"Increasing Nutrition Education Access and Knowledge Among African American Children in Elementary School (Grades 3-8) in Durham County, NC”

By

Olukayode Akinlaja, Kamryn King, Grace Morningstar, Reed Teel

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Oscar Fleming, DrPH, MSPH

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Date

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Kimberly Truesdale, PhD, MSPH

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Date

ABSTRACT

Olukayode Akinlaja, Kamryn King, Grace Morningstar, Reed Teel: "Increasing Nutrition Education Access and Knowledge Among African American Children in Elementary School (Grades 3-8) in Durham County, NC"

(*Under the direction of Oscar Fleming and Kimberly Truesdale*)

Within Durham County, North Carolina education access and quality is a social determinant of health that impacts the overall health status of the community members and has health implications across the lifespan. African American children in schools are of particular priority as they are at a critical stage of development, they are the most impacted by educational opportunities, and minority populations in Durham County are disproportionately disadvantaged. Nutritional information is an often-overlooked aspect of health education in the public school system. An evidence-based after school cooking and nutrition education program is proposed for grades 3-8 in Durham County's underserved schools to improve nutritional knowledge amongst students in order to positively impact nutrition-related decisions of students and their families. The entire implementation process for this nutrition education program from design to evaluation will be rooted in collaboration with stakeholders from all sides of the public health issue.

Keywords: Durham County, North Carolina, social determinants of health, evidenced-based, underserved, implementation process, nutrition education program, stakeholders, public health issue

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COMMON PROPOSAL

Problem Statement and Goals

Education Access and Quality is a significant Social Determinant of Health (SDoH) recognized within Healthy People 2030. The research shows that individuals who receive higher quality education are more likely to live longer and live healthier (Office of Disease Prevention and Health Promotion, 2020). Children who do not have the opportunity to access and graduate from higher education schools are more likely to suffer from heart disease, diabetes, and depression (Education Access and Quality, 2021). Individuals with less education are also more likely to eat an unhealthy diet, smoke, and lack exercise (Zajacova & Lawrence, 2018). The National Bureau of Economic Research found that an additional four years of education lowers the risk of diabetes by 1.3%, lowers the risk of heart disease by 2.2%, and lowers five-year mortality by 1.8% (Picker, 2007). To understand the full extent of the impact of education access and quality, it's important to explore the role education plays on our health, and the opportunities it creates for making healthy, informed choices.

This impactful SDoH is particularly important to the Durham County community where the current education system has been known to reflect inequities and capitalize the disproportionate access and quality of education from one neighborhood to another (Tan, 2022).

African Americans make up the second largest racial group in Durham County, with a population just under 115,000 (*North Carolina,* n.d.). Presently, statistics show that minority populations in Durham County are disproportionately disadvantaged when it comes to education access and quality (Table 1). Without programming that specifically provides quality education to disadvantaged children, those who come from low socioeconomic families are the least likely to have access to valuable educational services that have the ability to improve health outcome

rates (Woodhead & Moss, 2007) and for that reason, African American children grades 3-8 are the priority population to focus efforts on improving education access and quality, in hopes of creating a more equitable Durham County.

This is a pivotal moment in time for Durham County to invest in its own future and build a better life for all through equitable education opportunities. In order for equitable policies to be put in place in Durham County, public health leaders, like nutritionists, must understand how education access and quality is a major social determinant of health.

Nutrition education should be implemented across Durham County public schools to promote health equity. Education increases a sense of control over one's life, encouraging and enabling a healthy lifestyle (Hahn & Truman, 2015). Policy makers, public health practitioners, and educators must collaborate to start initiatives that create a more equitable education system, with a goal of building healthy generations to come.

Programmatic Change

The proposed program to address this public health issue is an afterschool cooking and nutrition education program for grades 3-8 in the Durham County school system. This will take place at ten high poverty, underserved elementary and middle schools in Durham County, NC. Seventy percent or more of the selected students will be made up of those who are on free or reduced-price lunches. Fifty students from each school will be selected to participate, with half of the selected students (twenty-five) serving as the control group. The control group will take part in the pre- and post-intervention surveys but will not participate in the intervention.

By prioritizing underserved schools, we have a greater opportunity to reach minority students - like African American children - on the basis of improving nutrition education, cooking self-efficacy, fruit and vegetable liking and consumption, and communication to families regarding healthy eating (Jarpe-Ratner et al., 2016). The program will occur immediately after

school on Tuesdays for two hours for a total of 10 weeks. It will be held in the schools' cafeterias and kitchens. The two main components of the program will be nutrition education and hands-on cooking education.

The program will be run by health teachers and cooks from each respective school, as well as Durham County Public Health Nutritionists. The public health nutritionists will be responsible for planning and designing the education portions of the program, while the health teachers and cooks will be responsible for educating the students. The first thirty minutes of each program session will entail nutrition education and cultural awareness. The next seventy-five minutes will be run by the school cooks - with assistance from teachers - educating the students about meal preparation and basic cooking skills (Jarpe-Ratner et al., 2016). A similar program was conducted in underserved elementary and middle schools in Chicago and was found to increase nutrition knowledge of, exposure to, and consumption of fruits and vegetables, as well as their participation in cooking at home (Jarpe-Ratner et al., 2016).

The primary goal of the program is to increase knowledge of fruits and vegetables, increase knowledge of the role nutrition plays on health, and enhance cooking self-efficacy. A secondary goal is to encourage students to talk to their parents or guardians about nutrition and become more involved in meal planning and cooking in their homes. By increasing knowledge and critical thinking skills, individuals are empowered to make healthier choices for themselves.

Stakeholders:

The key stakeholders that will be needed for the positive fruition of our nutrition program include the students, their parents, school administrators, teachers, school cooks, Public health nutritionists, Durham County board of education and policymakers/legislators.

Students: Minority students, especially African Americans in Grades 3-8 will serve as the focus of the change. The nutritional program will be built around them and ways to keep them engaged will be prioritized.

Parents: These are the parents of the minority students and it will be necessary to keep them informed and involved with the program in order to ensure the active participation of their children.

Teachers: These are the class instructors. It will be a plus to get them participating in the program since they are already involved in daily activities with the students and there is usually a high regard for them on the part of the students.

School Administrators: They generally head the school, set/enforce the budgets, maintain the academics and manage the students and staff. Having them buy into the program as well as being active partners will make for seamless use of school resources and ensuring nutrition education is a part of the school curriculum.

Public Health Nutritionists : They are registered dietitians who specialize in teaching positive nutrition and nutritional habits. They do understand the importance of a healthy nutrition as well as the impact of the various inequities and will serve as the fulcrum for the change and spearhead the nutrition education program

School Cooks: These are presently attached to the schools. They will be actively involved in the food preparations and help in teaching the students how to make healthy meals.

Durham County Board of Education: They run the school district and make policies affecting the Durham County schools. They have to green light the nutrition education program as well as take on a supervisory role. They have to be constantly updated on the program.

Policymakers/Legislators: The Legislature makes laws that affect Durham County and North Carolina State. Their assistance is needed to earmark funds for the school nutrition program and they have to be constantly updated on the program.

Engagement Plan

Statement of Purpose

The purpose of our program is to improve nutritional knowledge amongst students in grades 3-8 in underserved students in the Durham Public School system in order to positively

impact nutrition-related decisions of students and their families. Nutritional information is an often overlooked aspect of health education in the public school system. Good nutritional decisions in childhood and adolescence are associated with decreased rates of negative health outcomes, such as obesity and diabetes, later in life (Healthy Eating Learning Opportunities and Nutrition Education | Healthy Schools | CDC, n.d.). We hope to provide students with accurate, succinct, and relevant knowledge through our 10-week after school program that will enable them to confidently participate in accurate discourse regarding nutrition, and prepare them to make the best possible nutritional decisions after the program ends. With the help of public health professionals, nutritionists, and experienced pediatric health educators, our program will provide a solid educational framework for students in our target age group. We have chosen a variety of engagement activities for different stakeholders in order to align with their responsibility and accountability in the program. Engagement methods were chosen for stakeholders based on which activities would make the program most palatable and engaging for them.

Engagement Methods

Focus group meetings are one engagement activity that we will implement in order to keep program progress on track. Focus groups will primarily include stakeholders with high accountability in the program's execution, such as public health professionals, pediatric health educators, and nutritionists. Meetings with these individuals will be conducted prior to the program start date and will aid in the design of program structure and content. Brainstorming activities, collective prioritization of certain content, and discussions regarding information delivery strategies will be included in focus group meetings in order to incorporate the viewpoints of those most involved in program design and execution. Some focus group meetings would also need to include school cooking staff in order to communicate the needs of the program clearly, and incorporate feedback from this group regarding responsibility load and feasibility.

In order to include the feedback of more stakeholder groups to adjust the program, periodic surveys will be sent out to gauge satisfaction with the program, thoughts about program execution, and potential suggestions for program improvement. Surveys will primarily be focused on stakeholders that are not directly involved in program design and execution, such as students and parents. Although students and parents do not have much power in the direction of our program, their experience with the program is paramount to understand in order to evaluate the program for applicability and effectiveness as well as to influence the program's direction. Ultimately, the participation of students and parents in the program is voluntary, but listening to and adjusting the program based on their feedback can help make the program attractive and engaging for them. Students will be able to take surveys periodically immediately after program sessions, and parents may be emailed surveys to be completed at home. Questions for students need to be based on their direct experience of the program, while questions for parents should be more focused on their experience with the program through their children.

Email updates will be sent out periodically to let stakeholders who are more distant from the program know about the program's progress. Parents, teachers, school administration, and the county Board of Education will all receive news about the program before, during, and after program implementation. This will allow these stakeholders to be aware of program proceedings without taking an active role in its execution.

Student evaluations are a cornerstone activity of our program, as they not only engage our target population, but also allow us to examine how effective our program is at reaching its goal. Students will be assessed before the program for general nutritional knowledge and estimated fruit and vegetable intake to obtain a baseline for comparison. After the program has ended, they will be assessed on the same bases to determine how much they were able to learn through the duration of the program, and how much the program was able to impact their nutritional habits.

Engagement Methods (condensed)

Engagement Activity	Description	Stakeholder(s) Involved
Focus group meetings	Inclusion of high-accountability stakeholders to discuss program design and adjustment	Public health professionals, nutritionists, health educators, school cooks
Surveys	Gathering feedback from low-accountability stakeholders to be used for program adjustment	Students, parents
Email updates	Providing information on program progress	Parents, teachers, school administration, county BOE,
Student evaluations	Pre- and post-course assessment to determine how much was learned by students during the program	Students

Program Evaluation

The success of the nutrition and cooking education program will be defined by improvements in nutrition knowledge, intake of fruits and vegetables, and cooking self-efficacy as measured by pre- and post-intervention surveys (Jarpe-Ratner et al., 2016). Answers to the survey questions will have response options ranked 1-4, which will be used to calculate the cumulative mean score for all questions. Data will be taken from each school and then averaged

across all ten schools. If outcomes are not achieved, the public health nutritionists, school cooks, school health teachers, and the board of education will meet to discuss an improvement plan.

Key milestones for evaluating the program include fundraising, data collection (surveys), and data analysis. Applying for funds will begin one year prior to the anticipated start date. Pre-intervention surveys will begin one month prior to the start of the program, and post-intervention surveys will take place one month following the completion of the 10-week program, to give time to assess changes in knowledge and behavior. Finally, data will be analyzed immediately following the collection of the post-intervention surveys.

The effectiveness of the program will be assessed with a quasi-experimental pre-post survey design on students. We anticipate students will increase their mean score of nutrition knowledge and fruit and vegetable intake each by 0.2 (Jarpe-Ratner et al., 2016). We also anticipate participation in the program will increase students' cooking self-efficacy score by 0.4 and the frequency of student cooking at home score by 0.1 (Jarpe-Ratner et al., 2016).

Quantitative statistics will be used to measure the outcomes. Scores for all students will be averaged from the pre- and post-intervention surveys ($\pm$ SD). For analysis, changes in scores will be calculated from the difference between pre- and post-scores for each student. The changes in scores will be analyzed with paired *t* tests. To be considered statistically significant, the difference must be $P < 0.5$ (Jarpe-Ratner et al., 2016).

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Appendix A: Common Proposal Figures and Tables

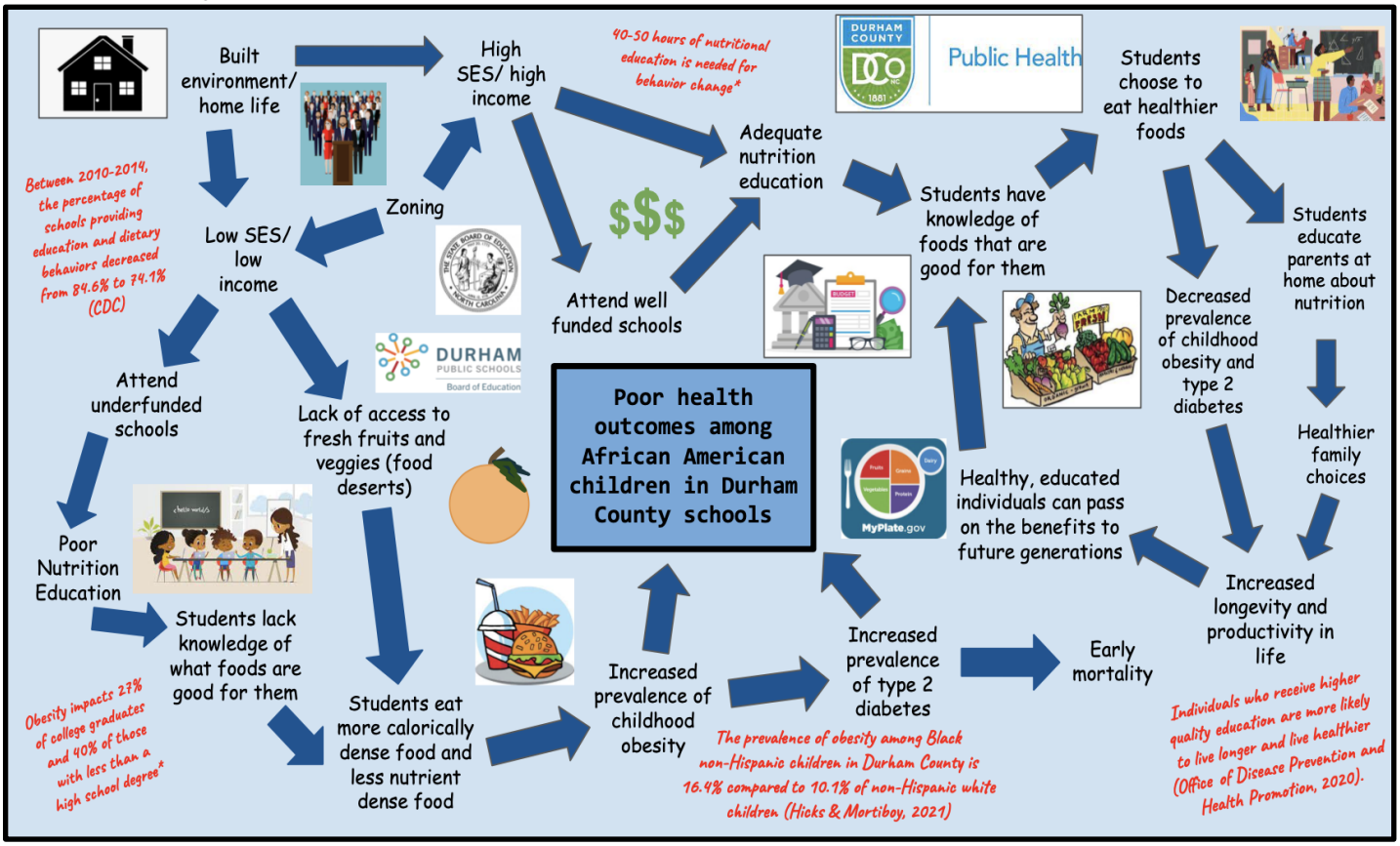
Table A1: Racial Breakdown of Durham County, NC in 2020.

Race	**Percentage in Durham County** (U.S. Census Bureau QuickFacts: Durham County, North Carolina, n.d.).
White non-Hispanic	43.4%
Black or African American	35.9%
Hispanic or Latino	13.8%
Asian	5.6%
Other/Mixed	2.8%
Native American	1.0%
Pacific Islander	0.1%

Table A2: Durham County, NC Educational Attainment Breakdown in 2021.

Educational Level	**Percentage in Durham County** (Durham County North Carolina Education Data for Research Orange County and Wake County, n.d.)
Bachelor's Degree or higher	49.5%
Some college or Associate's Degree	22.4%
High School or GED	17.7%
Less than High School	8.9%
No schooling	1.5%

Figure A1: Rich Picture of Poor Health Outcomes Among African American Children in Durham County Schools

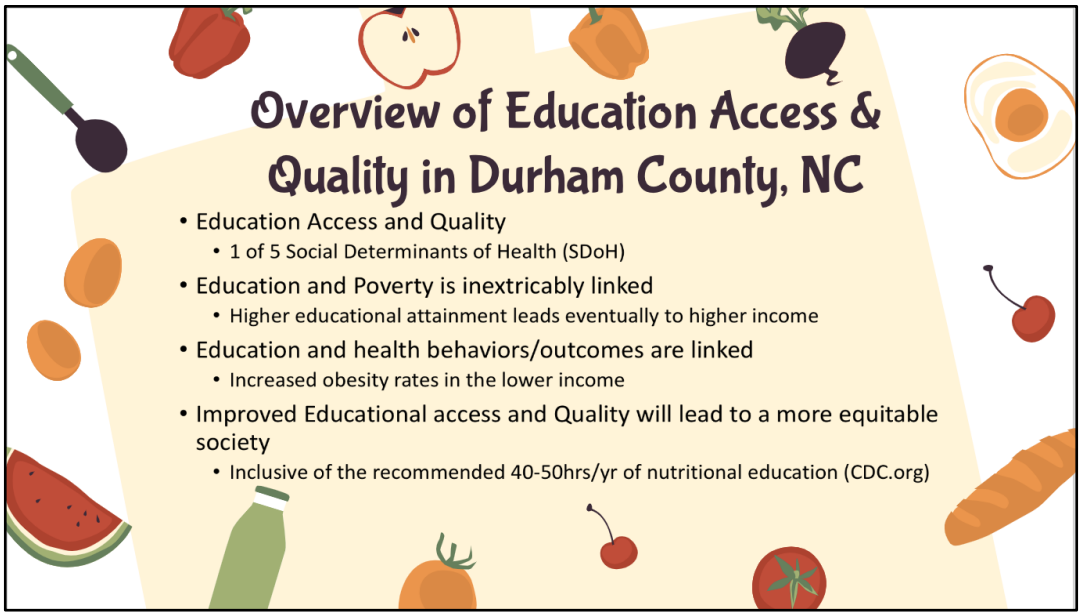


Communication Plan Presentation

Good evening, Durham County Commissioners and thank you for joining us. We are pleased to have you.

My name is Kamryn King and I will be presenting alongside Kay, Grace, and Reed.

Tonight, we will share our proposal to increase nutrition education access and knowledge among African American children in elementary school (specifically grades 3-8) in Durham County, NC.

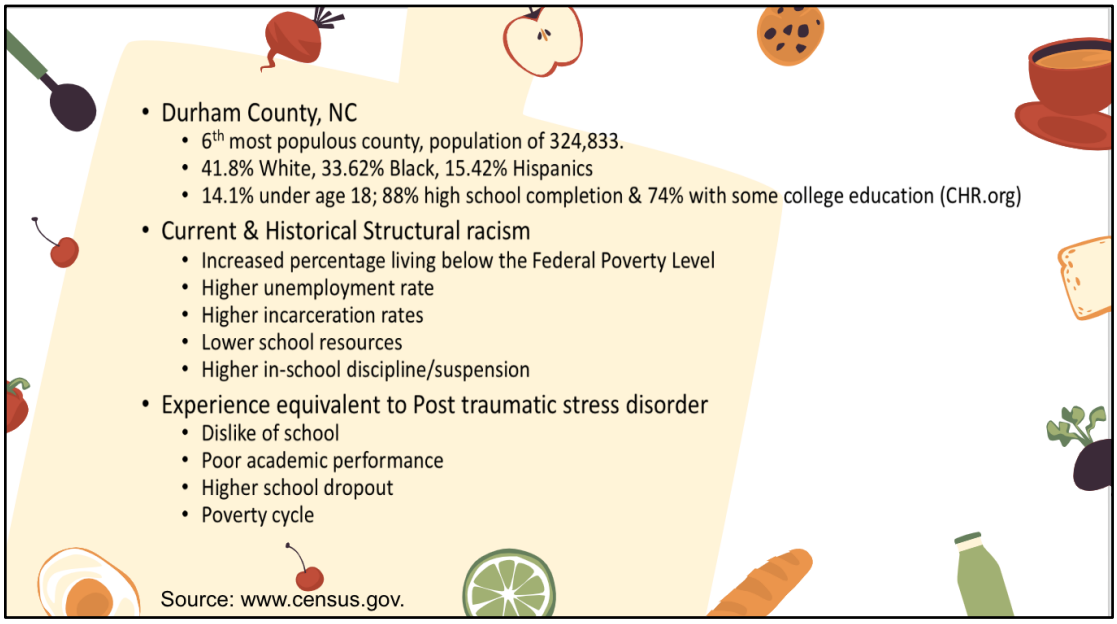


The focus here will be on the education access and quality in Durham county but other domains of the social determinants of health, include economic stability, healthcare access and quality, neighborhood and built environment as well as the social and community context.

Education and poverty have always been inextricably linked together and research has demonstrated that education is a definite way out of poverty since educational attainment tend to increase employment opportunities as well as accessible income. People with lower incomes do have a higher chance of living in poorer neighborhoods with poor quality schools and might not be able to afford the college costs for themselves or their offsprings unlike people with higher income who tend to have more opportunities and can afford to live in neighborhoods with better quality homes, improved access to high quality food and safer environment for physical activities.

It is also known that people with low income jobs have less access to good quality health insurance and health care providers, which along with other health behaviors and outcomes such as obesity might eventually lead to a higher rate of morbidity and mortality.

Efforts put into improving the nutrition knowledge among African American students in Durham County,NC will lead to the ability to make healthier choices, which might eventually assist with creating a healthier generation and a more equitable society.



Durham county is located in the state of North Carolina as part of the research triangle park. It is the sixth most populous county in the state with a population of 324,833 as at the 2020 census. It comprises of 41.18% non-Hispanic White, 33.62% non-Hispanic Black, 15.42% Hispanics, 5.14% Asian with others making up 5.63%.

52.4% of the population are females while 47.6% are males. 14.1% of the populace are under the age of 18 while 20.1% are above 60 years of age while the median household income in Durham county is $65,600.

Our nutrition education and training program will mainly be concentrated on the African American students, who will mostly be under the age of 18.

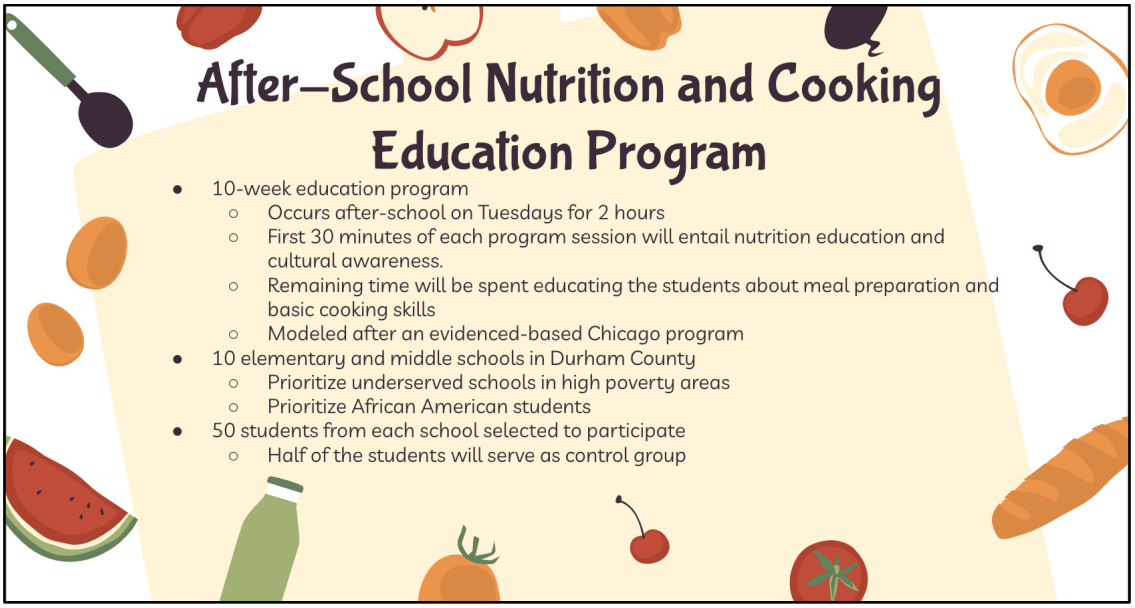
North Carolina, just like the rest of the United States, has factors that can be attributed to current and historical structural racism with an increased percentage of colored people living below the federal poverty level, having higher unemployment rate, higher incarceration as well as in-school suspension rate. School resources are also much less in schools with predominantly Black students.

