

STRENGTHENING ECONOMIC FOUNDATIONS:
ADDRESSING THE RELATIONSHIP BETWEEN HOUSING AND NUTRITION SECURITY
AMONG MAJORITY-MINORITY COMMUNITIES IN DURHAM COUNTY, NORTH
CAROLINA

BRENDAN FINN, EDWARD GONZALES, YASMEEN LEE, CYNTHIA SHARPE, AND
LINDSEY ZINK

A capstone submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Masters of Public Health in the Gillings School Public Health.

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Approved By

Seema Agarwal

W. Oscar Fleming

Elizabeth Tomlinson

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ABSTRACT

Brendan Finn, Edward Gonzales, Yasmeen Lee, Cynthia Sharpe, Lindsey Zink:
Strengthening Foundations: Addressing the Bidirectional
Relationship of Housing and Food Insecurity in Durham County
(Under the direction of Dr. Seema Agarwal)

To better address the broad spectrum of health in Durham County, North Carolina, this capstone offers a series of housing and nutritional policy reforms that aim to improve the economic security of Durham County residents by addressing the bidirectional nature of housing and food insecurity. The following proposal explains the impact economic precarity and instability has on Durham County residents' health and how it impacts how residents live, work, and play. The proposal details how reforming zoning laws for affordable housing, coupled with community gardens and nutrition education can help improve economic security for Durham County residents and how such policies will improve the County's public health. These proposals also include a detailed budget its zoning reform policy and program evaluation for its community gardens program. The proposal also includes an appendix with an additional housing reform policy to build additional permanent low-income housing.

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LIST OF ABBREVIATIONS

CDD	Community Development Department of Durham
CHA	Community Health Assessment
CHW	Community Health Worker
CNI	Choice Neighborhood Implementation Grant
DHA	Durham Housing Authority
DHIC	Developing Housing/Improving Communities
EMGV	Extension Master Gardener Volunteers
FFQ	Food Frequency Questionnaire
FHA	Federal Housing Authority
FPL	Federal Poverty Limit
GFGM	Good Food Good Medicine
HCV	Housing Voucher Choice
HUD	Housing and Urban Development
KBD	Keeping Durham Beautiful
MTO	Move to Opportunity
NCHFA	North Carolina Housing Finance Agency
SDOH	Social Determinant of Health
SEEDS	South Eastern Efforts Developing Sustainable Space
USDA	United States Department of Agriculture

COMMON PROPOSAL

PROBLEM STATEMENT AND GOALS

Social determinants of health create a new and innovative way of understanding public health by having a framework of social-ecological factors that affect the health of individuals and larger communities (Healthy People 2030, n.d.). Economic stability will be the focus of this proposal. Economic stability includes factors such as socioeconomic status, employment, family income, housing status, among others (Clark & Utz, 2014). Housing affordability is a crucial facet of economic stability when considering health outcomes. Healthy People 2030 (2023) outlines that housing affordability is housing costs that are equal to or less than 30% of household income. Families struggling with housing costs are less likely to have a usual source of medical care and are more likely to forego prescribed medications (Taylor, 2018). According to the 2020 Durham County Community Health Assessment, the County has struggled with offering affordable and quality housing to its residents. Specifically, the County's survey data shows that White residents were more likely than Black residents to own a home and more than 7% of respondents stated having been evicted (Durham County, 2020). Housing affordability can also have an impact on food security, which refers to the physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (World Bank, n.d.). Individuals experiencing housing instability face hardships in choosing between paying for rent or food, with Feeding America reporting that approximately 39% of those they serve must choose between paying for housing and paying for food (Feeding America, 2017). Furthermore, the lack of food security can be associated with an increased risk of chronic health conditions, poor mental health, and declines in the overall well-being of individuals (DHHS, 2022).

Priority population

Due to the large proportion of Black residents in Durham County, historical context regarding homeownership and home affordability will be a focus in this analysis. One example of this context is how the Federal Housing Administration (FHA) decided which areas would have guaranteed mortgage rates based on risk related to racial composition in neighborhoods, otherwise known as redlining (Center for American Progress, 2019). In present times, racial/ethnic identity is still often a barrier for accessing housing for communities of color. In Durham County, White individuals own over 68% of the homes they occupy, while Black individuals only own about 36% of the homes they occupy (U.S. Census Bureau, n.d.). Due to the high proportion of Black residents in

Durham County and the historical barriers they have faced in housing, the Black community is one of the groups most impacted by housing affordability and stability.

Rationale/Importance

Housing instability should be made a public health priority in Durham County due to the structural and historical racism that creates disparities for communities of color. Durham County’s Black community is one of the most at risk of experiencing housing instability due the County’s current housing data and the literature’s support that racism and housing are linked. Research also shows that interventions to improve housing access result in positive health outcomes. A randomized controlled trial seeking to understand the impact of placement in affordable housing on health changes found that after six months, families with medically complex children in the intervention group reported less anxiety and depression compared to the control group (Bovell-Ammon et al., 2020). Durham County could benefit from interventions on the policy and community level regarding housing instability and affordability.

POLICY AND PROGRAMMATIC CHANGES TO ZONING LAWS

The restrictions and regulations regarding how land can be developed, or zoning, create barriers for the development of residential buildings for many North Carolina communities (CATO Institute, 2022). Exclusionary zoning is when zoning is used to restrict the kinds of housing that can be developed in a neighborhood or community (CATO Institute, 2022). This practice impacts low-income and communities of color from accessing affordable housing where they live. Reforming zoning codes would allow for flexibility for the types of homes that can be built across the community.

Policy Analysis

Inclusionary zoning practices are used to open opportunities for affordable housing in lower income communities and neighborhoods (Health Affairs, 2018). These practices encourage housing development to expand offerings to families that otherwise would have difficulty affording a home (CATO Institute, 2022). The city of Raleigh has been reforming its zoning practices to address the 'missing middle', defined as housing types including multi-family homes, townhomes, and small apartments (What Is the Missing Middle, 2022). As of December 2022, 37 missing middle housing developments were completed in the city. More data is needed to determine the full effectiveness of zoning code reform in the city of Raleigh.

Final Recommendation

Reforming zoning codes in Durham County is the lowest cost and most politically feasible option for the current state of North Carolina, city of Durham, and Durham County. Additionally, the Black community in Durham County will benefit greatly from the expansion of affordable housing options through inclusionary zoning practices. Reforming zoning codes also creates a long-lasting impact on housing instability and sets a county-wide priority to address housing instability.

POLICY AND PROGRAMMATIC CHANGES TO NUTRITION SECURITY

Housing and food security are intricately related. Families with housing costs that are more than 30% of their income experiencing higher odds of food insecurity (Kirkpatrick & Tarasuk, 2011). Our program aims to increase housing quality and food security by providing year-round programming to residents in two low-income communities in Durham, North Carolina. The program is modeled after the Good Food Good Medicine program in Vermont and uses a “solidarity-not-charity” model (Vermont Garden Network, 2019). Programming includes building and maintaining community gardens as well as nutrition and budgeting education, such as how to shop healthily on a budget (Vermont Garden Network, 2019).

The two low-income communities will be selected after meeting with the Durham Housing Authority to identify communities at which this program will be feasible (DHA, 2023). The implementation of the gardening portion of the program will be carried out by two AmeriCorps volunteers with support from the Extension Master Gardener Volunteers of Durham County, and the educational component will be conducted by volunteers from local universities, such as Duke and UNC (Extension Master Gardener, 2023). Program components will vary by season. In the spring, gardens will be built, and seeds will be planted. In the summer, educators will be recruited, and the curriculum will be developed. In the fall, crops will be harvested, and in the winter, educational sessions and evaluation will take place. This program is expected to reach 30% of the residents at the two selected housing communities, based on the reach of the Good Food Good Medicine program (Vermont Garden Network, 2019).

Several community partners will assist the AmeriCorps and Extension Master Garden volunteers in the implementation of this program. Keep Durham Beautiful is an organization that works with local communities to build and maintain green spaces and will be a good source of guidance and volunteers during program implementation (Keep Durham Beautiful, 2023). The Partnership for a Healthy Durham will play an essential role in connecting us to other partners with the common goal of improving the health and well-being of Durham’s residents (Partnership for a Healthy Durham, 2023). Lowe’s Home Improvement, Home Depot, and local gardening stores will be solicited for donations of gardening supplies. Through the partnerships we will form with businesses, service organizations, and local universities, we will lower the cash amount needed for the implementation of the program. For any remaining expenses, we plan to lobby for a community development block grant from Durham County to support our garden and education sessions (Grants Office, 2023).

BUDGET FOR ZONING LAW POLICY PROPOSAL

The programmatic staff will oversee the design, implementation, analysis, and evaluation of the county's rezoning. However, listening to the community will be an important aspect of the success of this program. Research Consultants will lead the study design and data collection process in partnership with Community Health Workers (CHWs) identified within the community. The Program Director will be the lead on the rezoning policy's implementation with assistance from the Program Manager. The Monitoring & Evaluation Coordinator's role will be to monitor program activities and ensure that proper regulations and guidelines are being followed in the project's implementation.

This program will establish a baseline by gathering resident quantitative and qualitative data related to the county's current affordable housing status and compare this information to post-implementation data to assess effectiveness in impacting resident satisfaction in housing changes. Data in the form of individual interviews and stories and surveys from the communities most impacted will be coupled with the neighborhood and county-level data collected by the Environmental Impact Analyst. Surveys will include questions regarding resident housing satisfaction, current housing affordability, experiences of homelessness, and gaps/opportunities for improved housing options. The Policy Analyst and Housing Policy Assistant will lead the analysis of Durham County's current housing and zoning policies in addition to provide policy context to the data collected by the Environmental Impact Analyst.

The Qualitative Data Consultant and CHW / Promotora de Salud will work as a team to co-facilitate individual interviews. Interview and survey data will be analyzed by the Qualitative and Quantitative Data Consultants, respectively. The Research Manager will be the point of contact for both Data Consultants and ensure integration of qualitative and quantitative data in final dissemination of the project's findings. Equity will be embedded in the program's implementation by utilizing a racial equity coaching firm to guide the staff in understanding the historical, institutional, and structural racism that impacts housing stability and the county's residents. The Promotora de Salud's role will be brought on the team to lead the recruitment process of gathering community input with the county's Latino/a community. Spanish translation services will be utilized to create accessibility across all data collection materials and finalized reports. Similarly, the CHW's role will be to assist in the recruitment of English-speaking residents.

NUTRITION SECURITY POLICY EVALUATION

Two low-income communities in Durham County will be selected to participate in this intervention. In this study, residents are exposed to the adapted Good Food, Good Medicine program, and the desired outcome is increased frequency of produce intake by participants. Specifically, our intervention prioritizes evaluating the following outcome: within 2 years of program implementation, the frequency of participants' fruit and vegetable intake of "several times a day" will increase by at least 100% (Carney et al., 2012). This intervention will be sustained by funding from the CDD, by community volunteers, and by in-kind donations from area businesses collected prior to the Spring of garden building. Funds will also be used to hire necessary educators and gardeners and to carry out the evaluation.

Food frequency data will be collected by giving a survey to participants at the beginning and end of the study to collect food frequency information, particularly how often (and how much) produce is consumed daily. This survey is pre-established in the community gardening project by Carney et al; a sample of survey data is provided in the appendix. Comparison categories in the survey include "several times a day," "once a day," "a few times a week," and "almost never." The expected outcome is that there will be an increase in the number of participants in the "several times a day" category two years into the intervention compared to the start of the intervention. We will also collect demographic information from program participants to assess potential disparities. The data collected will be mixed as the frequency of produce intake will be qualitative (based on written categories), but the amount will be quantitative (numerical amount). We will use the Wilcoxon Signed-Rank Test (Carney et al., 2012), which will allow us to analyze the magnitude of the observed differences in produce consumption and adjust data to consider demographics.

Data collection will occur at the beginning and end of 2 years of the intervention with checkpoints throughout. Community partners will be engaged at all points of the intervention and before. All potential partners will be contacted a year in advance of the start of the project to request their participation. Evaluation will occur at the end of each Winter. Progress is defined as meeting internal deadlines for each season. This program will be sustained by funding from the CDD, by community volunteers, and by in-kind donations from area businesses. Funds will be collected prior to the Spring of garden building. Funds will then be disseminated bi-weekly for hired educators and two gardeners. Funds will then be used to carry out evaluation.

Data will be used to support the continuation of the program at implemented locations and to support promotion of the program in other communities. Data will be disseminated to the Durham Housing Authority and U.S. agencies such as the Department of Housing and Urban Development and the Department of Health and Human Services. Through community collaboration, our intervention enhances equity among low-income residents of Durham County by acknowledging the impact of historical bias on social determinants of health. Our program aims to increase access to nutritious food for majority-minority communities, improve produce intake, wellness knowledge, and, in the long-term, health outcomes of residents.

REFERENCES

- Bovell-Ammon, Allison, Cristina Mansilla, Ana Poblacion, Lindsey Rateau, Timothy Heeren, John T. Cook, Tina Zhang, Stephanie Ettinger de Cuba, and Megan T. Sandel. "Housing Intervention For Medically Complex Families Associated With Improved Family Health: Pilot Randomized Trial." *Health Affairs* 39, no. 4 (April 2020): 613–21. <https://doi.org/10.1377/hlthaff.2019.01569>.
- CATO Institute. "Keeping North Carolina's Housing Affordable." 2022. Available from: <https://www.cato.org/policy-analysis/keeping-north-carolinas-housing-affordable>.
- Carney, Patricia A, et al. "Impact of a Community Gardening Project on Vegetable Intake, Food Security and Family Relationships: A Community-Based Participatory Research Study." *Journal of Community Health*, U.S. National Library of Medicine, Aug. 2012, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3661291/>.
- Center for American Progress. "Systemic Inequality: Displacement, Exclusion, and Segregation." Available from: <https://www.americanprogress.org/article/systemic-inequality-displacement-exclusion-segregation/>.
- City of Raleigh. "What Is the Missing Middle?" 2022. Available from: <https://raleighnc.gov/planning/what-missing-middle>.
- Durham County. Community Health Assessment 2020. Available from: <https://www.dcopublichealth.org/resources/health-resources-data/community-health-assessment>
- Durham County Department of Public Health, Partnership for a Healthy Durham, Duke Health. (2018). (rep.). *2020 Durham County Community Health Assessment*. Retrieved January 2023, from <https://healthydurham.org/cms/wp-content/uploads/2018/06/Poverty-in-Durham-County-FINAL.pdf>.
- Durham Housing Authority. (2023). *DHA*. <https://www.durhamhousingauthority.org/>
- Extension Master Gardener. (2023). *About Us*. <https://mastergardener.extension.org/>
- Food Insecurity." *Food Insecurity - Healthy People 2030*, <https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/food-insecurity>.
- Grants Office. (2023). *Community Development Block Grant (CDBG) Program (North Carolina)*. <https://www.grantsoffice.com/GrantDetails.aspx?gid=35011>
- Healthy People 2020. US Department of Health and Human Services. Available from: www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=8.
- Healthy People 2030. (n.d.). *Social Determinants of Health*. <https://health.gov/healthypeople/priority-areas/social-determinants-health>
- "Housing And Health: The Role Of Inclusionary Zoning" Health Affairs Brief. (2018). Available from: <https://www.healthaffairs.org/doi/10.1377/hpb20180313.668759/full>.
- Keep Durham Beautiful. (2023). *About Us*. <https://keepdurhambeautiful.org/>
- Kirkpatrick, S. I., & Tarasuk, V. (2011). Housing circumstances are associated with household food access among low-income urban families. *Journal of urban health : bulletin of the New York Academy of Medicine*, 88(2), 284–296. <https://doi.org/10.1007/s11524-010-9535-4>
- Partnership for a Healthy Durham. (2023). *Who We Are*. <https://healthydurham.org/about-healthy-durham>

Poverty. Poverty - Healthy People 2030. (n.d.). Retrieved January 18, 2023, from <https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/poverty>

The World Bank. (n.d.). *What is Food Security?* <https://www.worldbank.org/en/topic/agriculture/brief/food-security-update/what-is-food-security>

U.S. Census Bureau quickfacts: *Durham County, North Carolina*. (n.d.). Retrieved January 18, 2023, from <https://www.census.gov/quickfacts/fact/table/durhamcountynorthcarolina/PST045222>

Vermont Garden Network. (2019, January 7). *Good Food Good Medicine: Reaping Garden Benefits Year-round*. <https://vtgardens.org/good-food-good-medicine/>

Weiland, Libby, and Joann Darling. "Online, via Zoom." *Vermont Garden Network*, 7 Jan. 2019, <https://vtgardens.org/good-food-good-medicine/>.

APPENDIX A: GROUP DELIVERABLES

RICH PICTURES



COMMON PROPOSAL PRESENTATION

Introduction slide



BRENDAN FINN, EDWARD GONZALES, YASMEEN LEE, CYNTHIA SHARPE, AND LINDSEY ZINK

CYNTHIA

We will begin our presentation today with an overview of our social determinant of health, housing insecurity in Durham County. This will be followed by our policy recommendation and our nutrition program recommendation. Next we will review our evaluation plan and our community partners, and finally, we will finish our presentation by discussing our budget.

AGENDA



EDWARD

Economic stability is a social determinant of health that includes factors such as socioeconomic status, employment, household income, and housing status. (Clark & Utz, 2014). In Durham County, housing affordability and therefore its stability, are issues that local government has recognized as a priority. Healthy People 2030 (2023) determines housing affordability as housing costs that are equal to or less than 30% of a given household income. The 2020 Durham County Community Health Assessment reports that the County had issues with

maintaining the availability of affordable and quality housing. The County's survey data shows that white residents were more likely than Black residents to own a home and more than 7% of county residents stated having been evicted (Durham County, 2020). One example of this racial context is how the Federal Housing Administration (FHA) decided which areas would have guaranteed mortgage rates based on risk related to racial composition in neighborhoods, otherwise known as redlining (Center for American Progress, 2019). In present times, racial/ethnic identity is still often a barrier for accessing housing for communities of color. Durham County could benefit from interventions on the policy and community level regarding housing instability and affordability.

OVERVIEW: HOUSING INSECURITY IN DURHAM COUNTY

- Durham County has struggled to offer affordable and quality housing to its residents (Durham County CHA, 2020).
- White residents were **more likely** than Black residents to own a home (Durham County, 2020).
- Durham County's Black community is one of the most at risk of experiencing housing instability.
- Policy and Community-level interventions could improve housing instability and affordability in Durham County.

Edward Gonzales

31%
Residents who pay more than 30 percent of their income to housing cost

Over 7%
Black Durham Co. residents who have faced evictions.

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NUTRITIONAL IMPACT

- Lack of housing insecurity impact on food insecurity – double burden
- Food vs. Rent (Feeding America, 2017).
 - Feeding America reports **39%** of those they serve report having to choose between paying for housing and paying for food.
- 2020 Durham County Community Health Assessment reported **1 in 10 people** reported skipping meals (DHHS, 2022).
 - Residents
 - Black (14.9%)
 - Hispanic Latino (12.6%)
 - White (6.6%)
- Increased risk of chronic health conditions, poor mental health, overall-decreased well-being of individuals (DHHS, 2022).
 - Adults in households with food insecurity are 40% more likely to be diagnosed with a chronic health condition.
- Underuse of medication due to cost along with increased use of healthcare services.

Edward Gonzales



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EDWARD

There is an important connection between housing insecurity and food insecurity. The lack of housing insecurity impacts food insecurity and creates a double burden among these communities.

Individuals experiencing housing instability face hardships in choosing between paying for rent or food. Feeding America reported that approximately 39% of those they serve report having to choose between paying for housing and paying for food.

The 2020 Durham County Community Health Assessment Reported 1 in 10 people reported skipping meals because they did not have enough money to buy food. Black and Latino residents were significantly more than likely of skipping a meal than white residents in the past year.

Additionally, food insecurity is associated with increased risk of chronic health conditions, poor mental health, and decreased well-being of individuals. As many adults in households with food insecurity are 40% more likely to be diagnosed with a chronic health condition such as: hypertension, coronary heart disease, stroke, and diabetes.

Furthermore, this leads to greater use of healthcare services, hospitals visits, and medication that are cost burdens.

ZONING RECOMMENDATION

Background on Zoning Reform

- What is zoning?
 - The restrictions and regulations regarding how land can be developed
- Exclusionary zoning is when zoning is used to restrict the kinds of housing that can be developed in a neighborhood or community (CATO Institute, 2022)
- This practice impacts low-income and communities of color from accessing affordable housing where they live. Reforming zoning codes would allow for flexibility for the types of homes that can be built across the community

Policy Option

- Zoning reform is low cost and politically feasible for the state
- The state has already shown prior interest in zoning reform, as has other NC counties
- The Black community in Durham County will benefit greatly from the expansion of affordable housing options through inclusionary zoning practices
- Reforming zoning codes also creates a long-lasting impact on housing instability and sets a county-wide priority to address housing instability.

Yasmeen Lee

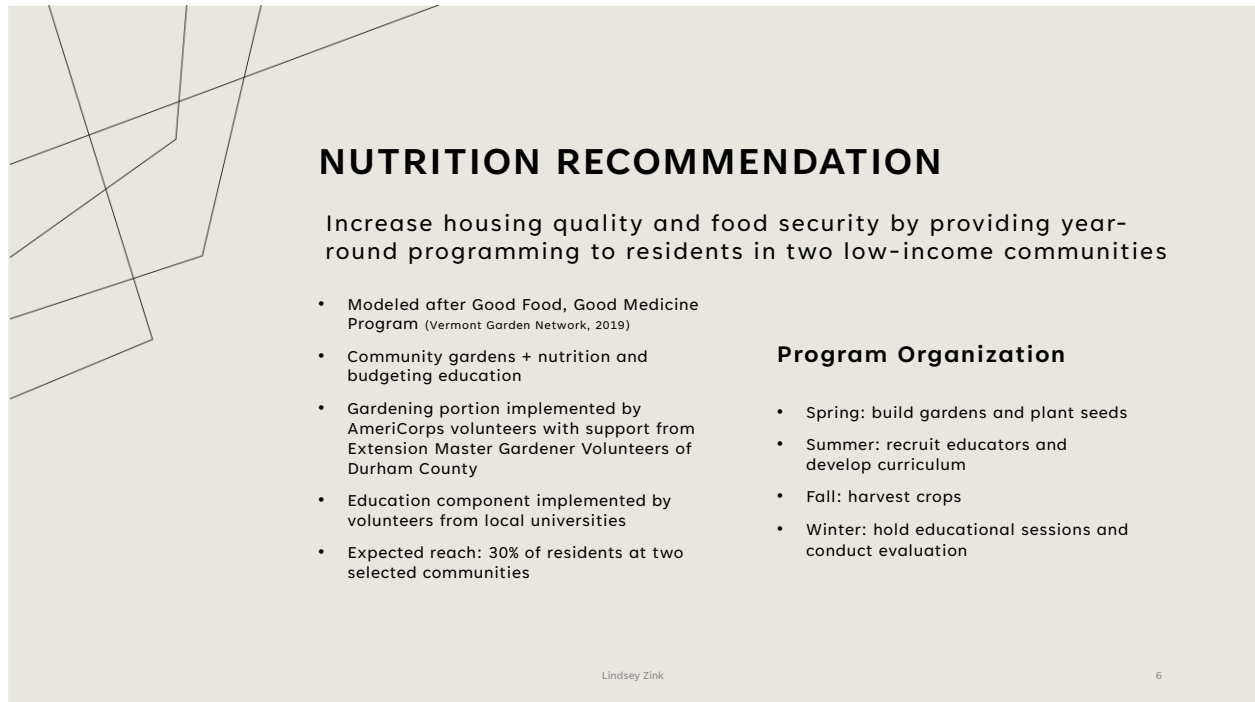
5

YASMEEN

Our policy recommendation to address housing issues in Durham County is zoning reform. The restrictions and regulations regarding how land can be developed, or zoning, creates barriers for the development of residential buildings for many North Carolina communities (CATO Institute, 2022). Exclusionary zoning is when zoning is used to restrict the kinds of housing that can be developed in a neighborhood or community (CATO Institute, 2022).

This practice impacts low-income and communities of color from accessing affordable housing where they live. Reforming zoning codes would allow for flexibility for the types of homes that can be built across the community.

