

“WHO DOES NOT HAVE ACCESS THAT NEEDS OR WANTS ACCESS?”: IMPROVING ACCESS  
TO EXERCISE OPPORTUNITIES IN BURKE COUNTY FOR OLDER ADULTS THROUGH A  
STRATEGIC BUILT ENVIRONMENT

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A Capstone Project submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Public Health in Leadership in Practice

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## **ABSTRACT**

Bradley Caison; Tsaiwei Cheng; Audrey Fratus; Lindsay M. Parlberg  
“Who Does Not Have Access that Needs or Wants Access?”: Improving Access to Exercise Opportunities  
in Burke County for Older Adults through a Strategic Built Environment  
(Under the direction of Kim Ramsey White, 1<sup>st</sup> Reader & W. Oscar Fleming, 2<sup>nd</sup> Reader)

Through a lens focused on the development of a strategic built environment, this proposal provides frameworks and tools for generating, scaling, and sustaining interventions to enhance the physical, emotional, and social health and wellbeing of Burke County residents. The proposal recommendations leverage existing resources and identify specific community and population needs using public health and quality improvement tools and principles. By addressing obstacles in the built environment to exercise opportunities, particularly for adults over 65, the proposal emphasizes optimizing Burke County's abundant resources to promote physical activity. The narrative advocates for a co-design approach, involving residents in shaping interventions that resonate with their needs and goals. This strategy aims to transform Burke County into a model for age-inclusive public spaces that encourage active living, paving the path for a future where strategic planning and community involvement converge to foster a healthier, more active community for seniors.

Keywords: neighborhood, built environment, physical activity, accessibility, exercise

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## **1 Introduction**

This proposal provides recommendations and resources to assist the Burke County Board of Commissioners in identifying effective leverage points and building sustainable interventions to improve the physical, emotional, and social health and wellbeing of county residents. Rather than focus on the medical factors that contribute to individual and population health, the proposal instead moves to the community level to examine the connections between social factors and health outcomes. These factors, or “social determinants of health”, can include income, education, employment, conditions at home, school, or work, social inclusion or exclusion, and access to healthcare, among others (Healthy People 2030, n.d.-b). At this level, county decision-makers are better able to see connections between their areas of influence and the ultimate health outcomes of their community. The proposed actions detailed in this document are grounded in a focused analysis of a single social determinant of health, the built environment (Healthy People 2030, n.d.-b). While the proposal outlines effective ways of thinking about the connection between the built environment and community health outcomes, it does not provide specific recommended interventions. Instead, it aims to guide county leaders to themselves identify potential solutions that integrate their comprehensive understanding of the needs of Burke County and its residents.

## **2 Social Determinant of Health Analysis**

When a person walks out the door, infrastructure, buildings, and landscaping – collectively called the “built environment” - impact their functional decision making. Where they can go, how they can get there, and what they can do when they arrive are all shaped by the design and development of the physical spaces in which they live, work, and play (Bonaccorsi et al., 2020). The relationship between the built environment and how a community makes and executes decisions has a significant effect on health outcomes by either limiting or extending the community’s ability to engage in health-promoting activities (Travert et al., 2019). The effect of the built environment on engagement with healthy behaviors is demonstrated most immediately by individual and community decisions about where, when, and how much to engage in physical activity. Inaccessible resources and exclusionary design are significant

obstacles to daily exercise, particularly for adults over 65, who make up a growing proportion of Burke County's population and are more likely to experience poverty and disability (themselves barriers to access) than other county populations (Bonaccorsi et al., 2020; Cunningham et al., 2020; NC DHHS, 2020).

Burke County contains abundant resources – infrastructure, social services, greenspaces - that can be optimized to enhance physical activity opportunities for county residents, including those older than 65 (WPCG Area Agency on Aging, 2016; Burke County, 2022). Despite the county's unusually large stock of recreation space and facilities, Burke County is below the state average by significant margins for both access to exercise opportunities and daily physical exercise (*Burke, North Carolina, 2023*). Reflecting on this apparent contradiction, the 2022 Burke County Community Health Assessment (CHA) astutely notes that “just because [the county has] improved in providing people with places to partake in physical activity does not mean they are accessible to all who need it” (Burke County Health Department, 2022). The CHA asks the critical question, “Who does not have access that needs or wants access?”.

At least one likely answer to that question is Burke County's growing population of older adults. Deficiencies in the built environment, such as poorly maintained recreation buildings or uncomfortable public transportation options, are known to negatively impact the willingness of adults 65 and older to use available resources (Bonaccorsi et al., 2020; Cunningham et al., 2020). Lack of physical activity or sedentary lifestyles can lead to detrimental health effects, including metabolic dysfunction and increased risks of chronic conditions like diabetes and heart disease (Cunningham et al., 2020). Older adults are particularly vulnerable to morbidity and premature mortality from these conditions (CDC, 2022; Davies et al., 2019). As Burke County's population ages, it becomes more imperative to see the built environment as an effective leverage point for equitably improving community health.

### **3 Contextual Analysis**

It's essential to frame Burke County's built environment and the challenge of providing equitable and accessible exercise opportunities to older adults not as isolated areas of focus, but as both informed by and informing the political, economic, natural, and social context of the county. An analysis of the system

to provide exercise access in Burke County, a system that goes far beyond just recreation departments and integrates factors from across the county's distinct demographic, geographical, and infrastructural landscape, reveals patterns of behavior that may be contributing to the contradiction noted above. These patterns of behavior, called "system archetypes", are not associated with individual choices; rather, they reflect multi-actor dynamics that develop over time (Braun, 2002). As seen in the red cycle in [Appendix A.3.A](#), the "Fixes that Fail" system archetype illustrates how Burke County's significant investment in traditional recreation spaces, like lake beaches or county parks, might inadvertently overlook the 65+ demographic's specific needs, leading to a cycle where short-term solutions do not address deeper systemic issues. As an extension, the "Success to the Successful" archetype, illustrated by the blue cycle in [Appendix A.3.A](#), demonstrates how the popularity of the county's traditional spaces for recreation may overshadow the need for age-appropriate facilities or infrastructural adaptation, perpetuating accessibility challenges for the elderly.

These system-wide patterns could be disrupted through both physical intervention, such as creating and enhancing age-friendly recreational spaces with features like low-impact exercise equipment and accessible walking paths, and emotional intervention, by fostering a community mindset that considers age-inclusivity a key element of development. A dual approach, finding both physical and emotional leverage points, could lead not only to improved health outcomes for the elderly but also a more cohesive community ethos prioritizing active living for all ages (Public Health Agency of Canada, 2008).

Interventions targeted at social determinants of health, like the built environment, are most effectively managed through formal cross-sectoral collaboration and meaningful change leadership by those immediately impacted by the issue (De Montigny et al., 2017). While this collaboration could take any number of forms, a formal steering committee model is perhaps the best aligned with Burke County's current decision-making structures. Older adults with lived experience in Burke County should be fully represented in the committee's membership, as should the agencies and departments responsible for guiding policy and providing services relevant to the built environment (Haldane et al., 2019). In order to meaningfully contribute to positive change in the proportion of Burke County residents aged 65 and older



regularly accessing exercise opportunities, the steering committee would need to: 1) leverage existing programs, policies, partnerships, and investments within the county, 2) evaluate community-level barriers to engaging in exercise opportunities, and 3) empower community members to come together to prioritize accessibility and build community connections. Establishing clear commitments across the steering committee with the development of a memorandum of understanding (MOU) at formation will enhance and build accountability among contributors to the diverse steering committee. See [Appendix A.3.B](#) for a model MOU template. A strong MOU would integrate quantifiable success metrics and early consensus on dispute resolution (see [Appendix A.3.C](#) and [Appendix A.3.D](#) for examples of these resources) (U.S. DHHS, 1982).

The group responsible for enacting change in the built environment might begin their work by referencing quality improvement tools to identify relevant internal and external stakeholders and to begin to uncover the root causes of Burke County’s faltering exercise indicators. An application of root cause analysis tools (see [Appendix A.3.E](#)) identifies perception of accessibility, social connectedness, and resource awareness as potential drivers for the disconnect between available resources and actual resident use. This analysis is purely illustrative; additional analysis integrating information gained from focused conversation with stakeholders should be undertaken. It’s important to note that leaders in Burke County have already acknowledged and begun the process of addressing negative health outcomes through intervention in the built environment. Formal policies, such as the redevelopment of College Street in Morganton into a multimodal connector, and informal policies, such as the ridership processes for Greenway Public Transportation, are attempts at embracing the connection between infrastructure and health (City of Morganton, 2020; WPRTA, 2024). The application of systems analysis and quality improvement tools and frameworks builds on this existing work.

#### **4 Recommendations for Action**

While this proposal will not recommend specific interventions or programs intended to address deficiencies in the built environment that may impact the health of older residents, as those are best developed by Burke County itself, it can offer approaches and techniques that may be effective in this

distinct context. For example, the county is well-positioned to implement a co-design process to generate, test, and scale-up program concepts and actualize full-community access to exercise opportunities. Co-design positions end users, such as older adults, and other community stakeholders as equal leaders of change, working alongside decision-makers to create interventions that are relevant and sustainable (Sanders & Stappers, 2008). Existing collaboration within a steering committee, as described above, could be leveraged to produce co-design efforts.

To develop context-appropriate and challenge-responsive solutions, co-designers should consider implementing Gemba Walks, a tool that requires design team members to physically experience the processes the target population move through to complete the goal, regular exercise (Dombrowski & Mielke, 2013). Gemba Walks allow design personnel to understand the sensations, emotions, and interaction points along the process path in order to generate informed change concepts (Aij & Teunissen, 2017; Dombrowski & Mielke, 2013). The tool is particularly effective when applied to challenges where the physical environment influences the population's experience, as is the case in the connection between the built environment and the lagging health outcomes for Burke County's residents (Aij & Teunissen, 2017). To expand on this exercise, co-designers should develop user personas, or representations of user experiences and emotions, based on their experiences on the Walks (Turner et al., 2013). These personas can be translated into user stories, which outline specific goals and needs of likely users of the system. User stories are an effective starting point for building measurements of success (Turner et al., 2013). Illustrative examples of user stories and quality measurements are shared in [Appendix A.3.F](#). These exercises, among others, should be closely analyzed to identify leverage points for change.

After the co-design team has developed candidate change concepts, the Model for Improvement (MOI) would be an appropriate framework for testing their viability. MOI requires clear insight for what the project team wants to accomplish and the degree to which a proposed change will move them towards that target (Randolph et al., 2009). This insight is paired with an iterative implementation and analysis cycle that starts with small scale prototypes and slowly expands to scale (Randolph et al., 2009). See [Appendix A.3.G](#) for an illustration of the model. As each new cycle begins, the team will have to consider

the priorities and experiences of stakeholders, the ownership of the change process, and the need for enhancing system readiness (Koorts & Rutter, 2021). Should the change reach scale, Burke County would be effectively served by making oversight and management of the generated program a routine job function of a Health Department staff member, and by confirming that programming aligns with county and municipality strategic planning (Crowl et al., 2015). These efforts could be supported by a formal sustainability strategy, developed alongside the MOU. The strategy would ensure that the committee's actions persist, aligning goals with commitment to lasting change and fostering it as a collective and individual priority. See [Appendix A.3.H](#) for an illustrative sustainability protocol.

## **5 Conclusion**

While the analysis in this proposal examines access to exercise opportunities for older adults in Burke County, the strategies and tools proposed could be applied to any number of other intervention points for using the built environment to improve resident health outcomes. The consulting team has provided key contextual considerations, including patterns of system-level behavior and resources for identifying the appropriate community and government partners to lead change. These contextual elements are connected to recommendations for generating, scaling-up, and sustaining change through the application of co-design principles and quality improvement tools. Ultimately, this proposal is a “step one” for moving away from individual perceptions of health and towards community-level responsibility for identifying and addressing connections between Burke County’s built environment and the health of county residents.

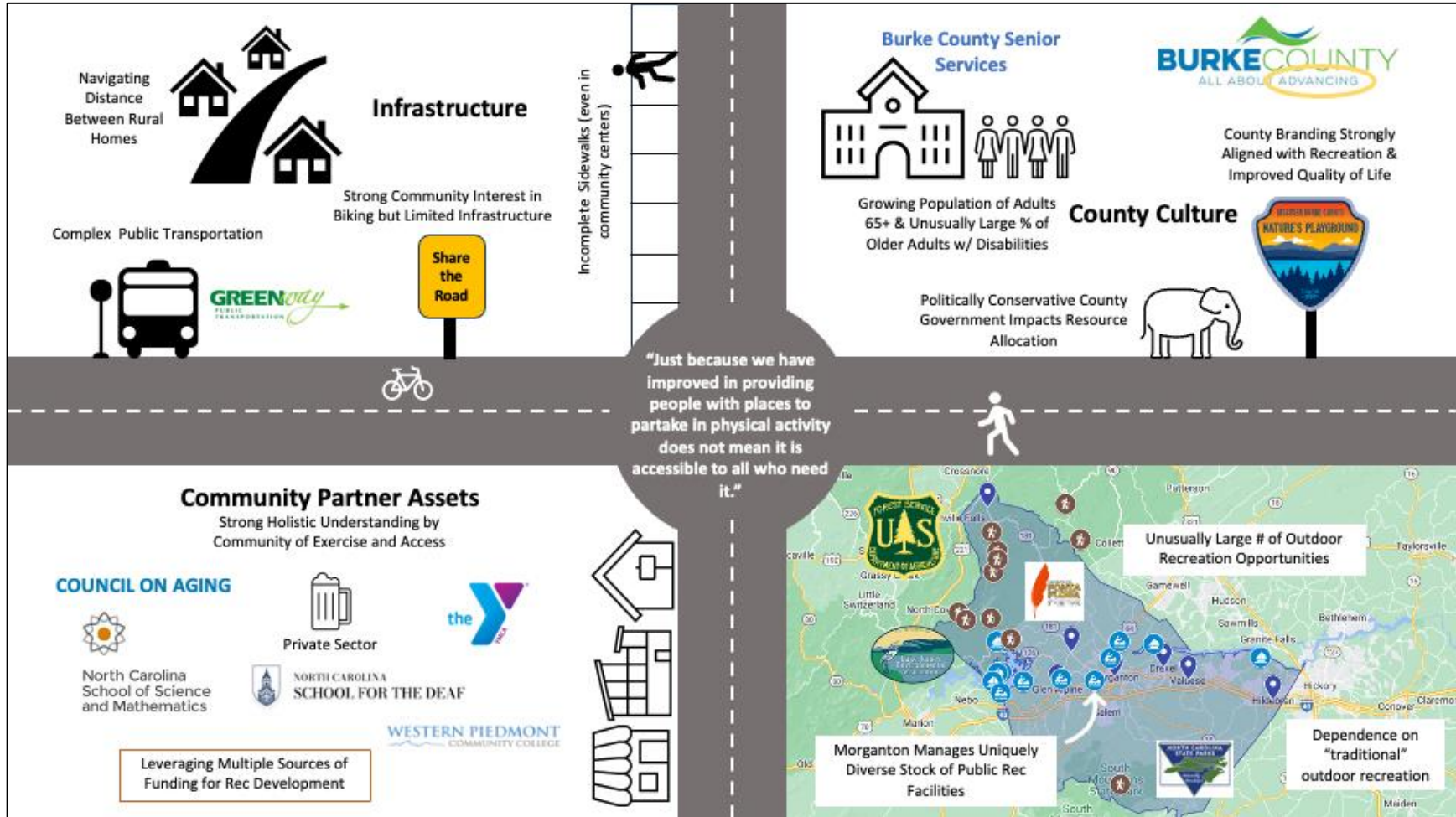
## 6 References

- Aij, K. H., & Teunissen, M. (2017). Lean leadership attributes: a systematic review of the literature. *Journal of Health Organisation and Management*, 31(7/8), 713–729. <https://doi.org/10.1108/jhom-12-2016-0245>
- Bonaccorsi, G., Manzi, F., Del Riccio, M., Setola, N., Naldi, E., Milani, C., Giorgetti, D., Dellisanti, C., & Lorini, C. (2020). Impact of the built environment and the neighborhood in promoting the physical activity and the healthy aging in older people: An umbrella review. *International Journal of Environmental Research and Public Health*, 17(17), 6127. <https://doi.org/10.3390/ijerph17176127>
- Braun, W. (2002). The System Archetypes. In *The Systems Modeling Workbook* (pp. 1–26). [https://www.albany.edu/faculty/gpr/PAD724/724WebArticles/sys\\_archetypes.pdf](https://www.albany.edu/faculty/gpr/PAD724/724WebArticles/sys_archetypes.pdf)
- Burke County. (2022). *2022-2030 Burke County Strategic Land Use Plan*. <https://www.burkenc.org/DocumentCenter/View/298/Blueprint-Burke---Burke-County-Land-Use-Plan>
- Burke County Health Department. (2022). *2022 Burke Community Health Assessment*. <https://www.burkenc.org/DocumentCenter/View/2666/2022-Community-Health-Assessment>
- Burke, North Carolina. (2023). County Health Rankings & Roadmaps. <https://www.countyhealthrankings.org/explore-health-rankings/north-carolina/burke?year=2023>
- CDC. (2022). *Inactivity among Adults 50+*. U.S. DHHS. <https://www.cdc.gov/physicalactivity/inactivity-among-adults-50plus/index.html>
- City of Morganton. (2020). *Fact Sheet: College Street Redesign Project*. [https://www.morgantonnc.gov/sites/default/files/fileattachments/city\\_manager/project/4474/morganton\\_college\\_st\\_fact\\_sheet.pdf](https://www.morgantonnc.gov/sites/default/files/fileattachments/city_manager/project/4474/morganton_college_st_fact_sheet.pdf)
- Crowl, A., Sharma, A., Sorge, L. A., & Sorensen, T. D. (2015). Accelerating quality improvement within your organization: Applying the Model for Improvement. *Journal of the American Pharmacists Association*, 55(4), e364–e376. <https://doi.org/10.1331/japha.2015.15533>
- Cunningham, C., Sullivan, R. O., Caserotti, P., & Tully, M. (2020). Consequences of physical inactivity in older adults: A systematic review of reviews and meta-analyses. *Scandinavian Journal of Medicine & Science in Sports*, 30(5), 816–827. <https://doi.org/10.1111/sms.13616>
- Davies, K. a. B., Pickles, S., Sprung, V. S., Kemp, G. J., Alam, U., Moore, D. R., Tahrani, A., & Cuthbertson, D. J. (2019). Reduced physical activity in young and older adults: metabolic and musculoskeletal implications. *Therapeutic Advances in Endocrinology and Metabolism*, 10, 204201881988882. <https://doi.org/10.1177/2042018819888824>
- De Montigny, J. G., Desjardins, S., & Bouchard, L. (2017). The fundamentals of cross-sector collaboration for social change to promote population health. *Global Health Promotion (Print)*, 26(2), 41–50. <https://doi.org/10.1177/1757975917714036>
- Dombrowski, U., & Mielke, T. (2013). Lean Leadership – Fundamental Principles and their Application. *Procedia CIRP*, 7, 569–574. <https://doi.org/10.1016/j.procir.2013.06.034>

- Haldane, V., Chuah, F. L. H., Srivastava, A., Singh, S., Koh, G. C., Seng, C. K., & Legido-Quigley, H. (2019). Community participation in health services development, implementation, and evaluation: A systematic review of empowerment, health, community, and process outcomes. *PloS One*, *14*(5), e0216112. <https://doi.org/10.1371/journal.pone.0216112>
- Healthy People 2030. (n.d.-a). *Neighborhood and Built Environment*. Retrieved April 14, 2024, from <https://health.gov/healthypeople/objectives-and-data/browse-objectives/neighborhood-and-built-environment>
- Healthy People 2030. (n.d.-b). *Social Determinants of Health*. Retrieved April 14, 2024, from <https://health.gov/healthypeople/objectives-and-data/social-determinants-health>
- Koorts, H., & Rutter, H. (2021). A systems approach to scale-up for population health improvement. *Health Research Policy and Systems*, *19*(1). <https://doi.org/10.1186/s12961-021-00679-0>
- NC DHHS. (2020). *County Aging Profiles 2020: Burke County, NC*. <https://www.ncdhhs.gov/county-aging-profiles-2020pdf/open>
- Public Health Agency of Canada. (2008). *Age-Friendly Rural and Remote Communities: A Guide*. [https://www.phac-aspc.gc.ca/seniors-aines/alt-formats/pdf/publications/public/healthy-sante/age\\_friendly\\_rural/AFRRC\\_en.pdf](https://www.phac-aspc.gc.ca/seniors-aines/alt-formats/pdf/publications/public/healthy-sante/age_friendly_rural/AFRRC_en.pdf)
- Randolph, G. D., Esporas, M., Provost, L., Massie, S., & Bundy, D. G. (2009). Model for Improvement - Part two: Measurement and feedback for quality improvement efforts. *Pediatric Clinics of North America/the αPediatric Clinics of North America*, *56*(4), 779–798. <https://doi.org/10.1016/j.pcl.2009.05.012>
- Sanders, E., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *CoDesign (Print)*, *4*(1), 5–18. <https://doi.org/10.1080/15710880701875068>
- Travert, A., Annerstedt, K. S., & Daivadanam, M. (2019). Built Environment and Health Behaviors: Deconstructing the Black Box of Interactions—A Review of Reviews. *International Journal of Environmental Research and Public Health/International Journal of Environmental Research and Public Health*, *16*(8), 1454. <https://doi.org/10.3390/ijerph16081454>
- Turner, A. M., Reeder, B., & Ramey, J. (2013). Scenarios, personas and user stories: User-centered evidence-based design representations of communicable disease investigations. *Journal of Biomedical Informatics*, *46*(4), 575–584. <https://doi.org/10.1016/j.jbi.2013.04.006>
- U.S. DHHS. (1982). *A Guide to Memorandum of Understanding Negotiation and Development*. <https://aspe.hhs.gov/sites/default/files/private/pdf/73991/mouguide.pdf>
- WPCG Area Agency on Aging. (2016). *Resource Directory for Older Adults*. Western Piedmont Council of Governments. [https://media.wix.com/ugd/960958\\_937d7bfd2fa4e78bd85c50da3b686f0.pdf](https://media.wix.com/ugd/960958_937d7bfd2fa4e78bd85c50da3b686f0.pdf)
- WPRTA. (2024). *Rider Information*. <https://www.mygreenway.org/riderinformation>

# Appendix A: Proposal Supplementary Material

## Appendix A.1: Rich Picture



## Appendix A.2: Group Presentation

**“Who does not have access that needs or wants access?”**

**Improving Access to Exercise Opportunities in Burke County for Older Adults through a Strategic Built Environment**

Proposal Developed for Burke County Board of Commissioners  
April 16, 2024  
*Bradley Caison, Tsaiwei Cheng, Audrey Fratus, Lindsay Parlberg*

**Lindsay:** Thanks for the opportunity to present today. I’m Lindsay and I’m pleased to introduce our group members: Tsaiwei, Brad, and Audrey. Together we have developed this project titled “Who does not have access that needs or wants access?”: Improving Access to Exercise Opportunities in Burke County for Older Adults Through a Strategic Built Environment.

**Proposal Contents**

*What are we here to discuss today?*

### Introduction

### Proposal Development Process

### Contextual Analysis

- Social Determinants of Health & Burke County Policies
- Systems Analysis
- Quality Improvement & Change Leadership

### Recommendations for Action

- Co-Design Process & Tools
- Identifying Change Concepts
- Strategies for Scale-Up
- Sustaining Change

### Conclusion

### References

**Lindsay:** This afternoon throughout our presentation we will discuss the methodology used during the proposal developed; provide a detailed Contextual Analysis; then we conclude by highlighting Recommendations for Action.

## Introduction

*Why did we develop this proposal?*

**Affiliation:** University of North Carolina at Chapel Hill Gillings School of Global Public Health

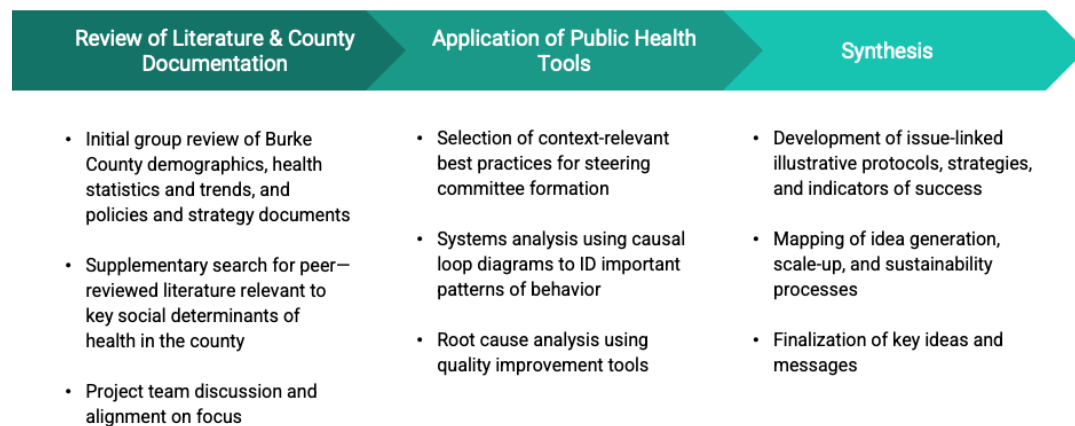
**Commission:** Recommend structures and tools for leveraging social determinants of health to improve the wellbeing of Burke County residents

**Focus:** Built Environment

**Motivation:** 2022 CHA results that indicated an interest in moving beyond provision of resources and into meaningful accessibility<sup>1</sup>

**Lindsay:** At the Board’s request, our proposal moves beyond the medical factors that contribute to individual and population health, and instead examines the connections between social factors and health outcomes, called social determinants of health. At this level, county decision-makers are better able to see connections between their areas of influence and the ultimate health outcomes, positive and negative, of their community.

## Proposal Development Process



**Tsaiwei:** Our proposal development process included a review of county documents, such as CHAs, recreation and land use strategies, the accreditation report, and any pertinent peer reviewed literature. After reviewing literature and documentation, we applied public health tools to understand context and develop recommendations. Lastly, our findings were synthesized into clear action items and organized proposal resources.



# Contextual Analysis

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## What is the built environment?<sup>2</sup>



The buildings we live, work, and play in



Transportation systems



Roadways, bridges, and signage

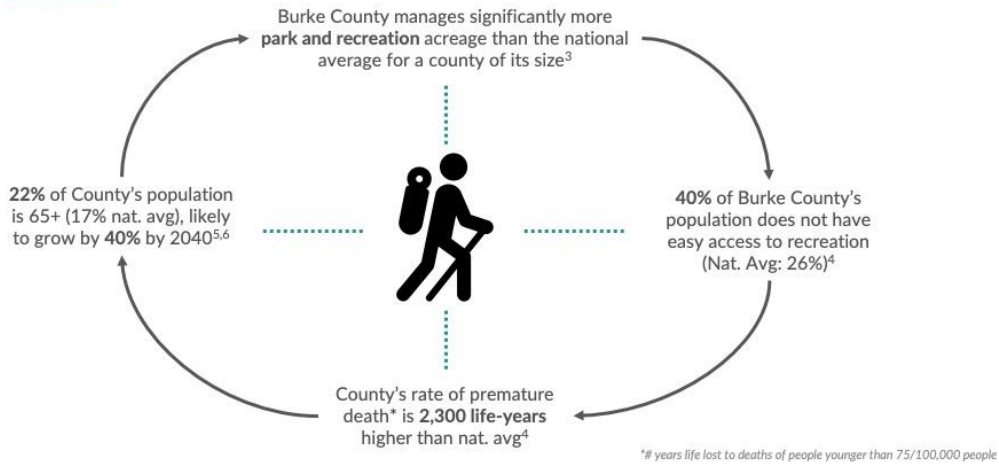


Utilities

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**Audrey:** The proposed actions detailed in this document are grounded in a focused analysis of a single social determinant of health, the built environment. When a person walks out the door, where they can go, how they can get there, and what they can do when they arrive are all shaped by the design and development of infrastructure, buildings, and landscaping.

## Access to Exercise Opportunities in Burke County



**Audrey:** The effect of the built environment on engagement with healthy behaviors is demonstrated most immediately by individual and community decisions about where, when, and how much to engage in physical activity. Inaccessible resources and exclusionary design are significant obstacles to daily exercise, particularly for adults over 65, who make up a growing portion of Burke County's population. Despite the county's unusually large stock of recreation space and facilities, Burke County is below the national average for access to exercise opportunities by a significant margin, which in turn is associated with excess morbidity and mortality. Deficiencies in the built environment are known to disproportionately and negatively impact the willingness of adults 65 and older to use available resources. For that reason, we recommend targeting that population for intervention.

