ADVANCING MENTAL HEALTH AND NUTRITIONAL WELL-BEING AMONG HIGH SCHOOL STUDENTS IN DURHAM PUBLIC SCHOOLS WITH SCHOOL-BASED TELEHEALTH THERAPY AND EVIDENCE-BASED NUTRITION EDUCATION

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A Capstone Project submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Public Health in Nutrition and Dietetics, Leadership and Practice, and Health Policy and Management.

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ABSTRACT

Jiaxun Bei, Harper Eisen, Virginia Schranck, Alyssa Walker, and Mikayla Welch: Advancing Mental Health and Nutritional Well-Being Among High School Students in Durham Public Schools with School-Based Telehealth Therapy and Evidence-Based Nutrition Education

(Under the direction of Oscar Fleming)

Education access and quality is a social determinant of health that impacts individuals' health outcomes, as those with higher education often live longer, healthier lives (U.S. Department of Health and Human Services, 2023). Physical and mental health can impact an individual's ability to attend and engage in classes, therefore impacting their academic performance. In Durham County, North Carolina 35% of high school students reported feelings of depression and 28% of high school students described themselves as overweight in 2019 (Naney, 2019; Obesity, Diabetes, and Food Access, 2022). We hope to increase equity while addressing mental health and nutritional well-being for all students at Durham County public high schools by providing greater opportunities and resources with school-based telehealth therapy and the *Let's Eat Healthy* Nutrition curriculum that can boost their overall health and education.

Keywords: Social determinant of health, education access, mental-health, nutrition education, Durham County

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LIST OF ABBREVIATIONS

AES	Australian Eating Survey
DPC	Durham's Partnership for Children
DPS	Durham Public Schools
GNKQ	General Nutrition Knowledge Questionnaire
FFQ	Food Frequency Questionnaire
NCDPI	North Carolina Department of Public Instruction
SDOH	Social Determinant of Health

COMMON PROPOSAL

Problem Statement and Goals

The social determinant of health (SDoH) Education Access and Quality is the connection between education and well-being, including key issues such as graduating high school, language and literacy, and general education attainment (Education Access and Quality, n.d.). Within Durham County, 35% of high school students reported feelings of depression and 28% of high school students described themselves as overweight in 2019 (Naney, 2019; Obesity, Diabetes, and Food Access, 2022). Mental and physical health impact the experience students have in high school, including academics, relationships, and personal well-being (Hahn et al., 2015). Students with poor diets and unhealthy eating behaviors have been found to have decreased attendance, attention, and academic performance, when compared to students with better quality diets, which concurrently has a negative impact on mental health (Florence et al., 2008). Durham County public high school students have an average math proficiency of 42% and reading proficiency of 48%, both lower than the state average by 10% (*Durham Public Schools School District (2023) - Durham, NC*, n.d.). The school district is racially diverse, with 41% Black and 33.1% Hispanic/Latino students (*Durham Public Schools*, n.d.). Majority-minority communities, like Durham County, have higher rates of negative mental health outcomes and obesity, and reduced access to high quality mental health and food/nutrition resources (Sansom & Hannibal, 2021). Ensuring students have the best possible experience in high school includes working towards improving the health and nutrition education, mental health resources, and overall well-being of the high school students in Durham County. Our goal is to improve health education and access through improving mental health resources in Durham County Public High Schools, to set students up for success in high school and beyond.

Policy and Programmatic Changes

Policy Proposal

To address mental health in Durham Public Schools (DPS) the proposed program is to hire five licensed, diverse therapists to provide telehealth therapy to high school students during the school day. Students can be referred by teachers, nurses, and parents, or request an appointment themselves. After referrals or requests, students will be paired with a therapist that meets their needs from the network. With hour-long appointments, each of the therapists will see 35 students a week, with a total of 175 students being seen each week. This telehealth therapy will

be paid for through the Duke Endowment Grant and will be free to students, therefore providing accessible and affordable care to thousands of DPS high schoolers. The grant application will be written by the Student Health Advisory Council (SHAC) of DPS and will occur before year one. Telehealth provides opportunities for students to see specialists they may not have access to and reduces time and travel costs for guardians (Introduction to School-Based Telehealth | Telehealth.HHS.Gov, n.d.). Telehealth allows the ability to draw from a network of providers from across the state to match students' needs and not solely rely on providers available in the county (North, 2020).

Program Proposal

To address the poor nutrition intake of high school students in DPS, a high-quality nutrition education program will be implemented (Falkner,2022). Aiming for establishing a successful nutrition education program, the new health education curriculum, *Let's Eat Healthy* will be incorporated into the current health education course. The new nutrition education curriculum focuses on elevating the health of children through the pursuit of healthy eating habits. It is full of resources for teaching, planning, student workbooks, and online education for promoting the nutrition learning of students. Students will also learn to cook food most healthily in the practical nutrition class (Falkner, 2022). The program can contribute to better health outcomes for these students later in life including decreased rates of chronic health-related issues (Falkner, 2022). Three DPS will be chosen as schools to start the pilot program, their students will take the new nutrition curriculum starting freshmen year, as initiating this class sooner will help to form better nutrition-based behaviors sooner (Falkner, 2022). Other three DPS are going to participate as the control group to evaluate the efficacy of the nutrition curriculum. Two registered dietitians, health education teachers, the North Carolina State Board of Education, and the North Carolina Department of Public Instruction (NCDPI) are all contributors to the implementation of the program.

Community Partners

Community partners identified to address this include the North Carolina Department of Public Instruction (NCDPI), the Superintendent, the Durham County Public School Board, high school principals, high school teachers, and high school students as well as families and community members. The NCDPI oversees any curriculum changes for public schools in North Carolina and will likely have continuous involvement throughout the project. The Durham County Public Schools superintendent is the chief administrative officer as well as the chief executive officer of the school board and is responsible for assisting in implementing new policies or curricula as

well as assisting in making decisions within the school board. The Durham County Public School Board is responsible for policies within the schools and raising any concerns to the superintendent and plays a key role in decision making for Durham County Public Schools.

Teachers will implement the new curriculum in the classrooms and will report directly to principles with any concerns or successes. Teachers and principals will be invested in the curriculum implementation when it reaches the schools as it is their job to implement the new curriculum in the classrooms and will help bridge the gap between the school board and superintendent and the students and family members. Students, parents, and community members will likely be engaged as time permits but will be essential in the evaluation to determine if efforts have been effective in improving health education in the schools. These community partners identified will engage in varying degrees due to many factors including time constraints, knowledge, and their role within the school systems or the community.

Budget

The budget includes direct personnel expenses, indirect and direct non-personnel expenses, and revenue. Revenue includes solely money from the Duke Endowment Grant. There will be a network of five certified telehealth therapists working for the ten DPS schools. Our therapists will be making the average school-based therapist salary in Durham, NC at $39,229 (Salary.com, n.d.). These therapists' salaries will increase by 2% every year for the three years. Fringe benefits include health insurance, home office stipends, time off, etc., and are budgeted for 30% of the therapists' salary.

Non-personnel expenses include direct and indirect costs; all foreseeable indirect costs are covered by the school's budget (rent, utilities, etc.). Direct costs are broken down into privacy tools, technology, and comfort items. Privacy tools include items that are needed to make the appointment room private and soundproof; each school will have a sound machine and door noise stopper. Technology includes headphones and laptops, and a video conferencing platform. Doxy.me is a HIPAA-compliant secure platform for video conferencing and virtual meetings that will be used by all providers: it is $35 a month for each provider (Free HIPAA Compliant Telemedicine Doxy.Me Plans & Pricing, n.d.). Comfort items are budgeted to make the students feel comfortable and relaxed during appointments: each school will have a comfortable bean bag and a pack of fidget toys. All of these items

except the virtual platform may be reused for years two and three, however, we budget 75% of the year one expense for years two and three in case they need replacing.

Engagement and Accountability Plan

A community-engaged approach fosters trust among the implementation team and the community, which will help ensure that community partners are on board with a curriculum change. Once there is a foundation of trust created, the implementation team and community partners can focus on building community capacity and mobilization. These are essential steps to ensure that the community can sustain any changes made.

In the design phase of the project the team will utilize presentations to inform partners about health concerns and the proposed program. These presentations will be conducted in a group setting with virtual options and will be available to all identified partners. Presentations will use 30/30, a project planning and engagement tool to establish a timeline to inform partners on progress and data collected throughout program implementation and be continued through the design and improve phases of implementation on a quarterly basis.

Another engagement method designed to consult and collaborate with community partners will be group meetings in which appreciative inquiry interviews are conducted. Meetings will be available to all partners throughout the design phase and include a virtual option, however these will happen monthly. As the program progresses to the improve phase, meeting frequency will reduce to quarterly. Once the program progresses into the sustain/scale phase, meetings and presentations will be combined into one event. They will occur on a quarterly basis to continue informing partners while also creating space for collaboration.

Lastly, there will be workshops and training sessions designed to inform and collaborate specifically with high school health teachers to better implement the new curriculum. The workshops will occur in person daily, starting several weeks before the beginning of a new school year. The workshops will be used throughout the design phase, and then later be adapted to fit in with teacher trainings that occur before the start of each new year, or when a new teacher begins. Engagement in each method can be determined using the number of participants in attendance as a performance measure. If there is continuously low attendance, dates and times of each can be adjusted to better accommodate for various partners' schedules.

Program/Policy Evaluation Component

The output we expect to see from this program is an increased consumption of fruit and vegetables by the students we are evaluating. The importance of knowing general nutrition as well as an increased consumption of fruit and vegetables is seen through its ability to help contribute to better health outcomes for these students later in life including decreased rates of diabetes, obesity, and other chronic health-related issues that can lead to lifelong battles (Falkner, 2022). For our new nutrition program, success will be measured through the accomplishment of our short- and long-term objectives. For the short-term objective, a key milestone will be the completion of the initial General Nutrition Knowledge Questionnaire (GNEQ) in August of 2024 (Burrows et al., 2015). This will mark the initiation of our program and the first step in exposing the students to the new nutrition curriculum. At the end of the school year in June of 2025, the second GNEQ will be given, and here we will measure success by whether there is an average of at least a 10% increase in score for the nutrition knowledge questionnaire among the freshman classes that were exposed to the curriculum (Kuwahara & Eum, 2022).

While our team is assessing the GNEQs we will continue working towards the long-term objective. The comparison of the fruit and vegetable FFQ's that the students will take their freshman and senior years of high school, to evaluate any changes in eating behaviors, will be quantified ("National health", 2008). With the observational and FFQ-based data that we collect, we expect that the students of the three Durham County public high schools with the new nutrition curriculum will have a higher fruit and vegetable intake than those not receiving the education, improving their overall health and energy status (Falkner, 2022). Research shows that students who consume higher amounts of fruit and vegetables improve their mental health more than those who eat the least number of fruits and vegetables (Barnard, 2021). Kuwahara and Eum show how nutrition education for young students is often carried over into the family through conversations at dinner and thus better nutritionally balanced eating behaviors for the whole family (2022). In the end, we hope to increase equity for all students at Durham County public schools by providing greater opportunities and resources that can boost their overall health and education.

Common Proposal References

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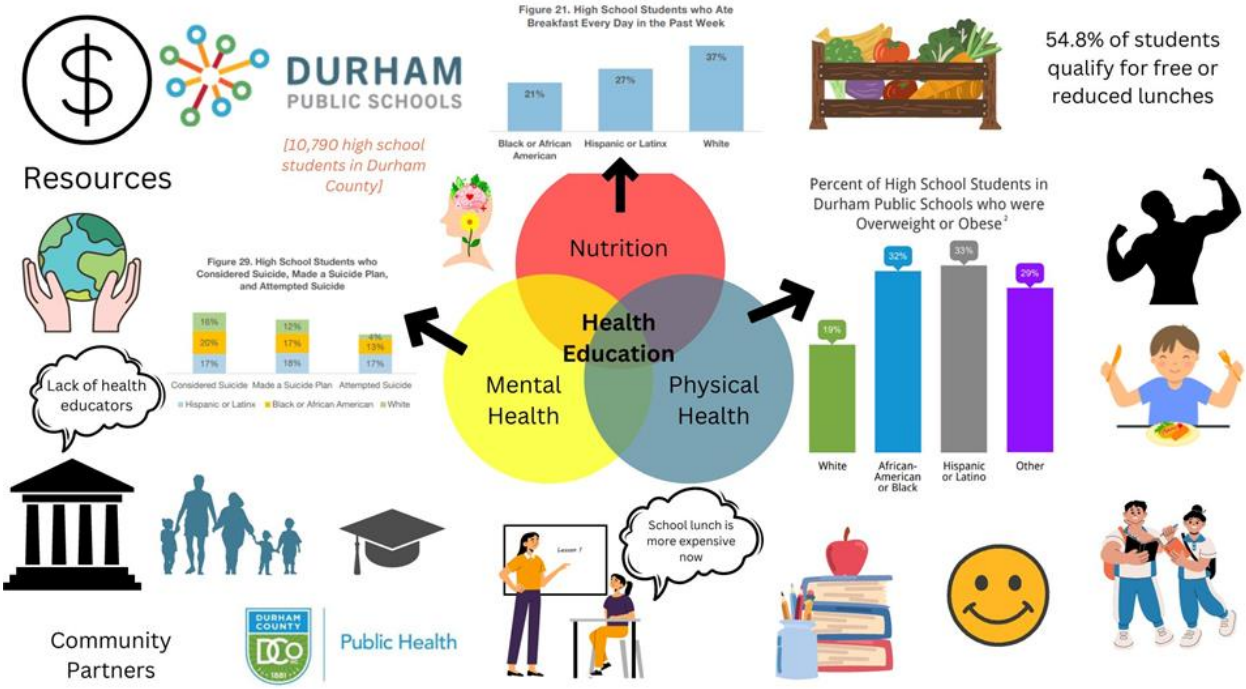
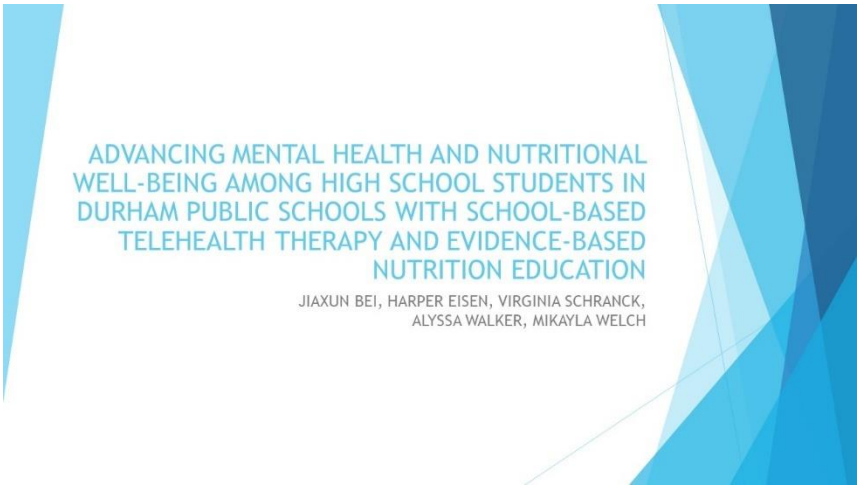
APPENDIX A: GROUP DELIVERABLES

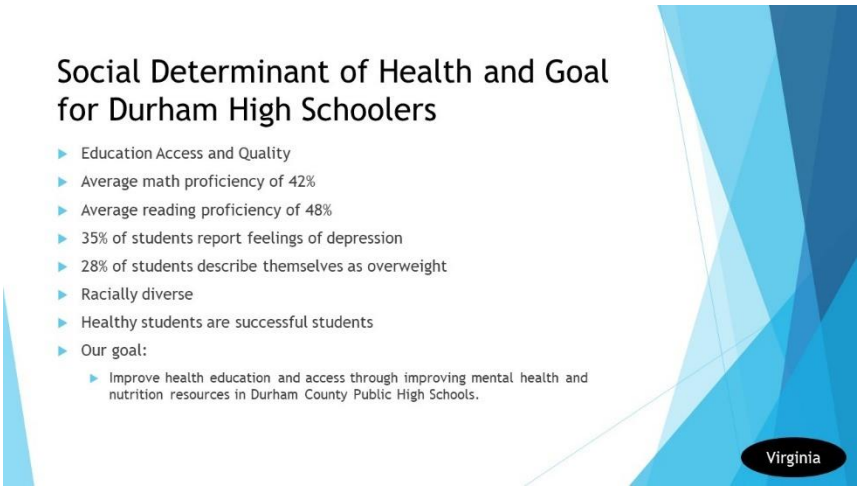
Rich Picture



Group Presentation Slides



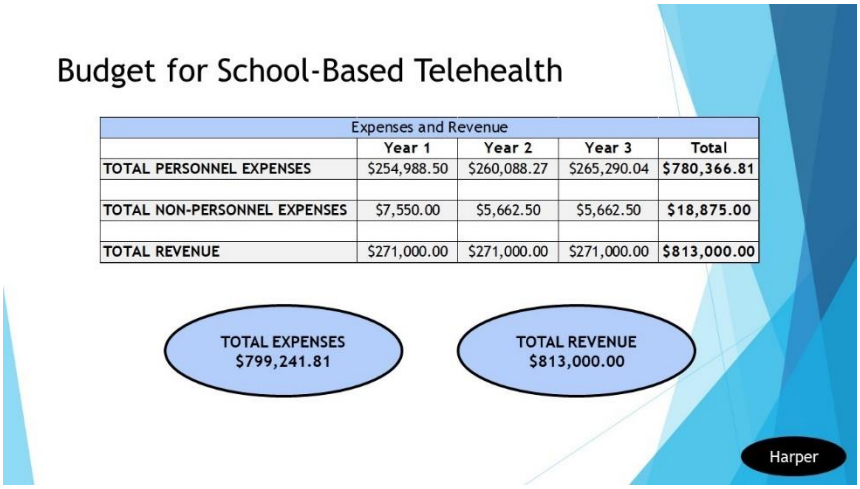
VIRGINIA: Thank you for joining us for our presentation today! We were asked to investigate a Social Determinant of Health priority for Durham County, and we are here to present our findings and gameplan for making improvements to the health of Durham County.



VIRGINIA: First, we will start off with our social determinant of health, which is Education Access and Quality, this is the connection between education and well-being, including key issues such as graduating high school, language and literacy, and general education attainment. Here are a few statistics about the high school students in Durham County: They have an average math proficiency of 42% and reading proficiency of 48%, both lower than the state average by 10% (Durham Public Schools School District (2023) - Durham, NC, n.d.) 35% of high school students reported feelings of depression and 28% of high school students described themselves as

overweight in 2019 (Naney, 2019; Obesity, Diabetes, and Food Access, 2022). The student population is racially diverse with 42% Black and 33.1% Hispanic/Latinx students. Students with poor diets and unhealthy eating behaviors have been found to have negative academic outcomes, when compared to students with healthy behaviors. Mental and physical health go hand in hand and improving both can help students in and out of the classroom. Our goal is to improve health education and access through improving mental health resources and nutrition education in Durham County Public High Schools, to set students up for success in high school and beyond.