- Zoning reform itself is a low-cost solution and only allows the development of “middle-housing” options
- This policy option would create opportunities for affordable housing across the county and impact a large number of residents. However, impact is contingent upon developers utilizing the flexibility created by zoning reform
- The state government has already shown interest in zoning reform through the introduction of [S.B. 349 and H.B. 401](#) in 2021 which would have legalized “middle housing” statewide
- The [Black community is the most negatively impacted](#) by exclusionary zoning practices and therefore would benefit the most from zoning reform



NUTRITION RECOMMENDATION

Increase housing quality and food security by providing year-round programming to residents in two low-income communities

- Modeled after Good Food, Good Medicine Program (Vermont Garden Network, 2019)
- Community gardens + nutrition and budgeting education
- Gardening portion implemented by AmeriCorps volunteers with support from Extension Master Gardener Volunteers of Durham County
- Education component implemented by volunteers from local universities
- Expected reach: 30% of residents at two selected communities

Program Organization

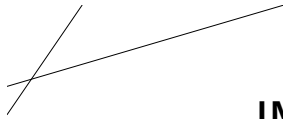
- Spring: build gardens and plant seeds
- Summer: recruit educators and develop curriculum
- Fall: harvest crops
- Winter: hold educational sessions and conduct evaluation

Lindsey Zink 6

LINDSEY

As discussed, housing and food security are intricately related. Our program aims to increase housing quality and food security by providing year-round programming to residents in two low-income communities in Durham, North Carolina. The program is modeled after the Good Food Good Medicine program in Vermont and uses a “solidarity-not-charity” model. Programming includes building and maintaining community gardens as well as nutrition and budgeting education, such as how to shop healthily on a budget.

The two low-income communities will be selected after meeting with the Durham Housing Authority to identify communities at which this program will be feasible. The implementation of the gardening portion of the program will be carried out by two AmeriCorps volunteers with support from the Extension Master Gardener Volunteers of Durham County, and the educational component will be conducted by volunteers from local universities, such as Duke and UNC. Program components will vary by season. In the spring, gardens will be built, and seeds will be planted. In the summer, educators will be recruited, and the curriculum will be developed. In the fall, crops will be harvested, and in the winter, educational sessions and evaluation will take place. This program is expected to reach 30% of the residents at the two selected housing communities, based on the reach of the Good Food Good Medicine program.



IMPLEMENTATION & EVALUATION TIMELINE

SPRING 2024	SPRING 2025	SUMMER 2025	FALL 2025	WINTER 2025	SPRING-WINTER 2026	SPRING 2027
Meet with Durham Housing Authority to select two communities to participate in the program Recruit community partners	Food Frequency Survey data collected from two chosen communities. Gardens built and planted.	Educators recruited (largely from partners). Curriculum developed with participant input. Tending	Curriculum decided upon with participant input. Harvest	Wellness Workshops Food Frequency Survey data collected from participating communities.	Last year's process repeated	Data analysis and dissemination

*Community partners will be engaged throughout the duration of the intervention

Lindsey Zink

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LINDSEY

This slide is a more detailed depiction of the program implementation and evaluation timeline. Data collection will occur at the beginning and end of the 2-year intervention, with checkpoints throughout. Community partners will be engaged prior to the start of the intervention, as well as at all points of the intervention implementation. All potential partners will be contacted a year in advance of the start of the project to request their participation. This timeline also further illustrates the flow of the program components, starting with building and planting the gardens in the spring, tending the gardens in the summer, harvesting them in the fall, and holding wellness workshops in the winter. For the second year of the program, this process will be repeated. Evaluation will occur at the end of each winter. This program will be sustained by funding from the Community Development Department, by volunteer hours from community partners, and by in-kind donations from area businesses. Funds will be collected prior to the spring of each year.

EVALUATION

- Expectation: An increase in fruit and vegetable consumption.
- Comparison Categories:
 - “several times a day”
 - “once a day”
 - “a few times a week”
 - “almost never”
- Demographic Information Collection
- Qualitative & Quantitative Data Collection
- Data Dissemination to Durham Housing Authority, HUD, & DHHS

Cynthia Sharpe

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CYNTHIA

The desired outcome of this intervention is increased frequency of fruit and vegetable intake by participants. Food frequency data will be collected by giving a survey to participants at the beginning and end of the study to collect food frequency information, particularly how often (and how much) produce is consumed daily. Comparison categories in the survey include “several times a day,” “once a day,” “a few times a week,” and “almost never.” The expected outcome is that there will be an increase in the number of participants in the “several times a day” category two years into the intervention compared to the start of the intervention. We will also collect demographic information from program participants to assess potential disparities. The data collected will be mixed as the frequency of produce intake will be qualitative (based on written categories), but the amount consumed will be quantitative (numerical amount). We will use the Wilcoxon Signed-Rank Test (Carney et al., 2012), which will allow us to analyze the magnitude of the observed differences in produce consumption and adjust data to consider demographics. Data will be used to support the continuation of the program at implemented locations and to support promotion of the program in other communities. Data will be disseminated to the Durham Housing Authority and U.S. agencies such as the Department of Housing and Urban Development and the Department of Health and Human Services.

YASMEEN

In Durham County, most housing initiatives are focused on rezoning and expanding current housing choices. There are 3 main policy partners that we would work with for the zoning reform policy option. The responsibility and authority of future policy change to build permanent housing would fall on the City of Durham and their decision would most likely be based on any and all recommendations from the Durham Planning Commission. Additionally, the Joint City-County Planning Committee serves as an intermediary between the city and Council governments in reaching consensus on issues that impact both governments. The implementation of this policy option would also include the use of City funds to afford building costs.



POLICY PARTNERS



Yasmeen Lee

9



PROGRAM PARTNERS



Cynthia Sharpe

10

CYNTHIA: Several community partners will assist the AmeriCorps and Extension Master Garden volunteers in the implementation of this program. Keep Durham Beautiful is an organization that works with local communities to build and maintain green spaces and will be a good source of guidance and volunteers during program implementation. The Partnership for a Healthy Durham will play an essential role in connecting us to other partners with the common goal of improving the health and well-being of Durham’s residents. Lowe’s Home Improvement, Home Depot, and local gardening stores will be solicited for donations of gardening supplies. Through the partnerships we will form with businesses, service organizations, and local universities, we will lower the cash amount needed for the implementation of the program. For any remaining expenses, we plan to lobby for a community development block grant from Durham County to support our garden and education sessions.

ZONING PROGRAM BUDGET

2023 - 2025

Total Cost = \$1,574,870

Salaried Staff	Contracted Staff	Overhead	Travel + Other Expenses
<ul style="list-style-type: none"> • Six (6) Full-Time Staffers <ul style="list-style-type: none"> • Program Director • Program Manager • Monitoring + Evaluation Coordinator • Policy Analyst • Housing Policy Asst • Research Manager • Duration <ul style="list-style-type: none"> • 24 Months (6) 	<ul style="list-style-type: none"> • Five (5) Positions <ul style="list-style-type: none"> • Environmental Impact Analyst • Data Consultants (2) • Community Health Worker (CHW) (2) • (5) Part time <ul style="list-style-type: none"> • (0.5 FTE) • Durations <ul style="list-style-type: none"> • 18 Months (1) • 12 Months (4) 	<ul style="list-style-type: none"> • Office Space • Computers, tech + office supplies • Internet • Phone • Utilities 	<ul style="list-style-type: none"> • In-State Travel for CHW • (3) Racial Equity Coaching Sessions • Incentives for Interview Survey Participants • Translation Services
\$1,326,030	\$177,850	\$62,520	\$33,370

Brendan Finn

BRENDAN: In terms of budgeting the zoning policy proposal, the programmatic staff will oversee the design, implementation, analysis, and evaluation of the county’s work. This group makes up the salaried full time staff members described in the left pane. Each of these staff members will be a full-time employee working on the project for 24 months. The Program Director will lead the rezoning policy’s implementation with support from the Program Manager.

The Monitoring + Evaluation Coordinator will monitor program activities and ensure the implementation plan follows appropriate regulations and guidelines.

The Contracted staff will include programmatic staff members namely the two research consultants (one quantitative, one qualitative) who will lead the study design and data collection process related to the county's current affordable housing status and compare this information to post-implementation data to assess effectiveness in impacting resident satisfaction in housing changes. The research consultants will partner with the two community health workers (one English speaking, one Spanish speaking) will interview and survey residents about their housing situation and the potential impact of redefining zoning laws.

Overhead expenses have the potential to be reduced by utilizing available county government department space and utilities already on the county budget books. Finally, other expenses include three racial equity coaching sessions for the program staff to ensure the team understands the historical, institutional, and structural racism that impacts housing stability and the county's residents. Translation services are about 50% of the other expenses budget. This could be reduced by incorporating this into the role and responsibilities of a bilingual research manager.



ASK

Through community collaboration, our intervention enhances equity among low-income residents of Durham County by acknowledging the impact of historical bias on social determinants of health. Our program aims to increase access to nutritious food for majority-minority communities, improve produce intake, wellness knowledge, and, in the long-term, health outcomes of residents.

Support this zoning policy and nutrition program through funding and partnership.

CYNTHIA: Through community collaboration, our intervention enhances equity among low-income residents of Durham County by acknowledging the impact of historical bias on social determinants of health. Our program aims to increase access to nutritious food for majority-minority communities, improve produce intake, wellness knowledge, and, in the long-term, health outcomes of residents. We ask that the city council supports this zoning policy and nutrition program through funding and partnership.

THANK YOU

PRESENTATION TITLE

REFERENCES

- Bowell-Ammon, Allison, Cristina Monsilla, Ana Pobkacion, Lindsey Rateau, Timothy Heeren, John T. Cook, Tina Zhang, Stephanie Ettinger de Cuba, and Megan T. Sandoz. "Housing Intervention For Medically Complex Families Associated With Improved Family Health: Pilot Randomized Trial." *Health Affairs* 39, no. 4 (April 2020): 613–21. <https://doi.org/10.1377/hlthaff.2019.01560>.
- CATO Institute. "Keeping North Carolina's Housing Affordable." 2022. Available from: <https://www.cato.org/policy-analysis/keeping-north-carolina-housing-affordable>.
- Carney, Patricia A, et al. "Impact of a Community Gardening Project on Vegetable Intake, Food Security and Family Relationships: A Community-Based Participatory Research Study." *Journal of Community Health*. U.S. National Library of Medicine, Aug. 2012. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3661291/>.
- Center for American Progress. "Systemic Inequality, Displacement, Exclusion, and Segregation." Available from: <https://www.americanprogress.org/article/systemic-inequality-displacement-exclusion-segregation/>.
- City of Raleigh. "What Is the Missing Middle?" 2022. Available from: <https://raleighnc.gov/planning/what-missing-middle>.
- Durham County. Community Health Assessment 2020. Available from: <https://www.dcopublichealth.org/resources/health-resources/data/community-health-assessment>
- Durham County Department of Public Health, Partnership for a Healthy Durham, Duke Health. (2018). (rep.). 2020 Durham County Community Health Assessment. Retrieved January 2023, from <https://healthydurham.org/cms/wa-content/uploads/2018/06/Poverty-in-Durham-County-FINAL.pdf>.
- Durham Housing Authority. (2023). DMA. <https://www.durhamhousingauthority.org/>
- Extension Master Gardener. (2023). About Us. <https://mastergardener.extension.org/>
- Food Insecurity." Food Insecurity - Healthy People 2030, <https://health.gov/healthypeople/priority-areas/social-determinants-health/feature-summaries/food-insecurity>.
- Grants Office. (2023). Community Development Block Grant (CDBG) Program (North Carolina). <https://www.grantsoffice.com/GrantDetails.aspx?gid=35011>
- Healthy People 2020. US Department of Health and Human Services. Available from: www.healthypeople.gov/2020/topic/objectives/2020/objectiveslist.aspx?topicId=8
- Healthy People 2030. (n.d.). Social Determinants of Health. <https://health.gov/healthypeople/priority-areas/social-determinants-health>
- "Housing And Health: The Role Of Inclusionary Zoning" Health Affairs Brief. (2018). Available from: <https://www.healthaffairs.org/doi/10.1377/hlthaff.brief20180213.668769.full>
- Keep Durham Beautiful! (2023). About Us. <https://www.keepdurhambeautiful.org/>
- Kirkpatrick, S. L., & Torasku, V. (2011). Housing circumstances are associated with household food access among low-income urban families. *Journal of urban health : bulletin of the New York Academy of Medicine*, 88(2), 284–296. <https://doi.org/10.1007/s11528-010-9535-4>
- Partnership for a Healthy Durham. (2023). Who We Are. <https://healthydurham.org/about-healthy-durham/>
- Poverty, Poverty - Healthy People 2030. (n.d.). Retrieved January 18, 2023, from <https://health.gov/healthypeople/priority-areas/social-determinants-health/feature-summaries/poverty>
- The World Bank. (n.d.). What Is Food Security? <https://www.worldbank.org/en/topic/agriculture/brief/food-security-updates/what-is-food-security>
- U.S. Census Bureau quickfacts: Durham County, North Carolina. (n.d.). Retrieved January 18, 2023, from <https://www.census.gov/quickfacts/fact/table/durhamcountynorthcarolina/P5104522>
- Vermont Garden Network. (2019, January 7). Good Food Good Medicine: Reaping Garden Benefits Year-round. <https://vtgarden.org/good-food-good-medicine/>
- Welland, Libby, and Joann Darfling. "Offline, via Zoom." *Vermont Garden Network*, 7 Jan. 2019. <https://vgarden.org/good-food-good-medicine/>
- What would you choose, housing or food? Feeding America. (2017). Retrieved from <https://feedingamerica.org/what-would-you-choose-housing-or-food/>

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Table 1 Common Proposal Policy Analysis Scoring Matrix

Criteria	Criterion Score	Score Explanation
Costs to the County	5	Zoning reform itself is a low-cost solution and only allows the development of “middle-housing” options
Impact	4	This policy option would create opportunities for affordable housing across the county and impact a large number of residents. However, impact is contingent upon developers utilizing the flexibility created by zoning reform
Political Feasibility	5	The state government has already shown interest in zoning reform through the introduction of S.B. 349 and H.B. 401 in 2021 which would have legalized “middle housing” statewide
Equity: Black Population	5	The Black community is the most negatively impacted by exclusionary zoning practices and therefore would benefit the most from zoning reform
Overall Score:	19/20	

Table 2 Zoning Reform Program Budget

Category	Employee Status	FTE	Duration (months)	Salary	Cost	Fringe (30%)	Personel Cost (annual)	Annual 2% increase	Total Cost (2023-2025)
Staffing Costs									
Program Director	Salary (W-2)	1	24	\$130,000	\$130,000	\$39,000	\$169,000	\$172,380	\$341,380
Program Manager	Salary (W-2)	1	24	\$95,000	\$95,000	\$28,500	\$123,500	\$125,970	\$249,470
Monitoring & Evaluation Coordinator	Salary (W-2)	1	24	\$65,000	\$65,000	\$19,500	\$84,500	\$86,190	\$170,690
Policy Analyst	Salary (W-2)	1	24	\$80,000	\$80,000	\$24,000	\$104,000	\$106,080	\$210,080
Housing Policy Assistant	Salary (W-2)	1	24	\$55,000	\$55,000	\$16,500	\$71,500	\$72,930	\$144,430
Research Manager	Salary (W-2)	1	24	\$80,000	\$80,000	\$24,000	\$104,000	\$106,080	\$210,080
Environmental Impact Analyst	Hourly (1099 subcontractor)	0.5	18	\$70,000	\$35,000	-	-	\$35,700	\$52,850
Quantitative Data Consultant	Hourly (1099 subcontractor)	0.5	12	\$75,000	\$37,500	-	-	-	\$37,500
Qualitative Data Consultant	Hourly (1099 subcontractor)	0.5	12	\$75,000	\$37,500	-	-	-	\$37,500
Community Health Worker (CHW)	Hourly (1099 subcontractor)	0.5	12	\$50,000	\$25,000	-	-	-	\$25,000
Promotora de salud (CHW)	Hourly (1099 subcontractor)	0.5	12	\$50,000	\$25,000	-	-	-	\$25,000
Staffing Total Cost									\$1,478,980
Category	Item	Units	Cost/unit	# units	Fixed/Variable	Total Cost			
Overhead & Supplies Costs									
	Office Space	Month	\$1,800	24	Fixed				\$43,200
	Computers, tech. supplies	Staff	\$900	10	Fixed				\$9,000
	Internet	Month	\$150	24	Fixed				\$3,600
	Phone	Month	\$80	24	Variable				\$1,920
	Utilities	Month	\$200	24	Variable				\$4,800
Overhead Total Cost									\$62,520
Travel Costs									
	In-state mileage for CHWs	Miles	\$0.65	4,800	Variable				
Travel Total Cost									\$3,120
Other Expenses									
	Racial Equity Coaching	Month	\$3,000	3	Fixed				\$9,000
	Interview participant incentive	Participant	\$50	30	Variable				\$1,500
	Survey participant incentives	Participant	\$25	100	Variable				\$2,500
	Interview transcription service	Audio Minute	\$1.25	1800	Variable				\$2,250
	Spanish translation	Word	\$0.12	125,000	Variable				\$15,000
Other Expenses Total Co									\$30,250
Total Costs:									\$1,574,870.00

Table 3 Garden Sample Survey: Food Intake/Security Variable

Sample Survey

Food Intake/Security Variables	Pre-Garden	Post Garden*	p value
Frequency that Adults in Household Eat Vegetables (n=33)			<0.001
Several times a day	18.2%	84.8%	
Once a Day	45.5%	12.1%	
A few times a week	33.3%	3.0%	
Almost never	3.0%	0	

APPENDIX B: BRENDAN FINN INDIVIDUAL DELIVERABLES

B1: SOCIAL DETERMINANT OF HEALTH ANALYSIS

SDOH Description

One of the most critical social determinants impacting the health of Durham residents is whether they are living in poverty. According to the USDA 2021 poverty guidelines, an individual is impoverished if their income is less than \$12,880 or under \$26,500 for a four-person family or household (USDA, 2021). Income and poverty are strongly associated with several health outcomes, including the burden of disease and mortality (Lubetkin & Jia, 2017; Khullar & Chokshi, 2018). Poverty also contributes to a series of health disparities that lead to worse health outcomes, including clinical factors like higher rates of chronic conditions, higher rates of behavioral risk factors like smoking and substance use, and exposure to chronic stress. These poor health outcomes can be seen as the culmination of intersectional social determinants resulting from poverty (Khullar & Chokshi, 2018).

Poverty contributes to both short and long-term impacts on health outcomes. The short-term impacts of poverty include the ability of an individual or family to secure stable housing, environmental safety, risks surrounding food security, and environmental stress associated with economic precarity, violent acts, and discrimination (Khullar & Chokshi, 2018). People in poverty are also less likely to receive healthcare services and engage in preventative screening; such lack of access can lead to more serious health diagnoses over time (Cunningham, 2018). The long-term impacts of poverty are drastic. In parts of the United States, the difference in life expectancy for the richest and poorest one percent of residents can be between 10 and 14 years for women and men, respectively (Chetty et al., 2016). Likewise, people living in poverty are more likely to report higher rates of poor mental health, difficulty sleeping, and chronic conditions such as food insecurity, obesity, and smoking (Cunningham, 2018). Recent literature has also shown poverty's negative impact on individuals' genomic structure and function (McDade et al., 2019). Likewise, other researchers have demonstrated how poverty extends beyond the individual and family unit, makes it difficult to build intergenerational wealth, and exacerbates chronic stress (Chen et al., 2016; Winship et al., 2021).

Geographic and Historical Context

Durham County is home to more than 326,000 residents and a majority-White county (54.5 percent) with a large Black population (35.9 percent) and a sizable Hispanic population (13.4 percent) (US Census, 2022). Durham

has a relatively low poverty rate for North Carolina counties; Durham has the 19th lowest rate of poverty of all 100 North Carolina counties, with 11.7 percent of all residents living in poverty. Durham also has the 20th lowest rate of childhood poverty, with 16.2 percent of all Durham county children living in poverty (USDA, 2022). However, there are large disparities in income between White and non-White (Black and Hispanic) residents in Durham County. In 2018, the White median household income was nearly \$77,000, almost 75 percent more than the Hispanic household income (\$44,004) and more than 80% of the median Black household income (\$42,417) (Jenkins et al., 2020). Public health, historical, and public policy research has demonstrated a relationship between racism, housing policy, intergenerational wealth, and economic prosperity, where policies such as “redlining,” mortgage loan refusal, and urban renewal with subsequent gentrification have negatively impacted financial prospects and economic security of minority communities in Durham (Jenkins et al., 2020). These historical and contemporary policy decisions continue to impact the economic security and opportunities of historically marginalized communities and contribute to Black and Hispanic residents being overrepresented as those experiencing poverty in Durham. The 2019 Durham State of the County Health Report found that 20 percent of Black residents lived at or below 200 percent of the federal poverty level (FPL), while that number was 31 percent for Hispanic residents. These numbers were more than double and triple the relative percentage for White residents, where only eight percent of White residents lived at or below 200 percent FPL (Jenkins et al., 2020).

In the past, Durham community organizations and health care partners have initiated public health policy efforts to address poverty in the county, including the formation of Duke Health’s Benefit Enrollment Center, which provided \$10M in benefits for older adults, including healthy foods, medical care, and prescription drug benefits (Jenkins et al., 2020). The county has also launched its “Transformation in Ten” initiative, which provides “data-driven, community-led, collaborat[ive] efforts to reduce poverty” by focusing on health, housing, finance, jobs, and more (Durhamnc.gov, 2023).

Priority Population

To best allocate limited resources to community members who need them most, this public health intervention to address poverty in Durham will prioritize populations that experience disproportionately high rates of poverty in the community, namely Black and Hispanic community members who live at or below 200 percent FPL. Black and Hispanic residents were more than two and three times as likely to live at or below 200 percent FPL as their White counterparts in Durham County, respectively (Jenkins et al., 2020). Given these disparities, it will be

imperative that the program centers the needs and lived experiences of Black and Hispanic community members by providing culturally relevant and applicable resources to help lift them out of poverty permanently.

Measure of SDOH

This public health intervention will measure poverty as 200 percent FPL as North Carolina has for its *Healthy North Carolina 2030* initiatives, instead of the federal USDA poverty level since it captures a wider population experiencing health disparities due to living with a low income. Nearly 37 percent of residents in North Carolina lived at or below the 200 percent FPL limit as of 2020 (NCIOM, 2020). Between 2014 and 2018, one in five Black residents lived at or below 200 percent FPL, while nearly 60 percent of Hispanic neighborhood residents had incomes below 200 percent FPL. This intervention effort may also focus on the county's youth population, which experiences poverty at higher rates than the county's adult population (Jenkins et al., 2020). The program will also measure key health disparities impacted by poverty, including health insurance coverage, food, and housing security, self-reported health and mental health status, and adverse childhood experiences.

Rationale/Importance

Poverty is considered a public health issue because of its impact on a series of individual and population-level health outcomes. According to researchers, people in impoverished communities over the course of a lifetime are at higher risk for adverse health effects related to obesity, smoking, substance use, and chronic stress. Likewise, they are at higher risk of disabilities and report poorer mental health status (Health People 2030, 2020). These downstream factors are compounded by the fact that the US health care delivery system does not guarantee health care for its residents and citizens, and its high costs disincentivize low-income people from seeking care, leaving them to ignore care until it's an emergency, leading to worse health outcomes (McWilliams, 2009). Addressing poverty may not change the cost of health care, but research shows that raising material conditions for people leads to better health outcomes in both self-reported and clinical settings (Finkelstein et al., 2022; Lenhart, 2018).

Disciplinary Critique

The health policy professional is an essential member of the program design team who can provide strategies to foster political buy-in for the policy and cultivate strategic planning and best practices for addressing poverty at the local county level. Given the policy professional's ability to corral disparate program strategies and previously implemented policies, as well as their ability to gauge the political climate and stakeholders' party to

addressing poverty, the policy expert management role in implementing the program strategy is essential to its success.

Confronting poverty is the most direct line to addressing health disparities and health equity for Durham. Investing in programs that increase the income of residents facing health and income disparities in Durham is also a means to support the local economy, with research showing that investment in low-income people results in a reinvestment in the local economy (Natali et al, 2016; Eggers et al., 2019).