## Policy Environment

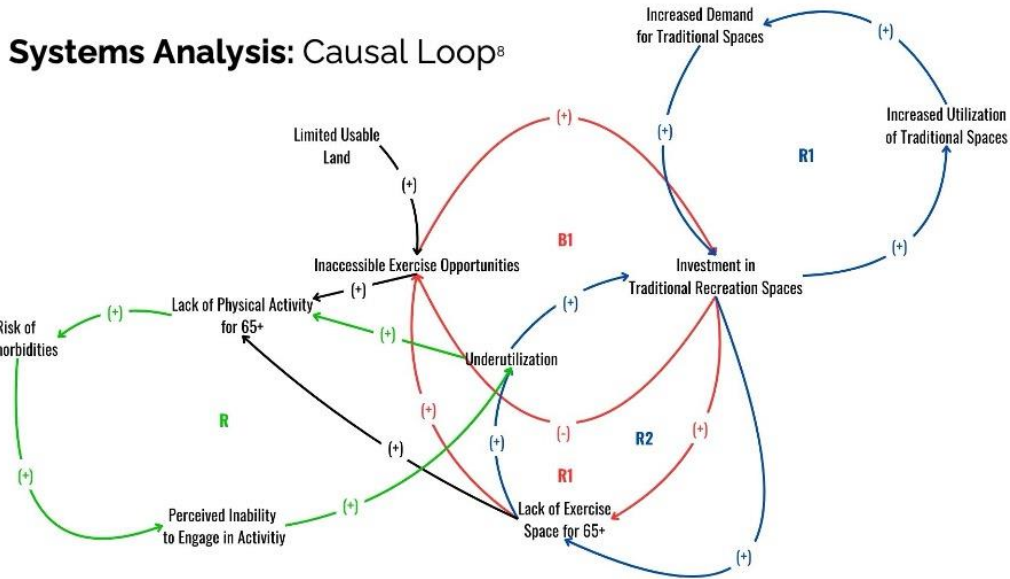
- Association between recreation and Burke County's branding and identity
- Pursuit of funding and land acquisition for recreation infrastructure (e.g., the development of multimodal streetscapes in Morganton)<sup>7</sup>
- Fiscal responsibility and an emphasis on economic development drive a portion of infrastructural policy decisions<sup>3</sup>

## DISCOVER BURKE COUNTY NATURE'S PLAYGROUND

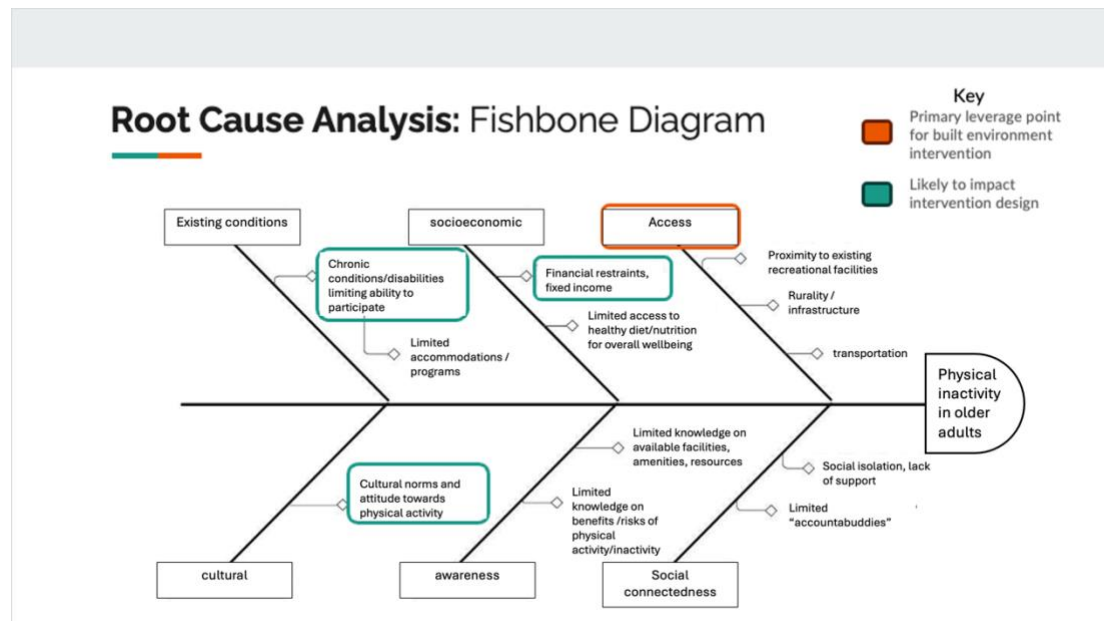


**Audrey:** Burke County decision-makers have already identified recreation for all residents as a key strategic priority for developing the local economy and improving health outcomes and have taken policy

steps that are cognizant of the connection between infrastructure and health. Health leaders within the county have also independently noted that they are now in a position to move beyond simple provision of recreation resources and toward meaningful age-inclusive accessibility. This proposal leverages these existing commitments and resources.



**Brad:** We employed a systems analysis approach to map out the complex interactions contributing to the current state of exercise accessibility. Using a causal loop diagram, we identified key system behaviors known as archetypes that perpetuate the challenges faced by our older adult population. This holistic view helped us understand the recurring patterns and feedback loops that must be addressed to create lasting change. Two demonstrated archetypes, Fixes that Fail (illustrated by the red loop) and Success to the Successful (illustrated by the blue loop), depict cycles that feed back into a system which can create disenfranchisement from recreation activities for adults 65+ in Burke County.



**Tsaiwei:** Complimenting our systems analysis, we conducted a root cause analysis on the lack of engagement in physical activity for our priority population, illustrated here with a fishbone diagram. The causes related to physical access, highlighted in orange, are the most pertinent to the build environment. The causes highlighted in green were noted to have strong links to perception of accessibility and willingness to engage, which could be considered in built environment interventions.

## Change Leadership

Proposed Steering Committee Membership <sup>9</sup>		Steering Committee Success Measurement Tools <sup>9</sup>	
Burke County Senior Services	Burke County Recreation	Focus Area	Illustrative Measurement Tool
County Council on Aging	Phifer Family YMCA	<b>Member Engagement</b>	Track meeting attendance, participation, and task completion
UNC Health Blue Ridge	65+ Community Member	<b>Member Relationships</b>	Survey the quality of interactions and willingness to collaborate
25-50 Community Member	AARP Chapter 3262	<b>Coalition Capacity</b>	Evaluate resources and skill alignment with objectives
Burke Wellness Initiative	Chamber of Commerce	<b>Achievement of Goals</b>	Set & monitor measurable targets and maintain reporting system

**Tsaiwei:** In consideration of change leadership, we recommend forming a steering committee with diverse representation from relevant groups and provided a committee success measurement tool. Note that given Burke County’s population demographics, many of these proposed representatives may wear two hats: 1. a personal perspective as an older resident of the county and 2. a professional perspective. The steering committee success is connected to clear and consistent mission alignment and the cultivation of intermember relationships. The measurement tools on the right will help evaluate success and ensure that the efforts are fruitful and efficient.

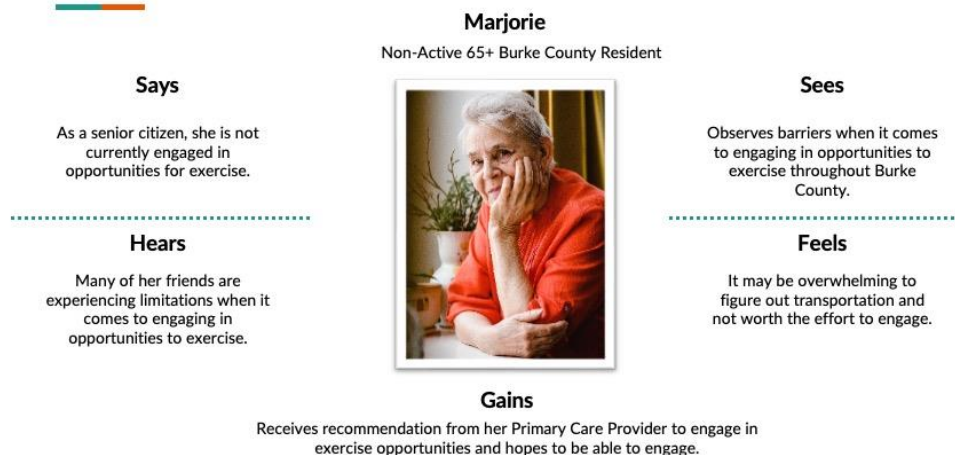
## Recommendations for Action

## Integrating Co-Design Principles & Practices<sup>10,11</sup>



**Lindsay:** Co-design is important thought the early stages of design process and beyond as it helps in identifying users that not easily identified through traditional methods, and it allows the opportunity for teaching stakeholders and users how to design a system so that everyday people can participate in the design process.

## Empathy Mapping<sup>12</sup>



**Lindsay:** As part of the co-design process personas were developed highlighting the experience of Burke County Seniors. Shown here is an empathy map for Marjorie highlighting what she says “As a senior citizen, she is not currently engaged in opportunities for exercise” ; what she hears “Many of her friends are experiencing similar limitations”; what she sees in her community “Observes barriers when it comes to engaging in opportunities to exercise throughout Burke County” How she feels “and importantly what she hopes to Gain “Receives recommendation from her Primary Care Provider to engage in exercise opportunities and hopes to be able to engage.

## Generating Change Concepts: Gemba Walks

A Quality Improvement tool designed to have co-designers physically experience processes to ID areas for change.<sup>13</sup> Best for challenges related to physical environment.

In Burke County: Steering Committee members should follow each step of accessing common recreation resources, noting observations and ideas.



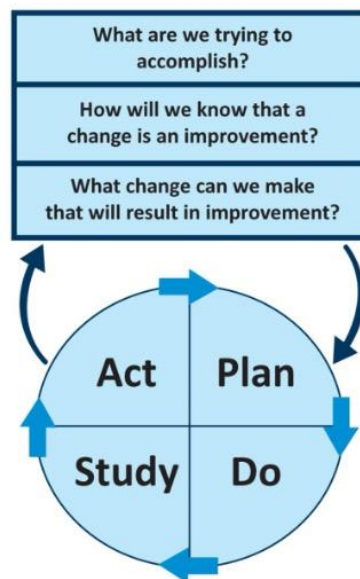
**Audrey:** In order to identify change concepts while aligning with county health department accreditation requirements, we recommend using quality improvement tools and principles. One context and challenge-appropriate approach we recommend to generate intervention ideas is a Gemba Walk. Gemba, which means “on-site” in Japanese, requires co-designers to physically experience the processes they hope to change or influence. For example, members of the co-design team might physically move through the steps of leaving their home, using public transportation to get to the recreation center, joining a senior aquatics class, and transiting home, while noting all the sensations, emotions, and experiences they have along the way. Gemba Walks help design teams identify points in the process in need of change, though they should also be paired with additional consultation with co-designers and community stakeholders who have lived experience.

## Scaling Up Change

Model for Improvement<sup>14</sup>

### Considerations for Scale-Up<sup>15</sup>

- Priorities and experiences of stakeholders
- Changing ownership of change process
- Documenting and expanding system readiness



**Lindsay:** After the co-design team has developed candidate change concepts, the Model for Improvement (MOI) would be an appropriate framework for testing their viability as this requires clear insight for what the project team wants to accomplish and the degree to which the change their concept proposes will move them towards that target. This is paired with an iterative implementation and analysis cycle that starts with small scale prototypes and slowly expands. As each new cycle begins, the team will have the opportunity to consider the priorities and experiences of stakeholders, the ownership of the change process, and the need for expanding system readiness.



**Brad:** Our proposal offers a sustainability framework to guide Burke County in fostering long-term health initiatives. It emphasizes the formation of partnerships with local entities aligned with the goal of promoting active lifestyles. Such collaborations can enrich the community's health landscape and ensure a broad base of support. We also highlight the importance of diverse funding strategies, encouraging the county to pursue grants targeted at health and active living, alongside community-driven fundraising activities like health fairs or fun runs. These efforts not only secure necessary funds but also galvanize community spirit around wellness. A crucial element of our proposal is the integration of active living principles into urban planning and policy. We advocate for policies that prioritize accessibility and physical activity in future developments, ensuring that public spaces and infrastructure support an active and inclusive community. This blueprint is designed to provide County Commissioners with a strategic approach to embedding health and wellness into Burke County's fabric, ensuring that initiatives for active living are sustainable and impactful over time.

# Conclusion & Commitment

*A built environment strategy which leverages Burke County's existing strengths and is equally age-inclusive in its decision-making philosophy and its design outcomes.*

**Brad:** We hope this overview of our proposal helps to get gears turning for how County leadership could approach change in the built environment to improve the health of county residents, particularly those 65 and older. Our recommendations are ultimately rooted in the county's existing commitment to providing meaningful opportunities for physical activity to all residents and the policies and relationships already in place in Burke County that support that aim. The analysis aims to disrupt the current contradiction of abundant recreation resources and faltering resident utilization by clarifying the patterns of behavior and decision making active in the county that lead to that disconnect. The county is then positioned to take up the toolbox of resources – co-design, quality improvement, policy development, effective committee management – to enact meaningful and sustainable change in Burke County's built environment. Thank you for giving us the opportunity to share with you today.

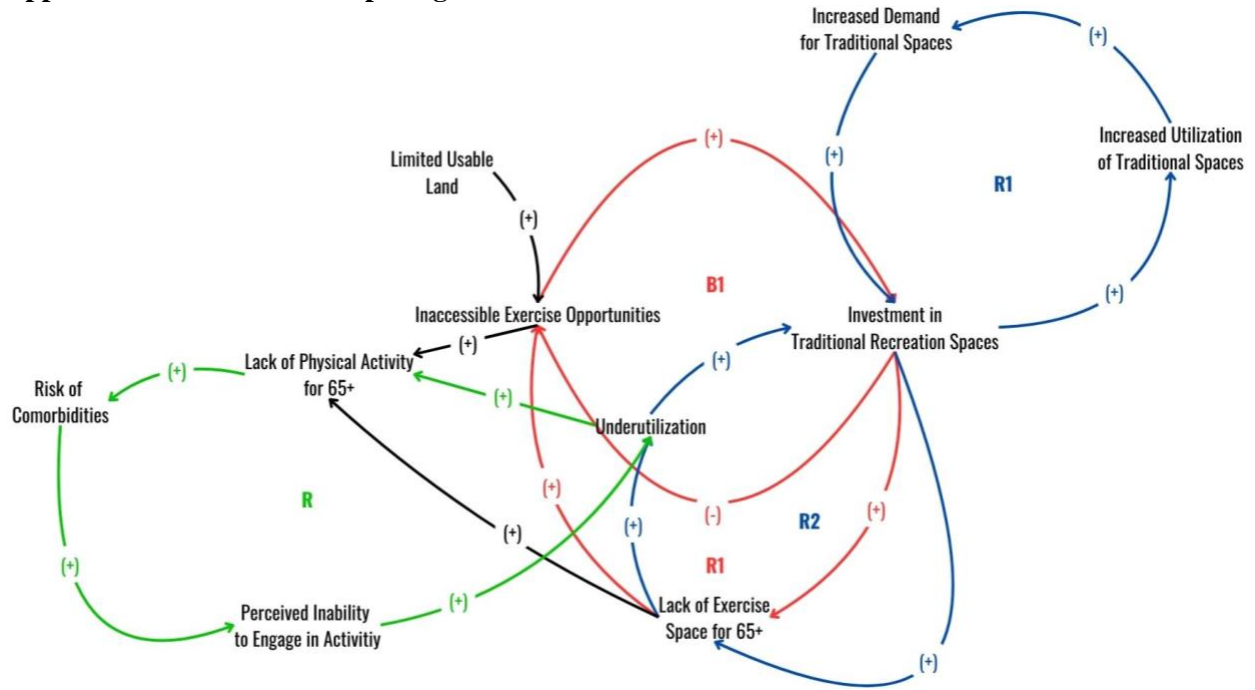
## References

1. Burke County Health Department. (2022). 2022 Burke Community Health Assessment. <https://www.burkenc.org/DocumentCenter/View/2666/2022-Community-Health-Assessment>
2. Healthy People 2030. (n.d.-a). Neighborhood and Built Environment. Retrieved April 14, 2024, from <https://health.gov/healthypeople/objectives-and-data/browse-objectives/neighborhood-and-built-environment>
3. Burke County. (2022). 2022-2030 Burke County Strategic Land Use Plan. <https://www.burkenc.org/DocumentCenter/View/298/Blueprint-Burke---Burke-County-Land-Use-Plan>
4. Burke, North Carolina. (2023). County Health Rankings & Roadmaps. <https://www.countyhealthrankings.org/explore-health-rankings/north-carolina/burke?year=2023>
5. NC DHHS. (2020). County Aging Profiles 2020: Burke County, NC. <https://www.ncdhhs.gov/county-aging-profiles-2020pdf/open>
6. Bonaccorsi, G., et al. (2020). Impact of the built environment and the neighborhood in promoting the physical activity and the healthy aging in older people: An umbrella review. *International Journal of Environmental Research and Public Health*, 17(17), 6127. <https://doi.org/10.3390/ijerph17176127>
7. City of Morganton. (2020). Fact Sheet: College Street Redesign Project. [https://www.morgantonnc.gov/sites/default/files/fileattachments/city\\_manager/object/4474/morganton\\_college\\_st\\_fact\\_sheet.pdf](https://www.morgantonnc.gov/sites/default/files/fileattachments/city_manager/object/4474/morganton_college_st_fact_sheet.pdf)
8. Braun, W. (2002). The System Archetypes. In *The Systems Modeling Workbook* (pp. 1–26). [https://www.albany.edu/faculty/gpr/PAD724/724WebArticles/sys\\_archetypes.pdf](https://www.albany.edu/faculty/gpr/PAD724/724WebArticles/sys_archetypes.pdf)
9. De Montigny, J. G., Desjardins, S., & Bouchard, L. (2017). The fundamentals of cross-sector collaboration for social change to promote population health. *Global Health Promotion* (Print), 26(2), 41–50. <https://doi.org/10.1177/1757975917714036>
10. Haldane, V., Chuah, F. L. H., Srivastava, A., Singh, S., Koh, G. C., Seng, C. K., & Legido-Quigley, H. (2019). Community participation in health services development, implementation, and evaluation: A systematic review of empowerment, health, community, and process outcomes. *PLoS One*, 14(5), e0216112. <https://doi.org/10.1371/journal.pone.0216112>
11. Sanders, E., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *CoDesign* (Print), 4(1), 5–18. <https://doi.org/10.1080/15710880701875068>
12. Turner, A. M., Reeder, B., & Ramey, J. (2013). Scenarios, personas and user stories: User-centered evidence-based design representations of communicable disease investigations. *Journal of Biomedical Informatics*, 46(4), 575–584. <https://doi.org/10.1016/j.jbi.2013.04.006>
13. Dombrowski, U., & Mielke, T. (2013). Lean Leadership – Fundamental Principles and their Application. *Procedia CIRP*, 7, 569–574. <https://doi.org/10.1016/j.procir.2013.06.034>
14. Randolph, G. D., Esporas, M., Provost, L., Massie, S., & Bundy, D. G. (2009). Model for Improvement - Part two: Measurement and feedback for quality improvement efforts. *Pediatric Clinics of North America*, 56(4), 779–798. <https://doi.org/10.1016/j.pcl.2009.05.012>
15. Koorts, H., & Rutter, H. (2021). A systems approach to scale-up for population health improvement. *Health Research Policy and Systems*, 19(1). <https://doi.org/10.1186/s12961-021-00679-0>



## Appendix A.3: Additional Resources

### Appendix A.3.A: Causal Loop Diagram



*Note.* Causal loop diagram depicting system variables related to access to exercise opportunities in Burke County.

**Appendix A.3.B: Model Memorandum of Understanding**

**Burke County Steering Committee Memorandum of Understanding**

**Memorandum of Understanding**

Between  
(Partner)  
and  
(Partner)

This Memorandum of Understanding (MOU) sets for the terms and understanding between the (partner) and the (partner) and the (partner) and the (partner)..... to (insert activity).

**Background**

(Why partnership important)

**Purpose**

This MOU will (purpose/goals of partnership)

The above goals will be accomplished by undertaking the following activities:

(List and describe the activities that are planned for the partnership and who will do what)

**Reporting & Deliverables**

(Record who will evaluate effectiveness and adherence to the agreement and when evaluation will happen)

**Funding**

(Specify that this MOU is not a commitment of funds)

**Duration & Roles/Responsibilities**

This MOU is at-will and may be modified by mutual consent of authorized officials from (list partners). This MOU shall become effective upon signature by the authorized officials from the (list partners) and will remain in effect until modified or terminated by any one of the partners by mutual consent. In the absence of mutual agreement by the authorized officials from (list partners) this MOU shall end on (end date of partnership).

**Contact Information**

Partner name	Partner name
Partner representative	Partner representative
Position	Position
Address	Address
Telephone	Telephone
E-mail	E-mail

### Appendix A.3.C: Measurement Tools for Steering Committee Success

<b>Target</b>	<b>Measurement Tool</b>
Member Engagement	Track meeting attendance, participation, and task completion, supplemented by engagement surveys to gauge member interest and satisfaction
Member Relationships	Survey the quality of interactions and willingness to collaborate, utilize peer feedback, and assess the success of joint initiatives as relationship strength indicators.
Coalition Capacity	Evaluate resources and skills alignment with objectives, member perceptions of coalition effectiveness, and adherence to planned activities.
Goal Achievement	Set and monitor measurable targets for goals, visualize progress through dashboards, convene regular progress reviews, and maintain an update reporting system.

## **Appendix A.3.D: Conflict Management Protocol**

### **I. Group Consensus on Conflict Management Processes**

The Parties hereby agree to the following conflict management processes, which have been developed in a spirit of cooperation and mutual respect:

#### **1. Initiation of Conflict Management Protocol**

a. The conflict management process shall be initiated when any of the following conditions are met:

- i. A formal complaint is lodged by one Party against another.
- ii. There is a persistent disagreement that disrupts committee activities.
- iii. Mutual consent by the Parties that a conflict exists and needs to be resolved through the protocol.

#### **2. Terms of Engaging in Conflict Management Protocol**

a. The Parties agree to the following terms of engagement:

- i. All communication shall be conducted respectfully and constructively.
- ii. The conflict management process will take place at a neutral location agreed upon by all Parties.
- iii. The process shall begin within a timeframe of [Insert Number] days following the acknowledgment of a conflict.

#### **3. Steps Towards Resolution**

a. The steps toward resolution shall include:

- i. Clear articulation of the conflict by the involved Parties.
- ii. Facilitated discussion sessions aimed at understanding all perspectives.
- iii. Identification of possible solutions and negotiation of an equitable resolution.
- iv. Formal voting by the steering committee if consensus cannot be reached.

#### **4. Accountability & Follow-Up**

a. Once a resolution is agreed upon, the following structures will ensure accountability:

- i. A written agreement outlining the terms of the resolution, to be signed by the involved Parties.
- ii. Designation of an individual or sub-committee responsible for overseeing the implementation of the resolution.
- iii. A scheduled follow-up meeting within [Insert Number] days to assess the effectiveness of the resolution and ensure compliance.

## **II. Amendment of MOU**

This MOU may be amended at any time by mutual consent of the Parties. Proposed amendments must be presented in writing and agreed upon in the same manner as the original MOU.

### **III. Duration of MOU**

This MOU is effective upon the date of the last signature below and will remain in effect for [Insert Duration] or until modified or terminated by any Party with [Insert Number] days' written notice.

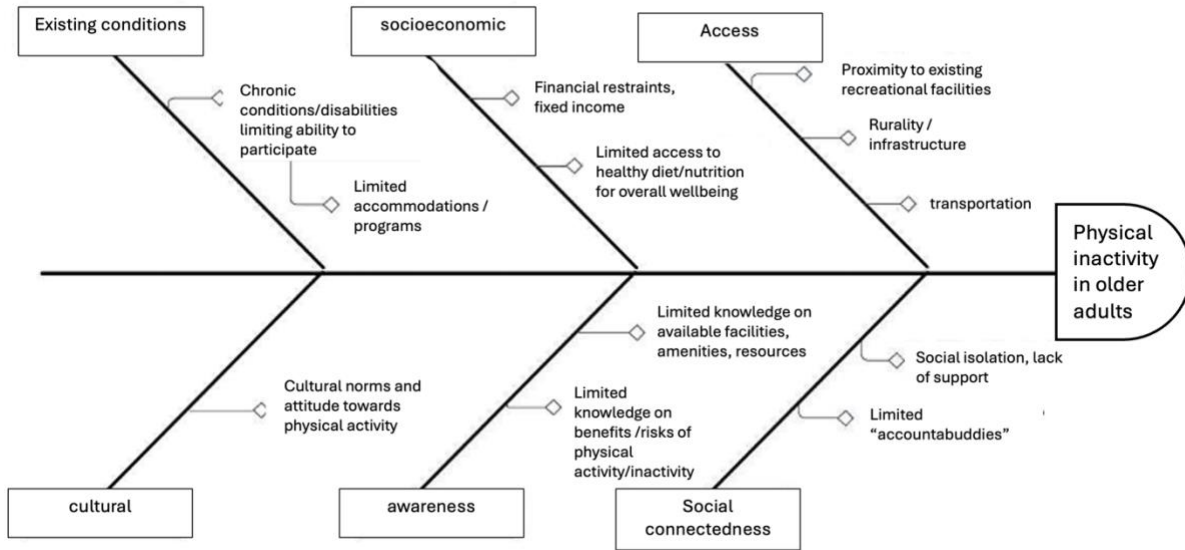
### **IV. Signatures**

This MOU expresses the full and complete understanding of the Parties regarding the subject matter and supersedes all prior representations and understandings, whether oral or written. Agreement to this MOU does not imply any commitment to provide funding.