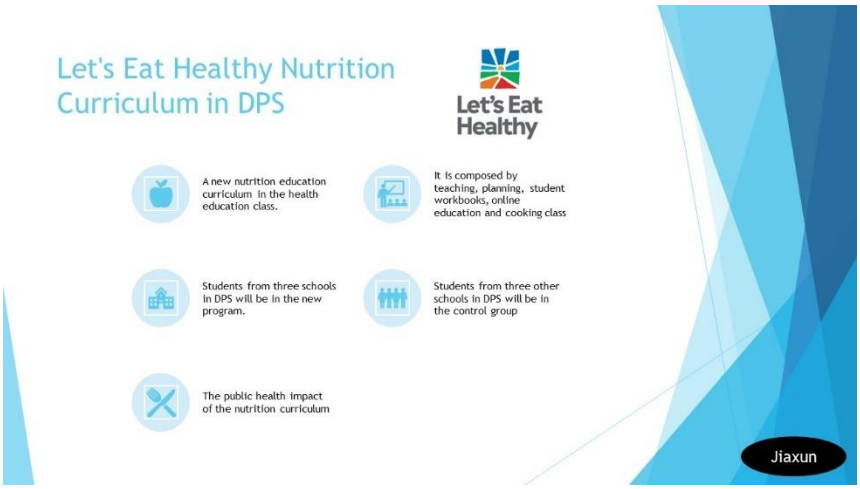
HARPER: To address mental health in Durham Public Schools (DPS) the proposed program is to hire five licensed, diverse therapists to provide telehealth therapy to high school students during the school day. Students can be referred by teachers, nurses, and parents, or request an appointment themselves. After referrals or requests, students will be paired with a therapist that meets their needs from the network. This telehealth therapy will be paid for through the Duke Endowment Grant and will be free to students, therefore providing accessible and affordable care to thousands of DPS high schoolers. Similar programs have been implemented in North Carolina in Jones County and Duplin County and have been successful. Telehealth provides opportunities for students to see specialists they may not have access to and reduces time and travel costs for guardians. Telehealth allows the ability to draw from a network of providers from across the state to match student's needs and not solely rely on providers available in the county.



HARPER: Here is a consolidated three-year budget plan for the school-based telehealth therapy program that includes personnel expenses, non-personnel expenses, and revenue. Personnel expenses cover the therapists' salaries and fringe benefits. Non-personnel expenses include direct and indirect costs; all foreseeable indirect costs are covered by the school's budget (rent, utilities, etc.). Direct costs are broken down into privacy tools, technology, and comfort items. Revenue includes solely money from the Duke Endowment Grant. Our total expenses and revenue can be seen here.

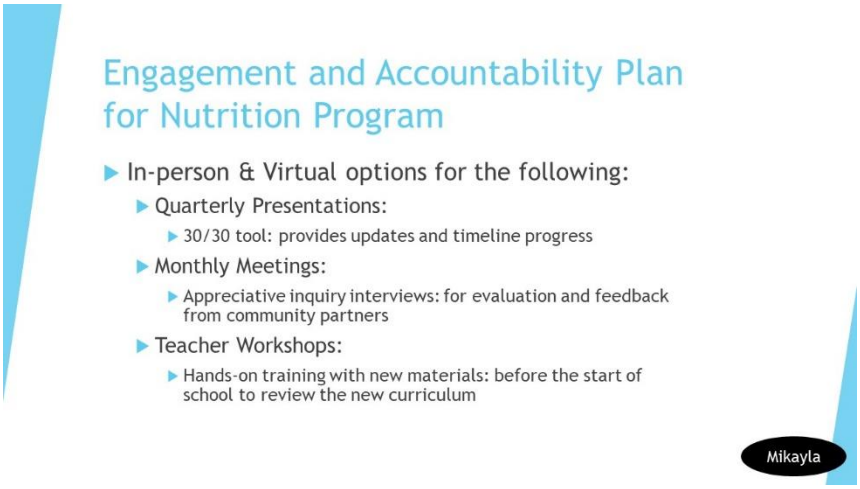
HARPER: Breaking down our non-personnel expenses, privacy tools include items that are needed to make the appointment room private and soundproof; each school will have a sound machine and door noise stopper. Technology includes headphones and laptops, and a secure, HIPAA compliant, video conferencing platform.

Comfort items are budgeted to make the students feel comfortable and relaxed during appointments: each school will have a comfortable bean bag and a pack of fidget toys.

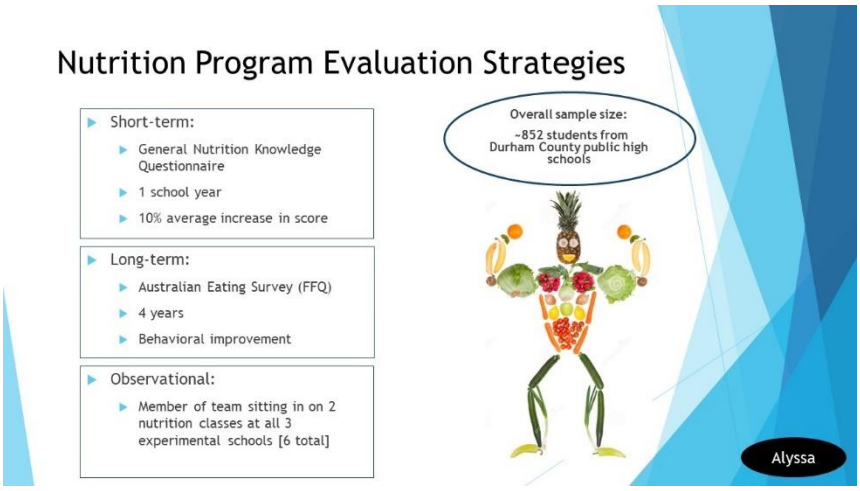


JIAXUN: To address the poor nutrition intake of high school students in DPS, a high quality nutrition education program will be implemented. Aiming for establishing a successful nutrition education program, the new health education curriculum "let's eat healthy" will be incorporated into the current health education course. It is composed by teaching, planning, student workbooks, and online education for promoting nutrition learning of students. Students will also learn to cook food in the healthiest way in the practical nutrition class. Students from three schools in DPS will be chosen to start the pilot program, students are going to take the new nutrition curriculum since freshmen year, as initiating this class sooner will help to form better nutrition-based behaviors sooner. Students from three other schools in DPS are going to participate as the control group to evaluate the efficacy of the nutrition curriculum. They are not going to participate in the program. As for the public health impact of the nutrition curriculum, the new nutrition education curriculum focuses on elevating the health of children through the pursuit of healthy eating habits. In addition, the program can contribute to better health outcomes for these students later in life including decreased rates of chronic health-related issues.

MIKAYLA: Many partners both within the school and the broader community will likely be involved in addressing this issue. For this intervention, we identified 7 key community partners including the North Carolina Department of public instruction, local therapists, the high school superintendent, the school board, principals, teachers, students, families, and community members. To determine these community partners, we focused on individuals in the community who are involved with the school or developing curriculum. We then examined their individual interests and the impact they may have on an intervention. North Carolina Department of public instruction is responsible for curriculum development and changes for the state, so they will have a large impact on the success of the intervention and will likely be involved throughout. While students will be less involved throughout the project implementation, they will experience an improved health education curriculum that leads to better health outcomes.



MIKAYLA: Several engagement methods will occur throughout the project utilizing different engagement tools. Presentations and meetings will be available to all community members. Presentations will be used at the start of the plan to inform partners of the health issue and to provide updates on progress throughout. Meetings will be used to obtain feedback from community partners. Teacher workshops will be the final step and will consist of training teachers on the new curriculum. Engagement in each method can be determined using the number of participants in attendance as a performance measure. If there is continuously low attendance, dates, and times of each can be adjusted to better accommodate various partners' schedules.



ALYSSA: Our program has an overall sample size of about 852 students from Durham County public high schools. For our short-term evaluation strategy, students will take the general nutrition knowledge questionnaire at the beginning of their freshman year in August 2024 and then again after they have gone through the nutrition curriculum at the end of the year in June 2025. We hope to see an average of a 10% increase in score through the comparison of the 2 questionnaires. Our long-term objective involves a fruit and vegetable-based food frequency questionnaire. The students will first take this at the start of their freshman year and again 4 years later at the end of their senior year in June 2028, after they have gone through the nutrition curriculum and had time to implement what they have learned. We hope to see behavioral improvement in their consumption of fruits and vegetables after these 4 years. The final evaluation strategy is observational. A member of our team will sit in on 2 of the nutrition classes at each of the 3 Durham County public high schools that our curriculum is being implemented into. The goal is to ensure that the curriculum is being taught properly and to evaluate the student's engagement with the material.

Our research has shown that students who consume higher amounts of fruit and vegetables improve their mental health more than those who eat the least number of fruits and vegetables.

ALYSSA: In conclusion, with your help, we hope to increase equity while addressing mental health and nutritional well-being for all students at Durham County public high schools by providing greater opportunities and resources with school-based telehealth therapy and Let's Eat Healthy Nutrition curriculum that can boost their overall health and education. Thank you for listening. Do you have any questions?

APPENDIX B: JIAXUN BEI INDIVIDUAL WORK

B.1 Individual SDOH Analysis

Social Determinant of Health

The social determinant of health (SDoH) are the social factors that can influence population health in daily life which includes economic stability, education and health care access, and community environment (Marmot, 2015). The SDoH focus is to increase the proportion of children who participate in high-quality early childhood education programs — EMC-D03, one of the healthy people 2030 objectives (Social Determinants of Health, 2020). The short-term impact of not participating in the program is negative, for an example, children who do not participate in early childhood education programs may fall behind in the schoolwork than those who participated in it. They are less ready and motivated to participate in school (Ramey & Ramey, 1998). The long-term impact of participating in the early childhood education program can increase standardized tests performance and the high school graduation rate, which can help to lower low teen birth rate and crime rate (Reynolds, Temple, & Ou, 2010). For children from low-income or racial and ethnic minority communities, is likely to reduce educational achievement and economic gaps for them when they participate in the early education program. It helps to promote health equity (The Community Guide, 2022).

Geographic and Historical Context

The community is focused on Durham County in North Carolina. According to the 2019 Durham County Community Health Assessment (CHA) Survey, Durham PreK program invests over $10 million dollars to the universal preschool system. The aim of the program was to raise the salary and contribute to the professional skill developments for educators. It also provides advanced technology for raising the quality of the early education. The staff in Durham perk program works with the local education institute for recruiting more early educators in the Durham County. In addition to the investment grants, Durham County also developed the NC Early Childhood Action Plan to improve physical and mental health, readiness to attend school, food and housing security, and high-quality early education for children. However, only 29% of the 23,000 children from zero to age five in Durham County participate in licensed, regulated early child education programs. It is less than a third of the population of children age from 0-5 years. There are more than 3,000 children on are waiting for the scholarship to enroll in the

program. This economic inequity makes the gap between children from different socioeconomic backgrounds to receive the same early education opportunity (NC Department of Health and Human Services, 2023).

Priority Population

The priority population is children age from 0 to 5 years old who live in Durham County. The SDoH focuses on early education which aims to improve the cognitive intelligence and social skills development of children from 0 to 5 years old. The program includes educational components which can improve literacy, numeracy, and motor skills. It may offer additional elements including recreation, nutrition education, health care, parental supports, and social services (Centers for Disease Control and Prevention, 2020). Low-income family children especially need program because they do not have the same financial resources for having access to the program, they need to get support from the local institute to get enrolled in (Centers for Disease Control and Prevention, 2020). To do that, the local community needs to support the children with scholarships into the program.

Measures of SDOH

Education related benefits from the Early Childhood Education are shown as following: test scores have the mean increase of 0.29 standard deviations from 27 study groups, high school graduation rate has the mean increase of 0.20 standard deviations from 7 study groups (The Community Guide, 2022). Grade retention (in which children are held back from the next grade because they have not succeeded in required learning) has the mean decrease of 0.23 standard deviations from 12 study groups (The Community Guide, 2022). Moreover, social and health related benefits from early childhood education shows the crime rates have a mean decrease of 0.23 standard deviations from 5 study groups, the self-regulation has a mean increase of 0.21 standard deviations from 5 study groups, and the emotional development has a mean increase of 0.04 standard deviations from 7 study groups (The Community Guide, 2022).

Rationale/Importance:

Early Childhood Education (ECE) provides health outcome which lower risk of developing adult disease and disability. Additional studies have shown enrolling in ECE contributes to fewer underweight, overweight, and obese children after participating in grade school (Kwon et al., 2017). Children with high quality ECE have a better job with higher income in the future. ECE also increases maternal employment and income, which helps to reduce crime rate, welfare dependency, and child abuse and neglect (Barnett & Masse, 2007). The program benefits

children in physical and mental health, nutrition, economic returns, and academic performance. It is beneficial to implement this program to reach the SDoH for the population (Centers for Disease Control and Prevention, 2023)

Disciplinary critique:

As shown in the measure of SDOH section, the statstics indicate the significance of implementing the program in solving the health disparity issue. If the children cannot participate in the program, there are lots of drawbacks for them in future health outcomes and income level. The overall median benefit-to-cost ratio from research was 4.19:1. The benefits from students' future incomes alone exceed program costs (The Community Guide, 2022). Nutrition education can help children to develop a healthy perspective on food to prevent childhood underweight, overweight, or obesity (Kwon et al., 2017).

B.1a Individual SDOH Analysis References

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B.1b Individual SDOH Analysis Appendices

Table 1: Measures of SDOH

Benefits	**Measurements (mean increase + or decrease -)**
Test scores	+0.29 SD
High school graduation rate	+0.20 SD
Grade retention	- 0.23 SD
Crime rate	-0.23 SD
Self-regulation	+0.21 SD
Emotion development	+0.04 SD

B. 2 Implementation Plan for Nutrition Program

Introduction

The social determinant of health (SDoH) are the social factors which can influence population health in daily life which includes economic stability, education, and health care access, as well as community environment (U.S. Department of Health and Human Services, 2021). The social determinant of health which gets addressed is health education access and quality. The key issue is to use a nutrition education program to reduce the obesity prevelance and mental health isse, as well as minizing the health disparity among and between the public high school students in Durham County (DCO Public Health, 2021). The priority population is 9^{th} to 12^{th} grade high school students in Durham County public high schools. The education program can provide strategies for students to consume healthy meals to boost their physical and mental health, and even further, to enhance their academic performance (Academy of Nutrition and Dietetics, n.d.). Therefore, it is crucial to implement a series of nutrition education programs in the public high school of Durham County.

Evidence Based Nutrition Program

Public high school students in Durham County have a relatively poor nutrition intake, which is one of the major contributors negatively influencing the condition of obesity, mental health, and academic success of high school students (Falkner,2022). According to the 2019 Durham County Community Health Assessment Survey, residents identified obesity as one of the top five county health concerns (DCO Public Health, 2021). By implementing a high-quality education program on nutrition, physical health and mental health, the current nutrition concerns will be addressed (Hamulka et al., 2018). Let's eat healthy is a great nutrition education curriculum program to follow, they provide systematic and high-quality nutrition education courses to K-12 students (Academy of Nutrition and Dietetics, n.d.). It promotes healthy eating habits for the students. The reason we choose this program is it contains lots of comprehensive nutrition education courses for specific high school students. It also has plenty of resources regarding workbooks, lesson plans and courses.

Evidence Based Outcomes

The short-term outcome objective will be an average of a 10% increase in score for the nutrition knowledge test among the whole freshman class in public high school after a year of learning the nutrition education curriculum (Kuwahara & Eum, 2022). The general nutrition knowledge test will be given to all freshmen on the first day of

school in August of 2024. After taking the new nutrition education curriculum in the health education class for a year, the same nutrition knowledge test will be given to the same population at the end of the same school year in June 2025. The results of the tests will be compared to determine if there are any improvements on the nutrition knowledge of freshman in public high school of Durham County.

The long-term outcome objective will be seeing a nutrition behavior change among the students in a four-year time frame. In detail, a food frequency questionnaire (FFQ) will be given to the students at the beginning of their 9th grade in August 2024, and the same FFQ will be given again before they graduate from 12th grade in June 2028. Through comparing these FFQs, nutrition behavior improvement is anticipated. Especially, the effect of the nutrition education curriculum will be tested here to understand if students changed their nutrition behavior after they get the nutrition knowledge. We expect an imporved nutriton behaviors such as students who attends the progrma likes eating more vegetables and fruits. Because a gap between knowledge and behavior exists in the real-world public health practice (Kennedy et al., 2004).

Evidence Based Implementation Strategies and Activities

Aiming for implementing the nutrition education program smoothly, it is vital to introduce the new health education curriculum "Let's eat healthy" to the health educators in the public high school in Durham County. The health teachers need to familiarize themselves with the new material of the health education program, then they can be prepared for the new curriculum before the semester starts. In addition to this, the current health education curriculum needs to integrate with the addition of a new nutrition education program. The updates of the curriculum are required to be reviewed and approved by North Carolina Department of Public Instruction (NCDPI). Its involvement with the direction of the State Board of Education has the law enforcement right to change the curriculum (Truitt, 2023).

To carry out the planned nutrition program implementation in the high shcool health eduction class, four components are required to work together: Two registered dietitians, health education teachers, State Board of Education, and NCDPI. They collaborate to implement the program in every public high school of Durham County. It is vital to implement the program in the full scale of Durham County public high schools to practice equity of education. The priority population is for all students who enroll 9th to 12th grades in the public high school of Durham County. Our goal is to provide the nutrition education curriculum to 10,790 high school students in Durham

County (Durham Public Schools, n.d.). The socioecological model fits here, It focuses on individual student's understanding of nutrition education. For the relationship within the family, family members can have positive or negative influence on students on their eating habits (Berge et al., 2017) In addition, it mandates the whole high school community to work together for implementing the program. It also requires society to have a policy on promoting healthy meals, which can be done by lobbying the legislators.

Stakeholders

There are several stakeholders involved in the nutrition education program. The family of the high school students, the State Board of Education, the Durham County public health department, and the public high school at Durham County, and Every stakeholder plays a role in the program implementation. First, the family of the high school students plays a crucial role for implementing the program among the students. Because the family of high school students can assist students on cooking healthy food which they learned from the nutrition curriculum. (Liu et al., 2021). If the family cannot support the students for nutrition practice, for example, they keep cooking unhealthy meals for students, it will be difficult for students to practice the nutrition knowledge they learned from the nutrition curriculum. Second, the State Board of Education plays roles in reviewing the nutrition curriculum and helps with implementing the new nutrition curriculum in the public high school (North Carolina Department of Public Instruction, n.d.). They would like to fulfill the goal to improve nutrition education for high school students. Third, the Durham County public health department can help to design and implement the new nutrition curriculum for the Durham County high school (Elledge, 2023). The dietitians who work for the Durham County public health department will implement the course to share the professional nutrition knowledge with the teachers and the students in school. It can serve as a pilot program to test the effect of the program. Later on, we can implement on more high shcools if it is effective. Because there is not a current program for high school students in Durham County yet (DCO Public Health, n.d.). Finally, the public high school can help students to do better in academic and physical health, then students are going to appreciate the school for doing this course, students are going to be fond of the school. It remains popular among students (CDC, n.d.).

Budget

Durham County department of public instruction and Durham County department of public health grant the program which gets implemented in public high school. Around 18% of the budget is going to be distributed to

develop the nutrition curriculum. It breaks down into development materials and educational materials. 8% of the total budget is used for the development materials, which contain curricular programing and educator teaching guides. As for educational materials, the cost is 10% of the total budget. The budget for educational materials is divided into three categories: nutrition textbooks, food and cooking equipment, and online lesson programs. Finally, the cost of the personnel is 80% of the total budget. We want to hire 2 dietitians and five health class educators for working for the program implementation. We also need a certified health education specialist to oversee everything. The rest of the budget is for the miscellaneous cost, which is estimated as 2% of the whole budget. A table in the appendix will show the detail of money amount breakdowns of the budget.

Conclusion

The advantage of the recommendation of the class is students could learn the nutrition concept and improve their nutrition status to live in a healthy lifestyle, which can help students to have a better academic performance (Falkner, 2022). On the other hand, the disadvantage of the program is the timeline. It takes the entire school year to implement the new education curriculum, students may feel that is an extra burden on them if they cannot see any improvement immediately. In case that students lose interest over the course of the program, more engaged activities should be developed. It also needs approval from the school district to implement or change the curriculum and that will also take time. Our program prioritizes the overall mental and physical health of Durham County public high school students. After they finish learning our program, they should be able to have a new concept on how health and nutrition can give their power to be successful in high school.

