

INCREASING ACCESS TO FREE SCHOOL LUNCHES IN DURHAM PUBLIC SCHOOLS, NC TO
ADDRESS YOUTH MENTAL HEALTH DISPARITIES VIA REDUCING FOOD INSECURITY
STRESS

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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 the Department of Leadership, Nutrition and Dietetics, and Health Policy and Management in the Gillings School of Global Public Health.

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ABSTRACT

Sarah Dressel, Kai Larson, Lisa Pham, Rachel Smith, Haley Williams:
Increasing Access to Free School Lunches in Durham Public Schools, NC to Address Youth Mental Health
Disparities Via Reducing Food Insecurity Stress
(Under the direction of Seema Agrawal)

The social and community context a child grows up in greatly influences their health over the course of their life. Healthy mental, emotional, and behavioral (MEB) development is essential for building resistance to stress during childhood and throughout the lifespan. However, without proper nutrition and access to healthy foods, healthy MEB development cannot occur and poor mental health outcomes result. According to the 2019 Durham County Youth Risk Behavior Survey (YRBS), 32% of middle school students and 35% of high school students reported feeling depressed in the past year (Davis, 2019). This proposal aims to improve mental health among Black and Latino youth in Durham County through free school lunches (FSL) at all Durham Public Schools. Schools that are eligible for and willing to apply for the Community Eligibility Provision (CEP) will be incentivized to do so, while additional funding will be secured to implement FSL at schools that do not receive CEP. Behavioral outcomes associated with free meal programs include reduction in hyperactivity, anxiety, depression, and a reduced surge in disciplinary infractions (Hanks, n.d.).

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LIST OF ABBREVIATIONS

ACE	Adverse Childhood Experience
CEP	Community Eligibility Provision
CDC	Centers for Disease Control and Prevention
DPS	Durham Public Schools
FSL	Free School Lunches
MEB	Mental, Emotional, Behavioral
SNAP	Supplemental Nutrition Assistance Program
TANF	Temporary Assistance for Needy Families
UFM	Universal Free Meals
USDA	United States Department of Agriculture
YRBS	Youth Risk Behavior Surveillance

CHAPTER 1: COMMON PROPOSAL

Social Determinant of Health Overview

In 2021, the U.S. Surgeon General declared a youth mental health crisis as grief, trauma, and isolation related to COVID-19 escalated the already worsening mental health of youth in the U.S. (Murthy 2021). According to the 2019 Durham County Youth Risk Behavior Survey (YRBS), 32% of middle school students and 35% of high school students reported feeling depressed in the past year (Davis, 2019). Impacts of poor mental health in youth include low emotional stability, a higher likelihood of engaging in risky behaviors, behavioral problems in school, and harmful impacts on academic achievement (Agnafors et al., 2021). Resilience to stress is a critical protective factor for mental health (Song et al., 2020). Addressing youth mental health is of strong local interest in Durham County as evidenced by 2020 Durham County Community Health Assessment (DCPHD et al., 2021). Results from Durham County's 2017 YRBS data found 13% of Black students and 17% of Latino students reported attempting suicide compared to 4% of White students, indicating disparities in mental health are present among Durham County's students. (DCPHD, 2019). Durham's sizable population of Black and Latino students are particularly vulnerable to the negative cycle of financial inequity, resource disparities, and health consequences which can disrupt development and hinder an individual's ability to cope with stress (DCPHD, 2021).

Programs to address food insecurity present an unconventional yet critical tool in the promotion of mental health in youth, as access to healthy foods is essential for healthy mental, emotional, and behavioral development and resilience to stress (Helton et al., 2019; NASEM et al., 2019). Lack of access to food poses a significant threat to youth mental health. Negative mental health outcomes in teenagers associated with food insecurity include risk of anxiety, irritability, depression, bipolar disorder, and suicidality in teenagers (Hanks, n.d.). However, food insecurity affects residents of Durham County differently. In 2020, food insecurity among Black residents was 21%, and 19% among Latino residents compared to 7% among White residents in Durham County, clearly indicating that Black and Latino populations in Durham County experience disproportionately food insecurity (Feeding America, 2020a; Feeding America, 2020b; Feeding America, 2020c). We hope to implement food security interventions to improve youth mental health and resilience in Durham County, targeting the inequities among Black and Latino students.

Policy and Programmatic Changes

Fund Free School Lunches via the Community Eligibility Provision in Qualifying Durham Public Schools

Free and reduced school lunches are an evidence-based approach to improving youth resilience to stress by lowering mental distress associated with food insecurity and equipping youth with the nutrition needed to learn, socialize, and cope with everyday challenges (NASEM, 2019). We recommend County Commissioners allocate funding to incentivize and support participation in the Community Eligibility Provision (CEP) for all willing and eligible Durham Public Schools (DPS). Part of the National School Lunch Program (NSLP), CEP is a voluntary federal program designed to provide universal free lunch to all students at qualifying low-income schools (e.g., schools wherein at least 40% of students are eligible for other federal means-tested food programs, such as the Supplemental Nutrition Assistance Program (SNAP) or Temporary Assistance for Needy Families (TANF) (USDA, 2016). CEP participation is an evidence-based approach for decreasing food insecurity, which has a significant impact on mental health and resilience to stress (NASEM, 2019). Adopting CEP will allow all students at qualified schools to have universal access to free meals with support from federal reimbursements. County funds would support both early program implementation and resource schools to cover outstanding costs in cases of insufficient federal reimbursement (USDA, 2016; Landry & Simmons, 2022).

Eligible DPS would adopt CEP as a group, as groupings of schools benefit from expanded involvement for near-eligible schools as well. (USDA, 2016). Advantages of providing free lunch include higher utilization of school meals and a lower likelihood of stigma and bullying for students facing food insecurity. CEP also reduces administrative burden for low-income parents by waiving the requirement for individual household meal applications as CEP eligibility data is automatically sourced from eligibility for other national means-tested food programs (e.g. SNAP or TANF) (FRAC, 2023; Martinelli et al. 2022; NC DPI, 2023;). The evidence base for CEP adoption shows improvements in attendance, behavior, and academic performance for students, as well as reductions in documentation burden and unpaid meal debt for schools (Bipartisan Policy Center, 2022; Schwartz & Rothbart, 2020; Zerbino & Franco, 2022).

Expand Free School Lunch to All Durham Public Schools

In addition to the above CEP policy, we recommend the County Commissioners fund a free school lunch (FSL) program in all remaining DPS to increase food security and promote public health. The success of FSL programs in European countries and some US states, as well as the positive impact of a universal free meal (UFM)

program in Maine during the COVID-19 pandemic, supports this recommendation (Cohen et al., 2021; Cohen et al., 2022). Analysis of data from schools that participated in the CEP found that lower costs for a UFM program can be achieved without compromising the nutritional quality of the free meals provided (Long et al., 2021). Behavioral outcomes associated with free meal programs include reduction in hyperactivity, anxiety, depression, and a reduced surge in disciplinary infractions at the end of the month when SNAP benefits are typically depleted (Hanks, n.d.).