[Name], [Title] Date

[Repeat for each Party]

### Appendix A.3.E: Root Cause Analysis

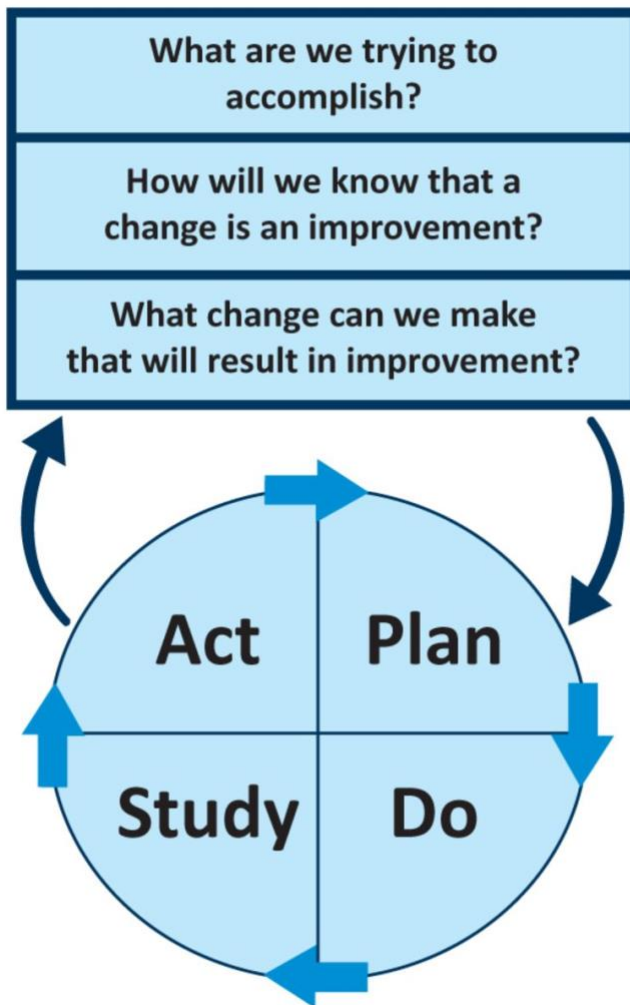


### Appendix A.3.F: User Stories & Quality Characteristics

User Type	User Story
<b>Active 65+ Community Member</b>	<ol style="list-style-type: none"> <li>1. As an active Burke County Senior, I want to ensure the voices of my community are heard to provide greater access to opportunities to engage in exercise.</li> <li>2. As an active Burke County Senior, I want adequate time with the project designers to build sustainable program infrastructure leveraging our community's existing resources.</li> <li>3. As an active Burke County Senior, I want easy to schedule check ins on the ongoing programs to solve potential problems in real time.</li> </ol>
<b>Non-Active 65+ Community Member</b>	<ol style="list-style-type: none"> <li>1. As a non-active Burke County Senior, I want to ensure the voices of my community and peers are heard to provide greater access to insight to the limitations upon those of us who are unable to currently engage in opportunities to exercise.</li> <li>2. As a non-active Burke County Senior I want to view and have access to information about the proposed opportunities so I can better advise and support the community.</li> <li>3. As a non-active Burke County Senior I want to be able to balance my personal/work life and not spend time worrying about transportation so I can spend more time engaging in opportunities to exercise.</li> </ol>

User Needs	Quality Characteristics
<b><u>Active Burke County Senior (65+)</u></b>	
I want to ensure the voices of my community are heard to provide greater access to opportunities to engage in exercise.	The number of times community members are called upon to provide insight and experiences during the design process.
I want adequate time with the project designers to build sustainable program infrastructure leveraging our community's existing resources.	Average number of planning meetings able to attend and engage in.
I want easy to schedule check ins on the ongoing programs to solve potential problems in real time.	Percentage of time the teams are available to check in and solve problems compared to unanswered communications.
<b><u>Non-Active Burke County Senior (65+)</u></b>	
I want to view and have access to information about the proposed opportunities so I can better advise and support the community.	Percentage of plans and materials shared with the target population before finalization.
I want to ensure the voices of my community and peers are heard to provide greater access to insight to the limitations upon those of us who are unable to currently engage in opportunities to exercise.	Percentage of meetings in which key community members are invited to provide feedback and insight during planning meetings.
I want to be to be able to balance my personal/work life and not spend time worrying about transportation so I can spend more time engaging in opportunities to exercise.	Average number exercise opportunities engaged in

### Appendix A.3.G: Model for Improvement



Source: Vaux, E., Went, S., Norris, M. J., & Ingham, J. (2012). Learning to make a difference: introducing quality improvement methods to core medical trainees. *Clinical Medicine*, 12(6), 520–525. <https://doi.org/10.7861/clinmedicine.12-6-520>



## **Appendix A.3.H: Sustainability Strategy**

### **I. Introduction**

This Sustainability Plan is created to ensure the ongoing success and the continual improvement of the [Steering Committee/Coalition Name]. It outlines methods for sustaining the partnership, fostering growth and adaptation, and facilitating leadership transitions to maintain momentum in achieving our goals.

### **II. Sustaining the Partnership**

1. **Continual Reassessment and Adaptation** a. Establish a bi-annual review process to assess the effectiveness of the partnership and identify areas for improvement. b. Solicit feedback from all members and stakeholders to inform the adaptation process. c. Update strategies and goals accordingly to reflect the changing needs of the community and the partnership.
2. **Resource Allocation and Management** a. Develop a diversified funding strategy that includes grants, local businesses contributions, and fundraising activities. b. Designate a finance sub-committee to oversee budgeting, resource allocation, and financial planning.
3. **Communication and Engagement** a. Maintain open and regular communication through monthly newsletters, meetings, and an updated website. b. Cultivate community engagement through public forums, surveys, and collaborative events.

### **III. Evolution and Expansion of the Partnership**

1. **Incorporating New Members and Partners** a. Create an inclusive membership policy that allows new entities to join the partnership. b. Develop an orientation program for new members to ensure alignment with the partnership's vision and operations.
2. **Leadership Development and Transition** a. Establish a leadership development program to prepare members for potential leadership roles. b. Implement a structured transition plan for leadership roles, ensuring continuity and stability.

### **IV. Building Upon Successes**

1. **Recognition and Replication** a. Celebrate achievements and share success stories both internally and in the wider community. b. Document best practices and lessons learned to replicate successful initiatives.
2. **Continuous Improvement** a. Leverage successes to enhance the partnership's credibility and to secure additional resources. b. Encourage innovation and the exploration of new ideas to build upon initial successes.

## **V. Conclusion**

The [Steering Committee/Coalition Name] is committed to a sustainable future by implementing this plan. We will strive for growth, adaptability, and resilience, ensuring that our partnership remains effective and responsive to the needs of those we serve.

## **Appendix B: Bradley Caison Individual Deliverables**

### **Appendix B.1: Social Determinant of Health Analysis**

#### **Neighborhood & Built Environment**

The physical environment around where one lives, works, and plays has substantial influence on individual and community health. From short-term effects asthma induced by reduced air quality to long-term impacts such as poorly designed communities which don't allow for safe recreation, our built environment's influence is a far-reaching social determinant of health which Healthy NC 2030 has identified as a key indicator to focus on to further the overall health of North Carolina communities (North Carolina Institute of Medicine, 2020). One key component of built environment is access to exercise opportunities to promote physical health and prevent many persisting chronic conditions which continue to be top health issues for North Carolinians (North Carolina Institute of Medicine, 2020).

#### **Defining Access to Exercise Opportunities**

Access to Exercise Opportunities is operationalized by Healthy NC 2030 as the “percent of the population a half mile from a park in any area, one mile from a recreational center in a metropolitan area, or three miles from a recreational center in a rural area. (North Carolina Institute of Medicine, 2020).” Most people choose to exercise in their own neighborhood, and those with facilities close to their residence or place of employment are more likely to engage in regular physical activity, thereby making access to proximal exercise opportunities for communities important (Giles- Corti et al., 2008; Andrade et al., 2021). However, the term “access” should be more properly defined. Geographic distance is only one of a multitude of factors that influence accessibility of recreational facilities (Omura et al., 2020).

#### ***Associated Health Impacts***

Regular moderate-to-vigorous physical activity has been shown to reduce the risk of various negative health outcomes such as cardiovascular disease, type-2 diabetes, hypertension, and dementia as well as improve overall quality of life (U.S Department of Health and Human Services, 2018). Benefits of regular physical activity span across the lifecycle including improvements related to bone health, weight status,

fitness and cognition for children in adolescents in addition to lower risk of falls and fall-related injuries for older adults (U.S Department of Health and Human Services, 2018). In areas with low access to exercise opportunities, prevalence of cardiovascular disease, obesity, and diabetes is higher than areas with greater access to opportunities for exercise and recreation (Angraal et al., 2019).

## **Geographic & Situational Context**

### ***County Demographics***

Burke County has an estimated population of 87,881 residents (U.S Census Bureau, 2022). Burke County is a predominantly white county, with a percentage (80.8%) of white residents compared to the state average. Burke county has an aging population, with a higher percentage of residents over the age of 65 compared to the state average (61.5%). Furthermore, it is projected that populations over the age of 65 will experience the highest growth in Burke County by 2042 (North Carolina Department of Health and Human Services Division of Aging and Adult Services, 2024). See [Appendix B.1.A](#) for a detailed demographic breakdown of Burke County compared to the state of North Carolina.

### ***Access to Exercise Opportunities in Burke County***

Burke County has rugged topography which influences the usability of available land, thereby impacting accessibility of exercise opportunities and recreation (Burke County, 2022; Wu et al., 2023). Furthermore, aging infrastructure within the county could require updates to meet the accessibility needs required for some county residents to utilize exercise facilities (Burke County 2022, Burgstahler, 2021).

### ***County Assets & Resources***

Multiple assets and resources already exist within Burke County related to access to exercise opportunities. Burke County's Facilities & Parks Department currently maintains three county own parks (Burke County, n.d.). Furthermore, Burke County Senior Services provides entry points for a variety of aging related services as well as opportunities for recreation and physical activity through two different branches (Western Piedmont Council of Governments Area Agency on Aging, 2016). Various partners within the community could afford beneficial partnerships as well through shared use agreements of their recreation facilities including Western Piedmont Community College, NC School for the Deaf, and the

North Carolina School for Science and Mathematics (Burke County, 2022). Moreover, a variety of natural attractions and trails make Burke County an excellent location for developing further outdoor recreation facilities, parks, and trails that are universally accessible (Burke County Visitors Center, n.d.).

### **Priority Population**

Given the aging population of Burke County, correlations between access to exercise opportunities and longevity of life, as well as specific conditions within Burke County, a specific population of interest for this social determinant of health are adults residing in Burke County over the age of 65.

### **Measures**

Older adults are less likely to engage in leisure-time physical activity compared to their younger counterparts. See [Appendix B.1.B](#) comparing trends in leisure-time activity between age groups from 2008 to 2018. Adults over the age of 65 averaged higher than their younger counterparts when reporting no leisure-time activity, and consistently averaged above the Healthy People 2020 target goal of 32.6% (Office of Disease Prevention and Health Promotion, 2021). Older adults are also more likely to experience comorbidities associated with lack of physical activity. Adults over the age of 65 in Burke County are more likely to be living with a disability compared to the state average, with 42% of adults over the age of 65 identified disability compared to the state average of 34% (North Carolina Department of Health and Human Services, 2024). Adults with disabilities are less likely to achieve recommended physical activity guidelines benchmarks and are more likely to experience the complications associated with lack of exercise opportunities mentioned previously compared to adults without disabilities (Centers for Disease Control and Prevention, 2019). See [Appendix B.1.C](#) comparing reported leisure-time activity between adults who do and do not identify as having a disability.

### **Rationale**

Multiple factors justify investing Burke County resources towards increasing access to exercise opportunities for residents 65 years and older. Due to the already substantial aging population in Burke County, and the forecast that it will increase over the next two decades, there will likely be an increasing for these services (North Carolina Department of Health and Human Services, 2024; Western Piedmont

Council of Governments Area Agency on Aging, 2016). Data also suggests that investment costs made in creating more accessible recreation and tourism features can create significant economic benefits thereby outweighing the initial starting costs (European Commission & DG Enterprise and Industry, n.d.).

## References

- Andrade, L., Geffin, R., Maguire, M., Rodriguez, P., Castro, G., Alkhatib, A., & Barengo, N. C. (2021). The associations between access to recreational facilities and adherence to the American Heart Association's physical activity guidelines in US adults. *Frontiers in Public Health*, 9, 660624-660624. <https://doi.org/10.3389/fpubh.2021.660624>
- Angraal, S., Gupta, A., Khera, R., Nasir, K., & Desai, N. R. (2019). Association of access to exercise opportunities and cardiovascular mortality. *The American Heart Journal*, 212, 152-156. <https://doi.org/10.1016/j.ahj.2019.02.010>
- Becerra, A. (2021). *The Americans with Disabilities Act at 31*. U.S Department of Health and Human Services. <https://www.hhs.gov/blog/2021/07/26/the-americans-with-disabilities-act-at-31.html>
- Burgstahler, S. (2021). *Universal design: Process, principles, and applications*. University of Washington. [https://www.washington.edu/doit/sites/default/files/atoms/files/Universal\\_Design\\_04\\_12\\_21.pdf](https://www.washington.edu/doit/sites/default/files/atoms/files/Universal_Design_04_12_21.pdf)
- Burke County Visitors Center. (n.d.) *Parks & forests*. Retrieved on January 23, 2024 from <https://www.discoverburkecounty.com/all-attractions/?subcategories=parks-forests>
- Burke County. (2022). *Blueprint Burke strategic land use plan*. <https://www.burkenc.org/DocumentCenter/View/298/Blueprint-Burke---Burke-County-Land-Use-Plan>
- Burke County. (n.d.). *Facilities & parks*. Retrieved on January 23, 2024 from <https://www.burkenc.org/1238/Facilities-Parks>
- Centers for Disease Control and Prevention. (2019). *Disability and health data system*. <https://dhds.cdc.gov>
- European Commission & DG Enterprise and Industry. (n.d.). *Economic impact and travel patterns of accessible tourism in Europe – Final report summary*. <https://www.accessibletourism.org/resources/toolip/doc/2014/07/06/study-a-economic-impact-and-travel-patterns-of-accessible-tourism-in-europe---fi.pdf#page=9>
- Giles-Corti, B., Knuiaman, M., Timperio, A., Van Niel, K., Pikora, T. J., Bull, F. C. L., Shilton, T., & Bulsara, M. (2008). Evaluation of the implementation of a state government community design policy aimed at increasing local walking: Design issues and baseline results from RESIDE, Perth Western Australia. *Preventive Medicine*, 46(1), 46-54. <https://doi.org/10.1016/j.ypmed.2007.08.002>
- NC Department of Health and Human Services Division of Aging and Adult Services. (2024). *North Carolina aging profiles 2022*. <https://www.ncdhhs.gov/documents/2022-north-carolina-aging-profiles/open>
- North Carolina Institute of Medicine. (2020). *Healthy North Carolina 2030 – A path forward*. <https://nciom.org/wp-content/uploads/2020/01/HNC-REPORT-FINAL-Spread2.pdf>

- Omura, J. D., Hyde, E. T., Whitfield, G. P., Hollis, N. D., Fulton, J. E., & Carlson, S. A. (2020). Differences in perceived neighborhood environmental supports and barriers for walking between US adults with and without a disability. *Preventive Medicine*, 134, 106065. <https://doi.org/10.1016/j.ypmed.2020.106065>
- U.S Department of Health and Human Services. (2018). *Physical activity guidelines for Americans*. 2<sup>nd</sup> edition. Washington D.C.
- United States Census Bureau. (2022). *QuickFacts North Carolina; Burke County, North Carolina*. <https://www.census.gov/quickfacts/fact/table/NC,burkecountynorthcarolina/PST045222>
- Western Piedmont Council of Governments Area Agency on Aging. (2016). *Resource Directory for Older Adults*. [https://media.wix.com/ugd/960958\\_937d7bfdb2fa4e78bd85c50da3b686f0.pdf](https://media.wix.com/ugd/960958_937d7bfdb2fa4e78bd85c50da3b686f0.pdf)
- Wu, L., Yang, Y., Yang, H., Xie, B., & Luo, W. (2023). A comparative study on land Use/Land cover change and topographic gradient effect between mountains and flatlands of southwest china. *Land (Basel)*, 12(6), 1242. <https://doi.org/10.3390/land12061242>



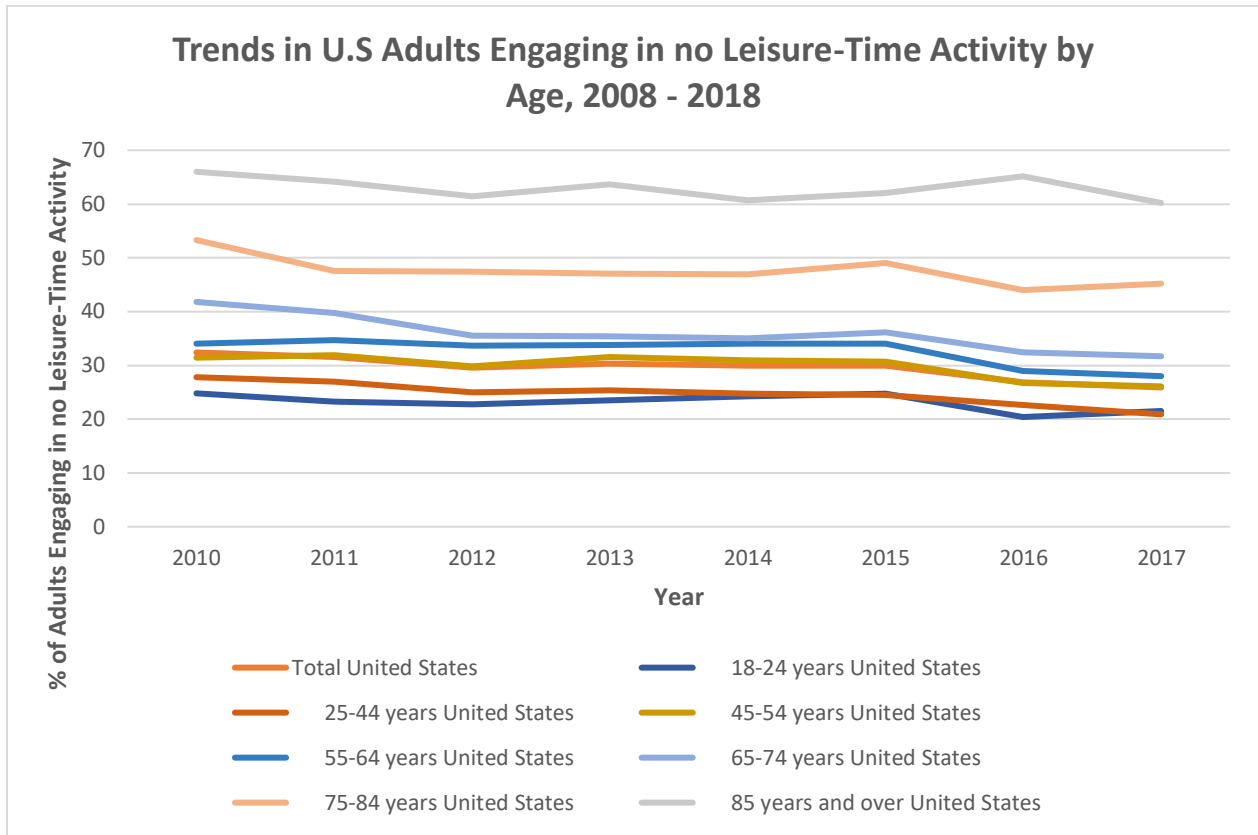
**Appendix B.1.A: Table Comparing Burke County Demographics to North Carolina**

<b>Census Data Comparison Between Burke County and North Carolina</b>		
<b>Fact</b>	<b>North Carolina</b>	<b>Burke County, North Carolina</b>
<b>Population</b>		
Population estimates, July 1, 2023, (V2023)	10,835,491	NA
Population Estimates, July 1, 2022, (V2022)	10,695,965	87,881
Population estimates base, April 1, 2020, (V2023)	10,439,459	NA
Population estimates base, April 1, 2020, (V2022)	10,439,459	87,573
Population, percent change - April 1, 2020 (estimates base) to July 1, 2023, (V2023)	3.8%	NA
Population, percent change - April 1, 2020 (estimates base) to July 1, 2022, (V2022)	2.5%	0.4%
Population, Census, April 1, 2020	10,439,388	87,570
Population, Census, April 1, 2010	9,535,483	90,912
<b>Age and Sex</b>		
Persons under 5 years, percent	5.6%	4.6%
Persons under 18 years, percent	21.4%	17.8%
Persons 65 years and over, percent	17.4%	22.0%
Female persons, percent	51.0%	49.8%
<b>Race and Hispanic Origin</b>		
White alone, percent	69.9%	85.9%
Black or African American alone, percent	22.2%	6.5%
American Indian and Alaska Native alone, percent	1.6%	1.0%
Asian alone, percent	3.6%	3.8%
Native Hawaiian and Other Pacific Islander alone, percent	0.1%	0.7%
Two or More Races, percent	2.6%	2.0%
Hispanic or Latino, percent	10.5%	7.0%
White alone, not Hispanic or Latino, percent	61.5%	80.8%
<b>Population Characteristics</b>		
Veterans, 2018-2022	632,989	4,966
Foreign born persons, percent, 2018-2022	8.3%	4.9%
<b>Health</b>		

With a disability, under age 65 years, percent, 2018-2022	9.3%	14.8%
Persons without health insurance, under age 65 years, percent	11.1%	14.6%
<b>Income &amp; Poverty</b>		
Median household income (in 2022 dollars), 2018-2022	\$66,186.00	\$53,732.00
Per capita income in past 12 months (in 2022 dollars), 2018-2022	\$37,641.00	\$30,633.00
Persons in poverty, percent	12.8%	12.6%
<b>Geography</b>		
Population per square mile, 2020	214.7	173
Population per square mile, 2010	196.1	179.3
Land area in square miles, 2020	48,623.02	506.24
Land area in square miles, 2010	48,617.91	507.1

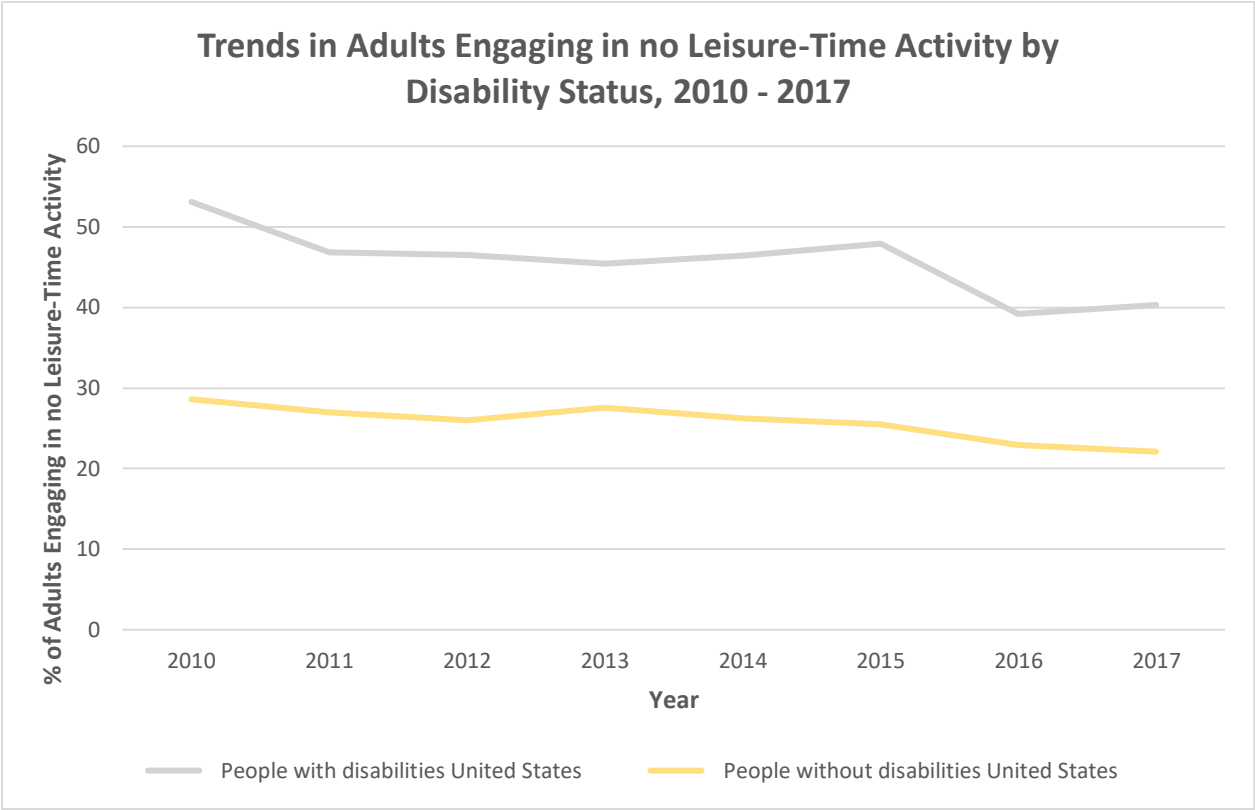
Source: U.S Census Bureau, [Quick Facts](#)

**Appendix B.1.B: U.S Adults Engaging in no Leisure-Time Activity by Age**



Source: Office of Disease Prevention and Health Promotion, [Healthy People 2020 Archive](#)

**Appendix B.1.C: U.S Adults Engaging in no Leisure-Time Activity by Disability Status**



Source: Office of Disease Prevention and Health Promotion, [Healthy People 2020 Archive](#)

## **Appendix B.2: Systems Contextual Analysis**

### **Background**

#### **Social Determinants of Health – Neighborhood & Built Environment**

A person's neighborhood and built environment play a crucial role in their overall health and well-being (Office of Disease Prevention and Health Promotion, n.d.). Included within a person's built environment are spaces, or lack thereof, designed to encourage physical activity (Office of Disease Prevention and Health Promotion, n.d.). Burke County's demographics reveal a predominantly white and increasingly aging population, confronting unique geographic and infrastructural challenges that hinder the accessibility of exercise facilities (U.S Census Bureau, 2022; Burke County, 2022; Wu et al., 2023) Increasing access to exercise opportunities is vital for the health of adults aged 65 and over (65+) in Burke County, as the physical environment significantly influences community health, a fact underscored by Healthy NC 2030 (North Carolina Institute of Medicine, 2020). Access is defined not just by proximity to parks and recreational facilities but also by a variety of factors affecting the usability of these spaces (Omura et al., 2020). Despite these challenges, the county possesses parks, senior services, and natural attractions that can be optimized to enhance physical activity opportunities for those 65+ (Western Piedmont Council of Governments Area Agency on Aging, 2016; Burke County, 2022).

### **System Analysis**

#### **System Statement**

The system to promote equitable access to exercise opportunities for residents of Burke County.

#### **Area of Concern**

The area of concern and primary focus for this systems analysis would be the perceived lack of access to exercise opportunities amongst Burke County residents 65+.

#### **Wicked Problem Properties**

The issue of improving access to exercise opportunities for adults 65+ in Burke County exhibits several characteristics of a wicked problem as described by Rittel and Webber. Firstly, the problem is

unique to Burke County's specific demographic, geographical, and infrastructural context (Rittel & Webber, 1973). Secondly, it lacks a definitive formulation because the needs of adults 65+ for exercise opportunities are diverse and influenced by various social determinants (Rittel & Webber, 1973). Lastly, the problem is symptomatic of larger issues such as health equity and urban development, making it inherently complex (Rittel & Webber, 1973).

### **Defining the System**

Please reference [Appendix B.2.A](#) for a visual representation, known as a causal loop diagram, which illustrates key variables of the system contributing to the perceived lack of access to exercise opportunities for Burke County residents 65+. Please reference [Appendix B.2.B](#) for a table defining the variables depicted within the causal loop diagram.

### ***System Archetype – Fixes That Fail***

The "Fixes that Fail" system archetype is depicted in the causal loop diagram where efforts to invest in traditional recreation spaces inadvertently neglect the specific needs of the 65+ demographic (Braun, 2002). This results in a short-term fix of increased utilization of traditional spaces, while the deeper systemic issue of inaccessible exercise opportunities for those 65+ persists (Braun, 2002). Over time, this lack of appropriate spaces leads to continued underutilization by the older population, demonstrating a fix that fails to address the root problem and instead creates a recurring issue (Braun, 2002). Please refer to [Appendix B.2.A](#) for a visual representation of this archetype, denoted in red.

### ***System Archetype – Success to the Successful***

The "Success to the Successful" system archetype within the causal loop diagram is exemplified by the reinforcing loop (R1), where the increased utilization of traditional recreation spaces leads to further investments in those spaces (Braun, 2002). This cycle favors the already successful traditional spaces, amplifying their success, while the specific needs of adults 65+ are marginalized due to a lack of targeted investment (R2). Consequently, the system inadvertently disadvantages those 65+, who continue to face inaccessible exercise opportunities. The archetype is reflected in how the success of traditional spaces

reinforces their dominance, overshadowing the necessity to develop spaces suitable for those 65+ (Braun, 2002). Please refer to Appendix B.2.A for a visual representation of this archetype, denoted in blue.

## **System Transformation – Potential Leverage Points for Intervention**

### ***System Infrastructure***

One apparent leverage point for change in the system would be system infrastructure (Meadows, 1999). Addressing physical activity in the 65+ demographic in Burke County through system infrastructure involves strategic enhancements to create and improve accessible, age-friendly recreational spaces. Key initiatives could include retrofitting parks with low-impact exercise equipment, establishing shaded and non-slip walking paths, and ensuring efficient transportation routes to facilitate safe access to these areas (World Health Organization, 2007). Infrastructure planning should also consider the development of multipurpose indoor and outdoor venues that accommodate year-round physical activities, integrating universal design principles to cater to varying mobility levels (World Health Organization, 2007).

### ***Mindsets***

Another system leverage point evident in the system would be mindsets (Meadows, 1999). When the collective mindset of a community includes a strong belief in the value of accessible exercise opportunities for older adults, it can lead to a strategic redirection of resources toward creating and adapting recreational spaces that cater to the needs of the 65+ population (World Health Organization, 2007). Furthermore, by cultivating a mindset among planners and developers that prioritizes inclusivity, Burke County can become a model for age-friendly infrastructure, where the environment supports and encourages physical activity for all citizens, regardless of age. This approach has the potential not only to improve health outcomes for the older population but also to foster a more cohesive, supportive community ethos where every member is valued and empowered to live an active, healthy life (World Health Organization, 2007).