APPENDIX B1.1

Table 4 Brendan Finn: SDOH Table, Durham County Economic & Health Stats (2020 Durham Community Health Assessment)

Race	White	Black	Hispanic
Median Income (2018)	\$76,962	\$42,417	\$44,004
% Living in Poverty (under 200% FPL)	8.0%	20.0%	31.0%
% Uninsured (2019)	6.0%	7.6%	40.3%
% Living with Diabetes	9.2%	18.4%	13.3%
Heart Disease Mortality Rates (per 100,000)	152.4	192.2	—

REFERENCES

- Chetty, R., Stepner, M., Abraham, S., Lin, S., Scuderi, B., Turner, N., Bergeron, A., & Cutler, D. (2016). The Association Between Income and Life Expectancy in the United States, 2001-2014. *JAMA*, *315*(16), 1750–1766. <https://doi.org/10.1001/jama.2016.4226>
- Cunningham, P. (2018, September 27). *Why Even Healthy Low-Income People Have Greater Health Risks Than Higher-Income People*. The Commonwealth Fund. <https://doi.org/10.26099/y2gb-wa98>
- Egger, D., Haushofer, J., Miguel, E., Niehaus, P., & Walker, M. W. (2019). *General Equilibrium Effects of Cash Transfers: Experimental Evidence from Kenya* (Working Paper No. 26600). National Bureau of Economic Research. <https://doi.org/10.3386/w26600>
- Finkelstein, D. M., Harding, J. F., Paulsell, D., English, B., Hijjawi, G. R., & Ng'andu, J. (2022). Economic Well-Being And Health: The Role Of Income Support Programs In Promoting Health And Advancing Health Equity. *Health Affairs*, *41*(12), 1700–1706. <https://doi.org/10.1377/hlthaff.2022.00846>
- Health Indicator: Individuals Below 200% Federal Poverty Level (FPL)*. (2020). North Carolina Institute of Medicine. <https://nciom.org/wp-content/uploads/2020/01/Poverty-Level.pdf>
- Jenkins, R., Galbraith, K., & Owens, T. (2020a). *2020 Durham County Community Health Assessment Executive Summary* (p. 8). Durham County Department of Public Health. <https://healthydurham.org/cms/wp-content/uploads/2021/07/2020-Durham-County-CHA-Executive-Summary-English.pdf>
- Jenkins, R., Galbraith, K., & Owens, T. (2020b). *Durham County Community Health Assessment 2020* (p. 524). Durham County Department of Public Health. <https://schs.dph.ncdhhs.gov/units/ldas/cha2020/2020-DURHAM-CHA.pdf>
- Khullar, D. & Chokshi Dave. (2018, October 4). *Health, Income, & Poverty: Where We Are & What Could Help*. Health Affairs. <https://www.healthaffairs.org/doi/10.1377/hpb20180817.901935/full/>
- Lenhart, O. (2019). The effects of income on health: New evidence from the Earned Income Tax Credit. *Review of Economics of the Household*, *17*(2), 377–410. <https://doi.org/10.1007/s11150-018-9429-x>
- Lubetkin, E. I., & Jia, H. (2017). Burden of disease associated with lower levels of income among US adults aged 65 and older. *BMJ Open*, *7*(1), e013720. <https://doi.org/10.1136/bmjopen-2016-013720>
- McDade, T. W., Ryan, C. P., Jones, M. J., Hoke, M. K., Borja, J., Miller, G. E., Kuzawa, C. W., & Kobor, M. S. (2019). Genome-wide analysis of DNA methylation in relation to socioeconomic status during development and early adulthood. *American Journal of Physical Anthropology*, *169*(1), 3–11. <https://doi.org/10.1002/ajpa.23800>
- McWilliams, J. M. (2009). Health Consequences of Uninsurance among Adults in the United States: Recent Evidence and Implications. *The Milbank Quarterly*, *87*(2), 443–494. <https://doi.org/10.1111/j.1468-0009.2009.00564.x>
- Ntali, L., Handa, S., Peterman, A., Seidenfeld, D., & Tembo, G. (2016, February). *Making Money Work: Unconditional cash transfers allow women to save and re-invest in rural Zambia*. UNICEF-IRC. <https://www.unicef-irc.org/publications/827-making-money-work-unconditional-cash-transfers-allow-women-to-save-and-re-invest.html>
- Poverty: County-Level Data Sets*. (2022, June 3). Economic Research Service. https://data.ers.usda.gov/reports.aspx?ID=17826#P1e37cf905acc4bda8de25d7edfac3d5e_5_390iT4

Social Determinants of Health Literature Summaries: Poverty (Healthy People 2030). (n.d.). <https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/poverty#cit2>

Transformation In Ten Initiative / Durham, NC. (n.d.). City of Durham. Retrieved January 15, 2023, from <https://www.durhamnc.gov/3211/Transformation-in-Ten>

U.S. Census Bureau QuickFacts: Durham County, North Carolina. (2022, July 1). <https://www.census.gov/quickfacts/fact/table/durhamcountynorthcarolina/PST045222>

Winship, S., Pulliam, C., Shiro, A. G., Reeves, R. V., & Santiago, D. (2021, June 10). Long shadows: The Black-white gap in multigenerational poverty. *Brookings*. <https://www.brookings.edu/research/long-shadows-the-black-white-gap-in-multigenerational-poverty/>

B2: POLICY ANALYSIS

Background

Housing security and cost-burden housing is a problem that permeates North Carolina. Durham County rivals other counties with some of the highest rates of cost-burden and severe cost-burden for renters and homeowners in the state (NCHFA, 2021). Housing insecurity and cost-burdens impact other aspects of public health and contribute to worse health and social outcomes for community members. People who experience evictions, forced relocation, or homelessness are more like to report poor physical and mental health even years after the negative housing experience took place (Hatch & Yun, 2020).

In Durham County, 46 percent of renters and 20 percent of homeowners are cost-burdened, spending more than 30 percent of their income on rent. Furthermore, 22 percent of those renters have severe cost-burden housing, spending more than 50 percent of their income on rent (NCHFA, 2021). Durham County's cost-burden rates are comparatively higher than neighboring Wake, Granville, and Chatham counties (NCHFA, 2021). The tight housing market in Durham County compounds the cost burden and housing security issues. Vacancies make up only seven percent of the housing market, and low vacancies are causally related to increased rent prices (NCHFA, 2021; Buffie, 2016). Likewise, high cost of living can drive low-income individuals to live in substandard housing, which impacts poor health outcomes related to chronic conditions like asthma and can increase the risk of serious illness related to COVID19 (Grande et al., 2022; Ahmad et al., 2020). The goals of addressing housing security in Durham County are to improve the material housing conditions of its low income residents which can positively impact their quality of life, reduce exposure to health threats, and improve mental health (Palimaru et al, 2020; Hatch & Yun, 2020).

Policy Options & Evaluation Criteria

Building Permanent Housing for Low-Income Families:

The Community Preventive Services Task Force recommends that building permanent supportive housing has decreased homelessness, improved housing stability, improved quality of life, and reduced hospitalization and emergency department visits (Healthy People, 2030). This intervention could be implemented by establishing a Housing First program or expanding the current Forever Home Durham investment program beyond the city into the broader Durham County (City of Durham Community Development, 2021). Recently, other growing cities and counties in the US South have partnered with health care providers to develop and implement housing security

programs emphasizing the development of more permanent affordable housing (Rodriguez, 2022). Last year, Nashville and CVS announced a partnership to invest nearly \$13M in developing affordable housing in Nashville, providing over 200 affordable housing units in downtown Nashville (Rodriguez, 2022). In 2020, the Greensboro, North Carolina, city council approved a 10-year housing project that offered a comprehensive multiprong approach to addressing housing insecurity in the community with affordable rental homes as one of its top priorities (Housing GSO, 2020; HR&A Advisors, 2020). Providing long-term stable housing can help reduce poor health outcomes and health care costs to the state and community (Taylor, 2018).

Tenant-Based Voucher Program to Promote Long-Term Housing Stability:

Durham County could develop a tenant-based voucher system in partnership with HUD as part of the Housing Choice Voucher Program. This program would use the Department of Housing and Urban Development's (HUD) Moving On model which provides a "sustainable, affordable housing option" to participants interested in moving beyond housing assistance vouchers (HUD, 2021). This would be part of a centralized approach to help support housing security for residents without the intensive infrastructural needs required to build additional housing in Durham County. This approach would also incorporate measures to ensure housing stability and economic opportunity for residents, including financial health education and coaching, peer support, tenancy education, and keeping participants connected to the community through this support network (CSH, 2018). Both of the policy options described will be evaluated based on cost to the county, the number of people positively impacted by the policy, political feasibility, and impact on equity in the county.

Analysis of Building Permanent Housing for Low-Income Residents:

Addressing housing insecurity in Durham County will require a comprehensive effort. The county can build off the momentum of the "Forever Home Durham" program approved by the City of Durham Community Development in 2021, which invested \$160M in affordable housing and services for Durham residents (City of Durham Community Development, 2021). Durham County could reduce housing insecurity by investing in new affordable homes for residents. A good target population for building affordable housing in Durham County would be the severe housing cost-burdened population, which is over six percent of the county, or about 20,000 residents (NCHFA, 2021). One way to incentivize home building in the county and to reduce costs over the long term would be for the county to reconsider its zoning laws and permit multifamily home construction in new neighborhoods (Schell, 2022; Schuetz, 2020). The county could couple its rezoning efforts with Low-Income Housing Tax Credit

incentives from the state Housing Finance Agency to spur builders to offer lower bids to build these multifamily units in Durham County (Sally et al., 2018).

In terms of cost, Durham County could compare the additional cost to implement this policy to the Greensboro City Council plan that passed in 2020, where consultants estimated it would cost the city \$45,000 per additional unit of affordable housing for low-income residents (HRA Greensboro Affordable Housing Plan, 2020). Depending on the number of multifamily units built, and drawing from the Greensboro example, building new permanent housing for Durham County residents facing severe cost burdens could provide relief for over 1200 households. Building new affordable housing units is a resource-intensive process that requires alignment of financial, material, and political resources within the local government structure and from higher-ranking state and federal bodies, making its feasibility rather difficult (Schuetz, 2021). That said, Durham County could follow the Metropolitan Government of Nashville and Davidson County model and partner with private funding streams to begin the project before requiring higher government funding streams (Pereira, 2022; Cooper, 2021). Building low-income housing multifamily units would have a large impact on equity and would help raise the quality of life baseline and affordability for low-income people over time in Durham County (Rosen et al., 2021). Housing proposals in Durham County have stakeholders who support and oppose building permanent low-income housing. In support, the Community Empowerment Fund, DHIC (Developing Housing/Improving Communities), and Casa are three local organizations that have previously or are currently working with Durham to improve housing affordability in the community and would likely be involved in developing plans as well (Durham.gov, 2021). However, given the possibility of rezoning for affordable housing developments and its perceived threat to property values, homeowner associations, nature preserve groups, and some neighborhood associations may protest development plan designs that impact their community directly (Sally, 2014; Duke, 2010).

Analysis of a Tenant-Based Voucher Program to Promote Long-Term Housing Stability:

Housing Choice Vouchers (HCV) programs are administered at the local government level but are funded at the federal level (Anderson, 2021). Durham County currently provides vouchers to over 2,500 families through the county housing authority (Durham Housing Authority, 2023). While housing authorities cannot expand direct financial resources for housing vouchers at the local level, they can implement programs such as HUD's "Moving On" services and supports to empower HCV recipients to move beyond housing support programs to independent permanent housing (HUD, n.d.). Implementing such programs can help alleviate the backlog and waitlists endemic

to the HCV programs (Acosta & Gartland, 2021; Anderson, 2021). The Moving On service guidelines provide a programmatic outline for how local governments can partner with community-based organizations, social workers, and other resources to empower HCV recipients to move to unsubsidized housing, thereby allowing new HCV recipients to leave the waitlist and get housing (HUD, n.d.).

These services could impact the 2,500 families receiving vouchers in the county and those on the voucher waitlist. Designing and implementing this program requires contracting with local housing and social work non-profits which would likely cost \$20,000 per year per tenant to the county, less costly than building permanent housing (CSH, 2018). Given the robust network of social services providers, non-profits, universities, and local philanthropies, a HUD “Moving On” HCV support program could be implemented successfully with favorable political buy-in from elected and appointed local officials, as well as a broad spectrum of residents who support social programs, affordable housing, and reducing disparities within the community (ETC Institute, 2021). Opposition to the HCV program could potentially include landlords who are under no obligation to accept voucher recipients (Bell et al., 2018). The program design would likely have a moderate impact on equity, as it aims to support those who want to graduate from public housing assistance while also helping those on the HCV waitlist get the housing they need (Dohler et al., 2016). The HUD Moving On Model was launched in 2021, but it can be compared to the Moving to Opportunity (MTO) HUD demonstration from the 1990s given the Moving On model’s incorporation of MTO support programs such as counseling services and supports (Orr et al., 2003; CSH, 2018). A series of randomized control trials showed that the MTO program demonstrated effectiveness of pairing housing vouchers and counseling to single-mother households in urban areas and helped recipients move to less impoverished and safer neighborhoods (Shroeder and Orr, 2012; Liebman et al. 2011). Retrospective analyses of the MTO program found that participants experienced improved physical health, demonstrated by lowering the prevalence of severe obesity and diabetes compared to control groups; children under 13 were less likely to experience poverty later in life; and female adult and child MTO recipients were less likely to experience depression and anxiety (Katz et al., 2011, ; Liebman et al. 2011). There is a reasonable expectation that the Moving On model can build on the baseline improvements established by MTO and continue to reduce housing insecurity and its related disparities.

Recommendation & Evaluation Metric:

This policy analysis recommends that Durham County pursues a policy to build permanent housing for low-income residents, taking program designs from similar cities such as Greensboro and Nashville. This program might also consider rewriting zoning laws that would allow for increased high-density multifamily homes in the county. While building new housing is a more complex and materially intensive policy, but ultimately offers a long-term investment that can spur economic growth and reduce health disparities tied to housing insecurity (Anthony, 2022; NCFHA, 2020). The project progress will be evaluated on the number of units constructed and its outcome measure will be the relative reduction in severely cost-burdened families in Durham County.

APPENDIX B2.1

The policies have been evaluated on a scale of one to five with equal weighting.

- **Cost to the county**
 - (1 = most expensive, 5 = least expensive)
- **# of people positively impacted**
 - (1 = least number of people, 5 = most people)
- **Political Feasibility**
 - (1 = least feasibility, 5 = most feasible)
- **Equity Considerations**
 - (1 = doesn't consider equity, 5 = greatest equity consideration)

Table 5 Brendan Finn: Policy Analysis Scoring Matrix

<i>Policy</i>	<i>Cost to the County</i>	<i># of People Positively Impacted</i>	<i>Political Feasibility</i>	<i>Equity Considerations</i>	<i>Total Score</i>
Building Permanent Housing	1	4	3	4	12
Housing Voucher Support Program	3	2	3	3	11

REFERENCES

- Acosta, S., & Gartland, E. (2021). *Families Wait Years for Housing Vouchers Due to Inadequate Funding*. <https://www.cbpp.org/research/housing/families-wait-years-for-housing-vouchers-due-to-inadequate-funding>
- Affordable Housing Benefits Health*. (2020). North Carolina Housing Finance Agency. https://www.nchfa.com/sites/default/files/page_attachments/2020BOHAffordableHousingBenefitsHealth.pdf
- Ahmad, K., Erqou, S., Shah, N., Nazir, U., Morrison, A. R., Choudhary, G., & Wu, W.-C. (2020). Association of poor housing conditions with COVID-19 incidence and mortality across US counties. *PLOS ONE*, 15(11), e0241327. <https://doi.org/10.1371/journal.pone.0241327>
- Anderson, D. (2021). *Preventing Housing Instability Fact Sheet: Community-Based Measures to Promote Housing Stability*. The Network for Public Health Law. <https://www.networkforphl.org/wp-content/uploads/2021/05/Fact-Sheet-Community-Based-Measures.pdf>
- Anthony, J. (2022). Housing Affordability and Economic Growth. *Housing Policy Debate*, 0(0), 1–19. <https://doi.org/10.1080/10511482.2022.2065328>
- Bell, A., Sard, B., & Koepnick, B. (2018, October 10). *Prohibiting Discrimination Against Renters Using Housing Vouchers Improves Results*. <https://www.cbpp.org/research/housing/prohibiting-discrimination-against-renters-using-housing-vouchers-improves-results>
- Buffie, N. (2016, April 12). Vacancies and Rents: A Causal Relationship. *Center for Economic and Policy Research*. <https://www.cepr.net/vacancies-and-rents-a-causal-relationship/>
- Dohler, E., Bailey, P., Rice, D., & Katch, H. (2016, May 31). *Supportive Housing Helps Vulnerable People Live and Thrive in the Community*. Center on Budget and Policy Priorities. <https://www.cbpp.org/research/housing/supportive-housing-helps-vulnerable-people-live-and-thrive-in-the-community>
- Duke, J. (2010). Exploring Homeowner Opposition to Public Housing Developments. *Journal of Sociology and Social Welfare*. <https://www.semanticscholar.org/paper/Exploring-Homeowner-Opposition-to-Public-Housing-Duke/5b0fc508e50fc7c90c40ca7ad3d20a45db9cb839>
- ETC Institute. (2021). *2021 Resident Survey Findings Report* (p. 165). <https://www.dconc.gov/home/showpublisheddocument/36358/637822411391700000>
- Forever Home, Durham Investment Program*. (2021, April 15). <https://www.durhamnc.gov/DocumentCenter/View/38031/Forever-Durham-Program-Overview-4-15-20>
- Forever Home, Durham: Partners*. (2021). Durhamnc.Gov. <https://www.durhamnc.gov/4604/Partners>
- Grande, M., Eldeirawi, K., Polivka, B., Huntington-Moskos, L., & Nyenhuis, S. (2022). Food and Housing Insecurity and its Effect on Asthma Control During the Covid-19 Pandemic. *The Journal of Allergy and Clinical Immunology*, 149(2), AB85. <https://doi.org/10.1016/j.jaci.2021.12.304>
- Hatch, M. E., & Yun, J. (2021). Losing Your Home Is Bad for Your Health: Short- and Medium-Term Health Effects of Eviction on Young Adults. *Housing Policy Debate*, 31(3–5), 469–489. <https://doi.org/10.1080/10511482.2020.1812690>
- Housing Choice Vouchers HCV*. (2023). Durham Housing Authority. <https://www.durhamhousingauthority.org/housing-choice-vouchers>

- Housing GSO. (2020). *Creating Opportunities to Build a Better Community*. Greensboro North Carolina. <https://www.greensboro-nc.gov/departments/housing-neighborhood-development/housing-services/housing-gso>
- Housing Instability*. (n.d.). Department of Health and Human Services. <https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/housing-instability>
- HR&A Advisors. (2020). *Housing GSO: Creating Opportunities to Build a Better Community* (p. 176). <https://user-kcmpny.cld.bz/Housing-GSO-HRA-Greensboro-Affordable-Housing-Plan>
- Katz, L. F., Ludwig, J., Gebler, N., & Shroder, M. (2011). *Moving to Opportunity (MTO) for Fair Housing Demonstration Program*. <http://www2.nber.org/mtopublic/>
- Liebman, J., Ludwig, J., Katz, L., Chetty, R., Kling, J., Sanbomatsu, L., Adam, E., Duncan, G. J., Kessler, R. C., Gennetian, L., Lindau, S. T., McDade, T. W., Pinkston, J. C., & Whitaker, R. C. (2011). *Evaluating the Impact of Moving to Opportunity in the United States*. The Abdul Latif Jameel Poverty Action Lab (J-PAL). <https://www.povertyactionlab.org/evaluation/evaluating-impact-moving-opportunity-united-states>
- Moving On Service Guide*. (2021). US Department of Housing and Urban Development. <https://files.hudexchange.info/resources/documents/Moving-On-Services-Guide.pdf>
- NC Housing Snapshot*. (2021). North Carolina Housing Finance Agenc. <https://www.nchfa.com/about-us/policy-research/nc-housing-snapshot>
- Palimaru, A. I., McBain, R., McDonald, K., Batra, P., & Hunter, S. B. (2021). The relationship between quality of housing and quality of life: Evidence from permanent supportive housing. *Housing and Society*, 0(0), 1–22. <https://doi.org/10.1080/08882746.2021.1928853>
- Rodriguez, S. (2022, February 11). *CVS Health Invests Millions to Better Housing Security, Care Access. Patient Engagement HIT*. <https://patientengagementhit.com/news/cvs-health-invests-millions-to-better-housing-security-care-access>
- Rosen, K. T., Bank, D., Hall, M., Reed, S., & Goldman, C. (2021). *Housing is Critical Infrastructure: Social and Economic Benefits of Building More Housing*. <https://www.nar.realtor/sites/default/files/documents/Housing-is-Critical-Infrastructure-Social-and-Economic-Benefits-of-Building-More-Housing-6-15-2021.pdf>
- Scally, C. P. (2014, April 23). *Who, Why, and How Communities Oppose Affordable Housing*. Shelterforce. https://shelterforce.org/2014/04/23/who_why_and_how_communities_oppose_affordable_housing/
- Scally, C. P., Gold, A., Hedman, C., Gerken, M., & DuBois, N. (2018). *The Low-Income Housing Tax Credit Past Achievements, Future Challenges* (p. 46). https://www.urban.org/sites/default/files/publication/98761/lithc_past_achievements_future_challenges_final_0.pdf
- Schell, B. (2022). *Housing Security Fact Sheet: Zoning Reform*. Network for Public Health Law. <https://www.networkforphl.org/wp-content/uploads/2022/03/Zoning-Reform.pdf>
- Schuetz, J. (2020, January 7). To improve housing affordability, we need better alignment of zoning, taxes, and subsidies. *Brookings*. <https://www.brookings.edu/policy2020/bigideas/to-improve-housing-affordability-we-need-better-alignment-of-zoning-taxes-and-subsidies/>

- Schuetz, J. (2021, January 14). Four reasons why more public housing isn't the solution to affordability concerns. *Brookings*. <https://www.brookings.edu/blog/the-avenue/2021/01/14/four-reasons-why-more-public-housing-isnt-the-solution-to-affordability-concerns/>
- Shroder, M. D., & Orr, L. L. (2012). Moving to Opportunity: Why, How, and What Next? *Cityscape*, 14(2), 31–56.
- Taylor, L. A. (2018, June 7). *Housing And Health: An Overview Of The Literature / Health Affairs*. Health Affairs. <https://www.healthaffairs.org/doi/10.1377/hpb20180313.396577/>

B3: BUDGET & NARRATIVE

Building Permanent Housing for Low-Income Families in Durham County

Durham County rivals other counties with some of the highest rates of cost-burden and severe cost-burden for renters and homeowners in the state (NCHFA, 2021). Housing insecurity and cost-burdens contribute to worse health and social outcomes for community members. People who experience evictions, forced relocation, or homelessness are more like to report poor physical and mental health even years after the negative housing experience took place (Hatch & Yun, 2020).

The proposed program to build permanent housing for low-income Durham County residents will provide opportunities to address economic concerns and improve health and housing outcomes. Tax subsidies and a public-private partnership between community members and businesses that together pay to construct new low-income housing units across the County. The program will also include consultation with community stakeholders, a resident survey, and an environmental impact assessment. These efforts will help determine the types of housing construction that would best meet the needs of residents. Likewise, the program will help address housing costs while maintaining the County's environmental protections. This program will measure the number of new low-income housing units built and the year-over-year change in the housing cost burden to county residents in the bottom half of the county's income distribution. The program aims to reduce housing cost burden in Durham County from the current 46 percent to the national average of 40 percent. The program aims to achieve a 15 percent relative reduction in the County's housing cost burden during the three year program (Jordan, 2022; NCFHA, 2022).

Table 6 Brendan Finn: Policy Budget

DURHAM COUNTY LOW-INCOME HOUSING PROGRAM (10/1/23 – 10/1/26)

Category Personnel	Position	Organization	Type	FTE	Months	Salary	Cost	Fringe	Cost (year 1)	Cost (year 2)	Cost (year 3)	Total Cost
	Program Director	Lead	Salary	1.0	36	\$ 125,000.00	\$ 125,000.00	\$ 37,500.00	\$ 162,500.00	\$ 165,750.00	\$ 166,081.50	\$ 494,331.50
	Program Manager	Lead	Salary	1.0	36	\$ 80,000.00	\$ 80,000.00	\$ 24,000.00	\$ 104,000.00	\$ 106,080.00	\$ 106,292.16	\$ 316,372.16
	Policy Analyst	Lead	Salary	1.0	12	\$ 68,000.00	\$ 68,000.00	\$ 20,400.00	\$ 88,400.00			\$ 88,400.00
	Licensing and Registration Coordinator	Lead	Salary	1.0	36	\$ 65,000.00	\$ 65,000.00	\$ 19,500.00	\$ 84,500.00	\$ 86,190.00	\$ 86,362.38	\$ 257,052.38
	Program Evaluator	Lead	Salary	1.0	18	\$ 60,000.00	\$ 55,000.00	\$ 16,500.00	\$ 71,500.00	\$ 36,465.00		\$ 107,965.00
	Environmental Impact Assessment Lead	Subcontract	Hour	0.5	12	\$ 75,000.00	\$ 37,500.00	\$ -	\$ 37,500.00			\$ 37,500.00
	Environmental Impact Analyst	Subcontract	Hour	0.5	12	\$ 55,000.00	\$ 27,500.00	\$ -	\$ 27,500.00			\$ 27,500.00
	Community Survey Program Coordinator	Subcontract	Hour	0.5	12	\$ 60,000.00	\$ 30,000.00	\$ -	\$ 30,000.00			\$ 30,000.00
	Survey Data Analyst	Subcontract	Hour	0.5	12	\$55,000.00	\$ 27,500.00	\$ -	\$ 27,500.00			\$ 27,500.00
	Community Stakeholder Liaison	Subcontract	Hour	0.5	18	\$55,000.00	\$27,500.00		\$27,500.00			\$ 27,500.00
												\$ 1,414,121.04
											Total	

Category	Housing Funding	Item	Cost/unit	# units	Fixed/Variable?	Annual Cost	Total Cost	In-Kind Costs
		Low-Income Housing Tax Subsidy (4% of project cost) ¹	\$35,000.00	50	Variable	\$1,750,000.00	\$5,250,000.00	
		Private Funding Partnership (10% of county subsidy)	\$3,500.00	50	Fixed	\$175,000.00	\$525,000.00	\$525,000.00
		Payment in Lieu of Tax Program	\$2,000.00	20	Variable	\$40,000.00	\$120,000.00	\$120,000.00
		Public Land Assessments	\$5,000.00	8	Fixed	\$40,000.00	\$120,000.00	
						<i>Total Housing Funding Costs</i>	\$6,015,000.00	\$645,000.00

¹ The budget increased the county-provided subsidy cost for inflation from the 2020 Greensboro Affordable Housing Plan, which estimated a cost of \$31,000 per unit in its plan from a few years ago.