Historically Black and White students were segregated into different schools as a result of the pre-existing policies and White students are exposed to better materials and tutors leading to better academic achievements and opportunities.

These various experiences, which are equivalent to post traumatic stress disorders can lead to children disliking school, achieving poor academic performance and result in higher high school

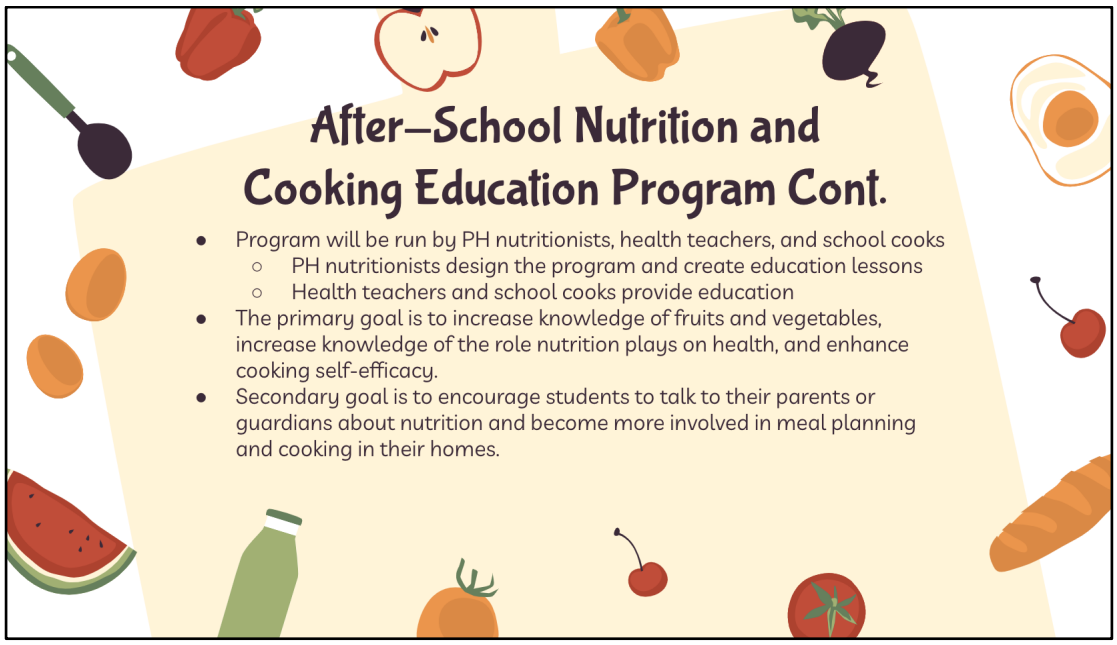
dropout with the end result being the establishment of a poverty cycle if not quickly curbed.

A focus on removing the barriers and improving the access to, as well as the quality of education available to all community members in Durham county, can lead to an improvement on the present high school completion and college attendance rate thereby giving everyone the opportunity for achieving an optimal quality of life.



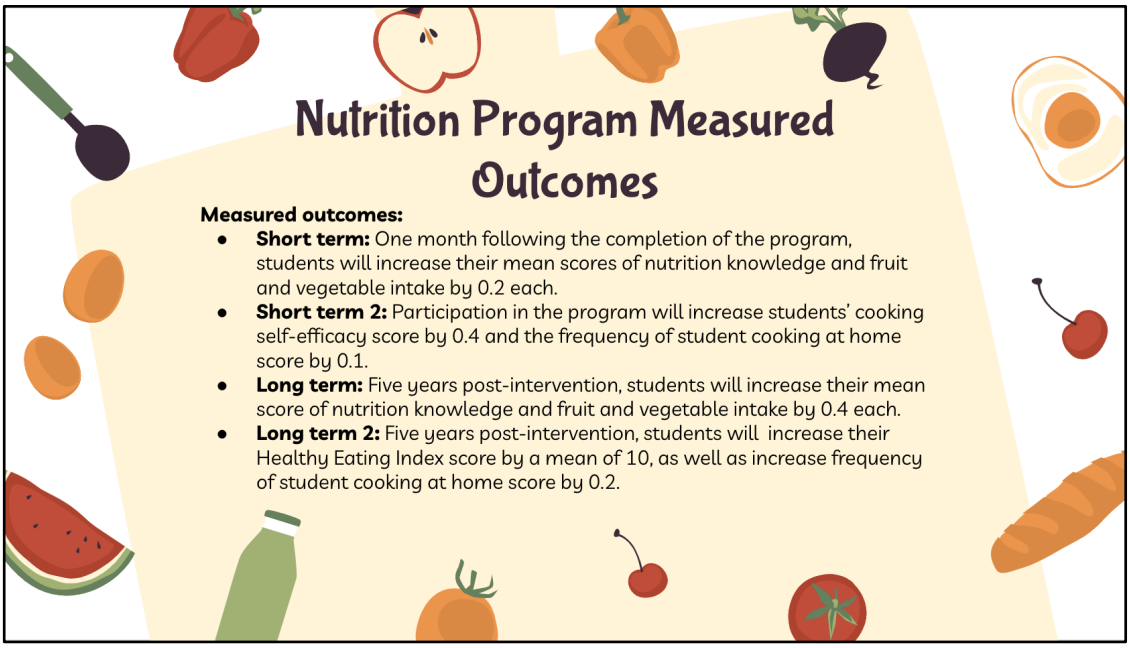
We are proposing a 10-week after-school nutrition and cooking education program that occurs every Tuesday for 2 hours in the schools' cafeterias and kitchens. The first 30 minutes of each session will entail nutrition education and cultural awareness lessons, followed by cooking education, which will focus on meal preparation and basic cooking skills. Our proposed program is modeled after an evidenced-based program in Chicago.

Like the Chicago program, our program will prioritize underserved elementary and middle schools. However, our program will take place in ten Durham County public schools and also prioritize African American students. Fifty students from each school will be selected to participate with half of the students serving as the control group.



The program will be led by PH nutritionists, school health teachers, and school cooks. The PH nutritionists will design the program and create the lesson plans. The health teachers and cooks will use the lesson plans to provide the education.

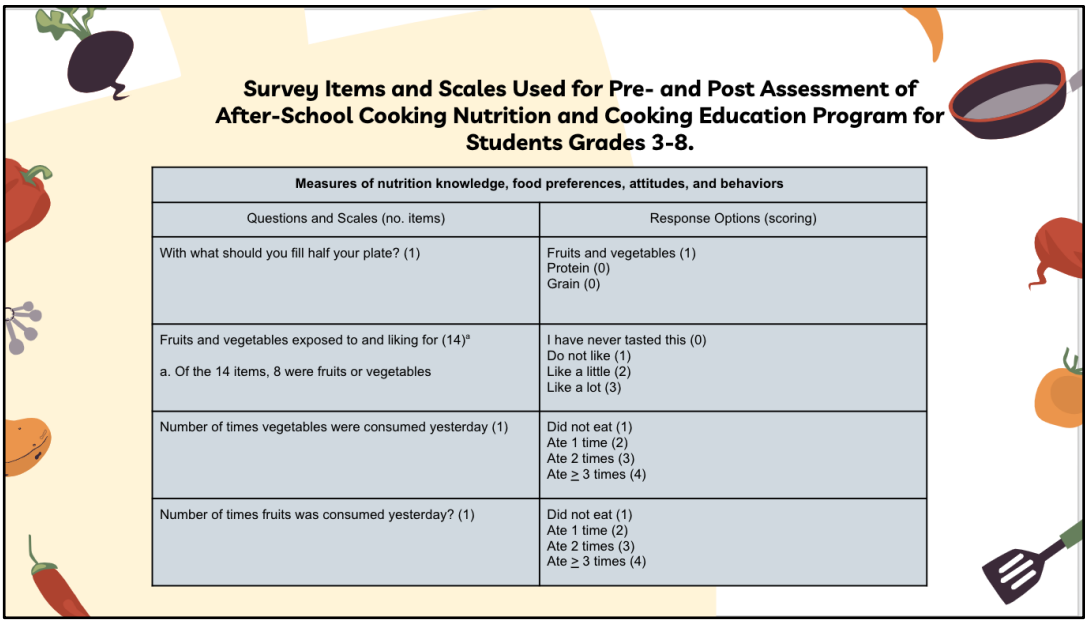
Our primary goal in this after-school program is to increase knowledge of fruits and vegetables, increase knowledge of the role nutrition plays on health, and enhance cooking self-efficacy. Our secondary goal is to encourage students to talk with their parents or guardians about nutrition and become more involved in meal planning and cooking at home.



We have established two short term and two long term measured outcomes for our program. The first short term out is one month following the completion of the program, students will increase their mean scores of nutrition knowledge and fruit and vegetable intake by 0.2 each. Our second short term outcome is that participation in the program will increase students' cooking self-efficacy score by 0.4 and the frequency of student cooking at home score by 0.1. This will also be measured one month following the completion of the program.

Our first long-term measured outcome is five years post-intervention, students will increase their mean score of nutrition knowledge and fruit and vegetable intake by 0.4 each. Our second long term outcome is five years post-intervention, students will increase their Healthy Eating Index score by a mean of 10, as well as increase frequency of student cooking at home score by 0.2.

The short term outcome will be measured using survey questions that will be used pre-and post-intervention to assess changes in students' mean scores. The long term outcomes will be measured using the survey questions from the short term outcome, as well as the health eating questionnaire that will also be provided to students pre-intervention and five years post-intervention.

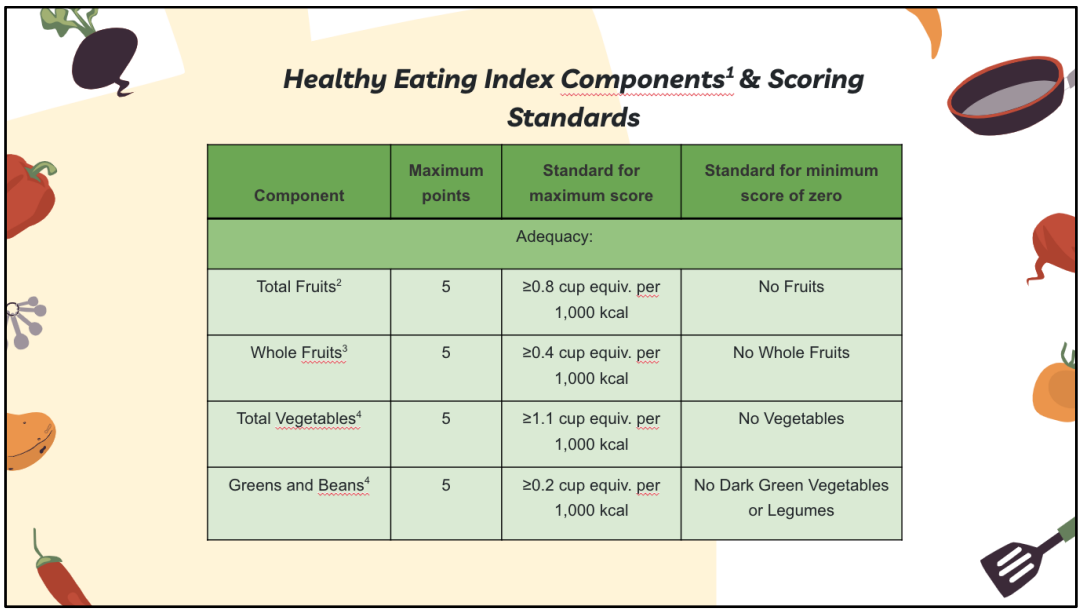


Survey Items and Scales Used for Pre- and Post Assessment of After-School Cooking Nutrition and Cooking Education Program for Students Grades 3-8.

Measures of nutrition knowledge, food preferences, attitudes, and behaviors	
Questions and Scales (no. items)	Response Options (scoring)
With what should you fill half your plate? (1)	Fruits and vegetables (1) Protein (0) Grain (0)
Fruits and vegetables exposed to and liking for (14)[a] a. Of the 14 items, 8 were fruits or vegetables	I have never tasted this (0) Do not like (1) Like a little (2) Like a lot (3)
Number of times vegetables were consumed yesterday (1)	Did not eat (1) Ate 1 time (2) Ate 2 times (3) Ate ≥ 3 times (4)
Number of times fruits was consumed yesterday? (1)	Did not eat (1) Ate 1 time (2) Ate 2 times (3) Ate ≥ 3 times (4)

We wanted to share a sample of a few survey questions and scales that will be collected before and after involvement in our nutrition education program in order to measure the impact the program had on nutritional knowledge and fruit and vegetable intake.

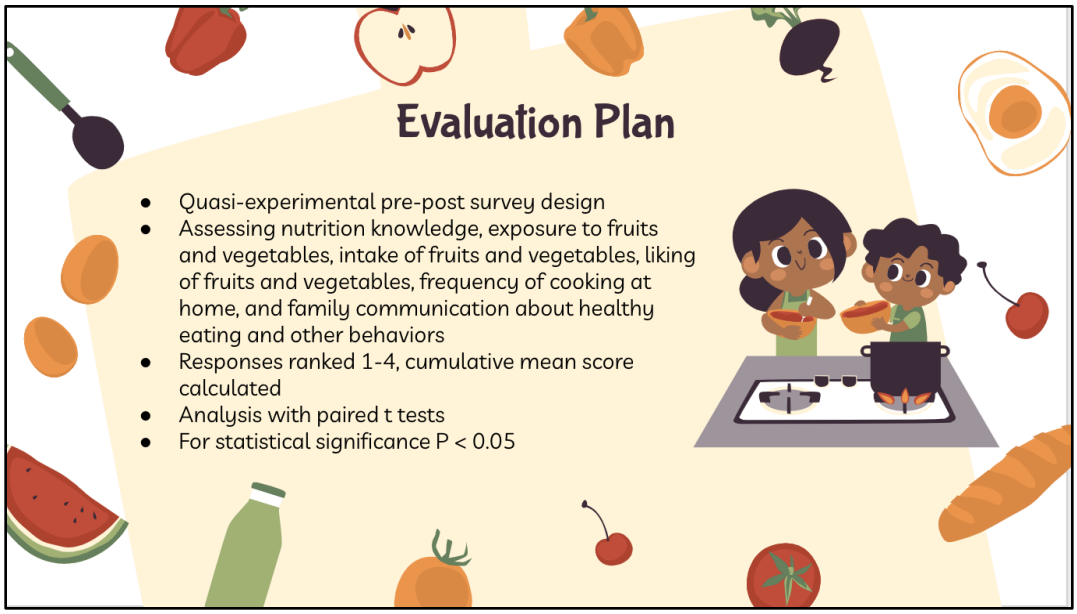
For instance these questions include what food group should you fill half of your plate with as well as the number of vegetables that the student consumed the day before.



Healthy Eating Index Components[1] & Scoring Standards

Component	Maximum points	Standard for maximum score	Standard for minimum score of zero
Adequacy:			
Total Fruits[2]	5	≥0.8 cup equiv. per 1,000 kcal	No Fruits
Whole Fruits[3]	5	≥0.4 cup equiv. per 1,000 kcal	No Whole Fruits
Total Vegetables[4]	5	≥1.1 cup equiv. per 1,000 kcal	No Vegetables
Greens and Beans[4]	5	≥0.2 cup equiv. per 1,000 kcal	No Dark Green Vegetables or Legumes

For the long term evaluation of our program we wanted to first share this table which breaks down the components for the Healthy Eating Index scoring standards. Categories shown include total fruits (which includes 100% fruit juice), whole fruits (which does not include juice), total vegetables, and greens and beans. The maximum points in each category is 5 and there are different cup amounts per 1,000 kcals for each which indicate what is considered an adequate amount. Intakes between the minimum and maximum standards are scored proportionately. The total HEI score is the sum of these adequacy components (i.e. foods to eat more of for good health) as well as moderation components (i.e. foods to limit for good health).



Now I will discuss our Evaluation plan in more detail.

Overall, the effectiveness of the program will be assessed on students with a quasi-experimental pre-post survey design. Quasi-experiments are studies that aim to evaluate interventions but that do not use randomization. The aim with this design is to demonstrate causality between our intervention (the nutrition education program) and an outcome.

The pre- and post-intervention surveys will be completed by students to assess nutrition knowledge, exposure to fruits and vegetables, intake of fruits and vegetables, liking of fruits and vegetables, frequency of cooking at home, and family communication about healthy eating and other behaviors.

Answers to the survey questions will have response options ranked 1-4, which will be used to calculate the cumulative mean score for all questions.

Data will then be taken from each school and then averaged across all ten schools.

For analysis, changes in scores will be calculated from the difference between pre- and post-scores for each student.

The changes in scores will be analyzed with paired t tests. To be considered statistically significant, the difference must be $P < 0.5$.

The post-intervention survey will take place one month following the completion of the program to give time to assess changes in behavior. Once mean scores have been calculated and results of the program have been finalized, the evaluation will take place.

Progress will be defined by students showing improvements in nutrition knowledge and/or cooking self-efficacy via their post-intervention surveys.

If progress does not occur, the public health nutritionists, school cooks, school health teachers, and the board of education will meet to discuss an improvement plan. The public health nutritionists will also reach out to students and parents to get program feedback.

1 year Budget

Description	Unit	Unit Cost	Quantity	Unit Amount in USD	Total Amount in USD
Human Resources					
Public Health Nutritionists (Program Director)	Staff	$22,000	6 months	$22,000	$22,000
School Cooks	Staff	$100/session	10 sessions	$1,000	$1,000
Health Teachers	Staff	$100/session	10 sessions	$1,000	$1,000
Direct Expenses					
Food for in-session cooking	Students	$7/student/ session	10 sessions for 250 students	$70/student for 10 sessions	$17,500
Cooking/ Miscellaneous Supplies	Unit	$100/student	250 students	$25,000	$25,000
Food Donations from Grocery Stores, Farmers, and Community for Students to Take Home	Unit	$0	In-kind	$0	$0
Total					$66,500

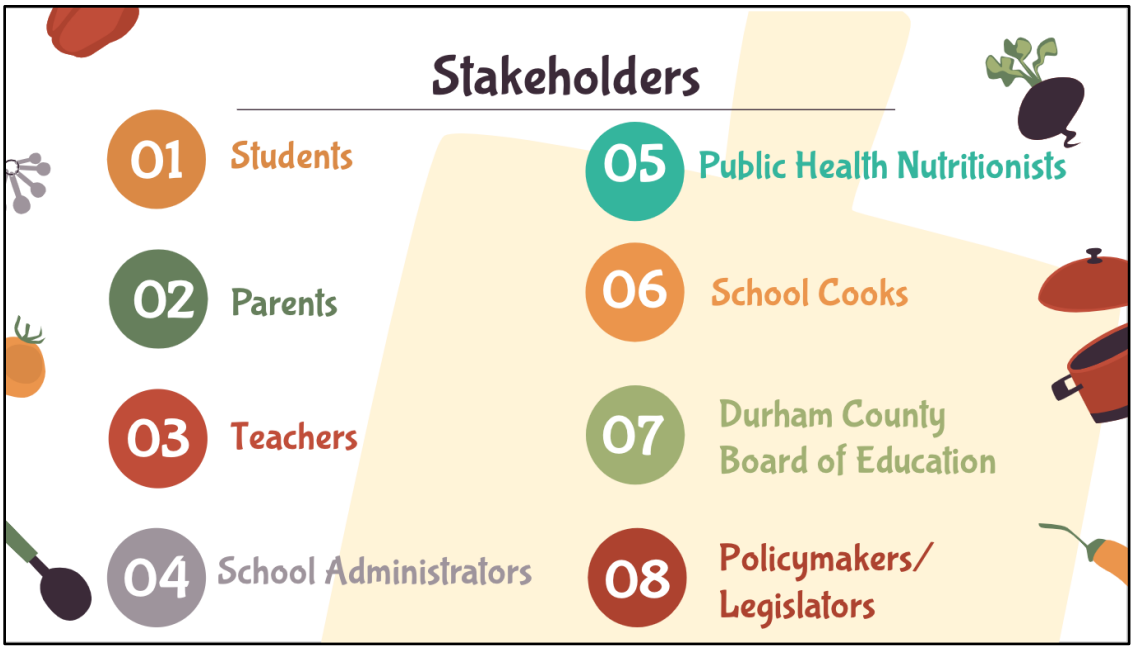
Though our group did not have a health policy representative we have outlined a estimated 1 year budget.

A large portion of the expenses will come out in staffing costs which will include public health nutritionists, school cooks, and health teachers.

Then we will have the bulk of costs coming out of direct expenses such as food for in-session cooking and miscellaneous cooking supplies.

We would like to note that food donations from grocery stores, farmers, and the community are expected to be donated in-kind and will not contribute to overall costs.

The total we estimate for the first year of the program is $66,500. Once the first iteration is completed of the 10-week nutrition education program we will re-evaluate and move into a second iteration of the program based on the feedback we receive. Based on this budget three years or iterations of the program will come out to a total of $199,500.



The key stakeholders that will be needed for the positive fruition of our nutrition program include the students, their parents, school administrators, teachers, school cooks, Public health nutritionists, Durham County board of education and policymakers/legislators.

Students: Minority students, especially African Americans in Grades 3-8 will serve as the focus of the change. The nutritional program will be built around them and ways to keep them engaged will be prioritized.

Parents: These are the parents of the minority students and it will be necessary to keep them informed and involved with the program in order to ensure the active participation of their children.

Teachers: These are the class instructors. It will be a plus to get them participating in the program since they are already involved in daily activities with the students and there is usually a high regard for them on the part of the students.

School Administrators: They generally head the school, set/enforce the budgets, maintain the academics and manage the students and staff. Having them buy into the program as well as being active partners will make for seamless use of school resources and ensuring nutrition education is a part of the school curriculum.

Public Health Nutritionists : They are registered dietitians who specialize in teaching positive nutrition and nutritional habits. They do understand the importance of a healthy nutrition as well as the impact of the various inequities and will serve as the fulcrum for the change and spearhead the nutrition education program

School Cooks: These are presently attached to the schools. They will be actively involved in the food preparations and help in teaching the students how to make healthy meals.

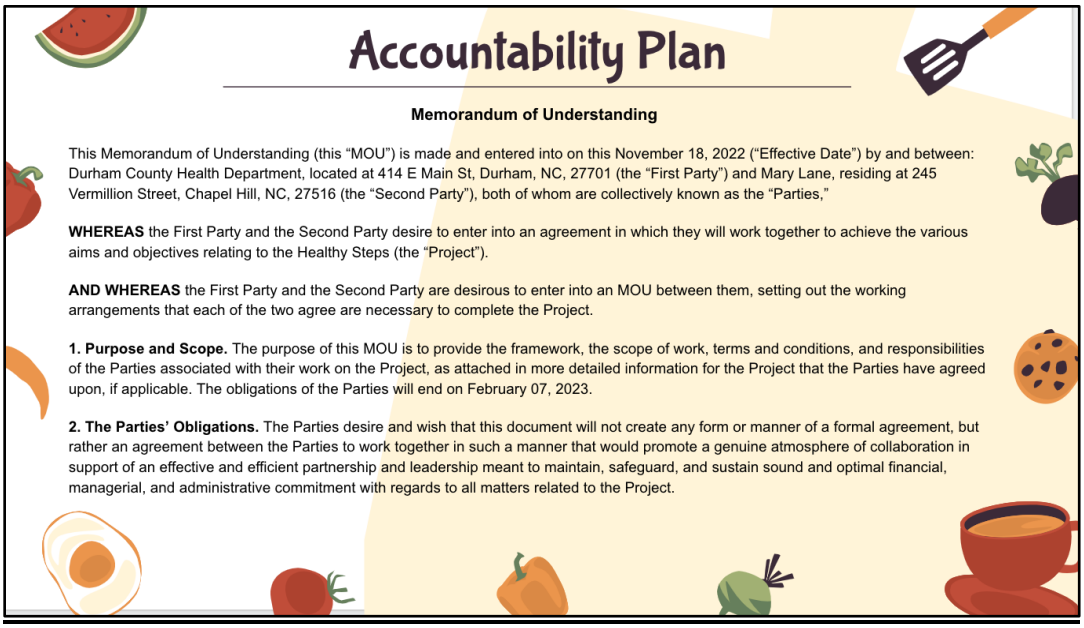
Durham County Board of Education: They run the school district and make policies affecting the Durham County schools. They have to green light the nutrition education program as well as take on a supervisory role. They have to be constantly updated on the program.

Policymakers/Legislators: The Legislature makes laws that affect Durham County and North Carolina State. Their assistance is needed to earmark funds for the school nutrition program and they have to be constantly updated on the program.