### **Insights, Strengths, and Weaknesses**

As evident by the system analysis, the area of concern for Burke County regarding access to physical activity for residents 65+ is inherently complex and interconnected. Tangible and perceived barriers impact 65+ residents of Burke County and their ability to engage in physical activity. Further analysis into community perceptions of physical activity and accessibility would be beneficial in understanding how to better leverage mindset shifts for system change. Strengths of this analysis include a well-defined system statement and area of concern with specific variables demonstrating their relationships. Limitations include this analysis being conducted by a community outsider without direct consultation from key community members.



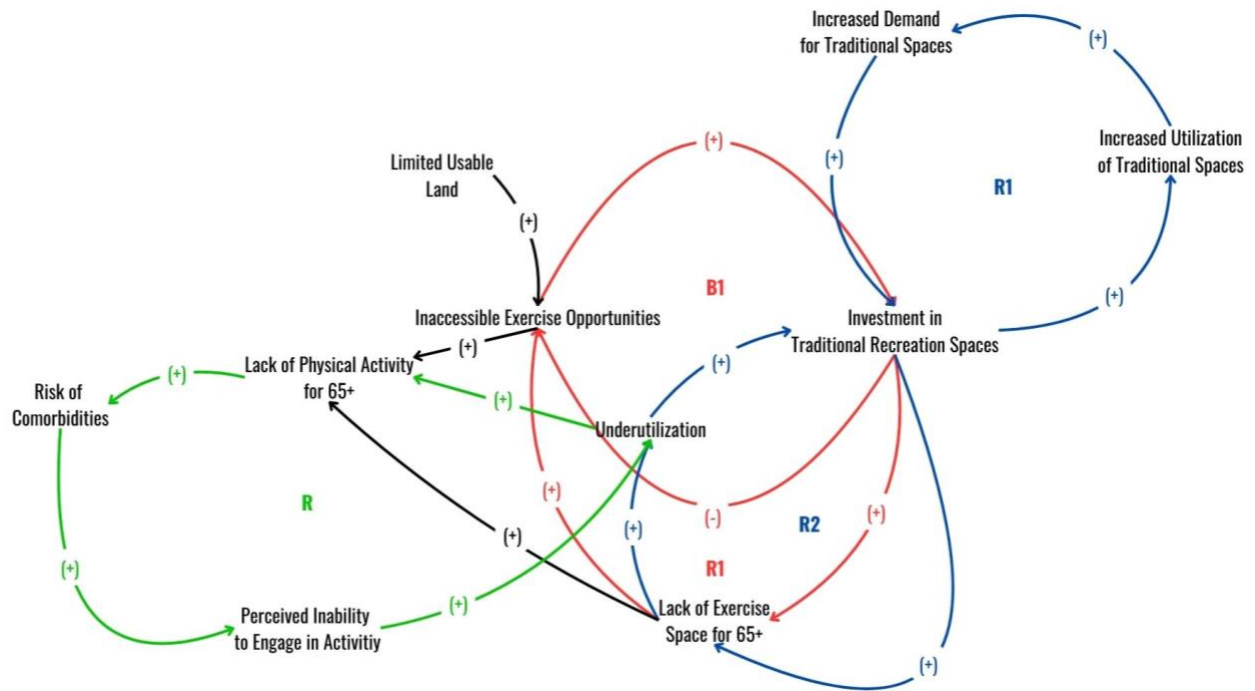
## References

- North Carolina Institute of Medicine. (2020). *Healthy North Carolina 2030 – A path forward*. <https://nciom.org/wp-content/uploads/2020/01/HNC-REPORT-FINAL-Spread2.pdf>
- Omura, J. D., Hyde, E. T., Whitfield, G. P., Hollis, N. D., Fulton, J. E., & Carlson, S. A. (2020). Differences in perceived neighborhood environmental supports and barriers for walking between US adults with and without a disability. *Preventive Medicine, 134*, 106065. <https://doi.org/10.1016/j.ypmed.2020.106065>
- Giles-Corti, B., Knuiman, M., Timperio, A., Van Niel, K., Pikora, T. J., Bull, F. C. L., Shilton, T., & Bulsara, M. (2008). Evaluation of the implementation of a state government community design policy aimed at increasing local walking: Design issues and baseline results from RESIDE, perth western australia. *Preventive Medicine, 46*(1), 46-54. <https://doi.org/10.1016/j.ypmed.2007.08.002>
- Andrade, L., Geffin, R., Maguire, M., Rodriguez, P., Castro, G., Alkhatib, A., & Barengo, N. C. (2021). The associations between access to recreational facilities and adherence to the american heart association's physical activity guidelines in US adults. *Frontiers in Public Health, 9*, 660624-660624. <https://doi.org/10.3389/fpubh.2021.660624>
- United States Census Bureau. (2022). *QuickFacts North Carolina; Burke County, North Carolina*. <https://www.census.gov/quickfacts/fact/table/NC.burkecountynorthcarolina/PST045222>
- Western Piedmont Council of Governments Area Agency on Aging. (2016). *Resource Directory for Older Adults*. [https://media.wix.com/ugd/960958\\_937d7bfdb2fa4e78bd85c50da3b686f0.pdf](https://media.wix.com/ugd/960958_937d7bfdb2fa4e78bd85c50da3b686f0.pdf)
- Wu, L., Yang, Y., Yang, H., Xie, B., & Luo, W. (2023). A comparative study on land Use/Land cover change and topographic gradient effect between mountains and flatlands of southwest china. *Land (Basel), 12*(6), 1242. <https://doi.org/10.3390/land12061242>
- Office of Disease Prevention and Health Promotion. (2021). *Adults engaging in no leisure-time physical activity (age adjusted, percent, 18+ years)*. <https://wayback.archive-it.org/5774/20220122152418/https://www.healthypeople.gov/2020/data/Chart/5052?category=4&by=Age%20group%20%C2%A7&fips=-1>
- European Commission & DG Enterprise and Industry. (n.d.). *Economic impact and travel patterns of accessible tourism in Europe – Final report summary*. <https://www.accessibletourism.org/resources/toolip/doc/2014/07/06/study-a-economic-impact-and-travel-patterns-of-accessible-tourism-in-europe---fi.pdf#page=9>
- Braun, W. (2002). *The system archetypes*. [https://www.albany.edu/faculty/gpr/PAD724/724WebArticles/sys\\_archetypes.pdf](https://www.albany.edu/faculty/gpr/PAD724/724WebArticles/sys_archetypes.pdf)
- Rittel, H., & Webber, M. (1973). Dilemmas in a general theory of planning. *Policy Sci, 4*, 155–169. <https://doi.org/10.1007/BF01405730>
- World Health Organization. (2007). *Global age-friendly cities: A guide*. World Health Organization. <https://iris.who.int/bitstream/handle/10665/43755/9/8921?sequence=1>

Meadows, D. (1999). *Leverage points: Places to intervene in a system*. The Sustainability Institute.  
[https://donellameadows.org/wp-content/userfiles/Leverage\\_Points.pdf](https://donellameadows.org/wp-content/userfiles/Leverage_Points.pdf)

Office of Disease Prevention and Health Promotion. (n.d.). Neighborhood and built environment.  
<https://health.gov/healthypeople/objectives-and-data/browse-objectives/neighborhood-and-built-environment>

## Appendix B.2.A: Causal Loop Diagram



*Note:* Causal loop diagram depicting system variables related to access to exercise opportunities in Burke County.

**Appendix B.2.B: Table of Defined System Variables**

<b>Variable Name</b>	<b>Definition</b>
<b>Lack of Physical Activity in 65+</b>	Lack of physical activity that is recommended for adults aged 65+.
<b>Risk of Comorbidities.</b>	The risk of disease or conditions associated with lack of physical activity.
<b>Perceived Inability to Engage in Physical Activity.</b>	Perceptions of not being able to engage in physical activity due to limitations on one's condition.
<b>Inaccessible Exercise Opportunities.</b>	Any exercise or recreation facility or attraction which does not have design components that allow for all Burke County residents to utilize them.
<b>Investment in Traditional Recreation Spaces.</b>	Time, money, and other resources dedicated to creating traditional recreation spaces found within Burke County and surrounding areas.
<b>Lack of Exercise Space for 65+.</b>	Lack of spaces that meet the specific population needs for Burke County residents aged 65+.
<b>Underutilization.</b>	Inadequate use of exercise facilities or recreation spaces.
<b>Increased Utilization of Traditional Spaces.</b>	Increased use of exercise facilities and recreation spaces that have traditionally not met the accessibility needs of Burke County residents aged 65+.
<b>Increased Demand for Traditional Spaces.</b>	Increased demand for exercise facilities and recreation spaces that have traditionally not met the accessibility needs of Burke County residents aged 65+.

*Note:* Table defining variables visualized in the causal loop diagram.

## **Appendix B.3: Leadership Recommendations**

### **Background**

#### **Social Determinants of Health – Neighborhood & Built Environment**

A person's neighborhood and built environment play a crucial role in their overall health and well-being (Office of Disease Prevention and Health Promotion, n.d.). Included within a person's built environment are spaces, or lack thereof, designed to encourage physical activity (Office of Disease Prevention and Health Promotion, n.d.). Burke County's demographics reveal an increasingly aging population, confronting unique geographic and infrastructural challenges that hinder the accessibility of exercise facilities (U.S Census Bureau, 2022; Burke County, 2022; Wu et al., 2023) Increasing access to exercise opportunities is vital for the health of adults aged 65 and over (65+) in Burke County, as the physical environment significantly influences community health, a fact underscored by Healthy NC 2030 (North Carolina Institute of Medicine, 2020). Access is defined not just by proximity to parks and recreational facilities but also by a variety of factors affecting the usability of these spaces (Omura et al., 2020). Despite these challenges, the county possesses parks, senior services, and natural attractions that can be optimized to enhance physical activity opportunities for those 65+ (Western Piedmont Council of Governments Area Agency on Aging, 2016; Burke County, 2022).

#### **Steering Committee Measures & Operations**

##### **Measures of Success**

To monitor and evaluate progress towards the steering committee's overall goals established in Appendix E.2 (beginning on page 10) the committee will need to select appropriate measures of success. Multiple factors should be considered when selecting these measures. The measures should reflect alignment towards the overall goals of the committee (Organisation for Economic Co-operation and Development, n.d.). Furthermore, the measures should be quantifiable in some way allow for accurate tracking and assessment (Organisation for Economic Co-operation and Development, n.d.). Finally, the measures of success should try to align with not only the goals of the committee, but also the goals of all

respective organizations involved to promote equitable partnership between all parties (Organisation for Economic Co-operation and Development, n.d.). The following proposed measures of success can serve as indicators for the success and progress of the steering committee's efforts to address the goals referenced in Appendix E.2.

### ***Member Engagement***

The degree to which steering committee members actively participate in meetings and events, fulfill roles and responsibilities, and contribute to the committee's initiatives.

- Measurement Methods:
  - Measure attendance rates at meetings and events, noting patterns in participation and addressing any barriers to attendance.
  - Evaluate the frequency and quality of contributions to discussions, projects, or tasks by each member.
  - Monitor the completion rates of assigned tasks and responsibilities, noting who consistently meets or exceeds expectations.
  - Use engagement surveys to gather self-reported data on members' levels of interest, motivation, and satisfaction with committee activities.

### ***Member Relationships***

The strength and quality of the collaborative interactions among steering committee members, reflecting mutual respect, communication effectiveness, and the ability to work collectively towards shared objectives.

- Measurement Methods:
  - Conduct regular surveys or assessments that query members on their perceived quality of interactions, willingness to collaborate, and ease of communication with one another.
  - Implement a peer review mechanism where members can provide anonymous feedback on their experiences working with one another.

- Track joint initiatives or projects and measure their success as an indicator of the strength of member relationships.
- Record and assess the frequency and resolution of conflicts as a measure of relationship dynamics.

### ***Coalition Capacity***

Measures the coalition's ability to achieve its objectives by evaluating resources, skills, and coordination among members.

- Measurement Methods:
  - Assess the availability and adequacy of resources allocated for coalition activities.
  - Evaluate skills and expertise within the coalition to ensure they align with the set objectives.
  - Conduct surveys to gauge the members' perceptions of coalition effectiveness and capability.
  - Monitor the execution of activities against the plan to determine the coalition's operational capacity.

### ***Progress Towards Goal Achievement***

Monitors the advancements made towards the specific goals established by the steering committee.

- Measurement Methods:
  - Set clear, measurable targets for each goal and track progress at regular intervals.
  - Use a dashboard to visualize key performance indicators related to the goals.
  - Hold regular review meetings to discuss progress and address any barriers.
  - Implement a reporting system where committee members can submit updates on their responsibilities towards achieving the goals.

### **Conflict Management**

Strategies to mitigate and navigate conflict are necessary for any steering committee or coalition. Evidence-based systematic approaches to conflict management have demonstrated success across

organizations and disciplines (Wang & Wu, 2020). Successful conflict management strategies should include methods to identify, resolve, learn from, and prevent conflict (Wang & Wu, 2020). The following methods could be utilized to define what conflict looks like for the steering committee and how it will be managed.

### ***Group Consensus on Conflict Management Processes***

Prior to any conflicting arising, the steering committee should come consensus on how conflict will be managed. Detailing a conflict management protocol within standardized agreements, such as a Memorandum of Understanding (MOU), creates defined terms on how conflict will be managed. Numerous variables connected to the conflict management process should be considered and defined within the respective protocol. Refer to Appendix B.3.A for a sample MOU conflict management protocol.

**Initiating Conflict Management Protocol.** What conditions need to be met for the outlined conflict management process to be initiated?

**Terms of Engaging in Conflict Management Protocol.** What will the terms of engagement be for executing the conflict management protocol? Things to consider include communication styles, location where the process will take place, as well as appropriate timelines for engagement once the conflict management process has begun.

**Steps Towards Resolution.** How will the protocol define appropriate steps towards resolution for the conflict? How will the steering committee come to a consensus on an equitable resolution for the conflict?

**Accountability & Follow-Up.** What formal structures will create a plan for accountability once terms of resolution have been agreed upon? When should follow-up occur after a preceding conflict?

### **Sustainability Plan**

The steering committee should also consider a formal strategy to ensure the sustainability of its efforts. Various frameworks and methods can be used to create a culture of sustainability (Galpin, Whittington, & Bell, 2015). Firstly, overall goals and objectives for the committee should reflect a



commitment to sustainability as well as the intended goal (Galpin, Whittington, & Bell, 2015).

Furthermore, methods to foster a culture of sustainability within the committee should be utilized to promote sustainability as not just an organizational priority, but also a priority among individual members (Galpin, Whittington, & Bell, 2015). See Appendix B.3.B for a sample sustainability plan that may be utilized in conjunction with the committees MOU.

## References

- Andrade, L., Geffin, R., Maguire, M., Rodriguez, P., Castro, G., Alkhatib, A., & Barengo, N. C. (2021). The associations between access to recreational facilities and adherence to the american heart association's physical activity guidelines in US adults. *Frontiers in Public Health*, 9, 660624-660624. <https://doi.org/10.3389/fpubh.2021.660624>
- European Commission & DG Enterprise and Industry. (n.d.). *Economic impact and travel patterns of accessible tourism in Europe – Final report summary*. <https://www.accessibletourism.org/resources/toolip/doc/2014/07/06/study-a-economic-impact-and-travel-patterns-of-accessible-tourism-in-europe---fi.pdf#page=9>
- Galpin, T., Whittington, J. L., & Bell, G. (2015). Is your sustainability strategy sustainable? creating a culture of sustainability. *Corporate Governance (Bradford)*, 15(1), 1-17. <https://doi.org/10.1108/CG-01-2013-0004>
- Giles-Corti, B., Knuiaman, M., Timperio, A., Van Niel, K., Pikora, T. J., Bull, F. C. L., Shilton, T., & Bulsara, M. (2008). Evaluation of the implementation of a state government community design policy aimed at increasing local walking: Design issues and baseline results from RESIDE, perth western australia. *Preventive Medicine*, 46(1), 46-54. <https://doi.org/10.1016/j.ypmed.2007.08.002>
- North Carolina Institute of Medicine. (2020). *Healthy North Carolina 2030 – A path forward*. <https://nciom.org/wp-content/uploads/2020/01/HNC-REPORT-FINAL-Spread2.pdf>
- Office of Disease Prevention and Health Promotion. (2021). *Adults engaging in no leisure-time physical activity (age adjusted, percent, 18+ years)*. <https://wayback.archive-it.org/5774/20220122152418/https://www.healthypeople.gov/2020/data/Chart/5052?category=4&by=Age%20group%20C2%A7&fips=-1>
- Office of Disease Prevention and Health Promotion. (n.d.). Neighborhood and built environment. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/neighborhood-and-built-environment>
- Omura, J. D., Hyde, E. T., Whitfield, G. P., Hollis, N. D., Fulton, J. E., & Carlson, S. A. (2020). Differences in perceived neighborhood environmental supports and barriers for walking between US adults with and without a disability. *Preventive Medicine*, 134, 106065. <https://doi.org/10.1016/j.ypmed.2020.106065>
- Organisation for Economic Co-operation and Development. (n.d.). *Evaluation guidelines*. [https://www.oecd.org/dac/evaluation/seco\\_guidelines.pdf](https://www.oecd.org/dac/evaluation/seco_guidelines.pdf)
- United States Census Bureau. (2022). *QuickFacts North Carolina; Burke County, North Carolina*. <https://www.census.gov/quickfacts/fact/table/NC,burkecountynorthcarolina/PST045222>
- Wang, N., & Wu, G. (2020). A systematic approach to effective conflict management for program. *SAGE Open*, 10(1), 215824401989905. <https://doi.org/10.1177/2158244019899055>
- Western Piedmont Council of Governments Area Agency on Aging. (2016). *Resource Directory for Older Adults*. [https://media.wix.com/ugd/960958\\_937d7bfd2fa4e78bd85c50da3b686f0.pdf](https://media.wix.com/ugd/960958_937d7bfd2fa4e78bd85c50da3b686f0.pdf)

World Health Organization. (2007). *Global age-friendly cities: A guide*. World Health Organization. <https://iris.who.int/bitstream/handle/10665/43755/9/8921?sequence=1>

Wu, L., Yang, Y., Yang, H., Xie, B., & Luo, W. (2023). A comparative study on land Use/Land cover change and topographic gradient effect between mountains and flatlands of southwest china. *Land (Basel)*, 12(6), 1242. <https://doi.org/10.3390/land12061242>

**Appendix B.3.A: Conflict Management Protocol**  
**I. Group Consensus on Conflict Management Processes**

The Parties hereby agree to the following conflict management processes, which have been developed in a spirit of cooperation and mutual respect:

**5. Initiation of Conflict Management Protocol**

a. The conflict management process shall be initiated when any of the following conditions are met:

- i. A formal complaint is lodged by one Party against another.
- ii. There is a persistent disagreement that disrupts committee activities.
- iii. Mutual consent by the Parties that a conflict exists and needs to be resolved through the protocol.

**6. Terms of Engaging in Conflict Management Protocol**

a. The Parties agree to the following terms of engagement:

- i. All communication shall be conducted respectfully and constructively.
- ii. The conflict management process will take place at a neutral location agreed upon by all Parties.
- iii. The process shall begin within a timeframe of [Insert Number] days following the acknowledgment of a conflict.

**7. Steps Towards Resolution**

a. The steps toward resolution shall include:

- i. Clear articulation of the conflict by the involved Parties.
- ii. Facilitated discussion sessions aimed at understanding all perspectives.
- iii. Identification of possible solutions and negotiation of an equitable resolution.
- iv. Formal voting by the steering committee if consensus cannot be reached.

**8. Accountability & Follow-Up**

- a. Once a resolution is agreed upon, the following structures will ensure accountability:
- i. A written agreement outlining the terms of the resolution, to be signed by the involved Parties.
  - ii. Designation of an individual or sub-committee responsible for overseeing the implementation of the resolution.
  - iii. A scheduled follow-up meeting within [Insert Number] days to assess the effectiveness of the resolution and ensure compliance.

## **II. Amendment of MOU**

This MOU may be amended at any time by mutual consent of the Parties. Proposed amendments must be presented in writing and agreed upon in the same manner as the original MOU.

## **III. Duration of MOU**

This MOU is effective upon the date of the last signature below and will remain in effect for [Insert Duration] or until modified or terminated by any Party with [Insert Number] days' written notice.

## **IV. Signatures**

This MOU expresses the full and complete understanding of the Parties regarding the subject matter and supersedes all prior representations and understandings, whether oral or written. Agreement to this MOU does not imply any commitment to provide funding.

## **Appendix B.3.B: Sample Sustainability Plan**

### **Sustainability Plan for [Steering Committee/Coalition Name]**

#### **I. Introduction**

This Sustainability Plan is created to ensure the ongoing success and the continual improvement of the [Steering Committee/Coalition Name]. It outlines methods for sustaining the partnership, fostering growth and adaptation, and facilitating leadership transitions to maintain momentum in achieving our goals.

#### **II. Sustaining the Partnership**

4. **Continual Reassessment and Adaptation** a. Establish a bi-annual review process to assess the effectiveness of the partnership and identify areas for improvement. b. Solicit feedback from all members and stakeholders to inform the adaptation process. c. Update strategies and goals accordingly to reflect the changing needs of the community and the partnership.
5. **Resource Allocation and Management** a. Develop a diversified funding strategy that includes grants, local businesses contributions, and fundraising activities. b. Designate a finance sub-committee to oversee budgeting, resource allocation, and financial planning.
6. **Communication and Engagement** a. Maintain open and regular communication through monthly newsletters, meetings, and an updated website. b. Cultivate community engagement through public forums, surveys, and collaborative events.

#### **III. Evolution and Expansion of the Partnership**

3. **Incorporating New Members and Partners** a. Create an inclusive membership policy that allows new entities to join the partnership. b. Develop an orientation program for new members to ensure alignment with the partnership's vision and operations.
4. **Leadership Development and Transition** a. Establish a leadership development program to prepare members for potential leadership roles. b. Implement a structured transition plan for leadership roles, ensuring continuity and stability.

#### **IV. Building Upon Successes**

3. **Recognition and Replication** a. Celebrate achievements and share success stories both internally and in the wider community. b. Document best practices and lessons learned to replicate successful initiatives.
4. **Continuous Improvement** a. Leverage successes to enhance the partnership's credibility and to secure additional resources. b. Encourage innovation and the exploration of new ideas to build upon initial successes.

## **V. Conclusion**

The [Steering Committee/Coalition Name] is committed to a sustainable future by implementing this plan. We will strive for growth, adaptability, and resilience, ensuring that our partnership remains effective and responsive to the needs of those we serve.

## **Appendix C: Tsaiwei Cheng Individual Deliverables**

### **Appendix C.1: Social Determinant of Health Analysis**

Social Determinants of Health (SDOH) encompass the myriad social, economic, and environmental factors that shape health outcomes, extending beyond the scope of clinical care. These factors include elements such as income, education, employment, and social support networks, profoundly impacting health disparities and equity within the Burke County community. One critical component of SDOH is physical activity, whose absence can exacerbate health inequities and hinder overall well-being. Lack of physical activity exemplifies the interconnectedness between lifestyle behaviors and health outcomes.

Physical activity offers a plethora of health benefits, ranging from improved brain health, lowering risks of cardiovascular disease, type 2 diabetes, lowers risks of cancer, weight management and bone health (CDC, 2023). For brain health in particular, exercise is one of the only proven interventions in preventing dementia and Alzheimer's Disease (AD). The Alzheimer's Society reports that physical exercise can reduce risks of developing dementia by 28% and AD by 45% (Alzheimer's Society, 2023).

However, lack of physical activity or sedentary lifestyles pose significant health risks, even in short periods. For instance, just 14 days of physical inactivity can detrimentally affect metabolic functions, particularly in individuals with type 2 diabetes, leading to reduced insulin sensitivity and adverse lipid and cardiorespiratory profiles (Davies et al., 2018). In contrast, just ninety minutes of weekly moderate exercise was found to reduce lipid levels and improve diabetes measures (Silva et al., 2020). For the general population of adults, the CDC reports the following immediate benefits of exercise: improvement in sleep, reduction in anxiety and blood pressure (CDC, 2023).

When analyzing the leading causes of death in Burke County for 2019, it becomes evident that physical exercise has the potential to mitigate several of these primary causes: cancer, heart disease, brain health (such as cerebrovascular diseases and Alzheimer's disease), and diabetes (Appendix C.1.A).

In addressing the social determinant of physical activity and access, it is important to recognize its multifaceted nature and the profound implications for health equity. Access to safe recreational spaces,



affordable exercise facilities, and culturally-informed programming are just a few of the structural factors that affect opportunities for physical activity. By elucidating the relationship between physical activity, health outcomes, and socio-environmental contexts, public health interventions can be tailored to mitigate disparities and foster equitable access to opportunities for active living and a healthier community population.

### **Geographic and Historical Context**

Burke County's historical and geographical context plays a significant role in shaping health outcomes. Established in 1777, Burke County has a rich historical legacy, deeply intertwined with the Native American Catawba and Cherokee tribes and European settlers of Scotch-Irish and German descent. Geographically situated in the southern Appalachian Mountain region, the county offers diverse landscapes for outdoor recreation, reflecting its significance in shaping the cultural and the regional economy (History of the County, n.d.). As its population grew over time, the county was divided to establish new administrative jurisdictions. In 1791, a collaboration between Burke County and Rutherford County led to the creation of Buncombe County, integrating portions from both regions. By 1833, parts of Burke and Buncombe counties were further consolidated, giving rise to Yancey County. Throughout the 19th century, Burke County was further divided and redistributed to establish neighboring counties in the region. These historical geographical divisions shaped much of Western North Carolina region today and its political and cultural structure. For instance, the 2022 Burke County Community Health Assessment (CHA) used Burke's surrounding "Peer Counties" to make health comparisons (Burke County 2022 Community Health Assessment, 2022).

### **Priority Population: Older Adults**

The 2022 Burke County CHA indicated significant concern surrounding housing insecurity, which is linked to poverty. This issue disproportionately impacts individuals aged 25-54, with a considerable portion falling below the poverty line. The prevalence of poverty, coupled with North Carolina's prior limited Medicaid expansion, has resulted in diminished access to healthcare for a broad spectrum of the population, particularly those with chronic illnesses such as diabetes and heart disease, which are more

prevalent among older adults. Burke County exhibits a higher median age of 44.3 +/- 0.3 compared to the state's median age of 38.9 +/- 0.1, with over 20% of its population aged 65 and older (Burke County 2022 CHA, 2022). This demographic composition, notably the aging population, necessitates focused attention when addressing health disparities associated with physical inactivity. Consequently, prioritizing preventive health measures for this demographic group becomes imperative.

In examining SDOH measures for Burke County, it is imperative to analyze key indicators such as disease prevalence, risk factors, and health disparities. Utilizing data from the 2022 Burke County CHA offers valuable insights into the local health landscape. Disease prevalence, including those for cardiovascular disease, diabetes, and certain cancers, provide a snapshot of the burden of chronic conditions within the county (Appendix C.1.A). Additionally, assessing risk factors associated with physical inactivity, such as obesity rates, sedentary behavior patterns, and access to recreational facilities, helps elucidate the factors contributing to poor health outcomes. By comparing these measures of occurrence across different demographic groups or neighboring counties, we can identify disparities in health outcomes and access to resources.