Category— Overhead	Item	Unit	Cost/unit	# units	Fixed/Variable?	Annual Cost	Total Cost	In-Kind Costs
	Office Space	Month	\$ 1,250.00	12	Fixed	\$ 15,000.00	\$45,000.00	
	Internet	Month	\$ 50.00	12	Fixed	\$ 600.00	\$1800.00	
	Utilities	Month	\$ 122.00	12	Variable	\$ 1,470.00	\$4,410.00	
	Computers, printers, etc.	Per staff member	\$ 1,000.00	11	Variable	\$ 11,000.00	\$33,000.00	
						<i>Total Overhead</i>	\$84,210.00	
Category— Supplies + Equipment	Item	Unit	Cost/unit	# units	Fixed/Variable?	Annual Cost	Total Cost	In-Kind Costs
	Project Supplies/Photocopying	Annual	\$ 3.00	150	Variable	\$450.00	\$1,350.00	
	Refreshments for community partner feedback meetings	Annual	\$ 7.50	180	Variable	\$1,350.00	\$4,050.00	
						<i>Total Supplies</i>	\$5,400.00	
Category— Other Expenses	Item	Unit	Cost/unit	# units	Fixed/Variable?	Annual Cost	Total Cost	In-Kind Costs
	Data Cleaning for Survey	Hour	\$ 80.00	24	Variable	\$1,920.00	\$5,760.00	
	Participant survey incentives (\$20 gift card)	Participant	\$ 20.00	60	Variable	\$1,200.00	\$3,600.00	
	Evaluation costs	Annual	\$ 4,500.00	1	Variable	\$4,500.00	\$4,500.00	
						<i>Total Other Expenses</i>	\$13,860.00	
						<i>Total Costs</i>	\$ 7,532,591.04	
						<i>Total In-Kind Contributions</i>	\$ 645,000.00	
						<i>Total Costs to Funder</i>	\$ 6,887,591.04	

Budget Narrative

The budget for Building Permanent Housing for Low-Income Families in Durham County relies on assumptions that may overestimate staff costs but underestimate subsidies required to entice contractors to take on affordable housing contracts with the County. Most of the staff required to manage the housing development program are assumed to be new hires to the County. The Program Director will provide high-level oversight and communicate between local officials, private partners, and community organizations. The Program Manager will oversee day-to-day program operations, manage the project budget and full-time staff members. Given the resources available at the Durham Housing Authority (DHA), it is possible that some of the staff required to carry out the responsibilities of the program, such as contract solicitation, management, and compliance work, could be allocated to already salaried workers at DHA. Using DHA staff could save the program 2.0 FTE over the course of the three year program. This staffing reallocation would still count towards the program's cost but would not add to the DHA bottom line since it would be an internal resource reallocation. The budget also accounts for a robust series of subcontracted employees to carry out the community stakeholder survey and environmental impact assessment, which a smaller unit may complete depending on the vendor contracted to provide these deliverables.

Regarding the program's financing for new low-income housing projects and contracts, the budget accounts for a tax subsidy designed to entice contractors to break ground on projects using a non-competitive four percent low-income housing tax credit, as opposed to the competitive nine percent low-income housing tax credit which are limited and provided by the North Carolina Housing Finance Agency (HRA Greensboro Affordable Housing Plan, 2020). The financing plan also provides a low estimate for private partnership investment in the program, accounting for 10 percent of the subsidy cost. The private partnership investment could be greater considering recent examples like CVS's 2021 housing investment in Nashville. Partner investment accounted for almost one-third of the city's new low-income housing development in that program (Rodriguez, 2022). The budget also assumes local partners would be interested in a potential "in lieu of" tax program where community partners could earmark their local tax dues to this low-income housing program. If partners were not interested in this tax program, it could reduce in-kind donations and increase total program costs.

REFERENCES

- HR&A Advisors. (2020). *Housing GSO: Creating Opportunities to Build a Better Community* (p. 176). <https://user-kcmpnye.cld.bz/Housing-GSO-HRA-Greensboro-Affordable-Housing-Plan>
- Jordan, J. (2022, December 8). *More Than 19 Million Renters Burdened by Housing Costs*. Census.Gov. <https://www.census.gov/newsroom/press-releases/2022/renters-burdened-by-housing-costs.html>
- Mayor Cooper Releases Affordable Housing Report*. (2021, June 8). Nashville.Gov. <https://www.nashville.gov/departments/mayor/news/mayor-cooper-releases-affordable-housing-report>
- NC Housing Snapshot*. (2021). North Carolina Housing Finance Agenc. <https://www.nchfa.com/about-us/policy-research/nc-housing-snapshot>
- Rodriguez, S. (2022, February 11). *CVS Health Invests Millions to Better Housing Security, Care Access*. Patient Engagement HIT. <https://patientengagementhit.com/news/cvs-health-invests-millions-to-better-housing-security-care-access>

APPENDIX C: EDWARD GONZALES INDIVIDUAL DELIVERABLES

C1: SOCIAL DETERMINANT OF HEALTH ANALYSIS

Social Determinant of Health (SDoH):

In Healthy People 2030, SDoH are defined as the conditions of the environment where people are born, raised, live, work, play, worship, and age that affect a person's overall health, function, and quality-of-life outcomes and risks (DHHS, 2023). Economic stability plays a significant role as an SDoH. Lack of income due to poverty can result in poor health, limited access to healthcare, food insecurity, and unfavorable living conditions. These SDoH can have both short- and long-term impacts on health outcomes. Short-term impacts may include trouble sleeping, and increased levels of stress, which can then affect work/school performance and at-home behavior. Long-term impacts can include cognitive impairment among youth that are unable to access healthcare or food due to socioeconomic issues, increased risk for mental illness, chronic diseases, and lower life expectancy (DHHS, 2023).

Geographic and Historical Context

As of 2020, Durham County has a population of 318,000 people with a median age of 35.5 and a median household income of \$62,812 (NCDHHS, 2020). The estimated Durham County population is comprised of White (54.5%), Black or African American (35.9%), Asian/Native American (5.6%), and Hispanic (13.8%) residents (NCDHHS, 2020). Historically in Durham County, in terms of economic stability being a social determinant of health living in poverty ranked third among the top concerns by residents in the community health assessment in both the 2016 Durham Community Health Assessment (CHA) and the 2018 Health Prioritization Survey (DCPH, 2020). In Durham's most recent CHA (2019), a glaring 25% of respondents were at or below 200% of the federal poverty level (NCDHHS, 2020).

Current and previous efforts that Durham County has taken to address these social determinants of health include the *Durham Living Wage Project*. This project promotes economic stability by urging employers to pay their employee's livable wages within the community (DLW, 2023). An additional organization that has brought awareness of the crisis of poverty to the county's attention is the *End Poverty Durham* organization. This organization focuses on five major areas that address connections between the racism of marginalized communities and poverty such as education, housing, healthcare, jobs, and family support (EPD, 2019).

Priority Population

The priority populations that are disproportionately affected by this SDoH issue are people are color, specifically Black and Latinx communities. Among Black and Latinx communities 18.4% and 26.8% are living in poverty respectively, compared to their White counterparts (10.5%) (NCDHHS, 2020). In addition to these communities living in poverty, 61% of Latinx and 44% of Black respondents reported that they or someone in their household has experienced job or wage loss (NCDHHS, 2020). As a result, these priority populations experience an increased prevalence of economic insecurity, consequently being associated with unfavorable health conditions, higher rates of food insecurity, and adverse childhood experiences.

Measures of SDOH

Outside of the two populations mentioned above, many families are affected by income below the poverty level as well. In addition to the Black and Latinx families that are disproportionately affected; single female households without a husband are also disproportionately affected. Table 1 below shows families whose income in the past 12 months were below the poverty level in Durham County. When comparing these households, White family households are two to four times less likely to fall below the poverty level compared to single female lead (no husband), Black, and Latinx families (DCPH, 2020).

Rationale/Importance

When addressing the top five Durham County health priorities poverty is ranked third, however it should be considered a health priority, as it bilaterally affects other health priority concerns such as affordable housing, access to healthcare and insurance, and food access. If poverty remains unaddressed, the community will likely continue to be at risk of increased mental illness, chronic diseases, higher mortality rates, and lower life expectancy (DHHS, 2023).

Disciplinary Critique

As a public health nutritionist/dietitian, it is important to be involved when addressing SDoH. As a nutritionist/dietitian, it is important to explore beyond just what a client eats and instead ask questions such as, “Where do you get groceries?” “Do you have transportation to get food?” “How do you prepare your food?”. Investigating social and environmental factors that prevent an individual from obtaining or consuming food fill in research gaps that further helps us understand pathways leading towards food insecurity. Specifically, when addressing poverty, nutritionists/dietitians play an important role in attacking food poverty and food insecurity through contributions to food and nutrition education, collaborative practice among the community, innovative

research to access safe, secure, and sustainable food supply; and advocating towards nutrition policy efforts at the multiple government levels (Holben, 2010).

Table 7 Edward Gonzales: SDOH Table

Families Whose Income in the Past 12 Months were Below the Poverty Level, Durham County 2019

Family Make-Up	Percentage
All Families	10.1%
With related children of the household under 18 years	16%
Married Couple Families	3.9%
Families with female household lead, no husband	27.6%
White Families	6%
Black Families	16.2%
Latinx Families	22.4%

REFERENCES

- Durham County Public Health. (2020). *Durham County - NC - Public Health | Home*. Retrieved from: <https://www.dcopublichealth.org/home/showpublisheddocument/35452/637642751171270000>
- Durham Living Wage. (2023). Retrieved from <https://www.durhamlivingwageproject.org/>
End Poverty Durham. (2019). *End Poverty Durham*. Current Initiatives. Retrieved from <http://endpovertydurham.org/initiatives/current-initiatives/>
- Holben , D. (2010, August 25). *Position of the American Dietetic Association: Food Insecurity in the United States*. Journal of the American Dietetic Association. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0002822310011946>
- NCDHHS. (2020). N.C. State Center for Health Statistics. Retrieved from <https://schs.dph.ncdhhs.gov/>
- US Census Bureau. (2023). *QuickFacts Durham County, North Carolina*. Retrieved from <https://www.nami.org/Your-Journey/Identity-and-Cultural-Dimensions/Asian-American-and-Pacific-Islander>
- US Department of Health and Human Services . (2023). *Social Determinants of Health*. Priority Areas - Healthy People 2030. Retrieved from <https://health.gov/healthypeople/priority-areas>
- US Department of Health and Human Services. (2023). *Poverty*. Poverty - Healthy People 2030. Retrieved from <https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/poverty#:~:text=Across%20the%20lifespan%2C%20residents%20of,mortality%2C%20and%20lower%20life%20expectancy>

C2: NUTRITION PROGRAM OR POLICY ANALYSIS AND IMPLEMENTATION

Introduction

In Healthy People 2030, Social Determinants of Health (SDoH) is defined as the conditions of the environment where people are born, raised, live, work, play, worship, and age that affect a person's overall health, function, and quality-of-life outcomes and risks (Department of Health and Human Services, 2023). Housing stability remains a key issue among low-income households, especially for people of color in majority-minority communities. The lack of housing stability constitutes challenges that include overcrowding, moving frequently, or spending most of the household income towards rent and therefore negatively impact overall physical, mental, and quality of life of individuals (Department of Health and Human Services, 2023). Additionally, an issue that is overlooked because of the lacking housing stability is the impact on food security. Individuals experiencing housing instability face hardships in choosing between paying rent and food. Feeding America reported that approximately 39% of those they serve report having to choose between paying for housing and paying for food (Feeding America, 2017). Additionally, the lack of food security can be associated with an increased risk of chronic health conditions, poor mental health, and overall decreased well-being of individuals (DHHS, 2022). Therefore, it is important to recognize the synonymous relationship between the lack of housing security and food insecurity. This program aims to address this issue by providing Durham County residents with tools and resources towards lifelong food security to help mitigate factors that create housing instability.

Evidence Based Nutrition Program

In 2019, the Durham County Community Health Assessment (CHA) reported approximately one in 10 people reported skipping meals because they didn't have enough money to buy food (Durham County Public Health, 2020). Moreover, people of color or those in majority-minority communities are greatly affected. Specifically, Black (14.9%) and Latino residents (12.6%) were significantly more likely than White residents (6.6%) to have skipped a meal sometimes or more frequently in the past year in Durham County (DCPH, 2020). It's important to address the double burden these communities face when linking housing security and being able to be food secure. Thirty-one percent of Durham households are cost-burdened; meaning more than 30% of their income is spent on housing. Those greatly impacted are Black and Latino communities, as 18.4% and 26.8% are living in poverty respectively, compared to their White counterparts (10.5%) (N.C. State Center for Health Statistics, 2020). Because these communities are burdened with living in poverty and spending most of their income on securing housing, they face

challenges in food security. Those who are food insecure face an increased risk of poor health outcomes. For adults, food insecurity is associated with decreased nutrient intake, increased risk of mental health issues, depression, diabetes, hypertension, poor health exam outcomes, and poor sleep (Gunderson & Zailik, 2015). Addressing the double burden of housing and food insecurity within these affected communities would alleviate the economic burden residents face when struggling to eat and pay rent.

In efforts to address these issues to combat food insecurity, a nutrition-based program to consider adopting would be the Good Food Good Medicine (GFGM) program, which provides food access programs such as community gardens, edible landscaping, and cooking and nutrition education to increase access to healthy and affordable food throughout low-income communities in Barre, Vermont (Meisenheimer, 2015). The rationale for selecting this program is the similarities in outreach toward low-income communities that lack affordable housing and therefore face food insecurity. The program also emphasizes the integration of affordable housing and food access, as they acknowledge that both are basic needs among families that must account for and can result in becoming competing priorities for a budget (Meisenheimer, 2015). In a recent report (2019-2021) GFGM reported harvesting over \$5,200.00 worth of produce that was shared among residents and participants of the program (Vermont Garden Network, 2019). Additionally, GFGM provides free of charge services that essentially “bring food” to the community through the aspect of community gardens and providing them with nutritional education.

Evidence Based Outcomes

As this program is adapted, outcome considerations will include research based on evidence from the GFGM program in addition to a similar community-based community gardening program studied in a rural Oregon community. The Oregon community gardening program used surveys, interviews, and observations made at community-based gardening meetings to assess food security (Carney et al., 2012). The first short-term outcome is to have at least 75% of the program participants have a better understanding of overall wellness concepts related to diet and produce (education provided by our program) over the next two years (VGN, 2019). Second, increase the frequency of participants’ vegetable and fruit intake of “several times a day” by at least 100% over two years (Carney et al. 2012). Lastly, reduce the number of frequencies by at least 75% among participants who report, “sometimes” and “frequently” when worrying about food running out before money was available to buy more within the past month (Carney et al. 2012). One long-term outcome (5–10 years) that we would like our program to

achieve is to see an overall reduction of food insecurity and improved dietary intake among residents participating in affordable housing sites in Durham County (Carney et al., 2012).

Evidence Based Implementation Strategies and Activities

Using components of the Good Food Good Medicine program, we would implement a community garden and provide cooking/nutrition education among low-income housing communities across Durham Country. Meeting with the Durham Housing Authority (DHA) would allow us to look at existing communities with established assistance for housing instability residents and potential communities that would benefit from the implementation of our program. Working alongside the DHA would open potential partnerships with city and county agencies with which they work.

Once communities have been identified, we would reach out to property managers/owners to help gauge community interests in implementation. Ways to engage the community residents and family members would include the use of social media and the distribution of surveys to assess interest. Establishing personnel in leadership and educational roles would be filled through experienced volunteers from outreach groups that include: The North Carolina Extension Master Gardener Volunteers (EMGVs) and local Universities (Duke, UNC, NSCU, Durham Tech, North Carolina Central). Additionally, these roles served by recruited volunteers will also serve as educators and facilitators at established gardens.

It is imperative to implement a tailored garden that fits the community – speaking with residents and the housing authority will help our team identify needed fruits and vegetables to plant, ideal garden location and size, and helps us understand the demographic of whom will be attending the gardens. Recruitment of community leaders and members to serve as leaders would be a priority to allow representation among our targeted population. To determine the success and outcome measure of our community garden we would use food frequency questionnaires and survey tools adopted from the USDA. USDA survey tools such as the U.S. Adult Food Security Module and the Six-Item Short Form of the Food Severity Survey Module will allow us to analyze household summary measures of food security based on: food security scale scores and food security status (USDA, 2022). Implementation of the program would be overlooked by the Durham Housing Authority and program leadership, which would require meetings to provide feedback and assistance in developing strategies and future revisions to the program. Our expected outreach for this program would target at least 30% of residents participating in the program, like the

GFGM program (VGN, 2019). However, the number of persons exposed to the program would be dependent on community size and participants of the program.

Implementation of this program would address three levels of the socio-ecological model: Living and working conditions, interpersonal connections, and Individuals characteristics. The living and working conditions are addressed through the creation of these gardens to provide participants with the education needed to attain food security. Interpersonal connections are created through community involvement with local partnerships. Lastly, individual characteristics are addressed by instilling the confidence and skills to garden fresh produce and make healthier choices for their overall wellness.

Community Partners

Implementation and involvement in this program would involve many potential stakeholders. The affordable housing residents would serve as both beneficiaries and participants as their roles may also include leadership roles in the program. These residents are also the community that this program is designed to serve as they face food insecurity because of the lack of housing stability. Implementation of the program involves the Durham Housing Authority (DHA), City Council, and policymakers as they all play an active role in connecting residents and assisting with program location and implementation. Additionally, The NC Cooperative Extension may serve as a resource for community gardens through grants, events, and donations (Bradley, 2022).

The South Eastern Efforts Developing Sustainable Space (SEEDS) in Durham County offers a DIG program that is targeted toward high school students teaching them urban farming and leadership development skills (SEEDS, 2022). Community partners such as SEEDS and their DIG program can help in their involvement in community education and engage the youth (grades K-12) in participation. Alongside SEEDS, working with similar organizations such as Keeping Durham Beautiful within Durham County. Keeping Durham Beautiful (KDB) has worked with communities throughout Durham through partnerships that have connected communities through shared goals of removing waste, planting trees, and community gardens, and bringing communities together (KDB, 2021). Among other community partners to consider, are home improvement stores such as Lowes and Home Depot for donations of supplies for our program.

Budget

Our program budget considerations will include partnerships built with our community partners such as local businesses, universities, and private/country-level grant organizations. Our program would prefer not to

receive any federal funding to protect the integrity of the community we serve. Federal funding may require our program to participate in tasks that would be a potential burden to the community we serve – including checking identification, requesting social security numbers, and checking documentation status of residents in our program. The program would seek outreach towards our partnerships with our community partners for volunteers to fill personnel roles and donations for materials and supplies. Our program’s remaining expenses would seek funding through the program development team, private grants, and county-level grants. An example of this would be a Choice Neighborhood Implementation Grant (CNI), which involves a grant distributed to communities that have gone local planning to implement a plan to redevelop the neighborhood as Durham County was a recipient of this grant in 2019 (HUD, 2019). See Table 8 for a potential itemized budget for our program.

Conclusion

In efforts to combat food insecurity compounded by housing instability among people of color in majority-minority populations across Durham County, implementing this program would help improve access to food and provide residents with long-term knowledge surrounding fruit and vegetable growth, preparation, and dietary importance. The use of this knowledge will allow individuals to reduce expenses spend on food at grocery stores and empowers individuals to create life-long food security through the community gardens. The advantages of this program implementation include accessibility to fresh food, involving the youth in community engagement, building stronger communities, and promoting a healthier lifestyle. Additionally, providing this program free of services for residents will help alleviate the financial hardships that they are burdened with. Although, disadvantages to consider when implementing this program may include garden start-up, securing funding, recruiting volunteers, and harvesting during different seasons. However, this program will provide hands-on learning that will give individuals the confidence to grow their own food, become better eaters, and make healthier choices for their overall health and wellness.

Table 8 Edward Gonzales: Program Budget Breakdown
Community Gardens Budget Breakdown

Program Budget Breakdown		
Personnel	Cost	Sourcing
Garden Leaders (Volunteers) & Nutrition Educators	\$0	Universities (Duke, UNC, NCSU) SEEDS, Keep Durham Beautiful, North Carolina Extension Master Gardener Volunteers
Materials		
Garden Space (lease)	\$500 (annual)	Choice Neighborhood Implementation Grants (CNI)
Garden upkeep	\$1000 (annual)	CNI Grants
Raising Beds	\$2000	CNI Grants
Fencing	\$6000	CNI Grants
Water Hook-Up	\$1000	CNI Grants
Storage Shed	\$200	CNI Grants
Soil/Compost	\$0	Donations from local gardening stores
Seeds & Plants	\$0	Donations from local gardening stores
Gardening Tools	\$0	Donations from local gardening stores
Total	\$10,700 / per garden site	

REFERENCES

- Bradley, L. (2022). *Community Gardens Funding Opportunities*. NC State Extension News. Retrieved from <https://nccommunitygardens.ces.ncsu.edu/sustain-a-garden/nccommunitygardens-funding/NC> Retrieved from <https://nccommunitygardens.ces.ncsu.edu/sustain-a-garden/nccommunitygardens-funding/N> NC
- Carney, P. A., Hamada, J. L., Rdesinski, R., Sprager, L., Nichols, K. R., Liu, B. Y., Pelayo, J., Sanchez, M. A., & Shannon, J. (2012, August). *Impact of a community gardening project on vegetable intake, food security and family relationships: A community-based participatory research study*. Journal of community health. Retrieved February 22, 2023, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3661291/>
- Durham Country Public Health. (2020). *Durham County - NC - Public Health | Home*. 2020 Community Health Assessment (CHA). Retrieved from <https://www.dcopublichealth.org/home/showpublisheddocument/35452/637642751171270000>
- Durham Housing Authority . (n.d.). *Housing programs*. Durham Housing Authority. Retrieved from <https://www.durhamhousingauthority.org/housing-programs>
- Gundersen, C., & Ziliak, J. P. (2015). *Food Insecurity And Health Outcomes*. Food insecurity and health outcomes | health affairs. Retrieved from <https://www.healthaffairs.org/doi/10.1377/hlthaff.2015.0645>
- Meisenheimer, M. (2015). *Food Access & Affordable Housing*. Food Access & Affordable Housing | Vermont Housing & Conservation Board. Retrieved from <https://vhcb.org/sites/default/files/pdfs/Integrating-Food-Access-and-Affordable-Housing.pdf>
- NCDHHS. (2020). N.C. State Center for Health Statistics. Retrieved from <https://schs.dph.ncdhhs.gov/>
- SEEDS. (2022, June 8). *About dig*. SEEDS. Retrieved from <https://www.seedsnc.org/about-dig/>
- U.S. Department of Health and Human Services. (2022). *Food Accessibility, insecurity and health outcomes*. National Institute of Minority Health and Health Disparities. Retrieved from <https://www.nimhd.nih.gov/resources/understanding-health-disparities/food-accessibility-insecurity-and-health-outcomes.html>
- US Department of Health and Human Services. (2023). *Housing instability*. Housing Instability - Healthy People 2030. Retrieved from <https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/housing-instability>
- USDA. (2020, May). *Food Safety and Inspection Service*. Safe Minimum Internal Temperature Chart | Food Safety and Inspection Service. Retrieved from <https://www.fsis.usda.gov/food-safety/safe-food-handling-and-preparation/food-safety-basics/safe-temperature-chart>
- USDA. (2022). *Survey tools*. USDA ERS - Survey Tools. Retrieved from <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/survey-tools/>
- Vermont Garden Network. (2019). *Good Food Good Medicine: Reaping Garden Benefits Year-round*. Vermont Garden Network. Retrieved from <https://vtgardens.org/good-food-good-medicine/>
- What we do*. Keep Durham Beautiful. (2023). Retrieved from <https://keepdurhambeautiful.org/our-work/>

What would you choose, housing or food? Feeding America. (2017, December 18). Retrieved from <https://feedingamericaky.org/what-would-you-choose-housing-or-food/>

C3: NUTRITION PROGRAM OR POLICY EVALUATION

Introduction

Our group's social determinant of health is focused on housing stability. Housing stability remains a key issue among low-income households, especially for people of color in majority-minority communities. The lack of housing stability constitutes challenges that include overcrowding, moving frequently, or spending most of the household income towards rent and therefore negatively impacting overall physical health, mental health, and quality of life of individuals (Department of Health and Human Services, 2023). Additionally, an issue that is overlooked because of the lack of housing stability is the impact on food security. Individuals experiencing housing instability face hardships in choosing between paying for rent or food. Feeding America reported that approximately 39% of those they serve report having to choose between paying for housing and paying for food (Feeding America, 2017). Additionally, the lack of food security can be associated with an increased risk of chronic health conditions, poor mental health, and overall decreased well-being of individuals (DHHS, 2022). In the efforts to address these key issues of housing stability and food insecurity, our nutrition-based program will adopt the Good Food Good Medicine (GFGM) program – which provides food access programs such as community gardens, edible landscaping, and cooking and nutrition education to increase access to healthy and affordable food throughout low-income communities in Barre, Vermont (Meisenheimer, 2015). Meeting with the Durham Housing Authority (DHA) would allow us to look at existing and potential communities to select two low-income communities that are fit for our program. Once communities have been identified we would establish personnel in leadership and educational roles. These roles would be filled through experienced volunteers from outreach groups that include: The North Carolina Extension Master Gardener Volunteers (EMGVs) and local universities (Duke, UNC, NSCU, Durham Tech, North Carolina Central).