Engagement Plan

Engagement Method	Description	Frequency/ Timing	Stakeholders Involved
Community Asset Mapping	Partner with stakeholders to identify and decide on strategies for the development and implementation of the plan	One or two in person or virtual sessions early on in the development of the program	Public health professionals, nutritionists, health educators, school cooks, teachers, parents
Focus group meetings	Inclusion of high-accountability stakeholders to discuss program design and adjustment	Two to three in person or virtual sessions – before the program and after program.	Public health professionals, nutritionists, health educators, school cooks
Surveys	Gathering feedback from low-accountability stakeholders to fine tune the program	Link sent out over email or paper copies handed out at the end of each week of the program	Students, parents
Student evaluations	Pre- and post-course assessment to determine level of knowledge learned by students during the program	Before and after the program on paper or through an electronic assessment grader	Students
Email or text updates	Providing information on program progress	Major updates pre, mid, and post program. Weekly or as needed minor updates during the program.	Email: teachers, school administration, county board of education Email or text: Parents

These are engagement methods that we will use to integrate stakeholders in our program. Community asset mapping involves PH professionals, nutritionists, health educators, school cooks, teachers, and parents and allows us to identify and come to a consensus on implementation strategies; focus group meetings involve PH professionals, nutritionists, health educators, and school cooks and are meant to help with program design and fine-tuning; surveys are administered to students and parents to gather feedback to adjust the program accordingly; student evaluations are given as pre- and post-course assessments to determine the level of knowledge learned throughout the program; and email/text updates are sent to teachers, school administration, county BoE, and parents to provide information on program progress.



Accountability Plan

Memorandum of Understanding

This Memorandum of Understanding (this "MOU") is made and entered into on this November 18, 2022 ("Effective Date") by and between: Durham County Health Department, located at 414 E Main St, Durham, NC, 27701 (the "First Party") and Mary Lane, residing at 245 Vermillion Street, Chapel Hill, NC, 27516 (the "Second Party"), both of whom are collectively known as the "Parties,"

WHEREAS the First Party and the Second Party desire to enter into an agreement in which they will work together to achieve the various aims and objectives relating to the Healthy Steps (the "Project").

AND WHEREAS the First Party and the Second Party are desirous to enter into an MOU between them, setting out the working arrangements that each of the two agree are necessary to complete the Project.

1. Purpose and Scope. The purpose of this MOU is to provide the framework, the scope of work, terms and conditions, and responsibilities of the Parties associated with their work on the Project, as attached in more detailed information for the Project that the Parties have agreed upon, if applicable. The obligations of the Parties will end on February 07, 2023.

2. The Parties' Obligations. The Parties desire and wish that this document will not create any form or manner of a formal agreement, but rather an agreement between the Parties to work together in such a manner that would promote a genuine atmosphere of collaboration in support of an effective and efficient partnership and leadership meant to maintain, safeguard, and sustain sound and optimal financial, managerial, and administrative commitment with regards to all matters related to the Project.

This is an excerpt from a sample MOU between the DCHD and "Mary Lane," one of our health educators. The MOU details the responsibilities of each of these parties for the duration of our program. In this example, the DCHD has responsibilities that include, but are not limited to, providing public health expertise in nutrition as well as educational program structuring, while health educators are responsible for implementing the educational curriculum throughout the duration of the program and providing feedback as the program progresses.

References

- County health rankings: What Works for Health. Https://www.countyhealthrankings.org/take-action-to-improve-health/what-works-for-health
- Healthy Eating Learning Opportunities and Nutrition Education/ Healthy Schools/ CDC.(n.d.). Retrieved October 21, 2022 from https://www.cdc.gov/healthyschools/nutrition/school_nutrition_education.html
- Jarpe-Ratner, E., Folkens, S., Sharma, S., Daro, D., & Edens, N. K. (2016, November). An Experiential Cooking and Nutrition Education Program Increases Cooking Self-Efficacy and Vegetable Consumption in Children in Grades 3–8. Journal of Nutrition Education and Behavior, 48(10), 697-705.e1. https://doi.org/10.1016/j.jneb.2016.07.021
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- "U.S. Census Bureau QuickFacts: Durham County, North Carolina". www.census.gov. Retrieved September 16, 2022.

APPENDIX B: OLUKAYODE AKINLAJA'S INDIVIDUAL DELIVERABLES

Appendix B.1:

Problem Statement

Increasing Nutrition Education Access and Knowledge Among African American Children in Elementary School (Grades 3-8) in Durham County, NC.

The social determinants of health (SDoH) have been found to have an impact on not just the health and wellbeing of people but also the quality of their lives and it's known to contribute significantly to health disparities and inequities.

SDoH has been described as the "conditions in the environments where people are born, live, learn, work, play, worship and age that affect a wide range of health, functioning, and quality of life outcomes and risks" (www.health.gov).

The focus here will be on the education access and quality in Durham county but other domains of the social determinants of health, include economic stability, healthcare access and quality, neighborhood and built environment as well as the social and community context.

Education and poverty have always been inextricably linked together and research has demonstrated that education is a way out of poverty (Psacharopoulos et al., 1992). Educational attainment has been found to increase employment opportunities as well as the accessible income and people with lower incomes do have a higher chance of living in poorer neighborhoods with poor quality schools and might not be able to afford the college costs for themselves or their offsprings unlike people with higher income who tend to have more opportunities and can afford to live in neighborhoods with better quality homes, improved access to high quality food and safer environment for physical activities.

It's known that people with low income jobs have less access to good quality health insurance and health care providers, which might eventually lead to a higher rate of morbidity and mortality.

There is also a definite correlation between education access and quality, health behaviors and various health outcomes such as obesity and improving the nutrition knowledge among African American students in Durham County,NC leading to the ability to make healthier choices might eventually assist with creating a healthier generation and a more equitable society.

Geography

Durham county, founded on April 17, 1881, with its county seat at Durham, is located in the state of North Carolina as part of the research triangle park. It is the sixth most populous county in the state with a population of 324,833 as at the 2020 census, comprising of 41.18% non-Hispanic White, 33.62% non-Hispanic Black, 15.42% Hispanics, 5.14% Asian and others making up 5.63%. 52.4% of the population are females while 47.6% are males. 14.1% of the populace are under the age of 18 while 20.1% are above 60 years of age and the median household income in Durham County is $65,600. (www.census.gov).

Our nutrition education and training program will mainly be concentrated on the African American students, who will mostly be under the age of 18.

Priority Populace and Historical context

The issue of lower education access and quality, generally affects people of color more in Durham county, North Carolina just like in the rest of the United States and can usually be attributed to factors related to current and historical structural racism with an increased percentage living below the federal poverty level, having higher unemployment rate, incarceration as well as in-school suspension rate with Black students at risk of suspension without education services at twice the rate of White students while also facing microaggression from their peers. School resources are also much less in schools with predominantly Black students (Walker, 2022).

Historically Black and White students were segregated into different schools as a result of the pre-existing policies and White students are exposed to better materials and tutors leading to better academic achievements and opportunities.

These various experiences, which are equivalent to post traumatic stress disorders can lead to children disliking school, achieving poor academic performance and result in higher high school dropout with the end result being the establishment of a poverty cycle if not quickly curbed.

Scope of the problem measures

Durham is presently ranked among the healthiest counties in North Carolina with a high school completion rate of 88%, which is comparable to the entire state of North Carolina while the 74% of the populace who have achieved some college education is much higher than the 67% of the entire state population and may account for the lower unemployment rate of 3.4% as compared to 3.9% for the entire state (www.countyhealthrankings.org).

The prevalence of obesity, which is mainly a nutrition related issue is about 16.4% in non-Hispanic Black children in Durham County as compared to 10.1% among non-Hispanic White children (Hicks, et al. 2021) thereby making the need for nutrition education a necessity.

Rationale for Prioritizing a Solution

A focus on removing the barriers and improving the available access to, as well as the quality of education available to all community members in Durham County, can still lead to an improvement on the present high school completion and college attendance rate thereby giving everyone the opportunity for achieving an optimal quality of life.

An improvement in the nutrition knowledge among African American students will also help with them making healthier food choices, the adoption of healthier lifestyles and behaviors as well as reduce some of the resultant inequities.

Disciplinary critique and Summary

As good as it seems, the promotion of healthy choices and adequate health delivery alone will not tackle the issue of health inequities and disparities unless it's done in conjunction with a conscious effort by a broad coalition of stakeholders inclusive of public health organizations to tackle the conditions comprising the social determinants of health of which, access to quality education is one, as this will assure an adequate and long-lasting solution.

A dedicated focus on the access to good quality education for all by public health leaders, will eventually assist in reducing the health gaps related to race, ethnicity, income, location and social status and thereby lead to a society where all the citizenries have the potential to thrive.

The prevailing lack of nutrition education in the United States public school system, whereby students receive less than 8 hours out of the recommended 40-50 hours per school year (Healthy Eating Learning Opportunities and Nutrition Education/Healthy Schools/CDC, n.d.) is definitely in need of urgent attention.

References

County health rankings: What Works for Health https://www.countyhealthrankings.org/take-action-to-improve-health/what-works-for-health

Healthy Eating Learning Opportunities and Nutrition Education/ Healthy Schools/ CDC.(n.d.). Retrieved October 21, 2022 from https://www.cdc.gov/healthyschools/nutrition/school_nutrition_education.html

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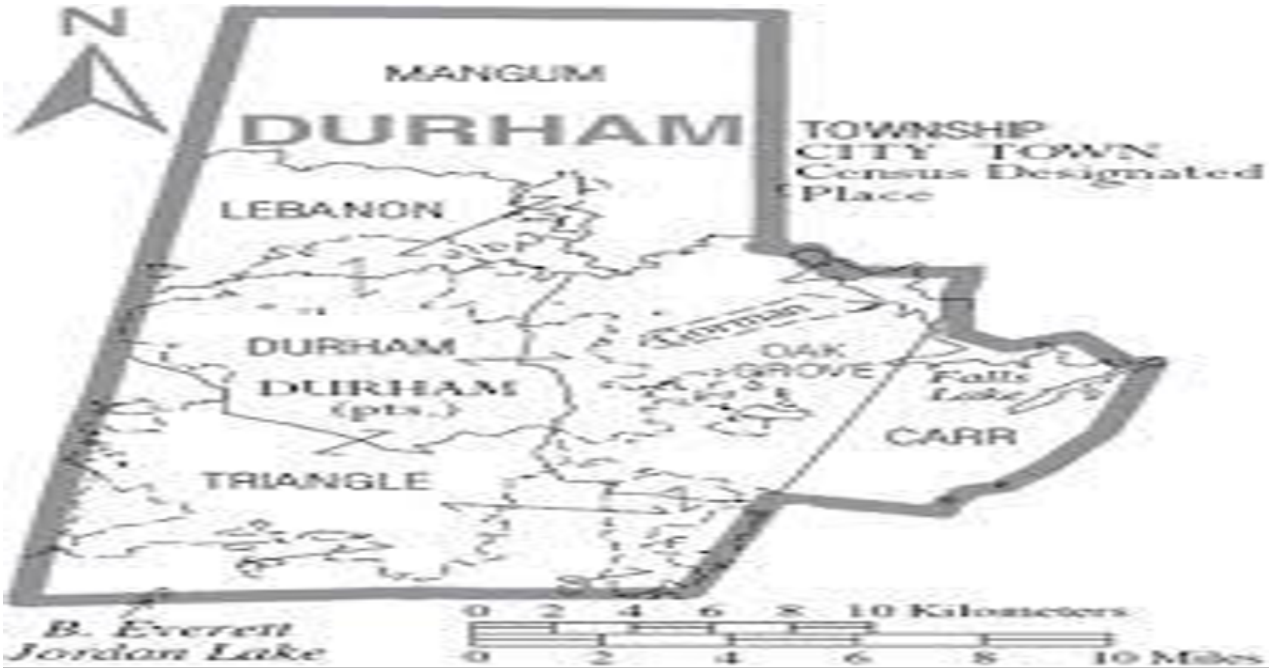
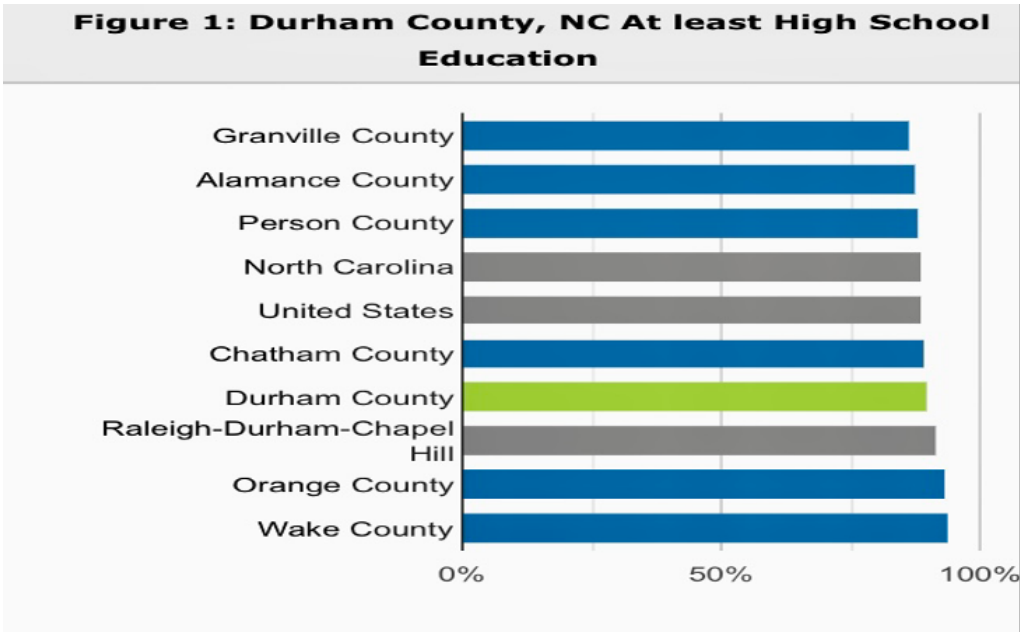
Walker, K (2022). Race in Education. "U.S. Census Bureau QuickFacts: Durham County, North Carolina". www.census.gov. Retrieved September 16, 2022.

Appendix B.1.a: Individual Problem Statement Figures and Tables

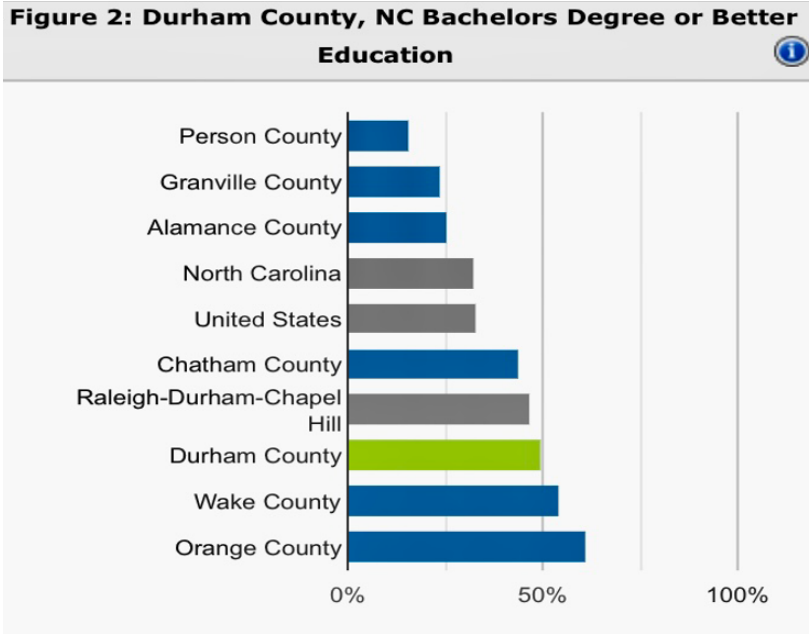


Appendix

Source: www.Wikipedia .org



Source: https://www.towncharts.com/North-Carolina/Demographics/Durham-County-NC-Demographics-data.html



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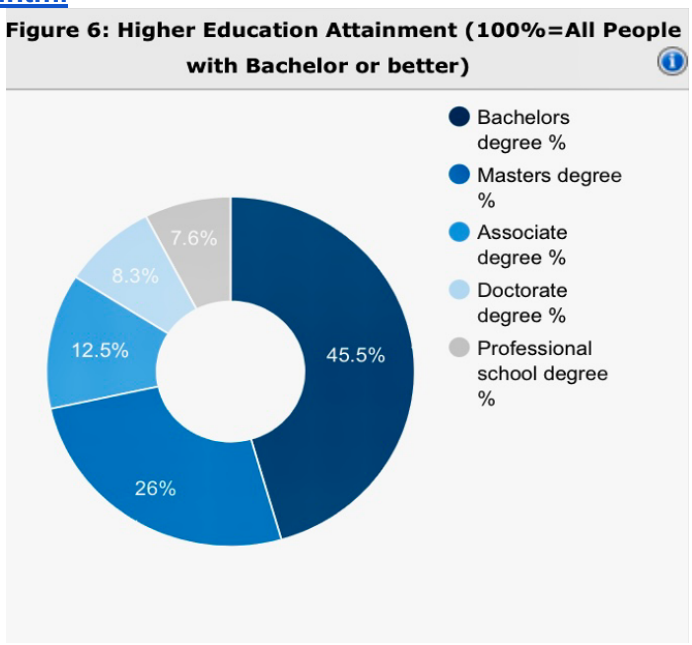
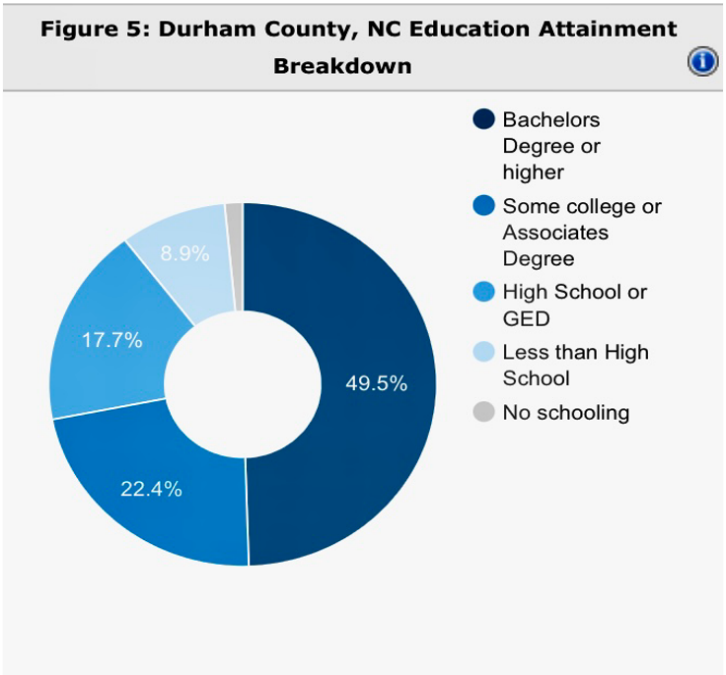


Source: https://www.towncharts.com/North-Carolina/Demographics/Durham-County-NC-Demographics-data.html



Source: https://www.towncharts.com/North-Carolina/Demographics/Durham-County-NC-Demographics-data.html

Appendix B.2: Stakeholder Analysis

Stakeholders Analysis:

Adequate education access and quality is an important key to achieving equity in a society and it is one of the social determinants of health (SDoH) alongside economic stability, healthcare access and quality, neighborhood and built environment with social and community context.

The social determinants of health, which are the “conditions in the environments where people are born, live, learn, work, play, worship and age that affect a wide range of health, functioning, and quality of life outcomes and risks” (www.health.gov) have components that do together impact both the health and wellbeing of people as well as the quality of their lives. Higher level of educational attainment has been demonstrated to be a pathway out of poverty (Psacharopoulos et al., 1992) and low level of education and poverty do form a cycle as there are more employment opportunities, higher incomes and the ability to purchase higher quality food, good quality health insurance and live in safer neighborhoods with a better chance of participating in physical activities and our group’s plan is to encourage higher educational attainment by creating an attraction to schools for African American students in Durham County, NC by implementing a nutritional program in schools, which will serve to improve nutritional knowledge, help with the ability to make healthier food choices, reduce the possibility of childhood obesity and the resulting health implications as well as serve as a means of social bonding/activity in the schools.

These might at the end serve as one of the prongs towards reducing health and other inequities in the society.

Stakeholders:

The key stakeholders that will be needed for the positive fruition of our nutrition program include the students, their parents, school administrators, teachers, school cooks, Public health nutritionists, Durham County board of education and policymakers/legislators.

Students: African American students will serve as the focus of the change. The nutritional program will be built around them and ways to keep them engaged will be prioritized.

Parents: It will be necessary to keep the parents of the African American students informed and involved with the program in order to ensure the active participation of their children.

Teachers: It will be a plus to get them participating in the program since they are already involved in daily activities with the students and there is usually a high regard for them on the part of the students.

School Administrators: Having them buy into the program as well as being active partners will make for seamless use of school resources and ensuring nutrition education is a part of the school curriculum.

Public Health Nutritionists : They understand the importance of a healthy nutrition as well as the impact of the various inequities and they will serve as the fulcrum of the change and spearhead the nutrition education program

School Cooks: They will be actively involved in food preparations and help in teaching the students how to make healthy meals.

Durham County Board of Education: They have to green light the nutrition education program as well as take on a supervisory role. They have to be constantly updated on the program.

Policymakers/Legislators: Their assistance is needed to earmark funds for the school nutrition program and they have to be constantly updated on the program.

Appendix B.2.a: Stakeholder Analysis Figures and Tables

Stakeholders Analysis Matrix

Stakeholder Name	**Contact Person** *Phone, Email, Website, Address*	**Impact** *How much does the project impact them? (Low, Medium, High)*	**Influence** *How much influence do they have over the project? (Low, Medium, High)*	**What is important to the stakeholder?**	**How could the stakeholder contribute to the project?**	**How could the stakeholder block the project?**	**Strategy for engaging the stakeholder**
Students	**African American students in Durham County**	**High**	**Low**	**Having improved quality and access to education**	**By participating in the Nutrition program as well as educating their parents on what's**	**None but can make it less effective by not participating**	**Weekly educational/ cooking classes by Nutritionists**

Stakeholder Name	Contact Person *Phone, Email, Website, Address*	Impact *How much does the project impact them? (Low, Medium, High)*	Influence *How much influence do they have over the project? (Low, Medium, High)*	What is important to the stakeholder?	How could the stakeholder contribute to the project?	How could the stakeholder block the project?	Strategy for engaging the stakeholder
					been learned		
Educators	Durham Association of Educators https://daenc.com	Medium	Medium	Maximizing students quality of education	Supporting the program and encouraging students active participation in the program	By opposing the program	Quarterly information and feedback meetings
Parents	African American Parents in	High	High	Getting their childre	Encourage their	Discouraging their children	Quarterly information

Stakeholder Name	Contact Person *Phone, Email, Website, Address*	Impact *How much does the project impact them? (Low, Medium, High)*	Influence *How much influence do they have over the project? (Low, Medium, High)*	What is important to the stakeholder?	How could the stakeholder contribute to the project?	How could the stakeholder block the project?	Strategy for engaging the stakeholder
	Durham County			n access to good quality education	children's attendance and participation in the program	from participating in the program	/update meetings
Policymakers	Durham County Board of Commissioners www.dconc.gov	Low	High	Increased access to good quality education for all citizens of	Passing supportive policies and ensuring funding for the	Passing obstructive or opposing policies	Update every school year

Stakeholder Name	Contact Person *Phone, Email, Website, Address*	Impact *How much does the project impact them? (Low, Medium, High)*	Influence *How much influence do they have over the project? (Low, Medium, High)*	What is important to the stakeholder?	How could the stakeholder contribute to the project?	How could the stakeholder block the project?	Strategy for engaging the stakeholder
				Durham County	program		
Public Health Professionals	Durham County Department of Public Health www.dcopublichealth.org	Low	Medium	Improved education access and quality as a social determinant of health and the overall health of	Health education, advocacy and provision of evidence based data	Non-support of the program and advocating alternatives	Quarterly information and update meetings

Stakeholder Name	**Contact Person** *Phone, Email, Website, Address*	**Impact** *How much does the project impact them? (Low, Medium, High)*	**Influence** *How much influence do they have over the project? (Low, Medium, High)*	**What is important to the stakeholder?**	**How could the stakeholder contribute to the project?**	**How could the stakeholder block the project?**	**Strategy for engaging the stakeholder**
				Durham County.	**program is in place**		

KANO MODEL

User	Type of Need
The African American Students	Basic: Access to Education Performance: Improved quality of education Delighter: improved Nutritional knowledge
The Entire Durham County populace	Basic: Better educated citizenry and equity in Education access Performance: Improved quality of education and employability Delighter: Overall reduction in childhood obesity.
Durham County Board of Education	Basic: improved education access and quality across board Performance: Improved enrollment in schools Delighter: Re-election
Durham County Board of Commissioners	Basic: public appreciation Performance: Increased education access and quality in their community Delighter: Re-election

CATWOE ANALYSIS FOR THE PUBLIC HEALTH NUTRITIONISTS IN DURHAM COUNTY

- ROOT DEFINITION: TO ENSURE ADEQUATE NUTRITION KNOWLEDGE AND IMPROVE THE EDUCATION ACCESS AND QUALITY FOR AFRICAN AMERICAN STUDENTS RESIDING IN DURHAM COUNTY, NC.