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B. 2b Implementation Plan for Nutrition Program Appendices

Table 2: Jiaxun Nutrition Program Budget

Item	Percentage of Budget	Dollar Amount
Development Materials	8%	
Curriculum programming		$25,000
Educator teaching guides		$19,500
Educational Materials	10%	
Nutrition textbooks		$9,500
Food and cooking equipment		$15,000
Online lesson programs		$20,000
Personnel	80%	
Dietitians (2)		$120,000
Health Class Educators (5)		$275,000
Certified Health Education Specialist		$50,000
Miscellaneous	2%	$11,125
Total Budget		**$556,250**

B. 3 Evaluation Plan

Introduction

The social determinant of health (SDoH) is a series of social factors which can influence population health including economic stability, education, and health care access, as well as community environment (U.S. Department of Health and Human Services, 2021). The SDoH gets addressed here is on health education access and quality. A nutrition education program is applied to enlighten the obesity and mental illness toll among the public high school students in Durham County. It is also beneficial to minimize the health disparity existing in the public high school students in Durham County. (DCO Public Health, 2021). The priority population is 9th to 12th grade high school students in Durham County public high schools. The education program can provide strategies for students to consume healthy meals to boost their physical and mental health, and even further, to enhance their academic performance. (Dairy Council of California, n.d.). Therefore, it is crucial to implement a series of nutrition education programs in the public high school of Durham County. Let's eat healthy is a beneficial nutrition education curriculum program (Rhoads, 2023). It provides systematic and high-quality nutrition education courses for K-12 students (Dairy Council of California, n.d.). Health education teachers are responsible for conducting nutrition education with the implementation of the new nutrition curriculum. In addition to the role of the health education teacher, three major components collaborate to implement the new education curriculum. Registered dietitians, School Board of Education, and North Carolina Department of Public instruction work together to implement the program.

Evidence Based Evaluation Plan

The long-term outcome objective will be to expect fruit and vegetable intake changes among the students in a four-year time frame. Becuase eating more fruits and vegetables is beneficial for imporving the mental health status and it helps to reduce the risk of developing chronic disease in the future (Bishwajit et al, 2017). The Food Frequency Questionnaire (FFQ) from the Australian Eating Survey (AES) is fruit and vegetable focused. It will be administered to the incoming students at the beginning of their 9th grade in August 2024, and the same FFQ will be given again before they graduate from 12th grade in June 2028. Through comparing these FFQs, the vegetable and fruits consumption behaviors are determined. Increased number of vegetables and fruits consumption is anticipated (Kuwahara & Eum, 2022). Especially, the effect of the nutrition education curriculum will be tested to understand if

students cosume more vegetables and fruits after they gain the nutrition knowledge. Because a gap between knowledge and behavior exists in the real-world public health practice, an increase in knowledge does not always lead to behavioral change (Kennedy et al., 2004).

Study design/data collection

We are going to do an observational case control study; The vegetable and fruits intake data from FFQ will be mostly self-reported in three experimental groups and three control groups. We will find three schools who would like to take part in the program with sufficient educational resources, they should have health eduction class with a credible health educator. Three schools from Durham County public high schools are chosen as experimental group to enroll in the nutrition education program, then three other schools are chosen as control groups which do not enroll in the nutrition education program. We need to evaluate the fruit and vegetables intake levels by using the same FFQ at the freshman year among all schools whether they enroll in the program or not, then we record the results. The inclusion and exclusion criteria for participants can help to recuirt eligieble students who are interested in taking part in the program. We want to evaluate the fruit and vegetable intake again at the senior year by using the same FFQ between experimental group and control groups in six schools from experimental and control group. We can compare the fruit and vegetables results between experiment group and control group in senior year.

An additional observation strategy that we will implement is that throughout the semester, a member of our main program team will join in two of the nutrition classes being taught at each of the three schools which the nutrition education program is being implemented in. A total of six classes will be observed, with the goal of ensuring that the curriculum is being taught properly, and to evaluate the student's engagement with the material. (Spreeuwenberg, 2022). With the result from the observational and FFQ data, we anticipate that the students from three Durham County public high schools with the implementation of nutrition education program will have a higher fruit and vegetable consumption status than those not receiving the education. (Falkner, 2022).

Sample and sampling strategy

According to the Public School Review website, the average student size in public high schools in North Carolina is 567 (Colayco, 2023). We can estimate the average freshman class size to be around 142 by dividing the 567 by 4 classes. We are going to evaluate 6 freshman classes from experimental group and control group schools. The overall population size is 852 students. The inclusion criteria for selecting school as the experimental group is

the based on the willingness and capability to participate in the study, their willingness will be measure by the survey of if you would like to take part in the nutrition education curriculum. They need to have enough health educator in the health education class who can understand new nutrition curriculum very well. Only schools which can provide professional health educator can enroll in as the experimental group schools.

Specific measures

The outputs should be an increased fruit and vegetables consumption status and gained nutrition knowledge in the experimental group of students. In our implementation plan, the experimental group students will take the standardized general nutrition knowledge questionnaire (GNKQ) before and after they have taken the nutrition program education (Kliemann et al., 2016). We will compare the GNKQ score before and after the nutrition program is implemented. It is expected to see at least a 10% increase in average score for the GNKQ among experimental group students after they learned the nutrition education program (Kuwahara & Eum, 2022).

Timing

Fruits and vegetables intake evaluation will be done by FFQ evaluation at the end of the senior year of high school in June 2028. Progress can be observed through getting feedback from students towards the nutrition class and getting the result from the GNKQ after a year of program implementation (Kliemann et al., 2016). If there is no progress after a year of implementation; there are no improvements from GKNQ or FFQ, we need to adjust our program based on receiving the feedback from students, teachers, and other parts of the community partner, such as student's family. We can change the format of the class to implement more student lead activity for sparking their interest on the nutrition knowledge.

Analysis plan

Quantitative and qualitative data will be both analyzed in the evaluation of the program. The quantitative data contains two parts here; The first part is fruits and vegetable intake comparison between the beginning of the freshmen year and the end of the senior year from the FFQ ("National health", 2008). The second part is the short-term outcome in the GNKQ. We anticipate seeing 10% grade increase on the nutrition knowledge exam before the freshmen year and the beginning of the sophomore year. (Falkner, 2022). Qualitative data will be collected based on observation of team member, when they sit in the class to observe students' engagement on the material. We will analyze the data from the GNKQ to compare the average score from the experimental and control group. We can

calculate it to check if it is meets the 10% grade increase. We will also check the FFQ before and after to count if they have higher amount of vegetbales and fruits intake by comparing the score of the FFQ.

Sources of funding

The program will be funded by the community partners including Durham Public Schools Board of Education, Durham County Public Schools, and Durham County Public Health ("Facts & figures", 2023). Community partners will engage in the program the whole time from the beginning freshmen year until the end of the senior year. We would like to work with more community partners if the program is successful, and the long-term goal is to implement the program in the whole Durham County high school.

Data use and dissemination

Data from the FFQ will help to measure the effectiveness of the nutrition education program on improving the fruit and vegetable intake of students in Durham County public high schools. The results will be disseminated among the implementation team and to our community partners, students, parents, teachers and staffs through meetings where we will discuss results of the program, and if there are any changes that we need to make for better results (Bryant, 2017). The reserach paper based on the data, study method, and results should be written, published, and presented in the conference.

Conclusion

The program has a common goal which needs to be achieved from the collaboration from different public health workers. The interdisciplinary effects of the program are increased fruit and vegetable consumption can result in better mental health for students (Falkner, 2022). Overall, we wish all students who are in Durham County public schools can enjoy an equal opportunity for the health benefits.

B. 3a Evaluation Plan References

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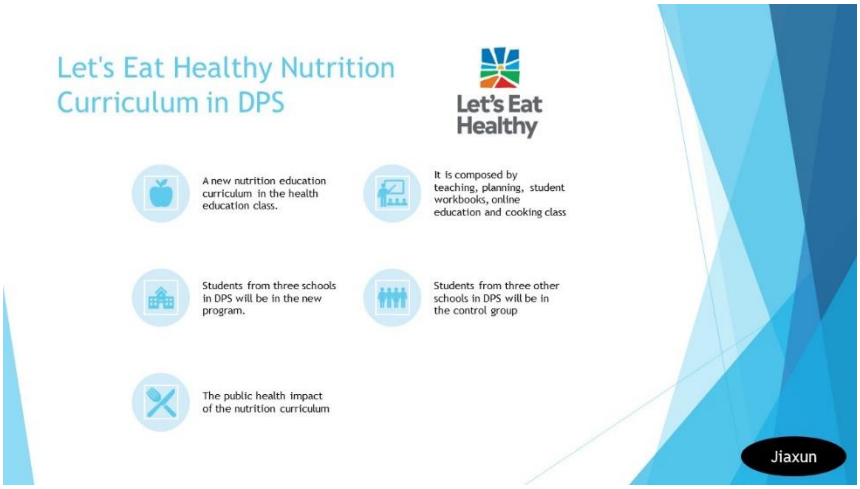
B. 3b Evaluation Plan Appendices

Appendix:

This is the link for the standardized general nutrition knowledge questionnaire (GNKQ)

chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.ucl.ac.uk/epidemiology-health-care/sites/epidemiology-health-care/files/gnkqrscoring.pdf

B. 4 Jiaxun's Presentation Slides and Script



JIAXUN: To address the poor nutrition intake of high school students in DPS, a high quality nutrition education program will be implemented. Aiming for establishing a successful nutrition education program, the new health education curriculum "let's eat healthy" will be incorporated into the current health education course. It is composed by teaching, planning, student workbooks, and online education for promoting nutrition learning of students. Students will also learn to cook food in the healthiest way in the practical nutrition class. Students from three schools in DPS will be chosen to start the pilot program, students are going to take the new nutrition curriculum since freshmen year, as initiating this class sooner will help to form better nutrition-based behaviors sooner. Students from three other schools in DPS are going to participate as the control group to evaluate the efficacy of the nutrition curriculum. They are not going to participate in the program. As for the public health impact of the nutrition curriculum, the new nutrition education curriculum focuses on elevating the health of children through the pursuit of healthy eating habits. In addition, the program can contribute to better health outcomes for these students later in life including decreased rates of chronic health-related issues.

APPENDIX C: HARPER EISEN INDIVIDUAL WORK

C.1 Individual SDOH Analysis

Social Determinants of Health

Social determinants of health (SDOH) are defined by Healthy People 2030 as the "conditions in the environments where people are born, live, learn, work, play, worship, and age that affects a wide range of health, functioning, and quality-of-life outcomes and risks." These can be grouped into five categories: economic stability, education access, and quality, health care access and quality, neighborhood, and built environment, and social and community context (Social Determinants of Health - Healthy People 2030 | Health.Gov, n.d.). SDOHs are factors and circumstances that can influence health outcomes. Education is a key social determinant of health because it has long-term impacts on other determinants like income, housing, and access to nourishment among many other things. People with higher levels of education live healthier and longer lives and children enrolled in schools that lack health resources and teacher support more often experience poorer physical and mental health. (Social Determinant of Health, 2021) Evidence supports that school-based mental health services allow for early identification and treatment of mental health issues, reduce access barriers, and may be linked to reduced absenteeism and better mental health outcomes (Panchal et al., 2022). Short-term impacts of the lack of mental health services include delayed diagnosis and treatment of possible mental health conditions resulting in lower academic performance, increased vulnerability to various negative school outcomes, likely lower math and reading scores, poor grade point averages (GPA), higher retention rates, and a greater probability of high school non-completion or dropout. The longer-term impacts of untreated mental health problems include a greater risk of substance use and violence. These risky behaviors as children can result in poorer health outcomes, low socioeconomic status, poor employment outcomes, and difficulty adjusting socially. (Swick & Powers, 2018)

Geographic and Historical Context

Durham County is located in the Piedmont region of North Carolina (Powell, 2006). Durham's historic economic and social development was led by the African American community. Durham County is home to North Carolina Central University, the nation's first publicly supported liberal arts college for African Americans, Duke University, and part of North Carolina's Research Triangle Park (Durham County Public Health, 2021; Powell, 2006). Durham County produces agricultural goods such as tobacco and soybeans, manufactured products including

telecommunications equipment and fiber optics, as well as minerals such as petrified wood and hematite (Powell, 2006). Since 2000, the county's population has grown over 64% to 311,848 in 2019 making it the sixth most populous county in North Carolina. According to the 2021 Durham County Community Health Assessment, 70% of residents have at least some college education and the percentage of residents over the age of 25 with a Bachelor's, graduate, or professional degree is higher than North Carolina or U.S. percentages (Durham County Public Health, 2021). In spring 2022, Durham County Public Schools launched The Whole Schools Movement as a program to tackle rising mental health needs in Durham County, the introduction of this has already started working towards creating transformative approaches at priority schools and aims to start implementing them at all schools by 2025. This program plans to include training, school-level grants, and piloted strategies. (Approach, n.d.) However, in a county where one in three high school students reported feelings of depression at some point pre-pandemic, urgent and well-funded action is needed (Naney, 2019).

Priority population

In Durham Public Schools there are a total of 54 schools with 32,005 students. The district's demographic breakdown is 19.3% White, 41% Black, 2.1% Asian or Asian/Pacific Islander, 33.1% Hispanic/Latino, 0.2% American Indian or Alaska Native, and 0.1% Native Hawaiian or other Pacific Islander (Durham Public Schools, n.d.). DPS's average testing ranking is four out of ten which is in the bottom 50% of schools and North Carolina and they have an average math proficiency of 32% and reading proficiency of 37%, both lower than the state average by at least 10% (Durham Public Schools School District (2023) - Durham, NC, n.d.).

Measures of SDOH

The Youth Risk Behavioral Survey in 2019 sampled Durham County students and identified that among high school students, 35% reported feelings of depression (27% Male and 43% Female) and 19% reported that they considered committing suicide in the 12 months leading up to the survey. This survey highlighted significant differences by race and ethnicity for high school students and not middle school students, which aligns with previous research that shows a positive correlation associated with depression and anxiety in people of color. This data illustrates the need for immediate action in this population of majority-minority students (Naney, 2019).

Table 2 highlights key data pertaining to the mental health of high schoolers in Durham County. It should be noted that there was an increase in the incidence of mental health problems from 2017 to 2019 but no data yet on post-pandemic incidence.

Rationale/Importance

It is imperative that Durham County address the mental health needs in public schools because data has shown an uptick in depression and suicidal ideation among Durham Public School students over the past few years. Without proper resources in schools these students' mental and emotional health will be inhibited as well as their academic attainment. The lack of adequate treatment of mental health needs in children can affect academic performance and overall well-being and can ultimately result in poorer health outcomes short and long term (Swick & Powers, 2018).

Disciplinary critique

It is important to address education access and quality as an SDoH because education is a key factor in affecting other aspects of life. By limiting disparities and issues in children, then we are setting them up to have limited negative health outcomes in the future and better future lives. Policy is important in addressing the lack of mental health services in schools because we can set guidelines and laws that can hold schools accountable and make sure that things are changing to address this problem. Policy can also allocate funding to these schools to hold programs that address the need. People in marginalized groups tend to suffer worse mental health outcomes due to structural inequities in access to high-quality mental health care services and ongoing discrimination, and in Durham County. Eighty percent of the DPS population is a part of a marginalized ethnicity so this would aim to address a large population of children that is largely affected by worse mental health outcomes (Durham County Public Health, 2021). Other than addressing health equity, good mental health is essential to a productive economy, helping create educated, productive workers (Reducing the Economic Burden of Unmet Mental Health Needs | CEA, n.d.). Untreated mental illnesses have a direct impact on the nation’s economy, costing about $100 billion a year in lost productivity (Untreated Mental Illnesses: The Causes and Effects – Princeton Public Health Review, n.d.). Offering school-based mental health services will only result in positive impacts on the community and individuals and is an immediate need in Durham County.

C.1a Individual SDOH Analysis References

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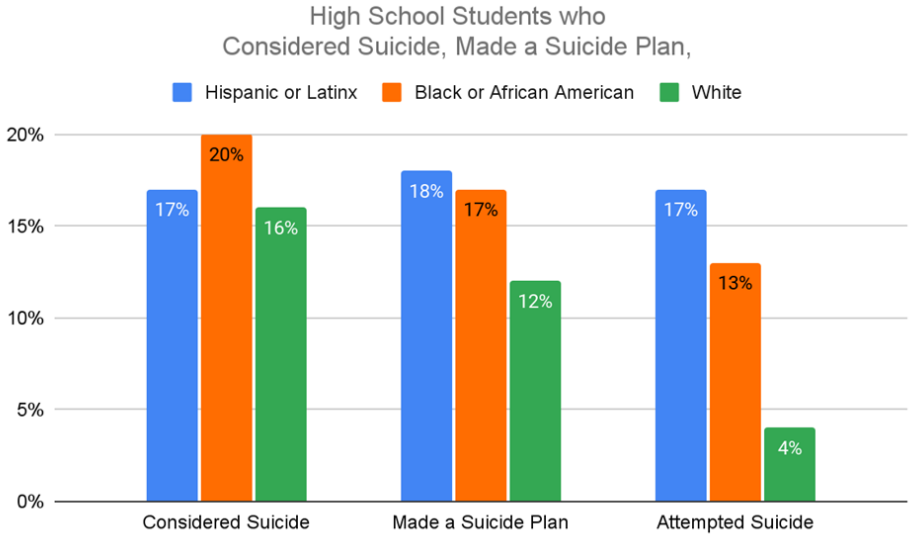
C.1b Individual SDOH Analysis Appendices

Table 3: Durham County High School Mental Health 2017-2019

Durham County High Schoolers	**Durham 2019**	**NC 2019**
Students who reported depression in the past year	35%	36%
Students who considered suicide during their lifetime	19%	19%
Students who attempted suicide in their lifetime	13%	10%

(Naney, 2019)

Figure 1: High School Students and Suicide 2019



(Naney, 2019)

C. 2 Policy Analysis

Background

Poor mental health is a rising public health issue nationwide and it can influence your relationships, schooling, work, personal well-being, and future life (*Understanding Mental Health as a Public Health Issue*, 2021). Mental health issues in childhood can interfere with development and cause problems in adulthood, which is why it is so important to diagnose and treat at a young age (CDC, 2022). The Durham County Youth Risk Behavior Survey (YRBS) is part of a national school-based survey administered every other year by Durham Public Schools (DPS) to look at health risk behaviors among adolescents. One in three high school students reported feelings of depression and 19% of high school students reported that they considered committing suicide (Naney, 2019). Although 2021 YRBS data for Durham County has not been released, North Carolina YRBS data from 2021 has shown an increase in the percentage of students struggling with mental health across the state (Bass, 2022). Mental health is an important aspect of wellness that affects the future of every child, and it is important to address this issue in Durham County Public Schools to prepare them for a successful, healthy future.

Policy Option #1: WSCC Implementation Teams

The first policy option for addressing mental health in Durham Public Schools (DPS) is an expansion of the current DPS school wellness policy (Section 6140). The current school wellness policy includes the Whole School, Whole Community, Whole Child (WSCC) Framework, a CDC model for addressing health in schools (North Carolina State Board of Education, 2021). The model includes 10 components, two of which relate to mental health: health education and counseling, psychological and social services (*Whole School, Whole Community, Whole Child (WSCC) | Healthy Schools | CDC*, 2022). This proposed policy expansion would require the designation of a WSCC implementation team at each high school in DPS to facilitate the adoption of the WSCC framework. The team would include current employees such as health education teachers, nutrition staff, any school psychologists, and admin staff, and they will be required to serve on the team. The Student Health Advisory Council (SHAC) for Durham County would oversee the WSCC teams and create a toolkit for them semesterly. To address mental health in DPS high schools, the SHAC would place mental health as a priority for the teams. We will only need funding for WSCC training for the team members, and for that, an application will be placed for the Duke Endowment Fund. School districts in Colorado have designated a 'WSCC Implementation Team' in each school to facilitate the adoption and

implementation of all aspects of this framework and they have created programs that have proven helpful to students.

Policy Option #2: Grant-Funded, School-Based Telehealth Therapy

The second policy option for addressing mental health in DPS is to hire five licensed, diverse therapists to provide telehealth therapy to high school students during the school day. Students can be referred by teachers, nurses, and parents, or request an appointment themselves. After referrals or requests, students will be paired with a therapist that meets their needs from the network. With hour-long appointments, each of the therapists will see 35 students a week, with a total of 175 students being seen each week. This telehealth therapy will be paid for through the Duke Endowment Grant and will be free to students, therefore providing accessible and affordable care to thousands of DPS high schoolers. The grant application will be written by the Student Health Advisory Council (SHAC) of DPS and will occur before year one.