Evidence-Based Evaluation Plan

Study Design / Data Collection

For this specific study design our group will focus on our short-term outcome of doubling the number of participants who report consuming fruit and vegetable intake of “several times a day” over a two-year period (Carney et al. 2012). To evaluate progress on this metric, we would use a combination of observational and survey questionnaires to measure success. To determine the success of increased food security and outcome measure of our

community garden we would use food frequency questionnaires and survey tools adapted from the United States Department of Agriculture (USDA). USDA survey tools such as the U.S. Adult Food Security Module and the Six-Item Short Form of the Food Severity Survey Module will allow us to analyze household summary measures of food security based on food security scale scores and food security status (USDA, 2022).

Sample and sampling strategy

Our group sampling strategy will include individuals and families who have participated in the community gardens program for at least two years and have attended at least 50% of educational courses taught by our team. Our target goal is to include at least 25% of program participant. However, the specific size will be dependent on the population in which this program is implemented and how many participate. In past studies, project leaders administered questionnaires to one family member (typically the head of household) that would best represent the family's experiences (Carney et al., 2012). This type of sampling would involve cluster sampling as it would involve dividing the populations who share the same experiences into housing subgroups. However, a challenge this might impose is that there may be differences among the subgroups, and therefore cannot guarantee it is representative of the whole population.

Specific Measures

Potential output measures we would like to evaluate from our program would include the amount of produce that was harvested (lbs), the number of participants in the community garden, and the number of education sessions held (including attendees at each session). To measure the amount of produce harvested, we would adopt the Family Concrete harvesting data collection toolkit (Farming Concrete, 2015). This toolkit would track the amount of produce grown in the community gardens to showcase the benefits that our gardens have provided (Farming Concrete, 2015). The number of participants in the community gardens will be measured through the distribution of our questionnaires to reflect the number of participants within the household and managed within our database. Lastly, the number of education sessions held, including the attendees at each session will be tracked using Microsoft Excel. The collective data collection of the output measures would be overseen by volunteers from either of the partnered universities (Duke, UNC, or NCSU) with our program.

Outcomes that our program would measure include the overall understanding of the wellness concepts taught during education sessions, frequency of fruit and vegetable intake, food insecurity measures, and overall dietary intake. To measure participants' overall understanding of the wellness concepts taught during our education

sessions, educators would provide participants with pre- and post-class assessments. Food Frequency Questionnaires (FFQ) will be used yearly to obtain a frequency of fruit and vegetable intake and overall dietary intake among participants. Lastly, USDA survey tools such as the U.S. Adult Food Security Module and the Six-Item Short Form of the Food Severity Survey Module will allow us to analyze household summary measures of food security based on food security scale scores and food security status (USDA, 2022).

Timing

Initial FFQ and USDA Food Severity Survey tools will be administered before the start of our program to measure participant baseline. A follow-up of yearly FFQ and USDA Food Severity Survey tools will be administered to ongoing participants of our program. Progress of our program will be determined by seeing a 100% increase (from baseline) in “several times a day” fruit and vegetable consumption. If progress does not occur, additional focus groups among community gardens participants and leadership meetings (program leadership, stakeholders, community leaders) will be held to address gaps and barriers (internal and external) our program may experience. Additionally, participants who would like to remain anonymous will be able to provide feedback via a suggestions box on-site at the community gardens.

Analysis Plan

Assessment analysis will include both qualitative and quantitative data. Qualitative information from focus groups will be collected to consider participants perceptions and experiences throughout the program. Quantitative information from the FFQ will be collected yearly to measure produce intake pre-post gardening questionnaires will involve the use of descriptive statistics and Wilcoxon Signed-Ranks Test to measure differences of the same population over the years (Carney et al., 20120.)

Sources of Funding

Our program budget considerations will include partnerships built with our community partners such as local businesses, universities, and private/country-level grant organizations. Our program would prefer not to receive any federal funding to protect the integrity of the community we serve. Per personal communication during an interview done with Inter-Faith Food Shuttle in Raleigh, NC – “Federal funding may require our program to participate in tasks that would be a potential burden to the community we serve – including checking identification, requesting social security numbers, and checking documentation status of residents in our program” (McCombs, 2022). The program would seek outreach towards our community partners for volunteers (to fill personnel roles) and

donations for materials and supplies to use for the gardens. Our program will seek additional funding to cover any remaining expenses through the program development team, private grants, and county-level grants. An example of this would be a Choice Neighborhood Implementation (CNI) grant. The CNI grant is distributed to communities that have gone local planning to implement a plan to redevelop the neighborhood as Durham County was a recipient of this grant in 2019 (HUD, 2019). See **Table 1** for a potential itemized budget for our program.

Data use and dissemination

Data will be collected and reviewed quarterly to measure the effectiveness of the community gardens in overall dietary intake, overall wellness understanding, and food insecurity. Overall qualitative and quantitative data collected from participants will be reviewed to establish baselines and goals that are feasible within our program. Additionally, the data can assist our program in making informed decisions and necessary adjustments to make our program successful. Quarterly and yearly data will be disseminated throughout program participants, leaders, and stakeholders to provide transparency in the program. If successful, report findings to the Durham Housing Authority with hopes to extend the program to additional locations throughout Durham County.

Conclusion

In efforts to combat food insecurity compounded by housing instability among people of color in majority-minority populations across Durham County, implementing this program would help improve access to food and provide residents with long-term knowledge surrounding fruit and vegetable growth, preparation, and dietary importance. The success for this program requires working alongside our community partners, program leaders, and program participants to better understand key issues through different perspectives. We hope that the knowledge obtained from these efforts will allow individuals to reduce expenses spent on food at grocery stores and empower individuals to experience life-long food security through the community gardens. This program would address the double burden of housing and food insecurity within these affected communities and would alleviate the economic burden residents face when struggling to eat nutritious food while paying rent – a public health issue at large.

Table 1: Community Gardens Budget Breakdown

Program Budget Breakdown		
Personnel	Cost	Sourcing
Garden Leaders (Volunteers) & Nutrition Educators	\$0	Universities (Duke, UNC, NCSU) SEEDS, Keep Durham Beautiful, North Carolina Extension Master Gardener Volunteers
Materials		
Garden Space (lease)	\$500 (annual)	Choice Neighborhood Implementation Grants (CNI)
Garden upkeep	\$1000 (annual)	CNI Grants
Raising Beds	\$2000	CNI Grants
Fencing	\$6000	CNI Grants
Water Hook-Up	\$1000	CNI Grants
Storage Shed	\$200	CNI Grants
Soil/Compost	\$0	Donations from local gardening stores
Seeds & Plants	\$0	Donations from local gardening stores
Gardening Tools	\$0	Donations from local gardening stores
Total	\$10,700 / per garden site	

REFERENCES

- Carney, P. A., Hamada, J. L., Rdesinski, R., Sprager, L., Nichols, K. R., Liu, B. Y., Pelayo, J., Sanchez, M. A., & Shannon, J. (2012, August). *Impact of a community gardening project on vegetable intake, food security and family relationships: A community-based participatory research study*. Journal of community health. Retrieved February 22, 2023, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3661291/>
- Durham Country Public Health. (2020). *Durham County - NC - Public Health | Home*. 2020 Community Health Assessment (CHA). Retrieved from <https://www.dcopublichealth.org/home/showpublisheddocument/35452/637642751171270000>
- Faming Concrete. (2015). *Farming concrete*. Data Collection Toolkit. Retrieved from <https://farmingconcrete.org/barn/static/resources/DataCollectionToolkit.pdf>
- HUD. (2022). *City of durham receives a \$40M choice neighborhoods implementation grant award*. U.S. Department of Housing and Urban Development (HUD). Retrieved from https://www.hud.gov/states/north_carolina/stories/2022-10-19
- Kylee McCombs. (2022). Personal Interview with Director of Community Health and Nutrition: Inter-Faith Food Shuttle. Inter-Faith Food Shuttle.
- Meisenheimer, M. (2015). *Food Access & Affordable Housing*. Food Access & Affordable Housing | Vermont Housing & Conservation Board. Retrieved from <https://vhcb.org/sites/default/files/pdfs/Integrating-Food-Access-and-Affordable-Housing.pdf>
- U.S. Department of Health and Human Services. (2022). *Food Accessibility, insecurity and health outcomes*. National Institute of Minority Health and Health Disparities. Retrieved from <https://www.nimhd.nih.gov/resources/understanding-health-disparities/food-accessibility-insecurity-and-health-outcomes.html>
- US Department of Health and Human Services. (2023). *Housing instability*. Housing Instability - Healthy People 2030. Retrieved from <https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/housing-instability>
- USDA. (2022). *Survey tools*. USDA ERS - Survey Tools. Retrieved from <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/survey-tools/>

APPENDIX D: YASMEEN LEE INDIVIDUAL DELIVERABLES

D1: SOCIAL DETERMINANT OF HEALTH ANALYSIS

Social Determinant of Health

Social determinants of health create a new and innovative way of understanding public health by having a framework of social-ecological factors that affect the health of individuals and larger communities. This framework includes the social, cultural, and environmental factors that impact health access and inevitably, health outcomes (Healthy People 2020, 2020). According to Healthy People 2030, there are five main categories of social determinants of health. For the sake of this analysis, economic stability will be the focus. Economic stability as a determinant can be described as factors such as socioeconomic status, employment, family income, housing status, among others (Clark & Utz, 2014). Housing affordability is one crucial facet of economic stability when considering health outcomes. Specifically, Healthy People 2030 (2023) outlines that housing affordability is housing costs that are equal to or less than 30% of household income.

In relation to housing affordability, the condition, context, and consistency of housing create a compounding burden on communities (Swope & Hernández, 2019). One study sought to understand the short-term relationship of quality of housing and its impact on self-reported health and wellbeing. The researchers found that after moving into higher quality housing, residents stated progressively better health from the two-four month interval and the nine-twelve intervals after the start of the study (Rolfe et al., 2020). Additionally, there are long-term impacts on health due to low quality housing and housing instability. Several studies have focused attention on the relationship between housing instability with diabetes incidence, prevalence, and overall outcomes. One study of homeless adults with diabetes found that when placed into supportive housing, the individuals' diabetes care and treatment, specifically HbA1C and lipid testing, improved (Lim et al., 2019).

Geographic and historical context

According to the 2020 Durham County Community Health Assessment, the County has struggled with offering affordable and quality housing to its residents. Specifically, the County's survey data shows that white residents were more likely than Black residents to own a home and more than 7% of respondents stated having been evicted (Durham County, 2020). In order to combat housing issues, the County has several organizations focused on providing affordable housing such as the Durham Housing Authority, Housing for New Hope, Community Empowerment Fund, and Families Moving Forward, among several others. Additionally, the County was able to

access some funding in response to the COVID-19 pandemic which resulted in \$7 million dollars to be directed towards rehousing, eviction diversion, and emergency shelter (Durham County, 2020).

Priority population

Understanding the racial context of the County is vital in understanding the full scope of housing instability because of the historical displacement, exclusion, and segregation of communities of color. Due to the large proportion of Black residents in Durham County, historical context regarding homeownership and home affordability will be a focus in this analysis. One example of this context is how the Federal Housing Administration (FHA) decided which areas would have guaranteed mortgage rates based on risk related to racial composition in neighborhoods, otherwise known as redlining (Center for American Progress, 2019). In present times, racial/ethnic identity is still often a barrier for accessing housing for communities of color. In a nationwide study of racial segregation and housing, it was found that homes that are in predominantly Black neighborhoods or devalued when compared to homes in white neighborhoods and white people have significantly lower unbanked and underbanked rates compared to Black people (Brookings, 2021). Within Durham County, the Black community due to their proportion of the County's population and historical barriers to housing, are some of the most impacted by housing affordability and stability.

Measures of SDOH

The cost of housing in Durham County, as it relates to the Healthy People 2030 metric of home affordability, shows that in 2020, 40,000 homes, or 31% were determined to cost more than 30% of household income (Durham County, 2020). Unfortunately, data disaggregated by race/ethnicity is not easily available for the County. In comparison, Orange County reported in 2019 that 48% of its families who rented paid over 30% of their household income on housing costs (Orange County, 2019). Although this comparison shows that Durham County's housing affordability issue is not as severe as one of its neighboring counties, only 13% of Orange County's population is Black compared to the 35.9% in Durham County (Orange County, 2019). Lastly, in comparison to the rest of the state which has a population of 21.2 Black people, 16% of North Carolina residents are experiencing one of four housing issues including overcrowding, high housing costs, and lack of kitchen or plumbing facilities (NCIOM, 2020).

Rationale/Importance

Housing instability should be made a public health priority in Durham County due to the structural and historical racism that creates disparities for communities of color. Durham County's Black community is one of the most at risk of experiencing housing instability due the County's current housing data and the literature's support that racism and housing are linked. Research also shows that interventions to improve housing access result in positive health outcomes. A randomized controlled trial seeking to understand the impact of placement in affordable housing on health changes found that after six months, families with medically complex children in the intervention group reported less anxiety and depression compared to the control group (Bovell-Ammon et al., 2020). Durham County could benefit from interventions on the policy and community level regarding housing instability and affordability.

Disciplinary critique

A policy and legislative focus on housing instability in Durham County would be an important step in addressing the issue because necessary funding and accountability mechanisms could be created. For example, policies that create more funding for affordable housing development through agreement by the City Council and expressed as a need by community members and advocacy organizations. Policymaking creates well-funded and sustainable changes within communities however, these changes need to be met with capacity and infrastructure within the communities that will be most impacted. Policy is not the only solution to housing instability but is an important step to creating an environment where change can be supported by the communities' Commissioners. However, it is possible that the County's Commissioners do not value health equity or community efforts. In this case, it could be argued that investing in housing interventions and infrastructures could lead to better health outcomes, as outlined above, and therefore result in less dollars being spent on getting people healthy. Additionally, higher quality housing attracts more residents and raises the overall value of the land and community of which the houses sit. Through both a health equity and an economic lens, it can be seen that housing instability is a public health issue that requires thought, funding, and intention.

REFERENCES

- Bovell-Ammon, Allison, Cristina Mansilla, Ana Poblacion, Lindsey Rateau, Timothy Heeren, John T. Cook, Tina Zhang, Stephanie Ettinger de Cuba, and Megan T. Sandel. "Housing Intervention For Medically Complex Families Associated With Improved Family Health: Pilot Randomized Trial." *Health Affairs* 39, no. 4 (April 2020): 613–21. <https://doi.org/10.1377/hlthaff.2019.01569>.
- Brookings. "Homeownership, Racial Segregation, and Policy Solutions to Racial Wealth Equity," September 1, 2021. Available from: <https://www.brookings.edu/essay/homeownership-racial-segregation-and-policies-for-racial-wealth-equity/>.
- Center for American Progress. "Systemic Inequality: Displacement, Exclusion, and Segregation." Available from: <https://www.americanprogress.org/article/systemic-inequality-displacement-exclusion-segregation/>.
- Clark, Myra L, and Sharon W Utz. "Social Determinants of Type 2 Diabetes and Health in the United States." *World Journal of Diabetes* 5, no. 3 (June 15, 2014): 296–304. <https://doi.org/10.4239/wjd.v5.i3.296>.
- Durham County. Community Health Assessment 2020. Available from: <https://www.dcopublichealth.org/resources/health-resources-data/community-health-assessment>
- Economic Stability - Healthy People 2030. US Department of Health and Human Services. Available from: <https://health.gov/healthypeople/objectives-and-data/browse-objectives/economic-stability>.
- Healthy People 2020. US Department of Health and Human Services. Available from: www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=8.
- Lim, Sungwoo, Sara A Miller-Archie, Tejinder P Singh, Winfred Y Wu, Sarah C Walters, and L Hannah Gould. "Supportive Housing and Its Relationship With Diabetes Diagnosis and Management Among Homeless Persons in New York City." *American Journal of Epidemiology* 188, no. 6 (June 1, 2019): 1120–29. <https://doi.org/10.1093/aje/kwz057>.
- NC Historic Sites. Cultivation of a tobacco empire. 2021. Available from: <https://historicsites.nc.gov/all-sites/duke-homestead/history/cultivation-tobacco-empire>
- North Carolina Institute of Medicine. Healthy North Carolina 2030: A Path Toward Health. Morrisville, NC: North Carolina Institute of Medicine; 2020.
- Orange County. 2019 Community Health Assessment. Available from: <https://www.orangeCountync.gov/DocumentCenter/View/11246/2019-COMMUNITY-HEALTH-ASSESSMENT-web>
- Rolfe, Steve, Lisa Garnham, Jon Godwin, Isobel Anderson, Pete Seaman, and Cam Donaldson. "Housing as a Social Determinant of Health and Wellbeing: Developing an Empirically-Informed Realist Theoretical Framework." *BMC Public Health* 20, no. 1 (July 20, 2020): 1138. <https://doi.org/10.1186/s12889-020-09224-0>.
- Swope, Carolyn B., and Diana Hernández. "Housing as a Determinant of Health Equity: A Conceptual Model." *Social Science & Medicine* 243 (December 1, 2019): 112571. <https://doi.org/10.1016/j.socscimed.2019.112571>.
- U.S. Census Bureau QuickFacts: Durham County, North Carolina. United States Census Bureau. Available from: <https://www.census.gov/quickfacts/durhamCountynorthcarolina>.

D2: POLICY ANALYSIS

Background Information

Economic stability is a social determinant of health that includes factors such as socioeconomic status, employment, household income, and housing status. (Clark & Utz, 2014). In Durham County, housing affordability and therefore its stability, are issues that local government has recognized as a priority. Healthy People 2030 (2023) determines housing affordability as housing costs that are equal to or less than 30% of a given household income. The 2020 Durham County Community Health Assessment reports that the County had issues with maintaining the availability of affordable and quality housing. The County's survey data shows that white residents were more likely than Black residents to own a home and more than 7% of county residents stated having been evicted (Durham County, 2020). Housing instability is a priority issue in Durham County based on the County's data and structural racism that creates disparities for communities of color.

Policy Options

Building Permanent Housing for Low-Income Families

One option to increase economic stability and improve housing availability for lower-income communities within Durham County is to expand permanent housing options. A cause of housing instability and homelessness for families is the lack of access to affordable housing (Urban Institute, 2015). Low-income and families of color are a priority population for housing interventions and policies in Durham County. Although often readily available within counties, transitional housing is only a short-term solution that does not fully address housing insecurity and has barriers to entry due to various screenings (Urban Institute, 2015). Building permanent housing will both improve short-term outcomes in housing stability and provide long-term options across the county.

Reform Zoning Codes

The restrictions and regulations regarding how land can be developed, or zoning, creates barriers for the development of residential buildings for many North Carolina communities (CATO Institute, 2022). Exclusionary zoning is when zoning is used to restrict the kinds of housing that can be developed in a neighborhood or community (CATO Institute, 2022). This practice impacts low-income and communities of color from accessing affordable housing where they live. Reforming zoning codes would allow for flexibility for the types of homes that can be built across the community.

To determine the best fit for Durham County, the two policy options, building permanent housing and reforming zoning codes, will be evaluated based on costs to the county, impact on housing instability, political

feasibility, and equity. Costs to the county will be critiqued based on a scale of 1-5, with 1 being the highest costs and 5 being the lowest costs. Impact on the issue of housing instability will be on a similar scale with 1 being the lowest impact and 5 being the highest impact. Political feasibility will be critiqued based on the same scale but 1 will be substantial barriers to local government approval and 5 being most likely to be approved. Lastly, equity will be critiqued based on the likelihood of impact on the Black population in Durham County. A ranking of 1 will be the least reduction of disparities and 5 will be the highest reduction of disparities.

Policy Analysis

Building Permanent Housing for Low-Income Families

The city of Raleigh has recently implemented interventions for small-scale rental development in order to target the needs of low-income families. In 2021, the city created the Small-Scale Rental Development program to create funding for the development of residential buildings that would expand affordable rental options (Affordable Rental Development, 2022). Similarly, the town of Chapel Hill has seen new funding and resident support to residential housing development. The Chapel Hill Town Council approved \$5.25 million in funding in 2021 for the development of over 250 homes. Since then, \$10 million in bonds was supported by 72% of voters in the 2022 election to develop 400 new affordable homes and preserve an additional 300 pre-existing homes (Chapel Hill Affordable Housing).

In Durham County, most housing initiatives are focused on rezoning and expanding current housing choices. The research shows there is little to no County efforts on building permanent housing options using County or city funds. The responsibility and authority of future policy change to build permanent housing would fall on the City of Durham and their decision would most likely be based on any and all recommendations from the Durham Planning Commission. Additionally, the Joint City-County Planning Committee serves as an intermediary between the city and Council governments in reaching consensus on issues that impact both governments. The implementation of this policy option would also include the use of City funds to afford building costs.

Table 9 Yasmeen Lee: Policy Analysis Scoring (Permanent Housing for Low-Income Families)

Criteria	Criterion Score	Score Explanation
Costs to the County	2	Depending on the scale of housing development initiated, the costs would be substantial as the funds would be provided by the County
Impact	5	Development of permanent housing options could create hundreds of housing options as seen in Chapel Hill
Political Feasibility	2	This is a high cost option and there are currently no initiatives through the City of Durham or Durham County to begin small-scale rental or residential development
Equity: Black Population	4	Affordable housing options in the neighborhoods where Black communities live, work, and play would need to be the policy focus to create impact specifically on the Black population
Overall Score:	13/20	

Reform Zoning Codes

Inclusionary zoning practices are used to open opportunities for affordable housing in lower income communities and neighborhoods (Health Affairs, 2018). These practices encourage housing development to expand offerings to families that otherwise would have difficulty affording a home. The city of Raleigh has been reforming its zoning practices to address the 'missing middle', defined as housing types including multi-family homes, townhomes, and small apartments (What Is the Missing Middle, 2022). As of December 2022, 37 missing middle housing developments were completed in the city. More data is needed to determine the full effectiveness of zoning code reform in the city of Raleigh.

On a larger-scale, the state of Oregon enacted a new mandate in 2019 that required communities across the state to allow for “middle housing” options in residential areas. However, a critique of the legislation was its lack of addressing pre-existing restrictive covenants that limit development to single-family use only (Adams-Schoen et al., 2021). In 2017, a Senate bill was introduced in the North Carolina General Assembly to allow for inclusionary

zoning practices in Durham County (SB. 300). Although SB 300 was not passed, Durham County did approve updates which decreased its minimum lot size requirement to 2,000 square feet and allowed for large lots to be divided into smaller housing plots (Tanner, 2022). Durham County’s City Council and Planning Commission would be key community partners in future zoning reform. The responsibility and authority of future policy change would fall on the Durham County Board of Commissioners and their decision would most likely be based on any and all recommendations from the Durham Planning Commission. Additionally, the Joint City-County Planning Committee serves as an intermediary between the city and Council governments in reaching consensus on issues that impact both governments.