Term	**Definition**
Customer	African American students
Actor	Nutritionists, Cooks and Dietitians
Transformation	Nutrition education as a part of the school curriculum
Worldview	Most are of the opinion that access to a good quality education is a right especially in a developed nation like ours
Owner	County board of education, Board of Commissioners
Environment	Democratic & Republican Parties, Lobbyists, Non-governmental organizations.

CATWOE ANALYSIS FOR THE AFRICAN AMERICAN STUDENTS IN DURHAM COUNTY

Term	**Definition**
Customer	Public schools in Durham County
Actor	African American students
Transformation	Nutrition education and an Increased Nutrition knowledge
Worldview	Better education will improve employment opportunities and incomes
Owner	County board of education
Environment	Durham County

- ROOT DEFINITION: TO ENSURE ADEQUATE NUTRITION KNOWLEDGE AND IMPROVE THE EDUCATION ACCESS AND QUALITY FOR AFRICAN AMERICAN STUDENTS RESIDING IN DURHAM COUNTY, NC.

CATWOE ANALYSIS FOR THE DURHAM COUNTY BOARD OF EDUCATION

Term	**Definition**
Customer	African American students
Actor	Durham County Board of Education
Transformation	Nutrition education as a means to improving education access and quality
Worldview	Improved education access and quality for all will lessen the problem of inequities.
Owner	Durham county
Environment	Democratic & Republican Legislature

- ROOT DEFINITION: TO ENSURE ADEQUATE NUTRITION KNOWLEDGE AND IMPROVE THE EDUCATION ACCESS AND QUALITY FOR AFRICAN AMERICAN STUDENTS RESIDING IN DURHAM COUNTY, NC.

Based on the multiplicity of stakeholders involved and the various roles they will play in ensuring the adoption of a nutrition education program in Durham County schools to foster increased education access and quality among the African American students, it is of

importance to categorize them based on their level of involvement and the timelines for updating them on the success and inadequacies of the program.

The CATWOE was used because it assists with describing and analyzing the various stakeholders perspectives and point of views as well as the influence of the point of views on their outlook while the matrix is used to identify and understand the various stakeholders who will have an influence over our nutrition education program.

References:

https://health.gov/healthypeople/priority-areas/social-determinants-health

Psacharopoulos, G., and J.B.G. Tilak (1992) Education and Wage Earnings". In: The Encyclopedia of Educational Research (Editor-in-Chief: M.C. Alkin). New York: Macmillan, for the American Educational Research Association, pp. 419–23

Appendix B.3: Engagement and Accountability Plan

Part I. Engagement Plan

Statement of Purpose

The purpose of this program is to improve nutritional knowledge amongst students in grades 3-8 in underserved students in the Durham Public School system.

Summary of the Purpose and the Rationale behind our Engagement Plan

The end point will be to positively impact the ability to make nutrition-related decisions by the students and by extension, their families as well.

We do intend on incorporating nutritional education as part of the school curriculum in the public schools system especially as good nutritional decisions in childhood has been found to be associated with a decreased rate of negative health outcomes such as diabetes and obesity in later life (Healthy Eating Learning Opportunities and Nutrition Education | Healthy Schools | CDC, n.d.).

A program will be instituted comprising of a 10-week after-school activity in conjunction with public health nutritionists, school cooks and health educators and through which, our target students will be given adequate, relevant knowledge through a hands-on practical approach that we hope, will provide them with the tools to make proper and healthy nutritional decisions.

Engagement Methods

List of the Planned Engagement Methods

1. Cross-sectional Surveys

a. Student Evaluations

2. Focus group meetings

3. E-mail updates

Description of the Planned Engagement Methods

A Pre-activity student evaluation survey will be done to understand the students' reaction to the planned proposal and suggestions on what needs to be included in the program to

increase participation will be solicited. Afterwards, periodic cross-sectional surveys across the various stakeholders to ensure that the program is meeting its goals. A student evaluation survey will also be conducted at the end of the program in order to evaluate that it met its goals and the students are better knowledgeable nutrition wise in addition to being ready to put it to practice.

Focus group meetings will be conducted prior to the program and include the various stakeholders as a means of brainstorming as well as understand what the program success means to the various stakeholders and to communicate what the program will entail. This will aid the program design and there will be continuous program modification depending on the issues raised at the focus group meetings.

Periodic email updates will be sent out periodically to inform the parents, teachers, school administrators, county board of education and policymakers updated information about the program and its progress.

Accountability Plan

Outline of Memorandum of Understanding (MOU)

This MOU Partnership Agreement is between:

Durham County Health Department

AND:

Our Program contracted health educators

It is mutually agreed this day; ————————- 2022 that the purpose of our partnership is to provide mutual support in increasing nutritional knowledge in our minority children grades 3-8 in the Durham County Public School system in order to positively impact the health outcomes in an otherwise disproportionately affected population.

We expect to increase the nutritional knowledge of our target population with the focus being an increase in daily fruit and vegetable intake.

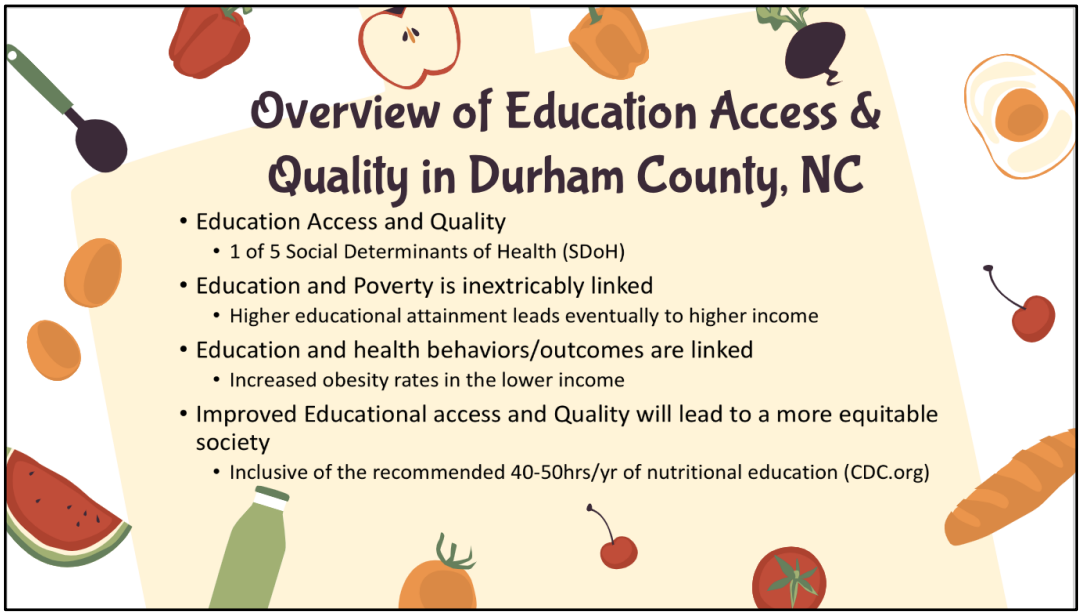
Program Evaluation and Program Modification

The success of the nutritional education program will be assessed using a pre-and post-intervention surveys as well as periodic evaluation surveys and if ever, the goals are not met, a meeting of the students, school cooks, health educators and public health nutritionist will be conducted to discuss an improvement plan and the program modified as needed.

References

Healthy Eating Learning Opportunities and Nutrition Education/ Healthy Schools/ CDC.(n.d.). Retrieved October 21, 2022 from https://www.cdc.gov/healthyschools/nutrition/school_nutrition_education.html

Appendix B.4: Individual Presentation Slides and Script

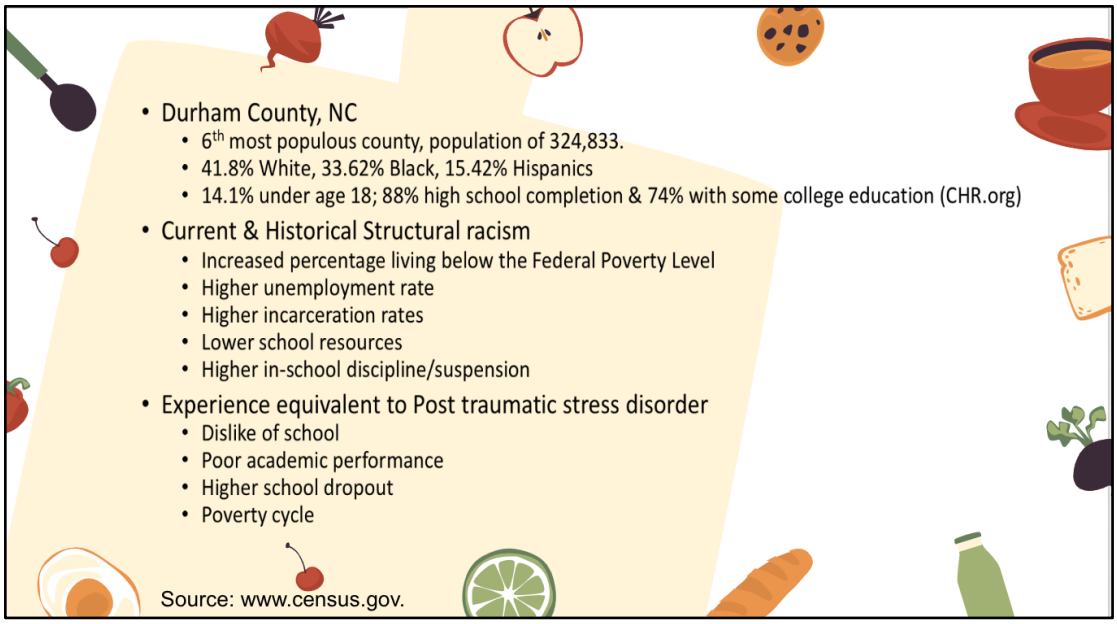


The focus here will be on the education access and quality in Durham county but other domains of the social determinants of health, include economic stability, healthcare access and quality, neighborhood and built environment as well as the social and community context.

Education and poverty have always been inextricably linked together and research has demonstrated that education is a definite way out of poverty since educational attainment tend to increase employment opportunities as well as accessible income. People with lower incomes do have a higher chance of living in poorer neighborhoods with poor quality schools and might not be able to afford the college costs for themselves or their offsprings unlike people with higher income who tend to have more opportunities and can afford to live in neighborhoods with better quality homes, improved access to high quality food and safer environment for physical activities.

It's also known that people with low income jobs have less access to good quality health insurance and health care providers, which along with other health behaviors and outcomes such as obesity might eventually lead to a higher rate of morbidity and mortality.

Efforts put into improving the nutrition knowledge among African American students in Durham County,NC will lead to the ability to make healthier choices, which might eventually assist with creating a healthier generation and a more equitable society.



Durham county is located in the state of North Carolina as part of the research triangle park. It is the sixth most populous county in the state with a population of 324,833 as at the 2020 census. It comprises of 41.18% non-Hispanic White, 33.62% non-Hispanic Black, 15.42% Hispanics, 5.14% Asian with others making up 5.63%.

52.4% of the population are females while 47.6% are males. 14.1% of the populace are under the age of 18 while 20.1% are above 60 years of age while the median household income in Durham county is $65,600.

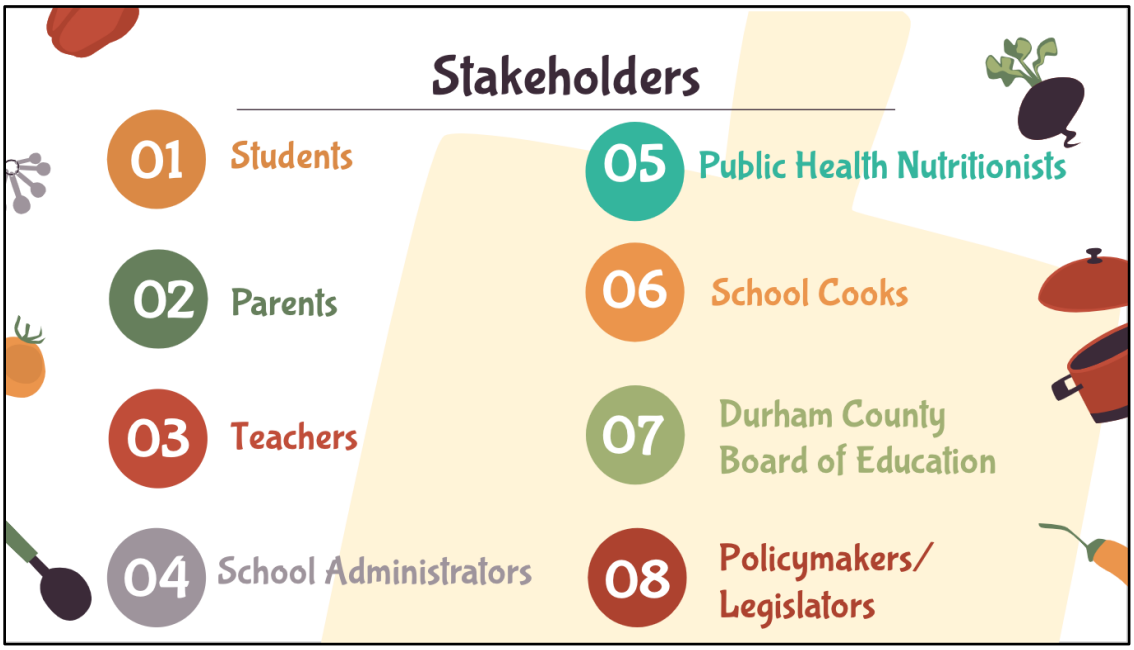
Our nutrition education and training program will mainly be concentrated on the African American students, who will mostly be under the age of 18.

North Carolina, just like the rest of the United States, has factors that can be attributed to current and historical structural racism with an increased percentage of colored people living below the federal poverty level, having higher unemployment rate, higher incarceration as well as in-school suspension rate. School resources are also much less in schools with predominantly Black students.

Historically Black and White students were segregated into different schools as a result of the pre-existing policies and White students are exposed to better materials and tutors leading to better academic achievements and opportunities.

These various experiences, which are equivalent to post traumatic stress disorders can lead to children disliking school, achieving poor academic performance and result in higher high school dropout with the end result being the establishment of a poverty cycle if not quickly curbed.

A focus on removing the barriers and improving the access to, as well as the quality of education available to all community members in Durham county, can lead to an improvement on the present high school completion and college attendance rate thereby giving everyone the opportunity for achieving an optimal quality of life.



The key stakeholders that will be needed for the positive fruition of our nutrition program include the students, their parents, school administrators, teachers, school cooks, Public health nutritionists, Durham County board of education and policymakers/legislators.

Students: Minority students, especially African Americans in Grades 3-8 will serve as the focus of the change. The nutritional program will be built around them and ways to keep them engaged will be prioritized.

Parents: These are the parents of the minority students and it will be necessary to keep them informed and involved with the program in order to ensure the active participation of their children.

Teachers: These are the class instructors. It will be a plus to get them participating in the program since they are already involved in daily activities with the students and there is usually a high regard for them on the part of the students.

School Administrators: They generally head the school, set/enforce the budgets, maintain the academics and manage the students and staff. Having them buy into the program as well as being active partners will make for seamless use of school resources and ensuring nutrition education is a part of the school curriculum.

Public Health Nutritionists: They are registered dietitians who specialize in teaching positive nutrition and nutritional habits. They do understand the importance of a healthy nutrition as well as the impact of the various inequities and will serve as the fulcrum for the change and spearhead the nutrition education program

School Cooks: These are presently attached to the schools. They will be actively involved in the food preparations and help in teaching the students how to make healthy meals.

Durham County Board of Education: They run the school district and make policies affecting the Durham County schools. They have to green light the nutrition education program as well as take on a supervisory role. They have to be constantly updated on the program.

Policymakers/Legislators: The Legislature makes laws that affect Durham County and North Carolina State. Their assistance is needed to earmark funds for the school nutrition program, and they have to be constantly updated on the program.

APPENDIX C: KAMRYN KING'S INDIVIDUAL DELIVERABLES

Appendix C.1: Individual Problem Statement

Social Determinant of Health (SDoH)

Education Access and Quality is a significant Social Determinant of Health (SDoH) recognized within Healthy People 2030. The research shows that individuals who receive higher quality education are more likely to live longer and live healthier (Office of Disease Prevention and Health Promotion, 2020). Education starts early on in life in the formative years of childhood when brain development is influenced and even well into young adulthood. Children who do not have the opportunity to access and graduate from higher education schools are more likely than their educated peers to have a low socioeconomic status, which is associated with negative health outcomes (Office of Disease Prevention and Health Promotion, 2020). These children are also more likely to suffer from heart disease, diabetes, and depression. This could be linked to the fact that understanding health information and the available health services is critical to individuals making good health choices (Education Access and Quality, 2021). Children receiving the education they need can result in short-term benefits like healthy brain development as well as long-term health outcomes such as lower levels of morbidity, mortality, and disability and preventative protection across the lifespan from chronic disease (Education Access and Quality, 2021).

Geographic and Historical Context

This impactful SDoH is particularly important to the Durham County community where education is of high importance within the rapidly growing population (Tan, 2022). The current education system in this county has been known to reflect inequities and capitalize the disproportionate access and quality of education from one neighborhood to another (Tan, 2022).

Durham County is located in the eastern central part of the Piedmont region of North Carolina and is made up of mostly urban cities. In the 2020 Census the Durham County population was 324,833 and the racial composition is fairly diverse (Appendix A). In Durham County the percentage of high school graduates age 25 and older is 89.6%, however the percentage of college graduates age 25 and older is only 49.5% (U.S. Census Bureau QuickFacts: Durham County, North Carolina, n.d.). This breakdown is important when considering the racial inequities rooted within educational access and quality.

Within Durham County there has been a rise in community involvement surrounding the Growing Together Initiative, a local education initiative that seeks to focus on envisioning new school assignment practices for young students (Tan, 2022). Those working in education improvement in the area recognize that the community is challenged with "program misalignment when students transition from one school to another, difficulty in allocating resources for building new schools and outdated school boundaries" (Tan, 2022). Durham County is known to be a progressive, innovative, and diverse community and it is important for the educational policies in place to align with the current values and culture of those living and learning in this area (Culture & Community, n.d.). The focus now is on balancing out the enrollment as well as the demographics of each school within Durham County in relation to newly established regions, which will ensure that kids can receive quality education close to where they live (Tan, 2022).

Priority Population

The priority population for this education access and quality work is the younger community of Durham County from preschool to high school, because education begins and is established in these early years of life. Importance should also be placed on individuals in parts of the community that have historically been disadvantaged in regard to several social

determinants of health including economic stability, the environment, and equitable education access and quality. Without programming that specifically provides quality education to disadvantaged children, those who come from low socioeconomic families are the least likely to have access to valuable educational services that have the ability to improve health outcome rates (Woodhead & Moss, 2007). Access to quality education from the commencement of a person's life can drastically impact the remainder of their life, the health choices they make, and the opportunities they receive as a result. Health literacy and well-being are directly influenced by the education an individual receives and how early on in their development they are exposed to healthy practices (Education Access and Quality, 2021). This is why this SDoH should be addressed preliminarily from the youngest portions of our population.

Measures of Problem Scope

The scope of the education access and quality problem within Durham County is multi-faceted. It is impacted by the performance of schools, the number of individuals who actually complete and receive degrees, the number of educational opportunities available to young learners, and of particular note racism. The educational attainment breakdown in the county has a wide range, which demonstrates the disproportionate educational experiences within the population (Appendix B). In 2019, of the 49 public schools with performance grades in the county 22% were classified as low performing (Durham County NC Goal: 2 Million by 2030 2020 County Attainment Profile, n.d.). Of those between the age of 25 and 44 in Durham county, 12% have less than a high school diploma. This limits the future income, health insurance access, and health literacy of the community. Durham County is also in the process of investing in the expansion of PreK options in order to address the inequities that currently controls the system and directly impact the early development of these children performing (Durham County NC Goal: 2 Million by 2030 2020 County Attainment Profile, n.d.).

Rationale and Importance

In 2020, Durham County commissioners recognized that racism negatively impacts education in communities of color compared to their white peers. Furthermore, they recognized that there are poorer health outcomes seen in the Black, Hispanic or Latin, Indigenous, poor, people with disabilities and LGBTQ communities. In particular it has been noted that Black neighborhoods in Durham County have been systemically neglected and as a result have lower life expectancies than for people in neighborhoods (Community Health Assessment | Durham County - NC - Public Health, n.d.). This is an important health disparity to note because enhanced education access and quality would help to improve the overall health outcomes in these areas that have historically been racially discriminated against. Education access and quality is a SDoH that should be addressed at the root of it and starting with the disadvantaged children of Durham County so that real change can occur.

Disciplinary Critique

Public health leaders in Durham County need to recognize right now the importance of capitalizing on education access and quality for the future health of their community. Health equity is directly impacted by this SDoH and it is undeniable the positive impact that education has on every facet of a person's life. This is a pivotal moment in time for Durham County to invest in its own future and build a better life for all through equitable education opportunities.

Appendix C.1.a: Individual Problem Statement Figures and Tables

Table C1: Racial Breakdown of Durham County, NC in 2020.

Race	**Percentage in Durham County** (U.S. Census Bureau QuickFacts: Durham County, North Carolina, n.d.).
White non-Hispanic	43.4%
Black or African American	35.9%
Hispanic or Latino	13.8%
Asian	5.6%
Other/Mixed	2.8%
Native American	1.0%
Pacific Islander	0.1%

Table C2: Durham County, NC Educational Attainment Breakdown in 2021.

Educational Level	**Percentage in Durham County** (Durham County North Carolina Education Data for Research Orange County and Wake County, n.d.)
Bachelor's Degree or higher	49.5%
Some college or Associates Degree	22.4%
High School or GED	17.7%
Less than High School	8.9%

No schooling	1.5%

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Appendix C.2: Stakeholder Analysis

The Social Determinant of Health (SDoH) in concern for this Stakeholder Analysis is Education Access and Quality specifically in Durham County, NC. The subsystem in focus within this SDoH is Nutrition Education to Improve the Health of African American Children in Durham Country, NC.

Education Access and Quality is a significant Social Determinant of Health recognized within Healthy People 2030. The research shows that individuals who receive higher, quality education are more likely to live longer and live healthier (Office of Disease Prevention and Health Promotion, 2020). Education starts early on in life in the formative years of childhood when brain development is influenced and continues into young adulthood. Improving education access and quality is one approach to improve health outcomes, such as obesity, in hopes of creating healthier, more equitable generations (Harvard School of Public Health, 2012).Due to the interaction between education and nutrition and the direct impacts they each have on health, the focus is improving nutrition knowledge among African American children in Durham County, NC.

In order to address this focus point, the proposed program is an after-school cooking and nutrition education program for grades 3-8 in Durham County's underserved schools. For the purpose of this program underserved schools are defined as schools in Durham County that have 50.1 or greater percent of students eligible for free or reduced-price lunch. By prioritizing underserved schools, there is inherently more opportunity to reach the priority population of African American children in the area. The specific aim will be to improve nutrition education, cooking self-efficacy, enjoyment and consumption of fruits and vegetables, and lastly increased communication to families regarding healthy eating (Jarpe-Ratner et al., 2016).

The drivers of the subsystem and the ones who will be most involved in the implementation of this program are known as stakeholders. Stakeholders are people or

organizations invested in the program or who are interested in the results of the program. Bringing diverse stakeholders to the table is important for addressing public health concerns in the community because it allows for the perspectives of legislators, public health practitioners, and the public to be considered concurrently (Laird et al., 2020). It is fundamental to include them and represent their needs and interests throughout the process of creating and evaluating a public health program to ensure that programming is relevant and sustainable.