Evaluation Criteria

To address mental health in Durham Public Schools, two policy options will be considered: WSCC Implementation Teams and Grant-Funded, School-Based Telehealth Therapy. Five evaluation criteria will be assessed to analyze the policy options. impact, cost, the likelihood of stakeholder involvement, political feasibility, and equity. The impact is determined by evidence base per policy option, the cost is determined by evidence base per policy option and estimated total cost for programs, the likelihood of stakeholder involvement is determined by assessing stakeholders needed for each option and their perceived likelihood of participation, political feasibility is the extent to which DPS is likely to pass policy or allocate funding, and equity is determined by how the policy option addresses equity in DPS.

Analysis of Policy Option #1: WSCC Implementation Teams

The NC Board of Education mandates school districts have a student health advisory council (SHAC) that helps monitor and implement the WSCC framework, and in Durham, that SHAC oversees a district of 32,000+ students (“6140 Student Wellness,” 2021). With a WSCC implementation team at every school helping monitor and implement the WSCC framework, they will be able to focus their efforts on a smaller population of students and tailor programs to their specific population. These teams will be required to complete WSCC training that will be led by the SHAC, and team members will be paid for initial training and any follow-up training by Duke Endowment

Funding. The teams at the school level can assist in the completion of surveys to develop needs assessments to understand the needs of the students and create programs that address these needs. As poor mental health has already been identified as a health issue in Durham Public Schools, the team's priority is to create a program for their students that aims to better mental health. The SHAC will create a toolkit of evidence-based mental health interventions for the team to pick and implement based on their knowledge of the school and students. The Falcon District 49 in Colorado designated WSCC teams to develop and implement annual school health improvement plans (SHIPs) and share success stories on their school website (ASCD, 2016). Falcon District Schools shared stories that improved student wellness and included a variety of different programs for all ages. Like the Falcon teams, the Durham teams would collect data and develop and implement student health improvement plans and share stories via their websites. The Falcon School District 49 in Colorado is about the same size as the Durham Public School district and has a similar size high school student population. This option was evaluated based on five criteria in the evaluation matrix (see Appendix C. 2b, Table 3).

Analysis of Policy Option #2: Grant-Funded, School-Based Telehealth Therapy

School-based telehealth has been proven to improve access and availability to several providers and healthcare needs. Telehealth provides opportunities for students to see specialists they may not have access to and reduces time and travel costs for guardians (*Introduction to School-Based Telehealth | Telehealth.HHS.Gov*, n.d.). Telehealth allows the ability to draw from a network of providers from across the state to match a student's needs and not solely providers available in the county (North, 2020). Telehealth therapy at DPS high schools will require school staff to help facilitate appointments and facilitate a distraction-free, private space for appointments. School administrators will manage appointments, keep track of referrals, and work with the health care provider. Jones County Public Schools in North Carolina adopted school-based telehealth services during the pandemic and schools saw fewer student absences, diminished classroom disruptions, and better academic performance among students who participated in therapy sessions. In Jones County, this program has resulted in over one thousand visits that not only included multiple mental health reasons such as anxiety and depression, but minor health concerns like cuts and scrapes (Heubeck, 2022). Although Jones County had success with a significantly smaller high school student population than Durham County, 442 compared to about 11,000, Duplin County implemented a similar program with two licensed professionals and around 10,000 students and experienced success (*Explore Duplin County*

Schools, n.d.; *Jones Senior High School in North Carolina - U.S. News Education*, n.d.; North, 2020). The evidence from Duplin County shows that five therapists in Durham County will be able to support the demand of 11,000 students. Once telehealth therapy is implemented in DPS for a year, we will assess how many students seek out the services and how their performances in class are affected to determine if there is a need for more therapists or if we hire fewer for the next year. Local mental health organizations and low-income parents would be big supporters of grant-funded telehealth therapy because it will give access to so many more young people wanting to access care, however, school nurses and psychologists may disapprove because this may cost them to lose their jobs because they are no longer needed. This option was evaluated based on five criteria in the evaluation matrix (See Appendix C. 2b, Table 4).

Final Recommendation

Based on the total scoring of the evaluation matrix, my final recommendation is Grant-Funded, School-Based Telehealth Therapy. Jones County is a great example of a successful program and with adequate funding, Durham Schools will see similar outcomes and better health. This policy option is more expensive, but it will be a valuable investment in the mental health of DPS high school students. By providing accessible, affordable telehealth therapy DPS will be helping thousands of students who would otherwise never seek out, or be able to afford therapy, so this policy option addresses equity in DPS. After 3 months of implementation, we would like to see 15% of all DPS high school students have an appointment scheduled. After a year of implementation, we would like to see the percentage of students feeling signs of depression fall from 35% to 32%.

C. 2a Policy Analysis References

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C. 2b Policy Analysis Appendices

Table 4: Policy Option 1: WSCC Implementation Teams

Criteria	Criterion Score	Score Explanation
Impact	3	The actions of the team will take time to plan and will not create an immediate impact. Success stories will be shared with other teams, but programs may not be uniform among schools.
Cost	5	The team consists of staff that is already salaried and will require no extra cost other than training time.
Likelihood of Stakeholders	3	Employees are required to be on the team and participate but may not be fully invested because there is no added stipend or reward.
Political Feasibility	4	DPS wants to prioritize mental health and this change is likely to benefit students. Employees required to be on the team may cause backlash due to extra work.
Equity	1	Equity is up to the SHAC to address and the team to implement. There is no promise of equity.
Overall Score	16/25	

Table 5: Policy Option 2: Grant-Funded, School-Based Telehealth Therapy

Criteria	Criterion Score	Score Explanation
Impact	5	Accessible, affordable therapy for students has proven to greatly impact mental health (Heubeck, 2022).
Cost	4	Paying therapists for providing care can be expensive out of pocket, but the Duke Endowment Fund has provided millions of dollars to support mental health previously (Heubeck, 2022; Candid, n.d.).
Likelihood of Stakeholders	3	Paying for therapists is going to be expensive, but the evidence base will prove that this is a valuable investment for students' futures.
Political Feasibility	4	DPS wants to prioritize mental health and this change is likely to benefit students in the short term.
Equity	5	DPS has an 80% minority population and studies show that there are already racial disparities in access to mental health services (Cook et al., 2017). It is very beneficial to a large minority population to provide these services.
Overall Score:	21/25	

C. 3 Budget and Budget Narrative

Program Summary

To address poor mental health in Durham Public Schools (DPS) the proposed program is to hire five licensed, diverse therapists to provide telehealth therapy to high school students during the school day. Students can be referred by teachers, nurses, and parents, or request an appointment themselves. After referrals or requests, students will be paired with a therapist that meets their needs from the network. With hour-long appointments, each of the therapists will see 35 students a week, with a total of 175 students being seen each week. This telehealth therapy will be paid for through the Duke Endowment Grant and will be free to students, therefore providing accessible and affordable care to thousands of DPS high schoolers. The grant application will be written by the Student Health Advisory Council (SHAC) of DPS and will occur before year one.

School-based telehealth has been proven to improve access and availability to several providers and healthcare needs. Telehealth provides opportunities for students to see specialists they may not have access to and reduces time and travel costs for guardians (Introduction to School-Based Telehealth | Telehealth.HHS.Gov, n.d.). Telehealth allows the ability to draw from a network of providers from across the state to match a student's needs and not solely providers available in the county (North, 2020). Telehealth therapy at DPS high schools will require school staff to help facilitate appointments and facilitate a distraction-free, private space for appointments. School administrators will manage appointments, keep track of referrals, and work with the health care provider.

Table 6: School-Based Telehealth Therapy Telehealth Therapist FTE Calculation

FTE Calculation			
	Year 1 FTE	**Year 2 FTE**	**Year 3 FTE**
Telehealth Therapist	1.00	1.00	1.00
Telehealth Therapist	1.00	1.00	1.00
Telehealth Therapist	1.00	1.00	1.00
Telehealth Therapist	1.00	1.00	1.00
Telehealth Therapist	1.00	1.00	1.00
Total	5.00	5.00	5.00

Table 7: School-Based Telehealth Therapy Direct Non-Personnel Costs

Year One: Direct Non-Personnel Costs			
	Cost	**Number of Items**	**Total Cost**
Privacy Tools			
Sound Machine[a]	$30.00	10	$300.00
Door Noise Stopper[b]	$20.00	10	$200.00
Total	$60.00	10	**$600.00**
Technology			
doxy.me[c]	$420.00	5	$2,100.00
Laptops[d]	$300.00	10	$3,000.00
Headphones[e]	$60.00	10	$600.00
Total			**$5,700.00**
Comfort Items			
Fidget Toys[f]	$25.00	10	$250.00
Bean Bags[g]	$100.00	10	$1,000.00
Total	$125.00	20	**$1,250.00**

[a] (*Amazon.Com: Sound Machine for Adults , USB Rechargeable White Noise Machine for Office Privacy & Noise Canceling, 42 Soothing Sound with Lullabies & Fan Sounds, Auto-Off Timer & 8-Level Volume Control : Health & Household*, n.d.)

[b] (*Holikme Twin Door Draft Stopper Weather Stripping Window Breeze Blocker Adjustable Door Sweeps 34inch Grey*, n.d.)

[c] (*Free HIPAA Compliant Telemedicine Doxy.Me Plans & Pricing*, n.d.)

[d] (*HP Laptop 17z-Cp200, 17.3"*, n.d.)

[e] (*Soundcore Anker Life Q20 Hybrid Active Noise Cancelling Headphones, Wireless Over Ear Bluetooth Headphones, 40H Playtime, Hi-Res Audio, Deep Bass, Memory Foam Ear Cups, for Travel, Home Office*, n.d.)

[f] (*(50 Pcs) Fidget Toys Pack Party Favors Gifts for Kids Adults, Autism Sensory Toy Classroom Prizes Autistic Children Pop Its Bulk Fidgets Stocking Pinata Stuffers, Treasure Box Girls Goodie Bag Stress*, n.d.)

[g] (*Amazon.Com: HABUTWAY Bean Bag Chair 3Ft Luxurious Velvet Ultra Soft Fur with High-Rebound Memory Foam Bean Bag Chairs for Adults Plush Lazy Sofa with Fluffy Removable Sponge 3'(Dark Blue) : Home & Kitchen*, n.d.)

Table 8: School-Based Telehealth Therapy Budget Expenses and Revenue

Expenses and Revenue					
	FTE	**Year 1**	**Year 2**	**Year 3**	**Total**
PERSONNEL EXPENSES					
Direct					
Salaries	5.00	$196,145.00	$200,067.90	$204,069.26	$600,282.16
Fringe Benefits (30%)	5.00	$58,843.50	$60,020.37	$61,220.78	$180,084.65
TOTAL PERSONNEL EXPENSES	-	$254,988.50	$260,088.27	$265,290.04	$780,366.81
NON-PERSONNEL EXPENSES					
Direct					
Privacy Tools	-	$600.00	$450.00	$450.00	$1,500.00
Technology	-	$5,700.00	$4,275.00	$4,275.00	$14,250.00
Comfort Items	-	$1,250.00	$937.50	$937.50	$3,125.00
Indirect	-	$0.00	$0.00	$0.00	$0.00
TOTAL NON-PERSONNEL EXPENSES	-	$7,550.00	$5,662.50	$5,662.50	$18,875.00
REVENUE					
Duke Endowment Grant	-	$271,000.00	$271,000.00	$271,000.00	$813,000.00
Total Expenses	-	$262,538.50	$265,750.77	$270,952.54	**$799,241.81**
Total Revenue	-	$271,000.00	$271,000.00	$271,000.00	**$813,000.00**

Budget Narrative

This budget was developed by looking at example programs in Duplin County and Jones County as well as standard practices for privacy in telemedicine. The budget includes direct personnel expenses, indirect and direct non-personnel expenses, and revenue. There are a few resources needed for this program that is already provided by the school and will not be included in the budget for this program: desks, desk chairs, classrooms for appointments, and admin booking appointments. Revenue includes solely money from the Duke Endowment Grant.

There will be a network of five certified telehealth therapists working for the ten DPS schools. Our therapists will be making the average school-based therapist salary in Durham, NC at $39,229, where the salary range typically falls between $35,434 and $44,083 (Salary.com, n.d.). These therapists' salaries will increase by 2% every year for the three years. Fringe benefits include health insurance, home office stipends, time off, etc, and are budgeted for 30% of the therapists' salary (*Applying for Licensure | North Carolina Board of Licensed Clinical Mental Health Counselors*, n.d.). Non-personnel expenses include direct and indirect costs; all foreseeable indirect costs are covered by the school's budget (rent, utilities, etc.). Direct costs are broken down into privacy tools,

technology, and comfort items. Privacy tools include items that are needed to make the appointment room private and soundproof; each school will have a sound machine and door noise stopper. Technology includes headphones and laptops, and a video conferencing platform. Doxy.me is a HIPAA-compliant secure platform for video conferencing and virtual meetings that will be used by all providers: it is $35 a month for each provider (*Free HIPAA Compliant Telemedicine Doxy.Me Plans & Pricing*, n.d.). Comfort items are budgeted to make the students feel comfortable and relaxed during appointments: each school will have a comfortable bean bag and a pack of fidget toys. All of these items except the virtual platform may be reused for years two and three, however, we budget 75% of the year one expense for years two and three in case they need replacing.

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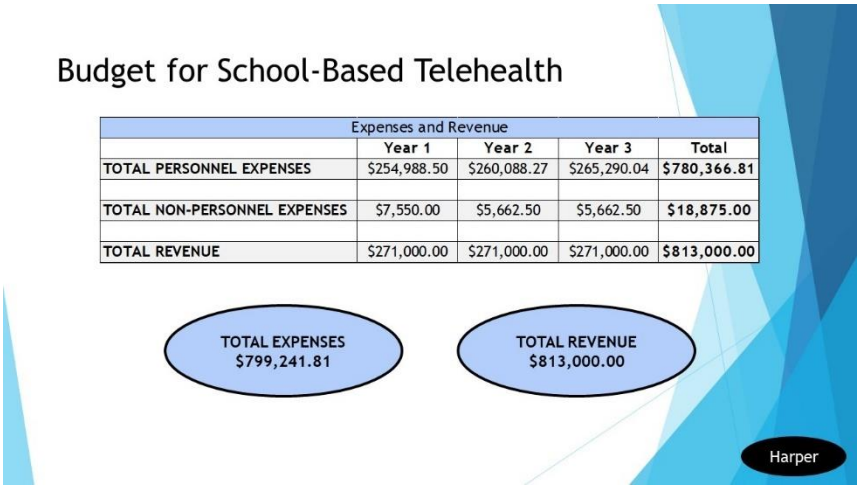
C 4 Harper's Presentation Slides and Script

HARPER: To address mental health in Durham Public Schools (DPS) the proposed program is to hire five licensed, diverse therapists to provide telehealth therapy to high school students during the school day. Students can be referred by teachers, nurses, and parents, or request an appointment themselves. After referrals or requests, students will be paired with a therapist that meets their needs from the network. This telehealth therapy will be paid for through the Duke Endowment Grant and will be free to students, therefore providing accessible and affordable care to thousands of DPS high schoolers. Similar programs have been implemented in North Carolina in Jones County and Duplin County and have been successful. Telehealth provides opportunities for students to see specialists they may not have access to and reduces time and travel costs for guardians. Telehealth allows the ability to draw from a network of providers from across the state to match student's needs and not solely rely on providers available in the county.



HARPER: Here is a consolidated three-year budget plan for the school-based telehealth therapy program that includes personnel expenses, non-personnel expenses, and revenue. Personnel expenses cover the therapists' salaries and fringe benefits. Non-personnel expenses include direct and indirect costs; all foreseeable indirect costs are covered by the school's budget (rent, utilities, etc.). Direct costs are broken down into privacy tools, technology, and comfort items. Revenue includes solely money from the Duke Endowment Grant. Our total expenses and revenue can be seen here.

HARPER: Breaking down our non-personnel expenses, privacy tools include items that are needed to make the appointment room private and soundproof; each school will have a sound machine and door noise stopper. Technology includes headphones and laptops, and a secure, HIPAA compliant, video conferencing platform.

Comfort items are budgeted to make the students feel comfortable and relaxed during appointments: each school will have a comfortable bean bag and a pack of fidget toys.

APPENDIX D: VIRGINIA SCHRANCK INDIVIDUAL WORK

D.1 Individual SDOH Analysis

Social Determinant of Health (SDoH):

A social determinant of health (SDoH) is a non-medical influence on an individual's health. They expose health inequities that impact the access, ability, and treatment of good health and health care (Social determinants of health, n.d.). The SDoH this section will focus on is Education Access and Quality, and more specifically, the objective to "Increase the proportion of high school students who graduate in 4 years – AH-08." The baseline data states that 26% of students attending public schools did not graduate with a regular diploma 4 years after starting 9th grade in school year 2015-16 (Office of Disease Prevention and Health Promotion [ODPHP], n.d.). Since the development of the Healthy People 2030 objectives, the percentage of students who did not graduate with a regular diploma 4 years after starting 9th grade has decreased slightly but is still a point of concern.

The importance of this objective is very high, as there is a strong connection between education and health (Education Access and Quality, n.d.). There are a great number of long-term impacts of graduating high school on health. It is a predictor of morbidity and mortality; with a 25-year-old man who completed high school being expected to live 6.7 years longer than a man who did not, and a woman who completed high school expected to live 7 years longer than a woman who did not (Hahn e al., 2015). Health conditions such as diabetes and heart disease, struggles with mental health, self-rated health status, and access to healthcare all contribute to the increased rates of morbidity and mortality (Lee et al., 2016). This alone is evident that having a high school education can greatly impact an individual's life, yet there are many factors that play into this result. Hahn et al., (2015) defined three interrelated pathways that contribute to the health of an individual with (or without) a high school education, which includes:

"(1) development of psychological and interpersonal strengths, such as a sense of control and social support, which in turn contribute to healthy social interactions; (2) problem-solving abilities and the ability to pursue and maintain productive work and adequate income, and the health benefits they provide; and (3) adoption of healthy behaviors."

These three main pathways affect the overall health of an individual, which demonstrates all that an individual learns about themselves and the world around them during their time in high school. It is a very

significant time for development not only in learning in class, but in their interactions and daily life. Additionally, it leads to improved ability to take care of oneself and greater opportunities for work in the future. In 2012 the proportion of individuals ages 16-24 who were not enrolled or did not complete high school were more likely to be in the lowest family income quartiles compared to those who did graduate high school (Hahn e al., 2015).

While most of the impacts of not graduating high school present as long-term, some also have short-term components as well. Mental health complications may present as a reason why someone was not able to complete high school through graduation, or later as a negative impact of not completing high school (Hahn e al., 2015).This can lead to physical health problems if they do not take care of themselves, whether that is because they do not know how to or do not have the access to resources that they need. There are many ways issues can present long or short term with the inability to graduate high school.

Geographic and Historical Context:

Durham is a county of rich history and culture. It was formed out of Orange and Wake counties in 1881 and named after the existing city of Durham. Early inhabitants of the county included Occaneechi and Eno Indians, with English, Scotch-Irish, and German settlers following (Durham County, n.d.). These early settlers-built gristmills and worked the land, (Overview of Durham History, n.d.). In the time between the Revolutionary and Civil Wars, large plantations were established, with Stagville Plantation being one of the largest plantation holdings of the South. African slaves were brought to labor on the farms and plantations and through the slave quarters came distinctively Southern cultural traditions involving crafts, social relations, life rituals, music, and dance (Overview of Durham History, n.d.). At the end of the Civil War, at Bennett Place in Durham, Union General Sherman and Confederate General Johnston negotiated the one of the largest surrenders.

In celebration with both Yankee and Rebel troops, Brightleaf tobacco was discovered. This led to the success of Washington Duke and his family, leading to the birth of one of the world's largest corporations. The growth of tobacco led to other prosperous industries in Durham, including denim and hosiery. Washington Duke and Julian Carr donated money and land to move Trinity College to Durham in 1892, and after a large donation from Duke's son in 1924 the college was renamed Duke University. North Carolina Central University, founded by James E. Shepard in 1910, was the nation's first publicly supported liberal arts college for African Americans (Overview of Durham History, n.d.). This college is just a piece of the history of the African American community in Durham.