## References

- Alzheimer's Society. (2023). Reduce your risk of dementia: Physical activity. Alzheimer's Society. <https://www.alzheimers.org.uk/about-dementia/managing-the-risk-of-dementia/reduce-your-risk-of-dementia/physical-activity>
- Burke County. (2022). 2022 Community Health Assessment. Retrieved from <https://www.burkenc.org/DocumentCenter/View/2666/2022-Community-Health-Assessment>
- Burke County. (n.d.). History of the County. Retrieved Jan. 28, 2024. <https://www.burkenc.org/1188/History-of-the-County>
- Bowden Davies, K. A., Sprung, V. S., Norman, J. A., et al. (2018). Short-term decreased physical activity with increased sedentary behaviour causes metabolic derangements and altered body composition: effects in individuals with and without a first-degree relative with type 2 diabetes. *Diabetologia*, 61, 1282–1294. <https://doi.org/10.1007/s00125-018-4603-5>
- Centers for Disease Control and Prevention. (2023). Health Benefits of Physical Activity. CDC. <https://www.cdc.gov/physicalactivity/basics/adults/health-benefits-of-physical-activity.html>
- Silva, V. R. R., Belozo, F. L., Pereira, R. M., Katashima, C. K., Cordeiro, A. V., Alves, J. F., Pauli, J. R., Silva, A., Ropelle, E. R., De Moura, L. P. (2020). The effects of ninety minutes per week of moderate intensity aerobic exercise on metabolic health in individuals with Type 2 Diabetes: A pilot study. *J Rehab Therapy*, 2(2), 1-12. <https://rehabiljournal.com/articles/the-effects-of-ninety-minutes-per-week-of-moderate-intensity-aerobic-exercise-on-metabolic-health-in-individuals-with-type-2-diabetes-a-pilot-study.pdf>

### Appendix C.1.A: Leading Causes of Death, Burke County, 2019

Rank	Cause	Number	%
1	Cancer	238	22.2
2	Heart Disease	217	20.3
3	Chronic lower respiratory disease	89	8.3
4	Cerebrovascular diseases	62	5.8
5	All other unintentional injuries	47	4.4
6	Diabetes	30	2.8
7	Alzheimer's disease	27	2.5
8	Nephritis, nephrotic syndrome, and nephrosis	21	2.0
9	Chronic liver disease and cirrhosis	18	1.7
10	Influenza and pneumonia	18	1.7

Source: Burke County 2022 Community Health Assessment, 2022

## **Appendix C.2: Quality Context Analysis**

The goal of this project is to address Burke County's social determinants of health (SDOH), particularly with physical activity for older adults. Regular exercise offers numerous health benefits, including improved brain health, reduced risks of cardiovascular disease, type 2 diabetes, cancer, and better weight management (CDC, 2023). Notably, exercise has been proven effective in preventing dementia and Alzheimer's Disease. Lack of physical activity or sedentary lifestyles can lead to detrimental health effects, including metabolic dysfunction and increased risks of chronic conditions such as diabetes and heart disease (Davies et al., 2018; CDC, 2023). Older adults are at increased risk of morbidity and mortality for these conditions. Moreover, given that more than 20% of Burke County's populace is aged 65 and above, it becomes crucial to tackle physical inactivity among older adults (Burke County 2022 CHA, 2022). Access to safe recreational spaces and affordable exercise facilities is essential to promote active living among older adults and mitigate disparities in health outcomes. Through understanding the relationship between physical activity, health outcomes, and socio-environmental contexts, tailored quality improvement can be implemented to address SDOH and foster equitable access to opportunities for exercise and promote a healthier community in Burke County.

In the most recent Burke County NCLHDA, activity number 10.2 was not met. The activity requires the Burke County Health Department (BCHD) to “carry out or assist other agencies in the development, implementation and evaluation of health promotion/disease prevention programs and educational materials targeted to groups identified as at-risk in the community health assessment” (Burke County NCLHDA Site Visit Report). Through this quality improvement project, our team would address activity 10.2 by collaborating with community organizations and agencies. Further, the project would address SDOHs that promote health and wellness, subsequently preventing disease development. Our root cause analysis identified “awareness” as a potential cause for physical inactivity in older adults of Burke County (Appendix C.2.B). Under this category of causes, we discussed lack of knowledge on benefits of physical

activity and knowledge on available community resources. To address this root cause, educational materials and programming could be included in the intervention design. The main target of this effort will be improving access to physical activity for older adults through addressing transportation, another identified root cause (Appendix C.2.B).

The aim statement is perhaps the most important factor in any quality improvement efforts. For the discussed SDOH of access to physical activities and priority population of older adults, this project's aim statement is: to increase participation of older adults (aged 65+) in community physical activity programs in Burke County by 20% in the next 2 years with a focus on improving transportation and infrastructure. This will be accomplished through addressing an identified unmet need by the most recent BCHD NCLHDA Site Visit Report, activity 10.2.

**Internal customers:**

1. Older adults, aged 65+. Specifically, this demographic group is highlighted in the paper due to their increased vulnerability to health disparities and the focus on preventive health measures.
2. General population of Burke County. Healthy adults within a community may provide support and mentorship for the general population, fostering intergenerational social connectedness.
3. Burke County Health Department

**External customers:**

4. Local health system leaders and organizations:
  - a. Department of Social Services
  - b. Healthcare providers / clinics / hospitals
  - c. Policymakers
5. Local and state health and recreational organizations:
  - a. Council on Aging
  - b. The YMCA

- c. NC State Parks & Recreation
  - d. Nature's Playground
  - e. Lake James Environmental Association
6. Transportation and infrastructure customers:
- a. Greenway Public Transport
  - b. Private transportation (Uber, Lyft, etc)

**How neighborhood improvement processes can affect customers:**

For the second group of external customers, improving access to physical activity for our at-risk population can strengthen or expand the capacity of these organizations to fulfill their missions. Overall, improvement of processes through inter-organizational collaboration may help strengthen the relationship of internal and external customers. Strengthening the relationship of local partners and customers can lead to more community improvement efforts in the future. Conversely, if collaboration is strained or unsuccessful, the negative experience can have opposite effects.

Process improvements can also help reduce disparities in health outcomes among different demographic groups within Burke County, leading to more equitable access to resources and opportunities for all residents. Through every quality improvement process, we learn about the issue addressed and whether or not a certain model of implementation works for the particular community or system. In piloting a quality improvement effort for Burke County, public health professionals and community leaders will have a process model that can be used in the future to address physical activity, equity, or other social determinants of health.

From an economic perspective, the burden of health inequity falls not only on individuals, but the system as a whole. A recent report from the World Health Organization (WHO) projected alarming statistics: by 2030, an estimated 500 million individuals may develop medical conditions linked to physical inactivity, resulting in a staggering economic burden of \$27 billion (World Health Organization,

2022). Given that 20% of Burke County residents are older adults, Improvements in health outcomes and well-being can have positive economic impacts on Burke County, such as reduced healthcare costs, increased productivity, and a more attractive environment for businesses, investors, and the tourism industry.

In summary, improvements in the processes related to addressing social determinants of health in Burke County can positively impact both external stakeholders, such as local health authorities and community organizations, and internal stakeholders, including residents, older adults, and other community members, leading to better health outcomes, increased equity, enhanced community well-being, and economic benefits for the county. The process of improving access to physical activity opportunities for an identified at-risk group, we would meet activity 10.2 from the BCHD Accreditation Site Visit Report, especially when considering inter- organizational collaboration with local agencies.



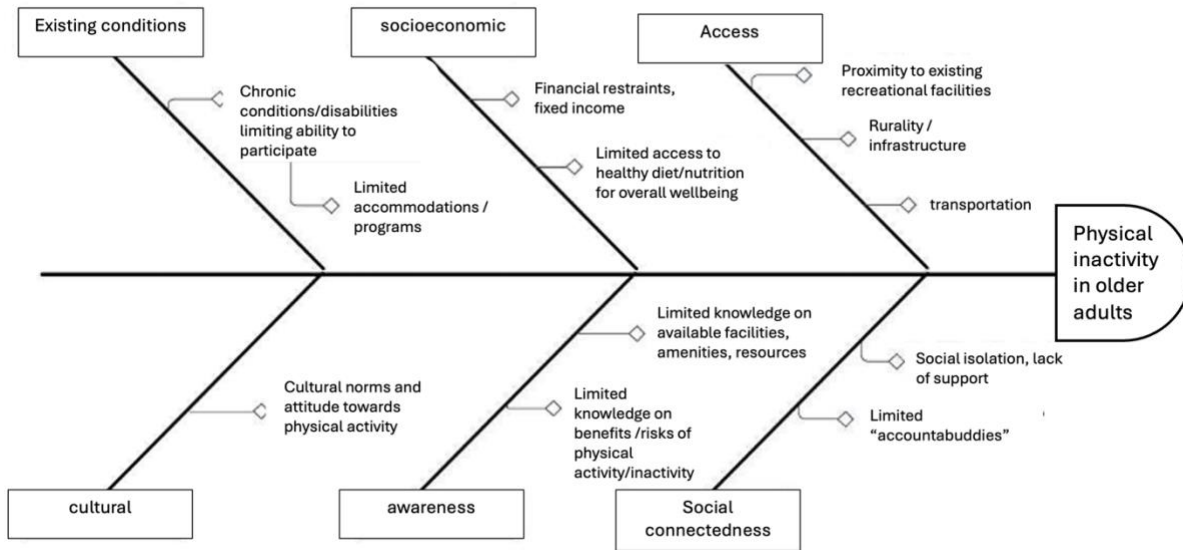
## References

- Burke County NCLHDA Site Visit Report. (2023). Retrieved from <https://adminliveunc.sharepoint.com/sites/PUBH992LIPOnly/Shared%20Documents/Forms/AllItems.aspx?id=%2Fsites%2FPUBH992LIPOnly%2FShared%20Documents%2FGeneral%2F3%2E%20For%20Students%2FBurke%20County%20Materials%202023%2D2024%2FBurke%20County%20NCLHDA%20Site%20Visit%20Report%5FJan%202023%2Epdf&parent=%2Fsites%2FPUBH992LIPOnly%2FShared%20Documents%2FGeneral%2F3%2E%20For%20Students%2FBurke%20County%20Materials%202023%2D2024&p=true&ga=1>
- Centers for Disease Control and Prevention. (2023). Health Benefits of Physical Activity. CDC. <https://www.cdc.gov/physicalactivity/basics/adults/health-benefits-of-physical-activity.html>
- Bowden Davies, K. A., Sprung, V. S., Norman, J. A., et al. (2018). Short-term decreased physical activity with increased sedentary behaviour causes metabolic derangements and altered body composition: effects in individuals with and without a first-degree relative with type 2 diabetes. *Diabetologia*, 61, 1282–1294. <https://doi.org/10.1007/s00125-018-4603-5>
- World Health Organization. (2022, October 19). WHO highlights high cost of physical inactivity in first-ever global report. <https://www.who.int/news/item/19-10-2022-who-highlights-high-cost-of-physical-inactivity-in-first-ever-global-report>

## Appendix C.2.A: Project Measures

Category	Descriptions
Outputs	<ol style="list-style-type: none"> <li>1. Number of visits of recreational facilities or amenities, such as parks, nature trails, exercise equipment. This measure will also delineate new versus existing users of recreational facilities or amenities.</li> <li>2. Time spent on physical activities among older adults</li> </ol>
Outcomes	<ol style="list-style-type: none"> <li>1. Increased number new users of recreational facilities or amenities. This will shed insight on whether or not access to recreational activities measu</li> <li>2. Improved health outcomes, such as sense of wellbeing, cholesterol and lipid levels, hemoglobin a1c (diabetes), and cognitive function.</li> </ol>
Process metrics	<ol style="list-style-type: none"> <li>1. Number of outreach or educational events for promoting physical activity in older adults.</li> <li>2. Number of older adults that received referrals to community partners and resources for physical activity.</li> <li>3. Engagement/retention: Percentage of older adults that return to participate in physical activities provided by community partners</li> <li>4. Transportation user satisfaction surveys</li> </ol>
Balancing measures	<ol style="list-style-type: none"> <li>1. Average cost per individual that participates in physical activity. (to individuals, organization partners, and project budget)</li> <li>2. Monitoring falls/injuries acquired from participation in physical activity.</li> </ol>

## Appendix C.2.B: Fishbone Diagram for Root Cause Analysis



### **Appendix C.3: Policy Recommendations**

#### **Social Determinant of Health**

The interplay between the built environment—both its perceived and actual characteristics—and community decision-making significantly impacts health outcomes by influencing the ability to engage in health-promoting activities (Travert et al., 2019). In North Carolina's Burke County, the Health Department has pinpointed environmental challenges as key factors in the observed decline in recreational engagement among residents, among other issues (Burke County Health Department, 2022). Moreover, the county's demographics, which are increasingly skewing older, present unique geographical and infrastructural challenges that restrict access to exercise facilities (U.S Census Bureau, 2022; Burke County, 2022; Wu et al., 2023). Despite possessing rich resources such as infrastructure, social services, and green spaces that could be harnessed to improve physical activity opportunities for those aged 65 and older, Burke County lags behind the state average in both the availability of exercise opportunities and actual physical activity engagement (Western Piedmont Council of Governments Area Agency on Aging, 2016; Burke County, 2022). Although the county boasts an extensive array of recreational spaces and facilities, with a political will to prioritize recreation, it still underperforms in usage rates (Burke, North Carolina, 2023). The 2022 Burke County Community Health Assessment raises a critical question: "Who lacks access that needs or wants it?" This query highlights a crucial gap—simply providing spaces for physical activity does not ensure they are accessible to everyone who needs them (Burke County CHA, 2022). Policy Solution 1: Expanding Morganton City's "Improve Street Walkability and Bikeability" Plan (2018 City of Morganton Development Master plan / College Street Redesign Project).

#### **Policy Solution 1: Expanding Morganton City's "Improve Street Walkability and Bikeability" Plan (2018 City of Morganton Development Master plan / College Street Redesign Project).**

Morganton City government plans to redevelop the built environment with features to improve access to daily exercise, and have recently approved the College Street reconstruction plan (City of Morganton, 2018). Success with this reconstruction could pave the way for similar initiatives across the county. Redevelopment policies and strategies would necessitate collaboration between municipal authorities,

community organizations, and potentially state agencies to devise and advocate for secure, accessible pathways for pedestrians and cyclists leading to parks and recreational amenities. By upgrading infrastructure elements such as sidewalks, crosswalks, and bike lanes, and by integrating safety features like improved lighting and signage, this endeavor holds promise in simplifying and safeguarding the journey for Burke County residents seeking recreational spaces and activities.

**Advantages:** Enhances safety and accessibility, encouraging more residents to engage in physical activity. While the presence of sidewalks does not increase walking for physical recreation, having accessible sidewalks does promote more walking for practical purposes such as running errands, commuting to work, or carrying out daily tasks (McCormack, et al., 2012; McCormack, 2017). Further, there are long term infrastructural benefits to redevelopment plans that improve walkability and bikeability; heavier vehicles such as trucks, SUVs and electrical cars can cause more wear and tear to asphalt, compared to biking or walking on the same asphalt (The Brussels Times, 2019). Thus, the redevelopment has the potential to reduce long term road maintenance cost, increase “lifespan” of roads.

**Disadvantages:** Infrastructure redevelopment at large scales such as this are complex and require careful planning, stakeholder engagement, and can come with a few disadvantages. Disadvantages would include factors such as cost, environmental impact, and short-term built environment disruption, possibly even displacement and relocation of existing residents or businesses (Hope et al., 2019; Ashby, 2018). There could also be opposition from community members that are concerned about changes in their neighborhoods or traffic patterns.

**Policy Engagement Level:** City level redevelopment would require engaging policymakers at the local (Burke County and Morganton city) level. However, obtaining funding and support for such projects would also likely involve state and possibly federal levels, especially if leveraging grants or funds for public health initiatives or community development.

## **Policy Solution 2: Public Transportation Improvements**

Improving public transportation services to better connect residents, especially older adults and those in rural areas, to recreation centers, parks, and greenways. This could involve expanding bus routes,

offering more flexible scheduling, and ensuring that transportation is accessible to those with physical limitations. Furthermore, integrating public transportation planning with the development of recreational facilities ensures that new or improved sites are easily physically reachable. Implementing technology solutions, like real-time tracking apps and online scheduling, could enhance usability. Through this initiative, local and county authorities, in cooperation with regional transportation sectors, could improve public transit routes, schedules, and accessibility to recreational areas and facilities.

**Advantages:** Reduces barriers to connect with recreational facilities and resources for older adults and those living in rural areas. This could potentially increase regular physical activity rates and community engagement, particularly reducing cost barriers and for those that have lost driving privileges.

**Disadvantages:** Requires continuous funding for operation and may face challenges in ridership sustainability and efficiency. The aging population may face technological challenges such as navigating online schedules and routes and smartphone applications with real time tracking and directions.

Significant public transportation improvements may also be new to current residents that have fixed mindset on transportation modalities and would require time and other initiatives to increase utilization of new and improved public transportation services.

**Policy Engagement Level:** This policy would require engagement at the county and municipal government levels, and possibly state or federal level of involvement for funds. If collaboration with existing regional transportation authorities and input from community members and stakeholders will be essential for tailoring public transportation services to meet local needs effectively.

### **Policy Solution 3: Community Engagement and Education Programs**

Launching community engagement and education programs to increase awareness and motivation to participate in physical activity. This approach is adaptable and can be implemented through a spectrum of entities, spanning from grassroots initiatives like local senior centers to more extensive programs orchestrated by county or state-level authorities. As discussed previously, increase in sidewalks do not increase participation in physical recreation activities (McCormack, et al., 2012; McCormack, 2017).

Engagement programs could be tailored to 65+ adults' physical capabilities and limitations or disabilities

and help individuals to develop habits of physical activity. By fostering a community culture that values and supports physical activity, these programs aim to make healthy lifestyle choices more accessible and appealing to all residents. Long term aim is to cultivate a community culture that prioritizes physical recreational activities.

**Advantage:** Builds community support for physical activity and can be tailored to meet the specific needs of different population segments. This solution is also flexibly attainable through various levels of entities, ranging from local and small scaled programming such as the local senior center.

**Disadvantage:** Programs tailored for 65+ adults might not reach or engage all community members equally, potentially exacerbating disparities in health outcomes.

**Policy Engagement Level:** This initiative primarily involves engagement at the local level, with city and county health departments and community organizations. However, partnerships with state health agencies and non-governmental organizations could provide additional resources and expertise.

### **Overall Policy Equity Assessment**

The three policy options—Redevelopment, Public Transport, and Community Engagement—highlight specific pathways to enhancing equity in access to physical activity. Redevelopment directly promotes health access equity since it is available to everyone, improves neighborhood safety, walkability, and bikeability, ensuring equitable access to outdoor activities. It directly addresses the barriers that often sideline marginalized communities from accessing recreational spaces, making it a powerful tool for equity. On the other hand, Public Transport excels in resource utilization efficiency, connecting communities to necessary resources and activities without the hefty investment of creating new spaces (redevelopment). Lastly, Community Engagement stands out for its sustainability, feasibility, and ability to foster active participation, ensuring that improvements meet the actual needs of community members. Together, these policies offer a layered approach to achieving health access equity, each from a unique angle that prioritizes safety, accessibility, and community inclusiveness.

## References

- Ashby, K. (2018, September 21). The pros and cons of new construction versus renovation. Foley & Lardner LLP. Retrieved from <https://www.foley.com/insights/publications/2018/09/the-pros-and-cons-of-new-construction-versus-renov/>
- The Brussels Times. (2019). Heavier electric cars wear out roads faster. Retrieved from <https://www.brusselstimes.com/61738/heavier-electric-cars-wear-out-roads-faster>
- Hope, A., Algeo, C., & Moehler, R. C. (2019). Review of the Key Challenges in Major Infrastructure Construction Projects: how do project managers 'skill-up'? ResearchGate. [https://www.researchgate.net/publication/333446409\\_Review\\_of\\_the\\_Key\\_Challenges\\_in\\_Major\\_Infrastructure\\_Construction\\_Projects\\_how\\_do\\_project\\_managers\\_'skill-up'](https://www.researchgate.net/publication/333446409_Review_of_the_Key_Challenges_in_Major_Infrastructure_Construction_Projects_how_do_project_managers_'skill-up')
- McCormack, G. R. (2017). Neighbourhood built environment characteristics associated with different types of physical activity in Canadian adults. *Health Promotion and Chronic Disease Prevention in Canada*, 37(6), 175–185. <https://doi.org/10.24095/hpcdp.37.6.01>
- McCormack, G. R., Shiell, A., Giles-Corti, B., Begg, S., Veerman, L., Geelhoed, E., Amarasinghe, A., & Emery, J. C. H. (2012). The association between sidewalk length and walking for different purposes in established neighborhoods. *International Journal of Behavioral Nutrition and Physical Activity*, 9(1), 92. <https://doi.org/10.1186/1479-5868-9-92>



**Appendix C.3.A: Policy Option Rankings**

<b>Goals</b>	<b>Policy 1 (Redevelopment)</b>	<b>Policy 2 (Public Transport)</b>	<b>Policy 3 (Community Engagement)</b>	<b>Ranking Justifications</b>
Accessibility to Physical Activity	1	2	3	Directly improves safety, walkability and bikability to engage in physical activity in daily living or access to existing recreational spaces.
Sustainability	2	3	1	Balances infrastructure development with potential for lasting community impact and usage.
Community Engagement / Support	2	3	1	Supports active participation and utilization of local parks through safer, more accessible routes.
Health Access Equity	1	2	3	Promotes equitable access to outdoor exercise options across different neighborhoods.
Resource utilization Efficiency	3	1	2	Infrastructure changes may require significant initial investment, though less so than creating new spaces.

## **Appendix D: Audrey Fratus Individual Deliverables**

### **Appendix D.1: Social Determinant of Health Analysis**

#### **Social Determinant of Health Overview**

The North Carolina Department of Health and Human Services has identified a community’s physical environment, or the buildings, infrastructure, and natural spaces in which people live, work, and play, as a key “upstream” factor in determining individual and population health outcomes (NC DHHS, n.d.). In reviewing the connections between Burke County’s physical environment and the health of its residents, an apparent contradiction emerges: proximity to abundant greenspaces and significant county investment in recreation, but faltering access to exercise opportunities. While the County has made significant strides to improve its physical environment - building new places to walk, bike, experience nature, and participate in fitness classes – in response to recent Community Health Assessments, upstream indicators for resident access to and engagement in outdoor recreation and indoor exercise, and downstream data on exercise-associated health markers, have not yet meaningfully improved (BCHD, 2022; University of Wisconsin, 2023). Burke County public health officials themselves note that the apparent contradiction their residents experience is a manifestation of an essential community health tenet - simply having places to participate in recreation and exercise does not make those places desirable or accessible to those who need them (BCDH, 2022; Slater, et al., 2019).

Access to exercise opportunities (with a definition of “access” that includes much more than simple provision of resources) plays a significant role in shaping both short – and long-term community health. There’s strong evidence that the ability to meaningfully and consistently engage with exercise opportunities improves the quality and duration of physical activity (TRB, 2005; Nicosia & Datar, 2018). By extension, regular physical activity lowers population prevalence of disease risk factors and disease, including high blood pressure, type 2 diabetes, stroke, and bone mineral loss (Warburton et al., 2006). A built environment designed for access to physical activity - sidewalks, bike lanes and bike racks, mixed use trails, playgrounds, multipurpose community spaces - is a protective factor against acute and chronic illness and premature mortality (Zhong et al., 2022; Frehlich et al., 2022).

## **Social Context and Resource Assessment**

Burke County is an interesting setting to understand and address deficiencies in access to exercise opportunities, as local government and commerce leaders frame the county as a destination for recreation tourism. In 2019, the Burke County Tourism Board selected the tagline “Nature’s Playground” as the county’s defining brand and identity and have aimed to attract a portion of the tourist base headed to nearby tourism-focused counties for outdoor recreation (Phillips, 2023). While tourism spending in the county has increased since the development of the brand, Burke County accounts for only 0.4% of the total state tourism economy, placing them at 45th in tourism, below their tourism-oriented neighbors and coastal NC counties with similar populations, which range from 0.6% to 8.6% of the tourism economy (NC Tourism Economics, 2023). Local decision-makers have attributed this gap to a lack of desirable recreation infrastructure and amenities, noting the county’s aging public buildings, limited alternative transportation options, and strained power and water grids as challenges (Burke County, 2021). These deficiencies, the county’s 2022-2030 Strategic Land Use Plan (SLUP) observes, impact residents far more than they impact short-term tourists, making them an even greater priority to address (Burke County Commission, 2022).

Both in response to a desire to attract new residents and visitors to the county, and to actualize Burke County government’s central objective – to make Burke County represent “the good life”, per their SLUP – significant efforts have already been made to improve access to places for recreation and exercise. Morganton, the county’s population center, invested in the development of a thoughtful and comprehensive Recreation Master Plan intended to guide facility upgrades, new recreation spaces for residents, interactive programming and the expansion of greenways (LandPlan Group & Toole Design, 2018). The consulting team contracted to develop the plan noted that the city “owns, operates, and maintains facilities that far exceed the national average in both acreage and number for a city of its population”, which may help to clear two of the most significant challenges in improving a county’s built environment: limited resources and low “buy-in” or social investment (LandPlan Group & Toole Design, 2018). Additionally, the county has cultivated meaningful public-private relationships that are

intentionally focused on the physical environment. Their SLUP outlines private sector partnerships aligned with recreation areas that they hope will help fit recreation more into the daily lives of residents, including food and beverage business next to major trails, bike shops in Morganton with community programming, and the county-supported construction of a mixed-use facility operated by the Foothills Conservancy on private parkland (Burke County Commission, 2022).

While the county has laid impressive groundwork for change, challenges remain. Burke County's recreation policies and resources heavily target outdoor activities, with few focused efforts to broaden the accessibility of indoor recreation spaces. Morganton's Recreation Master Plan notes that the limited indoor recreation spaces under their control (which make up essentially all public indoor recreation in the county) are aging to the point of significant inaccessibility for the elderly and disabled people (LandPlan Group & Toole Design, 2018). Additionally, while both municipal and county government have invested in recreation planning and ideation, actualization of plans appears to have lagged, leaving several key improvements half-done or not done at all (City of Morganton, 2022).

### **Priority Population**

While access to opportunities for physical activity impacts all residents of Burke County, the county's growing population over the age of 65 is both disproportionately impacted by deficiencies in access and most likely to experience positive change in response to upstream interventions. The NC Department of Health and Human Services reports that 22% of the county's population is aged 65+, compared to 17% statewide, and that proportion is expected to see a >40% positive change between 2024 and 2040 (NC DHHS, 2020). As an inevitable side effect of this process, services and facilities will need to adapt to meet changing county demographics. Additionally, in Burke County, both the percent of adults older than 65 with a disability (42%) and who are within 200% of the poverty level (26.3%) are significantly higher than the state averages (34.5% and 20.8% respectively) (NC DHHS, 2020). The data paints a picture of a rapidly growing elderly population in Burke County experiencing higher-than-average rates of disability and poverty, two factors known to play a significant role in how an individual accesses active recreation spaces and facilities **and** known to increase the public cost of providing subsidized health services

(Khavjou, et al., 2020; Kamyuka et al., 2020). The county has the opportunity to make a substantial impact on community quality of life by focusing resources towards programs, services, and interventions intended to serve older adults (Pinheiro, et al., 2022).

### **Measures of SDOH**

There are challenges in applying current indicators of this social determinant to thoughtful reflection and meaningful action, arising in large part from limitations inherent in the measurements of exercise opportunity itself. The primary county-level indicator “Access to Exercise Opportunities” tracks only the percent of a county’s census tracts placed in close proximity to a park and/or recreational facility. It does not track the accessibility of those spaces or actual use by county residents. Healthy North Carolina 2030’s indicator summary report notes this limitation, footnoting the measurement with the observation that proximity alone is a limited representative for “access” and physical, financial, and social barriers are not taken into account in tracking a county’s progress (Healthy NC 2030, 2022).

Despite these limitations, several clear patterns emerge from the data that indicate that while Burke has invested heavily in recreation, health indicators have not yet responded to a proportionate degree. Resident inactivity, tracked as a percent of residents reporting no physical activity outside of work, is slightly elevated, and access to exercise opportunities is significantly lower than state and national averages (University of Wisconsin, 2023). In response to the 2022 CHA Survey, residents reported being too tired, too busy, and too concerned about gym costs to exercise, though questions regarding personal fitness are often subject to bias (Burke County Health Department, 2022). Rates of death before age 75 are high, and the percent of the population in fair or poor physical health is 2% higher than the state average and 4% higher than the national average, a significant difference given the small percentage totals (University of Wisconsin, 2023). When compared to the state average, Burke County has slightly elevated age-adjusted rates for deaths associated with conditions known to be partially linked to physical inactivity – cardiovascular disease, stroke, and diabetes (NC DHHS, 2019). See Appendix D.1.A for full comparison data table of health indicators and Appendix D.1.B for charted rates of death associated with physical inactivity.

## **Rationale & Importance**

Burke County has the opportunity to leverage its unique geography, existing county brand, and political and economy focus on recreation as a public good to improve the health and wellbeing of older adults in the community. Reduction in premature morbidity and mortality lowers the strain on limited county health services, improves economic indicators, and moves the county closer towards being a place where (as the SLUP frames it) “the good life” is possible for all residents (Santos et al., 2023). The county’s abundance of recreational assets and already-laid groundwork for meaningful change – the development of a consistent exercise-oriented county brand, the partial implementation of a recreation master plan inclusive of social and financial accessibility considerations – position Burke County well for a successful intervention to address deficiencies in the physical environment as determinants of health and advance access to exercise opportunities.