Table 10 Yasmeen Lee: Policy Analysis Scoring (Zoning)

Criteria	Criterion Score	Score Explanation
Costs to the County	5	Zoning reform itself is a low-cost solution and only allows the development of “middle-housing” options
Impact	4	This policy option would create opportunities for affordable housing across the county and impact a large number of residents. However, impact is contingent upon developers utilizing the flexibility created by zoning reform
Political Feasibility	5	The state government has already shown interest in zoning reform through the introduction of S.B. 349 and H.B. 401 in 2021 which would have legalized “middle housing” statewide
Equity: Black Population	5	The Black community is the most negatively impacted by exclusionary zoning practices and therefore would benefit the most from zoning reform
Overall Score:	19/20	

Final Recommendation

Reforming zoning codes in Durham County is the recommended policy option after analyzing the two options across various criteria. This policy option is the lowest cost and most politically feasible option for the current state

of North Carolina, city of Durham, and Durham County. Additionally, the Black community in Durham County will benefit greatly from the expansion of affordable housing options through inclusionary zoning practices. Reforming zoning codes also creates a long-lasting impact on housing instability and sets a county-wide priority to address housing instability.

REFERENCES

- Adams-Schoen, Sarah and Sullivan, Edward J., Reforming Restrictive Residential Zoning: Lessons from An Early Adopter. (2021). *Journal of Environmental Law & Litigation*. Available from: <http://dx.doi.org/10.2139/ssrn.3926278>
- CATO Institute. “Keeping North Carolina’s Housing Affordable.” 2022. Available from: <https://www.cato.org/policy-analysis/keeping-north-carolinas-housing-affordable>.
- Chapel Hill Affordable Housing. “Bond Information.” Available from: <https://www.chapelhillaffordablehousing.org/bondinfo>.
- City of Raleigh. “Affordable Rental Development.” 2022. Available from: <https://raleighnc.gov/housing/affordable-rental-development>.
- City of Raleigh. “What Is the Missing Middle?” 2022. Available from: <https://raleighnc.gov/planning/what-missing-middle>.
- Clark, Myra L, and Sharon W Utz. “Social Determinants of Type 2 Diabetes and Health in the United States.” *World Journal of Diabetes* 5, no. 3 (June 15, 2014): 296–304. <https://doi.org/10.4239/wjd.v5.i3.296>.
- Durham County. Community Health Assessment 2020. Available from: <https://www.dcopublichealth.org/resources/health-resources-data/community-health-assessment>
- Healthy People 2020. US Department of Health and Human Services. Available from: www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=8.
- “Housing And Health: The Role Of Inclusionary Zoning” Health Affairs Brief. (2018). Available from: <https://www.healthaffairs.org/doi/10.1377/hpb20180313.668759/full/>.
- SB.300 – 2017 Biennium, 2017 Reg. Sess. (NC. 2017). <https://www.ncleg.gov/BillLookup/2017/S300>
- Tanner, Michael. “Keeping North Carolina’s Housing Affordable: A Free Market Solution,” Policy Analysis no. 938, Cato Institute, Washington, DC, December 7, 2022.
- Urban Institute. “Rapid Re-housing: What the Research Says”. 2015. Available from: <https://www.urban.org/sites/default/files/publication/54201/2000265-Rapid-Re-housing-What-the-Research-Says.pdf>

D3: BUDGET & NARRATIVE

Policy Summary

Rezoning and zoning reform in Durham County will allow for more residents to access housing options that are affordable and stable. In particular, rezoning creates housing opportunities for historically disenfranchised and discriminated communities such as the communities of color in the county. Zoning code reform encourages housing development to expand offerings to families that otherwise would have difficulty affording a home. Housing security and stability is linked to better perceived health and better health outcomes. The Black community in Durham County will benefit greatly from the expansion of affordable housing options through inclusionary zoning practices. Reforming zoning codes also creates a long-lasting impact on housing instability and sets a county-wide priority to address housing instability. This policy option will heavily utilize the foundations of health equity, community-based participatory research, and community partnership in its implementation and evaluation. In its implementation, zoning reform will include a two-year rezoning program that is informed by community data and analyzed to assess its impact on neighborhood/environmental change and on resident perspective. The attached budget outlines the staffing, overhead, travel, and other costs of implementing zoning reform beginning in August of 2023 and ending July 31st of 2025.

Budget Narrative

The programmatic staff will oversee the design, implementation, analysis, and evaluation of the county's rezoning. However, listening to the community will be an important aspect of the success of this program. The Program Director will be the lead on the rezoning policy's implementation with assistance from the Program Director. The Monitoring & Evaluation Coordinator's role will be to monitor program activities and ensure that proper regulations and guidelines are being followed in the project's implementation.

This program will establish a baseline by gathering resident data related to the county's current affordable housing status and compare this information to post-implementation data to assess effectiveness in impacting resident satisfaction in housing changes. Data in the form of individual interviews and surveys from the communities most impacted will be coupled with the neighborhood and county-level data collected by the Environmental Impact Analyst. The Policy Analyst and Housing Policy Assistant will lead the analysis of Durham County's current housing and zoning policies in addition to provide policy context to the data collected by the Environmental Impact Analyst.

The Qualitative Data Consultant and CHW / Promotora de Salud will work as a team to co-facilitate individual interviews. Interview and survey data will be analyzed by the Qualitative and Quantitative Data Consultants, respectively. The Research Manager will be the point of contact for both Data Consultants and ensure integration of qualitative and quantitative data in final dissemination of the project's findings. The Promotora de Salud's role will also be to lead the recruitment process of gathering community input with the county's Latino/a community. Spanish translation services will be utilized to create accessibility across all data collection materials and finalized reports. Similarly, the CHW's role will be to assist in the recruitment of English-speaking residents. Lastly, equity will be embedded in the program's implementation by utilizing a racial equity coaching firm to guide the staff in understanding the historical, institutional, and structural racism that impacts housing stability and the county's residents.

APPENDIX E: CYNTHIA SHARPE INDIVIDUAL DELIVERABLES

E1: SOCIAL DETERMINANT OF HEALTH ANALYSIS

Social Determinant of Health

“Social determinants of health are nonmedical factors that influence health outcomes. They are the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life” (CDC, 2022). There are many social determinants of health; however, here we will discuss a determinant that is an underlying factor for the poor quality of other determinants as well: poverty. Poverty has a fluctuating definition. In 2021, the federal government defined poverty as an individual’s income being below \$12,880 or a household of 4’s income being below \$26,500 (Healthy People, 2030, n.d.). These thresholds are set by the federal government (Healthy People, 2030, n.d.).

Poverty affects or is affected by all realms of the socio-ecological model. Poverty affects some communities more than others due to location and institutional racism and discrimination which affects employment opportunities, income opportunities, access to housing, access to food, access to healthcare, and other factors affecting quality of life (Healthy People, 2030, n.d.). Impoverished communities also have greater risk for chronic stress and substance use as well as “mental illness, chronic disease, higher mortality, and lower life expectancy” (Healthy People, 2030, n.d.).

Geographic and Historical Context

Durham County is part of “The Triangle” of Raleigh, Durham, and Chapel-Hill, also known as “The Research Triangle” of North Carolina because these locations house 3 major science and technology research schools; Durham is home to Duke University (Duke University, n.d.). This triangle offers thousands of jobs with an average salary of \$56,000 as of 2018, and the average salary of an individual in Durham County is \$39,496, \$66,623 for a household (U.S. Census Bureau, n.d.) (NCpedia, n.d.). Though, the 2020 Community Health Assessment of Durham County identified a disparity between White, Hispanic, and Black household incomes, each earning \$76,962, \$44,004, and \$42,417 respectively, seen in the graph below (DCONC, 2020).

Durham is also home to North Carolina Central University, a historically black public university founded in 1910 (North Carolina Central University, n.d.). During this time (late 1800s - early 1900s) Durham had its own “Black Wall Street,” four blocks of black-owned businesses residing nearby the Black Hayti community (Pashankar, 2022). It was considered the “mecca of the Black South” until the Durham Freeway destroyed the neighborhood in

the 1970s as a result of the federal government's urban renewal (Pashankar, 2022). Now, of the 7,729 employer establishments in 2020, 1,051 of them were minority owned as of 2017 (U.S. Census Bureau, n.d.). Urban renewal has also affected housing stability according to the 2020 Community Health Assessment, along with gentrification and redlining (DCONC, 2020). There are approximately 138,497 occupied housing units in the county (U.S. Census Bureau, n.d.). White individuals own over 45,000 of the over 66,000 they occupy; Black individuals own over 17,000 of the over 47,000 they occupy; all other races both own and occupy even fewer housing units (U.S. Census Bureau, n.d.).

Durham is rich in research, history, culture, and activities. It is home to stadiums, businesses, artists, venues, trails, restaurants, and more. Despite this and Triangle job opportunities, as of 2021, 13.4% of Durham County's approximate 326,126 people were experiencing poverty: 43,700 individuals (U.S. Census Bureau, n.d.). Within this community, however, are many assets that address poverty and its downstream effects. Recently, the county created a singular entry point for individuals to access shelter and housing resources if they are facing homelessness in Durham (Durham COC, n.d.). Duke University and Duke Health is doing their part by increasing minimum wage to \$15 an hour and connecting aging adults to food and health services through its Benefits Enrollment Center (DCONC, n.d.). These resources and others can continue to leverage Durham's assets to positively impact impoverished communities and upstream factors of poverty such as education, employment, and housing affordability.

Priority Population

Based on the aforementioned evidence regarding income and home-ownership disparity, the population of interest for the issue of poverty is minority residents, particularly those residing in low-income, previously redlined areas and those without houses. This group may be a mix of students, natives, relocators, immigrants, veterans, and others of all ages. This population makes up less than 13.4% of the county's population (U.S. Census Bureau, n.d.). Some of this population may be renters, owners, or houseless since poverty can affect all levels of housing.

Measures of SDOH

As a collective, groups of color are most affected by poverty, Black families (4,551) and Hispanic or Latino families (2,368) more so than all other groups (Partnership for a Healthy Durham, 2018). 18% of the county's Black population is affected and 30% of the county's Hispanic or Latino population is affected (Partnership for a Healthy Durham, 2018). Females have a slightly higher rate of incidence than males at 13% and 12.2% respectively (Healthy

Communities NC, n.d.). And individuals aged 18 to 24 are affected at a higher rate (25.6%) than any other age group, and individuals aged 24 and younger collectively have a higher rate of incidence than individuals over age 24 in this county as of 2020 (Healthy Communities NC, n.d.).

In 2020, Durham County ranked 69 out of North Carolina's 100 counties for rate of individuals affected by poverty, specifically those living below 100% of the Federal Poverty Line (Healthy Communities NC, n.d.). Though only approximately 17.4% of the population was affected in 2020, this accounted for a prevalence of 25,343 individuals. Its neighbor, Wake County, had a lower ranking of 74, with only 16% of its population affected; however, that accounts for 49,626 individuals experiencing poverty in 2020 (Healthy Communities NC, n.d.). In addition to the factors listed above, poverty is also more likely to affect those with less education and who are single (Confronting Poverty, 2021). Economic status is also impacted by sudden changes in job status, health, and family structure (Confronting Poverty, 2021).

Rationale / Importance

Addressing this priority population experiencing poverty could improve food security. As of 2019, 12.1% of Durham County residents were considered food insecure (Healthy Durham, 2022). By prioritizing low-income areas, raised income supports the placement of grocery stores in such areas and diversification of restaurants beyond fast food (Healthy Durham, 2022). This change in food access contributes to changes in health regarding risk for chronic diseases, many of which affect people of color (Healthy Durham, 2022). Additionally, more food businesses create more jobs in a community, supporting economic stability.

Disciplinary Critique

Though poverty is closely related to food insecurity, public health nutritionists and dieticians do not have a direct role in solving this social determinant, as poverty is determined by level of income. However, they can indirectly advocate for what kind of food businesses to bring into a community, and those businesses can bring jobs which may bring community wealth in the long-term. They can also provide health education and guidance regarding shopping healthily on a budget and provide food access resources, but this does not address poverty itself.

Addressing poverty in Durham County would improve not only the economic stability of the county and its ranking among other North Carolina counties, but the health of its residents, especially those disadvantaged by inequity. The county can reduce poverty by empowering affected communities through accessible education, job training, fair hiring practices, and supporting minority businesses. The county can lessen the burden of poverty

through community organizing for more accessible housing, healthy food, healthcare, transportation, and more.

Combatting poverty amongst people of color in low-income communities may also attract prospective residents and businesses as well as promote minority-owned businesses, further growing the economy and diversifying the county's workforce.

REFERENCES

- (n.d.). (rep.). *Healthy Durham*. Retrieved from <https://healthydurham.org/cms/wp-content/uploads/2022/08/Obesity-Diabetes-and-Food-Access-FINAL-1.pdf> .
- 2020-Durham-county-cha-executive-summary-english - DCONC. (n.d.). Retrieved January 18, 2023, from <https://www.dconc.gov/home/showpublisheddocument/35321/637632484211230000>
- About the Triangle*. About the Triangle | Duke Department of Surgery. (n.d.). Retrieved January 18, 2023, from <https://surgery.duke.edu/about-department/about-triangle>
- Bureau, U. S. C. (n.d.). Explore census data. Retrieved January 18, 2023, from https://data.census.gov/table?q=homeownership&t=Housing&g=0100000US%243100000_0500000US37063&tid=ACSST1Y2021..S2502
- Centers for Disease Control and Prevention. (2022, December 8). *Social Determinants of Health at CDC*. Centers for Disease Control and Prevention. Retrieved January 26, 2023, from <https://www.cdc.gov/about/sdoh/index.html>
- Coordinated entry intake*. DURHAM COC. (n.d.). Retrieved January 18, 2023, from <https://www.durhamcoc.org/coordinated-entry-intake.html>
- Durham County Department of Public Health, Partnership for a Healthy Durham, Duke Health. (2018). (rep.). *2020 Durham County Community Health Assessment*. Retrieved January 2023, from <https://healthydurham.org/cms/wp-content/uploads/2018/06/Poverty-in-Durham-County-FINAL.pdf>.
- Durham*. Durham County | Healthy Communities NC. (n.d.). Retrieved January 18, 2023, from <https://healthycommunitiesnc.org/profile/geo/durham-county?diversityButton1=ageOption&povertyLevels=poverty9>
- NCpedia: NCpedia*. Link to NCpedia main page. (n.d.). Retrieved January 18, 2023, from <https://www.ncpedia.org/anchor/research-triangle-park>
- Our heritage*. Our Heritage | North Carolina Central University. (n.d.). Retrieved January 18, 2023, from <https://www.nccu.edu/we-are-nc-central/our-heritage#:~:text=James%20E..Race%20on%20July%205%2C%201910>
- Pashankar, S. (2022, January 21). 'a special space carved out here in Durham': *The rise, fall and impact of Black Wall Street*. The Chronicle. Retrieved January 18, 2023, from <https://www.dukechronicle.com/article/2022/01/durham-black-wall-street-blackowned-businesses-construction-hotels-apartments>
- Poverty and the risk calculator*. Confronting Poverty. (2021, October 22). Retrieved January 26, 2023, from <https://confrontingpoverty.org/about-poverty-and-the-risk-calculator/#:~:text=Factors%20Associated%20with%20Poverty&text=Among%20the%20most%20important%20are,trigger%20a%20spell%20of%20poverty>.
- Poverty*. Poverty - Healthy People 2030. (n.d.). Retrieved January 18, 2023, from <https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/poverty>
- U.S. Census Bureau quickfacts: Durham County, North Carolina*. (n.d.). Retrieved January 18, 2023, from <https://www.census.gov/quickfacts/durhamcountynorthcarolina>
- U.S. Census Bureau quickfacts: Durham County, North Carolina*. (n.d.). Retrieved January 18, 2023, from <https://www.census.gov/quickfacts/fact/table/durhamcountynorthcarolina/PST045222>

E2: NUTRITION PROGRAM OR POLICY ANALYSIS AND IMPLEMENTATION

Introduction

Economic stability is a social determinant of health that is a challenge for many individuals residing in Durham, North Carolina (Poverty - Healthy People 2030, n.d.). Housing insecurity is a prevalent issue that falls under the umbrella of economic stability and largely affects people of color in majority minority communities (Poverty - Healthy People 2030, n.d.). This insecurity is often the result of poverty, which affects 13.4% of the county's population, and affects Black and Hispanic or Latino families more than any other group (U.S. Census Bureau, n.d.) (Partnership for a Healthy Durham, 2018). The federal government defines poverty as an individual's income being below \$12,880 or a household of 4's income being below \$26,500 (Poverty - Healthy People 2030, n.d.). This level of income combined with systemic bias practices have reinforced housing insecurity for people of color, who have less home ownership than White residents (Poverty - Healthy People 2030, n.d.) (U.S. Census Bureau, n.d.). And in communities where people of color are the majority, being able to "afford" a home leaves less money to cover other necessities such as utilities, healthcare, clothing, and food (Poverty - Healthy People 2030, n.d.). Having a limited budget for healthy food (and having limited access to healthy food) can negatively impact healthy eating habits which can be detrimental to one's nutritional status and health (Food Insecurity - Healthy People, 2030, n.d.).

Evidence Based Nutrition Policy or Program

Housing insecurity affects nutrition status, as being able to afford a home affects budget availability for nutritious food (Food Insecurity - Healthy People, 2030, n.d.). Affordable housing makes housing more accessible for low-income residents; however, these developments are also less desirable areas for grocery stores and other healthy food options, thereby impacting healthy food access and health status of inhabitants, our key nutrition issue (Food Insecurity - Healthy People, 2030, n.d.). Residents of these communities are often people of color (as poverty affects this group more than others), who are already at increased risk of chronic disease and mortality (Food Insecurity - Healthy People, 2030, n.d.).

The Good Food Good Medicine program targets low-income urban communities in Barre, Vermont (Weiland et al., n.d.). This program combines community gardening as well as nutrition and gardening education to form a year-round program promoting wellness for residents. The program uses Spring and Summer to plan, plant,

and tend to the community garden; Fall to harvest; and Winter to conduct cooking, nutrition, and wellness education. These services are provided to community members for free.

This program was selected because of its incorporation of both food access and nutrition education. It is an intervention that can be customized by what's grown and what's taught based on resident preferences. It is also an option that can beautify Durham and contribute to its culture of community gathering. Additionally, the program is an environmentally friendly option (creating habitats, reducing food transportation costs, etc.) that prioritizes equity (improving food access for low-income communities) (Greenleaf Communities, 2021). And not only are gardens flexible (as far as what to plant and how to plant) but the educators for Winter curriculum can vary, offering plenty of opportunity for community involvement from volunteers and local organizations and business.

Evidence Based Outcomes

An urban home garden program in Santa Clara County, CA concluded that “Education-enhanced urban home gardening may facilitate multidimensional nutrition and health improvements in marginalized populations at high cardiometabolic risk” (Palar et al., 2019). Based on this conclusion and results of improved food access, increased consumption of fresh produce, and improved nutritional knowledge, along with other studies involving community gardening, there are three desired short-term outcome objectives for this program to accomplish by January 1, 2025 (within 2 years) in Durham County (Palar et al., 2019). The first outcome is: By January 1, 2025, at least 75% of program participants will have a better understanding of the wellness concepts covered in the education sessions (Good Food, Good Medicine, 2021). The second outcome is: By January 1, 2025, the frequency of participants’ produce intake of “several times a day” will increase by at least 100% (as determined by survey before and after the intervention) (Carney et al., 2012) The third outcome is: By January 1, 2025, the sum of the frequencies of “sometimes” and “frequently” worrying in the past month that food would run out before money was available to buy more will drop by at least 75% (as determined by survey before and after the intervention). An increase in access is expected to correlate with increased consumption. One expected long-term (5 to 10 years) impact of the intervention is: Reduce food insecurity and improve dietary intake among residents of affordable participating housing sites (Carney et al., 2012).

Evidence Based Implementation Strategies and Activities

The Community Development Department of Durham (CDD) will implement the intervention as it is well connected to other housing assistance organizations and this intervention targets affordable housing communities,

which aligns with the purpose of the committee's creation: "*Foster safe, decent, and sustainable neighborhoods while enhancing housing quality and affordability for the citizens of Durham*" (Community Development Department, n.d.) Its current affordable housing strategy involves helping "low-income renters and homeowners remain in or improve their homes" (Affordable Housing Strategies, n.d.). Tasks will be carried out by AmeriCorps volunteers accompanied by the Extension Master Gardeners Volunteers of Durham County, as these groups support community efforts promoting wellbeing. The CDD will contact Durham Housing Authority, which will need to be met with in order to identify communities best to target. It must utilize property managers to gauge resident interest in the program. As program interest is gauged, fruit and vegetable consumption, resident satisfaction, and food access baseline data will be gathered as well.

To implement this intervention, community input is essential. Interest is a basic need to make this program happen; leadership by residents is also needed. Residents will guide garden size and location, what is planted in the garden, and maintenance of the garden. They will also have a say in what the nutrition and wellness curriculum consists of so that it tailors to their interests and needs. Low interest in topics covered could inhibit participation. Residents will also develop garden rules and harvest protocols with the guidance of the Extension Master Gardeners Volunteers and chosen educators.

Once the people involved and the communities involved in the program have been identified, the building of the gardens will commence. This will involve not only the gathering of garden supplies, development of educational materials, and designing the garden (as gardens can be vertical or horizontal and of various sizes), but finding community partners to fund the development as well. The CDD will be the primary funder; however local businesses, state programs, and commercial entities may be willing to fund the gardens or their supplies, or provide supplies if it is a product they already produce. The gardens will then be built and seeded in the Spring by Extension Master Gardeners volunteers, AmeriCorps volunteers, and Keep Durham Beautiful (as they specialize in community greening and creating safe and healthy communities) along with residents. (Keep Durham Beautiful, n.d.). These groups, others, and residents will also maintain the gardens. Curriculum and workshops for the program will be planned and recruited for during the Summer and Fall. The first teaching of the curriculum will be that Winter after harvesting the gardens. At the end of the first year, evaluation will be done to determine program progression from baseline data.

Finally, at any point during the implementation, feedback and evaluation are critical. This will be helpful in ensuring the sustainability and maximizing effectiveness and reach of the program. All stakeholders should be involved in this process, as multiple perspectives create well-rounded solutions and improvements. This program touches all levels of the socioecological model by addressing Living and Working Conditions (creating more accessible fresh produce) and being supported by Interpersonal Connections (gardening and learning as a community) and County Systems (CDD funding and community partners). The cooperation of these levels ultimately benefit the Individual (improving the opportunity to create healthful eating habits). National Systems such as institutional racism have helped placed these communities in need of such an intervention. The expected reach is 30% of 2 affordable housing communities: 1 long-standing and 1 new-build.

Community Partners

Aforementioned community partners include the CDD, the Durham Housing Authority, property managers, AmeriCorps, Extension Master Gardeners Volunteers of Durham County, Keep Durham Beautiful, and the suggestion of organizations connected to the CDD and local, state, and commercial entities potentially willing to contribute resources. More specifically, the CDD already partners with Reinvestment Partners, which will help fund the program at all locations or one location, or fund a portion of the program (Partners – Durham, n.d.). This will prevent communities or the county from funding the project themselves.

Curriculum development and instruction will be a collaborative effort. Curriculum will be planned by AmeriCorps volunteers with the help of the Extension Master Gardeners Volunteers of Durham County who already conduct classes and workshops on gardening (Agriculture - N.C. Cooperative Extension at the Durham Center, 2018). North Carolina Cooperative Extension will also provide nutrition and cooking educators for Winter programming (NC Cooperative Extension, n.d.). The SEEDS and DIG garden programs will also offer education volunteers as they already conduct plant and cooking-oriented workshops (SEEDS, 2022). Programs at local educational institutions will be asked to offer support as well by garnering student volunteers as educators. There are many institutions in the area including Durham Technical Community College, North Carolina Central University, and Duke University. These volunteers will also help with garden maintenance along with the two groups who build the gardens: Extension Master Gardeners Volunteers of Durham County and Keep Durham Beautiful. Gardening supplies and storage of that supplies will be provided by the groups helping maintain the gardens, the CDD, and in-

kind donations from community members and commercial home improvement business such as Lowe's Home Improvement, Ace Hardware, or Home Depot.