There was an area that became known as “Black Wall Street” as it was the home to numerous successful Black businesses. After the fall of the textile industry, Durham has gone through many changes and continues to go through revitalization of the community. There are still disparities between racial and ethnic groups as well as between income classes, but the county continues to put a focus on community organization and collaboration.

This focus on community organization and collaboration is key for helping to support high school students through graduation. High school dropout and graduation rates have been an ongoing concern, as the 2006 four-year graduation rate was 68.8% (Longitudinal Four-year and Five-year Cohort Graduation Rates through 2022, n.d.). There has been progress but continuing to work to improve the student’s experience in school imperative. The Communities in Schools Durham chapter is one organization that has been a working force to help support high school students. Communities in Schools is an organization that provides supports for high school students to allow them to achieve and succeed in their lives (Communities In Schools of Durham, n.d.).

Priority Population and Measures of SDOH:

The four-year graduation rate for Durham Public Schools was 84%, which is below the baseline data for Healthy People 2030 and well below the target of 90.7% (Cohort Graduation Rates, n.d.). The priority population for this analysis is students at Riverside High within the Durham Public School system. Riverside High had a graduation rate of 74.6% for students who entered 9th grade in 2018-2019 and graduated in 2021-2022. The demographic makeup of this cohort was 26% Black, 46% Hispanic, 24% White, and the remaining 4% American Indian, Asian, or two or more races. Hispanic individuals within this cohort had the lowest graduation rate at 64%. Appendix A covers the demographic effects on graduation rates, which are important factors to consider because they have impacts on the ability of students to graduate. This includes the support and resources they have access to, as well as stigmas surrounding their situation. The data is representative of that of Durham County Schools as a whole, which has an 80% minority enrollment (Durham Public Schools, n.d.). From school to school and cohort to cohort, there is differing demographics, however Riverside High is a depiction of the groups who may need the most assistance in successfully graduating high school in four years.

When compared to a school of a similar size from the Chapel Hill-Carrboro district, there are apparent differences between graduation rates and the impacts of the rates. Minority and disadvantaged groups have lower

rates within both districts, however there is a more dramatic decrease of those within Riverside High, as seen in Appendix A.

Rationale/Importance:

The collective evidence provided supports the notion that a portion of high school students in Durham need help and assistance in completing high school with a diploma in four years. This is something that impacts not only the students, but also the schools and the county. The students who do not graduate struggle with physical and mental health and are not fully equipped to provide and take care of themselves (Lee et al., 2016). While they should still be able to find work, it may not be in a field that is as high paying or provides as much support as if they were to have completed their high school education. This leaves the individuals without a high school education disadvantaged and unable to contribute to their local economy and community as their counterparts with a high school education, and much less so than those with higher education (Hahn e al., 2015). Addressing this SDoH would allow for the students to be set up for better futures, so they can live happier and healthier lives, as well as help the county of Durham to continue to thrive.

Disciplinary critique:

The role of nutrition may not be top of mind when thinking of how to address graduation rates and the success of high school students. It does, however, play a role in the ability for students to be engaged and prepared for the requirements of their school day (Florence et al., 2008). One of the factors that contributes to a student's ability to be fully present in the classroom is their nutrition habits. Students who have poor nutrition have been found to have decreased attendance, attention, and academic performance, when compared to students with better quality diets (Florence et al., 2008). This can include a deficiency of micronutrients, macronutrients, or calories. When a student is hungry, they may be unable to focus on their work or fully participate in the classroom. A study by Kleinman et al., found that students with poor nutritional intakes had significantly lower GPA's than students who had adequate nutritional intakes, which is just one of the impacts on a student's performance in school. Others include ability to complete assignments, move on to the next grade, and graduate on time. A deficiency in micronutrients or macronutrients can also begin to have an impact on a student's neurological function, which majorly impacts the ability to participate in school. The issue of poor nutrition also plays into food insecurity, another SDoH, which can have a profound impact on a student's ability to nourish their bodies and perform and

behave in ways that best support their educational advances. A public health nutrition professional can work on programs with schools in marginalized communities to increase access to healthy foods and help to improve nutrition education resources that students have access to.

D.1a Individual SDOH Analysis References

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D.1b Individual SDOH Analysis Appendices

Comparison of Graduation Rates and Demographic Impacts

	East Chapel Hill High	Riverside High (Durham)
Subgroup	Percent	Percent
All Students	>95	74.6
Male	94.9	69.8
Female	>95	80.6
Asian	>95	*
Black	78	78.3
Hispanic	94.1	64.0
Two or More Races	>95	*
White	>95	90.8
Economically Disadvantaged	81	68.9
English Learner	81.3	52.3
Students with Disabilities	82.9	55.8
Academically Gifted	>95	>95

Figure 2: Comparison of Graduation Rates and Demographic Impacts

D. 2 Implementation Plan for Nutrition Program

Introduction

The Social Determinant of Health focused on for this proposal and analysis is Health Education Access and Quality. More specifically, we are focusing on the status of mental and physical health of high school students in Durham County. Mental and physical health impact the experience students have in high school, including academics, relationships, and personal well-being (Hahn et al., 2015). Within Durham County, 35% of high school students reported feelings of depression and 28% of high school students described themselves as overweight in 2019 (Naney, 2019; Obesity, Diabetes, and Food Access, 2022). These statistics are just a glimpse into the lives of Durham high school students but show the need for allocating time and resources to ensuring their needs are assessed and met. During high school, healthy students have better educational and personal outcomes, including having better grades and feeling more connected to their teachers and peers (Conner et al., 2021). Struggles of mental and physical health causes concern for the prosperity of students and their ability to thrive in high school.

Evidence Based Nutrition Program

One possible intervention to help improve the mental and physical health of Durham County high school students is through enriching the nutrition education within school health curricula (Meiklejohn et. al., 2016). Poor nutrition, which varies in definition but ultimately is a deviation from the Dietary Guidelines for Americans, can negatively affect many aspects of a student's life, especially their mental and physical health (Grajek et. al., 2022). Students who have poor nutrition habits have been found to have decreased attendance, attention, and academic performance, when compared to students with better quality diets (Florence et al., 2008). There is a reciprocal relationship between mental and physical health and academic performance. Poor health negatively impacts a student's ability to participate in school, which in turn can affect their mental health; conversely, poor mental health can impact a student's ability to participate in school.

Within Durham County, 75% of high school students do not eat breakfast on all seven days of the week, with Black and Hispanic students being the least likely to eat breakfast (Naney, 2019). One cause for this could be food insecurity, which is defined as inadequate access to food due to economic or other restraints (Food Insecurity - Healthy People 2030, n.d.*)*. Within Durham County 20% of residents experienced food insecurity in 2021, with Black and Hispanic families reporting higher rates than white non-Hispanic families (Warnock, 2021). Food

insecurity can exacerbate nutritional complications within high school students and their families (Gundersen & Ziliak, 2015). High school students who engage in physical activity and/or participate in sports are less likely to miss meals than students who are not physically active (Lowry, 2015). Similarly, students who met recommendations for physical activity are more likely to eat fruits and vegetables, and students who exceed screen time recommendations are less likely to eat fruits and vegetables and more likely to consume fast-food and sugar sweetened beverages (Lowry, 2015). These examples are just a few of the factors that may naturally impact the nutrition habits of a high school student but are not all encompassing of the elements of nutrition habits in high school students. Additionally, students are typically aware of their health status and may make poor decisions because of their feelings about themselves, for example, students who are overweight or obese are more likely to miss meals when compared to normal-weight students, and students who perceive themselves as overweight are more likely to miss meals (Demissie, 2018).

The implementation of an improved nutrition education program will help us address the implications that nutrition has on the mental and physical health within this population (Firth et al., 2020). Let's Eat Healthy is an education program used within schools to teach nutrition topics, and we will use it to craft our inclusive and engaging curriculum to empower students to create healthy habits. This program has many components that will be helpful for teaching students about nutrition and healthy choices. In addition to nutrition and food topics, there are mental and physical health components which support the purpose of our intervention.

Evidence Based Outcomes

The short-term outcome for this program is that by May 1, 2025, Durham County high school students will have improved nutrition knowledge by 10%, as evaluated by a validated pre and post-test. This test will be administered to freshmen on the first day of health class and again at the end of the school year. From the pre- to the post-test, we hope to see an increase of 10% in nutrition exam scores across the students in the freshman class. The long-term goal for this program is that by May 1, 2029, Durham County high school students will have improved nutrition habits as evaluated by a Food Frequency Questionnaire (FFQ). Students will complete the FFQ in 2025, at the beginning of freshman year and again in 2029, at the end of their senior year. This FFQ will assess their nutrition habits and behaviors, and the results will be compared between the five years. Our hope is that after completing the nutrition curriculum set through our program, students will have sustained improved nutrition habits. It is presumed

that with increased knowledge on nutrition and healthy living, students will implement what they have learned and will see changes in their mental health (Firth et al., 2020). Although this is the intended impact, we cannot be certain it is what will happen, so we must include evaluation to reassess as necessary for the improvement of the program.

Evidence Based Implementation Strategies and Activities

We will use the Let's Eat Healthy nutrition education program as a guide into the development of our new and improved nutrition curriculum for Durham public high schools. This curriculum will be the foundation of helping students develop a healthy lifestyle through nutrition education, guidance through making healthy choices, and self-care. Once we have developed the curriculum, we will begin the implementation process with the Durham County Public School health teachers. Sharing the new program with the teachers is a vital first step, as they are the ones that will be teaching it. They will be responsible for ensuring that each aspect of the program is conveyed properly to maximize the benefits of the program. All health education teachers within Durham County Public Schools will be recruited and paid for attending workshops the summer before implementation of the program. The interactive approach of workshops will allow us to fully explain the program and its benefits and allow time to address any questions or concerns. We can use feedback from the teachers to refine the program and work together to ensure it will be a success. Additionally, over the course of the first year of using the new program, teachers and students will complete short surveys to gauge the perception and effectiveness of the program, and changes can be made accordingly.

The core implementation team will include one dietitian, one school health educator from a Durham County school, a Certified Health Education Specialist, and a member of the Durham Public Schools Board of Education. This is the group that oversees curating the new curriculum and will lead the implementation. Part of this process will include reorganizing the current health curriculum to make room for this new program in the schools, which will also include the assistance of school administration. This program is expected to reach all 10,970 high school students in the Durham Public School system. This may not happen within one year, because health classes are not required every year; however, it is expected that every student will complete the program during their time in high school. Considering the structure of classes varies by school, we may be able to incorporate this program as a requirement for freshmen at one school but a different grade at another.

This program will address multiple levels of the socioecological model, which is important to our goal of making positive health behavior changes within a high school population. Adolescents are influenced by many factors, therefore including different aspects of their surroundings into making behavior change is imperative. On an individual level, this program will teach students how to assess their current habits and create new, healthier habits with the knowledge they gain. There will be a focus on the characteristics and circumstances that may impact one's current habits or ability to create better ones. Considerations for the connection that many students have with making change on an interpersonal level have also been included. With lessons taught in a classroom setting, students will learn how food and eating can be an interactive experience, as well as how those around them can have an impact on the decisions they make. Students will be encouraged to share in discussions about their favorite meals or snacks and about their plans to make healthy lifestyle changes.

Community Partners

Involvement of community partners will be essential for ensuring the program has the necessary support to have the intended impact. The first partner will be the Durham County Public School teachers. The teachers will provide insight into what the students need and how a new program and curriculum can be implemented. The Durham County Public Health Department will be a knowledge base in helping assess what the students really need and in securing resources for the program. Parents of the high school students will provide insight into the circumstances of families in the schools, which will also help ensure that the program meets their needs and does so in an appropriate manner. Adolescent nutrition experts and educators will be necessary in helping build the program. The Durham County Board of Education will be included in this process as well, as they are responsible for approving new curriculum, so we will work with them to ensure that it meets quality standards set by school health and nutrition experts

Budget

The funds for this program will be secured in partnership with the Durham County Public Health Department. They will help us find and apply for state and federal education grants to cover costs for the program. Most of the funding will go towards educational materials and personnel. Educational materials will be needed for the creation of the new curriculum and materials needed for implementation, such as textbooks, printing, and food or such materials for in-class use and demonstrations. Funding towards personnel will cover the outsourcing of

dietitians, other health professionals, and teachers who help in the development of the new curriculum, as shown in Table 1. This will take a fair amount of research and effort to ensure that we create a program that meets quality and educational standards.

Conclusion

This program comes with advantages and disadvantages. By using an existing program to help guide our development we can build upon what is essential and customize it to the students in Durham. The Let's Eat Healthy program is not complicated, which will help us keep the focus on important topics and not overwhelm the students. One disadvantage is that there are only four core lessons for high school students, so we will expand and shape the program to the needs of the students. Additionally, the Let's Eat Healthy program was started by the Dairy Council of California, which allows for the existence of bias towards foods and food groups in which they receive monetary support. This could impact what they included in their lessons, however ensuring the program is evidence based will keep bias out of the program. In the creation and implementation of this program we prioritize the health and well-being of all Durham high school students. By improving the nutrition education, we will contribute to improving the mental and physical health of the students through lifestyle changes, this does not typically come naturally, but through this program and encouragement to take care of themselves, we will provide them the tools they need and empower them to feel more confident.

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D. 2b Implementation Plan for Nutrition Program Appendices

Table 9: Virginia Nutrition Program Budget

Category	% of budget	Dollar Amount
Development Materials	8%	
Curriculum programming		$25,000
Educator teaching guides		$19,500
Educational Materials	10%	
Nutrition textbooks		$9,500
Food and cooking equipment		$15,000
Online lesson programs		$20,000
Personnel	80%	
Dietitians (2)		$120,000
Health Class Educators (5)		$275,000
Certified Health Education Specialist		$50,000
Miscellaneous	2%	
Total		**$556,250**

D. 3 Evaluation Plan

Introduction

The SDoH for this program is Health Access and Quality, with our group key issue focusing on the health and well-being of Durham County high school students. Within Durham County, 35% of high school students reported feelings of depression and 28% of high school students described themselves as overweight in 2019 (Naney, 2019; Obesity, Diabetes, and Food Access, 2022). Mental and physical health impact the experience students have in high school, including academics, relationships, and personal well-being (Hahn et al., 2015). We will use nutrition as our point of intervention to influence the health and well-being of the high school students. Students with poor diets and unhealthy eating behaviors have been found to have decreased attendance, attention, and academic performance, when compared to students with better quality diets (Florence et al., 2008), which are negative impacts on their ability to participate in school. Therefore, we have set out to enrich the nutrition education programs within Durham County Public High Schools. It is presumed that with increased knowledge on nutrition and healthy living, students will implement what they have learned and will see changes in their mental health (Firth et al., 2020).

We are using the Let's Eat Healthy nutrition education program as a guide in developing a new and improved nutrition curriculum to empower students to create healthy eating habits. The curriculum will be implemented within three Durham Public High Schools, with two dietitians, five health class educators, and a Certified Health Education Specialist leading the project. The long-term objective for this program is that by May 1, 2029, Durham County high school students will have improved nutrition habits by 25%, as evaluated by a Food Frequency Questionnaire (FFQ). Students will complete the FFQ in 2025, during their freshman year and again in 2029, at the end of their senior year. This FFQ will assess their nutrition habits and behaviors, linked in appendix A (Usual Dietary Intakes NHANES Food Frequency Questionnaire (FFQ), n.d.). Our hope is that after completing the nutrition curriculum set through our program, students will have sustained improved nutrition habits.

Study Design

Due to the nature of this program, we will employ a quasi-experimental design. The new nutrition curriculum will be implemented within the health education classes at three public high schools in Durham County. Three other public high schools in Durham County will be used as comparison to evaluate the impact. Differences

between timing of health classes will be considered within our analysis. The intervention group will consist of students who attend schools with the new nutrition curriculum, and the comparison group will consist of students who attend schools without the new nutrition curriculum. This will allow us to assess potential variables and changes in the student's behaviors and attitudes that are not related to the curriculum. High school can be a time of many changes, so having this comparison group will help to account for confounding and changes that may already be happening within this population. We will match the schools based on demographics and geographic location.

Data Collection

We will use a few data collection techniques, with the first being pre- and post- curriculum surveys. Both the intervention and comparison groups will be given a FFQ at pre- and post-intervention to assess typical food consumption patterns (Usual Dietary Intakes NHANES Food Frequency Questionnaire (FFQ), n.d.). This will allow us to see changes within both groups and see what changes are correlated to the curriculum and what changes happen within the comparison group. Focus groups will be used with the intervention group to gain insight into their experiences with the curriculum. We will ask questions referring to what they liked and disliked and how they think the curriculum affected their eating habits and lifestyles, a few example questions are listed in Appendix B. This will allow us to gain additional insight into how the students really feel about the curriculum and leading a healthy lifestyle, beyond what the quantitative data will tell us.

Sample and Sampling Strategy

The first step in choosing our sample is to identify all public high schools in Durham. Six schools of similar size will be used, three for the intervention group and three for the comparison group. We will combine the schools in a way that produces the most representative sample in terms of demographics and geographic location, as well as number of students. The entire freshman class of 2025 of all six schools will be included in the recruitment for participation in the first FFQ and then again for the second FFQ when they are seniors in 2029. There are no exclusion criteria, as the point of this is to understand the entire population of high school students in Durham. It is not expected that all students will participate. Up to 100 students will be chosen using randomization for the focus groups within the intervention group, to attain a manageable and representative sample.

Specific Measures

The main outputs of this evaluation plan are the new nutrition curriculum lessons and the number of high school students who complete the new nutrition curriculum. The main outcome of this evaluation plan is the change in nutrition habits by the high school students. Another outcome that we will measure is the student's perceptions of nutrition and healthy eating. There is a potential for demographic disparities within this population. We will attempt to sample in a way that reduces disparities of socioeconomic status, disability, race/ethnicity, and language. The FFQ we will use in our study will be quick and comprehensive, taking only 15 minutes to complete. If we use an instrument that is too long in number or complexity of questions, we may lose the focus and attention of the students.

Timing

We will engage with our community partners as early as possible and will stay in contact with them throughout the program. From the beginning they will help us assess the needs of the high school students, secure resources, shape our curriculum, and implement the program. Therefore, we will keep them updated through every step of the way. We will use an iterative process for the evaluation of this program. Progress of the program will be based on reception and rates of engagement. There will be very short surveys given out to students and teachers of the curriculum in December of each school year, which will be used to assess how the program is received and will allow the opportunity for feedback, example questions are listen in Appendix C. We will work to immediately improve anything that is feasible and will make note of everything else to be incorporated in the next phases of the program. The surveys will be separate from the focus groups. The focus groups will be used to better understand the changes the students go through and how they feel, while the surveys are solely for feedback and evaluation of the reception of the program.

Analysis Plan

We will ideally receive data from all students in the freshman class in August 2025 and then again when they are seniors in 2029. We will use all data from the students and will not exclude students who move schools or join the school after freshman year. Quantitative data will be gathered from the FFQs and qualitative data from the focus groups. The focus group data will be transcribed and coded to identify themes and patterns among the students. This will be used to supplement the quantitative data. For the FFQs we will use descriptive statistics such

as mean, standard deviation, frequency, and percentage. This will be used to summarize the data and get an idea of how the students made changes over the past four years and how the curriculum impacted them. We will accommodate for unequal sample sizes as needed. T-tests will be used to compare the groups and regression analysis will be explored to help understand the relationship between the curriculum and the student's habits. The statistical significance in our analyses will be set at 95%. We will adjust for confounding when necessary, such as for physical activity, gender, race, etc.

Funding

The funds for this program will be secured by a state education grant. The main funds for the program will be needed within the first year, with the development of the new curriculum and obtaining all supplies. The remaining three schoolyears will not require funds, as the curriculum will be set up and students will be participating in the new curriculum. We will pay our health education specialist, using set-aside program funds, to lead the evaluation of the program in 2029.