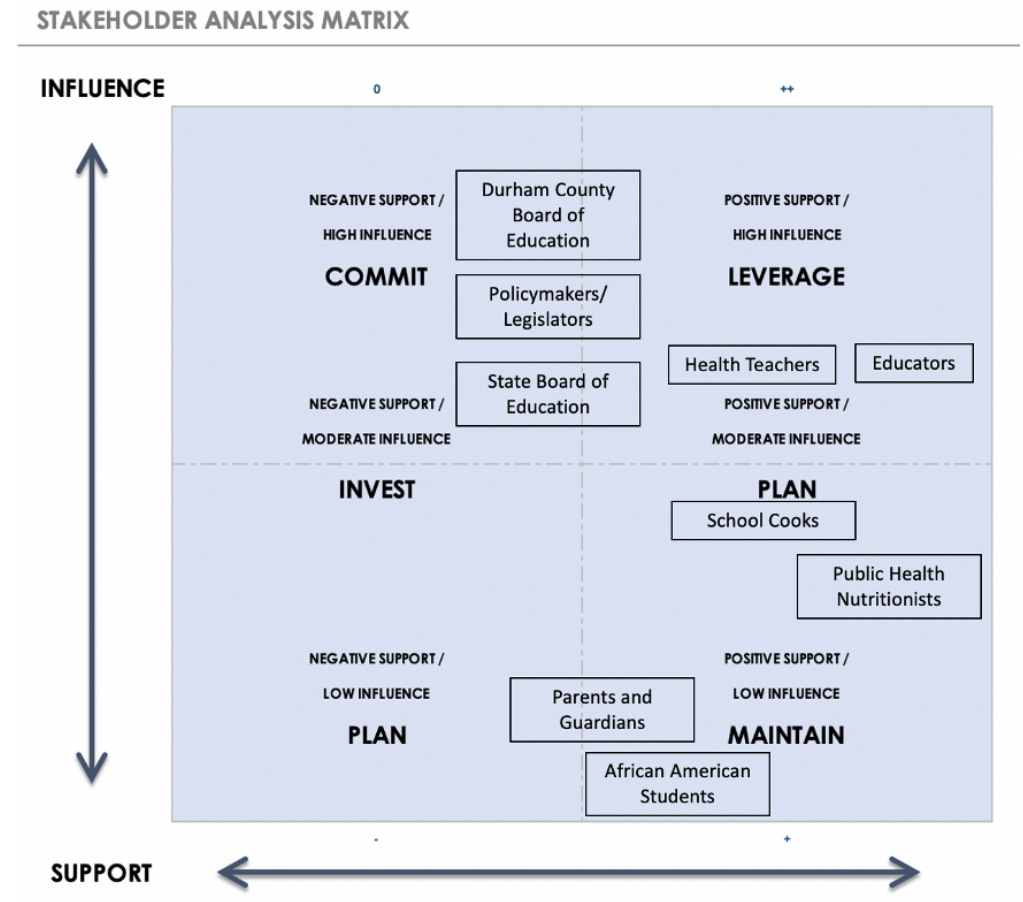
The stakeholders identified for the Nutrition Education Program are listed below. They have been identified as being relevant either because of their geographical proximity, their organizational ties, or by their proposed involvement. These stakeholders have also been identified because they are either directly or indirectly impacted by the nutrition education program (Laird et al., 2020).

Stakeholders for the Nutrition Education Program:

- African American students in Durham County, NC
- Parents and guardians in Durham County, NC
- Educators
- Health Teachers
- School Cooks
- Public Health Nutritionists
- Durham County Board of Education
- State Board of Education
- Policymakers/Legislators

Once stakeholders are identified it is critical to determine the power or influence and the interest or support that each has in regards to the program because this will help to prioritize, engage, and ultimately communicate effectively with them. Stakeholders have the potential, based on their power, to either prevent the program from happening or to help advance it into successful implementation. Some stakeholders will be interested in the program, while others may not and this will impact the communication that occurs with them (Laird et al., 2020). An influence and interest grid was conducted in order to better visualize where the identified stakeholders land in relation to one another based on their perceived power and the anticipated

support they would give to the nutrition education program. This tool will be used to more strategically engage stakeholders to benefit the program's implementation and sustainability plan.



African American students in Durham County may have a high interest in participating in this program or want to learn more about nutrition, but they may have little power over whether it is funded and implemented. It is important to note, however, that though these students have perceived low power they can hold some power over whether or not they want to voluntarily attend the program. Parents and guardians in Durham County may be less interested in the program than the students because it has the potential to add more stress to their life if they in turn have to figure out transportation or other logistics for their kids to participate. Notably there may be some parents who have higher interest in the nutrition program based on their circumstances. This may include parents who need help providing an after-school meal, parents

who have noticed their child is at risk for obesity, or parents who work in the nutrition field. Parents or guardians may have slightly more power than students because they can advocate for the program within the schools or within the Parent Teacher Association.

Educators, Health Teachers, and School Cooks may be supportive of improving the health of the students by educating them further. They could also be the ones implementing the program and ensuring that it can run smoothly, which gives them higher influence. Public Health Nutritionists may have high support or interest, but they may not already be active in schools or have the funding to be there unless the program is able to gain support at a higher level. Policymakers/Legislators may or may not be interested in this program depending on their stance on nutrition and education, however, they usually have influence over what gets passed and funding that may be received. The local representatives from Durham County could include the City Council members as well as the House of Representative and Senate members that represent the area. At this time those members are Representatives Vernetta Alston, Zack Hawkins, Marcia Morey, and Robert T. Reives, II as well the Senators Natalie S. Murdock and Mike Woodard (Durham County Representation - North Carolina General Assembly, n.d.). Each of these individuals plays a role in policymaking and the passing of legislation that impacts both education and health outcomes.

Lastly comes the educational boards with their overarching authority concerning many policies, funding, and programming opportunities. The Durham County Board of Education has a somewhat high influence or power over decisions within schools due to their own autonomy, but they do have many other concerns to address and goals to achieve which could prevent them from placing emphasis on this program. The State Board of Education may have some influence and power through funding opportunities within the budget, however, they are not typically involved in local programming at a high decision-making level.

Overall, the matrix will allow you to see how stakeholders compare and thus how to prioritize them based on how much they would be anticipated to support or have an interest in

the program as well as how much influence or power they have over implementation of the program. Recognizing how each will impact the success and sustainability of this nutrition education program is key to an efficacious experience in engaging stakeholders to create transformative change on education access and quality.

The following Table synthesizes this information to determine the overall priority level of engaging each stakeholder in order to highlight who will be the most beneficial to engage based on the analysis of the reasons behind the importance of their involvement. This priority level influences the manner in which groups are motivated to have a part in implementing this nutrition education program and ultimately determines the success and future of addressing education access and quality in Durham County through this avenue.

Appendix C.2.a: Stakeholder Analysis Figures and Tables

Table 1. Analysis of Stakeholder Priority

Stakeholder	**Interest/Influence**	**Priority Level**
African American students in Durham County, NC	Moderately High Interest, Low Influence	Medium Priority
Parents and guardians in Durham County, NC	Moderately Interested, Somewhat Low Influence	Low Priority
Educators	High Interest, Moderately High Influence	High Priority
Health Teachers	High Interest, Moderately High Influence	High Priority
School Cooks	High Interest, Moderate Influence	Medium Priority
Public Health Nutritionists	High Interest, Moderately Low Influence	Medium Priority
Durham County Board of Education	Somewhat Low Interest, High Influence	High Priority
State Board of Education	Somewhat Low Interest, Moderate Influence	Medium Priority
Policymakers/Legislators	Somewhat Low Interest, Moderate Influence	Medium Priority

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Appendix C.3: Engagement and Accountability Plan

Part I. Engagement Plan

Statement of Purpose

The Social Determinant of Health (SDoH) to be addressed is Education Access and Quality specifically in Durham County, NC. The subsystem in focus within this SDoH is Nutrition Education to Improve the Health of African American Children in Durham Country, NC. In order to address this focus point, the proposed program is a 10-week after-school cooking and nutrition education program for grades 3-8 in Durham County's underserved schools. For the purpose of this program underserved schools are defined as schools in Durham County that have 50.1 or greater percent of students eligible for free or reduced-price lunch. By prioritizing underserved schools, there is inherently more opportunity to reach the priority population of African American children in the area.

The specific aim of the program will be to improve nutrition education, cooking self-efficacy, enjoyment and consumption of fruits and vegetables, and lastly increased communication to families regarding healthy eating amongst students in grades 3-8 in underserved Durham county public schools in order to positively impact nutrition-related decisions of students and their families. (Jarpe-Ratner et al., 2016). Nutritional information is frequently omitted from the educational materials shared within public schools, and especially in underfunded schools that are unable to prioritize this topic. Children who are informed and who make positive nutritional choices are less likely to suffer from obesity and diabetes when they grow up and will even live longer (Office of Disease Prevention and Health Promotion, 2020).

With the support of a diverse group of stakeholders our program will provide a tangible educational basis for students to obtain the knowledge they need to make positive nutrition decisions for themselves long after the program has concluded. Engagement activities have been identified for each stakeholder group in order to align with their influence, interest, responsibility, and accountability in the program. Furthermore, engagement activities have been

refined based on the notion that they should provoke and promote support among stakeholders, guide program improvement through the first iteration, and respect the fact that many stakeholders have a right to information surrounding programming that will be directly impacting them.

Key Stakeholders Identified: The stakeholders identified for the Nutrition Education Program are listed below. They have been identified as being relevant either because of their geographical proximity, their organizational ties, or by their proposed involvement. These stakeholders have also been identified because they are either directly or indirectly impacted by the nutrition education program (Laird et al., 2020).

Stakeholders for the Nutrition Education Program:

- African American students in Durham County, NC
- Parents and guardians in Durham County, NC
- Educators
- Health Teachers
- School Cooks
- Public Health Nutritionists
- Durham County Board of Education
- State Board of Education
- Policymakers/Legislators

Engagement Methods

The first step in engaging stakeholders will be to survey stakeholder groups to determine their intended involvement and interest in the nutrition education program. In order to accurately determine how to effectively engage with stakeholders we must have an up to date understanding of their initial thoughts and perceptions surrounding the proposed programming and what we can plan to expect from them during the development, implementation, and evaluation periods. This will also be an opportunity to introduce the idea of nutrition education

programming in schools to stakeholders, possible for the first time, and could be valuable for raising awareness of the planned program. Once this is done an accurate Influence Vs. Interest Grid will be created based on their response (Appendix A). Based on this grid you can determine who to leverage and prioritize in the engagement process so that an effective, impactful, and sustainable program is executed.

Next you will determine the frequency and mode of communication appropriate for each stakeholder. This could look like meetings in person or virtually once a month, email newsletters with updates weekly, focus groups, interviews, forums, phone calls, text messages, or anything that is determined to be the most beneficial method of engagement. This process of dividing the stakeholders up based on different categories of engagement preferences allows you to determine who to inform, consult, collaborate, and empower (Program Evaluation Guide - Step 1 - CDC, 2022).

The first engagement activity that will be conducted with all available stakeholders will be Community Asset Mapping. This will be done collectively and in collaboration to identify and decide on strategies for the development and implementation of the program. This will be a time for stakeholders to share resources that they believe will be useful within the context of the nutrition education program. These sessions could be in person or held virtually once or twice early on in the development process and will consist of brainstorming and lots of discussion surrounding the assets of the Durham County community that already exist.

Focus group meetings are another engagement activity that we plan to utilize in order to discuss program design as well as adjustment for future iterations of the 10-week program. This will mainly employ high accountability stakeholders that will be highly involved in actually executing the program. This may include nutritionists, school cooks, public health professionals, and health educators who will be on site. The focus group meetings will begin prior to starting the program and will continue after the program has concluded in order to ensure program quality and potentially enable prospective improvements. These meetings will help to develop

the overall structure, teaching methods used, and even weekly content of the nutrition education. Furthermore, they will provide an opportunity for program staff to communicate their needs, gaps in the real-world application of the program, and what future changes are necessary.

Surveys are a critical engagement activity as they aid in gauging the satisfaction ratings and are a quick, convenient way to capture feedback data. Stakeholder feedback from these surveys will be used to fine-tune the program and determine where key players' viewpoints align or differ. This is also an opportunity to receive suggestions on how to make the program even better, either anonymously or not. These surveys can be sent out over email with a link or with paper copies handed out periodically like at the end of each week of the program. The focus with these will be on indirect stakeholders such as students and parents who do not play a role in the execution, but who are heavily impacted by the program. The study survey questions will be tailored to be about their experience within the after school nutrition education lessons, while parents will be asked about their experience and perceptions watching their child be a part of the program.

Student evaluations will be the backbone of the evaluation for the success of our program because they will let us assess how effective the program is at increasing nutritional knowledge in our target population. The students in Durham County will be tested pre- and post-program with the same exact assessments in order to calculate their estimated fruit and vegetable intake and their nutritional knowledge. This will allow us to determine just how much of an impact the nutrition education program had on student nutritional habits, awareness, and choices around health.

Lastly email or text updates will be sent out intermittently to reach out to stakeholders who may be more on the outskirts of the program to give them a progress report. This may include parents, teachers, the Durham County Board of Education members, and the Durham County school administration and we estimate that they will receive bigger updates before, at

the mid-point, and immediately after the 10-week program and smaller updates as needed. This allows these stakeholders to have an understanding of progress while maintaining a hands-off status. See Table 1 for a condensed version of the engagement method activities and strategies. See Table 2 for a RASCI analysis outlining who is responsible and accountable for accomplishing the program and ensuring the work and goals are completed.

Part II. Accountability Plan

Memorandum of Understanding

Between

Durham County Health Department

And

Durham County Board of Education

I. Purpose and Scope

The purpose of this Memorandum of Understanding (MOU) is to specify the roles and responsibilities of the Durham County Health Department (DCHD) as the backbone or lead agency and the Durham County Board of Education (DCBE) as a primary partner that will be responsible and accountable during the implementation of a 10-week after-school cooking and nutrition education program for grades 3-8 in Durham County's (DC) underserved schools. The purpose of the nutrition education program is to improve nutrition education, cooking self-efficacy, enjoyment and consumption of fruits and vegetables, and lastly increased communication to families regarding healthy eating amongst students in grades 3-8 in underserved Durham county public schools in order to positively impact nutrition-related decisions of students and their families.

DCHD and DCBE agree that program activities will be conducted in accordance with all application federal and state laws, rules, and regulations. Additional project partners include DC Educators, Health Teachers, School Cooks, Public Health Nutritionists, the NC State Board of Education, African American students, and Parents or guardians in Durham County.

II. MOU Term

The term of this MOU begins July 1st, 2023 and terminates June 31st, 2025. This is the timeframe for which the program activities summarized in this MOU will be executed.

III. Principles of Engagement

Each party agrees to uphold the following principles:

1. All parties will engage in effective communication and information sharing.
2. All parties will promote openness and transparency and will take the time to honor the other parties' opinions surrounding the program and its goals.
3. All parties will encourage collaboration and come together around a shared purpose.
4. All parties intend to engage in a sustained effort and will communicate any concerns or delays in advance.
5. All parties will promote trust within the community.
6. All parties will complete their respective responsibilities and uphold accountability for the other party.

IV. Durham County Health Department Responsibilities

1. Attend all meetings
2. Provide expert advice to the DCBE to ensure health safety measures are clearly outlined and implemented at participating schools.
3. Support DCBE staff and attend the initial programming kick-off
4. Serve as the point of contact for the public health nutritionists and school teams implementing the programming.
5. Provide meeting spaces and maintain meeting notes.
6. Work with DCBE to facilitate quality control visits to ensure that students are safe and all federal and state laws, rules, and regulations are upheld.
7. Provide feedback to those who are in the group implementing the program.

8. Participate in program design, evaluation, and implementation.

9. Contribute to the distribution and broadcasting of final results to the educational and public community.

V. Durham County Board of Education Responsibilities

1. Attend all meetings.
2. Provide expert advice to the ten schools involved in the nutrition programming
3. Support school staff and attend the initial programming kick-off
4. Work with the DCHD to maintain all health safety measures and recommendations.
5. Work with DCHD to facilitate quality control visits to ensure that students are safe and all federal and state laws, rules, and regulations are upheld.
6. Participate in program design, evaluation, and implementation.
7. Contribute in the distribution and broadcasting of final results to the educational and public community.

VI. Program Metrics

Partners agree that the following metrics will be used to measure the program progress:

Short term metrics (1 month post programming)

Pre- and post-intervention surveys will be completed by students to assess nutrition knowledge, exposure to fruits and vegetables, intake of fruits and vegetables, liking of fruits and vegetables, frequency of cooking at home, and family communication about healthy eating and other behaviors. Using these pre-and post-intervention surveys we anticipate the following progress measures:

1. Students who participate in the nutrition education program will have an increased reported score for nutrition knowledge by 0.2.

2. Students who participate in the nutrition education program will increase their fruit and vegetable intake by 0.2.

3. Students who participate in the nutrition education program will increase their cooking self-efficacy score by 0.4.

4. Students who participate in the nutrition education program will increase their frequency of cooking at home score by 0.1

The post-intervention survey will take place one month following the completion of the program to give time to assess changes in behavior. Quantitative statistics will be used to measure the outcomes. Scores for all students will be averaged from the pre- and post-intervention surveys ($\pm$ SD). For analysis, changes
in scores will be calculated from the difference between pre- and post-scores
for each student. The changes in scores will be analyzed with paired *t* tests. To be considered statistically significant, the difference must be $P < 0.5$. Short-term progress will be defined by students showing improvements in nutrition knowledge and/or cooking self-efficacy via these post-intervention surveys.

Long term metrics (4 years)

1. There will be a long-term goal of improving healthy behaviors and health outcomes in children who participate in the nutrition education program. Students will be followed up to 4 years, as long as they are in the Durham County school system to assess whether the nutrition programming had long-lasting impacts or if benefits. The same post-intervention survey will be given to students to assess whether improvements in nutrition knowledge, exposure to fruits and vegetables, intake of fruits and vegetables, liking of fruits and vegetables, frequency of cooking at home, and family communication about healthy eating and other behaviors have been maintained or waivered.

VII. Program Milestones

Year 1

1. June – Kick-Off Discussion meeting

2. August – Pre-program implementation meeting

3. September – Commencement of the after-school program

4. October – Mid-program progress meeting

5. December – Post- program meeting

6. March – Reflection and qualitative assessment of programming success and stakeholder perceptions

7. May – Year End Wrap Up discussion surrounding necessary updates and logistics for next iteration

Year 2

1. June – Year 2 Kick-Off Discussion meeting

2. August – Pre-program implementation meeting

3. September – Commencement of the second wave of after-school program

4. October – Mid-program progress meeting

5. December – Post- program meeting

8. March - Reflection and qualitative assessment of programming success

6. May – Final Meeting to share Results and Deliverables with community

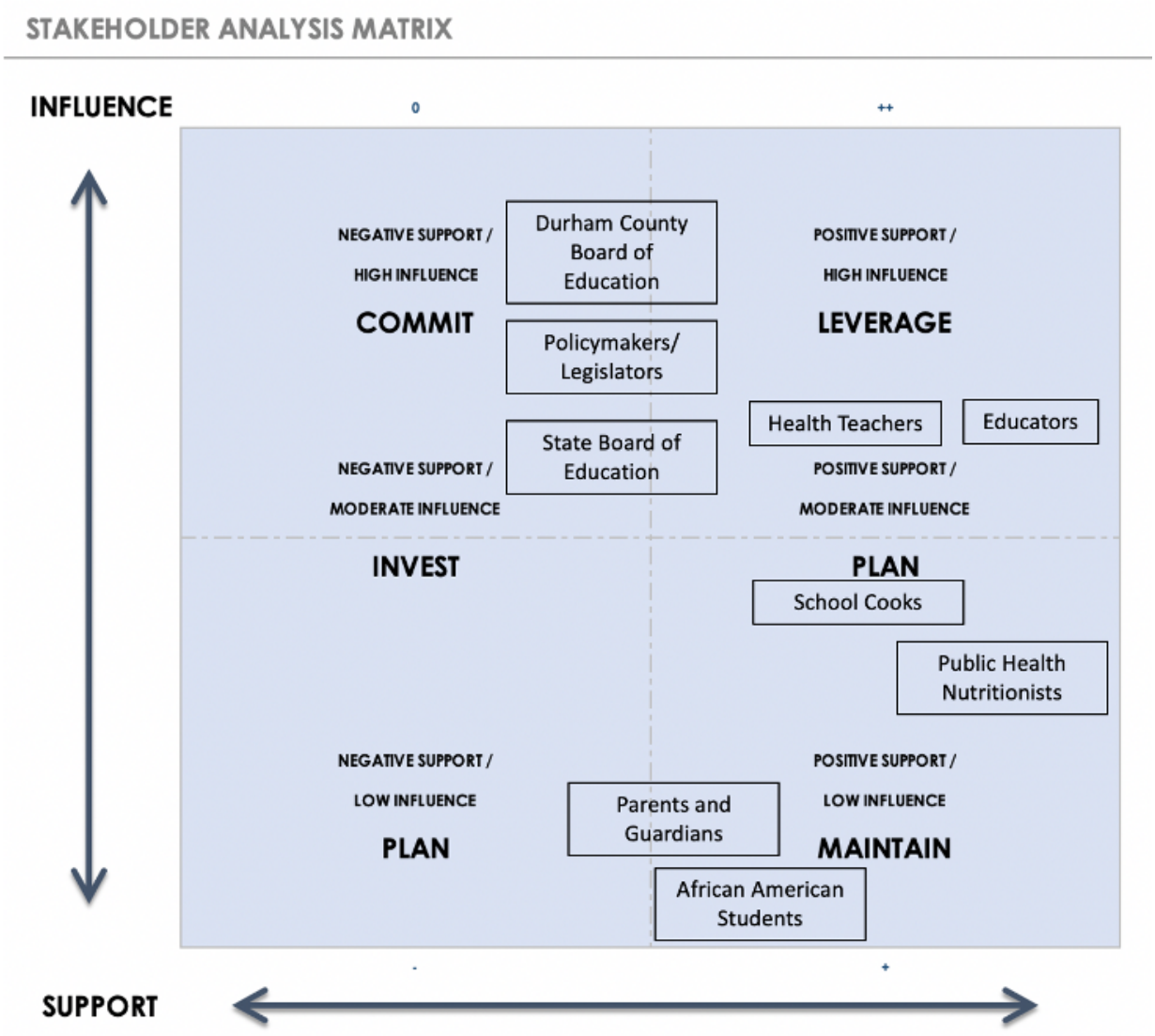
VIII. Modification and Termination

1. Either party is entitled to cancel this agreement by giving thirty (30) days notice. This should be in writing and must include the effective date of cancellation.

2. Either party is entitled to request amendments to this agreement by giving ten (14) notice. This should be in writing and must include the effective date of the amendment. The notice of amendment must then be signed by both parties.

Appendix C.3. a: Engagement and Accountability Plan Figures and Tables

Appendix A: Grid/ Matrix showing the anticipated influence (or power) and support (or interest) of identified stakeholders



Tables

Table 1: Condensed Engagement Methods

Engagement Method	Description	Frequency/ Timing	Stakeholders Involved

Community Asset Mapping	Partner with stakeholders to identify and decide on strategies for the development and implementation of the plan	One or two in person or virtual sessions early on in the development of the program	Public health professionals, nutritionists, health educators, school cooks, teachers, parents
Focus group meetings	Inclusion of high-accountability stakeholders to discuss program design and adjustment	Two to three in person or virtual sessions – before the program and after the program.	Public health professionals, nutritionists, health educators, school cooks
Surveys	Gathering feedback from low-accountability stakeholders to fine tune the program	Link sent out over email or paper copies handed out at the end of each week of the program	Students, parents
Student evaluations	Pre- and post-course assessment to determine level of knowledge learned by students during the program	Before and after the program on paper or through an electronic assessment grader	Students

Email or text updates	Providing information on program progress	Major updates pre, mid, and post program. Weekly or as needed minor updates during the program.	Email: teachers, school administration, county board of education Email or text: Parents

Table 2: RASCI analysis - **What do we propose and who do we want to lead the effort?**

The below RASCI analysis outlines who is responsible and accountable for accomplishing the program identified. This analysis is used to determine who has authority for the work and who is ultimately accountable for ensuring the work and goals are completed.

RASCI Levels		
Who is...	Policy/Program Transformation	Rationale for Partner Participation
Responsible=owns the problem / project	Public Health Nutritionists	They are the ones spear-heading the initiative because they understand how transformative and impactful nutrition education can be to overall health outcomes.

Accountable=ultimately answerable for the correct and thorough completion of the deliverable or task, and the one who delegates the work to those responsible	Health educators, public health professionals.	Responsible for the planning and implementation of the program
Supportive=can provide resources or can play a supporting role in implementation	Nutritionists, School Cooks	Offer supportive services throughout program duration
Consulted=has information and/or capability necessary to complete the work	Policymakers/Legislators, State Board of Education, Durham County Board of Education	Kept informed about program progress, but ultimately operate from a supervisory, hands-off position
Informed=must be notified of results, process, and methods, but need not be consulted	Teachers, Parents/ Guardians, Students	They are kept in the loop concerning what the program involves and how it is impacting the community, but they are not involved themselves

		in the implementation of the program.