## References

- BCHD. (2022). *2022 Burke Community Health Assessment*. Burke County Health Department (BCHD). <https://www.burkenc.org/DocumentCenter/View/2666/2022-Community-Health-Assessment>
- Burke County Commission. (2022). *2022-2030 Burke County Strategic Land Use Plan*. <https://www.burkenc.org/DocumentCenter/View/298/Blueprint-Burke---Burke-County-Land-Use-Plan?bidId=>
- City of Morganton. (2022). *Downtown Greenway Connector*. <https://www.morgantonnc.gov/development-design-services/project/downtown-greenway-connector>
- Frehlich, L., Christie, C. D., Ronksley, P. E., Turin, T. C., Doyle-Baker, P. K., & McCormack, G. R. (2022). The neighbourhood built environment and health-related fitness: a narrative systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, *19*(1). <https://doi.org/10.1186/s12966-022-01359-0>
- Kamyuka, D., Carlin, L., McPherson, G., & Misener, L. (2020). Access to physical activity and sport And the effects of isolation and cordon sanitaire during COVID-19 for people with disabilities in Scotland and Canada. *Frontiers in Sports and Active Living*, *2*. <https://doi.org/10.3389/fspor.2020.594501>
- Khavjou, O., Anderson, W., Honeycutt, A., Bates, L., Razzaghi, H., Hollis, N. D., & Grosse, S. D. (2020). National health care expenditures associated with disability. *Medical Care*, *58*(9), 826–832. <https://doi.org/10.1097/mlr.0000000000001371>
- LandPlan Group & Toole Design. (2018). *2018 Comprehensive Recreation Master Plan*. City of Morganton. [https://www.morgantonnc.gov/sites/default/files/fileattachments/parks\\_and\\_recreation/page/2580/city\\_of\\_morganton\\_updated\\_recreation\\_master\\_plan\\_final\\_reduced.pdf](https://www.morgantonnc.gov/sites/default/files/fileattachments/parks_and_recreation/page/2580/city_of_morganton_updated_recreation_master_plan_final_reduced.pdf)
- NC DHHS. (n.d.). *About Healthy Opportunities*. <https://www.ncdhhs.gov/about/department-initiatives/healthy-opportunities/about-healthy-opportunities>
- NC DHHS. (2019). North Carolina Statewide And County Trends In Key Health Indicators: Burke County. In *North Carolina County Trend Reports*. <https://schs.dph.ncdhhs.gov/data/keyindicators/reports/Burke.pdf>
- NC DHHS. (2020). *County Aging Profiles 2020: Burke County, NC*. <https://www.ncdhhs.gov/county-aging-profiles-2020pdf/open>
- NC Tourism Economics. (2023). *2022 County Level Visitor Expenditures*. Economic Development Partnership of North Carolina. <https://partners.visitnc.com/contents/sdownload/73488/file/2022+County+Level+Visitor+Expenditures+by+Total+Expenditures.pdf>
- Nicosia, N., & Datar, A. (2018). Neighborhood environments and physical activity: a longitudinal study of adolescents in a natural experiment. *American Journal of Preventive Medicine*, *54*(5), 671–678. <https://doi.org/10.1016/j.amepre.2018.01.030>

- Phillips, B. E. (2023, February 17). Nature's Playground is open for business and good business it is. *The Paper*. <https://www.thepaper.media/stories/natures-playground-is-open-for-business-and-good-business-it-is,8265>
- Pinheiro, M. B., Oliveira, J. S., Baldwin, J., Hassett, L., Costa, N., Gilchrist, H., Wang, B., Kwok, W., Albuquerque, B. S., Pivotto, L. R., CarvalhoSilva, A. P. M. C., Sharma, S., Gilbert, S. G., Bauman, A., Bull, F., Willumsen, J., Sherrington, C., & Tiedemann, A. (2022). Impact of physical activity programs and services for older adults: a rapid review. *International Journal of Behavioral Nutrition and Physical Activity*, *19*(1). <https://doi.org/10.1186/s12966-022-01318-9>
- Santos, A. C., Willumsen, J., Meheus, F., Ilbawi, A., & Bull, F. (2023). The cost of inaction on physical inactivity to public health-care systems: a population-attributable fraction analysis. *The Lancet Global Health*, *11*(1), e32–e39. [https://doi.org/10.1016/s2214-109x\(22\)00464-8](https://doi.org/10.1016/s2214-109x(22)00464-8)
- Slater, S. J., Tarlov, E., Jones, K. K., Matthews, S. A., Wing, C., & Zenk, S. N. (2019). Would increasing access to recreational places promote healthier weights and a healthier nation? *Health & Place*, *56*, 127–134. <https://doi.org/10.1016/j.healthplace.2019.01.013>
- TRB. (2005). *Does the built environment influence physical activity? Examining the evidence*. National Academies Transportation Research Board. <https://onlinepubs.trb.org/onlinepubs/sr/sr282.pdf>
- University of Wisconsin. (2023). *Burke, North Carolina*. County Health Rankings & Roadmaps. <https://www.countyhealthrankings.org/explore-health-rankings/north-carolina/burke?year=2023>
- Warburton, D. E. R. (2006). Health benefits of physical activity: the evidence. *Canadian Medical Association Journal*, *174*(6), 801–809. <https://doi.org/10.1503/cmaj.051351>
- Zhong, J., Liu, W., Niu, B., Lin, X., & Deng, Y. (2022). Role of built environments on Physical Activity and Health Promotion: a review and policy insights. *Frontiers in Public Health*, *10*. <https://doi.org/10.3389/fpubh.2022.950348>

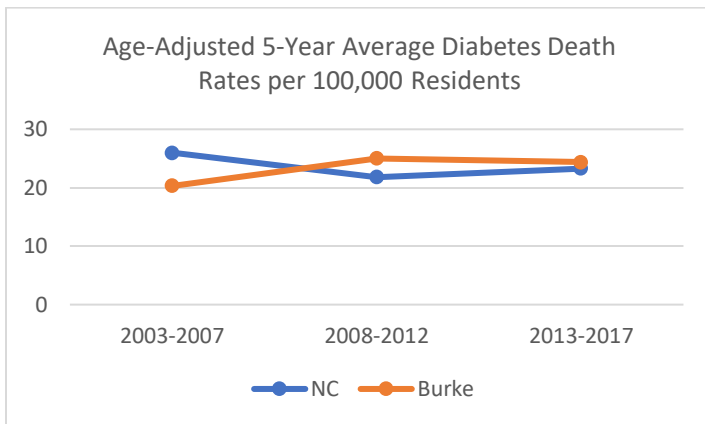
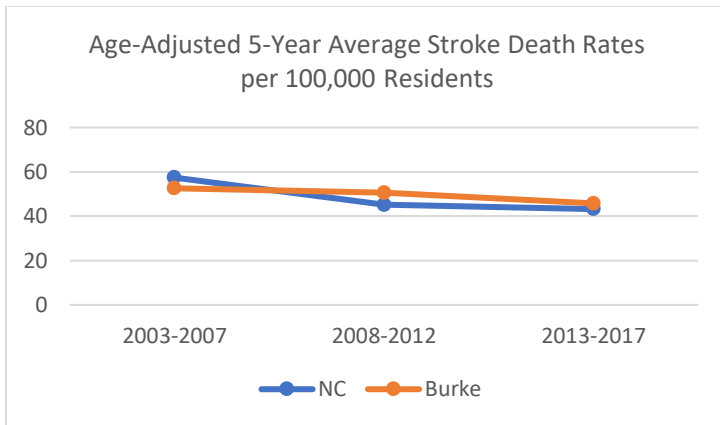
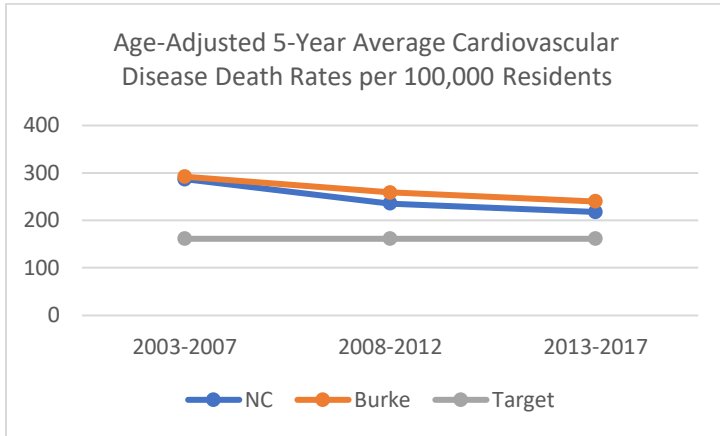


**Appendix D.1.A: Burke County Health Indicator Comparison, 2023**

<b>Indicator</b>	<b>Burke County</b>	<b>State Average</b>	<b>National Average</b>
Physical Inactivity	26%	22%	22%
Access to Exercise Opportunities	60%	75%	84%
Premature Death (# years of life lost to deaths of people younger than 75/100,000 people)	9600	8000	7300
Poor or Fair Physical Health	16%	14%	12%

Source: University of Wisconsin. (2023). *Burke, North Carolina*. County Health Rankings & Roadmaps. <https://www.countyhealthrankings.org/explore-health-rankings/north-carolina/burke?year=2023>

**Appendix D.1.B: Trends in Key Health Indicators, 2003-2017 – Burke County**



Source: NC DHHS. (2019). North Carolina Statewide and County Trends In Key Health Indicators: Burke County. In *North Carolina County Trend Reports*.  
<https://schs.dph.ncdhhs.gov/data/keyindicators/reports/Burke.pdf>

## **Appendix D.2: Policy Context Analysis**

### **SDOH Background and County Context**

When a person walks out the door, the built environment around them impacts their functional decision making – where they can go, how they can get there, and what they can do when they arrive are all shaped by the design and development of infrastructure, buildings, and landscaping (US DHHS, 2018). The relationship between the built environment, or the perceived built environment, and how a community makes and executes decisions has a significant downstream effect on health outcomes by either limiting or extending the community’s ability to engage in health-promoting activities (Travert et al., 2019). The Burke County Health Department has identified challenges in the built environment as potential drivers for current data documenting faltering engagement in recreation by county residents (Burke County Health Department, 2022).

Despite abundant natural resources, a notably large stock of recreation space and facilities, and political interest in prioritizing recreation, Burke County is below the state average for both access to exercise opportunities (a metric measured by housing proximity to greenspace) and daily physical exercise by significant margins (Burke, North Carolina, 2023). Local decision-makers point towards aging facilities, inadequate infrastructure, and outdated models for neighborhood development as potential causes (Burke County, 2022). These challenges are known to ultimately contribute to poor health outcomes, particularly for adults aged 65+, who are uniquely impacted by limited exercise and who make up a growing portion of Burke County’s population (Cunningham et al., 2020; NC DHHS, 2020). Burke County and its community partners have engaged in an active process to address deficiencies in the built environment and improve access to physical activity through policy development and implementation.

#### **“Big P” Policy with Direct Impact**

In their 2018 development master plan, the City of Morganton (Burke County’s population center and county seat) proposed the re-construction of College Street in an effort to improve walkability, bike-

ability, and community cohesion, as well as make a direct connection to the extended Burke County greenway (City of Morganton, 2018). College Street is a 1.3-mile-long city-owned road in central Morganton, along which lies the Burke County Senior Center, greenspaces, one of the city's two recreation and aquatic centers, several public-facing county department offices, and the public library. The road currently has 2-6 traffic lanes, incomplete sidewalks, and no bike lane (City of Morganton, 2020). Following community consultation and the identification of funding (total budget: \$3.3M), the city and the North Carolina Department of Transportation approved the redevelopment in 2021 and began right-of-way acquisition in 2022 (College Street Redesign Project, n.d.). Construction is expected to begin in fall 2024. This city government policy, a combination of budget and personnel allocation and transportation strategy, directly impacts access to exercise opportunities through redevelopment of the built environment.

#### *Impact of Policy on Access to Exercise Opportunities*

The proposed construction project is a form of infrastructure referred to as a “multimodal connector”, or a transportation corridor intended to safely and efficiently accommodate multiple forms of transportation (GoRaleigh, 2019). The design integrates several features known to have a positive impact on access to daily exercise. Individuals who self-report proximity to sidewalks and traffic control measures, both elements integrated into the College Street design, in their communities engage in more frequent physical activity than individuals who do not report this proximity (Duncan, et al., 2005). This association remains consistent even when controlling for other factors known to influence willingness to exercise. Interestingly, the presence of sidewalks does not appear to increase walking for recreation, but does increase daily walking to run errands, transit to work or to a recreation location, or complete necessary functions (McCormack, et al., 2012; McCormack, 2017).

Integration of daily movement, such as walking for transportation, is strongly recommended as a protective action against cardiovascular or pulmonary disease and osteoporosis for adults aged 65+ (NHS, 2021). Older adults are more inclined to walk for transportation when their neighborhood has pedestrian crossings, as the College Street redesign would introduce, and when their route encounters parks and

opportunities for socialization and recreation (Herbolsheimer et al., 2020). College Street’s abundant resources and the proposed connection to the greenway fit these needs. The construction may also help safely connect older adults in the Morganton urban center to city services offered at the Collett Street Recreation Center (which include classes targeted at adults aged 65+) and to the abundant resources available at the Burke County Senior Center, both of which sit in on or in close proximity to College Street (BCSS, n.d.).

Unfortunately, the potential impact of this redevelopment is unlikely to reach older adults outside of the Morganton urban center. Transit barriers – loss of driving permissions, irregular bus services, access and functional needs - between Burke County’s rural communities and urban Morganton remain in place, restricting the ability of residents outside of the city to use the redeveloped corridor (Burke County Health Department, 2022).

#### **“Little P” Policy with Indirect Impact**

Access to reliable, safe public transportation is a persistent challenge for rural communities (TRIP, 2019). In an effort to provide residents with expanded transportation options, a coalition of Western NC county and municipal governments formed the Western Piedmont Regional Transit Authority in 2008, serving Alexander, Burke, Caldwell, and Catawba counties (WPRTA, n.d.). The Authority, which does business as Greenway Public Transportation, offers a fixed route bus service in Hickory (Catawba Co.) and “flex routes” in Morganton (Burke Co.) and Taylorsville (Alexander Co.). Outside of urban centers, on-demand van service, through which residents call to schedule a van pick-up, is offered (WPRTA, n.d.)

The organizational policies in place for using and paying for Greenway’s services are complex, particularly for individuals who require additional assistance or accommodation for access and functional needs (WPRTA, 2024). Trips fares require exact change in cash, or a ticket purchased from the transit center in Conover, NC in Catawba County. Adults aged 65 and older qualify for a reduced rate of \$0.60 per ride (requiring two quarters and a dime) but must complete an application for a “half-fare” card in person at the transit center or remember to bring their Medicare card for each trip (WPRTA, 2024). If using the flex bus route in Morganton and requesting a route deviation, passengers receive an estimated

pickup window and must wait outside. The bus driver may choose to alter the requested pickup location, requiring the passenger to move to the new pickup point. Even if catching the bus on the standard route, stops often have no seating or shelter and are placed on roads without buffers between the sidewalk and traffic (WPRTA, 2024). Scheduling on-demand van service requires a phone call to the scheduling service and the submission of medical information to the scheduler – no written confirmation is provided, and no follow-up is offered on the day of the pickup. Should vans be full on the day of the scheduled trip, the trip can be canceled unilaterally (WPRTA, 2024). Older adults with disabilities may apply for paratransit to address some of these concerns, but the application requires the completion of a long and detailed questionnaire, a similarly complex form completed by the passenger’s doctor, and the submission of several supplementary forms (WPRTA, 2024).

#### *Impact of Policy on Access to Exercise Opportunities*

The complexity of accessing public transit in Burke County may indirectly contribute to challenges accessing exercise opportunities. Gerontologists posit that older adults must complete a far greater degree of “mobility work”, or the physical, emotional, and spatiotemporal labor of engaging in an activity, than younger people when using public transportation services, heightening the need for simplified and need-responsive organizational policies (Ravensbergen et al., 2021). Accessibility challenges – feeling rushed or overlooked by drivers or unsafe at bus stops, being unable to call the scheduling service, struggling to safely use the boarding ramp - have a quantifiably negative impact on the willingness of older adults to use public transportation, even when private transportation is no longer a safe option (Ravensbergen et al., 2022). That diminished “willingness to ride” translates into taking public transportation when necessary but avoiding discretionary trips to socialize, exercise, or engage in community activities (Davey, 2006). Ultimately, adults aged 65+ who are unable to use private transportation will choose not to travel to greenspaces, recreation centers, or senior centers to engage in physical activity in order to minimize the “mobility work” of using inaccessible (physically or emotionally) public transportation (Davey, 2006; Ravensbergen et al., 2021).

It should be noted that Greenway Public Transportation has dedicated significant effort to making their services more accessible within their resource constraints. It seems highly likely that organizational policies will be changed over time to better accommodate older adults or people with disabilities.

### **Policy Environment**

Burke County is governed by a board of commissioners, all of whom are politically and socially conservative, per their election platforms and voting history (“Burke County Board of Commissioners Candidate Profiles,” 2012/2019). Their fiscal year 2023-2024 strategic goals emphasizes economic development, public safety, and efficient financial management in service of a central objective: making Burke County a “community of choice” for current and new residents and visitors (Burke County BOC, 2023). While they set the budget of the Burke County Health Department, the county’s Board of Health structure ensures some degree of distance between the commissioners and health programming in the county (with the exception of the commissioner appointee on the Board). Morganton’s position as the county seat and population center plays a significant role in the policy environment of the county as well. The city’s council-manager governance structure is non-partisan and council members represent a variety of positions on both policy and social concerns, though all emphasize development of Morganton’s downtown as a priority (Morganton City Council, 2024).

#### *“Big P” Policy Reactions*

College Street’s redevelopment is aligned with the priorities of several policy-making groups in Burke County, which likely contributed to its approval. In Morganton city government, policymakers have prioritized the development of infrastructure that contributes to a well-developed community culture – the redeveloped street matches closely with their long-term strategic plans. Interestingly, the multimodal corridor also connects to the interests of the Burke County Board of Commissioners. Streetscapes of that type have been linked to greater engagement in the local economy and retention of residents, both priorities for the commissioners (NYC Department of Transportation, 2014). Perhaps of greatest interest to the Board would be the fact that the City of Morganton and the federal government are cost-sharing the project; the county is responsible for none of the cost.

### *“Little P” Policy Reactions*

Greenway Public Transportation relies on both fares and government contributions to operate and is partially limited by the preferences and priorities of local governments. Burke County has historically contributed to a more minimal degree than Catawba County, and public transportation is not a high priority. However, the 2022-2030 Burke County Strategic Land Use Plan does include the objective of working with Greenway to ultimately offer a fixed route bus service throughout the county, which may help address some of the complexities of the current service available in-county (Burke County, 2022). Based on social service priorities represented by their recent meeting minutes, the commissioners are likely to consider Greenway spending to meet the needs of the small number of senior riders to be an inefficient use of funds.

### **Conclusion**

These two sets of policies – the redevelopment of College Street by the City of Morganton and the ridership structure of Greenway Public Transportation – directly and indirectly shape the built environment and then by extension the ability of older adults in Burke County to access recreation and exercise. However, while these policies have the most immediate impact on the physical environment of the county, on a more fundamental level, they shape community decision making. The decision to walk instead of drive. The decision to run your own errands or take a class at the public pool, or stay home. The decision to pause for a moment to experience a greenspace, talk to your neighbors, or pick up a leaflet at the senior center. Understanding the built environment as a social determinant of health means understanding that the built environment – roads, bus stops, bike lanes, ramps, sidewalks – profoundly impacts individual and community choices to engage or not engage in healthy behaviors.



## References

- BCSS. (n.d.). *Burke County Senior Services: Services & Activities*.  
<https://www.burkenc.org/1213/Services-Activities>
- Burke County. (2022). *2022-2030 Burke County Strategic Land Use Plan*.  
<https://www.burkenc.org/DocumentCenter/View/298/Blueprint-Burke---Burke-County-Land-Use-Plan>
- Burke County Board of Commissioners candidate profiles. (2019). *Hickory Record*.  
[https://hickoryrecord.com/burke-county-board-of-commissioners-candidate-profiles/article\\_739ff1e8-c44e-57f7-b6cf-5bda1ae95f3a.html](https://hickoryrecord.com/burke-county-board-of-commissioners-candidate-profiles/article_739ff1e8-c44e-57f7-b6cf-5bda1ae95f3a.html) (Original work published 2012)
- Burke County BOC. (2023). *Commissioners' Strategic Plan*.  
<https://www.burkenc.org/2567/Commissioners-Strategic-Plan>
- Burke County Health Department. (2022). *2022 Burke Community Health Assessment*.  
<https://www.burkenc.org/DocumentCenter/View/2666/2022-Community-Health-Assessment>
- Burke, North Carolina*. (2023). County Health Rankings & Roadmaps.  
<https://www.countyhealthrankings.org/explore-health-rankings/north-carolina/burke?year=2023>
- City of Morganton. (2018). *Downtown Vision Plan: Morganton*.  
[https://www.morgantonnc.gov/sites/default/files/fileattachments/main\\_street/page/2946/downtown\\_masterplan\\_for\\_website.pdf](https://www.morgantonnc.gov/sites/default/files/fileattachments/main_street/page/2946/downtown_masterplan_for_website.pdf)
- City of Morganton. (2020). *Fact Sheet: College Street Redesign Project*.  
[https://www.morgantonnc.gov/sites/default/files/fileattachments/city\\_manager/project/4474/morganton\\_college\\_st\\_fact\\_sheet.pdf](https://www.morgantonnc.gov/sites/default/files/fileattachments/city_manager/project/4474/morganton_college_st_fact_sheet.pdf)
- College Street Redesign Project*. (n.d.). City of Morganton. <https://www.morgantonnc.gov/city-manager/project/college-street-redesign-project>
- Cunningham, C., Sullivan, R. O., Caserotti, P., & Tully, M. (2020). Consequences of physical inactivity in older adults: A systematic review of reviews and meta-analyses. *Scandinavian Journal of Medicine & Science in Sports*, 30(5), 816–827. <https://doi.org/10.1111/sms.13616>
- Davey, J. A. (2006). Older people and transport: coping without a car. *Ageing & Society*, 27(1), 49–65. <https://doi.org/10.1017/s0144686x06005332>
- Duncan, M. J., Spence, J. C., & Mummery, W. K. (2005). Perceived environment and physical activity: a meta-analysis of selected environmental characteristics. *International Journal of Behavioral Nutrition and Physical Activity*, 2(1). <https://doi.org/10.1186/1479-5868-2-11>
- GoRaleigh. (2019). *What is Multimodal?* <https://goraleigh.org/what-multimodal>
- Herbolsheimer, F., Mahmood, A., Michael, Y. L., & Chaudhury, H. (2020). Everyday walking among older adults and the neighborhood built environment: a comparison between two cities in North America. *Frontiers in Public Health*, 8. <https://doi.org/10.3389/fpubh.2020.564533>

- McCormack, G. R. (2017). Neighbourhood built environment characteristics associated with different types of physical activity in Canadian adults. *Health Promotion and Chronic Disease Prevention in Canada*, 37(6), 175–185. <https://doi.org/10.24095/hpcdp.37.6.01>
- McCormack, G. R., Shiell, A., Giles-Corti, B., Begg, S., Veerman, L., Geelhoed, E., Amarasinghe, A., & Emery, J. C. H. (2012). The association between sidewalk length and walking for different purposes in established neighborhoods. *International Journal of Behavioral Nutrition and Physical Activity*, 9(1), 92. <https://doi.org/10.1186/1479-5868-9-92>
- Morganton City Council. (2024). *IMAGINE Morganton 2040*. [https://www.morgantonnc.gov/sites/default/files/fileattachments/development\\_and\\_design\\_services/page/8683/im2040\\_conceptualgrowthstrategy\\_final.pdf](https://www.morgantonnc.gov/sites/default/files/fileattachments/development_and_design_services/page/8683/im2040_conceptualgrowthstrategy_final.pdf)
- NC DHHS. (2020). *County Aging Profiles 2020: Burke County, NC*. <https://www.ncdhhs.gov/county-aging-profiles-2020pdf/open>
- NHS. (2021). *Physical activity guidelines for older adults*. <https://www.nhs.uk/live-well/exercise/physical-activity-guidelines-older-adults/>
- NYC Department of Transportation. (2014). *The Economic Benefit of Sustainable Streets*. <https://www.nyc.gov/html/dot/downloads/pdf/dot-economic-benefits-of-sustainable-streets.pdf>
- Ravensbergen, L., Newbold, K. B., & Ganann, R. (2022). ‘It’s overwhelming at the start’: transitioning to public transit use as an older adult. *Ageing & Society*, 1–18. <https://doi.org/10.1017/s0144686x22000010>
- Ravensbergen, L., Newbold, K. B., Ganann, R., & Sinding, C. (2021). ‘Mobility work’: Older adults’ experiences using public transportation. *Journal of Transport Geography*, 97, 103221. <https://doi.org/10.1016/j.jtrangeo.2021.103221>
- Travert, A., Annerstedt, K. S., & Daivadanam, M. (2019). Built Environment and Health Behaviors: Deconstructing the Black Box of Interactions—A Review of Reviews. *International Journal of Environmental Research and Public Health*, 16(8), 1454. <https://doi.org/10.3390/ijerph16081454>
- TRIP. (2019). *Rural Connections: Challenges and Opportunities in America’s Heartland*. [https://tripnet.org/wp-content/uploads/2019/08/Rural\\_Roads\\_TRIP\\_Report\\_May\\_2019.pdf](https://tripnet.org/wp-content/uploads/2019/08/Rural_Roads_TRIP_Report_May_2019.pdf)
- US DHHS. (2018). *Neighborhood and Built Environment*. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/neighborhood-and-built-environment>
- WPRTA. (n.d.). *About Us*. <https://www.mygreenway.org/copy-of-about-us>
- WPRTA. (2024). *Rider Information*. <https://www.mygreenway.org/riderinformation>

## **Appendix D.3: Quality Recommendations**

### **Social Determinant of Health Introduction**

When a person walks out the door, the built environment around them impacts their functional decision making – where they can go, how they can get there, and what they can do when they arrive are all shaped by the design and development of infrastructure, buildings, and landscaping (US DHHS, 2018). The relationship between the built environment, or the perceived built environment, and how a community makes and executes decisions has a significant downstream effect on health outcomes by either limiting or extending the community’s ability to engage in health-promoting activities (Travert et al., 2019).

Despite abundant natural resources, a notably large stock of recreation space and facilities, and political interest in prioritizing recreation, Burke County is below the state average for both access to exercise opportunities and daily physical exercise by significant margins (Burke, North Carolina, 2023). The Burke County Health Department has identified challenges in the built environment as potential drivers for current data documenting faltering engagement in recreation by county residents (Burke County Health Department, 2022). These challenges are known to ultimately contribute to poor health outcomes, particularly for adults aged 65+, who are uniquely impacted by limited exercise and who make up a growing portion of Burke County’s population (Cunningham et al., 2020; NC DHHS, 2020). Burke County is well-positioned to use quality improvement tools to generate concepts that would enable the Health Department to improve the county’s built environment in the interest of ultimately promoting better health outcomes for older adults.

### **Generating Change Concepts**

In the Reaccreditation Site Visit conducted in Burke County by the North Carolina Local Health Department Accreditation program in January 2023, the site visit team noted that the Burke County Health Department had failed to make progress on Activity 10.2, which mandates that the department should develop, implement, and evaluate health promotion programs and materials targeted at one or

more at-risk groups, as identified by their community health assessment (NCLHDA, 2023). The 2022 Burke County Community Health Assessment acknowledges at several points that the county's priority health concerns are likely to impact adults aged 65+ in unique and significant ways, making that growing population a viable target for health promotion programming (Burke County Health Department, 2022).

### ***Approach 1***

Gemba Walks are a tool used most often by practitioners of Lean quality improvement, a framework which emphasizes the creation of equal or greater value with less waste of resources (Dombrowski & Mielke, 2013). The tool, which gets its name from a Japanese term that means "real place", allows quality improvement teams to develop a more meaningful understanding of a challenge by having them physically walk through the spaces in which the process occurs (Dombrowski & Mielke, 2013; Aij & Teunissen, 2017). For example, a senior manager in a hospital might adopt the role of a patient, moving from the parking lot all the way through to an examination room, carefully noting their observations and experiences along the way to identify where wastage or lowered value in the patient experience might be occurring.