Data Use and Dissemination

After analysis of the data, a comprehensive evaluation report will be created. We will use the key findings to highlight both the positive and negative results of the nutrition curriculum's impact on the student's habits. This report will be created in plain language and sent to our community partners to inform them of the impact the curriculum had on the students and how the program may be able to help more students with expansion of the program. Similar reports will be shared with the school board, families and students, and teachers to inform them of the progress that was made through the program.

Conclusion

This program of improving nutrition curriculum for Durham County high school students will only be possible with the collaboration of our community partners, the Durham County Commissioner, and the Durham County Public School system. By working together on this pressing public health topic of mental health and nutrition, we can help improve the experience that students have in high school. We will be mindful of equity considerations as we continue to develop our program, as it is very important to Durham County and the interdisciplinary team that will be at the forefront of this endeavor. Together, we will be able to make a difference in these student's lives that will impact them far beyond high school.

D. 3b Evaluation Plan References

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D. 3a Evaluation Plan Appendices

Appendix A

FFQ used for our program – Usual Dietary Intakes: NHANES Food Frequency Questionnaire (FFQ)

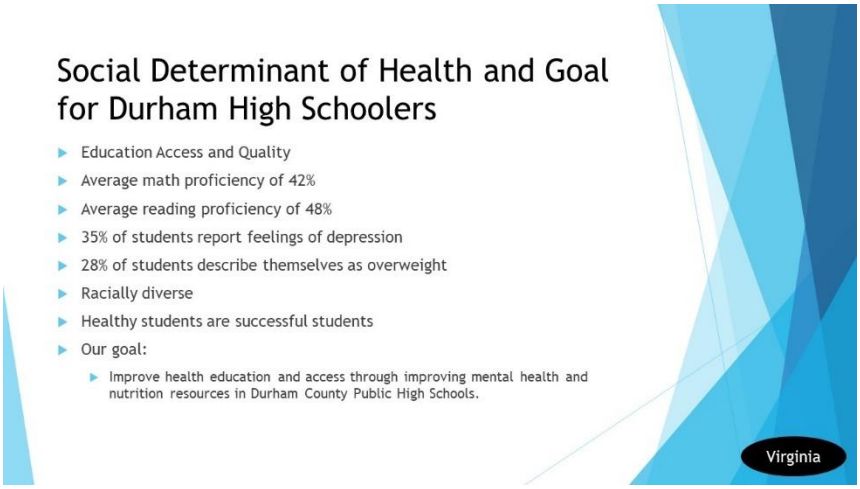
https://epi.grants.cancer.gov/diet/usualintakes/FFQ.English.June0304.pdf

Appendix B

Brief Focus Group Guide

- Introduction to make students feel comfortable
- Questions:
    - Nutrition has been a big focus in your health programs this year, what changes have you noticed?
    - What new things have you learned about nutrition? About your eating habits?
    - Has the content covered on nutrition in your health classes been interesting? Have your classes been engaging?
- Probes:
    - How did you feel when…?
    - What did you think when…?
    - What did you like/dislike about…?
    - Can you give me an example?
    - What do you mean by…?

D. 4 Virginia's Presentation Slides and Script



VIRGINIA: First, we will start off with our social determinant of health, which is Education Access and Quality, this is the connection between education and well-being, including key issues such as graduating high school, language and literacy, and general education attainment.

Here are a few statistics about the high school students in Durham County: They have an average math proficiency of 42% and reading proficiency of 48%, both lower than the state average by 10% (Durham Public Schools School District (2023) - Durham, NC, n.d.) 35% of high school students reported feelings of depression and 28% of high school students described themselves as overweight in 2019 (Naney, 2019; Obesity, Diabetes, and Food Access, 2022). The student population is racially diverse with 42% Black and 33.1% Hispanic/Latinx students

Students with poor diets and unhealthy eating behaviors have been found to have negative academic outcomes, when compared to students with healthy behaviors. Mental and physical health go hand in hand and improving both can help students in and out of the classroom.

Our goal is to improve health education and access through improving mental health resources and nutrition education in Durham County Public High Schools, to set students up for success in high school and beyond

APPENDIX E: ALYSSA WALKER INDIVIDUAL WORK

E.1 Individual SDOH Analysis

Social Determinant of Health

Social determinants of health (SDOH) are the conditions in the environments where people do their everyday activities including at work, school, or home that may affect a wide range of health, daily performance/functioning, and quality-of-life outcomes and risks ("Social Determinants", 2020). The SDOH that is being focused on here is seeking to increase the proportion of children who are developmentally ready for school (EMC-D01) ("Social Determinants", 2020). A short-term impact of this issue on health outcomes is that children who are not developmentally ready for school will immediately fall behind in class as compared to those children who are developmentally ready (Spreeuwenberg, 2022). A longer-term impact is that as children fall behind in school, their social and cognitive delay will only increase over the years (Reckhow, 2017). This can affect not only their education level but also lead into health problems such as childhood obesity. One study from the National Survey of Children's Health shows that obese children are significantly more likely to have school absences and school problems as well as lower school engagement than non-overweight children (Carey et al., 2015). It has been seen that children with developmental delays are more likely to be overweight or obese, among other consequences, which can set them up poorly for educational success in their future years.

Geographic and Historical Context

The community being focused on is Durham County in central North Carolina. While Durham County has a goal of being able to provide childcare programs to all children and families in the county, they still have work to do to achieve that goal. The federal benchmark for cost of childcare is 7% of a family's income, and Durham County greatly exceeds this number at 10% of a family's income (Reckhow, 2017). Two issues that families of Durham County are experiencing are that they cannot afford to send their children to an early childcare and education center, and there is also a lack of capacity in those centers to hold all the children (Spreeuwenberg, 2022). There are only enough spots in licensed centers available for 45% of infants and toddlers and 66% of preschool-aged children (Reckhow, 2017). There are programs established in Durham County such as Durham's Partnership for Children (DPC) that are seeking to ensure that every child in Durham enters school healthy and ready to succeed (Johnson, 2023). DPC carries out this mission by leading community strategies for children birth to age 5 and their

families that promote healthy development and learning and enhance access to high quality care (Johnson, 2023). While they hope to serve all 23,000 young children in Durham, this SDOH is still in need of improvement in Durham County as their waiting list continues to lengthen.

Priority Population

The population of interest is children from birth to age 5 years old. This age is where fundamental building blocks of social and cognitive development are established ("Early childhood", 2023). If children are not receiving adequate care and early education during these years, it could lead to them not being developmentally ready for school when they are of age to start. Although the chosen SDOH can affect children up through high school and beyond, the focus is from birth to 5 years old because this is where the most social and cognitive development is occurring ("Early childhood", 2023). One study notes that the first 18 months of a child's life, "lays the foundation of a child's security, harbors self-esteem, and builds emotional regulation and self-control skills" (Marwaha & Malik, 2022). Without the proper promotion of healthy development and learning in these young years, parents and teachers find that many children are not ready for an enhanced learning environment when school begins (Leach, 2018).

Measures of SDOH

There are multiple measures of occurrence related to children not being developmentally ready for school. These measures look at proficiency of reading as they enter kindergarten and throughout elementary school, the availability of childcare in Durham County, economic statistics, and more. For example, the percent of Durham children entering Kindergarten with a reading proficiency at grade level is 38%, which is very low, but the percent of Durham Hispanic children entering Kindergarten with a reading proficiency at grade level is even lower at 21% (Reckhow, 2017). Additionally, licensed centers and home-based care centers only have space for 45% of infants and toddlers in Durham, which is one reason why the children in Durham County are not prepared when they enter Kindergarten (Reckhow, 2017). These measures and more are stated in Table 1 of the appendix.

Rationale

The SDOH of children not being developmentally ready for school is a public health priority in Durham County, NC because students are experiencing less success in middle school, high school, and beyond due to their delay from the beginning of their education (Carey et al., 2015). When students are not prepared to start school, it

can lead to problems including decreased educational success, higher rates of obesity, and poor social outcomes. Preparing children for school is vital to their personal growth and development ("Early childhood", 2023). Factors such as nutrition, physical activity, early childhood education, home environment, and more can lead to not being developmentally ready for school (Carey et al., 2015). If Durham County is able to increase the availability for families to send their children to early education centers, receive quality nutrition, and understand key factors to cognitive development and growth for children, there could be a decrease in the number of children who are not developmentally ready for school. Tackling this SDOH can improve the lives and education of children and their families in Durham County.

Disciplinary Critique

In addressing this SDOH, a public health dietitian should be involved because quality nutrition is vital to proper development of children both cognitively and physically. The dietitian can give guidance, ideas, and help create a plan for specific nutrients that growing children need (Elledge, 2023). Inadequate nutrition can slow brain development and contribute to the high rates of childhood obesity seen across the United States ("North Carolina", 2016). Additionally, tackling the SDOH under discussion can increase health equity in Durham County as it has been seen that many minority families are unable to afford the early childhood education centers that can increase developmental growth in children. As noted in the above data, 71% of children living in Durham are from a minority group. From this same study, it was seen that only 38% of black children in Durham County were at grade level proficiency at the beginning of kindergarten in 2014-2015, and only 21% of Hispanic children (Reckhow, 2017). If this SDOH is properly addressed, these percentages may be able to increase, creating more health equity across the county.

Finally, improving the literacy, proficiency, and developmental growth of young children across Durham County could improve the county's economy because less funding would need to go towards assisting early education centers ("Early childhood", 2023). As of now, there is not enough funding being applied to this SDOH, but if more funding is able to go towards helping early education centers create room for more children, have adequate resources, and learn to function at a high-quality level on their own, the funding could then be dispersed towards other social determinants of health (Reckhow, 2017). Through focusing on one SDOH at a time, the economy could slowly shift funding around to different struggling areas as equity across the county is addressed and

improved. Durham County children and families are in need of better structures and systems for early childcare education centers in order to improve their readiness to start school and future success in the academic world (Leach, 2018). Overall, tackling the SDOH of seeking to increase the proportion of children who are developmentally ready for school will see benefits both in the next few years and in the decades to come.

E.1a Individual SDOH Analysis References

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E.1b Individual SDOH Analysis Appendices

The following data shows measures of occurrence related to the social determinant of health under discussion:

Table 10: Measures of Occurrence

Measure	***Occurrence***
Percent of Durham children entering Kindergarten with a reading proficiency at grade level (Reckhow, 2017)	38%
Percent of Durham Hispanic children entering Kindergarten with a reading proficiency at grade level (Reckhow, 2017)	21%
Percent of Durham third graders in public and charter schools in 2014-2015 who scored at or above grade level in reading (Reckhow, 2017)	47%
Percent of North Carolina third graders in public and charter schools in 2014-2015 who scored at or above grade level in reading (Reckhow, 2017)	59%
Percent of infants and toddlers in Durham that licensed centers and home-based care centers have available space for (Reckhow, 2017)	45%
Percent of preschool-aged children in Durham that licensed centers and home-based care centers have available space for (Reckhow, 2017)	66%
Percent of children ages 0-8 in Durham who live in a home where the head of household is at or below poverty level (Reckhow, 2017)	26%
Percent of young children living in Durham from a minority group (Reckhow, 2017)	71%
Percent of children in North Carolina with obesity ("North Carolina", 2016)	14%

E. 2 Implementation Plan for Nutrition Program

Introduction

Social determinants of health (SDOH) are the conditions in the environments where people do their everyday activities including at work, school, or home that may affect a wide range of health, daily performance/functioning, and quality-of-life outcomes and risks ("Social Determinants", 2020). The SDOH that is being analyzed here is education access and quality. Our group key issue is looking at the high rates of depression, obesity, and inadequate nutrition among Durham County public high school students. Specifically, there is a low presence of mental health and nutrition education within Durham County public high schools, which could be contributing to the unhealthy physical status of the students (Jones, 2022). Our SDOH analysis investigates three realms within Durham County public high schools: nutrition, physical health, and mental health. The priority population being covered is 9^{th}-12^{th} grade students at Durham County public high schools in central North Carolina. Statistics within our SDOH show the high rates of obesity, the poor mental health status of many students, and the number of students that rely on school meals (Naney, 2019). Overall, this topic needs a priority plan that can begin to resolve the poor health of many high school students in Durham County.

Evidence Based Nutrition Program

The nutrition key issue that we are looking at is how public high school students in Durham County have poor nutrition, which further affects their success in school (Carey et al., 2015). By implementing nutrition education in public high school health classes in Durham County, we can begin to challenge this education-based issue. There is evidence present showing that obesity and food access are top issues in Durham County ("Obesity", 2018). Furthermore, the National Survey of Children's Health shows that obese children are significantly more likely to have school absences and school problems as well as lower school engagement than non-overweight children (Carey et al., 2015). In Durham County alone, an average of 30% of high school students in public schools are overweight or obese ("Obesity", 2018).

One program which we have seen to be most effective is Let's Eat Healthy's nutrition education curriculum (Rhoads, 2023). Their curriculum focuses on nutrition education that elevates the health of children through the pursuit of healthy eating habits (Rhoads, 2023). We are seeking to implement a nutrition education curriculum like this one in the public high school health classes in Durham County. The reason we have selected this type of

nutrition program is because it is full of resources for teaching, planning, student workbooks, and online education (Rhoads, 2023). One unique addition to the nutrition curriculum will be a few practical nutrition classes during which food is brought in to show students how to cook and make the healthiest choices for themselves (Falkner, 2022). Additionally, since students are required to take health classes in high school, adding nutrition education to their curriculum will guarantee their exposure to this new and important knowledge (Falkner, 2022). The importance of knowing general nutrition is seen through its ability to help contribute to better health outcomes for these students later in life including decreased rates of diabetes, obesity, and other chronic health-related issues that can lead to lifelong battles (Falkner, 2022). The Durham County public high school students at 3 of the high schools will take this nutrition class their freshman year, as initiating this type of education earlier on will help their nutrition-based behaviors begin to change sooner in their high school years (Falkner, 2022).

Evidence Based Outcomes

The short-term objective for this program begins with the General Nutrition Knowledge Questionnaire (GNKQ) being given to Freshman on the first day of school in August of 2024 (Kliemann et al., 2016). The same nutrition knowledge test will be given at the end of the same school year in June 2025. We will track the scores from both tests and expect to see an average of at least a 10% increase in scores for the nutrition knowledge test among the whole freshman class, after having gone through the new nutrition curriculum (Kuwahara & Eum, 2022). At the same time, freshman classes at three other Durham County public high schools will be taking the same fruit and vegetable FFQ, acting as a control group as they do not receive the nutrition curriculum. A research study by Kuwahara and Eum (2022) shows how students who receive nutrition education tend to have a more positive attitude towards nutrition education and a greater knowledge of nutritionally balanced eating behaviors.

The long-term objective of this program is initiated by a fruit and vegetable Food Frequency Questionnaire from the Australian Eating Survey being given to students at the beginning of their 9th grade school year in August 2024, and again before they graduate 12th grade in June 2028 (Burrows et al., 2015). Through comparing these two Food Frequency Questionnaires, we expect to see improved nutrition behavior among the students (Kuwahara & Eum, 2022). For example, many students do not understand the importance of eating a nutritious breakfast every day (Naney, 2019). Yet with the implemented nutrition curriculum, we hope that over 4 years students will understand the importance of nutrition to their health and education and eat a hearty breakfast every day (Naney, 2019). It has

been seen that the nutrition behavior of students and student's outlooks on nutrition education is greatly affected by instructions from teachers in classes (Kuwahara & Eum, 2022).

Evidence Based Implementation Strategies and Activities

To implement our nutrition education program, we will first have to introduce the health class educators to the new nutrition curriculum. This will take place at 3 Durham County public high schools, where teachers can come in and get paid for one week before school starts to learn about the curriculum (Truitt, 2023). It is vital that the teachers understand the importance of the new curriculum and how fundamental it is to the success and health of their students (Rhoads, 2023). If teachers do not understand why the nutrition curriculum is being implemented and how it will benefit their students, they will be less motivated to learn the new material and teach it well (Jones, 2022). Moreover, we will reorganize the current health class curriculum to make space for the new nutrition education. Adjusting the health classes curriculum will involve the North Carolina Department of Public Instruction (NCDPI). The NCDPI is charged with implementing the state's public-school laws for pre-kindergarten through 12th grade public schools at the direction of the State Board of Education and the Superintendent of Public Instruction (Truitt, 2023).

Carrying out this implementation plan involves the main program team and community partners mentioned below as well as the North Carolina Department of Public Instruction (Truitt, 2023). These groups will work together to plan and implement the new nutrition curriculum into the health classes for high school students. The expected reach of this program is that around 500 students in Durham County high school will be exposed to the new nutrition curriculum, which is about the size of three freshman high school classes in Durham County ("Facts & figures", 2023). Since all students are required to take a health class throughout high schools, our hope is that every student will thus receive and understand the new nutrition education that we implement (Truitt, 2023). This understanding will be measured through the GNKQ and Food Frequency Questionnaire mentioned in the outcomes above (Kuwahara & Eum, 2022). The program addresses the community level of the socioecological model as schools in nearby Durham County are the targets of this program. Through providing nutrition education to the students in our community, we predict that the fresh nutrition knowledge will carry over into the whole Durham County community (Kuwahara & Eum, 2022).

Community Partners

The main team working on this program and receiving part of the funding will include two dietitians, five health class educators, and one certified health education specialist. There are additional community partners that we hope to engage and bring alongside this project as well including the Durham Public Schools Board of Education, Durham County Public Health, Durham County Public Schools, and the families of Durham County high school students. The Durham County Board of Education will need to review and support the new curriculum and help with the implementation of the new nutrition education into the Durham County public high schools ("Facts & figures", 2023). Secondly, Durham County Public Health will be able to assist in creating the specific nutrition curriculum that we choose to implement. Two dietitians that work for Durham County Public Health can review the specific nutrition information that is included in the new curriculum and support its implementation (Elledge, 2023).

Continuing with the community, it will be key to get Durham County public schools on board in support of the change in the high school health class curriculum. The Durham County public school staff strives to see their students be successful in all areas of life and improving their health class education will help them get closer to nutritional and physical success ("Facts & figures", 2023). Finally, the families of Durham County high school students will be important to have as stakeholders because it is their students that we are looking out for. With parents who want the best for their students, the implementation of this new curriculum should be encouraged and supported well. Kuwahara and Eum (2022) show how nutrition education for young students is often carried over into the family through conversations at dinner and thus better nutritionally balanced eating behaviors for the whole family. It will be hard for students to implement what they learn from the new nutrition curriculum if their parents are not helping them carry out their new health goals. With the help and support of the program team and the above community partners, we are excited that the new nutrition curriculum will have a group of allies behind it.

Budget

The funds for this program will be obtained from the North Carolina Department of Public Instruction and from Durham County Public Health (Truitt, 2023). A majority of the budget will go towards the personnel that help create the new nutrition education curriculum. This will require research, the construction of resources specific to Durham County for both students and teachers, and it will be asking for a large time commitment from many people (Rhoads, 2023). The other 20% of the budget will go towards the development and educational materials needed for

the nutrition curriculum. This includes curriculum programming, educator teaching guides, textbooks, and equipment. The practical nutrition classes during which food is brought in to show students how to cook and make the healthiest choices for themselves will need specific food and cooking materials from the budget as well (Rhoads, 2023). Table 1 has a specific breakdown of the budget and can be found in the appendix.

Conclusion

An advantage of this program is that students will be receiving better education on nutritional health which they can apply to their everyday lives and bring home to their families (Kuwahara & Eum, 2022). With an upgraded health class curriculum, it is anticipated that the implementation of improved health and lifestyle choices by the students will carry over into their success in other classes (Carey et al., 2015). On the other hand, a disadvantage of this program is that creating a new health class curriculum for the entire school year is a long process, so it will take time, patience, and commitment to create. It is possible that students will feel indifferent about the change in the curriculum, but if we can make the program engaging, they will hopefully enjoy the new education they are receiving. Our program prioritizes the overall cognitive and physical health of Durham County public high school students (Rhoads, 2023). While we are not directly addressing the other classes they are taking or the dynamics of high school overall that may be affecting them, we hope that as they learn through this new health class, they are able to start seeing the world and health from a new lens.