An FSL program in all DPS would increase food security among our population of interest by minimizing stigma and promoting food security for entire households by reducing household food costs (Cohen et al., 2021; Marcus & Yewell, 2022). Additionally, administration burden will be lowered, and producing greater quantities of meals is more cost-effective (Landry & Simmons, 2022; Long et al., 2021; Martinelli et al., 2022;). The federal reimbursement structure for school meals may result in higher reimbursement from an increase in meals served, offsetting some of the program costs (Cohen et al., 2021; Long et al., 2021). We recommend the County Commissioners allocate additional funding to DPS to subsidize the costs associated with implementing the program. In summary, expanding an FSL program to all DPS has the potential to improve public health outcomes, increase food security, and reduce school administrative burden and costs. The evidence of success in other communities supports the potential impact of this program.

Community Partners

The community partners that will be involved are food insecure DPS students, school district administration, DPS nutrition services, DPS teachers, and the DPS Parent-Teacher Association (PTA). These five potential partners have diverse interests and resources that can enhance the FSL program. Food insecure students have lived experience with food insecurity and most directly benefit from this intervention. They can provide powerful insight into their specific struggles with food insecurity and how FSL can best address them. Their role will be to inform and guide the program. To address privacy concerns, high school students will anonymously respond to a survey about food insecurity. These findings will be shared with pertinent community partners. Surveys will not be distributed to middle school or elementary school students for increased privacy and better clarity of responses. The school district administration oversees the overall function of the schools and can help implement new programs. They also have critical first-hand experience working with students and nutrition services. DPS nutrition services will help to select and provide nutritionally compliant food to the students. Nutrition services will be essential for advising what economic and logistics changes are necessary for FSL for all students. DPS teachers

are critical front line community partners for this program. Teachers interact with the students and can see first-hand the effects of various stressors in students' lives. The DPS PTA is also a potentially powerful ally. Their influence on policies to be implemented, interest in school programs, and overall connection to school administration and other community partners make them a cornerstone partner for this program. They can liaise with all the aforementioned partners and serve as strong advocates for the program.

Budget

Qualified DPS can expect to reduce food insecurity and stress for low-income students while providing nutrition to support healthy development by adopting CEP. The CEP program will be primarily funded by the federal government, with a substantial quantity of meals reimbursed at the generous federal "free" rate. County Commissioners will need to appropriate \$6,163,878 in overall funding to support Durham Public Schools in CEP program implementation, which includes staff costs, program costs, and revenues. Though the proposed program has operational components, most of the proposed county-level funding will act as a financial reserve for schools to use in cases wherein meal costs exceed federal reimbursement amounts, thus encouraging qualified schools to adopt CEP. If applying as a group, 14 Durham Public Schools are estimated to adopt CEP, thus providing free lunches for approximately 9,716 students.

Engagement and Accountability Plan

We plan to engage with community partners using various strategies and by creating a team contract that formalizes our agreements of deliverables. The implementation team will begin by presenting 6 topics to the community partners (invitation, possibilities, ownership, dissent, gifts, and agreement/commitment) that are important to co-leading a program with a community and gauging their buy-in (Rice, 2023). The implementation team will then lead a conversation on each of the 6 topics. Once the implementation team has buy-in they will plan meetings with the community partners every 30 days. These meetings help to create early wins by setting manageable goals for the implementation team and community partners to achieve each month. This consistent engagement helps maintain enthusiasm for the project which is critical to success. Early wins create momentum and thus keep community partners excited. County Commissioners will be kept informed on all goals and achievements and will have a representative at each meeting. The implementation team will organize outreach to community partners, review policy guidance thoroughly with DPS Nutrition Services, and attend these monthly meetings. These meetings keep all community partners on the same page and act to assess progress and create next steps. Formalized

agreements help to create accountability and commitment to the project. The commitments proposed for this project include: DPS Nutrition Services agrees to provide reviewed policy guidance and be available for communication. They will also appoint a member who will attend all monthly meetings. The County Commissioners agree to review all suggestions in a timely fashion, give feedback on unapproved plans and advise further on approved plans. Finally, the implementation team agrees to establish and co-lead all meetings, plan next steps, and collaborate with each community partner on executing program deliverables.

Program & Policy Evaluation Component

Increased participation in school meals would indicate short-term success of the FSL program. Although all students will be able to partake in free school lunch with this program, not all students will elect to participate. Research on schools that offer free lunch for all students shows an average of 5-8% higher school lunch participation after implementing the free meal program (Long et al, 2021). The outcome goal after 2 years of county-wide implementation of the program is 60% student participation across DPS, which is in line with the rate of recovery from pre-pandemic participation totaling 5.2% in two years.

We will also assess the long-term outcome of improved mental health status of DPS students from reduced school lunch stigma, less stress and anxiety from food insecurity, and more nourishment (Jackson et al, 2018; Cohen, 2021). We will use a quasi-experimental pre- and post-test design to evaluate the program. All students at DPS schools will have the option to participate in FSL, so there is no control group or student randomization. The evaluation will utilize data from Durham County's YRBS, administering a survey of validated mental health and school meal questionnaires, and conducting focus groups with students and school staff.

YRBS data analysis will be limited to the select few questions about mental health including feelings of depression, considering suicide, making a suicide plan, and attempting suicide (DCPHD 2019, p. 16). To collect more supplementary data about mental health from our schools that received the implementation we will conduct a survey which combines demographic questions (including race, ethnicity, gender identity, and year in school), a school meals survey designed by the nonprofit No Kid Hungry, and the depression and anxiety subscales from the Revised Child Anxiety and Depression Scale (RCADS). These surveys were specifically designed for children and adolescents to evaluate their mental health and perceptions about the desirability and stigma around school meals (CORC, n.d; No Kid Hungry by Share Our Strength, 2022). In addition, two types of focus groups will collect qualitative data from students and staff on how the program is received and any areas for improvement specific to

DPS circumstances. This complementary, mixed methods evaluation will provide robust insights about the mental health and equity implications of free school lunch in Durham.