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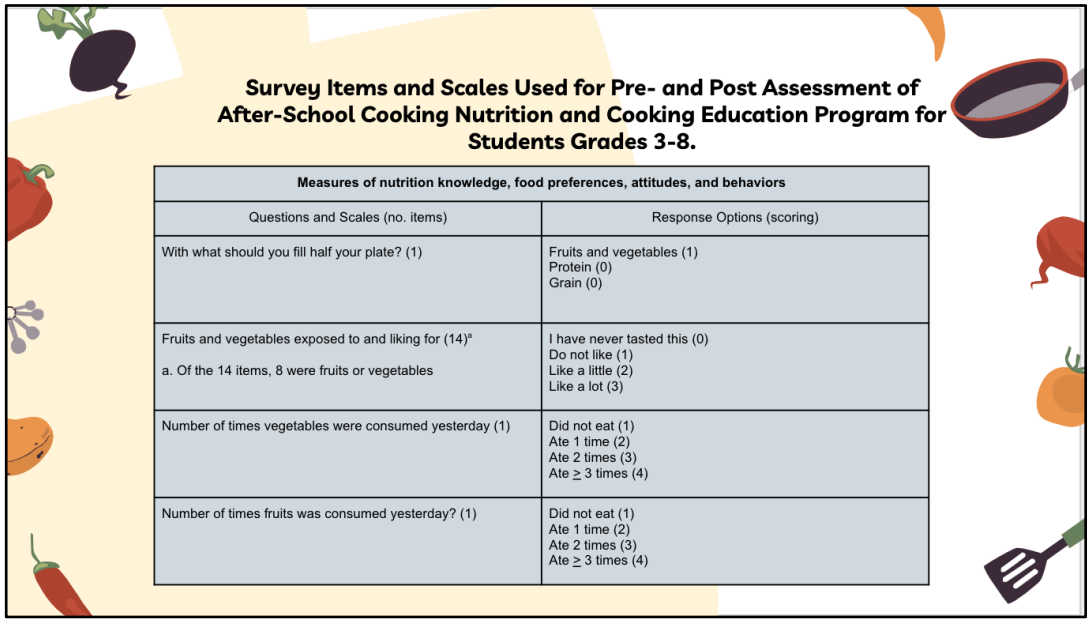
Appendix C.4: Individual Presentation Slides and Script

Good evening, Durham County Commissioners and thank you for joining us. We are pleased to have you.

My name is Kamryn King and I will be presenting alongside Kay, Grace, and Reed.

Tonight, we will share our proposal to increase nutrition education access and knowledge among African American children in elementary school (specifically grades 3-8) in Durham County, NC.

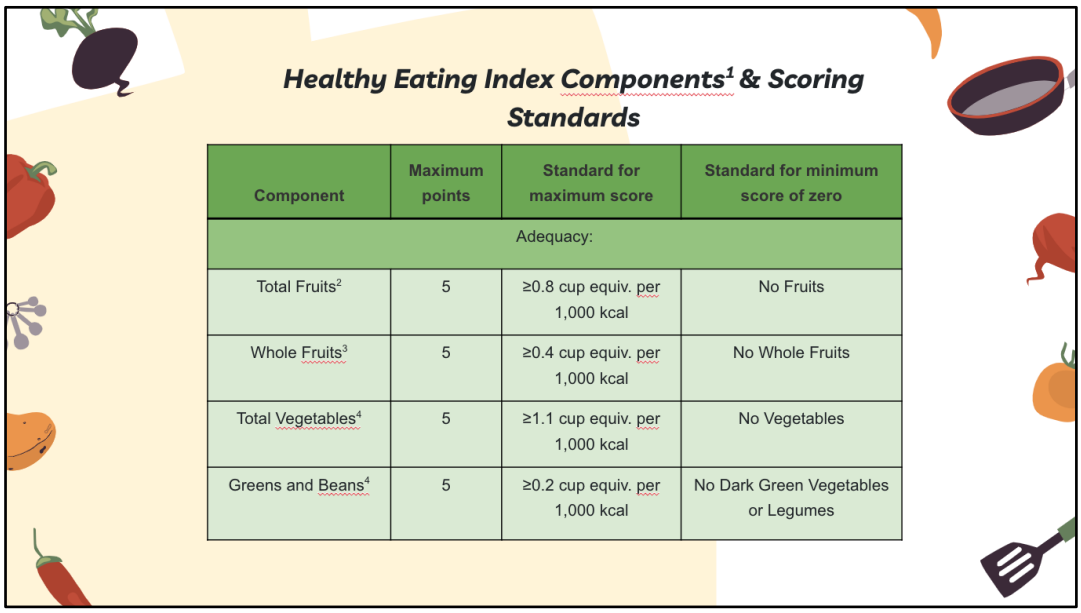


Survey Items and Scales Used for Pre- and Post Assessment of After-School Cooking Nutrition and Cooking Education Program for Students Grades 3-8.

Measures of nutrition knowledge, food preferences, attitudes, and behaviors	
Questions and Scales (no. items)	Response Options (scoring)
With what should you fill half your plate? (1)	Fruits and vegetables (1) Protein (0) Grain (0)
Fruits and vegetables exposed to and liking for (14)[a] a. Of the 14 items, 8 were fruits or vegetables	I have never tasted this (0) Do not like (1) Like a little (2) Like a lot (3)
Number of times vegetables were consumed yesterday (1)	Did not eat (1) Ate 1 time (2) Ate 2 times (3) Ate ≥ 3 times (4)
Number of times fruits was consumed yesterday? (1)	Did not eat (1) Ate 1 time (2) Ate 2 times (3) Ate ≥ 3 times (4)

We wanted to share a sample of a few survey questions and scales that will be collected before

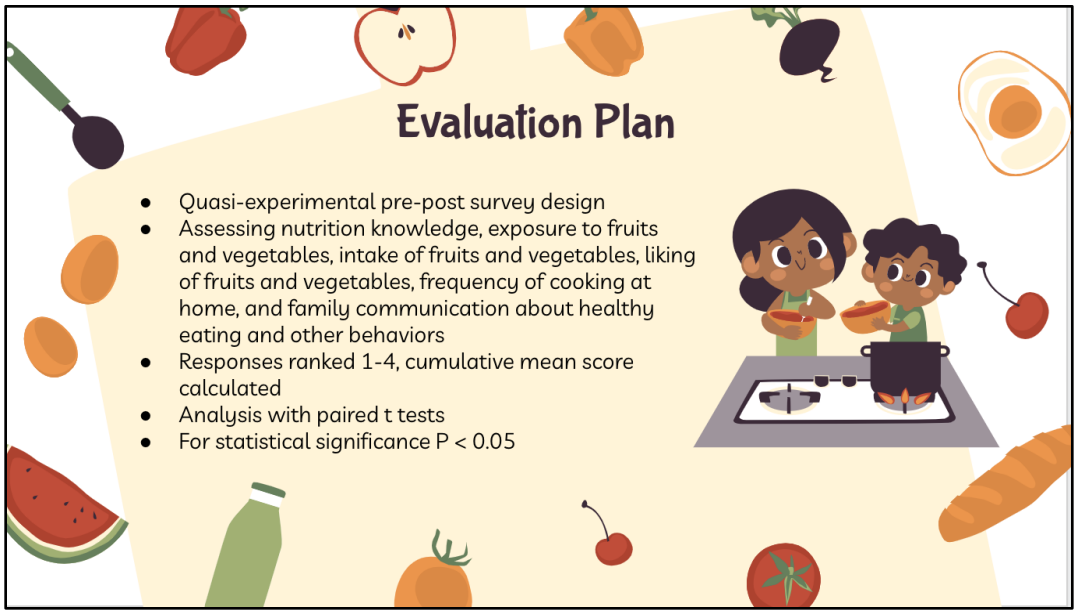
and after involvement in our nutrition education program in order to measure the impact the program had on nutritional knowledge and fruit and vegetable intake.
For instance these questions include what food group should you fill half of your plate with as well as the number of vegetables that the student consumed the day before.



Healthy Eating Index Components[1] & Scoring Standards

Component	Maximum points	Standard for maximum score	Standard for minimum score of zero
Adequacy:			
Total Fruits[2]	5	≥0.8 cup equiv. per 1,000 kcal	No Fruits
Whole Fruits[3]	5	≥0.4 cup equiv. per 1,000 kcal	No Whole Fruits
Total Vegetables[4]	5	≥1.1 cup equiv. per 1,000 kcal	No Vegetables
Greens and Beans[4]	5	≥0.2 cup equiv. per 1,000 kcal	No Dark Green Vegetables or Legumes

For the long term evaluation of our program we wanted to first share this table which breaks down the components for the Healthy Eating Index scoring standards. Categories shown include total fruits (which includes 100% fruit juice), whole fruits (which does not include juice), total vegetables, and greens and beans. The maximum points in each category is 5 and there are different cup amounts per 1,000 kcals for each which indicate what is considered an adequate amount. Intakes between the minimum and maximum standards are scored proportionately. The total HEI score is the sum of these adequacy components (i.e. foods to eat more of for good health) as well as moderation components (i.e. foods to limit for good health).



- Now I will discuss our Evaluation plan in more detail.
- Overall, the effectiveness of the program will be assessed on students with a quasi-experimental pre-post survey design. Quasi-experiments are studies that aim to evaluate interventions but that do not use randomization. The aim with this design is to demonstrate causality between our intervention (the nutrition education program) and an outcome.
- The pre- and post-intervention surveys will be completed by students to assess nutrition knowledge, exposure to fruits and vegetables, intake of fruits and vegetables, liking of fruits and vegetables, frequency of cooking at home, and family communication about healthy eating and other behaviors.
- Answers to the survey questions will have response options ranked 1-4, which will be used to calculate the cumulative mean score for all questions.
- Data will then be taken from each school and then averaged across all ten schools.
- For analysis, changes in scores will be calculated from the difference between pre- and post-scores for each student.
- The changes in scores will be analyzed with paired t tests. To be considered statistically significant, the difference must be $P < 0.5$.
- The post-intervention survey will take place one month following the completion of the program to give time to assess changes in behavior. Once mean scores have been calculated and results of the program have been finalized, the evaluation will take place.

- Progress will be defined by students showing improvements in nutrition knowledge and/or cooking self-efficacy via their post-intervention surveys.
- If progress does not occur, the public health nutritionists, school cooks, school health teachers, and the board of education will meet to discuss an improvement plan. The public health nutritionists will also reach out to students and parents to get program feedback.

1 year Budget

Description	Unit	Unit Cost	Quantity	Unit Amount in USD	Total Amount in USD
Human Resources					
Public Health Nutritionists (Program Director)	Staff	$22,000	6 months	$22,000	$22,000
School Cooks	Staff	$100/session	10 sessions	$1,000	$1,000
Health Teachers	Staff	$100/session	10 sessions	$1,000	$1,000
Direct Expenses					
Food for in-session cooking	Students	$7/student/ session	10 sessions for 250 students	$70/student for 10 sessions	$17,500
Cooking/ Miscellaneous Supplies	Unit	$100/student	250 students	$25,000	$25,000
Food Donations from Grocery Stores, Farmers, and Community for Students to Take Home	Unit	$0	In-kind	$0	$0
Total					$66,500

Though our group did not have a health policy representative we have outlined a estimated 1 year budget.

A large portion of the expenses will come out in staffing costs which will include public health nutritionists, school cooks, and health teachers.

Then we will have the bulk of costs coming out of direct expenses such as food for in-session cooking and miscellaneous cooking supplies.

We would like to note that food donations from grocery stores, farmers, and the community are expected to be donated in-kind and will not contribute to overall costs.

The total we estimate for the first year of the program is $66,500. Once the first iteration is completed of the 10 week nutrition education program we will re-evaluate and move into a second iteration of the program based on the feedback we receive. Based on this budget three years or iterations of the program will come out to a total of $199,500.

APPENDIX D: GRACE MORNINGSTAR'S INDIVIDUAL DELIVERABLES

Appendix D.1: Individual Problem Statement

Addressing the High School Dropout Rate in Minority-led Public High Schools in Durham County, North Carolina

Social Determinant of Health

The Centers for Disease Control defines education access and quality in public health as the "connection of education to health and well-being." Individuals without sufficient access to quality education are more likely to have shorter life expectancy and experience a lower quality of life.[7] Since inequitable access to education causes disadvantaged populations to be disproportionately affected by negative health outcomes, it is important that quality education be accessible to all members of a community and not just to those with the most limited constraints in socioeconomic status, transportation availability, and racial or ethnic discrimination.

One of the Healthy People 2030 objectives for education access and quality is to increase the number of students who graduate high school in four years.[7] Studies have shown that individuals who do not obtain a high school diploma are more likely to develop chronic conditions such as diabetes, hepatitis, and hypertension, and have an increased risk of substance abuse, arrest, and negative employment outcomes.[5,6] Generally, insufficient access to quality education is often driven by factors outside of an individual's control, such as housing and transportation availability, school zones, family income, and lack of funding for public institutions.

Geographic and Historical Context

According to 2021 U.S. Census data, Durham County, North Carolina, has approximately 326,126 residents. Of these residents, 35.9% are African American, 13.8% are Hispanic/Latino,

and 5.7% are Asian/Pacific Islander. The median annual household income is $62,812, and 11.7% of the population lives below the poverty line.[4] Located in the Research Triangle of North Carolina, Durham County is home to Duke University, North Carolina Central University, and Durham Technical Community College. 89.6% of adult Durham County residents have graduated high school, and nearly 50% of residents have a Bachelor's degree or higher.[4]

Durham County, like so many other regions in the United States, has a long history of racial and class discrimination through social attitudes and policy implementation.[1] Significant neighborhood segregation still exists within Durham County, divisions that have historically been drawn based on racial lines and sustained with gentrification efforts that have become more pronounced in the past few decades. The same principle extends to the educational institutions and resources that have been allocated to different zones within Durham County.

Priority Population

Public high schools in Durham County with African Americans as the majority race are experiencing lower-than-average graduation rates[3]. For example, the student bodies of Hillside, Jordan, Northern, Riverside, and Southern High School are all primarily constituted by African American students. The graduation rates of these schools are generally lower than other public schools in the area whose students are primarily non-Hispanic whites. The vast majority of students at the high schools mentioned above utilize free or reduced-price lunch programs, which typically coincides with lower familial socioeconomic status.[3] Other public schools, and especially private schools, in Durham County that are located closer to high-income neighborhoods do not seem to have these issues.[1] As such, minority and low-income students in the Durham Public School system seem to be at a distinct disadvantage.

Measures of Problem Scope

When the graduation rates of students within the Durham Public School system were stratified by racial group, African American students had a graduation rate of 78.1, while non-Hispanic white students had a graduation rate of 89.6.[8] Hispanic and Native American students had graduation rates of 66.8 and 66.7, respectively. Students who were reported to have a lack of English proficiency or a learning disability shared the lowest graduation rate, at 54.3.[8]

Of the thirteen high schools included in the DPS system, the seven schools with the highest prevalence of reduced-lunch program enrollment are constituted by at least 80% minority students. At the majority of DPS high schools, African American students are the primary enrollees in these programs.[8] The discrepancy between Black and non-Hispanic white student enrollment in these programs is generally wide; for example, at Northern High School, the percentage of Black students enrolled is 55.6%, while the percentage of non-Hispanic white students enrolled is 25.5%.[8]

Rationale/Importance

Education access and quality for minority and low-income students in Durham County is an area that requires significant focus from a public health standpoint. Education allows individuals to be afforded opportunities not only for economic growth, but also gives them the ability to advocate for themselves in numerous aspects of their lives. As a study published in the Journal for Adolescent Health illustrated, high school dropouts were 24 times more likely to endure at least four negative life or health outcomes by the time they turned 30.[6] Public health interventions in adolescence among this population could significantly reduce the chance that these students will fall victim to that statistic.

Disciplinary Critique

Public health leaders should make education access and quality for this population a priority, because education provides the basis for individuals to live the healthiest life possible. The factors that lead to poor education access and quality are not exclusive to education, but are rather indicative of systemic issues that need to be addressed through public health intervention and policy. Improving education access and quality will help mitigate other negative effects that are also generated by historically-rooted racial and class discrimination. It is the job of public health leaders to offer direction in addressing this problem.

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Appendix D.2: Concentration-Specific Deliverable #1

Stakeholder Analysis

SDoH and Structure of the Program:

Nutritional education access and quality has been shown to impact the prevalence of negative health outcomes such as obesity and diabetes in underserved minority populations. In Durham County, the prevalence of obesity among Black non-Hispanic children is 16.4% while only 10.1% in non-Hispanic white children (Hicks and Mortiboy, 2021). Providing information regarding nutrition specifically can help decrease obesity prevalence among African American students in Durham County. Currently, there is a severe lack of nutritional education in Durham County public schools that must be corrected in order to promote and effect behavioral change among this population. Studies have shown that 40-50 hours of nutritional education is needed for students to adopt better health behaviors (Healthy Eating Learning Opportunities and Nutrition Education | Healthy Schools | CDC, n.d.).

In order to improve nutritional education, promote good health behaviors, and decrease the obesity prevalence among African American students in the Durham Public School system (DPS), our team is proposing the implementation of an after-school cooking and nutritional education program for grades 3-8 in Durham County's most underserved schools. The 10-week program will be delivered in two-hour sessions immediately after school hours on Tuesdays. The program is two-pronged, emphasizing both nutritional education and hands-on cooking skills. Our main goal is to increase students' knowledge of fruits and vegetables as well as the role good nutrition plays in their health, and to elevate the confidence students have in their ability to to cook nutritious meals. We also hope to encourage nutrition-related communication between students and their parents so they may become more involved in nutritional decisions made in their homes.

Key stakeholders:

The key stakeholders involved in the implementation of our program are African American DPS students in grades 3-8, their parents, teachers and school administration, the county Board of Education, public health professionals, health educators, and nutritionists. This subset of students is our target population, for whom we hope our program has the highest impact. In accordance with the goal of our program to influence nutritional decisions made at home, we also include students' parents as key stakeholders as they largely determine nutrition-related practices outside of school.

The Durham County Board of Education is necessary for program approval and will be responsible for applying for the funding necessary to implement the program. After the program has been completed and its impact has been evaluated, the BoE will also be responsible for making decisions about the scaling and continuation of the program. School administrators, primarily the principal and vice principal, are necessary to ensure the smooth running of the program on school grounds after regular school hours. Teachers at the schools act as support structures for students in all aspects, and should be aware of what students are learning in the program.

Nutritionists provide the expertise necessary to determine which information should be included in our educational program. Health educators, on the other hand, are needed to make sure the information is translated sufficiently for an audience of children. Health educators that have previously worked with children, or who make children their target population for education efforts, will be given priority for inclusion in program efforts. Other public health professionals are integral for their expertise in program planning and design.

Stakeholder Power and Influence

The stakeholders in our program each serve an important role in making sure our program works. In order to understand how each stakeholder relates to each other and the program in terms of their investment and possible power to effect change through the program,

a power/interest matrix was constructed (Appendix A). The power/interest matrix illustrates a continuum of two key stakeholder aspects: their capacity to influence the program in design and implementation, and their interest in the program and its success. Those with the most influence and interest are those that should be engaged and consulted throughout the course of the program. High power/low interest stakeholders are those that should be heeded in direction but not particularly engaged, and low power/high interest stakeholders should be kept informed frequently about program proceedings. Those with the lowest power and interest are those that should be informed about the program the most passively and will not hold a direct role in the program.

The stakeholders with the highest interest and power in our program are health educators, nutritionists, and public health professionals. These are the stakeholders who play the most crucial roles in developing the program in content and structure, and in executing the program. Since health educators are dedicated to improving health outcomes through education, serve as the interface between nutrition consultants and students, and implement the program designed by public health professionals, they are the stakeholders with the highest power and interest and will be consistently engaged in the program and invested in its success. Public health professionals and nutritionists are also dedicated to improving health outcomes among this target population through nutritional education, but are decidedly less involved in program implementation, which gives them the same level of interest, but slightly less power than health educators.

Students and their parents are considered high interest/low influence stakeholders, because they have investment in the program's success, but do not have much say in how the program is implemented. Although parents are directly related to students and their nutritional decisions outside of school, 8-14 year-old BPOC students are ultimately our target population and have a higher interest in success than their parents. Parents should be kept informed about

program proceedings on a frequent basis, and feedback from students is important for determining how the program is being received.

On the other hand, the Durham County Board of Education is a high influence/low interest stakeholder. The Board of Education, as mentioned before, is responsible for obtaining the funding necessary to make our program happen; recruiting and compensating public health professionals, nutritionists, and health educators incurs initial costs, while maintaining the program for ten weeks provides additional needs for funding. They also will make decisions regarding the longevity of the program within the DPS system upon program completion. BoE members are obviously somewhat concerned with the health and well-being of students within their jurisdiction, but they ultimately do not play an active role in program design or implementation. Since BoE members are necessary to making the program a reality, but not particularly invested in its execution, it is most important to keep BoE members happy with the progress of the program.

Teachers at our target schools are the stakeholders with the lowest interest and influence. They are not directly involved in program design or implementation, and while they may be concerned with the health of their students, they do not have a reason to be particularly invested in the program itself. Teachers at the school should be kept informed periodically about the progress of the program, but do not need to be engaged more than necessary.

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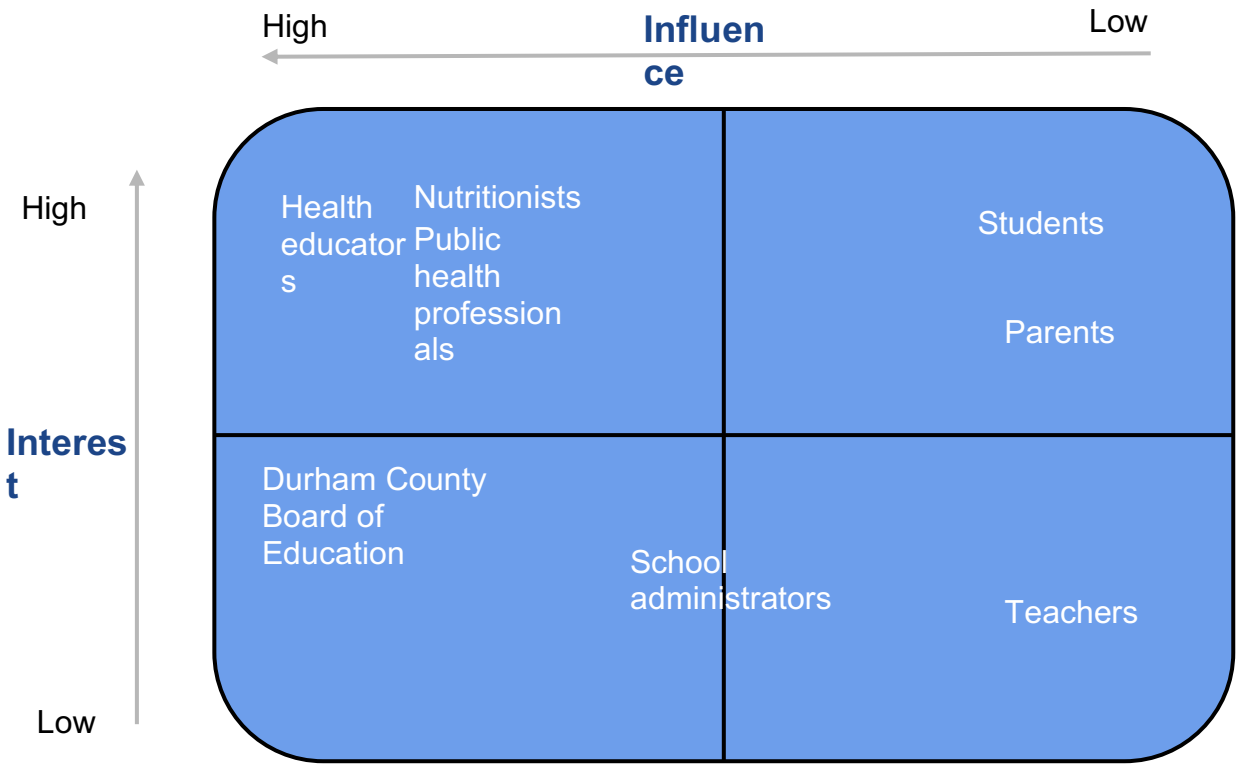
Appendix D.2.a: Concentration-Specific Deliverable #2 Figures and Tables



Power / Interest Matrix

Appendix D.3: Concentration-Specific Deliverable #2

Part I. Engagement Plan

Statement of Purpose

The purpose of our program is to improve nutritional knowledge amongst students in grades 3-8 in underserved students in the Durham Public School system in order to positively impact nutrition-related decisions of students and their families. Nutritional information is an often overlooked aspect of health education in the public school system. Good nutritional decisions in childhood and adolescence are associated with decreased rates of negative health outcomes, such as obesity and diabetes, later in life (Healthy Eating Learning Opportunities and Nutrition Education | Healthy Schools | CDC, n.d.). We hope to provide students with accurate, succinct, and relevant knowledge through our 10-week after school program that will enable them to confidently participate in accurate discourse regarding nutrition, and prepare them to make the best possible nutritional decisions after the program ends. With the help of public health professionals, nutritionists, and experienced pediatric health educators, our program will provide a solid educational framework for students in our target age group. We have chosen a variety of engagement activities for different stakeholders in order to align with their responsibility and accountability in the program. Engagement methods were chosen for stakeholders based on which activities would make the program most palatable and engaging for them.