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E. 2b Implementation Plan for Nutrition Program Appendices

Table 11: Alyssa Nutrition Program Budget

Item	Percentage of Budget	Dollar Amount
Development Materials	8%	
Curriculum programming		$25,000
Educator teaching guides		$19,500
Educational Materials	10%	
Nutrition textbooks		$9,500
Food and cooking equipment		$15,000
Online lesson programs		$20,000
Personnel	80%	
Dietitians (2)		$120,000
Health Class Educators (5)		$275,000
Certified Health Education Specialist		$50,000
Miscellaneous	2%	$11,125
Total Budget		**$556,250**

Table 9 shows a breakdown of the budget for the creation of the new nutrition curriculum program that will be implemented into the Durham County public high schools. The budget will be distributed between development materials, educational materials, personnel, and miscellaneous, with sub-items included in those categories for further dispersion.

E. 3 Evaluation Plan

Introduction

Social determinants of health (SDOH) are the conditions in the environments where people do their everyday activities including at work, school, or home that may affect a wide range of health, daily performance/functioning, and quality-of-life outcomes and risks ("Social Determinants", 2020). Our team is analyzing the SDOH of education access and quality. Our group key issue is looking at the high rates of depression, obesity, and inadequate nutrition among Durham County public high school students ("Obesity", 2018). Specifically, there is a low presence of mental health and nutrition education within Durham County public high schools, which could be contributing to the unhealthy physical status of the students (Jones, 2022). Our SDOH analysis investigates three realms within Durham County public high schools: nutrition, physical health, and mental health. To initiate change against this determinant, we are planning to create a nutrition curriculum that will be implemented in all the freshman health classes in three Durham County public high schools. A research study by Kuwahara and Eum shows how students who receive nutrition education tend to have a more positive attitude towards nutrition education and a greater knowledge of nutritionally balanced eating behaviors (2022). The main program team that will be conducting this program includes two dietitians, five health class educators, and one certified health education specialist. We are optimistic about the implementation and initiation of this new program in Durham County public high schools.

Evidence Based Evaluation Plan

We are evaluating a long-term objective, which involves the Australian Eating Study (AES), a fruit and vegetable-focused Food Frequency Questionnaire (FFQ), being given to students of three Durham County public high schools (Burrows et al., 2015). An example of one report from the AES can be found through Figure 1 of the Appendix. The FFQ will first be given to the incoming students at the beginning of their freshmen school year in August 2024, and again before they graduate 12th grade in June 2028. Through comparing these two Food Frequency Questionnaires, we expect to see improved fruit and vegetable intake among the students after four years (Kuwahara & Eum, 2022).

Study design/data collection

To study this group of students and collect data on their eating habits, the evaluation method will be mostly self-report with three control and three experimental groups. As we collect data from their initial fruit and vegetable Food Frequency Questionnaire, we will record the results. The students will then be taught their freshman year about nutrition through the nutrition curriculum that is implemented in their health class (Rhoads, 2023). At the same time, freshman classes at three other Durham County public high schools will be taking the same fruit and vegetable FFQ, acting as a control group as they do not receive the nutrition curriculum. At the end of the students four years in high school, they will take the fruit and vegetable FFQ again, before they graduate from the six schools we are evaluating.

We will be able to compare the student's initial behaviors from the FFQ and compare them with their nutrition-based behaviors four years later, after they have gone through the curriculum or not ("National health", 2008). An additional observation strategy is that throughout the semester, a member of our main program team will sit in on two of the nutrition classes being taught at each of the three schools the curriculum is being implemented in. A total of six classes will be observed, with the goal of ensuring that the curriculum is being taught properly (they are receiving accurate and comprehensible nutrition education), and to evaluate the student's engagement with the material (Spreeuwenberg, 2022). With the observational and FFQ-based data that we collect, we expect that the students of the 3 Durham County public high schools with the new nutrition curriculum will have a higher fruit and vegetable intake than those not receiving the education, improving their overall health and energy status (Falkner, 2022). Research shows that students who consume higher amounts of fruit and vegetables improve their mental health more than those who eat the least number of fruits and vegetables (Barnard, 2021). Kuwahara and Eum show how nutrition education for young students is often carried over into the family through conversations at dinner and thus better nutritionally balanced eating behaviors for the whole family (2022).

Sample and sampling strategy

The average number of students in public high schools in North Carolina is 567 students. (Colayco, 2023). Therefore, we expect the average freshman class in Durham County public high schools to be around 142 students. Through evaluating the freshman class of six different Durham County public high schools (three control and three experimental), we expect to have an overall sample size of around 852 students. The schools will be chosen based on their willingness to participate in the study and the current status of their health class educators. For example, if a

high school does not currently have a stable health class educator for their freshman class, but maybe a substitute, that school would not be included in the sample size. One substitute teacher in Columbus, Ohio, stated herself that "Our students, my children and your children, deserve better than having me as their teacher" (Hyatt, 2023). It is evident that committed health educators and teachers are needed for students rather than inconsistent substitutes.

Specific measures

The outputs we expect to see from the implementation of this program is an increased consumption of fruit and vegetables by the students we are evaluating. The importance of knowing general nutrition as well as an increased consumption of fruit and vegetables is seen through its ability to help contribute to better health outcomes for these students later in life including decreased rates of diabetes, obesity, and other chronic health-related issues that can lead to lifelong battles (Falkner, 2022). As stated in our implementation plan, for the three freshman classes undergoing the curriculum, they will take the validated general nutrition knowledge questionnaire (GNKQ) before and after they have gone through the new education (Kliemann et al., 2016). We will be forming this exam the summer before the curriculum is implemented and expect to see an average of at least a 10% increase in score for the nutrition knowledge test among all three freshman classes, after having gone through the curriculum (Kuwahara & Eum, 2022). The reach of our program is the students from the three Durham County public high schools that are going through this curriculum. It has been seen that the nutrition behavior of students and student's outlooks on nutrition education is greatly affected by instructions from teachers in classes (Kuwahara & Eum, 2022). Therefore, while kids may not be convinced by their parents that they need to eat healthier, education by their teachers may promote healthier eating behaviors (Hyatt, 2023).

Timing

Evaluation of the FFQ data will occur at the end of the students four years in high school, in June 2028. Community partner engagement activities will occur from now until August 2024, when the curriculum is being implemented. Community engagement with our stakeholders will also continue throughout the first year of the program implementation, to provide updates on how the program is going. Progress will be seen through observing some of the nutrition classes, as well as evaluating the student's nutrition knowledge at the end of their freshman year (Spreeuwenberg, 2022). If no progress is seen after the first year, we will come back together as a team and re-evaluate our curriculum program, with feedback from the students, teachers, and community. One potential area that

could need improvement is student engagement, which could be pushed by finding student leaders within the schools that will promote the nutrition education program.

Analysis plan

Quantitative and qualitative data will be used throughout the evaluation of our program. The comparison of the fruit and vegetable FFQ's that the students will take their freshman and senior years of high school, to evaluate any changes in eating behaviors, will be quantified ("National health", 2008). Quantitative data will also be used in the short-term outcome through the general nutrition knowledge questionnaires. As we expect to see an average of a 10% increase in score, we will have to track this statistic after they take the exam in August 2024 and then again in June 2025 (Falkner, 2022). Qualitative data will be gathered through the in-class sessions that we observe, analyze, and report on. These mixed measures that we are evaluating will help us see a well-rounded picture of the success of the newly implemented nutrition program.

Sources of funding

The program will be sustained and funded through the community partners that we plan to engage with including Durham Public Schools Board of Education, Durham County Public Health, and Durham County Public Schools ("Facts & figures", 2023). Engagement with these partners will start now, and continue throughout the length of our program, which at a minimum is 5 years, as we follow the first freshman class through their graduation in June 2028. Assuming the program is successful, we hope to start establishing more community partners along the way and eventually implement the nutrition curriculum in more Durham County public high schools.

Data use and dissemination

Data will be used to assess the effectiveness of the new nutrition curriculum in improving the fruit and vegetable intake of students in Durham County public high schools. The results from this data will be disseminated among our team and to our community partners, including students and parents, through bimonthly meetings where we will discuss the program, current results, and any changes that may need to be made (Bryant, 2017). One chief programming officer for a media company stated that in the meetings she holds for her company she "wants everyone talking about what they would do to make this better. It is amazing what comes out of those meetings" (Bryant, 2017). In the review meetings we hold with our team and stakeholders, this inclusive perspective is the mindset we hope to bring into our discussions (Bryant, 2017).

Conclusion

The nutrition curriculum program that we are seeking to implement into the Durham County public high schools will involve a collaboration of team members from different public health and educational backgrounds with unique input. The interdisciplinary effects of the program will be seen as increased fruit and vegetable consumption can lead to better mental health and higher energy for students (Falkner, 2022). In the end, we hope to increase equity for all students at Durham County public schools by providing greater opportunities and resources that can boost their overall health and education.

E. 3a Evaluation Plan References

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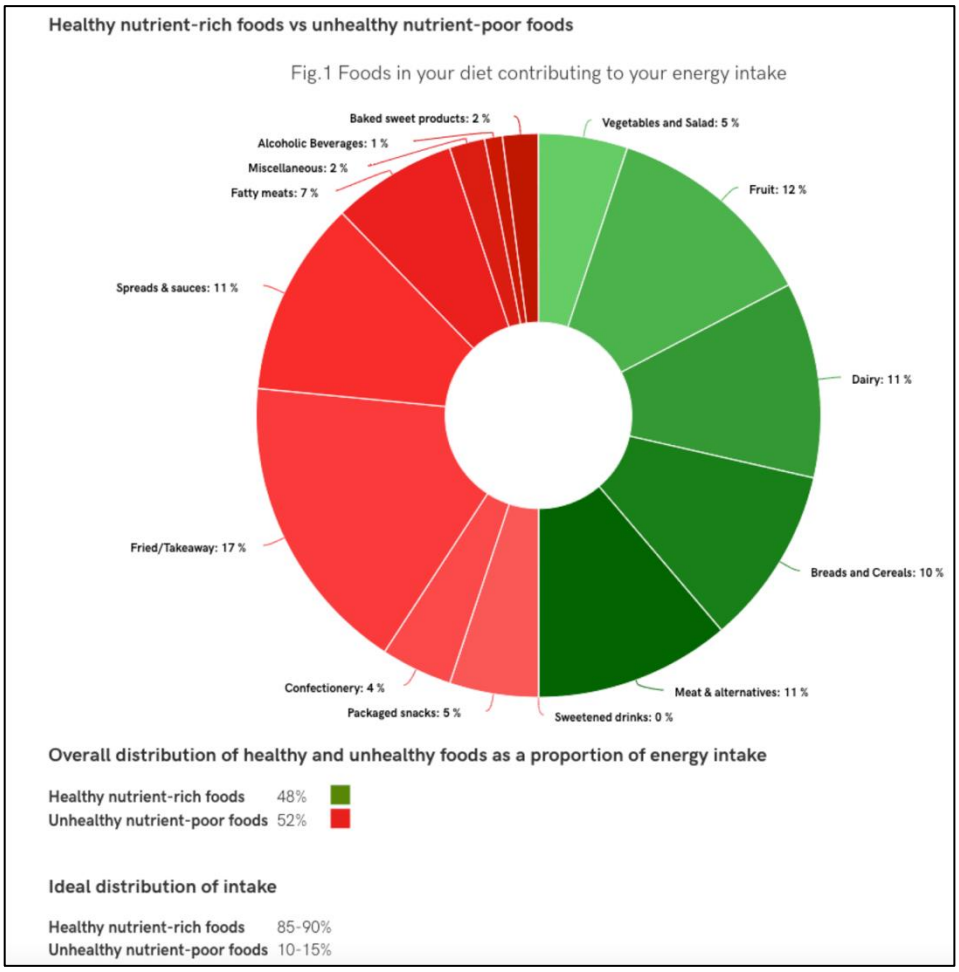
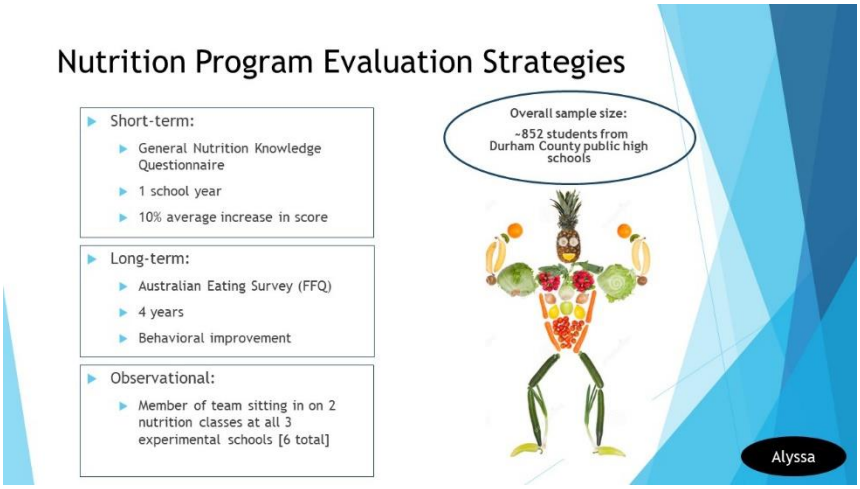


Figure 3: Australian Eating Survey

Figure 3 shows an example of one of the pages from the Australian Eating Survey report. This figure illustrates how the foods that one is consuming relate to the overall energy intake. Ideally, the fruit and vegetable intake should increase, while the red sections decrease. Due to rounding, the percentages from healthy foods and discretionary foods may not add up to 100% (Burrows et al., 2015).

E. 4 Alyssa's Presentation Slides and Script



ALYSSA: Our program has an overall sample size of about 852 students from Durham County public high schools. For our short-term evaluation strategy, students will take the general nutrition knowledge questionnaire at the beginning of their freshman year in August 2024 and then again after they have gone through the nutrition curriculum at the end of the year in June 2025. We hope to see an average of a 10% increase in score through the comparison of the 2 questionnaires. Our long-term objective involves a fruit and vegetable-based food frequency questionnaire. The students will first take this at the start of their freshman year and again 4 years later at the end of their senior year in June 2028, after they have gone through the nutrition curriculum and had time to implement what they have learned. We hope to see behavioral improvement in their consumption of fruits and vegetables after these 4 years. The final evaluation strategy is observational. A member of our team will sit in on 2 of the nutrition classes at each of the 3 Durham County public high schools that our curriculum is being implemented into. The goal is to ensure that the curriculum is being taught properly and to evaluate the student's engagement with the material. Our research has shown that students who consume higher amounts of fruit and vegetables improve their mental health more than those who eat the least number of fruits and vegetables.

ALYSSA: In conclusion, with your help, we hope to increase equity while addressing mental health and nutritional well-being for all students at Durham County public high schools by providing greater opportunities and resources with school-based telehealth therapy and Let's Eat Healthy Nutrition curriculum that can boost their overall health and education. Thank you for listening. Do you have any questions?

APPENDIX F: MIKAYLA WELCH INDIVIDUAL WORK

F.1 Individual SDOH Analysis

Social Determinants of Health

Education access and quality is a social determinant of health that can have both short- and long-term impacts on an individual's health outcomes (Health & Academics, 2023). Lack of access to education or quality education can result in lower reading proficiency resulting in children who are more likely to struggle in school and participate in risky behaviors (U.S. Department of Health and Human Services, 2023). Reading proficiency levels as early as third or fourth grade were reported as key indicators of an individual's ability to succeed in school. In the United States students who reported receiving grades of D or lower were eleven times more likely to have injected illegal drugs, four times more likely to have had four or more sexual partners, five times more likely to miss school because of safety concerns, and two times more likely to feel sad or hopeless when compared to students who reported receiving A letter grades (Health & Academics, 2023). Without early intervention, low reading proficiency can later result in low health literacy skills (Health & Academics, 2023). Health literacy is defined as an individual's capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions (Health Literacy, 2023). Therefore, adequate health literacy skills are necessary for people to make educated decisions for effective, safe, and high-quality care (Health Literacy, 2023). Short-term impacts of lower health literacy skills include health issues such as poor nutrition, sexual health, physical health, and mental health which can then lead to chronic illnesses and the mismanagement of those illnesses (Health Literacy, 2023). Individuals with lower health literacy skills are also less likely to have health insurance (Health Literacy, 2023). Healthy People 2030 identified increasing the proportion of fourth graders reading at or above a proficient level as a key objective because early intervention can improve school performance and healthy behaviors among children (U.S. Department of Health and Human Services, 2023). In the United States the percentage of fourth graders reading at or above a proficient level has decreased from 36.6% in 2017 to 35.3% in 2019 (U.S. Department of Health and Human Services, 2023).

Geographic and Historical Context

Durham County is a rapidly growing area with a population of 326,126 people as of July 2021 (United States Census Bureau, 2023). Of the total population in 2021, 19.9% were under the age of 18, 35.9% were Black or

African American, 13.8% were Hispanic or Latino, 14.3% were foreign-born, 13.4% were living in poverty, and 13.5% were without of health insurance (United States Census Bureau, 2023). A community health assessment was conducted in 2017 that highlighted education as a social determinant of health in Durham County stating that academic success is a key predictor of health outcomes (Durham County Public Health Department, 2017). The community assessment also identified top community issues and health problems within Durham County including substance use, discrimination, poverty, obesity, mental health, and diabetes (Durham County Public Health Department, 2017). In 2016 there was little to no relationship between Durham County administration and educational institutes, so any educational or health initiative had to be applied to each school individually (Durham County Public Health Department, 2017). With over 53 schools in the Durham Public School system, many wellness initiatives failed to reach Durham Counties' large youth population (Durham County Public Health Department, 2017). Durham County Public Schools implemented the read to achieve initiative as part of the Excellent Public Schools Act law in July 2012 (Read to Achieve, 2023). This act consists of seven components that include comprehensive plans and processes for reading achievement and reading proficiency. The Durham County Public Schools also follow the North Carolina State Literacy Plan which provides consistent measures to address literacy challenges and a plan for allocating support from the North Carolina Department of Public Instruction (Read to Achieve, 2023). Durham County Public Schools have also proposed $225,000 to the 2022–2023-year budget for early grade reading proficiency (Facts & figures about Durham Public Schools, 2023).

Priority Population and Measures Of SDOH

The Durham County Public School district has a total of 54 schools with a total of 31,124 students (Facts & figures about Durham Public Schools, 2023). Of those students 38.5% are African American, 34.3% are Hispanic/Latino, 19.4% are White and 7.8% are American Indian, Asian, Hawaiian-Pacific, and Multi-racial and 54.80% of those students qualify for free or reduced lunches (Facts & figures about Durham Public Schools, 2023). As of 2023 Durham County has 31 elementary schools (Durham Public Schools, 2023). As of 2022-2023, there were 13,759 students enrolled in kindergarten through fifth grade with a student-to-teacher ratio of one to twenty-three (Durham Public Schools, 2023). Durham County Public Schools is ranked in the bottom 50% of all 301 school districts in North Carolina with a reading proficiency score of 37% (Facts & figures about Durham Public Schools, 2023).

Reading proficiency scores in Durham County Public Schools are lower than the North Carolina state average by around 10% (Facts & figures about Durham Public Schools, 2023). However, Durham County is significantly more diverse than other schools in the state and has many students who do not report English as their first language which can impact scores as these students are more likely to fall behind in both reading and math proficiency due to language barriers and additional work learning the English language. (Facts & figures about Durham Public Schools, 2023).

Rationale

Increasing the proportion of fourth graders reading at or above a proficient level will help improve academic success, health literacy skills, and health outcomes among those living in Durham County North Carolina. Health literacy skills are essential to leading a healthy life because of the direct impact it has on health disparities, especially among vulnerable populations (Health Literacy, 2023). Limited health literacy skills impact an individual's use of preventative care, disease management, infectious disease understanding, and prescription drug use or food labels (Health Literacy, 2023). These can all have direct impacts on an individual's health as well as indirect impacts on the broader community, especially in times of public health emergencies. Providing early intervention can also help students graduate high school on time and encourage students to pursue higher education after high school (Health & Academics, 2023). This can be beneficial as it is reported that those with higher education often live healthier and longer lives (U.S. Department of Health and Human Services, 2023).