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APPENDIX: 1.1.a: PRESENTATION TO COUNTY COMMISSIONERS

Slide 1:
(Haley)



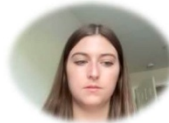
Increasing access to free school lunches in Durham Public Schools, NC to address youth mental health disparities via reducing food insecurity stress

Sarah Dressel, Kai Larson, Lisa Pham, Rachel Smith, and Haley Williams



My name is Haley Williams, my other group members are Sarah Dressel, Kai Larson, Lisa Pham, and Rachel Smith. We are proposing Increasing access to free school lunches in Durham Public Schools, NC to address youth mental health disparities via reducing food insecurity stress.

Slide 2
(Haley)



We will provide a brief background and analysis before discussing our proposed policy and budget, nutrition program, community partners, engagement and accountability, and program evaluation.

Slide 3-5:
(Haley)

Background and Social Determinant of Health Analysis

Social and Community Context¹
Has a significant impact on health outcomes across the lifespan

Resilience to Stress
is a critical protective factor for mental health²

Impacts of Poor Mental Health in Youth³

- Low emotional stability
- Higher likelihood of engaging in risky behaviors
- Poorer academic achievement

Priority for Durham Co.⁴
Listed as one of top 5 priorities in 2020 Community Health Assessment

Background and Social Determinant of Health Analysis Youth Risk Behavior Survey⁵

Disparities in mental health in Durham Co. students⁵

Black and Latino students particularly vulnerable to negative cycle of financial inequity, resource disparities, health consequences⁴

Inequities described above can hinder the ability to cope with stress⁴

Race	Percentage
Black	13%
Latino	17%
White	4%

Background and Social Determinant of Health Analysis Food Insecurity

Healthy Foods
Access to healthy foods is essential for healthy mental, emotional, and behavioral development and resilience to stress^{6,7}

Impacts of food insecurity on mental health⁸
Anxiety
Depression
Suicidality
Bipolar Disorder
Irritability

Food Insecurity in Durham County

Race	Percentage
Among Black Residents ⁹	21%
Among Latino residents ¹⁰	19%
Among White residents ¹¹	7%

As the Durham County commissioners recognize, social determinants of health play a major role in health outcomes. The social and community context one lives in is a main SDOH and has a great impact on health across the lifespan. Resilience to stress is a critical protective factor for mental health. In 2021, the U.S. Surgeon General declared a youth mental health crisis as grief, trauma, and isolation related to COVID-19 escalated the worsening mental health of youth in the U.S. Impacts of poor mental health in youth include low emotional stability, a higher likelihood of engaging in risky behaviors, and harmful impacts on academic achievement. Addressing mental health is of strong local interest in Durham County: it was listed as one of the top 5 priorities in the 2020 Durham County Community Health Assessment. Results from Durham County’s 2017 YRBS data found 13% of Black students and 17% of Latino students reported attempting suicide compared to 4% of white students, indicating disparities in mental health are present among Durham County’s students. Durham’s sizable population of Black and Latino students are particularly vulnerable to the negative cycle of financial inequity, resource disparities, and health consequences which can disrupt development and hinder an individual’s ability to cope with stress. Access to healthy foods is essential for healthy mental, emotional, and behavioral development and resilience to stress. Anxiety, depression, and suicidality are some negative mental health outcomes associated with food insecurity among teenagers. However, food insecurity affects residents of Durham County differently. In 2020, food insecurity among Black residents was 21%, and 19% among Latino residents compared to 7% among White residents in Durham County, clearly indicating that Black and Latino populations in Durham County experience disproportionately more food insecurity. Food security programs present an unconventional yet critical tool in the promotion of mental health in youth.

Slide 6:
(Rachel)

POLICY: Encourage CEP adoption in Durham Public Schools

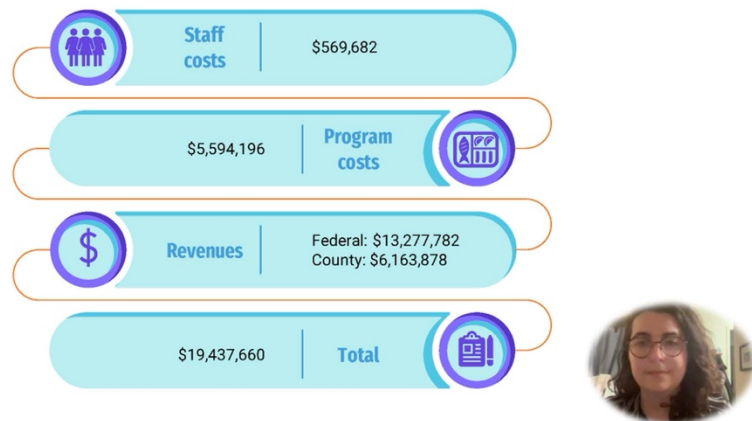


The national Community Eligibility Provision (CEP) aims to reduce childhood malnutrition by serving universal free lunch to students in qualified schools (schools in which 40% or more of the student body qualifies for a federal nutrition program such as SNAP or TANF). By adopting CEP, qualified Durham Public Schools (DPS) can expect to reduce food insecurity and stress for low-income students while providing nutrition to support healthy development. CEP increases participation in free meal programs by reducing barriers that occur in more traditional programs. For example, compared to the National School Lunch Program (NSLP), students, parents, and schools participating in CEP could see reductions in socioeconomic stigma, administrative burden, and financial strain. CEP-adopting schools would no longer need to charge students for meals or process free and reduced lunch applications. Despite generous federal reimbursements, adopting CEP can be financially burdensome to schools; we thus chose to present an incentive rather than a mandate to encourage adoption. Due to the potential for this financial burden, we suggest the County Commissioners appropriate funds to supplement meal costs, both to compensate for any losses schools might sustain and to prepare for the typical five percent increase in participation seen in CEP adopting schools. Further, in providing an incentive rather than a mandate 1) we hope to be consistent with federal requirements, under which individual schools can elect CEP participation and 2) the Durham Board of County

Commissioners typically funds such school efforts. To address program goals, we will employ a cross-functional team that follows CEP implementation best practices such as funding for marketing and outreach to parents.

Slide 7:
(Rachel)

3-Year Budget



The CEP program will be primarily funded by the federal government, with a substantial quantity of meals reimbursed at the generous federal “free” rate. County Commissioners will appropriate a total of **\$6,163,878** in funding overall to support Durham Public Schools in CEP program implementation. Though the proposed program has operational components, most of the proposed county-level funding will act as a financial reserve for schools to use in cases wherein meal costs exceed federal reimbursement amounts, thus encouraging qualified schools to adopt CEP. We will employ a cross-functional team to coordinate group efforts across new CEP-adopting schools to manage program implementation, oversight, and marketing. If applying as a group, 14 Durham Public Schools are estimated to adopt CEP, thus providing free lunches for approximately 9,716 students.