Applied to Activity 10.2, Burke County public health practitioners would be better equipped to develop and implement health promotion programming targeting improved access to exercise opportunities for older adults if they could experience challenges firsthand, an experience afforded by the Gemba Walk. This tool is best suited for quality challenges where the physical environment plays a role, and the Burke County Health Department has acknowledged that that county's built environment is likely impacting meaningful access to exercise opportunities (Burke County Health Department, 2022; Dombrowski & Mielke, 2013). The Burke County Health Department could consider having several staff members adopt the persona of older adults attempting to use the county's abundant resources for recreation or shadow older adults in the community doing so. As they move through that process, they would take detailed notes on the feelings, physical sensations, and practical experiences that arose, which would later be used to identify specific targets for quality improvement through targeted health promotion programming (Aij & Teunissen, 2017).

### ***Approach 2***

Six Hats exercises are a simpler approach to change concept generation that could be implemented within a shorter timeframe than a Gemba Walk. Each member of a quality improvement team adopts a “hat”, or a pre-established perspective on a challenge, and the group uses these varied perspectives to engage in more collaborative and productive ideation than could be achieved through unstructured discussion (Kivunja, 2015). The hats compel participants to see through the lens of positivity, negativity or caution, rationality, creativity, basic emotion, and control (De Bono, 1985). Throughout a Six Hats exercise, quality teams will “swap hats”, shifting from perspective to perspective as they discuss the area of concern and develop ideas for improvement.

Implementation of this tool in Burke County would be reasonably straightforward. A small team of relevant staff could be assembled and asked to consider Activity 10.2 and the need to develop and implement health promotion programming focused on exercise access for older adults. Each would be assigned an initial “hat”, and a facilitator would open discussion and ideation. County Health Department Leadership could anticipate that a Six Hats session would lead to a wide range of ideas, each informed and tempered by the “rationality” and “caution” hats.

### ***Approach 3***

Finally, Burke County could consider implementing a Failure Mode and Effects Analysis (FMEA) on the process to access exercise opportunities as an older adult in order to identify likely points of failure, which in turn would help clarify impactful intervention points for programming or resources that fulfill Activity 10.2. FMEA details two main areas of information: the ways in which a process might fail, and the impact of those failures (Liu et al., 2013). The tool pairs these with brainstorming around the potential causes of failure and the controls in place to help minimize failure risk, and is intended to be followed by the development of recommended actions aligned with the brainstorming (Liu et al., 2013; Spath, 2003).

Implemented in Burke County, the Health Department would need to select specific areas of recreation on which to focus analysis. For example, they could conduct an FMEA for the process to access the senior exercise classes at the Morganton recreation center, an underutilized resource for county residents. They would begin by noting each function within the process (e.g. “Locate class schedule

information” or “Find parking at rec center”) and considering the myriad reasons for which an older adult might be unable to continue with the process at that stage. Moving into recommended actions, they would use those failures to develop well-informed change concepts.

### **Testing Change Concepts**

As an illustrative example, the Burke County Health Department could complete a Gemba Walk shadowing older adults trying to go to an aquatics class in downtown Morganton and observe that they felt self-conscious and uncomfortable while waiting for the bus after class, as they were cold and damp. In response, the County may decide to pilot a health promotion program that uses a Greenway Public Transportation van to drop off senior aquatics class participants at their homes after class, to provide them a more private, more comfortable transportation option that encourages them to continue to attend.

The Model for Improvement (MOI) is a good choice for testing the viability of this change concept. MOI is a framework developed by Associates in Process Improvement that combines three essential quality improvement questions with an activity cycle that encourages iterative testing and learning (Crowl et al., 2015). The questions compel the project team to consider whether they have a strong foundation for change, asking “What are we trying to accomplish?”, “How will we know that a change is an improvement?”, and “What change can we make that will lead to improvement?” (Courtlandt et al., 2009; Crowl et al., 2015). With initial answers in place, the team begins the first Plan-Do-Study-Act (PDSA) cycle (Crowl et al., 2015). As an example, if county leadership tested the illustrative aquatics class van concept, that could look like: Plan: The county establishes an agreement with Greenway Public Transportation to pay for a single van to provide home drop-offs after a twice-weekly senior aquatics class and advertises this new service to that class’s attendees. A county staff member walks each attendee through how to find the van after class, among other essential details. Do: For a period of 2 months, the van provides drop off services to class attendees. The driver notes number of attendees and route after each class. Both riders and drivers complete very brief paper feedback slips on their experiences, which they drop off at the rec center. The rec center tracks class attendance, returning participants, and new participants. Study: The county reviews the ride log, feedback slips, and attendance data, noting patterns

and themes. Act: The county opts to maintain the same service, expand or modify the service and begin a new PDSA cycle, or discontinue the test based on what they've learned.

### **Scaling Change**

MOI is fundamentally an iterative and expanding process – PDSA cycles are generally intended to start small and be scaled up after the completion of each cycle (Randolph et al., 2009). If the initial cycle in the example *did* appear to result in an improvement, Burke County could consider providing more vans for the initial aquatics class, vans after all aquatics classes, and ultimately drop-off vans for all senior recreation classes in general, with each scale-up preceded by meaningful learning. The county should consider several key factors related to the built environment as they make the decision to scale-up the change concepts they generate.

First, they should consider the priorities, interests, and experiences of relevant stakeholders both for the sake of developing quality solutions, but also to ensure that scaling up doesn't lead to unintended consequences (Leeman et al., 2022). For example, Greenway Public Transportation could note after a first cycle that it's difficult for their drivers to plan multi-stop routes on the fly, leading to disruptions elsewhere in their transportation system due to the inefficient drop-offs. This perspective could lead to an adjustment in the change concept that asks class attendees to sign up for their drop-off in advance. Second, the process will require intention around leadership and ownership of the change. Changes focused on the built environment and exercise in Burke County have many potential "owners" – the Health Department, the Recreation Department, public transportation administrators, senior services personnel, the private sector, the state or municipalities – and as a concept is scaled up, it may be necessary to transfer leadership between these groups. Third and finally, successful scale-up calls for system readiness (Leeman et al., 2022). While related to leadership and stakeholder perspectives, this factor zooms in on the potential enablers and barriers within the system that might stall going to scale. In the example concept, the Health Department would need to consider the size of the van fleet, the number of drivers and their work schedules, the department budget and cost of van services, and the ability of recreation staff to assist class attendees with finding their van. They should even consider attitudes and

feelings of process participants. If a system isn't ready to accept change, scale-up will deepen challenges rather than improve them (Koorts & Rutter, 2021; Leeman et al., 2022).

### **Sustaining Change**

Should scale-up be successful and improvement in access be documented, the Burke County Health Department will then turn to program sustainability. One measure to increase sustainability would be the handoff of program management from a quality improvement team (or, more likely, a team selected to address deficiencies in the accreditation report) to department staff for whom the program aligns with their typical scope of work. Ideally, oversight and management of the generated program should be a routine job function rather than a standalone initiative to ensure continuity and the establishment of an effective and transferable knowledge base (Koorts & Rutter, 2021; Leeman et al., 2022). To date, there have been no staff for whom the issue of exercise access (as opposed to simple provision of services) was a core responsibility, and a purposeful handoff of this initiative could begin to address that gap. Meaningful participation in Burke County's active and ongoing strategic planning sessions would also be an essential component of program sustainability. The county is attempting to reposition itself as a recreation and business capital of North Carolina, and as a result, Burke County's decision-makers at both the county and municipal levels are near-continuously engaged in establishing plans and priorities for physical development of infrastructure and the environment (Burke County, 2022; Burke County BOC, 2023; City of Morganton, 2018). The Health Department should consider how to connect and align with that planning. With those measures in place, the change concept is likely to be able to make a significant impact in how Burke County's older residents access exercise opportunities.



## References

- Aij, K. H., & Teunissen, M. (2017). Lean leadership attributes: a systematic review of the literature. *Journal of Health Organisation and Management*, 31(7/8), 713–729. <https://doi.org/10.1108/jhom-12-2016-0245>
- Burke County. (2022). *2022-2030 Burke County Strategic Land Use Plan*. <https://www.burkenc.org/DocumentCenter/View/298/Blueprint-Burke---Burke-County-Land-Use-Plan>
- Burke County BOC. (2023). *Commissioners' Strategic Plan*. <https://www.burkenc.org/2567/Commissioners-Strategic-Plan>
- Burke County Health Department. (2022). *2022 Burke Community Health Assessment*. <https://www.burkenc.org/DocumentCenter/View/2666/2022-Community-Health-Assessment>
- Burke, North Carolina. (2023). County Health Rankings & Roadmaps. <https://www.countyhealthrankings.org/explore-health-rankings/north-carolina/burke?year=2023>
- City of Morganton. (2018). *Downtown Vision Plan: Morganton*. [https://www.morgantonnc.gov/sites/default/files/fileattachments/main\\_street/page/2946/downtown\\_masterplan\\_for\\_website.pdf](https://www.morgantonnc.gov/sites/default/files/fileattachments/main_street/page/2946/downtown_masterplan_for_website.pdf)
- Courtlandt, C., Noonan, L., & Feld, L. G. (2009). Model for Improvement - Part 1: A framework for health care quality. *Pediatric Clinics of North America*, 56(4), 757–778. <https://doi.org/10.1016/j.pcl.2009.06.002>
- Crowl, A., Sharma, A., Sorge, L. A., & Sorensen, T. D. (2015). Accelerating quality improvement within your organization: Applying the Model for Improvement. *Journal of the American Pharmacists Association*, 55(4), e364–e376. <https://doi.org/10.1331/japha.2015.15533>
- Cunningham, C., Sullivan, R. O., Caserotti, P., & Tully, M. (2020). Consequences of physical inactivity in older adults: A systematic review of reviews and meta-analyses. *Scandinavian Journal of Medicine & Science in Sports*, 30(5), 816–827. <https://doi.org/10.1111/sms.13616>
- De Bono, E. (1985). *Six thinking hats*. <https://managertoolkits.co.uk/documents/PPTF08-SixThinkingHats.pdf>
- Dombrowski, U., & Mielke, T. (2013). Lean Leadership – Fundamental Principles and their Application. *Procedia CIRP*, 7, 569–574. <https://doi.org/10.1016/j.procir.2013.06.034>
- Kivunja, C. (2015). Using De Bono's Six Thinking Hats model to teach critical thinking and problem solving skills essential for success in the 21st century economy. *Creative Education*, 06(03), 380–391. <https://doi.org/10.4236/ce.2015.63037>
- Koorts, H., & Rutter, H. (2021). A systems approach to scale-up for population health improvement. *Health Research Policy and Systems*, 19(1). <https://doi.org/10.1186/s12961-021-00679-0>
- Leeman, J., Boisson, A., & Go, V. F. (2022). Scaling up public health interventions: engaging partners across multiple levels. *Annual Review of Public Health*, 43(1), 155–171. <https://doi.org/10.1146/annurev-publhealth-052020-113438>

- Liu, H., Ling, L., & Liu, N. (2013). Risk evaluation approaches in failure mode and effects analysis: A literature review. *Expert Systems With Applications*, 40(2), 828–838. <https://doi.org/10.1016/j.eswa.2012.08.010>
- NCLHDA. (2023). *Burke County Health Department Reaccreditation Site Visit Report*.
- Randolph, G. D., Esporas, M., Provost, L., Massie, S., & Bundy, D. G. (2009). Model for Improvement - Part two: Measurement and feedback for quality improvement efforts. *Pediatric Clinics of North America*, 56(4), 779–798. <https://doi.org/10.1016/j.pcl.2009.05.012>
- Spath, P. (2003). Using failure mode and effects analysis to improve patient safety. *AORN Journal*, 78(1), 15–37. [https://doi.org/10.1016/s0001-2092\(06\)61343-4](https://doi.org/10.1016/s0001-2092(06)61343-4)
- Travert, A., Annerstedt, K. S., & Daivadanam, M. (2019). Built Environment and Health Behaviors: Deconstructing the Black Box of Interactions—A Review of Reviews. *International Journal of Environmental Research and Public Health*, 16(8), 1454. <https://doi.org/10.3390/ijerph16081454>
- US DHHS. (2018). *Neighborhood and Built Environment*. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/neighborhood-and-built-environment>

## **Appendix E: Lindsay Parlberg Individual Deliverables**

### **Appendix E.1: Social Determinant of Health Analysis**

#### **Social Determinants of Health**

At the national level social determinants of health (SDOH) are defined by U.S. Department of Health and Human Services as the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks (U.S. Department of Health and Human Services, n.d.) Within Healthy People 2030 there are five primary domains to address SDOH including, economic stability, education access and quality, health care access and quality, neighborhood and the built environment, social and community context. This analysis will focus within the domain of the Neighborhood and the Built Environment. The goal of this domain at the national level is to create neighborhoods and environments that promote health and safety. To address the upstream or conditions that affect this domain we explore the related objective of ‘physical activity’ because physical activity and exercise has been linked to positive physical, psychological, and social outcomes (World Health Organization, 2022).

This analysis will be conducted in the context of the State of North Carolina, specifically, it will utilize the Healthy North Carolina 2030 Report (Healthy NC 2030) (Donohoe, 2018). The goal that resides within the Physical Environment, health indicator seven “Access to Exercise Opportunities”. Healthy NC 2030 defines “exercise access” based on census tract including proximity to public parklands or recreational facilities such as gyms, community centers, dance studios, pools, and other exercise facilities. This is a critical health indicator to address as all North Carolina residents deserve equitable access to safe areas where they can be physically active (Phillips, 2022). Publications have highlighted how the lack of availability of facilities that enable and promote physical activity may, reinforce the lower levels of activity observed among underserved populations in the U.S. (Powell et al., 2006). Physical activity and regular exercise is essential for health, benefits everyone and is a protective factor for many health conditions, including obesity, which is a serious chronic disease and increasing around the US and North Carolina (Mora & Valencia, 2018).

## **Geographic and Historical Context**

The context of this analysis will focus within Burke County, North Carolina. Burke County is in the western part of North Carolina located in the foothills of the Blue Ridge Mountains. The county spans about 500 square miles and encompasses 13 townships and seven municipalities. Over 90,000, mostly White Non-Hispanic residents (81.2%) call Burke County home (Burke Community Health Assessment, 2022). Burke County is a member of the ‘Unifour Counties’ also including Caldwell, Catawba and Alexander Counties, all of which experienced the economic downturn called the Great Recession in the mid- 2000s that affected a broad range of manufacturing uses in the region (Blueprint Burke, Strategic Land Use Plan, 2022).

Burke County prides itself on the abundance of natural resources and beauty, even bearing the slogan “Nature’s Playground”. Specifically, Burke County has multiple state recognized hiking and mountain biking trails, including the Fonta Flora, Overmountain Victory National Historic Trail and Mountains to Sea Trail, Lake James and South Mountain State Parks, Linville Gorge Wilderness Area Pisgah National Forest, and the Blue Ridge Parkway. These natural spaces, when equitably utilized, have the potential to benefit both residents and tourist alike. The recreation and tourism groups can seek to improve coordination between rural and urban entities to promote joint development for recreation. Studies have shown that people who live in communities that facilitate easy access to exercise opportunities are better able to engage in physical activity (Angraal et al., 2019).

Despite the abundance of places to recreate and investments over the last five years the 2022 Burke Community Health Assessment has identified ‘Obesity with Risk Factors’ as a top three priority to address. The team identified a critical question of “Who does not have access that needs or wants access?”, in other words simply improve in providing people with places to partake in physical activity does not mean it is accessible to all who need it (Burke Community Health Assessment, 2022).

### **Priority population**

Unfortunately, disparities exist in physical activity rates by race/ethnicity, sex, age, and region (AuYoung et al., 2016). Seeing as Burke County has a slightly older population compared to North

Carolina (20.1% vs 17.4%), the priority population for this analysis is Burke County Residents Aged 65 years and over (U.S. Census Bureau QuickFacts, n.d. & Burke Community Health Assessment 2022). Despite the many benefits of being physically active, approximately one in four adults aged  $\geq 50$  years are inactive, therefore communities can be purposeful to make it safer and easier for persons of all ages and abilities to be physically active (Watson et al., 2016). Removing barriers for adults with disabilities and transportation limitation should be further explored and prioritized within older adult population of Burke County (North Carolina Office on Disability and Health., 2008 & Blueprint Buke, Strategic Land Use Plan, 2022).

### **Measures**

Healthy North Carolina 2030 reports that 73% of North Carolinians currently have access to exercise opportunities, however the target is to increase this to the target of 92% by 2030. Within Burke county however only 66.9% of the residents have access to exercise opportunities (Burke County | Healthy Communities NC, n.d.) Data for the variable within the Healthy NC 2030 report is provided from a compilation of County Health Rankings and Roadmaps, Business Analyst, Geospatial mapping software, & US Census. It is important to discuss, however, that the measurement is insufficient; and as described in the report the current data prohibits utilization in a meaningful way.

Disparities may exist within Burke County specifically because rural areas tend to face more barriers to exercise access than their metropolitan counterparts as documented in other research studies (Park et al., 2017). The Catawba River Greenway Park features 3.8 miles of paved walking trail following the river through wooded and open areas. Many of the county gyms/exercise facilities are concentrated near the city of Morganton including, the Phifer Family YMCA, Planet Fitness, New Level Fitness, HiTONE Fitness, Peak Performance Health and Fitness LLC, and Bone Breaker Gym (Explore Burke County's Health, n.d.) (Tourism, n.d.) ("Burke County," n.d.). It is also important to consider alternative exercise opportunities and approaches for physical activity within the community such as integrating physical activity into primary care practice (AuYoung et al., 2016)

**Rationale/Importance**

As described above the 2022 Burke County Community Health Assessment has identified reducing obesity and risk factors as a top health priority to address. By leveraging the previous county investments, unique geographical context we can seek to serve the priority population of adults 65 years and older by positively addressing this social determinate of health. When we increase access to exercise opportunities for one of the most vulnerable and growing populations, we have the opportunity to invest in meaningful public health practices and improve the health of the community.

## References

- Angraal, S., Gupta, A., Khera, R., Nasir, K., & Desai, N. R. (2019). Association of access to exercise opportunities and cardiovascular mortality. *American Heart Journal*, 212, 152–156. <https://doi.org/10.1016/j.ahj.2019.02.010>
- AuYoung, M., Linke, S. E., Pagoto, S., Buman, M. P., Craft, L. L., Richardson, C. R., Hutber, A., Marcus, B. H., Estabrooks, P., & Sheinfeld Gorin, S. (2016). Integrating Physical Activity in Primary Care Practice. *The American Journal of Medicine*, 129(10), 1022–1029. <https://doi.org/10.1016/j.amjmed.2016.02.008>
- Burke County. (n.d.). NCIOM. Retrieved January 23, 2024, from <https://nciom.org/counties/burke-county/>
- Burke County | Healthy Communities NC. (n.d.). Retrieved January 22, 2024, from <https://healthycommunitiesnc.org/profile/geo/burke-county>
- Donohoe, C. (2018, December 20). Healthy North Carolina 2030. NCIOM. <https://nciom.org/healthy-north-carolina-2030/>
- Explore Burke County's Health. (n.d.). Retrieved January 23, 2024, from <https://www.usnews.com/news/healthiest-communities/north-carolina/burke-county>
- Mora, J. C., & Valencia, W. M. (2018). Exercise and Older Adults. *Clinics in Geriatric Medicine*, 34(1), 145–162. <https://doi.org/10.1016/j.cger.2017.08.007>
- North Carolina Office on Disability and Health. (2008). Removing Barriers to Health Clubs and Fitness Facilities A Guide for Accommodating All Members, Including People with Disabilities and Older Adults. [https://fpg.unc.edu/sites/fpg.unc.edu/files/resources/other-resources/NCODH\\_RemovingBarriersToHealthClubs.pdf](https://fpg.unc.edu/sites/fpg.unc.edu/files/resources/other-resources/NCODH_RemovingBarriersToHealthClubs.pdf).
- Park, T., Eyler, A. A., Tabak, R. G., Valko, C., & Brownson, R. C. (2017). Opportunities for Promoting Physical Activity in Rural Communities by Understanding the Interests and Values of Community Members. *Journal of Environmental and Public Health*, 2017, 8608432. <https://doi.org/10.1155/2017/8608432>
- Phillips, K. U. (2022). Achieving Healthy NC 2030 Goals: Physical Environment. *North Carolina Medical Journal*, 83(2), 121–123. <https://doi.org/10.18043/ncm.83.2.121>
- Powell, L. M., Slater, S., Chaloupka, F. J., & Harper, D. (2006). Availability of Physical Activity–Related Facilities and Neighborhood Demographic and Socioeconomic Characteristics: A National Study. *American Journal of Public Health*, 96(9), 1676–1680. <https://doi.org/10.2105/AJPH.2005.065573>
- Tourism, B. C. (n.d.). All Attractions (<https://www.discoverburkecounty.com/all-attractions/?subcategories=health-wellness>) [Text/html]. Burke County Tourism; Burke County Tourism. Retrieved January 23, 2024, from <https://www.discoverburkecounty.com/all-attractions/?subcategories=health-wellness>
- U.S. Census Bureau QuickFacts: North Carolina. (n.d.). Retrieved January 31, 2024, from <https://www.census.gov/quickfacts/fact/table/NC/AGE775222#AGE775222>

U.S. Department of Health and Human Services. (n.d.). Healthy People 2030. Retrieved January 23, 2024, from <https://health.gov/healthypeople/priority-areas/social-determinants-health>

Watson, K. B., Susan A. Carlson, Janelle P. Gunn, Deborah A. Galuska, & Ann O'Connor. (2016). Physical Inactivity Among Adults Aged 50 Years and Older—United States, 2014. *MMWR. Morbidity and Mortality Weekly Report*, 65. <https://doi.org/10.15585/mmwr.mm6536a3>

World Health Organization. (2022, October 7). Physical activity—Great for your body, great for your mind. <https://www.who.int/news-room/feature-stories/detail/physical-activity---great-for-your-body--great-for-your-mind>



## **Appendix E.2: Leadership Context Analysis**

### **Social Determinant of Health**

At the national level social determinants of health (SDOH) are defined by U.S. Department of Health and Human Services as the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks (U.S. Department of Health and Human Services, n.d.) Within Healthy People 2030 there are five primary domains to address SDOH including, economic stability, education access and quality, health care access and quality, neighborhood and the built environment, social and community context. This analysis will focus within the domain of the Neighborhood and the Built Environment, the goal of which at the national level is to create neighborhoods and environments that promote health and safety. To address the upstream conditions that affect this domain we explore the related objective of ‘physical activity’ because physical activity and exercise has been linked to positive physical, psychological, and social outcomes (World Health Organization, 2022).

This analysis will be conducted within the context of Burke County, North Carolina, specifically, and it will utilize the Healthy North Carolina 2030 Report (Healthy NC 2023) the goal that resides within the Physical Environment, health indicator “Access to Exercise Opportunities” (Donohoe, 2018). This is a critical health indicator to address as North Carolina residents deserve equitable access to safe areas where they can be physically active (Phillips, 2022). Burke County is in the western part of North Carolina located in the foothills of the Blue Ridge Mountains. Burke County prides itself on the abundance of natural resources and beauty, even bearing the slogan “Nature’s Playground”. These natural spaces, when equitably utilized, have the potential to benefit both residents and tourist alike. The recreation and tourism groups can seek to improve coordination between rural and urban entities to promote joint development for recreation. Studies have shown that people who live in communities where there is easy access to exercise opportunities are better able to engage in physical activity (Angraal et al., 2019).

Despite the abundance of places to recreate and investments over the last five years the 2022 Burke County Community Health Assessment has identified reducing obesity and risk factors as a top health priority to address posing a critical question of “Who does not have access that needs or wants access?”, in other words simply providing people with places to partake in physical activity does not mean it is accessible to all who need it (Burke Community Health Assessment, 2022). By leveraging the previous county investments and unique geographical context, we can seek to serve the Burke County priority population of adults 65 years and older who are at risk of limited mobility, obesity, among other factors by positively addressing this social determinant of health. Despite the many benefits of being physically active, approximately one in four adults aged  $\geq 50$  years are inactive, therefore communities can be purposeful to make it safer and easier for persons of all ages and abilities to be physically active (Watson et al., 2016). When we increase access to exercise opportunities for one of the most vulnerable and growing populations, we can invest in meaningful public health practices and improve the health of the community. This is a critical health indicator to address as all residents deserve equitable access to safe areas where they can be physically active (Phillips, 2022). Research highlights how the lack of availability of facilities that enable and promote physical activity may, reinforce the lower levels of activity observed among underserved populations in the U.S. (Powell et al., 2006). Physical activity and regular exercise is essential for health, benefits everyone and is a protective factor for many health conditions, including obesity, which is a serious chronic disease and increasing around the US and North Carolina (Mora & Valencia, 2018). Addressing this SDOH for Burke County residents 65 years and over will improve health for a growing population in this community.

### **Leadership Alignment and Commitment**

When seeking to improve access to exercise opportunities for the priority population of residents aged 65 and older in Burke County, North Carolina it is critical to strategically plan to bring together a cross-sector group for collaboration. Key fundamentals of successful cross-sector collaboration that can lead to collective learning and impact to promote population health have been described by de Montigny and colleagues in the 2017 including, we must engage in collaborative engagement for planning, implement

processes with capacity for collaborative action and adaptability, along with sustained motivation for collaborative engagement (de Montigny et al., 2017). Each of these fundamental factors can be utilized when establishing processes to promote change within the community. To address and increase exercise opportunities for adults over the age of 65 In Burke County, North Carolina organizing a representative steering committee to engage with others who have relevant experience and invested interest is important. As summarized in Appendix E.2.A the Steering Committee will include diverse representatives. A Burke County Senior Services Department representative, whose interest and goals are to serve our priority population, this representative will have a direct connection to the population and are seen to hold high power and influence within the committee. A Burke County Parks and Recreation representative whose interest lies within expanding services and offerings to meet needs of aging population, this representative holds a medium level of power and influence within the community. A Burke County Council on Aging representative can serve in advisory capacity to as they are well versed in matters concerning the status of the aging population and the existence of or need for programs for older citizens residing in the County, this representative hold high power and medium level of interest. The Phifer YMCA Sliver Sneakers Program representative hold unique perspective as they routinely engage with the priority population and can provide insight to innovative ideas for increases opportunities to exercise, this representative hold both medium power and interest. Another representative will be a Primary Care Provider for Burke County Medicare recipients (part of the UNC Health Blue Ridge System of Care), their interest will reside in the potential opportunity to expand primary care and offer 'alternative' solutions and approaches to primary care, which is important to consider for this population, this representative holds low power and medium influence. The steering committee will also include a Burke Community Member who is over the age of 65 as they will likely be a direct customer of the advancement of initiatives, they are viewed with medium power and influence. Additionally, we will include a future beneficiary of change, a Burke County resident who is between 25- and-50 years old, they can potentially offer innovative or technology-based solutions, however, are viewed with low power and influence. The Burke County AARP Chapter 3262 representative will provide diverse knowledge of the community members' needs

and hold the potential to leverage national opportunities for collaboration, they hold high power and medium influence. A Burke Wellness Initiative (BWI) representative will join as they offer key knowledge of ongoing health assessment information from the community and seek to improve health, holding high power and influence within the community. Finally, a Burke Chamber of Commerce representative will join to bridge the connection to local businesses and leverage unique business, such as the recreation and tourism groups insights, as they represent a variety of populations they are thought to hold medium power and influence. Each of the included representatives on this Steering Committee are situated in a particular setting and have the power and influence to address the health challenge within our priority population. Additionally, it is important to mention that success is achieved through the purposeful engagement of people who have lived experience, and our team is proud to build a steering committee that includes a number of older individuals who have lived experience in Burke County.

### **Governing Vision and Commitment**

It is critical to develop a governing vision and set of established goals for the well-represented steering committee to ensure members are aligned and utilizing their time and community resources effectively. The overarching vision of the Burke County Steering Committee is to promote and expand access to exercise opportunities for Burke County residents aged 65 and older in a holistic manner. This vision can be successfully achieved by increasing the proportion of Burke County residents aged 65 and over who have access to exercise opportunities within the Neighborhood and Built Environment which will support improved health outcomes for the county. Specifically, the Steering Committee will seek to achieve three goals 1) Highlight, amplify and leverage available government programs, policies, community partnerships, and local business investments within the county by developing county level exercise opportunity quarterly newsletters including but not limited to showcasing: community greenspaces such as the NC State Parks, county parks and recreational programs, local walking/biking trails, and the multimodal connector corridor; YMCA Silver Sneakers Program; and an array of other Burke County Senior Services Department & Council on Aging Programs. 2) Identify and evaluate community-level barriers to engaging in exercise opportunities for Burke County residents over 65 years

old by conducting a twice annual 65 and older community engagement meeting. 3) Create opportunities that empower community members to come together to prioritize accessibility, encourage more movement and ensure lasting community connections by hosting a series of community connection events for Burke County residents over 65 years old at established facilities.