Engagement Methods

Focus group meetings are one engagement activity that we will implement in order to keep program progress on track. Focus groups will primarily include stakeholders with high accountability in the program's execution, such as public health professionals, pediatric health educators, and nutritionists. Meetings with these individuals will be conducted prior to the program start date and will aid in the design of program structure and content. Brainstorming activities, collective prioritization of certain content, and discussions regarding information

delivery strategies will be included in focus group meetings in order to incorporate the viewpoints of those most involved in program design and execution. Some focus group meetings would also need to include school cooking staff in order to communicate the needs of the program clearly, and incorporate feedback from this group regarding responsibility load and feasibility.

In order to include the feedback of more stakeholder groups to adjust the program, periodic surveys will be sent out to gauge satisfaction with the program, thoughts about program execution, and potential suggestions for program improvement. Surveys will primarily be focused on stakeholders that are not directly involved in program design and execution, such as students and parents. Although students and parents do not have much power in the direction of our program, their experience with the program is paramount to understand in order to evaluate the program for applicability and effectiveness as well as to influence the program's direction. Ultimately, the participation of students and parents in the program is voluntary, but listening to and adjusting the program based on their feedback can help make the program attractive and engaging for them. Students will be able to take surveys periodically immediately after program sessions, and parents may be emailed surveys to be completed at home. Questions for students need to be based on their direct experience of the program, while questions for parents should be more focused on their experience with the program through their children.

Email updates will be sent out periodically to let stakeholders who are more distant from the program know about the program's progress. Parents, teachers, school administration, and the county Board of Education will all receive news about the program before, during, and after program implementation. This will allow these stakeholders to be aware of program proceedings without taking an active role in its execution.

Student evaluations are a cornerstone activity of our program, as they not only engage our target population, but also allow us to examine how effective our program is at reaching its

goal. Students will be assessed before the program for general nutritional knowledge and estimated fruit and vegetable intake to obtain a baseline for comparison. After the program has ended, they will be assessed on the same bases to determine how much they were able to learn through the duration of the program, and how much the program was able to impact their nutritional habits.

Engagement Methods (condensed)

Engagement Activity	Description	Stakeholder(s) Involved
Focus group meetings	Inclusion of high-accountability stakeholders to discuss program design and adjustment	Public health professionals, nutritionists, health educators, school cooks
Surveys	Gathering feedback from low-accountability stakeholders to be used for program adjustment	Students, parents
Email updates	Providing information on program progress	Parents, teachers, school administration, county BOE,
Student evaluations	Pre- and post-course assessment to determine how much was learned by students during the program	Students

Part II. Accountability Plan

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (this “MOU”) is made and entered into on this November 18, 2022 (“Effective Date”) by and between: Durham County Health Department, located at 414 E Main St,

Durham, NC, 27701 (the “First Party”) and Mary Lane, residing at 245 Vermillion Street, Chapel Hill, NC, 27516 (the “Second Party”), both of whom are collectively known as the “Parties,”

WHEREAS the First Party and the Second Party desire to enter into an agreement in which they will work together to achieve the various aims and objectives relating to the Healthy Steps (the “Project”).

AND WHEREAS the First Party and the Second Party are desirous to enter into an MOU between them, setting out the working arrangements that each of the two agree are necessary to complete the Project.

1. Purpose and Scope. The purpose of this MOU is to provide the framework, the scope of work, terms and conditions, and responsibilities of the Parties associated with their work on the Project, as attached in more detailed information for the Project that the Parties have agreed upon, if applicable. The obligations of the Parties will end on February 07, 2023.

2. The Parties’ Obligations. The Parties desire and wish that this document will not create any form or manner of a formal agreement, but rather an agreement between the Parties to work together in such a manner that would promote a genuine atmosphere of collaboration in support of an effective and efficient partnership and leadership meant to maintain, safeguard, and sustain sound and optimal financial, managerial, and administrative commitment with regards to all matters related to the Project.

3. Cooperation. The Parties represent that they have unique, specialized expertise that they will draw upon to meet the objectives of the Project.

The First Party will use the following unique experiences and expertise to further the objectives of the Project:

- Educational program structuring, nutritional expertise.

The Second Party will use the following unique experiences and expertise to further the objectives of the Project:

- Educational program delivery, communication with children and young adolescents.

4. Responsibilities.

The First Party shall undertake the following activities under this MOA:

- Provide the backbone for the program's structure and expertise in the realm of pediatric nutrition.

The Second Party shall undertake the following activities under this MOA:

- Collaborate with the First Party in determining how to deliver information and provide feedback as the program progresses.

5. Resources. The Parties will endeavor to have final approval and secure any financing necessary to fulfill their individual financial contributions at the start of the Project.

The First Party agrees to provide the following material, financial, and labor resources in respect of the Project:

- Participation in frequent communication and periodic meetings.

The Second Party agrees to provide the following material, financial, and labor resources in respect of the Project:

- Teach children participating in the program effectively and provide feedback to DPHD team members regarding the program through surveys and meetings.

6. Communication Strategy. Marketing of the Project should always be consistent with the aims of the Project and only undertaken with the express written agreement of both Parties. Where it does not breach any confidentiality protocols, a spirit of open and transparent communication should be adhered to. Coordinated communications should be made with external organizations to elicit their support and further the aims of the Project.

7. Dispute Resolution. The Parties to this MOU agree that if any dispute arises through any aspect of this agreement, including, but not limited to, any matters, disputes, or claims, the Parties shall confer in good faith to promptly resolve any dispute. In the event that the Parties are unable to resolve the issue or dispute between them, then the matter shall be mediated in an attempt to resolve any and all issues between the Parties.

8. Governing Law. This MOU shall be construed in accordance with the laws of the State of North Carolina.

9. Assignment. Neither Party may assign or transfer the responsibilities or agreement made herein without the prior written consent of the non-assigning party.

10. Amendment. This MOU may be amended from time to time by mutual agreement of the parties in a written modification signed by both parties.

11. Termination. This MOU may be terminated by mutual written agreement of the Parties upon fourteen (14) days notice.

This MOU shall automatically terminate upon completion of all responsibilities as stated in the “Purpose and Scope” section unless otherwise amended, see attached timeline and list of objectives for the Project, if applicable.

12. Prior Memorandum Suspended. This MOU constitutes the entire Memorandum between the Parties relating to this subject matter and supersedes all prior or simultaneous representations, discussions, negotiations, and Memorandums, whether oral or written.

13. Understanding. By signing this MOU, both Parties of this MOU mutually agree and understand that:

Each Party will take finance and legal responsibility for the actions of its affiliates, officers, employees, independent contractors, agents, volunteers, and representatives.

Each Party agrees to indemnify, defend and hold harmless the other to the fullest extent permitted by law from and against all actions, demands, claims, losses, liabilities, costs (including attorney’s costs and fees), and damages. Each Party shall also be responsible for the proportionate cost of any damages arising from the fault of such Party, its officers, agents, employees, and independent contractors.

Each Party shall carry insurance at its sole expense to cover its activities in connection with this MOU. Each Party shall also obtain and maintain insurance for general liability, workers' compensation, and business automobile liability adequate to cover any potential liabilities.

14. Notice. All notices, demands, requests, and other communications given hereunder for purposes other than termination shall be made in writing and shall be deemed given if:

I. Delivered by hand or

II. Mailed by domestic registered or certified mail with prepaid postage, after two (2) business days since the date postmarked.

Any notices, demands, requests, and other communications returned to the sending Party as non-delivered should be re-delivered or re-mailed to the forwarding address affixed thereto. Such communications will be deemed delivered in the same way as those that had not been returned to the sending Party.

15. Severability. Any part or provision of this MOU that is found to be unenforceable, illegal, void, or prohibited in any jurisdiction will be ineffective without invalidating the remaining provisions and parts of the MOU. In such a scenario, the Parties will use reasonable efforts to employ and find an alternative way to achieve the same or substantially the same result as contemplated by such part or provision.

16. Authorization and Execution. The signing of this MOU does not constitute a formal understanding and as such it simply intends that the Parties shall strive to reach, to the best of their abilities, the objectives stated herein.

The MOU shall be signed by the First Party's Representative _____, _____ and the Second Party and shall be effective as of the date first written above.

_____ Date: _____

Durham County Health Department

_____, _____

_____ Date: _____

Mary Lane

REFERENCES

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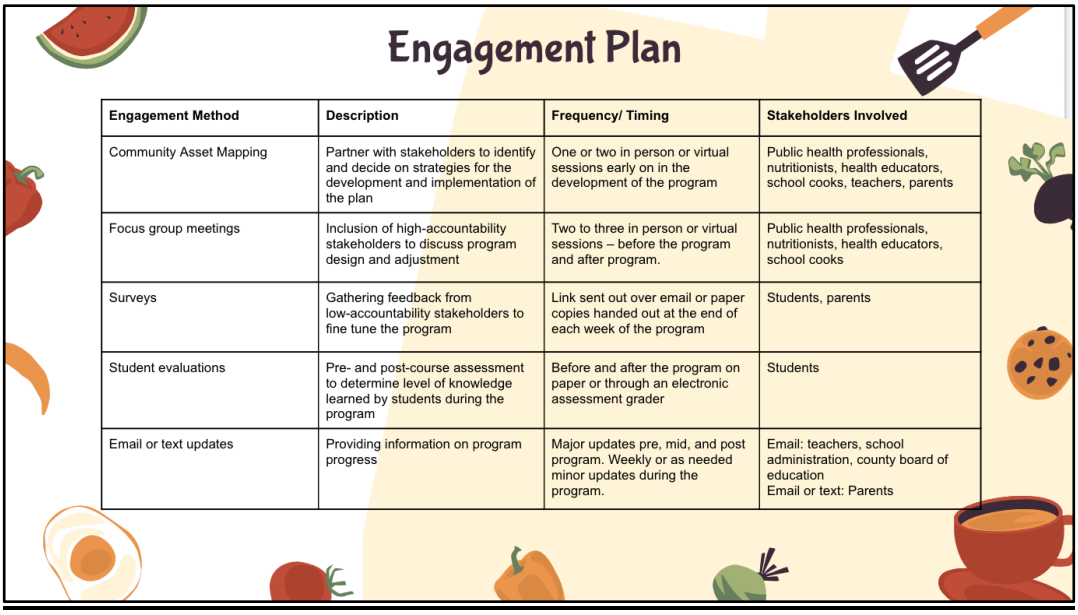
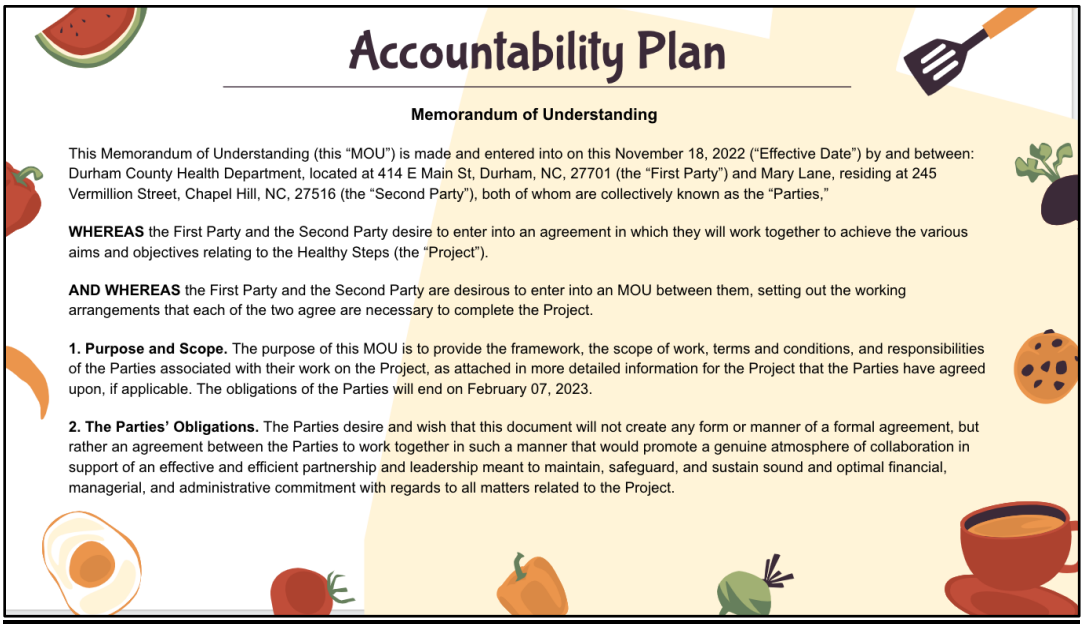
Appendix D.4: Individual Presentation Slides and Script



These are engagement methods that we will use to integrate stakeholders in our program. Community asset mapping involves PH professionals, nutritionists, health educators, school cooks, teachers, and parents and allows us to identify and come to a consensus on implementation strategies; focus group meetings involve PH professionals, nutritionists, health educators, and school cooks and are meant to help with program design and fine-tuning; surveys are administered to students and parents to gather feedback to adjust the program accordingly; student evaluations are given as pre- and post-course assessments to determine the level of knowledge learned throughout the program; and email/text updates are sent to teachers, school administration, county BoE, and parents to provide information on program progress.



Accountability Plan

Memorandum of Understanding

This Memorandum of Understanding (this "MOU") is made and entered into on this November 18, 2022 ("Effective Date") by and between: Durham County Health Department, located at 414 E Main St, Durham, NC, 27701 (the "First Party") and Mary Lane, residing at 245 Vermillion Street, Chapel Hill, NC, 27516 (the "Second Party"), both of whom are collectively known as the "Parties,"

WHEREAS the First Party and the Second Party desire to enter into an agreement in which they will work together to achieve the various aims and objectives relating to the Healthy Steps (the "Project").

AND WHEREAS the First Party and the Second Party are desirous to enter into an MOU between them, setting out the working arrangements that each of the two agree are necessary to complete the Project.

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2. The Parties' Obligations. The Parties desire and wish that this document will not create any form or manner of a formal agreement, but rather an agreement between the Parties to work together in such a manner that would promote a genuine atmosphere of collaboration in support of an effective and efficient partnership and leadership meant to maintain, safeguard, and sustain sound and optimal financial, managerial, and administrative commitment with regards to all matters related to the Project.

This is an excerpt from a sample MOU between the DCHD and "Mary Lane," one of our health educators. The MOU details the responsibilities of each of these parties for the duration of our program. In this example, the DCHD has responsibilities that include, but are not limited to, providing public health expertise in nutrition as well as educational program structuring, while health educators are responsible for implementing the educational curriculum throughout the duration of the program and providing feedback as the program progresses.

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APPENDIX E: REED TEEL'S INDIVIDUAL DELIVERABLES

Appendix E.1: Individual Problem Statement

Social Determinant of Health (SDOH)

Education access and quality is an issue across the United States. One of the core focuses of the U.S. Department of Health and Human Services' Healthy People 2030 plan is to provide high-quality educational opportunities for children and adolescents (Education Access and Quality - Healthy People 2030 | health.gov, n.d.). Education access and quality is one of several social determinants of health that has both short- and long-term health impacts. To understand its full extent, it's important to explore the role education plays on our health, and the opportunities it creates for making healthy, informed choices.

High quality education provides resources that enable individuals to have more control over their lives and their health. In the competitive job market in America, education standards for jobs are increasing. Some jobs that used to only require a bachelor's degree now require a master's degree (2024 Graduate Degree Requirement: Registration Examination Eligibility, n.d.). Education quality and access are not equal for everyone, which leads to varying health outcomes as a result. Education leads to safer, more stable, and higher paying jobs (Zajacova & Lawrence, 2018). In the short term, this allows more affluent, educated individuals to have the means to purchase high quality food, live in safe, walkable neighborhoods, and purchase reliable vehicles to get to and from work. Higher education jobs are more likely to come with health insurance as well. In 2010, 27% of American adults who lacked a high school education reported being unable to afford to go to the doctor (Why Education Matters to Health: Exploring the Causes, 2015). These are all benefits that reduce stress and enable individuals to have more autonomy over their lives and their health.

The short-term health impacts that come with higher education, such as access to healthy food, health insurance, and safe, walkable neighborhoods lead to long-term health

impacts. Individuals with less education are more likely to eat an unhealthy diet, smoke, and lack exercise (Zajacova & Lawrence, 2018). The National Bureau of Economic Research found that an additional four years of education lowers the risk of diabetes by 1.3%, lowers the risk of heart disease by 2.2%, and lowers five-year morality by 1.8% (Picker, 2007). Improving access to education and the quality of education for everyone will create more autonomy over individual choices, which can improve both short- and long-term health outcomes.

Geographic and Historical Context

Durham County, North Carolina is taking part in creating a more equitable, healthier county by improving education quality and access in their Community Health Assessment 2020 (Hicks & Mortiboy, 2021). Durham County sits in the middle of North Carolina, with a diverse population of 337,306 residents. Of that population, 43.3% percent of residents are non-Hispanic White, 35% Black or African American, 13.7% Hispanic or Latino, 5.7% Asian, and 0.9% Native American (*North Carolina,* n.d.). Education is an important focus of the county, considering the largest research park in the United States - Research Triangle Park - is located in Southeastern Durham County. However, education equity remains an issue in the county. In 2018, Durham Public Schools (DPS) launched a five-year plan, focusing on five priorities for improving education access and quality. Areas of focus include racial equity training for staff, a core literacy curriculum for all schools, and a campaign to address inequities in digital access (Hicks & Mortiboy, 2021). It's unclear how Covid-19 school closures will impact the five-year plan, but we do know that the effects of Covid-19 have disproportionately impacted people of color.

Priority Population

For that reason, I have chosen school-aged African American children as the priority population to focus efforts on improving education access and quality, in hopes of creating a more equitable Durham County. For the first half of the 20th century, children in North Carolina attended school based on race. While school segregation was often touted as separate but

equal, in reality, this was far from true (*North Carolina African American High Schools,* n.d.). Minority schools were underfunded, receiving less money for buildings, staff salaries, and textbooks. In 1954, the Supreme Court abolished segregation in schools. Unfortunately, it took another 17 years before separate but equal rights were actually upheld (*North Carolina African American High Schools,* n.d.).

Measures of Problem Scope

African Americans make up the second largest racial group in Durham County, with a population just under 115,000 (*North Carolina,* n.d.). Still to this day, statistics show that minority populations in Durham County are disproportionately disadvantaged when it comes to education access and quality. Table E. 1 in the Appendix section highlights the poverty rates, unemployment rates, and education rates across varying racial groups in Durham County. The table sheds light on the inequities around education, and the effects low education rates have on unemployment and poverty rates.

Rationale/Importance

As you can see, minority populations, like African Americans in Durham County, are more likely to have less education than non-Hispanic Whites. As mentioned earlier, educational attainment is tied to other factors, creating a cyclic pattern. Families with less education often make less money; thus, live in cheaper housing and send their children to lower funded schools or even have children drop out of school to help support the family financially. This shows how education is closely tied to the unemployment and poverty rates found in Table E.1. In hopes of creating a more equitable future, education access and quality must become a public health priority. By looking upstream and prioritizing education, public health policies can help fight injustices that cause health disparities among minority populations.

Disciplinary Critique

Examples of equitable policy ideas include 1) providing a free tutor for students performing below grade level, 2) offering free and reduced lunch for all students, 3) changing school schedules to 9am-5pm to match parents' needs, and 4) supporting, training, and paying teachers like professionals (*7 Great Education Policy Ideas for Progressives in 2018*, 2018). In order for equitable policies to be put in place in Durham County, public health leaders, like nutritionists, must understand how education access and quality is a major social determinant of health.

In addition to the aforementioned policy ideas, nutrition education should be implemented across Durham County public schools to promote health equity. Public health nutritionists can address education access and quality by creating standardized education materials for each grade level. By providing yearly education focused on the importance of nutrition for overall health, students are equipped with knowledge that can improve health behaviors in school and beyond. Education increases a sense of control over one's life, encouraging and enabling a healthy lifestyle (Hahn & Truman, 2015).

In addition to improving health behaviors, education creates opportunities, such as jobs that are higher paying, allowing for the accumulation of generational wealth (Zajacova & Lawrence, 2018). Higher paying jobs are often safer and more stable, thus reducing financial stress, orthopedic injuries, and chronic stress. Failing to recognize how education is linked to health outcomes only further exacerbates health inequities in Durham County. Policy makers, public health practitioners, and educators must collaborate to start initiatives that create a more equitable education system, with a goal of building healthy generations to come.

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Appendix E.1.a: Individual Problem Statement Figures and Tables

Table E.1

Demographics of Durham County, North Carolina in 2020

	Education Rate	Poverty Rate	Unemployment Rate
White	High School Degree - 96% Bachelor's Degree - 63.4%	7.1%	3.4%
African American	High School Degree - 89.5% Bachelor's Degree - 35%	16.7%	7.2%
Hispanic	High School Degree - 52.2% Bachelor's Degree - 15.4%	25%	2.9%
Asian	High School Degree - 97.1% Bachelor's Degree - 77.1%	17.2%	2.3%

Note: U.S. Census Bureau QuickFacts: Durham County, North Carolina. (2021). Census Bureau QuickFacts. https://www.census.gov/quickfacts/fact/table/durhamcountynorthcarolina/RHI225221

Appendix E.2: Evidence Based Nutrition Program

Introduction

Education access and quality is an issue across the United States. It is one of several social determinants of health that has both short- and long-term health impacts. It's important to understand the correlation between education, health behaviors, and specific health outcomes such as obesity. Data from 2011-2014 showed that "prevalence of obesity among college graduates was lower (27%) than among those with some college (40.6%) and those with a high school degree or less (40.0%)" (Ogden, 2018).

Reflecting on these statistics, our group has chosen to focus on the following key issue: improving nutrition knowledge among African American children in Durham County, NC. Improving education access and quality is one approach to improve health outcomes, such as obesity, in hopes of creating healthier, more equitable generations. By increasing knowledge and critical thinking skills, individuals are empowered to make healthier choices for themselves. In addition to enhanced knowledge and critical thinking skills, further education also comes with higher paying jobs that elevate autonomy over one's life and decision-making capacity.

Evidenced Based Nutrition Program or Policy

The prevalence of obesity among Black non-Hispanic children in Durham County is 16.4% compared to 10.1% of non-Hispanic white children (Hicks & Mortiboy, 2021). To combat inequities like this in Durham County, education quality and access must improve. Nutrition is a specific area within education that can help decrease obesity prevalence among African American students in Durham County. There is a lack of nutrition education in the United States public school system that is needed to affect behavior change. Students in the U.S. receive less than 8 hours of required nutrition education each school year; data shows that 40-50 hours is needed for behavior change (Healthy Eating Learning Opportunities and Nutrition Education | Healthy Schools | CDC, n.d.). Between 2010-2014, the percentage of schools providing

education and dietary behaviors decreased from 84.6% to 74.1% (Healthy Eating Learning Opportunities and Nutrition Education | Healthy Schools | CDC, n.d.).

In hopes of improving nutrition education and health behaviors, and decreasing the obesity prevalence, we are proposing an afterschool cooking and nutrition education program be implemented for grades 3-8 in Durham County's underserved schools. By prioritizing underserved schools, we have a greater opportunity to reach minority students - like African American children - on the basis of improving nutrition education, cooking self-efficacy, fruit and vegetable liking and consumption, and communication to families regarding healthy eating (Jarpe-Ratner et al., 2016). A similar program was conducted in underserved elementary and middle schools in Chicago and was found to increase nutrition knowledge of, exposure to, and consumption of fruits and vegetables, as well as their participation in cooking at home (Jarpe-Ratner et al., 2016).

To reduce barriers that may come with food access, we will work with local grocery stores and farmers to get unsold and donated fruits and vegetables to give to the students to be taken home. In the event the program does not receive adequate donations for students to take home, outcomes could be skewed. To help ensure food access is not a barrier, we will also provide information to participants' families regarding food assistance programs like SNAP and food banks.

Evidenced Based Outcomes

The program will be measured in a short-term three month outcome and long-term five year outcome. The short-term outcome will be the following: One month following the completion of the program, students will increase their mean score of nutrition knowledge and fruit and vegetable intake by 0.2 each. We also anticipate that participation in the program will increase students' cooking self-efficacy score by 0.4 and the frequency of student cooking at home score by 0.1 (Jarpe-Ratner et al., 2016). Each question will have answers with respective numbers ranging from 1-4, which will be used to calculate a mean score. The effect of the

program will be assessed on students with a quasi-experimental pre–post survey design. Pre-intervention surveys will be administered to the students on the first day of the program, and post-intervention surveys will be administered to the students one month following the conclusion of the program. The goal of the surveys will be to collect demographic data and test nutrition knowledge, exposure to and liking of fruits and vegetables, number of times fruits and vegetables were consumed the previous day, cooking self-efficacy, and family communication about healthy eating and other behaviors (Jarpe-Ratner et al., 2016). Of the fifty selected students from each school, half of the students (twenty-five) will not participate in the program portion, but instead, serve as the control group.

Five years post-intervention, students will show improvement in diet quality (e.g., Healthy Eating Index) and frequency of cooking at home (Doustmohammadian, 2020). In addition to the pre- and post- intervention surveys for the short-term outcome, students' diet quality will be assessed using the Healthy Eating Index Questionnaire.