- There are three main components to the budget: **staff costs, program costs, and revenue.**
- **Staff costs:** Staff will conduct program operations, analysis, and communications. Staff costs total at \$569,662, with salaries and training costs aligned with market rates.
- **Program costs:**
- **Program costs: The CEP adoption award** is an incentive provided for newly adopting CEP schools in their first two years of adoption. Each school will receive \$10,000 annually for the two years. Award funding will be earmarked for improving the school’s nutrition program in order to optimize student participation and outcomes ([USDA 2016](#)).
- **The County Meal Support Stipend** is the CEP difference, or the projected difference between expected yearly county **meal expenditures and expected federal reimbursement.**
- Each staff member will receive a business laptops.
- Revenue:
- **Federal:** We use the federal free and paid rates, as well as CEP implementation guidance, to calculate anticipated federal funding ([USDA 2016](#)). Projected annual federal funding for program reimbursement totals to \$13,273,782.
- **County:** County funding encompasses the *CEP difference* (calculated above under County Meal Support Stipend) and all other program and staff costs, reaching a total of **\$6,163,878.**

Slide 8 and 9:
(Sarah)

Nutrition Program: Free School Lunch for Durham Public School Students

- Durham County Commissioners fund free school lunch for all students in the 37 DPS schools that don't currently have CEP
- ⬆️
 - Increase food security for Durham families
 - Increase school meal usage by students
 - Improve public health outcomes
- ⬇️
 - Serving all students decreases stigma of poverty
 - Decreased administrative burden for schools
- ⬇️
 - Reduced hyperactivity, anxiety, depression
 - Fewer disciplinary infractions



Free School Lunch for All Program Implementation

- Management Director
- School Nutrition Directors from each school
- DPS Administration
- Public health nutritionists and RDs
- Durham County Commissioners Budget Reallocation
- State funding
- State and federal grants
- Private donations
- Students involved in menu planning
- Social media, emails, fliers during school enrollment period
- In-classroom announcements by teachers
- 18 schools launch year 1
- Challenges addressed in summer
- 19 schools launch year 2



Alongside the CEP policy, we recommend that Durham County fund free school lunches for all students in the remaining Durham Public Schools. This program will further increase food security in a way that destigmatizes school meals, increases their usage by students, and ultimately improves Durham youth public health outcomes. Free school lunch for all students has made a positive impact at the city level in New York City public schools and the state level, most recently becoming permanent statewide in Maine. These successful programs show increased participation in the school meals program and increased food security for entire households as they reduce household food costs. Although this program would reach beyond targeting Durham’s Black and Latino residents who may benefit more from increased food security, it is a more effective approach for reaching them as it minimizes the “othering” and underlying stigma of poverty for students who need it. Free school lunch is associated with a variety of positive mental health and behavior outcomes for students including reduced hyperactivity, anxiety, depression, and fewer disciplinary infractions at the end of the month when SNAP benefits are usually depleted. The school system will also benefit from the program as there is significantly less paperwork and administrative burden for schools since individual families no longer need to apply and be evaluated for free and reduced lunch status. Additionally, producing a higher quantity of meals is more cost effective, and the federal reimbursement structure for the national school lunch program may reimburse at a higher level for more meals served, offsetting some program costs. Alongside these reimbursements and funding from the Durham County budget, relevant grants and state funding can be pursued by the program implementation team to bolster funding, including the National School Lunch Program Equipment Assistance Grant, as well as external funding. We recommend expanding free school

lunch to the 37 schools that do not currently offer this in two waves, half in the first year and the other half in the second year with the summer in between used to make any adjustments before the second roll out like addressing unforeseen challenges and areas for improvement. Staff from the nineteen schools that already have a free meal program will be utilized as knowledge experts to help with training other staff and orient the planning process at all stages.

Slide 10:
(Kai)

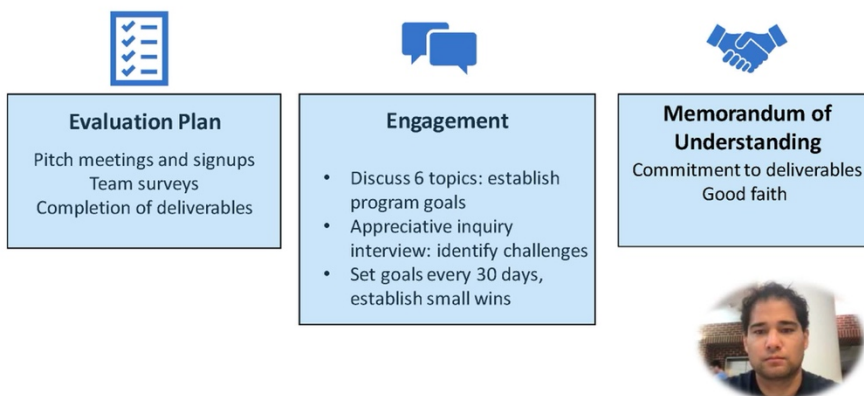


We have chosen the following community partners to help us achieve transformational change: DPS Nutrition Services, DPS Students, DPS Teachers, DPS Parent-Teacher Association, and DPS District Administration. This roster of partners helps us to address many facets of our program. Each partner brings their own unique expertise, knowledge of leverage points, and connections to push this initiative to where it needs to be.

9:26

Slide 11:
(Kai)