If the three goals of the Steering Committee are achieved Burke County will have the opportunity to showcase the natural beauty and community investments made over the years by improving the built environment, establishing the improved greenway corridors for a more walkable built environment for community members and disseminating that information to the priority population. Additionally, establishing conditions around improving information sharing within the priority population of available exercise programs offered from the county parks and recreation division will seek to highlight available opportunities. When potential community-level barriers are identified the steering committee members can seek to develop and offer specific and targeted innovative solutions to improve exercise opportunities. By empowering community members and our priority population to prioritize accessibility and increase opportunities for sustained movement and exercise within the community we are contributing to an environment that is healthier for all.

### **Member Accountability**

Our plan is to establish mutual accountability across the steering committee with the development of a memorandum of understanding (MOU) at the early onset of formation. An MOU is not an official legal/binding contract, but rather a document designed to enhance and build accountability among contributors to the diverse steering committee. The key elements to include within the MOU are logic and purposeful intention. Specifically, sections outlining the scope and purpose of the steering committee; clear leadership and team member roles and responsibilities; methods for communication and commitment of service to the steering committee; funding provided (if relevant), review and endorsement/signature of each member; and finally, an outline of the products, materials, or deliverables to be produced along with any relevant plans for dissemination of materials and reporting. Please see [Appendix E.2.B](#) for a template which can be utilized by the Burke County Steering Committee upon

formation. This steering committee will seek to operate under the framework of results-based accountability which can assist the group in turning the curve to determine if progress and change is underway (Friedeman, 2015). This framework provides users the opportunity to answer five questions when working toward change. How are we doing, or what do we know, and how well it is working, as this will be helpful to think about and anchor the group and create a boundary to keep focused within. What is the story behind the curve, this is where contributors are doing it in practice and implementing possible solutions. Who are the partners who have a role to play in turning the curve, this question will allow the steering committee representatives to think about the partners and the systems as whole. What works to turn the curve, helps steering committee determine what would each of the practices have to do to change practice. Finally, what is our action plan to turn the curve, answering this question will provide the steering committee with actionable ways to implement change within the community. Developing an MOU and operating under the results-based accountability framework will improve the effectiveness of steering committee and offer guidance for expectations and desired outcomes.

## References

- Angraal, S., Gupta, A., Khera, R., Nasir, K., & Desai, N. R. (2019). Association of access to exercise opportunities and cardiovascular mortality. *American Heart Journal*, 212, 152–156. <https://doi.org/10.1016/j.ahj.2019.02.010>
- de Montigny, J. G., Desjardins, S., & Bouchard, L. (2017). The fundamentals of cross-sector collaboration for social change to promote population health. *Global Health Promotion*, 26(2), 41–50. <https://doi.org/10.1177/1757975917714036>
- Donohoe, C. (2018, December 20). Healthy North Carolina 2030. NCIOM. <https://nciom.org/healthy-north-carolina-2030/>
- Friedman, Mark (2015), *Trying Hard is Not Good Enough*, 3rd Edition, 10th Anniversary Edition, Parse Publishing
- Mora, J. C., & Valencia, W. M. (2018). Exercise and Older Adults. *Clinics in Geriatric Medicine*, 34(1), 145–162. <https://doi.org/10.1016/j.cger.2017.08.007>
- Phillips, K. U. (2022). Achieving Healthy NC 2030 Goals: Physical Environment. *North Carolina Medical Journal*, 83(2), 121–123. <https://doi.org/10.18043/ncm.83.2.121>
- Powell, L. M., Slater, S., Chaloupka, F. J., & Harper, D. (2006). Availability of Physical Activity–Related Facilities and Neighborhood Demographic and Socioeconomic Characteristics: A National Study. *American Journal of Public Health*, 96(9), 1676–1680. <https://doi.org/10.2105/AJPH.2005.065573>
- U.S. Department of Health and Human Services. (n.d.). Healthy People 2030. Retrieved January 23, 2024, from <https://health.gov/healthypeople/priority-areas/social-determinants-health>
- Watson, K. B., Susan A. Carlson, Janelle P. Gunn, Deborah A. Galuska, & Ann O’Connor. (2016). Physical Inactivity Among Adults Aged 50 Years and Older—United States, 2014. *MMWR. Morbidity and Mortality Weekly Report*, 65. <https://doi.org/10.15585/mmwr.mm6536a3>
- World Health Organization. (2022, October 7). Physical activity—Great for your body, great for your mind. <https://www.who.int/news-room/feature-stories/detail/physical-activity---great-for-your-body--great-for-your-mind>

**Appendix E.2.A: Steering Committee Representatives**

	<b>Burke County Steering Committee Representatives</b>	<b>Link to more information about the entity they represent within Burke</b>	<b>Relevant Interest</b>	<b>Importance</b>	<b>Power (Low, Medium, High)</b>	<b>Influence (Low, Medium, High)</b>
1	<b>Senior Services Dept</b>	<a href="https://www.burken.c.org/1212/Senior-Services">https://www.burken.c.org/1212/Senior-Services</a>	Goals are to serve priority population	Direct connection to Burke County Govt	High	High
2	<b>Parks &amp; Recreation</b>	<a href="https://www.burken.c.org/1239/Parks-Recreation-Commission">https://www.burken.c.org/1239/Parks-Recreation-Commission</a>	Expand services to meet needs of aging population	Connection to Burke County Govt	Medium	Medium
3	<b>Council on Aging</b>	<a href="https://www.burken.c.org/2543/Council-on-Aging">https://www.burken.c.org/2543/Council-on-Aging</a>	Goals are to serve priority population	Connection to Burke County Govt	High	Med
4	<b>Phifer YMCA</b>	<a href="https://www.ymcacv.org/programs/health-wellness">https://www.ymcacv.org/programs/health-wellness</a>  Silver Sneakers Cardio Circuit	Expand services and leverage community partnerships / serve community	Opportunity to model after other NC state—wide YMCA programs	Middle	Medium
5	<b>Primary Care Provider for Medicare recipients (UNC Health Blue Ridge)</b>	<a href="https://www.unchealthblueridge.org/locations/profile/unc-health-blue-ridge-morganton/">https://www.unchealthblueridge.org/locations/profile/unc-health-blue-ridge-morganton/</a>	Opportunity to expand primary care and offer ‘alternative solutions/approaches to care	Key touch-point for priority population	Low	Medium



6	<b>65+ Burke Community Member</b>	NA	Direct consumer/beneficiary of change	Key customer	Medium	Medium
7	<b>25-50-year-old Burke Community member</b>	NA	Future beneficiary of change (potentially offer innovative / tech solutions)	Future customer	Low	Low
8	<b>Burke County AARP Chapter 3262</b>	<a href="https://business.burkecountychamber.org/list/member/burke-county-aarp-chapter-3262-6921.htm">https://business.burkecountychamber.org/list/member/burke-county-aarp-chapter-3262-6921.htm</a>	Can provide insight to community members needs	National collaboration efforts	High	Med
9	<b>Burke Wellness Initiative (BWI)</b>	<a href="https://www.burkecountychamber.org/2271/Burke-Wellness-Initiative">https://www.burkecountychamber.org/2271/Burke-Wellness-Initiative</a>	Up to date on the latest health information in county	County resources and health needs	High	High
10	<b>Chamber of Commerce</b>	<a href="https://burkecountychamber.org/">https://burkecountychamber.org/</a>	Diverse members and many opportunities to collaborate	Leverage local businesses	Medium	Medium

**Appendix E.2.B: Steering Committee Memorandum of Understanding Template**

**Burke County Steering Committee Memorandum of Understanding**

**Memorandum of Understanding**

Between

(Partner)

and

(Partner)

This Memorandum of Understanding (MOU) sets for the terms and understanding between the (partner) and the (partner) and the (partner) and the (partner)..... to (insert activity).

**Background**

(Why partnership important)

**Purpose**

This MOU will (purpose/goals of partnership)

The above goals will be accomplished by undertaking the following activities:

(List and describe the activities that are planned for the partnership and who will do what)

**Reporting & Deliverables**

(Record who will evaluate effectiveness and adherence to the agreement and when evaluation will happen)

**Funding**

(Specify that this MOU is not a commitment of funds)

**Duration & Roles/Responsibilities**

This MOU is at-will and may be modified by mutual consent of authorized officials from (list partners). This MOU shall become effective upon signature by the authorized officials from the (list partners) and will remain in effect until modified or terminated by any one of the partners by mutual consent. In the absence of mutual agreement by the authorized officials from (list partners) this MOU shall end on (end date of partnership).

**Contact Information**

Partner name

Partner representative

Position

Address

Telephone

E-mail

Partner name  
Partner representative  
Position  
Address  
Telephone  
E-mail

\_\_\_\_\_ Date:  
(Partner signature)  
(Partner name, organization, position)

\_\_\_\_\_ Date:  
(Partner signature)  
(Partner name, organization, position)

\_\_\_\_\_ Date:  
(Partner signature)  
(Partner name, organization, position)

\_\_\_\_\_ Date:  
(Partner signature)  
(Partner name, organization, position)

\_\_\_\_\_ Date:  
(Partner signature)  
(Partner name, organization, position)

\_\_\_\_\_ Date:  
(Partner signature)  
(Partner name, organization, position)

\_\_\_\_\_ Date:  
(Partner signature)  
(Partner name, organization, position)

## **Appendix E.3: Systems Recommendations**

### **Social Determinant of Health**

When a person walks out the door, the built environment around them impacts their functional decision making – where they can go, how they can get there, and what they can do when they arrive are all shaped by the design and development of infrastructure, buildings, and landscaping (US DHHS, 2018). The relationship between the built environment, or the perceived built environment, and how a community makes and executes decisions has a significant downstream effect on health outcomes by either limiting or extending the community’s ability to engage in health-promoting activities (Travert et al., 2019). The North Carolina Burke County Health Department has identified challenges in the built environment as potential drivers for current data documenting faltering engagement in recreation by county residents (Burke County Health Department, 2022). Additionally, Burke County's demographics reveal an increasingly aging population, confronting unique geographic and infrastructural challenges that hinder the accessibility of exercise facilities (U.S Census Bureau, 2022; Burke County, 2022; Wu et al., 2023).

Burke County contains abundant resources – infrastructure, social services, greenspaces - that can be optimized to enhance physical activity opportunities for those 65+ (Western Piedmont Council of Governments Area Agency on Aging, 2016; Burke County, 2022). Despite the county’s unusually large stock of recreation space and facilities, and political interest in prioritizing recreation, Burke County is below the state average for both access to exercise opportunities and daily physical exercise by significant margins (Burke, North Carolina, 2023). Reflecting on this apparent contradiction, the 2022 Burke County Community Health Assessment (CHA) poses a critical question: “Who does not have access that needs or wants access?”, noting that simply providing people with places to partake in physical activity does not make those places accessible to all who need it (Burke County CHA, 2022). Lack of physical activity or sedentary lifestyles can lead to detrimental health effects, including metabolic dysfunction and increased risks of chronic conditions like diabetes and heart disease. Older adults are at increased risk of morbidity

and mortality for these conditions (Davies et al., 2018; CDC, 2023; Silva et al., 2020). Increasing access to exercise opportunities is vital for the health of adults aged 65 and over (65+) in Burke County, as the physical environment significantly influences community health, a fact underscored by HealthyNC 2030 (North Carolina Institute of Medicine, 2020).

### **Co-Design Scope and Objectives**

Co-design is important throughout the early stages of design process and beyond as it helps in identifying later users that not easily identified through traditional methods, and it allows the opportunity for teaching stakeholders and users how to design a system so that everyday people can participate in the design process (Treschler et. al, 2018). Co-design moves from the traditional focus of building products to rather a process and designing for a purpose (Sanders and Stappers, 2008). A participatory co-design approach can be used to address this system change as the system designers and users can work together to create designs that are relevant and sustainable (in the future beyond the design project). The area of concern and primary focus for this system analysis is the perceived lack of access to exercise opportunities amongst Burke County residents 65+. To achieve the goals and objectives set forth to address this area of concern a Burke County Community Partners and Co-design team will be formed (Appendix E.3.A). Each member of this team will play an important role in the process as they each bring forward a key perceptible and consideration for the process. Specifically, the Burke County Senior Services Department, Program Coordinator, has an in-depth understanding of available services within the county. A team member who is an active 65+ year old Burke community member, will benefit as a direct consumer, and as a beneficiary of change, this individual will be able to provide key insight and holds knowledge of limitations within system and can represent desires of other active older adults in the county. Similarly, a non- active 65+ Burke community member is another potential direct consumer and could be classified as a beneficiary of change. The Burke County Parks & Recreation Program Coordinator can help expand non-traditional spaces to be more inclusive for those who are older than 65 in the county. A Burke Chamber of Commerce, business partnership representative can bring forth a private/public relations provide insight to local gyms/breweries or other entities who may be available and interested in

collaborating to promote change. Finally, the Primary Care Provider for Medicare recipients (within UNC Health Blue Ridge), is a co-design team member who can share knowledge of opportunity to expand primary care and offer ‘alternative solutions/approaches to care.

Underlying principles of co-design have been established to guide the process as described by Luck and colleagues in 2018, equalizing power relations gives voice to those who may be invisible or weaker in the organizational or community power structures. Situation-based action is the understanding design issues in actual setting and contexts. Transformation focused, emphasizes promoting change to build a better future. Where building infrastructure for long term relationships is developing processes for sustainable change and growth. Two principles described by Huffstetler and colleagues in 2017, that should be implemented throughout this co-design process include Principle 2) we use design to center the voices of those directly impacted by the outcomes of the design process. In addition to Principle 3) prioritize impact on the community over the intentions of the designer.

### **Personas, User Stories, Needs, and Quality Characteristics**

As part of the co-design process two personas were developed highlighting the experience of Burke County Seniors.

#### ***Persona 1: Raymond***



Raymond (Ray) is a physically active senior (65+) and Burke County resident. He currently spends two or three days a week being physically active on local greenways and trails, often visiting breweries with his buddies afterwards. He primarily engages in exercise opportunities when it is nice outside.

However, he is looking to expand and modify his existing exercise routine. He hopes to be a year-round participant in local, Burke County, opportunities to exercise that are less weather dependent. This persona also has a specific and related user story developed available for reference within [Appendix E.3.C](#) below.

## ***Persona 2: Marjorie***



Marjorie is a senior (65+) life-long Burke County resident. She is not active, nor does she currently engage in opportunities for exercise in her community.

However, her UNC Blue Ridge, Primary Care Provider recently recommended she modify their lifestyle to include more ways to engage in physical activity.

Marjorie feels there are limitations in programs offered within her community that are accessible. She does not have access to personal transportation, and

therefore relies on Burke County Transportation or family members to travel outside of her home. Many of her friends express similar limitations. Marjorie fears she will be too stressed and overwhelmed determining how to get to an opportunity to exercise that she won't be able to engage. Marjorie's Empathy Map has been provided as reference in [Appendix E.3.B](#) below. This persona also has a specific and related user story developed available for reference within [Appendix E.3.C](#) below.

### **Kano Model**

The Kano model can be applied to prioritize the user needs, this model can highlight the quality of performance compared to satisfaction, and it includes three levels of need, basic, delighter, and performance (Flemming, PUBH 718- Lesson 9, 2023). As described in [Appendix E.3.D](#), table I, the active Burke County Senior needs, I want to ensure the voices of my community are heard to provide greater access to opportunities to engage in exercise, can be classified as a basic need within the Kano model. I want adequate time with the project designers to build sustainable program infrastructure leveraging our community's existing resources, can be classified as a delighter need. Finally, I want easy to schedule check ins on the ongoing programs to solve potential problems in real time, is classified as performance level need. As described in [Appendix E.3.D](#), table II, the non-Active Burke County Senior (65+) need, I want to ensure the voices of my community and peers are heard to provide greater access to insight to the limitations upon those of us who are unable to currently engage in opportunities to exercise is classified as basic within the Kano model. Additionally, the need I want to view and have access to information about the proposed opportunities so I can better advise and support the community, can be

classified as a delighter. Finally, the need, I want to be to be able to balance my personal/work life and not spend time worrying about transportation so I can spend more time engaging in opportunities to exercise can be classified as a performance level need.

### **Quality Characteristics**

Quality characteristics are the features that a product, service, or program must have to demonstrate that it is meeting user needs (Flemming, PUBH 718- Lesson 9, 2023). As detailed in Appendix E.3.E below, the quality characteristics for the Active Burke County Senior (65+) user include the following: the number of times community members are called upon to provide insight and experiences during the design process; average number of planning meetings able to attend and engage in; and percentage of time the teams are available to check in and solve problems compared to unanswered communications. Additionally, for the Non-Active Burke County Senior (65+) user the quality characteristics are detailed in Appendix E.3.E include percentage of plans and materials shared with the target population before finalization; percentage of meetings in which key community members are invited to provide feedback and insight during planning meetings, and average number exercise opportunities engaged in.

### **Design Brief**

Based on the output of this deliverable, the focus and objective of the design work to come will be based on the participatory approach to co-design. Using the convergent method, such as the six thinking hats during the early phases of co-design will ensure a refined and enhanced set of ideas is put forth to expand access to exercise opportunities for Burke County Seniors. This will also allow the co-design team members to adequately identify the user needs described throughout this analysis in the Kano model and quality characteristics, and ultimately improve the neighborhood and built environment by increasing access to exercise opportunities for Burke County Seniors.



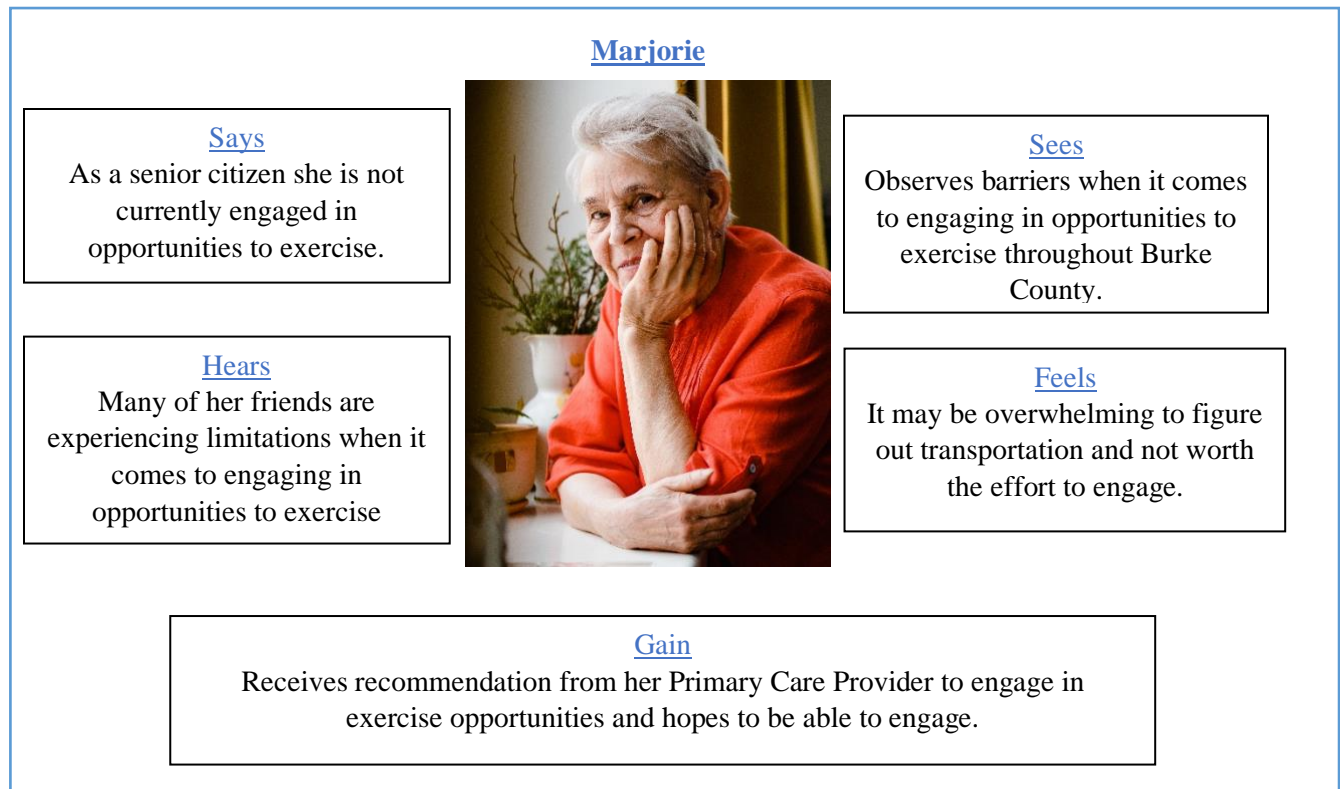
## References

- Burke County. (2022). 2022 Community Health Assessment. Retrieved from <https://www.burkenc.org/DocumentCenter/View/2666/2022-Community-Health-Assessment>
- Centers for Disease Control and Prevention. (2023). Health Benefits of Physical Activity. CDC. <https://www.cdc.gov/physicalactivity/basics/adults/health-benefits-of-physical-activity.html>
- Flemming O. (Fall 2023) PUBH 718-Systems and Design Thinking for Public Health, Lesson 9
- Huffstetler HE, Boland SE, Williams CR, Rice DK, Ramaswamy R. Beyond Virtue-Signaling: Advancing Equity Through Design Justice and Public Health Critical Race Praxis. *Health Equity*. 2022 Jan 17;6(1):21-26. doi: 10.1089/heap.2021.0075. PMID: 35112042; PMCID: PMC8804244.
- Sanders E. & Stappers P (2008) Co-creation and the new landscapes of design, *CoDesign*, 4:1, 5-18, DOI: 10.1080/15710880701875068
- Silva, V. R. R., Belozo, F. L., Pereira, R. M., Katashima, C. K., Cordeiro, A. V., Alves, J. F., Pauli, J. R., Silva, A., Ropelle, E. R., De Moura, L. P. (2020). The effects of ninety minutes per week of moderate intensity aerobic exercise on metabolic health in individuals with Type 2 Diabetes: A pilot study. *J Rehab Therapy*, 2(2), 1-12. <https://rehabiljournal.com/articles/the-effects-of-ninety-minutes-per-week-of-moderate-intensity-aerobic-exercise-on-metabolic-health-in-individuals-with-type-2-diabetes-a-pilot-study.pdf>
- Travert, A., Annerstedt, K. S., & Daivadanam, M. (2019). Built Environment and Health Behaviors: Deconstructing the Black Box of Interactions—A Review of Reviews. *International Journal of Environmental Research and Public Health*, 16(8), 1454. <https://doi.org/10.3390/ijerph16081454>
- United States Census Bureau. (2022). QuickFacts North Carolina; Burke County, North Carolina. <https://www.census.gov/quickfacts/fact/table/NC,burkecountynorthcarolina/PST045222>
- US DHHS. (2018). Neighborhood and Built Environment. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/neighborhood-and-built-environment>
- Western Piedmont Council of Governments Area Agency on Aging. (2016). Resource Directory for Older Adults. [https://media.wix.com/ugd/960958\\_937d7bfdb2fa4e78bd85c50da3b686f0.pdf](https://media.wix.com/ugd/960958_937d7bfdb2fa4e78bd85c50da3b686f0.pdf)
- Wu, L., Yang, Y., Yang, H., Xie, B., & Luo, W. (2023). A comparative study on land Use/Land cover change and topographic gradient effect between mountains and flatlands of southwest china. *Land (Basel)*, 12(6), 1242. <https://doi.org/10.3390/land12061242>

**Appendix E.3.A: Burke County Community Partners and Co-Design Team**

<b>Burke County Community Partners</b>		<b>Role/Position</b>	<b>Key Contribution(s)</b>	<b>User Role/Level</b>
1	<b>Senior Services Department</b>	Program Coordinator	Understand available services within the county	Doing
2	<b>Active 65+ Burke Community Member</b>	Direct consumer	Beneficiary of change, key insight/knowledge of limitations within system and can represent desires	Adapting
3	<b>Non- active 65+ Burke Community Member</b>	Direct consumer	Beneficiary of change, key insight/knowledge of limitations within system and can represent desires	Adapting
4	<b>Parks &amp; Recreation</b>	Program Coordinator	Help expand non-traditional spaces to be more inclusive for 65+	Creating
5	<b>Chamber of Commerce – Business partnership</b>	Representative	Private/Public relations provide insight to local gyms/breweries / available who may be interested in collaborating to promote change	Making
6	<b>Primary Care Provider for Medicare recipients (UNC Health Blue Ridge)</b>	Medical provider	Share knowledge of opportunity to expand primary care and offer ‘alternative solutions/approaches to care	Adapting

## Appendix E.3.B: Empathy Map



**Appendix E.3.C: User Stories**

<b>User Type</b>	<b>User Story</b>
<p><b>Active 65+ Community Member</b></p>	<ol style="list-style-type: none"> <li>1. As an active Burke County Senior, I want to ensure the voices of my community are heard to provide greater access to opportunities to engage in exercise.</li> <li>2. As an active Burke County Senior, I want adequate time with the project designers to build sustainable program infrastructure leveraging our community's existing resources.</li> <li>3. As an active Burke County Senior, I want easy to schedule check ins on the ongoing programs to solve potential problems in real time.</li> </ol>
<p><b>Non-Active 65+ Community Member</b></p>	<ol style="list-style-type: none"> <li>1. As a non-active Burke County Senior, I want to ensure the voices of my community and peers are heard to provide greater access to insight to the limitations upon those of us who are unable to currently engage in opportunities to exercise.</li> <li>2. As a non-active Burke County Senior I want to view and have access to information about the proposed opportunities so I can better advise and support the community.</li> <li>3. As a non-active Burke County Senior I want to be able to balance my personal/work life and not spend time worrying about transportation so I can spend more time engaging in opportunities to exercise.</li> </ol>

**Appendix E.3.D: Burke County User Needs and the Kano Model**

<b>User Needs I</b>	<b>Priority / Need</b>
<b>Active Burke County Senior (65+)</b>	
1. As an active Burke County Senior, I want to ensure the voices of my community are heard to provide greater access to opportunities to engage in exercise.	Basic
2. As an active Burke County Senior, I want adequate time with the project designers to build sustainable program infrastructure leveraging our community's existing resources.	Delighter
3. As an active Burke County Senior, I want easy to schedule check ins on the ongoing programs to solve potential problems in real time.	Performance

<b>User Needs II</b>	<b>Priority / Need</b>
<b>Non-Active Burke County Senior (65+)</b>	
1. As a non-active Burke County Senior, I want to ensure the voices of my community and peers are heard to provide greater access to insight to the limitations upon those of us who are unable to currently engage in opportunities to exercise.	Basic
2. As a non-active Burke County Senior I want to view and have access to information about the proposed opportunities so I can better advise and support the community.	Delighter
3. As a non-active Burke County Senior I want be to be able to balance my personal/work life and not spend time worrying about transportation so I can spend more time engaging in opportunities to exercise.	Performance

**Appendix E.3.E: Burke County User Needs and Quality Characteristics**

User Needs	Quality Characteristics
<b><u>Active Burke County Senior (65+)</u></b>	
I want to ensure the voices of my community are heard to provide greater access to opportunities to engage in exercise.	The number of times community members are called upon to provide insight and experiences during the design process.
I want adequate time with the project designers to build sustainable program infrastructure leveraging our community’s existing resources.	Average number of planning meetings able to attend and engage in.
I want easy to schedule check ins on the ongoing programs to solve potential problems in real time.	Percentage of time the teams are available to check in and solve problems compared to unanswered communications.
<b><u>Non-Active Burke County Senior (65+)</u></b>	
I want to view and have access to information about the proposed opportunities so I can better advise and support the community.	Percentage of plans and materials shared with the target population before finalization.
I want to ensure the voices of my community and peers are heard to provide greater access to insight to the limitations upon those of us who are unable to currently engage in opportunities to exercise.	Percentage of meetings in which key community members are invited to provide feedback and insight during planning meetings.
I want to be to be able to balance my personal/work life and not spend time worrying about transportation so I can spend more time engaging in opportunities to exercise.	Average number exercise opportunities engaged in