fdgth.2022.880849)
- Garcia, M.C., Faul, M., Massetti, G., Thomas, C.C., Hong, Y., Bauer, U.E., & Iademarco, M.F. (2017). Reducing potentially excess deaths from the five leading causes of death in the rural United States. *Morbidity and Mortality Weekly Report, 66*(2): 1-7. DOI: [10.15585/mmwr.ss6602a1](https://doi.org/10.15585/mmwr.ss6602a1)
- Gauthreaux, N., Bucklin, R., Corraera, A., Steere, E., Pham, H., Afifi, R.A., & Askelson, N.M. (2024). Community and organizational readiness to adopt a physical activity intervention in micropolitan settings. *Health Promotion Practice, 15*248399231221728. DOI: [10.1177/15248399231221728](https://doi.org/10.1177/15248399231221728)
- Harris, J.K., Beatty, K., Leider, J.P., Knudson, A., Anderson, B.L., Meit, M. (2016). The double disparity facing rural local health departments. *Annual Review of Public Health, 37*, 167-184. DOI: [10.1146/annurev-publhealth-031914-122755](https://doi.org/10.1146/annurev-publhealth-031914-122755)
- Hemple, S., Maik-Lye, I.,... Ganz, D. A. (2019). Quality improvement toolkits: Recommendations for development. *American Journal of Medical Quality, 34*(6): 538-544. DOI: [10.1177/1062860618822102](https://doi.org/10.1177/1062860618822102)
- Leider, J.P., Meit, M., McCullough, J.M., Resnick, B., Dekker, D., Alfonso, Y.N., & Bishai, D. (2020). The state of rural public health: Enduring needs in a new decade. *American Journal of Public Health, 110*(9), 1283-1290. DOI: [10.2105/AJPH.2020.305728](https://doi.org/10.2105/AJPH.2020.305728)
- Lichter, D. T. & Brown, D. L. (2011). Rural America in an urban society: Changing spatial and social boundaries. *Annual Review of Sociology, 37*(1), 565-592. <https://doi.org/10.1146/annurev-soc-081309-150208>
- Matthews, K.A., Croft, J.B., Liu, Y., Lu, H., Kanny, D., Wheaton, A.G., Cunningham, T.J., Khan, L.K., Caraballo, R.S., Holt, J.B., Eke, P.I., & Giles, W.H. (2017). Health-related behaviors by urban-rural county classification – United States, 2013. *Morbidity and Mortality Weekly Report, 66*(5): 1-8. DOI: [10.15585/mmwr.ss6605a1](https://doi.org/10.15585/mmwr.ss6605a1)
- Moy, E., Garcia, M.C., Bastian, B., Rossen, L.M., Ingram, D.D., Faul, M., Massetti, G.M., Thomas, C.C., Hong, Y., Yoon, P.W., & Iademarco, M.F. (2017). Leading causes of death in nonmetropolitan and metropolitan areas – United States, 1999-2014. *Morbidity and Mortality Weekly Report, 66*(1): 1-8. DOI: [10.15585/mmwr.ss601a1](https://doi.org/10.15585/mmwr.ss601a1)
- O'Connor, A., & Wellenius, G. (2012). Rural-urban disparities in the prevalence of diabetes and coronary heart disease. *Public Health, 126*(10): 813-820. DOI: [10.1016/j.puhe.2012.05.029](https://doi.org/10.1016/j.puhe.2012.05.029)
- Petrovskis, A., Baquero, B., & Bekemeier, B. (2022). Involvement of local health departments in obesity prevention: A scoping review. *Journal of Public Health Management and Practice, 28*(2). DOI: [10.1097/PHH.0000000000001346](https://doi.org/10.1097/PHH.0000000000001346)
- Potthoff, S., Finch, T., Bührmann, L., Eitzelmüller, A., van Genugten, C. R., Girling, M., May, C. R., Perkins, N., Vis, C., Rapley, T., & ImpleMentAll consortium (2023). Towards an Implementation-Stakeholder Engagement Model (I-STEM) for

- improving health and social care services. *Health expectations : an international journal of public participation in health care and health policy*, 26(5), 1997–2012. DOI: [10.1111/hex.13808](https://doi.org/10.1111/hex.13808)
- Powell, B. J., McMillen, J. C., Proctor, E. K., Carpenter, C. R., Griffey, R. T., Bunger, A. C., Glass, J. E., & York, J. L. (2012). A compilation of strategies for implementing clinical innovations in health and mental health. *Medical care research and review : MCRR*, 69(2), 123–157. <https://doi.org/10.1177/1077558711430690>
- Powell, B. J., Waltz, T. J., Chinman, M. J., Damschroder, L. J., Smith, J. L., Matthieu, M. M., Proctor, E. K., & Kirchner, J. E. (2015). A refined compilation of implementation strategies: Results from the Expert Recommendations for Implementing Change (ERIC) project. *Implementation Science: IS*, 10, 21. <https://doi.org/10.1186/s13012-015-0209-1>
- Rural Health Information Hub. (2024). *Rural Public Health Agencies*. <https://www.ruralhealthinfo.org/topics/public-health>
- Slattery, P., Saeri, A.K., & Bragge, P. (2020). Research co-design in health: A rapid overview of reviewers. *Health Research Policy and Systems*, 18(1), 17. DOI: 10.1186/s12961-020-0528-9
- Tay, B.S.J., Edney, S.M., Brinkworth, G.D., Cox, D.N., Wiggins, B., Davis, A., Gwilt, I., Haveman-Nies, A., & Ryan, J.C. (2021). Co-design of a dietary intervention for adults at risk of type 2 diabetes. *BMC Public Health*, 21(1), 2071. DOI: 10.1186/s12889-021-12102-y
- The Community Guide. (2022). *CPSTF Findings for Physical Activity*. <https://www.thecommunityguide.org/pages/task-force-findings-physical-activity.html>
- The Community Guide. (2023). *About the Community Preventive Services Task Force*. <https://www.thecommunityguide.org/pages/about-community-preventive-services-task-force.html>
- Thoele, K., Ferren, M., Moffat, L., Keen, A., & Newhouse, R. (2020). Development and use of a toolkit to facilitate implementation of an evidence-based intervention: a descriptive case study. *Implementation science communications*, 1, 86. <https://doi.org/10.1186/s43058-020-00081-x>
- United States Census Bureau. (2023). *Glossary*. <https://www.census.gov/programs-surveys/metro-micro/about/glossary.html>
- United States Census Bureau. (2024). *Metropolitan and micropolitan statistical areas population totals: 2020-2023*. <https://www.census.gov/data/tables/time-series/demo/popest/2020s-total-metro-and-micro-statistical-areas.html>
- Viprey, M., Mougeot, F., Dima, A.L., Haesebaert, J., Occelli, P., Durieu, I., Rouzé, H., Reynaud, Q., & Touzet, S. (2023). A participatory approach involving patients with cystic fibrosis and healthcare professionals for the co-design of an adherence-enhancing intervention toolkit. *Patient Preference and Adherence*, 17, 995-1004. DOI: 10.2147/PPA.S389792
- Whitfield, G.P., Carlson, S.A., Ussery, E.N., Fulton, J.E., Galuska, D.A., Petersen, R. (2019). Trends in meeting physical activity guidelines among urban and rural dwelling adults – United States, 2008-2017. *Morbidity and Mortality Weekly Report*, 68(23): 513-518. DOI: [10.15585/mmwr.mm6823a1](https://doi.org/10.15585/mmwr.mm6823a1)