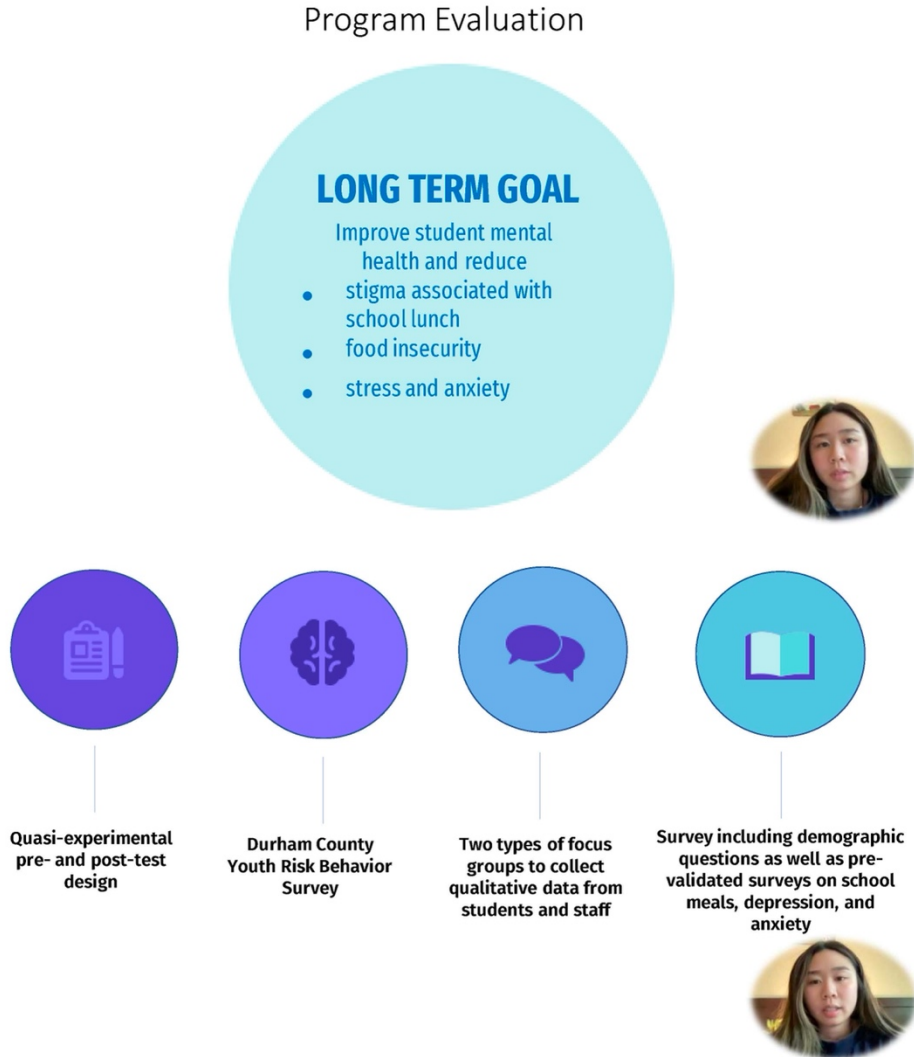
Engagement and Accountability



We will engage with our partners using various tools to create a strong coalition and working relationship. These tools include the six conversations, in which we discuss 6 topics with our community partners that help to establish goals and objectives for our program, appreciative inquiry interviews where we dive further into identifying what issues need to be addressed, and the 30/30 method which establishes early wins through setting small goals to

achieve every 30 days along with monthly check-ins. Our ultimate commitment to each other will be written into a memorandum of understanding which outlines what a good faith working relationship looks like for us.
10:07

Slide 12-13:
(Lisa)

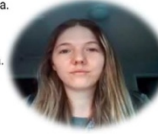


Our goal is to evaluate the outcomes of the program, with a focus on student mental health and school meal participation rates. Our long-term goal is to improve student mental health and reduce the stigma associated with school lunch, food insecurity, and stress and anxiety. To evaluate this goal, we will use a quasi-experimental pre- and post-test design to evaluate the program's impact on students' mental health. We will utilize the Durham County Youth Risk Behavior Survey (YRBS). Also, conduct two types of focus groups to collect qualitative data from students and staff on how the program is received and any areas for improvement specific to DPS circumstances. To supplement this information, we will perform a survey including demographic questions as well as pre-validated surveys on school meals, depression, and anxiety. Our evaluation will provide robust insights into the mental health and equity implications of free school lunch in Durham. We hope our findings will support the continued implementation and improvement of the FSL program in DPS.

Slide 14:
(Sarah)

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CHAPTER 2: SARAH DRESSEL'S INDIVIDUAL DELIVERABLES

Section 2.1: Social Determinant of Health Analysis

Social Determinant of Health: Mental, Emotional, and Behavioral Health of Children

The impact of nurturing the mental, emotional, and behavioral (MEB) health of children and adolescents ripples out through both the individual's lifespan and into the greater community. These formative years place individuals on a trajectory that can either predispose them toward risky behaviors or healthy behaviors. Healthy MEB development is assessed by an individual's social and emotional competence which affects their ability to have a productive life and create meaningful relationships (NASEM 2019, p. 31). Negative influences during this critical life stage can lead to a variety of poor health outcomes in the immediate and long term. Adverse childhood experiences (ACEs) are a large disruptor of healthy MEB development and consist of various types of trauma including physical, sexual, and emotional abuse and neglect (NASEM 2019, p. 47). In the short-term, ACEs are correlated with more risk-taking behaviors, social rejection, and the association with peers who engage in illegal or unhealthy activity (i.e. stealing, smoking, substance use etc.) (NASEM 2019, p. 47). The long-term harmful effects of ACEs are caused by the toxic stress they induce which changes brain development in children and adolescents and how their bodies respond to stress (CDC, 2019). These developmental changes manifest as problems in adulthood as the effects compound over time and contribute to poor health outcomes later in life including depression, suicide, substance abuse, cardiovascular disease, autoimmune disorders, sustained inflammatory processes that can trigger disease, and premature death (NASEM 2019, p. 47-48). The more ACEs one has, the higher their individual risk of experiencing one or more of these negative health outcomes. The CDC emphasizes how reducing ACEs could have a sweeping impact on many health conditions, as five of the top ten causes of death are associated with ACEs (2019). In particular, preventing ACEs could reduce depression in adults by as much as 44% (CDC, 2019).

Geographic and Historical Context

Durham, North Carolina is a growing community that values healthcare and education as its major industries. The population has grown over 16% since 2010, significantly passing the state's 10% growth (DCDPH 2021, p. 40). The community is well-educated, with at least 70% of residents having received at least some college education (DCDPH 2021, p. 42). Despite this, 13.4% of residents live in poverty and one quarter were at or below 200% of the federal poverty level as of 2019 (DCDPH 2021, p. 108). About 20% of residents are children and youth under 18, in the crucial window to be impacted by ACEs (US Census Bureau, 2022). There is an established link between poverty and ACEs, and children living in poverty are at higher risk of experiencing one or multiple ACEs (DCDPH 2021, p. 109). Although trending down, about 20.6% of the children in Durham were living in poverty in 2021, a higher prevalence than is experienced by adults in Durham (Data USA, nd). 36.5% of Durham's population consists of Black residents, which is a more than 10% higher proportion than both the state and neighboring Wake County (see Table 1 for comparison) (DCDPH 2021, p. 23). Historic enslavement, discrimination, and segregation of Durham's Black communities have all contributed to the persistent higher prevalence of poverty in this community today (18.4%) compared to the white population (10.5%), resulting in a higher exposure to ACEs (DCDPH 2021, p. 110). Years of policies and practices in redlining, lack of community investment, and exclusion from intergenerational access to capital have resulted in this disparity (DCDPH 2021, p. 110). It is imperative the cycle is interrupted from children going on to experience the associated adverse effects of poverty like ACEs at a higher rate. Fortunately, the Durham County Department of Public Health has brought attention to this connection in the 2020 Durham Community Health Assessment. Two organizations making strong headway on these issues are the Durham ACEs and Resilience Taskforce and Durham TRY, both working toward making Durham a resilient community with equitable approaches to prevent and respond to toxic stress and trauma (2021, p. 111-112).