Budget

With so many community partners available, costs of the program can be reduced to and all depend on what volunteers are available. The cost for 2 community gardens and wellness educators could be \$0 or a few thousand dollars. But should no one volunteers and no items be donated, funds will be provided by the CDD and Reinvestment Partners. This money will need to finance the building of the gardens (raised beds or living walls), the supplies for maintaining the garden, potentially storage of those supplies, garden management, and education facilitators. Most of the available budget will go towards ground prep for garden beds and paying educators. Garden management could be left to residents and volunteers alone, but if not, one gardener will be hired per garden. This could be less costly than educators depending on the frequency of sessions. An estimated budget table can be found in Appendix I.

Conclusion

This recommendation comes with multiple advantages including increased knowledge of, access to, and consumption of fruits and vegetables for participating residents; a plethora of community partners to collaborate with which builds community and may lower project costs; a closer and fresher option to obtaining produce besides a grocery store; free services to residents; and building community amongst residents. And the advantages are not outweighed by the disadvantages: potentially having to pay for garden management, the effort to create or find space for gardens on properties, and the patience needed to reap the tangible benefits of gardening. This effort prioritizes equity by increasing food access and options in low-income areas. These options put a healthier lifestyle within reach for these communities, with the goal of improving health outcomes and reducing the burden of housing insecurity, poverty, and structural bias.

Table 12 Cynthia Sharpe: Program Budget

Expense	Cost
Garden Creation (raised beds or living walls)	\$500 - \$2500 per garden
Maintenance Supplies	\$1000 / garden initially
Supplies Storage	\$500 - \$3000
Garden Management Personnel	\$1500 / month (Spring – Fall)
Garden Educators	\$2000 / month (weekly sessions)
Nutrition/ Wellness Educators	\$2000 / month (weekly sessions)

REFERENCES

- Bradley, Dr. Lucy. "Community Gardens Funding Opportunities." *NC State Extension News*, <https://nccommunitygardens.ces.ncsu.edu/sustain-a-garden/nccommunitygardens-funding/>.
- "About DIG." *SEEDS*, 8 June 2022, <https://www.seedsnc.org/about-dig/>.
- "Affordable Housing Strategies." *Affordable Housing Strategies | Durham, NC*, <https://www.durhamnc.gov/4729/Affordable-Housing-Strategies>.
- Carney, Patricia A, et al. "Impact of a Community Gardening Project on Vegetable Intake, Food Security and Family Relationships: A Community-Based Participatory Research Study." *Journal of Community Health*, U.S. National Library of Medicine, Aug. 2012, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3661291/>.
- "Community Development Department." *Community Development Department | Durham, NC*, <https://www.durhamnc.gov/445/Community-Development>.
- DeMuro, Katie. "The Many Benefits of Community Gardens." *Greenleaf Communities*, 30 Apr. 2021, <https://greenleafcommunities.org/the-many-benefits-of-community-gardens/>.
- Durham County Department of Public Health, Partnership for a Healthy Durham, Duke Health. (2018). (rep.). *2020 Durham County Community Health Assessment*. Retrieved January 2023, from <https://healthydurham.org/cms/wp-content/uploads/2018/06/Poverty-in-Durham-County-FINAL.pdf>.
- "Extension Master Gardener." *Agriculture - N.C. Cooperative Extension at the Durham Center*, 25 Jan. 2018, <https://agdurham.org/extension-master-gardener-durham/>.
- "Food Insecurity." *Food Insecurity – Healthy People 2030*, <https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/food-insecurity>.
- "Health & Nutrition: North Carolina Cooperative Extension." *NC Cooperative Extension News*, <https://durham.ces.ncsu.edu/categories/health-nutrition/>.
- Palar K;Lemus Hufstedler E;Hernandez K;Chang A;Ferguson L;Lozano R;Weiser SD; "Nutrition and Health Improvements after Participation in an Urban Home Garden Program." *Journal of Nutrition Education and Behavior*, U.S. National Library of Medicine, 2019, <https://pubmed.ncbi.nlm.nih.gov/31601420/>.
- "Partners." *Partners | Durham, NC*, <https://www.durhamnc.gov/4604/Partners>.
- Planting Healthy Habits: Adapting to the Pandemic by Cultivating Resilience 2019 - 2021*, Good Food, Good Medicine, Barre, Vermont, 2021, pp. 1–42.
- Poverty. Poverty - Healthy People 2030. (n.d.). Retrieved January 18, 2023, from <https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/poverty>
- U.S. Census Bureau quickfacts: *Durham County, North Carolina*. (n.d.). Retrieved January 18, 2023, from <https://www.census.gov/quickfacts/fact/table/durhamcountynorthcarolina/PST045222>
- Weiland, Libby, and Joann Darling. "Online, via Zoom." *Vermont Garden Network*, 7 Jan. 2019, <https://vtgardens.org/good-food-good-medicine/>.
- "What We Do." *Keep Durham Beautiful*, <https://keepdurhambeautiful.org/our-work>.

E3: NUTRITION PROGRAM OR POLICY EVALUATION

Housing Insecurity's Impact on Nutrition Security in Majority Minority Communities

Introduction

Housing insecurity is a prevalent issue that falls under the umbrella of economic stability (a social determinant of health) and largely affects people of color in majority minority communities (Poverty - Healthy People 2030, n.d.). This insecurity is often the result of poverty, which affects Black and Hispanic or Latino families more than any other group (U.S. Census Bureau, n.d.) (Partnership for a Healthy Durham, 2018). Having a low income combined with systemic bias practices have reinforced housing insecurity for people of color, who have less home ownership than White residents (Poverty - Healthy People 2030, n.d.). Housing insecurity affects nutrition status, as being able to afford a home affects budget availability for nutritious food (Food Insecurity - Healthy People, 2030, n.d.). Affordable housing makes housing more accessible for low-income residents; however, these developments are also less desirable areas for grocery stores and other healthy food options, thereby impacting healthy food access and health status of inhabitants (who are at increased risk of chronic disease and mortality), our key nutrition issue (Food Insecurity - Healthy People, 2030, n.d.).

The Good Food Good Medicine program targets low-income urban communities in Barre, Vermont (Weiland et al., n.d.). This program combines community gardening as well as nutrition and gardening education to form a year-round program promoting wellness for residents. This program will be adapted and implemented in two low-income housing communities in Durham and will be carried out by the Community Development Department of Durham (CDD), enlisting the services of AmeriCorps volunteers, Extension Master Gardeners Volunteers of Durham County and other community partners outlined in the program analysis and implementation deliverable.

Evidence Based Evaluation Plan

We have prioritized evaluating the following outcome: Within 2 years of program implementation, the frequency of participants' fruit and vegetable intake of "several times a day" will increase by at least 100% (as determined by survey before and after the intervention) (Carney et al., 2012).

Study Design/Data Collection

This is a quasi-experimental study as we are not comparing communities with the program to communities without, but are implementing a program to see its effects on two communities over a period of time. Here, the exposure is the adapted Good Food, Good Medicine program, and the desired outcome is increased frequency of

produce intake by participants. This information will be collected by giving a survey to participants at the beginning and end of the study to collect food frequency information, particularly how often (and how much) produce is consumed daily. This survey is pre-established in the community gardening project by Carney et al; a sample of survey data is provided in the appendix.

Sample and Sampling Strategy

The sample is two low-income communities in Durham County, low-income meaning that the average income of the community is below \$12,880 for individuals or below \$26,500 for a household of 4. These communities may also be chosen based on whether they are Section 8 voucher communities. Therefore, the sampling strategy is not randomized but intentional. However, there is variation within our sample as participants will be various ages. All community members are welcome to participate and are recruited by interest meetings held before the program's start.

Specific Measures

The outcome of measure is produce intake. Based on starting surveys, we will measure if there has been an increase in the amount of produce consumed daily. Comparison categories include "several times a day," "once a day," "a few times a week," and "almost never." The expected outcome is that more participants will be in the "several times a day" category two years into the intervention than before the intervention. Secondary data will include how much these intakes consist of.

Timing

Data collection will occur at baseline and at the end of 2 years. Community partners will be engaged at all points of the intervention and before. All potential partners will be contacted a year in advance of the start of the project to request their participation. Gardens will be built and planted in Spring. Curriculum will be developed in Summer and decided upon in Fall. Recruitment of and hiring of educators will be in Summer as well during harvest. Teaching and workshops will occur in Winter; frequency will be determined by curriculum leads, though at least biweekly is suggested. Evaluation will occur at the end of each Winter. Garden maintenance will occur throughout each season. AmeriCorps and Extension Master Gardeners will be consistently involved. Keep Durham Beautiful will be involved in the building of the gardens in Spring and maintenance as desired. The SEEDS and DIG programs, student volunteers, and Cooperative Extension will be involved periodically for garden maintenance and

education. Progress is defined as meeting internal deadlines for each season. Should progress not occur as expected, project leaders must take action themselves within 2 weeks of a missed deadline.

Analysis Plan

The data collected will be mixed as the frequency of produce intake will be qualitative (based on written categories), but the amount will be quantitative (numerical amount). The differences in frequency before and after the intervention will be measured. We expect a correlation coefficient of 1 demonstrating that participant involvement corresponds with increased frequency of produce intake.

Sources of Funding

This program will be sustained by funding from the CDD, by community volunteers, and by in-kind donations from area businesses. Funds will be collected prior to the Spring of garden building. Funds will then be disseminated bi-weekly for hired educators and two gardeners. Funds will then be used to carry out evaluation.

Data Use and Dissemination

Data will be used to continue the program at implemented locations and to support promotion of the program in other communities. It will be disseminated through email as a PDF to housing authorities and submitted to U.S. agencies such as the Department of Housing and Urban Development and the Department of Health and Human Services.

Conclusion

Through collaboration with community partners and county resources, the adapted Good Food, Good Medicine program can be implemented to enhance equity among low-income residents. This interdisciplinary public health intervention acknowledges the impacts of historical bias on social determinants of health. Determinants of health such as poverty and housing insecurity have detrimental impacts on nutrition as access to health promoting resources including fruits and vegetables is reduced. This impact escalates for majority minority communities as they are at higher risk of chronic disease than non-minority communities. Our program aims to increase access to nutritious food for majority minority communities, improving produce intake, wellness knowledge, and, in the long-term, health outcomes of residents.

Table 13 Cynthia Sharpe: Evaluation Sample Survey

Food Intake/Security Variables	Pre-Garden	Post Garden*	p value
Frequency that Adults in Household Eat Vegetables (n=33)			<0.001
Several times a day	18.2%	84.8%	
Once a Day	45.5%	12.1%	
A few times a week	33.3%	3.0%	
Almost never	3.0%	0	

REFERENCES

- Carney, Patricia A, et al. "Impact of a Community Gardening Project on Vegetable Intake, Food Security and Family Relationships: A Community-Based Participatory Research Study." *Journal of Community Health*, U.S. National Library of Medicine, Aug. 2012, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3661291/>.
- Durham County Department of Public Health, Partnership for a Healthy Durham, Duke Health. (2018). (rep.). *2020 Durham County Community Health Assessment*. Retrieved January 2023, from <https://healthydurham.org/cms/wp-content/uploads/2018/06/Poverty-in-Durham-County-FINAL.pdf>.
- "Food Insecurity." *Food Insecurity – Healthy People 2030*, <https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/food-insecurity>.
- Poverty. Poverty - Healthy People 2030. (n.d.). Retrieved January 18, 2023, from <https://health.gov/healthypeople/priority-areas/social-determinants-health/literature-summaries/poverty>
- U.S. Census Bureau quickfacts: Durham County, North Carolina. (n.d.). Retrieved January 18, 2023, from <https://www.census.gov/quickfacts/fact/table/durhamcountynorthcarolina/PST045222>
- Weiland, Libby, and Joann Darling. "Online, via Zoom." *Vermont Garden Network*, 7 Jan. 2019, <https://vtgardens.org/good-food-good-medicine/>.

APPENDIX F: LINDSEY ZINK INDIVIDUAL DELIVERABLES

F1: SOCIAL DETERMINANT OF HEALTH ANALYSIS

Social Determinant of Health

Food insecurity is a social determinant of health that falls under economic stability (Economic Stability, 2023). Household food insecurity is defined by the USDA in two levels. Low food security represents reduced quality, variety, or desirability of diet with little or no indication of reduced food intake (Definitions of Food Security, 2022). Very low food security occurs when there are multiple indications of disrupted eating patterns and reduced food intake (Definitions of Food Security, 2022). This paper focuses on both types of food insecurity, as they have been regularly associated with negative short- and long-term health outcomes. Research has found that among children with food insecurity, there are increased risks of some birth defects, anemia, lower nutrient intakes, obesity, cognitive issues, aggression, and anxiety (Gundersen & Ziliak, 2015). In adults, food insecurity is associated with decreased nutrient intakes, increased rates of mental health problems, diabetes, hypertension, obesity, and hyperlipidemia (Gundersen & Ziliak, 2015). Food-insecure seniors have been found to be over twice as likely to report being in fair or poor health compared to food-secure seniors (Gundersen & Ziliak, 2015). Research has also found that food-insecure adults had annual health care expenditures that were \$1,834 higher than food-secure adults (Berkowitz et al., 2019).

Geographic and Historical Context

Durham County was founded in 1881 and is currently the sixth most populous county in North Carolina (Durham County CHA, 2021). It has grown at a rate of over 16% since 2010, which is higher than the state's 10% growth rate during that same period (Durham County CHA, 2021). The county's population is more diverse than that of North Carolina or the United States (Durham County CHA, 2021). The rate of same-sex households per 1000 is 9.69, which is the second largest in the state (Durham County CHA, 2021). The county also has a greater proportion of African American residents (36.5%) and Latinx residents (13.5%) than the state (Durham County CHA, 2021).

Durham County has a history of racism and systemic oppression (Durham County CHA, 2021). Beginning in the 1930s, the Federal Housing Administration began racist practices such as redlining and racial deed restriction, which limited the Black population's economic opportunities (Durham County CHA, 2021). In the 1960s, the City of Durham embarked on the Urban Renewal project. Despite promising new housing and major infrastructure

improvements in Black neighborhoods, the program not only fell flat on these commitments but also created Highway 147, which cut through the middle of the Black Hayti community, ultimately displacing over 4,000 families and 500 businesses (Durham County CHA, 2021). In the 1990s and early 2000s, the county saw an influx of Latinx migrants. Because many are not fluent in English and some lack legal status, these migrants have struggled to access basic services such as healthcare (Durham County CHA, 2021).

Disparities across systems continue to persist among racial and ethnic groups in Durham. Black and Latinx people experience higher rates of economic insecurity as well as a variety of health issues (Durham County CHA, 2021). These two factors are interrelated and result from years of institutional racism. Covid-19 has worsened both economic and health conditions in the county, with job losses hitting Black and Latinx communities the hardest (Durham County CHA, 2021). Studies have shown that these populations have also lost employer-sponsored health care coverage at a disproportionately higher rate than white people, which will further increase healthcare disparities (Durham County CHA, 2021).

There are several ongoing initiatives to address poverty and food insecurity in Durham County. For instance, the Durham Living Wage Project urges employers to pay living wages, while End Poverty Durham aims to raise awareness of the poverty crisis and to develop a plan to eliminate said crisis within 25 years (Durham County CHA, 2021). In response to covid-19, the county government and community organizations partnered to create task forces to address the food needs of residents experiencing food insecurity (Durham County CHA, 2021). End Hunger Durham is a program that “supports food relief agencies and those in need of food with reliable information, collaborations, and advocacy aimed at ending hunger and malnutrition (About End Hunger Durham, 2023).

Priority Population

The priority population for this program is minority children under the age of 18 living in Durham County. Food insecurity rates in Durham County are highest among this population, with approximately 19% of children experiencing food insecurity compared to 11% of all ages overall (Food Insecurity, 2022). Furthermore, 21% of Black residents and 19% of Latinx residents are food insecure, compared to 7% of White residents (Food Insecurity, 2022). These racial disparities are due in large part to a long history of racism and systemic oppression that limited minority’s educational and economic opportunities (Durham County CHA, 2021). Households with children typically experience higher rates of poverty and food insecurity than those without children, and this holds true in

Durham County (Hunger & Poverty, 2022). Therefore, this program will specifically target minority children in Durham.

Measures of SDoH

In 2020, 11.3% of Durham's population was food insecure (Food Insecurity, 2022). Food insecurity rates were much higher among Black (21%) and Latinx (19%) residents (Food Insecurity, 2022). Prevalence of food insecurity was also higher among children under the age of 18 (18.8%) and has gotten worse with the pandemic (Food Insecurity, 2022). Similar trends can be seen with poverty rates, with higher rates among Black (18.4%), Latinx (26.8%), and residents under the age of 18 (20.6%) (Durham County CHA, 2021). Table included in appendix.

Rationale/Importance

Food insecurity is a public health priority among minority children in Durham County due to its prevalence within this population as well as its known negative impacts (Gundersen & Ziliak, 2015). While food insecurity has harmful effects for all, it can be especially devastating for children as proper nutrition plays a crucial role in establishing a strong foundation for a child's future physical and mental health, academic achievement, and economic productivity (Children and Families, 2023). Those who experienced food insecurity as children often face physical, mental, emotional, and social disadvantages as adults, making this an issue with long-lasting negative consequences with the potential to further exacerbate existing inequities (Children and Families, 2023). By addressing food insecurity among this population, Durham County would be taking action to decrease health and economic disparities and to create a more equitable community.

Disciplinary Critique

Public health nutritionists and dietitians can help address this social determinant of health by screening patients for food insecurity and establishing mechanisms for referring patients suffering from food insecurity to community and government resources. These resources include food pantries, WIC offices, Meals on Wheels, and produce programs (Durham County Food Security, 2022). This will help to prevent food insecure individuals from slipping through the cracks and to work towards a more just and equitable society in which all individuals have access to healthy, nutritious food. County, state, and national data illustrate that our society is currently falling short of this goal at all levels, with people of color and families with children suffering the highest levels of food insecurity (Food Insecurity, 2022). Not only does this create new and worsen existing disparities, but it also is an

incredibly expensive issue, with the annual costs of hunger to the U.S. healthcare system estimated to be \$130.5 billion (Hunger & Poverty, 2022). In Durham County, diabetes (10.8%) and obesity (34.4%) are prevalent issues (Overview of Durham, 2022). These issues disproportionately affect people of color and low-income populations and are correlated with food security, with those with diabetes and obesity more likely to be food insecure (Durham County CHA, 2021). They are also costly issues, with diabetes and obesity costing the US healthcare system a combined total of \$500 billion annually (Health and Economic Costs, 2022). Thus, it is in the county’s best interest, both from an equity and economic lens, to tackle the issue of food insecurity in Durham County.

Appendix F1.1

Table 14 Lindsey Zink: SDOH Table

Rates of Poverty and Food Insecurity in Durham County, NC		
<i>Population</i>	<i>Rate of Poverty</i>	<i>Rate of Food Insecurity</i>
Overall	14.0% ¹	11.3% ²
White	10.5% ¹	7.0% ²
Black	18.4% ¹	21.0% ²
Latinx	26.8% ¹	19.0% ²
Under 18	20.6% ³	18.8% ²

¹ *Durham County Community Health Assessment 2020*

² *Food Insecurity in Durham County*

³ *Durham County, NC*

REFERENCES

- Berkowitz, S. A., Basu, S., Gundersen, C., & Seligman, H. K. (2019). State-Level and County-Level Estimates of Health Care Costs Associated with Food Insecurity. *Preventing Chronic Disease*, 16, E90. <https://doi.org/10.5888/pcd16.180549>
- CDC. (2022). Health and Economic Costs of Chronic Diseases. <https://www.cdc.gov/chronicdisease/about/costs/index.htm>
- Data USA. (2022). Durham County, NC. <https://datausa.io/profile/geo/durham-county-nc>
- DCO Public Health. (2021). Durham County Community Health Assessment 2020. <https://www.dcopublichealth.org/home/showpublisheddocument/35452/637642751171270000>
- Durham County NC. (2022). Durham County Food Security. <https://www.dconc.gov/county-departments/departments-a-e/cooperative-extension/food-security>
- End Hunger Durham. (2023). About End Hunger Durham. <https://www.endhungerdurham.org/about/>
- Feeding America. (2023). Children and Families. <https://hungerandhealth.feedingamerica.org/explore-our-work/programs-target-populations/children-and-families/>
- Feeding America. (2022). Food Insecurity in Durham County. <https://map.feedingamerica.org/county/2018/overall/north-carolina/county/durham>
- Food Research & Action Center. (2022). Hunger & Poverty in America. <https://frac.org/hunger-poverty-america>
- Gundersen, C., & Ziliak, J.P. (2015). Food insecurity and health outcomes. *Health Affairs (Project Hope)*, 34(11), 1830–1839. <https://doi.org/10.1377/hlthaff.2015.0645>
- Healthy People 2030. (2023). Economic Stability. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/economic-stability>
- USDA ERS (2022, October 17). Definitions of Food Security. <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security->
- US News. (2022). Overview of Durham County, NC. <https://www.usnews.com/news/healthiest-communities/north-carolina/durham-county>

F2: NUTRITION PROGRAM OR POLICY ANALYSIS AND IMPLEMENTATION

Introduction

The targeted social determinant of health is housing quality and security (Economic Stability, n.d.). This proposal is focusing on increasing housing quality and security among people of color in majority-minority communities in Durham County. Research shows a significant positive correlation between tenants' experience of property quality and their health and wellbeing (Rolfe et al., 2020). There are also correlations between housing stability and the management of specific health outcomes, such as diabetes (Lim et al., 2019). One study of homeless adults with diabetes found that when placed into supportive housing, people were more likely to receive diabetic evaluation (74% vs. 66%) and management services (42% vs. 34%) than those not provided with housing (Lim et al., 2019). According to the 2020 Durham County Community Health Assessment, the county struggles with offering affordable and quality housing to its residents (Durham County CHA, 2021). This issue is particularly prominent among people of color, who have endured a long history of systemic oppression (Durham County CHA, 2021). Survey data shows that white residents in Durham County were more likely than Black residents to own a home (Durham County CHA, 2021). Given the impact of housing quality and stability on health and wellbeing outcomes, this proposal aims to increase housing quality and security among people of color in Durham County.

Evidence-Based Nutrition Program

Housing and food insecurity are intricately related. Research shows a significant association between food insecurity and the proportion of income allocated to shelter, with families with housing costs that are more than 30% of their income experiencing higher odds of food insecurity (Kirkpatrick & Tarasuk, 2011). Additionally, a longitudinal study found that families who experience food insecurity were 62% more likely to experience housing insecurity, while those experiencing housing insecurity were 40% more likely to experience food insecurity (Lee et al., 2021). When there are financial constraints on multiple basic needs, such as housing and food, sacrifices are often made; thus, strategies for reducing such hardship should tackle housing instability and food insecurity jointly (Kirkpatrick & Tarasuk, 2011).

Research shows that community gardens have the potential to improve both food security and housing quality and stability (Carney et al., 2012; Cochran & Minaker, 2020). According to a study from Oregon, concerns about food security dropped from 31% of households to 3% of households after participation in local community gardens (Carney et al., 2012). Not only do gardens improve food security, but research shows a positive association between

community gardens and access to and consumption of *healthy* foods (Garcia et al., 2018). This at least partially accounts for the fact that community gardens are associated with an improvement in health behaviors and outcomes, including in marginalized populations (Palar et al., 2019).

Community gardens also have positive financial repercussions (Gregory et al., 2016; Chow et al., 2020). Participants in a New York study reported substantial cost savings from community gardens, with 77% harvesting enough to meet at least a third of their household produce needs (Gregory et al., 2016). These cost savings are particularly beneficial for individuals who are spending more than 30% of their income on housing (Chow et al., 2020). Research also shows that small-group nutrition education interventions with budgeting components can positively impact individuals' ability to shop healthily on a budget (Bessems et al., 2020). Finally, a return-on-investment analysis shows that community gardens can increase neighborhood safety and social cohesion (Cochran & Minaker, 2020).

For our program, we aim to combine the positive health, wellbeing, and socioeconomic benefits of community gardens with those of nutrition and budgeting education. The Good Food Good Medicine is a grassroots food justice program that accomplishes this goal (Vermont Garden Network, 2019). Good Food Good Medicine provides year-round programming to residents in five low-income communities in Barre, Vermont (Vermont Garden Network, 2019). The programming includes community gardens as well as nutrition and budgeting education (Vermont Garden Network, 2019). This program aims to put participants' health and well-being into their own hands with a "solidarity-not-charity" model, while simultaneously fostering community building, resilience, and empowerment (Vermont Garden Network, 2019). Good Food Good Medicine has led to the harvest of over \$5,000 worth of produce which goes directly to residents of the participating communities and has allowed residents to choose healthy options that are affordable (Vermont Garden Network, 2019). Thus, it is an ideal program to replicate in Durham County to simultaneously improve food insecurity and housing quality among low-income communities.