Student participants who have not graduated high school and remain in the Durham County school system will be provided post-intervention surveys and health eating index questionnaires to measure the intended outcomes. The goal is to increase their healthy eating index score - which ranges from 0-100 - by a mean of 10, as well as increase the frequency of student cooking at home score by a mean score of 0.2. Additionally, we anticipate students will increase their mean score of nutrition knowledge and fruit and vegetable intake by 0.4 each. Table E.2 breaks down the components and scoring of the Healthy Eating Index. Lastly, the post-intervention survey will include questions that assess food insecurity and other factors that may have an impact on diet quality and confidence or means to cook at home.

Evidence Based Implementation Strategies and Activities

Similar to the Chicago nutrition program, the proposed program will also take place at underserved, high poverty schools in Durham County. Seventy percent or more of the selected students will be made up of those who are on free or reduced-price lunches. Students will receive applications with consent forms for parents to sign, in order to participate in the program. Fifty students from each school will be selected to participate, prioritizing students in need of a hands-on, active program. The program will address multiple levels of the socioecological model, including: the individual, interpersonal, organizational, and community levels.

The program will occur immediately after school on Tuesdays for two hours for a total of 10 weeks. It will be held in the schools' cafeterias and kitchens. The two main components of the program will be nutrition education and hands-on cooking education. The primary goal of the program is to increase knowledge of fruits and vegetables, increase knowledge of the role nutrition plays on health, and enhance self-efficacy and participation in cooking. A secondary goal is to encourage students to talk to their parents and guardians about nutrition and become more involved in meal planning and cooking in their homes.

The program will be run by health teachers and cooks from each respective school, as well as Durham County Public Health Nutritionists. The public health nutritionists will be responsible for planning and designing the education portions of the program, while the health teachers and cooks will be responsible for educating the students. The first thirty minutes of each program session will entail nutrition education and cultural awareness. The next seventy-five minutes will be run by the school cooks - with assistance from teachers - educating the students on meal preparation and basic cooking skills (Jarpe-Ratner et al., 2016). The program will progress with each week building off the next in terms of cooking skills and nutrition knowledge.

Stakeholders

Stakeholders are an essential part of any program, and this program will have five primary stakeholders that each play a role in its execution. First and foremost, African American students are the primary stakeholder. The program is designed to improve health outcomes, such as decreased obesity prevalence, among the African American student population; thus, their participation in the program is imperative to its success. Educators are another stakeholder that are vital to the program. Health education teachers and school cooks will both be involved in the education portion of the program. However, for the teachers to be successful, they must have easy-to-digest nutrition education provided to them by the public health nutritionists. The public health nutritionists are stakeholders responsible for the program design and education outlines. They are the backbone of the program, ensuring that the teachers and cooks have everything they need to be successful educators.

Parents/guardians are important stakeholders as well, because they have to approve and support their child's participation in the program. Additionally, they are the ones most likely to go grocery shopping and cook in the home. Lastly, the Durham County Board of Education is a primary stakeholder because they must approve, advocate, and help with funding for the program. Their complete support for the program helps to ensure that the necessary resources are provided for all those involved in its implementation.

Budget

To fund the study, the Durham County Public School Board of Education will apply for federal education grants to fund the program. Any additional funds needed will come from Durham County school education tax funds. Funds will be divided into personnel and supplies. Sixty-five percent of funds will be spent on supplies, such as cooking materials, food, and education material (e.g. handouts for children and parents). The other 35% will be spent on personnel (e.g. health teachers, school cooks, and public health nutritionists). The program will also rely on donations from local grocery stores, farmers, and community residents.

Conclusion

The proposed program is a multi-disciplinary approach at improving nutrition and cooking knowledge, and ultimately health outcomes, among African American students in Durham County. Prioritizing underserved schools in Durham County creates opportunities to reach students who may have higher obesity prevalence. Providing nutrition education and hands-on cooking education creates better engagement and allows students to take their newly learned skills and apply them at home. Another advantage of the program is that it is after school. This creates an extracurricular activity for students after school that is fun, interactive, and educational.

Holding the program after school can also be considered a disadvantage due to the program being voluntary. Students may not want to stay an additional two hours after school ends, which can limit participation. Additionally, the program requires school cooks and teachers to stay beyond school hours as well. Offering additional compensation will be required for workers since the program is beyond their regular schedule. Lastly, the program has limited participation from parents/guardians. Because they are the primary food providers and cooks in the home, they are ultimately responsible for what the students eat and drink at home.

A major objective of the program is its hands-on aspect. Incorporating educational material into the hands-on portion of the classes is essential to keep students' attention and create buy-in. The atmosphere must be fun, collaborative, and informative in order for the students to participate and health behaviors to improve. To ensure that every student feels welcome and seen, the program will be taught through a culturally competent, health equity lens.

Appendix E.2.a: Nutrition Program Tables

Table E.2

HEI–2015[1] Components & Scoring Standards

Component	Maximum points	Standard for maximum score	Standard for minimum score of zero
Adequacy:			
Total Fruits[2]	5	≥0.8 cup equiv. per 1,000 kcal	No Fruits
Whole Fruits[3]	5	≥0.4 cup equiv. per 1,000 kcal	No Whole Fruits
Total Vegetables[4]	5	≥1.1 cup equiv. per 1,000 kcal	No Vegetables
Greens and Beans[4]	5	≥0.2 cup equiv. per 1,000 kcal	No Dark Green Vegetables or Legumes
Whole Grains	10	≥1.5 oz equiv. per 1,000 kcal	No Whole Grains
Dairy[5]	10	≥1.3 cup equiv. per 1,000 kcal	No Dairy
Total Protein Foods[6]	5	≥2.5 oz equiv. per 1,000 kcal	No Protein Foods

Seafood and Plant Proteins[6,7]	5	≥0.8 oz equiv. per 1,000 kcal	No Seafood or Plant Proteins
Fatty Acids[8]	10	(PUFAs + MUFAs)/SFAs ≥2.5	(PUFAs + MUFAs)/SFAs ≤1.2
Moderation:			
Refined Grains	10	≤1.8 oz equiv. per 1,000 kcal	≥4.3 oz equiv. per 1,000 kcal
Sodium	10	≤1.1 gram per 1,000 kcal	≥2.0 grams per 1,000 kcal
Added Sugars	10	≤6.5% of energy	≥26% of energy
Saturated Fats	10	≤8% of energy	≥16% of energy

1: Intakes between the minimum and maximum standards are scored proportionately. The total HEI score is the sum of the adequacy components (i.e. foods to eat more of for good health) and moderation components (i.e. foods to limit for good health).
2: Includes 100% fruit juice.
3: Includes all forms except juice.
4: Includes legumes (beans and peas).
5: Includes all milk products, such as fluid milk, yogurt, and cheese, and fortified soy beverages.
6: Includes legumes (beans and peas).
7: Includes seafood, nuts, seeds, soy products (other than beverages), and legumes (beans and peas).
8: Ratio of poly- and monounsaturated fatty acids (PUFAs and MUFAs) to saturated fatty acids (SFAs).

Note: Krebs-Smith SM, Pannucci TE, Subar AF, Kirkpatrick SI, Lerman JL, Tooze JA, Wilson MM, and Reedy J. Update of the Healthy Eating Index-2015. *J Acad Nutr Diet*. 2018 Sep;118(9):1591-1602.

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Appendix E.3: Nutrition Program Evaluation

Introduction

Education access and quality is an issue across the United States. It is one of several social determinants of health that has both short- and long-term health impacts. It's important to understand the correlation between education, health behaviors, and specific health outcomes such as obesity. Data from 2011-2014 showed that "prevalence of obesity among college graduates was lower (27%) than among those with some college (40.6%) and those with a high school degree or less (40.0%)" (Ogden, 2018).

Reflecting on these statistics, our group has chosen to focus on the following key issue: improving nutrition knowledge among African American children in Durham County, NC. Improving education access and quality is one approach to improve health outcomes, such as obesity, in hopes of creating healthier, more equitable generations. By increasing knowledge and critical thinking skills, individuals are empowered to make healthier choices for themselves.

Our proposed program will be a 10-week, 2 hours/week after-school program focusing on nutrition education and cooking self-efficacy in ten high-poverty, underserved Durham County public schools for grades 3-8. Durham County has forty combined elementary and middle schools. We have chosen to pilot our program by prioritizing ten of the forty schools with the highest percentage of students in poverty. Fifty students from each school will be selected to participate. Public Health Nutritionists will be responsible for program design. Health teachers and school cooks will be responsible for educating the students, which will be conducted in each school's cafeteria. The designed program will be standardized across all ten schools.

Study Design/Data Collection

The effectiveness of the program will be assessed on students with a quasi-experimental pre-post survey design. Pre- and post-intervention surveys will be completed by students to assess nutrition knowledge, exposure to fruits and vegetables, intake of fruits and vegetables, liking of fruits and vegetables, frequency of cooking at home, and family communication about

healthy eating and other behaviors (Jarpe-Ratner et al., 2016). Table E.3.1 in the appendix includes example questions that will be asked pre- and post-intervention. Answers to the survey questions will have response options ranked 1-4, which will be used to calculate the cumulative mean score for all questions. Data will be taken from each school and then averaged across all ten schools.

Sample and Sampling Strategy

Fifty students from each school will be selected to participate in the program, prioritizing students in need of a hands-on, active program. Seventy percent or more of the selected students will be made up of those who are on free or reduced-price lunches. Students will receive applications with consent forms for parents to sign, in order to participate in the program. Of the fifty selected students, half of the students (twenty-five) will not participate in the program portion, but instead, serve as the control group. The reason for fifty students from each school is to allow for a strong sample size and control group size that fits into the allotted budget. Fifty students allows for the program to be completed once per year for three years while staying within budget.

Specific Measures

Our program will be measuring improvements in nutrition knowledge and cooking self-efficacy, with the long term goal of improving healthy behaviors and health outcomes. Regarding the outputs of our program, we have prioritized African American students in the Durham County public school system in grades 3-8. We have chosen this priority population due to the 16.4% prevalence of obesity among Black non-Hispanic children in Durham, as compared to the 10.1% prevalence of obesity in non-Hispanic white children (Hicks & Mortiboy, 2021). The selected students will participate in a 10-week, 2 hours/week nutrition education and cooking skills after-school program. Using pre-and post-intervention surveys, we anticipate students will increase both their mean score of nutrition knowledge and their mean score of fruit and vegetable intake by 0.2. We also anticipate that participation in the program will increase

students' cooking self-efficacy score by 0.4 and the frequency of student cooking at home score by 0.1 (Jarpe-Ratner et al., 2016).

Timing

The timeline for stakeholder engagement will depend on the specific stakeholder. Student and parent engagement will be initiated the school year prior to the program intervention. Additional engagements will take place three months prior to the program start date and after completion of the program. Engagement will consist of handouts for students/parents and emails for parents detailing specifics of the program and its benefits.

The board of education engagement will begin two years prior to the start of the program, with additional engagements taking place the prior school year, three months prior to the program, and after the completion of the program. Engagement will consist of conversations regarding budget, personnel, logistics, and benefits of the program.

The public health nutritionists, school cooks, and school health teachers are the backbone stakeholders. They are responsible for carrying out the program for the students. Initial engagement will begin the prior school year, followed by three months prior to the program and after completion of the program. Engagement will revolve around creating student buy-in, program implementation, and suggestions for improvement following the program.

The post-intervention survey will take place one month following the completion of the program to give time to assess changes in behavior. Once mean scores have been calculated and results of the program have been finalized, the evaluation will take place. Progress will be defined by students showing improvements in nutrition knowledge and/or cooking self-efficacy via their post-intervention surveys. If progress does not occur, the public health nutritionists, school cooks, school health teachers, and the board of education will meet to discuss an improvement plan. The public health nutritionists will also reach out to students and parents to get program feedback.

Analysis Plan

Quantitative and qualitative statistics will be used to measure the outcomes. Scores for all students will be averaged from the pre- and post-intervention surveys (± SD). For analysis, changes in scores will be calculated from the difference between pre- and post-scores for each student. The changes in scores will be analyzed with paired *t* tests. To be considered statistically significant, the difference must be $P < 0.5$.

Sources of Funding

The Durham County Public School Board of Education will apply for federal education grants to fund the program. Any additional funds needed will come from Durham County school education tax funds. Funding will begin one year prior to the anticipated start date. The program will also reach out to local grocery stores, farmers, and community residents for food donations. See Table E.3.2 for budget details.

Data Use and Dissemination

Data will be used to help similar programs be initiated across North Carolina. Data will be disseminated via the North Carolina Public Health and Durham County Public School websites. Public health departments and county public school systems outside of Durham County will collaborate with the Durham County Public Health Department and public school system to ensure similar programs are successfully implemented.

Conclusion

Collaboration will take place between public health nutritionists, health teachers, school cooks, and the Durham County board of education. The program will be interdisciplinary, focusing not only increasing nutrition knowledge but also cooking self-efficacy. This will require education taught by both health teachers and school cooks from public health nutritionists designed curriculum. A goal is that the program can be implemented in other parts of the state and continue the partnership between the NC Public Health and the NC Public School System. By improving access to and quality of nutrition education in public schools, students' knowledge of nutrition and cooking self-efficacy will greatly improve. This will ideally carry over into their

everyday lives, which will translate into healthy behaviors and improved health outcomes. To ensure that every student feels welcome and seen, the program will be taught through a culturally competent, health equity lens.

Appendix E.3.a: Nutrition Program Evaluation Tables

Table E.3.1

Survey Items and Scales Used for Pre- and Post Assessment of After-School Cooking Nutrition and Cooking Education Program for Students Grades 3-8.

Measures of nutrition knowledge, food preferences, attitudes, and behaviors	
Questions and Scales (no. items)	Response Options (scoring)
With what should you fill half your plate? (1)	Fruits and vegetables (1) Protein (0) Grain (0)
Fruits and vegetables exposed to and liking for (14)[a] a. Of the 14 items, 8 were fruits or vegetables	I have never tasted this (0) Do not like (1) Like a little (2) Like a lot (3)
Number of times vegetables were consumed yesterday (1)	Did not eat (1) Ate 1 time (2) Ate 2 times (3) Ate ≥ 3 times (4)
Number of times fruits was consumed yesterday? (1)	Did not eat (1) Ate 1 time (2) Ate 2 times (3) Ate ≥ 3 times (4)
Number of times chips were consumed yesterday (1)	Did not eat (1) Ate 1 time (2) Ate 2 times (3) Ate ≥ 3 times (4)
Number of times soda or sports drink was consumed yesterday (1)	Did not eat (1) Ate 1 time (2) Ate 2 times (3) Ate ≥ 3 times (4)
Willingness to try new foods (4)	Never true (1) Sometimes true (2) Usually true (3) Always true (4)
Measures of cooking self-efficacy, knowledge, and interest	
Cooking self-efficacy (6)	I cannot do this (1) I am not sure I can do this (2) I can do this with help (3) I can do this on my own (4)
Frequency of adult cooking at home (1)	Never (1) Once in a while (2) A few times a week (3) Every night or almost every night (4)
Frequency of student helping cook dinner at home (1)	Never (1) Once in a while (2) A few times a week (3) Everynight or almost every night (4)

From: Jarpe-Ratner, E., Folkens, S., Sharma, S., Daro, D., & Edens, N. K. (2016, November). An Experiential Cooking and Nutrition Education Program Increases Cooking Self-Efficacy and Vegetable Consumption in Children in Grades 3–8. Journal of Nutrition Education and Behavior, 48(10), 697-705.e1. https://doi.org/10.1016/j.jneb.2016.07.021

Table E.3.2

Implementation and Evaluation Budget of Durham County, NC Nutrition and Cooking Education Program for Grades 3-8

Description	Unit	Unit Cost	Quantity	Unit Amount in USD	Total Amount in USD
Human Resources					
Public Health Nutritionists (Program Director)	Staff	$22,000	6 months	$22,000	$22,000
School Cooks	Staff	$100/session	10 sessions	$1,000	$1,000
Health Teachers	Staff	$100/session	10 sessions	$1,000	$1,000
Direct Expenses					
Food for in-session cooking	Students	$7/student/ session	10 sessions for 250 students	$70/student for 10 sessions	$17,500
Cooking/ Miscellaneous Supplies	Unit	$100/student	250 students	$25,000	$25,000
Food Donations from Grocery Stores, Farmers, and Community for Students to Take Home	Unit	$0	In-kind	$0	$0
Total					$66,500

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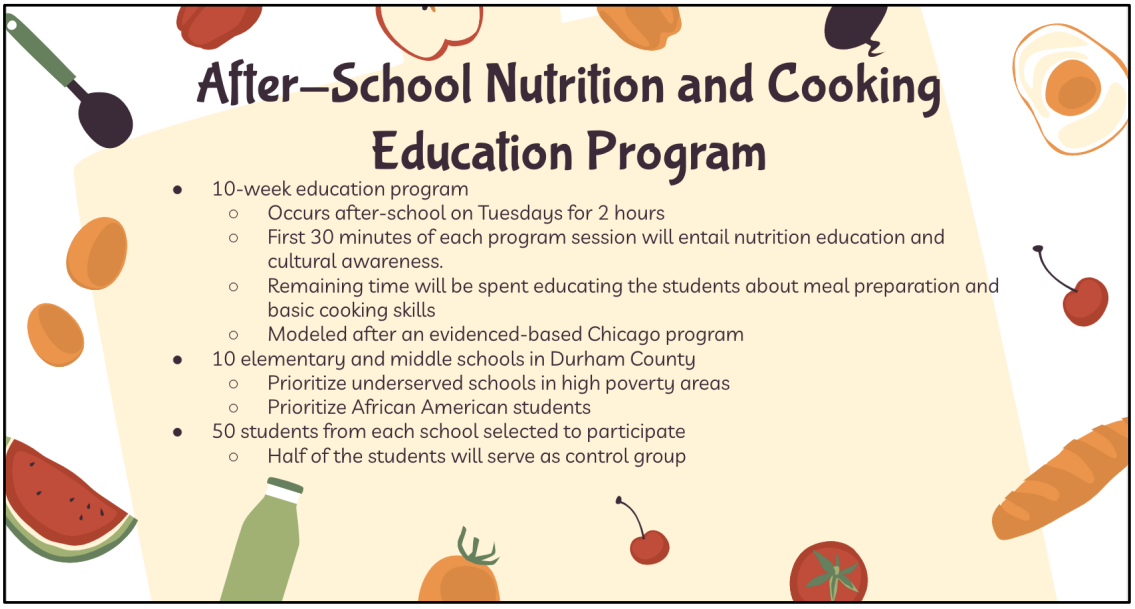
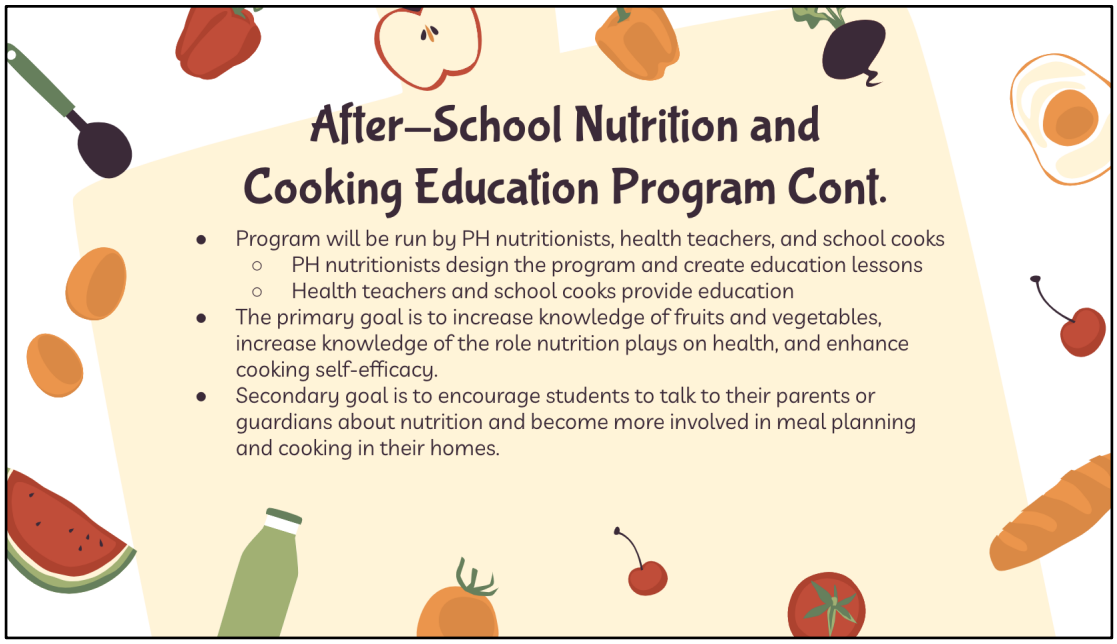
Appendix E.4: Individual Presentation Slides and Script



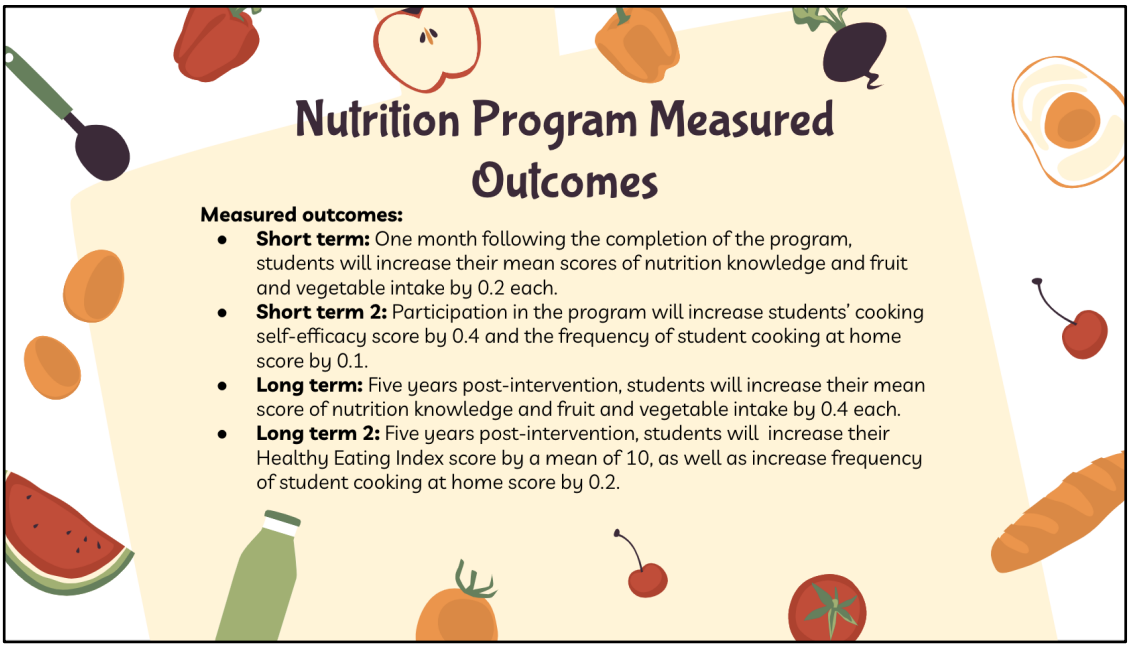
We are proposing a 10-week after-school nutrition and cooking education program that occurs every Tuesday for 2 hours in the schools' cafeterias and kitchens. The first 30 minutes of each session will entail nutrition education and cultural awareness lessons, followed by cooking education, which will focus on meal preparation and basic cooking skills. Our proposed program is modeled after an evidenced-based program in Chicago.

Like the Chicago program, our program will prioritize underserved elementary and middle schools. However, our program will take place in ten Durham County public schools and also prioritize African American students. Fifty students from each school will be selected to participate with half of the students serving as the control group.



The program will be led by PH nutritionists, school health teachers, and school cooks. The PH nutritionists will design the program and create the lesson plans. The health teachers and cooks will use the lesson plans to provide the education.

Our primary goal in this after-school program is to increase knowledge of fruits and vegetables, increase knowledge of the role nutrition plays on health, and enhance cooking self-efficacy. Our secondary goal is to encourage students to talk with their parents or guardians about nutrition and become more involved in meal planning and cooking at home.



We have established two short term and two long term measured outcomes for our program. The first short term out is one month following the completion of the program, students will increase their mean scores of nutrition knowledge and fruit and vegetable intake by 0.2 each. Our second short term outcome is that participation in the program will increase students' cooking self-efficacy score by 0.4 and the frequency of student cooking at home score by 0.1. This will also be measured one month following the completion of the program.

Our first long-term measured outcome is five years post-intervention, students will increase their mean score of nutrition knowledge and fruit and vegetable intake by 0.4 each. Our second long term outcome is five years post-intervention, students will increase their Healthy Eating Index score by a mean of 10, as well as increase frequency of student cooking at home score by 0.2.

The short term outcome will be measured using survey questions that will be used pre-and post-intervention to assess changes in students' mean scores. The long term outcomes will be measured using the survey questions from the short term outcome, as well as the health eating questionnaire that will also be provided to students pre-intervention and five years post-intervention.