Priority Population

Given these historic and present-day disparities along with the sizable population in Durham, strategies that will prevent and reduce ACEs for Black children should be prioritized. More specifically, emphasis should be on the period of puberty and adolescence as this is a time of rapid biological change when an individual's neural development is active and receptive to interventions (NASEM 2019, p. 42). While birth to three is a similarly sensitive period of development, a concerted effort is already being made in Durham to better serve this demographic. Durham County's release of the Durham Early Childhood Action Plan in 2019 marks the first county

in the state to create county-specific strategies to strengthen systems to help children aged 0-8 to thrive and address disparities, and a parallel effort is needed to serve adolescents as well (Allen, 2021).

The COVID-19 pandemic also served as a significant disrupter to learning and socialization for all age groups from 2020-2022, increasing risk for ACEs further. Even prior to the pandemic, major depressive episodes among youth aged 12-17 increased from 9% in 2004-2007 up to 15% in 2016-2019 (DHHS 2020, p. 6). Short-term mental health consequences like depressive episodes could be a result of adolescents experiencing ACEs, and this group has only increased in their vulnerability.

Measures of SDOH

As of 2017, almost one in four children in North Carolina experienced two or more ACE's (NCIM, 2020). Black people are the single largest racial group experiencing two or more ACEs in the state at 36% (see Graph 1) (NCIM, 2020). Up to 71% of children at or below 200% of the federal poverty line in the state have also experienced two or more ACEs (NCIM, 2020). Prioritizing the prevention and reduction of ACEs in Durham's Black communities is in line with the Healthy North Carolina 2030 goal to reduce the number of children with two or more ACEs down below 18% (NCIM, 2020). There are 31 states with a lower percent of children with two or more ACEs than North Carolina (NCIM, 2020).

Rationale/Importance

Adolescence is a vulnerable and impactful time for mental, emotional, and behavioral development. Preventing the short- and long-term detrimental effects that ACEs could have on disrupting the MEB development of Durham's young Black community will not only help them thrive as members of society but increase their years of economic productivity that aren't hindered by chronic diseases or poor mental health. Focusing on this group will help interrupt the negative cycle of financial inequity, resource disparities, and health consequences by targeting the toxic stress piled on by ACEs that hinder an individual's ability to cope. The Durham County Community Health Assessment has taken the first step in acknowledging this key connection and opportunity for intervention with its creation of a Durham ACEs and Resilience Task Force. The goal of this group is to prevent and overcome the impact of ACEs, and our intervention will build on this purpose and important community resource (DCDPH 2021, p. 230).

Disciplinary Critique

A registered dietitian nutritionist plays an important role in supporting MEB development because nutrition plays a critical role in advancing this process. Food insecurity could be an ACE itself resulting in hunger and nutrient deficiencies that impair development. This could lead to a harmful intergenerational cycle if this ACE exposure leads to poor mental health outcomes like chronic depression, which makes finding and preparing food with proper nutrition to support oneself and their family even more difficult. A dietitian's knowledge of resources like federal nutrition assistance programs, state-level and nonprofit nutrition support resources, and food insecurity assessments should be considered and integrated into any ACE prevention intervention.

APPENDIX 2.1.a: SOCIAL DETERMINANT OF HEALTH ANALYSIS TABLE

Table 1: 2020-2021 State and County Comparisons of Race, Poverty, and Food Insecurity (Table 1)

	Durham County, NC	Wake County, NC	North Carolina
Black or African American	35.9%	21%	22.3%
Persons in poverty	13.4%	8.52%	13.4%
Children in poverty	20.6%	9.4%	19.3%
Proportion of Black or African American Persons in Poverty (Compared to white persons)	18.4% (10.5%)	14.7% (6.7%)	21.2% (9.6%)
Food insecure	13.5%	10.4%	14%

(Data USA, n.d.; U.S. Census Bureau, 2022)

Section 2.2: Nutrition Program Analysis and Implementation

Introduction

The social and community context of an individual consists of the relationships they develop with others in their home and community, which play a fundamental role in nurturing their mental, emotional, and behavioral (MEB) health (Office of Disease Prevention & Health Promotion, n.d.). This important social determinant of health can be disrupted by adverse childhood experiences (ACEs), including abuse, neglect, violence, and household instability (NASEM 2019, p. 47). ACEs can negatively affect a child's brain development through exposure to consistently high levels of serious, lasting stress, which is also known as toxic stress when the child's body cannot turn off the stress response (Center for Youth Wellness, 2018). This exposure to toxic stress is associated with poor mental health outcomes in both the short and long term (CDC, 2021; Mwachofi et al, 2020; Petrucci et al, 2019). ACEs can contribute to an intergenerational cycle of poor MEB development that compounds with other factors like racism and poverty (NASEM 2019, p. 66). North Carolina residents have a higher prevalence of ACEs than most other states, with 31 states containing a lower percentage of children with two or more ACEs (NCIM, 2020). Durham's sizable population of Black and Latino students are particularly vulnerable to the negative cycle of financial inequity, resource disparities, and health consequences that can be brought on by the toxic stress from ACEs which disrupts development and hinders an individual's ability to cope with that stress (DCDPHD, 2021). Prioritizing the prevention and reduction of ACEs in Durham's Black and Latino communities aligns with the Healthy North Carolina 2030 goal to reduce the number of children with two or more ACEs down below 18% (NCIM, 2020). Prevention strategies are needed to help children develop a resilience against these risks for multiple long term mental health consequences (NASEM 2019, p. 4).

Evidence-Based Nutrition Program: Free School Lunches in Durham Public Schools

Adequate nutrition is a critical part of childhood development, and household food insecurity interferes with healthy MEB development (NASEM 2019, p. 190). Food insecurity is defined by the United States Department of Agriculture as "a household level economic and social condition of limited or uncertain access to adequate food" (USDA, 2022a). ACEs are associated with higher odds of food insecurity, and the cumulation of ACEs is strongly associated with moderate to severe food insecurity (Jackson et al, 2019). Food insecurity can be considered an ACE itself, as this deprivation in childhood could cause nutrient deficiencies and brain injuries that impair development (DCDPHD 2021, p. 109). Additionally, food insecurity can also be a cause of ACEs, leading to more violence in the

home (Jackson et al, 2019). Recent prospective studies have shown that persistent food insecurity creates a significantly increased risk of experiencing exposure to violence and victimization at home (Helton 2018; Jackson et al, 2018). Some researchers surmise that the chronic psychological stress of food insecurity and lack of food are types of deprivation beyond other aspects of poverty that cause parents to respond with more frequent aggression toward their children (Helton, 2018). While there are a complex variety of factors that lead to ACEs, access to food is a basic, critical need that should be addressed in the prevention of child maltreatment and promotion of developmental resilience (Helton, 2019). Providing food-insecure families with more food directly improves this issue in a practical way with preexisting mechanisms that will impact a family beyond their immediate food security status (Helton, 2019). Targeting food access is an important component of reducing the prevalence of ACE exposures and bolstering the MEB development of the child (Helton, 2019).