Evidence-Based Outcomes

The outcomes for our program are based on evidence from the Good Food Good Medicine program, as well as a similar community gardening project in Oregon (Vermont Garden Network, 2019; Carney et al., 2012). The first short-term outcome is for at least 75% of program participants to have a better understanding of the wellness concepts covered in the education sessions (Vermont Garden Network, 2019). The second short-term

outcome is for the frequency of participants' produce intake of "several times a day" to have increased by at least 100% at the end of two years (Carney et al., 2012). The final short-term outcome is for the frequencies of participants "sometimes" and "frequently" worrying in the past month that food would run out before money was available to buy more to have dropped by at least 75% after two years (Carney et al., 2012). The program has the long-term outcome objective of reducing food insecurity and improving dietary intake among the residents of the participating affordable housing sites (Carney et al., 2012).

Evidence-Based Implementation Strategies and Activities

Implementation Setting

Because the Good Food Good Medicine began its programming with only two low-income housing communities, we plan to start with two housing communities as well (Vermont Garden Network, 2019). To determine which two low-income housing communities to target for this program, we will first meet with the Durham Housing Authority to identify communities at which this program will be feasible (DHA, 2023). Feasibility will depend on having a plot of land available to create a community garden as well as a communal space within the community for the education sessions (Vermont Garden Network, 2019). Once we have worked with the Durham Housing Authority to identify communities at which our program will be feasible, we will reach out to the property manager and sustainability coordinator (when possible) at each community to further gauge interest and feasibility. At the communities where interest is expressed, we will then work with the property manager to send out a survey to residents to determine their interest in gardening and their desired level of participation. The results from these surveys will be used to select the two low-income housing communities at which the program will be implemented (those with the highest levels of resident interest).

Implementers

The implementation of the gardening portion of this program will be carried out by two AmeriCorps volunteers with support from the Extension Master Gardener Volunteers of Durham County (Extension Master Gardener, 2023). AmeriCorps frequently trains and places volunteers in community garden settings in which they help create and maintain gardens, in conjunction with staff and other volunteers (AmeriCorps, n.d.). Each volunteer will be assigned to a housing community. The Extension Master Gardener volunteers are trained to help Durham residents learn more about a myriad of gardening topics, answer questions, conduct demonstrations and workshops,

and help maintain community gardens (Extension Master Gardener, 2023). They will provide important support to the AmeriCorps volunteers.

Implementation Components

Each AmeriCorps volunteer will hold a focus group in their assigned housing community with the intention of allowing residents to share their input on what they would like to grow in the garden and what topics would be most useful to cover in the education sessions. This will also be an opportunity to identify any residents who are interested in attending to the garden and/or those who are interested in serving in more of a leadership role. The volunteers will share a survey with interested residents to assess their access to fruit and vegetables as well as their current fruit and vegetable intake frequency. They will then work with residents to identify an appropriate location for the gardens at each housing community, accounting for factors such as sunlight, space, water access, existing structures, and access. Once the location has been determined, there will be a planning meeting with the volunteers and resident leaders to 1) determine the vision and features for the garden, 2) design the space, and 3) assign planning, design, and construction tasks. Based on this plan, the volunteers will work to create a budget for the garden to determine how much the garden will cost to install and where the needed funds will come from. Donations from community organizations such as in-kind donation of materials and volunteer labor will be solicited.

The next step will be to hold a launch meeting and to create garden rules. The garden plan will be presented to all interested residents prior to installing the garden to ensure buy-in. It is also important for residents to be involved in drafting garden rules to empower them in the process. Interested residents will then be able to sign up for the task(s) they would like to be responsible for. Once the necessary tools are acquired through donations and the various gardening roles have been filled, the volunteers can guide the residents in creating the garden. Once the process has begun, the volunteers will hold regular meetings to keep residents involved in the garden and to ensure that any problems that arise are resolved quickly. Additionally, the volunteers and any residents with gardening experience can use these meetings to share gardening best-practices with the more inexperienced gardeners. These meetings will also be utilized for nutrition and food-preparation education sessions. For these sessions, volunteers from local universities such as Duke, UNC, Durham Tech, and North Carolina Central will be solicited to serve as educators.

Expected Reach

The expected reach of this program is 30% of the residents at the two selected low-income housing communities, based on the reach of the Good Food Good Medicine Program (Vermont Garden Network, 2019). The exact number will depend on the size of the community.

Socioecological Model

This program aims to address the institutional, interpersonal, and individual levels of the socioecological model. The institutional level is addressed by influencing the built environment in which individuals are living by adding gardens, thereby increasing community level access to fresh produce. The interpersonal level is addressed by creating a sense of community and collaboration through the creation and maintenance of the gardens. Finally, the program aims to increase the individual knowledge and skills of participants with regards to growing and preparing fresh produce.

Community Partners

As discussed, both AmeriCorps volunteers and Extension Master Gardener Volunteers of Durham will be important community partners involved in the implementation of this program (AmeriCorps, n.d., Extension Master Gardener, 2023). These volunteers will play a role in helping the residents determine the best set-up for the garden and will provide ongoing education around gardening best practices. Keep Durham Beautiful is a nonprofit organization that works with local communities and businesses to build and maintain green spaces, including community gardens (Keep Durham Beautiful, 2023). This organization will be a good source of guidance and potentially volunteers during the implementation of our program. The local schools—Duke University, University of North Carolina at Chapel Hill, North Carolina Central University, and Durham Tech Community College—will be an important source of supplemental volunteers for the educational portion of this program. The Partnership for a Healthy Durham, which is under the population health division of the Durham County Public Health Department, will play an essential role in connecting us to other partners with the common goal of improving the physical, mental, and social health and well-being of Durham’s residents (Partnership for a Healthy Durham, 2023). Finally, Lowe's Home Improvement, Home Depot, and local gardening stores such as For Garden’s Sake will be solicited for donations of gardening supplies.

Budget

We plan to form partnerships with businesses, service organizations, and universities/colleges to solicit donations of materials and volunteers to lower the cash amount needed for the implementation of this program. For

any remaining expenses, we plan to lobby for a community development block grant from Durham County to support our garden and education sessions (Community Development, 2023). Through this grant program, the county “provides flexible funding to carry out a wide range of community development activities directed towards neighborhood revitalization, economic development, and improved community facilities/services” (Community Development, 2023). We believe that our program would fall under these activities. Additional information on our budget is shown in Table 1.

Conclusion

Advantages

The advantages of this proposed program are that it aims to increase residents’ knowledge about, access to, and intake of fruits and vegetables, thereby decreasing food insecurity. This program has the potential to reduce residents’ monthly food costs—if they are eating the produce grown in the garden, they will have less to buy at the grocery store. This is particularly important for residents who are spending large proportions of their income on housing costs (Chow et al., 2020). This program has the potential to increase the sense of community among residents and satisfaction in their housing situation. Additionally, there are many community partners available for collaboration, as detailed above.

Disadvantages

Some disadvantages are that the gardens and education sessions will require either volunteers or hired professionals, particularly at the initiation of the program. There is also a chance that limited space availability will pose a challenge to finding a suitable location for the gardens. Finally, the advantages that come with growing fresh produce are not immediate, and residents will have to wait up to months to reap the benefits of their hard work. This could potentially lead to attrition in the program. However, based on the success of Good Food Good Medicine and other similar programs, we strongly believe that the advantages outweigh the disadvantages of this proposed program.

APPENDIX F2.1

Table 15 Lindsey Zink: Program Budget and Funding

Budget Requirements and Funding Sources		
Expense	Estimated Cost	Funding Source
<i>Personnel</i>		
Garden facilitators	\$0	Volunteers from AmeriCorps, Extension Master Gardener Volunteers of Durham County, and/or Keep Durham Beautiful
Nutrition educators	\$0	Volunteers from local universities/colleges
<i>Materials</i>		
Raised beds	\$2,600	Community Development Block Grant
Fencing	\$10,000	Community Development Block Grant
Storage shed	\$150	Community Development Block Grant
Mulch	\$0	In-kind donation from gardening store*
Soil	\$0	In-kind donation from gardening store*
Hand tools (e.g., clippers)	\$0	In-kind donation from gardening store*
Large tools (e.g., rakes)	\$0	In-kind donation from gardening store*
Irrigation supplies	\$0	In-kind donation from gardening store*
Plants, seeds, bulbs, etc.	\$0	In-kind donation from gardening store*
Total	\$12,750	

*Good Food Good Medicine received all of their smaller materials and supplies as donations from their community partners, which leads us to believe that we will be able to do the same (Vermont Garden Network, 2019).

REFERENCES

- AmeriCorps. (n.d.). What We Do. <https://americorps.gov/about/what-we-do/public-health-ameri-corps>
- Bessems, K. M. H. H., Linssen, E., Lomme, M., & van Assema, P. (2020). The Effectiveness of the Good Affordable Food Intervention for Adults with Low Socioeconomic Status and Small Incomes. *International journal of environmental research and public health*, 17(7), 2535. <https://doi.org/10.3390/ijerph17072535>
- Carney, P. A., Hamada, J. L., Rdesinski, R., Sprager, L., Nichols, K. R., Liu, B. Y., Pelayo, J., Sanchez, M. A., & Shannon, J. (2012). Impact of a community gardening project on vegetable intake, food security and family relationships: a community-based Participatory research study. *Journal of community health*, 37(4), 874–881. <https://doi.org/10.1007/s10900-011-9522-z>
- Chow, E., Biscocho, B., Tran, K., & Prasad, C. (2020). The Socioeconomic and Health Impacts of Community Gardens. *PNWMSRJ*. <https://pnwmsrj.org/meta-analysis/2020/10/the-socioeconomic-and-health-impacts-of-community-gardens/>
- Cochran, Susie & Minaker, Leia. (2020). The Value in Community Gardens: A Return on Investment Analysis. *Canadian Food Studies / La Revue canadienne des études sur l'alimentation*. 7. 126-149. <https://doi.org/10.15353/cfs-rcea.v7i1.332>
- Community Development Block Grant (CDBG) Program (North Carolina). (2023). Grants Office. <https://www.grantsoffice.com/GrantDetails.aspx?gid=35011>
- Durham County Community Health Assessment 2020. (2021). DCO Public Health. <https://www.dcopublichealth.org/home/showpublisheddocument/35452/637642751171270000>
- Durham Housing Authority. (2023). DHA. <https://www.durhamhousingauthority.org/>
- Economic Stability. (n.d.). Healthy People 2030. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/economic-stability>
- Durham Housing Authority. (2023). DHA. <https://www.durhamhousingauthority.org/>
- Garcia, M. T., Ribeiro, S. M., Germani, A. C. C. G., & Bógus, C. M. (2018). The impact of urban gardens on adequate and healthy food: a systematic review. *Public health nutrition*, 21(2), 416–425. <https://doi.org/10.1017/S1368980017002944>
- Gregory, M., Leslie, M., & Drinkwater, T. (2016). Agroecological and social characteristics of New York city community gardens: Contributions to urban food security, ecosystem services, and environmental education. *Urban Ecosystems*, 19(2), 763-794. <https://doi.org/10.1007/s11252-015-0505-1>
- Keep Durham Beautiful. (2023). <https://keepdurhambeautiful.org/>
- Kirkpatrick, S. I., & Tarasuk, V. (2011). Housing circumstances are associated with household food access among low-income urban families. *Journal of urban health : bulletin of the New York Academy of Medicine*, 88(2), 284–296. <https://doi.org/10.1007/s11524-010-9535-4>
- Lim, Sungwoo, Sara A Miller-Archie, Tejinder P Singh, Winfred Y Wu, Sarah C Walters, and L Hannah Gould. “Supportive Housing and Its Relationship With Diabetes Diagnosis and Management Among Homeless Persons in New York City.” *American Journal of Epidemiology* 188, no. 6 (June 1, 2019): 1120–29. <https://doi.org/10.1093/aje/kwz057>.

- Lee, C. Y., Zhao, X., Reesor-Oyer, L., Cepni, A. B., & Hernandez, D. C. (2021). Bidirectional relationship between food insecurity and housing instability. *Journal of the Academy of Nutrition and Dietetics*, 121(1), 84–91. <https://doi.org/10.1016/j.jand.2020.08.081>
- Palar, K., Lemus Hufstedler, E., Hernandez, K., Chang, A., Ferguson, L., Lozano, R., & Weiser, S. D. (2019). Nutrition and Health Improvements After Participation in an Urban Home Garden Program. *Journal of nutrition education and behavior*, 51(9), 1037–1046. <https://doi.org/10.1016/j.jneb.2019.06.028>
- Partnership for a Healthy Durham*. (2023). Who We Are. <https://healthydurham.org/about-healthy-durham>
- Rolfe, Steve, Lisa Garnham, Jon Godwin, Isobel Anderson, Pete Seaman, and Cam Donaldson. “Housing as a Social Determinant of Health and Wellbeing: Developing an Empirically-Informed Realist Theoretical Framework.” *BMC Public Health* 20, no. 1 (July 20, 2020): 1138. <https://doi.org/10.1186/s12889-020-09224-0>.
- Vermont Garden Network. (2019, January 7). *Good Food Good Medicine: Reaping Garden Benefits Year-round*. <https://vtgardens.org/good-food-good-medicine/>

F3: NUTRITION PROGRAM OR POLICY EVALUATION

Introduction

The targeted social determinant of health is housing quality and security (Economic Stability, n.d.). This proposal aims to improve housing quality and security among people of color in majority-minority communities in Durham County. Research shows a significant positive correlation between tenants' experience of housing quality and security and their health and wellbeing (Rolfe et al., 2020). Housing and food security are intricately related, with families with housing costs that are more than 30% of their income experiencing higher odds of food insecurity (Kirkpatrick & Tarasuk, 2011). Our program aims to increase housing quality and food security by providing year-round programming to residents in two low-income communities in Durham, North Carolina. The program is modeled after the Good Food Good Medicine program in Vermont and uses a "solidarity-not-charity" model (Vermont Garden Network, 2019). It includes community gardens as well as nutrition and budgeting education, such as how to shop healthily on a budget (Vermont Garden Network, 2019). The two low-income communities will be selected after meeting with the Durham Housing Authority to identify communities at which this program will be feasible (DHA, 2023). The implementation of the gardening portion of this program will be carried out by two AmeriCorps volunteers with support from the Extension Master Gardener Volunteers of Durham County (Extension Master Gardener, 2023). The education component will be conducted by volunteers from local universities.

Evidence-Based Evaluation Plan

Study design and data collection

This will be a community-based participatory research program with a pre-post study design (Carney et al., 2012). Measures will include a validated pre-post gardening survey, key informant interviews, and observations made at community-based gardening meetings to assess food security, produce consumption, and understanding of the wellness concepts covered during the intervention (Carney et al., 2012; Vermont Garden Network, 2019).

Sample and sampling strategy

We plan to use a sample size that is the equivalent of 25% of program participants. While the actual number will depend on the size of the housing community and the number of residents who choose to participate in the program, based on the Good Food Good Medicine program, we estimate the number of participants to be around 200 and for the sample to therefore be around 50 participants. For the evaluation, we will select from participants who have been involved in the program for two years and have attended at least 50% of the educational intervention

classes. This will ensure that we are evaluating active program participants. Program organizers will then select one family member (typically the head of household) who they believe best represents the family's experiences to whom to administer the questionnaires (Carney et al., 2012). This purposive sampling method will enable researchers to select a sample that is most useful to the purposes of this study, and we believe this method will be efficient without compromising the data (Carney et al., 2012).

Specific measures

For our evaluation, we will measure the following outputs: pounds of produce harvested (stratified by type of produce), number of staff training sessions and educational intervention sessions held, number of participants in the community garden, number of attendees at each education session, and number of community partners involved. Pounds of produce harvested will be measured and stratified using the validated Harvest Count tool created by the Farming Concrete Data Collection Toolkit, which has been used in the evaluation of various New York City community garden studies (Farming Complete, 2015). The number of staff training sessions and educational intervention sessions held will both be tracked via an excel spreadsheet maintained by one volunteer at each site. The number of participants in the program will be measured by sending out a survey to all community residents to assess whether they have participated in the community garden and if so, at what frequency. The number of attendees at each education session will be tracked via attendance sheets that participants will sign at each session. The number of community partners involved will be tracked via an excel spreadsheet maintained by one volunteer at each site.

We will measure the following outcomes: frequency of participants' produce intake, participant understanding of wellness concepts covered in the education sessions, and frequency of participants worrying that food would run out before money was available to buy more. Frequency of participants' produce intake will be assessed using two validated, single-question surveys that ask about total daily fruit and vegetable intake over the previous month (Appendix A) (Cook et al., 2015). Participant understanding of wellness concepts will be measured by asking each participant to complete short pre- and post-assessments at each class (Appendix B). Frequency of participants worrying about food running out will be assessed using the USDA's six-item short form of the food security survey (USDA, 2022).

We will also collect demographic information from program participants to assess potential disparities. Specifically, we will collect information on participants' race, sex, age, and income. The food frequency questionnaires will include an initial section asking for this demographic information.

Timing

We plan to begin engaging with community partners and collecting materials needed for the gardens six months prior to the start of the intervention. The single-question food frequency surveys will be administered at the initiation of the program to collect baseline data and then again at the two year mark. Progress is defined by an increase in the number of participants reporting fruit and vegetable intake of “2 servings per day” or higher. Specifically, for our outcome to be achieved, we hope to see a 100% increase from baseline in “2 servings per day” or higher of produce consumption. If we do not see a 100% increase, we plan to host a focus group in which participants can share any barriers to participation in the program and/or produce consumption. We will also create a “comment box” for participants to anonymously share their thoughts (Carney et al., 2012). This will benefit those who may not be willing or comfortable to share their comments in a group setting.

Analysis plan

We will use quantitative statistics to determine the difference in the frequency of produce consumption at the two year mark compared to the frequency of produce consumption at baseline. We will use the Wilcoxon Signed-Rank Test with $\alpha = 0.05$ (Carney et al., 2012). This test will allow us to analyze the magnitude of the observed differences in produce consumption (LaMorte, 2017). We will adjust for our demographic covariates to address potential confounding factors.

Sources of funding

The program will be implemented by volunteers from AmeriCorps, Extension Master Gardener Volunteers of Durham County, Keep Durham Beautiful, and local universities/colleges. Because they are all volunteers, our program will not have any associated personnel costs. At the beginning of the program, we will apply for funding from Durham County's community development block grant (Community Development, 2023). These funds will be used to pay for the materials required to set up community gardens, such as raised beds, fencing, and storage sheds (Vermont Garden Network, 2019). Once the gardens have been set up, the materials needed to maintain them are much smaller, such as soil, hand tools, and seeds. Many of the smaller garden materials will be provided as in-kind

donations from home improvement and/or local gardening stores (Vermont Garden Network, 2019). These materials will be solicited on a quarterly basis, ahead of each new season.

Data use and dissemination

Collected data will be used to determine how effective our program is at achieving its goals of increasing community members' consumption of produce and their understanding of wellness concepts while decreasing their concerns around running out of food before they can buy more. We will disseminate these findings among residents of the low-income community via short written reports that we will distribute in their mailboxes (Vermont Garden Network, 2019). If the program is successful, we also plan to provide written reports and potentially a brief presentation to the Durham Housing Authority to encourage them to consider expanding the program to more low-income housing communities, as Good Food Good Medicine did with the Barre Housing Authority in Vermont (Vermont Garden Network, 2019).

Conclusion

To be successful, this program will require collaboration between various interdisciplinary parties, including the Durham Housing Authority, AmeriCorps, Extension Master Gardener Volunteers of Durham County, Keep Durham Beautiful, local universities and colleges, Durham County Public Health Department, home improvement/gardening stores, low-income housing community property managers and sustainability coordinators, and, most importantly, low-income housing community residents. Our program hopes to promote equity and improve nutrition by eliminating barriers (such as cost and transportation) to accessing fresh, healthy fruits and vegetables for residents of two low-income housing communities in Durham. This will be done by supporting residents in the initiation and maintenance of accessible gardens and by providing them with education on how to shop healthily on a budget. We aim to put participants' health and well-being into their own hands with a "solidarity-not-charity" model, while simultaneously fostering community building, resilience, and empowerment (Vermont Garden Network, 2019). The ultimate goal is to improve the public health of the communities we target by empowering residents while simultaneously increasing housing quality and food security.

APPENDIX F3.1

Table 16 Lindsey Zink: Sample Evaluation Survey (Food Frequency Questionnaires)

To assess fruit intake, we will use the following validated single-question food frequency questionnaire (Cook et al., 2015):

Q: Over the LAST 1 MONTH ONLY, on average, how many servings of fruit did you eat per day?

- a. None
- b. Less than 1 serving per day
- c. 1 serving per day
- d. 2 servings per day
- e. 3 servings per day
- f. 4 or more serving per day

To assess vegetable intake, we will use the following validated single-question food frequency questionnaire (Cook et al., 2015):

Q: Over the LAST ONE MONTH ONLY, on average, how many servings of vegetables/legumes did you eat per day?

- g. None
- h. Less than 1 serving per day
- i. 1 serving per day
- j. 2 servings per day
- k. 3 servings per day
- l. 4 servings per day
- m. 5 servings per day
- n. 6 servings per day
- o. 7 or more servings per day

*Participants will be provided with a thorough description of what constitutes a serving and an explanation of the types of foods and beverages to include or exclude

APPENDIX F3.2

Table 17 Lindsey Zink: Sample Evaluation Survey (Wellness Concept Pre- and Post-Assessments)

At the beginning and end of each class, participants will complete a short pre- and post-assessment to determine if their understanding of the covered wellness concept increased during the class. They will answer the same questions at the beginning and the end of class.

Example of assessment for class on MyPlate:

Q1. What food groups are represented by the four triangles?

- p. Proteins, vegetables, grains, fats
- q. Fruits, proteins, vegetables, grains
- r. Fats, fruits, proteins, vegetables
- s. Grains, fats, fruits, proteins
- t. Vegetables, grains, fats, fruit

Q2. The current dietary guidelines recommend filling half of your plate with fruits and vegetables.

- u. True
- v. False
- w. Unsure

Q3. The current dietary guidelines recommend limiting saturated fat, added sugar, and sodium.

- x. True
- y. False
- z. Unsure

Q4. Eating one serving of vegetables once a day is enough to meet dietary guideline recommendations. (One serving = 1 cup of raw or cooked vegetables, or 2 cups of dark, leafy greens).

- aa. True
- bb. False
- cc. Unsure

REFERENCES

- Carney, P. A., Hamada, J. L., Rdesinski, R., Sprager, L., Nichols, K. R., Liu, B. Y., Pelayo, J., Sanchez, M. A., & Shannon, J. (2012). Impact of a community gardening project on vegetable intake, food security and family relationships: a community-based participatory research study. *Journal of community health*, 37(4), 874–881. <https://doi.org/10.1007/s10900-011-9522-z>
- Cook, A., Roberts, K., O'Leary, F., & Allman-Farinelli, M.A. (2015). Comparison of single questions and brief questionnaire with longer validated food frequency questionnaire to assess adequate fruit and vegetable intake. *Nutrition*, 31(7-8), 941-947. <https://doi.org/10.1016/j.nut.2015.01.006>
- Durham Housing Authority. (2023). *DHA*. <https://www.durhamhousingauthority.org/>
- Grants Office. (2023). *Community Development Block Grant (CDBG) Program (North Carolina)*. <https://www.grantsoffice.com/GrantDetails.aspx?gid=35011>
- Healthy People 2023. (n.d.) *Economic Stability*. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/economic-stability>
- Farming Concrete. (2015). *Data Collection Toolkit*. <https://farmingconcrete.org/barn/static/resources/DataCollectionToolkit.pdf>
- Kirkpatrick, S. I., & Tarasuk, V. (2011). Housing circumstances are associated with household food access among low-income urban families. *Journal of urban health : bulletin of the New York Academy of Medicine*, 88(2), 284–296. <https://doi.org/10.1007/s11524-010-9535-4>
- LaMorte, Wayne. (2017, May 4). *Wilcoxon Signed Rank Test*. https://sphweb.bumc.bu.edu/otlt/mphmodules/bs/bs704_nonparametric/BS704_Nonparametric6.html
- Rolfe, Steve, Lisa Garnham, Jon Godwin, Isobel Anderson, Pete Seaman, and Cam Donaldson. “Housing as a Social Determinant of Health and Wellbeing: Developing an Empirically-Informed Realist Theoretical Framework.” *BMC Public Health* 20, no. 1 (July 20, 2020): 1138. <https://doi.org/10.1186/s12889-020-09224-0>.
- USDA. (2022, October 17). *Survey Tools*. <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-u-s/survey-tools/#six>
- Vermont Garden Network. (2019, January 7). *Good Food Good Medicine: Reaping Garden Benefits Year-round*. <https://vtgardens.org/good-food-good-medicine/>