Disciplinary Critique

Public health leaders are essential in addressing this social determinant of health as they aid in community building and bridging the gaps between schools and other necessary partners. It is a public health leader's role to promote community engagement throughout a health initiative to foster trust, capacity, and sustainability within the community. It is also the public health leader's responsibility to monitor the initiatives to ensure they are having the desired impact while also factoring in equity considerations. Durham County Public Schools is one of the most diverse school districts in North Carolina so there will be different considerations for any intervention implementations to ensure all students' needs are met. Initiatives within the school need to be addressed at the county level to create a relationship between the schools and county administration to ensure all staff members are on the same page and can move forward together. Addressing this at the county level also ensures all schools receive the same initiatives, therefore, increasing education access and quality for all residents of Durham County. Early

intervention to improve reading proficiency among fourth-grade students in Durham County may also have indirect community impacts such as a decrease in substance use and sexually transmitted diseases as well as improvements in overall school attendance and mental health among school-aged children (Health & Academics, 2023).

F.1a Individual SDOH Analysis References

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F.1b Individual SDOH Analysis Appendices

Table 12: Public School Comparison Chart

	Durham County Public Schools	North Carolina Public Schools Average
Reading Proficiency Score	37%	46%
Minority Enrollment	81%	54%
Spending per student	$12,165	$9,805

F. 2 Community Partner Analysis

Introduction

Education access and quality is the connection between education and well-being and includes key issues such as graduating from high school, language and literacy, and general education attainment (Social determinants of health at CDC, 2022). Education access and quality is a social determinant of health as individuals with higher levels of education are more likely to live longer, healthier lives (U.S. Department of Health and Human Services, 2023). Access to education can be limited by several things including school policies and practices. Out-of-school suspension policies limit a student's access to education during the time they are suspended and at Durham County Public Schools marginalized groups are reported to be disproportionately suspended (Advocates for Children's Services of Legal Aid of North Carolina (ACS), 2013). As high rates of out-of-school suspensions are associated with increased rates of academic failure, and school withdrawal, these students are less likely to achieve higher levels of education (ACS, 2013). These students can be out of school for multiple days at a time resulting in missed classes and possibly missed meals if they rely on school meals.

Background

Durham County Public Schools utilize the North Carolina Essential Standards for Health Education for all health education courses (Public Schools of North Carolina, 2019). The high school standards for grades 9-12 include two standards for mental and emotional health and four standards for nutrition and physical activity out of a total of 14 essential standards (Public Schools of North Carolina, 2019). Despite the current health education efforts, 28% of high school students reported being slightly or very overweight (Youth Risk Behavior Survey Durham County, 2019). High School students also reported that they rarely ate breakfast every day of the week with 21% of Black or African American students, 27% of Hispanic or Latinx, and 37% of white students reporting that they ate breakfast every day in the past week (Youth Risk Behavior Survey Durham County, 2019). Similarly, reports showed high rates of depression among high schoolers with 43% of female students and 27% of male students reporting feelings of depression in the last twelve months (Youth Risk Behavior Survey Durham County, 2019). Additionally, 19% of high schoolers considered committing suicide in the past twelve months (Youth Risk Behavior Survey Durham County, 2019). Of those that considered suicide 16% were white, 20% were Black or African American and 17% were Hispanic or Latinx (Youth Risk Behavior Survey Durham County, 2019).

Program Transformation

To better address these issues in Durham County Publics Schools we recommend the implementation of an improved nutrition education program using the Let's Eat Healthy nutrition education program as a guide. This guide focuses on developing healthy lifestyles through nutrition education, making healthier choices, and practicing self-care (Rhoads, 2023). This program guide includes teaching and planning resources, and student workbooks to support the nutrition curriculum (Rhoads, 2023). This guide will be beneficial to adapt to the current health education curriculum to provide a more well-rounded and integrated approach that emphasizes the importance of nutrition and health education for overall student health and school performance.

Community Partner Identification and Analysis

Many community members both within the school and the broader community will likely be involved in addressing this social determinant of health. A community partner analysis map (Appendix A) was used to outline potential community partners, their interests and influence on the topic, and potential strategies to engage each partner. Community partners identified through the analysis map (Appendix A) include the North Carolina Department of Public Instruction (NCDPI), the Superintendent, the Durham County Public School Board, high school principals, high school teachers, and high school students as well as families and community members. The NCDPI will have both high interest and high influence as it oversees any curriculum changes for public schools in North Carolina and will likely have continuous involvement throughout the project. The Durham County Public Schools superintendent is the chief administrative officer as well as the chief executive officer of the school board, so they will also likely have high interest and high influence. The superintendent is responsible for assisting in implementing new policies or curricula as well as assisting in making decisions within the school board and will be heavily invested in any changes due to this being their job within the community. The Durham County Public School Board is responsible for policy within the schools and raising any concerns to the superintendent and will have both high interest and high influence because of the role they play in decision-making for Durham County Public Schools. The relationship between the school board and superintendent is essential in ensuring quality changes are implemented at the schools and determining an adequate allocation of the school budget.

Principals and teachers at Durham County high schools will help bridge the gap between the school board and superintendent on one hand and the students and family members on the other hand. Teachers would be the ones

to implement the new curriculum in the classrooms and would report directly to principals with any concerns or successes. Teachers and principals are likely to be invested in the curriculum implementation when it reaches the schools as it is their job to implement the new curriculum in the classrooms. Parents and community members will likely be engaged as time permits but will have limited influence over decision-making. Students and community members will also have less involvement in the implementation of new policies or curricula but can help with evaluation to determine effectiveness or relevance because they can report any concerns to school officials or attend school board meetings. These community partners identified will engage in varying degrees due to many factors including time constraints, knowledge, and their role within the school systems or the community.

Worldview Exploration

In examining the worldview (Appendix B) of students participating in the new curriculum students are identified as the customer and actors as they are the individuals who will take part in the new curriculum upon implementation to improve their health outcomes and school performance. The transformation expected to occur through the program implementation is that high school students will be made aware of the positive effects improved health education can have on both their health and school performance. The curriculum will ultimately help students to make better choices to have better health outcomes. In examining the worldview (Appendix C) of health teachers they are identified as the actor while students remain the customer because of their role in implementing the new curriculum in the schools. Teachers in this situation may be somewhat hesitant to implement a new curriculum because of the time and difficulties that come with curriculum change. However, they will likely want to help improve the health and school performance of students in Durham County Public Schools and therefore be willing to make these curriculum changes to support the transformation. Implementation of a new policy or curriculum within a school district requires many moving parts and community partners. In both worldview examples, the NCDPI acts as the owner because of its role in determining any curriculum changes for the state of North Carolina.

Conclusion

Questions to consider for the community partners include do they currently recognize health education as an issue, how they view the current standards the school utilizes, do they think the health of students is an issue, do they believe students could benefit from new health education policies, and do they have any concerns about

changing the curriculum? Limitations to this analysis include the many varying perspectives any community partner could have on the issues and their willingness and ability to engage. While many of the community partners are involved in the school system their engagement and interest will likely still be limited by other responsibilities or financial constraints. Limitations also extend to the willingness of students to engage in the curriculum and apply topics they learn to their daily lives. A strength is the utilization of the many community partners and their established connections between the community and schools that will help ensure community engagement throughout the project. Continuous input from schools and the community will ensure smooth transitions and more willing participants. Identifying different community partners worldviews and environments (Appendix B) helps to better understand community partners perspectives and community influences regarding the curriculum change. Utilizing a community partner analysis map (Appendix A) also helps to clearly outline and understand each community partner's interests, and influence to obtain support or better engage the partner throughout the process.

F. 2a Community Partner Analysis References

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F. 2b Community Partner Analysis Appendices

Table 13: Community Partner Analysis Map

Community Partner	Community Partner's interest in the Health Topic/Project	Assessment of Impact (influence/interest)	Potential Strategies for Obtaining Support and/or Reducing Obstacles
North Carolina Department of Public Instruction	• Responsible for curriculum changes in North Carolina Public Schools	(high/high)	• Addressing the current curriculum and using it to build of off to address gaps •
Superintendent	• Ensuring the needs of students are met • Improve student education and wellbeing • Time and resources dedicated to the schools	(high / high)	• Presentation of data on current student health outcomes • Meetings to propose evidence based strategies
Durham County Public School Board	• Job is to raise concerns and develop policies	(high / high)	• Presentation of CDC policy and successes

	for schools in Durham County • Improve health education policies and standards		• Present concerns for student health at Durham County
Durham County Public High School Principals	• Interested in the wellbeing of the student population and the community at large • A community connector and advocate • Interested in collaborating with teachers and administrators to enact change to promote the wellbeing of the student body	(high influence/ high interest)	• Present current health of students and explain the correlation to school performance

Durham County Public High School teachers	• Interested in curriculum required to teach students • Interested in the education and development of students in Durham County	(low / high)	• Provide an evidence based framework that is easy to follow for curriculum implementation • Explain the impacts of health on overall student performance
Durham County Public High School students	• Directly impacts their health and education • They will be taught the new curriculum and likely asked to review	(low / low)	• Engage students throughout the process • Explain the health impacts and school performance aspects of health and health education
Durham County families and community members	• May have children attending schools	(low/low)	• May attend meetings • May read informational

	• May be interested in the health of the community		materials sent to the community

Table 14: CATWOE 1: Students Participate in New Nutrition Curriculum

Term	Definition
Customer	High school students in Durham County Public Schools
Actor	High school students in Durham County Public Schools
Transformation	To have better nutrition and mental health education to improve overall health
Worldview	Improved health education can make my school experience better and result in a healthier life
Owner	North Carolina Department of Public Instruction
Environment	Student perception, awareness
Root Definition	To continue to improve understanding on the importance of nutrition and mental health in my health education courses. In order to improve health outcomes through appropriate education

Table 15: CATWOE 2: Teachers Implement New Nutrition Curriculum

Term	Definition
Customer	High school students in Durham County Public Schools
Actor	Health Teachers at the High School
Transformation	To provide adequate health education for high school students to improve nutrition and mental health related health out comes
Worldview	Better quality health education will improve student performance and overall health in high school students
Owner	North Carolina Department of Public Instruction
Environment	Advocacy from public health departments, education policy and standards awareness
Root Definition	To continue to provide adequate health education to Durham County High School students. In order to improve student health through policy and curriculum changes

F. 3 Engagement Plan

Introduction

The proposed program, Let's Eat Healthy, aims to improve current health education for high school students in Durham County Public Schools (DPS). This proposed curriculum focuses on making healthier choices through education in better nutrition, lifestyle, and self-care practices (Rhoads, 2023). The program materials include planning and teaching resources for teachers and workbooks for students that will support a smooth transition to the new curriculum for both students and teachers.

Engagement strategy

This engagement strategy will focus on DPS high school health teachers because of their role in the implementation of the new curriculum. A community-engaged approach fosters trust among the implementation team and the community, which will help ensure that teachers are on board with a curriculum change. Once there is a foundation of trust created the implementation team and community partners can focus on building community capacity and mobilization. These are essential steps to ensure that the community can sustain any changes made. As teachers have a unique role of having to both learn the new curriculum for themselves and then teach it to others it is important that they are involved throughout the process. Health teachers are likely aware of the current health status of their students and the impacts this can have on academic performance. For curriculum changes to be successful, health teachers will need to attend meetings and workshops to first review and learn the new curriculum so that they are then able to adequately teach it to their students in the next school year. Their involvement throughout the process increases the likelihood that they will be supportive of curriculum changes and therefore willing to attend the necessary meetings, and workshops to support curriculum implementation to better support their students.

Methods, Timing, and Measures

Several methods will be used to engage DPS high school health teachers and the greater community outlined in the methods timing and measures table (Appendix B). In the design phase of the project, the team will utilize presentations to inform partners about health concerns and the proposed program. Presentations will use the 30/30 tool to establish a timeline to inform partners on progress and data collected throughout program implementation. These presentations will be conducted in a group setting available to all identified partners with virtual options and will continue through the design and improve phases of implementation on a quarterly basis.

Another engagement method designed to consult and collaborate with community partners will be group meetings in which appreciative inquiry interviews are conducted. These interviews are an engagement tool used to build trust and communication while also equalizing differences in interest and influence among community partners (Appendix B). Similar to presentations meetings will be available to all partners throughout the design phase and include a virtual option, however, these will happen monthly. These meetings will allow space for partners to raise any concerns or provide feedback and suggestions. As the program progresses to improve phase meeting frequency will reduce to quarterly. Once the program progresses to the sustain/scale phase meetings and presentations will be combined into one event and happen quarterly to continue informing partners while also creating space for collaboration.

Lastly, there will be workshops and training sessions designed to inform and collaborate specifically with high school health teachers to better implement the new curriculum. These workshops will occur in person, daily several weeks before the beginning of a new school year. These workshops will be used throughout the design phase, and then later be adapted to fit in with teacher training that occurs before the start of each new year, or when a new teacher begins.

Engagement in both meetings and presentations can be determined using the number of participants in attendance as a performance measure. This can be easily calculated at every meeting and presentation to determine how engaged the community is over time. However, using attendance as a performance measure for engagement has some limitations as it does not necessarily capture community partner involvement in each engagement method. If there is continuously low attendance the team can try scheduling meetings at different times to ensure conflicting schedules are not a barrier to meeting participation. For workshops, we can use the number of teachers in attendance as the performance measure. This can be determined using workshop attendance. If there is low attendance, dates and times of workshops can be adjusted to better accommodate a teacher's schedule.

Barriers and facilitators

There will be several internal and external factors that may limit or increase high school health teachers' involvement in the proposed program. These are considered barriers or facilitators respectively (Appendix B). Teachers have many responsibilities both within and outside the school community, resulting in scheduling conflicts. This means that their ability to participate in meetings, presentations, and workshops can be limited by the

time they have available. Teachers may also be reluctant to implement a new curriculum if they do not find issues with the current curriculum, or do not want to take the time to learn the new curriculum. However, because of their role and involvement in students' success, they likely have a strong desire to support their student's health and academic performance. This desire will function as a facilitator of their involvement.

To better facilitate health teachers' ability to participate in meetings there will first be a poll distributed through email with a selection of times to choose from that best fit their schedules. The results from the poll will determine meeting times based on the greatest number of available participants. To further support involvement in meetings there will be both in-person and virtual options, as reflected in the methods, timing, and measures table (Appendix B). To address health teachers' potential hesitation to learn a new curriculum, there will be presentations that include the current health education standards along with student health data that supports the need to improve health education to better support student health and academic success. In these presentations, it will be made clear that we intend to build on the current health education curriculum to reduce the amount of time in these workshops to better accommodate teachers' busy schedules. As teachers may be reluctant to learn a new curriculum, using the current curriculum to build on will also help reduce the information teachers are required to learn for the coming school years and will hopefully reduce any reluctance to change from the current curriculum they may be more familiar with or find no issues with.

Accountability Plan

A Memorandum of Understanding (MOU) is designed to outline the scope and purpose of a project. Through identification and agreement of each partner's tasks, an MOU works to assign community partners responsibility and accountability in the project. The leadership and program implementation team will be held both responsible and accountable for the proposed program and the implementation of the curriculum. This includes the facilitation of meetings, presentations, and workshops and the development of materials throughout the various phases of the project. However, it is teachers who will be implementing the new curriculum in the schools, so they will be tasked with attending workshops and learning the new curriculum making this their key responsibility. The progress of these tasks will be reviewed monthly at the meetings to ensure all partners can complete their identified tasks. At the completion of program implementation, the leadership team will also be tasked with developing reports for publication and dissemination of findings. Partners can assist with writing reports and will have the opportunity

to read and provide feedback at various meetings before any reports are shared outside of the project. Partners will then receive final reports and be able to share them with their contacts as well.

F. 3a Engagement Plan References

REFERENCES

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F. 3b Engagement Plan Appendices

Table 16: RASCI Analysis

RASCI Table		
Policy/Program –Let's Eat Healthy is an education program that focuses on developing a healthy lifestyle through nutrition education, making healthier choices, and practicing self-care.		
RASCI Levels Who is…	**Community Partners**	**Rationale**
Responsible=owns the challenge/ project	North Carolina Department of Public Instruction (NCDPI) Implementation Team	NCDPI is responsible for any curriculum changes for the state of NC.
Accountable=ultimately answerable for the correct and thorough completion of the deliverable or task, and the one who delegates the work to those *responsible*	North Carolina Department of Public Instruction Implementation Team Durham County Public School Board Superintendent	NCDPI assists school boards and superintendents with implementation of new curriculums
Supportive=can provide resources or can play a supporting role in implementation	Durham County Public High School teachers Durham County Public High School Principals	High School Principals and teachers will also assist in the implementation of the new curriculum and can support decisions made by the superintendent and school board.
Consulted=has information and/or capability necessary to complete the work	Durham County Public High School teachers Durham County Public High School Principals	Principals, teachers, students, and community members will be informed throughout the implementation and inform the

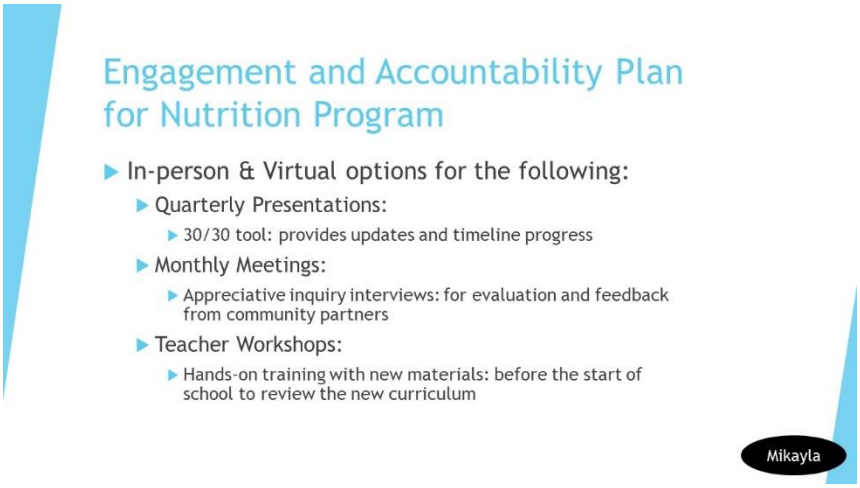
	Durham County families and community members Durham County Public High School students	process with knowledge about the school and current needs.
Informed=must be notified of results, process, and methods, but need not be consulted		

Table 17: Methods, Timing, and Measures Table

Engagement Method	Facilitator/ Barrier	Phase(s)	Performance measure	Assessment method	Frequency
Meetings	Virtual options/Time and schedule conflicts	Design, Improve	# of participants	Meeting attendance	Monthly
Presentations	Virtual options/Time and schedule conflicts	Design, Improve	# of participants	Meeting attendance	Quarterly
Presentations & Meetings Combined	Virtual options/Time and schedule conflicts	Sustain/scale	# of participants	Meeting attendance	Quarterly
Workshops	Virtual options/Time and schedule conflicts	Design, Sustain/scale	# of teachers attending workshops	Workshop attendance	Full week or two before school starts

F. 4 Mikayla's Presentation Slides and Script

MIKAYLA: Many partners both within the school and the broader community will likely be involved in addressing this issue. For this intervention, we identified 7 key community partners including the North Carolina Department of public instruction, local therapists, the high school superintendent, the school board, principals, teachers, students, families, and community members. To determine these community partners, we focused on individuals in the community who are involved with the school or developing curriculum. We then examined their individual interests and the impact they may have on an intervention. North Carolina Department of public instruction is responsible for curriculum development and changes for the state, so they will have a large impact on the success of the intervention and will likely be involved throughout. While students will be less involved throughout the project implementation, they will experience an improved health education curriculum that leads to better health outcomes.



MIKAYLA: Several engagement methods will occur throughout the project utilizing different engagement tools. Presentations and meetings will be available to all community members. Presentations will be used at the start of the plan to inform partners of the health issue and to provide updates on progress throughout. Meetings will be used to obtain feedback from community partners. Teacher workshops will be the final step and will consist of training teachers on the new curriculum. Engagement in each method can be determined using the number of participants in attendance as a performance measure. If there is continuously low attendance, dates, and times of each can be adjusted to better accommodate various partners' schedules.