This is a critical issue for Durham County and North Carolina for which food insecurity rates are higher than the national food insecurity rate (DCDPHD 2021, p. 171; USDA, 2022b). Almost one fifth of children in Durham are food insecure (Feeding America, 2020b). Black and Latino populations in Durham have a higher prevalence of poverty and experience more of its negative effects including more ACEs and food insecurity (DCDPHD 2021, p. 110). The problem of food insecurity impacted 11.3% of the residents in Durham County in 2020, and the Black and Latino populations in Durham County were disproportionately affected with a prevalence of 21% and 19% in those communities respectively (Feeding America, 2020a; Feeding America, 2020c; Feeding America, 2020d).

To combat food insecurity, we propose serving free school lunches in Durham Public Schools (DPS) for all students. It is well established that free school lunch reduces food insecurity and improves nutrition in children, and establishing this program would foster healthy MEB development in DPS students (NASEM 2019, p. 190 & 192). Free school lunch provides two main avenues of sustained support for families experiencing food insecurity to prevent and treat this trauma and build resilience (Jackson et al, 2019). First, it provides financial support by removing the cost burden of the meals, and second it delivers immediate access to food (Jackson et al, 2019). The impact of this intervention extends into the child's household as the savings it accrues for the family can increase their purchasing power for other foods and foster food security for the entire household (Cohen et al, 2021). During the nationwide free school lunch expansion period in 2020 (that has since been rolled back) one mother found she saved \$125 per child that year which made a significant impact on their family budget (Sutherland and Chakrabarti,

2022). This program also reduces paperwork and administrative costs by eliminating the household application and tracking of unpaid meal charges (FNS, 2022a). In a study examining the impact of free school meals for all in Maine, there was a significant increase in school meal participation and a reduction in perceived stigma of school meals for students in lower-income households (Cohen et al, 2022). This stigma reduction found in Maine makes free school meals a more appealing program option over a program targeting the priority population as it indicates higher utilization by the vulnerable students who need it the most (Cohen et al, 2022). In a qualitative review of students' perspectives on participating in free school meals, one element students considered was social acceptability and stigmatization, further emphasizing stigma as an important element to consider (Mauer et al, 2022).

Evidence Based Outcomes

The short-term outcome that will indicate immediate increased access to food for the students is participation in the free school lunch program. Although all students will be able to partake in free school lunch with this program, not all students will elect to participate. Research on schools that offer free lunch for all students show an average of 5-8% higher school lunch participation after implementing the free meal program (Long et al, 2021). As of the 2022-2023 school year, 54.8% of students in DPS participate in the free or reduced school meals program (DPS, 2023). This is lower than participation before the COVID-19 pandemic which sharply reduced participation, and a full comparison of participation rates since 2019 can be found in Table 1 of the Appendix (DPS, 2019). The outcome goal after 2 years of county-wide implementation of the program is 60% student participation across DPS, which is in line with the rate of recovery from pre-pandemic participation totaling 5.2% in two years. This is also a reasonable outcome based on results from other free school lunch program participation increases.

The long-term impact will likely be a decrease in poor mental health outcomes in students which will be measured using the Youth Risk Behavior Survey (YRBS) results in Durham County. Free school lunch contributes to mental health by reducing anxiety and stress related to food insecurity and reducing the stigma around consuming school meals (Cohen, 2021; Jackson et al, 2018). The adverse mental health outcomes considered on the YRBS include feelings of depression and plans around suicide (CDC & DCoDPH, 2019). Additionally, the YRBS already includes racial stratification of data in the analysis, allowing us to use the existing YRBS structure to assess the program's effect on MEB outcomes among Black and Latino students (DCPHD, 2019). The YRBS is an appropriate choice to measure this outcome as it is a robust dataset that is consistently maintained by the CDC and has

undergone two reliability studies and other psychometric testing by independent parties confirming the general validity of the data (CDC, 2013).

Evidence Based Implementation Strategies and Activities

We will model the implementation of this program after the USDA's Community Eligibility Provision (CEP), which allows qualifying schools to serve breakfast and lunch at no cost to all students, by extending free lunch to all 56 schools in the Durham Public School system (FNS, 2022). Currently 19 schools in Durham participate in CEP and will serve as the knowledge experts and models for scaling and budgeting the food production logistics (NCDHHS, 2021). We will apply lessons learned from the statewide policy extension of free school meals in Maine, which passed once the national policy ended for the 2022-2023 school year, and from New York City's universal free lunch campaign (Cohen et al, 2022; Watts et al, 2021).

The program implementation will occur across two years, with the first group of 19 schools participating in year one and the remaining 18 joining in year two. This approach follows a prototyping model to allow for any necessary adjustments (Lister et al, 2017). This strategy is feasible because free school lunch was temporarily offered in all North Carolina public schools during two years of the pandemic, therefore the schools have a foundational understanding of what is needed to scale up their program. However, we will split the implementation across two years in case there are any significant challenges or resource gaps ascertained from the first group of schools that need to be addressed before finalizing the program throughout the school system.

Funding will be secured from a combination of public and private sources at multiple levels. County funding will be pursued through budget reallocation to increase Durham Public School funding for the 2023-2024 fiscal year for this program. The federal reimbursement for free school lunch, which is based on the number of meals served, will also be a major funding source to offset food costs (FNS, 2022b). The current reimbursement rate for free lunch is \$3.93 per meal served compared to only \$0.37 for each paid lunch (FNS, 2022b).

Data on meal usage, budget and cost, and student perceptions will be collected throughout the program implementation through school site visits and student focus groups. The existing electronic record-keeping food service management and service systems will be used to collect meal usage and financial data.

A core implementation management team will be hired to scale and lead the program. A management director with experience as a school nutrition director will lead the team and oversee the school nutrition directors and foodservice managers of participating schools. This group will assess staffing needs, hire additional food service

personnel, create operating procedures, create promotional materials to bolster the demand for meals, and ensure they continue to meet the nutrition standards for the state of North Carolina. Existing equipment will be inventoried by food service staff in the schools and equipment that is missing or needs replacement will be purchased and installed.

Our implementation will include a marketing element to reduce school lunch stigma and encourage higher rates of participation. Flyers about the change and information about the free school lunch program will be delivered to all parents/guardians via email, post mail, announcements at events attended by parents, and during the school enrollment process. Teachers and principals will also be responsible for announcing free school lunch multiple times near the beginning of the school year. Participation rates have shown to be higher when principals and teachers demonstrate support for the school lunch program (Watts et al, 2021). Emphasis will be placed on the fact that there is no application or income documentation required to participate and no separation of students in cafeteria lines which are typical barriers that contribute to school lunch stigma (Watts et al, 2021).

Our priority population of Black and Latino students comprise a significant majority (72.8%) of DPS' student population, or about 22,660 individuals (DPS, 2022b). This inclusive approach reduces the stigma of free school meals by eliminating the separation of students by income in the cafeteria (Watts et al, 2021). Normalizing free school meals for all removes the school food program's poverty stigma that can stifle participation and magnify food insecurity (Watts et al, 2021).

This program is impactful at multiple levels of the socio-ecological framework, which is fully detailed in Graphic 1 of the Appendix.

Stakeholders

Our primary stakeholders are students in Durham Public Schools who will be participating in the program. School foodservice staff and school administration will also be significantly impacted as they are the group largely responsible for implementing the program. See Table 2 in the Appendix for additional key external stakeholders and for a breakdown of each group's role and involvement.

Budget

Sufficient funding is necessary to ensure the long-term success of this program, and financial sustainability was a concern raised by foodservice staff at schools in Maine (Cohen et al, 2022). However, there is evidence indicating lower costs can be achieved for free school lunch while maintaining nutritional quality (Long et al, 2021).

The federal reimbursements for meals are based on school lunch participation and reimbursement rates are much higher for free meals than paid meals (FNS, 2022b). Multiple studies analyzing the expense and revenues at CEP participating schools show that although food service revenues decline by providing more free meals, the increased federal funds compensate for this, and schools spend less per meal (Long, 2021; Rothbart et al, 2020). See Table 3 in the Appendix for a full breakdown of expenses.

Conclusion

Free school lunch directly addresses the problem of food insecurity, which can be both an ACE and a cause of ACEs. There is also an existing structure for free school lunch already in place in one third of schools that can serve as a model and support for this program so the focus can be on optimizing the program quality and budget rather than building a new infrastructure. The remaining schools also had some exposure to this model during the pandemic when school lunch was temporarily free nationwide. We have prioritized increasing the scope of the intervention to include students beyond the priority group since stigma is an important consideration for food access (Cohen et al, 2022). The upfront investments of cost and time required in staffing, scaling the foodservice operations, and acquiring new equipment to meet higher demand are the main challenges. Although this intervention is not specifically targeted toward Black and Latino students, the value of inclusion remains central as this approach will help reduce social othering and stigma that will encourage participation of our priority population.

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APPENDIX 2.2.a: POLICY ANALYSIS FIGURES AND TABLES

Table 2: Free and Reduced School Lunch Participation in Durham Public Schools (Table 1)

Year	Participation (%)	Source
2019-2020	64.46%	(Durham Public Schools, 2019)
2020-2021	51.65%	(Durham Public Schools, 2020)
2022-2023	54.8%	(Durham Public Schools, 2022a)

Figure 1: The Socio-Ecologic Model of Free School Lunch in Durham Public Schools (Figure 1)



Table 3: Stakeholder Roles (Table 2)

Stakeholder	Program Involvement
DPS students	Primary recipients of intervention. They can provide feedback on experiences of stigma, and the quality and desirability of the lunch.
DPS parents	Involved in encouraging their children to take advantage of the free lunch, destigmatizing free lunch, and may have improved food security status from reduced financial burden.
Durham County Board of Commissioners	Serves as a significant funder through Durham County budget allocation to Durham Public Schools
DPS administration and foodservice staff	Responsible for delivering the program at no cost to all students. Supportive school administration was shown to lead to higher participation in New York City schools when free school lunch was implemented city-wide (Watts et al, 2021).
NC Department of Public Instruction Office of School Nutrition	Works with schools to administer Federally Assisted National School Breakfast and School Lunch Programs (NCDPI, n.d.). They will ensure the program continues to follow all local, state, and federal regulations for funding and nutrition.
Teachers	Teachers can promote participation in free school lunch to both students and parents and provide feedback from observing the program implementation on a regular basis in the cafeteria.
School counselors, nurses, social workers	These professionals observe the daily effects of negative MEB development in children and their physical and psychological wellbeing.
North Carolina Pediatric Society	May advocate for improved child nutrition and provide compelling clinician experience in support of free school lunch as the New York chapter did in New York City advocacy efforts for free school meals (Watts et al, 2021).
Durham Public Health Department	Identified the problem of ACEs, food insecurity, and demographic inequities in Durham through the Community Health Assessment and are invested in the community impact of improved health outcomes for our priority group and children in the county.

Table 4: Free School Meals for All Budget (Table 3)

Category	Budget Percentage	Description
Operating	10%	Upgrading the equipment including replacement, repair, and maintenance. Upgrading service software as needed.
Labor/Compensation*	65%	Salaries, benefits, and training for kitchen staff, food service workers, and supervisors. Costs associated with hiring and training new staff.
Food Processing	5%	Costs associated with proper processing of food prior to food service. Includes, but not limited to: items required for food storage (containers, plastic wrap, etc.) to prevent spoilage.
Food & Supplies**	20%	Costs associated with purchasing food and supplies from local distributors and transportation.

Source: Food Insight Group, 2021

*Increased labor costs from the Food Insight Group’s model as public health and education professionals are historically underpaid.

**Reduced food costs down from typical 30% in a school foodservice budget since the federal reimbursement per meal served will increase.

Section 2.3: Nutrition Program Evaluation

Introduction

The social and community context of an individual plays a fundamental role in nurturing their mental, emotional, and behavioral (MEB) health (Office of Disease Prevention & Health Promotion, n.d.). This important social determinant of health can be disrupted by adverse childhood experiences (ACEs), including abuse, neglect, violence, and household instability (NASEM 2019, p. 47). ACEs can negatively affect a child's brain development through exposure to toxic stress, or consistently high levels lasting stress that a child cannot downregulate (Center for Youth Wellness, 2018). This exposure to toxic stress is associated with poor mental health outcomes in both the short and long term (CDC, 2021; Mwachofi et al, 2020; Petruccelli et al, 2019). Black and Latino children in Durham have a higher prevalence of poverty and experience more of its negative effects including more ACEs and food insecurity (DCoDPH 2021, p. 110). Adequate nutrition is a critical part of child brain development; household food insecurity interferes with healthy physical and mental development, and can also be a cause of ACEs, leading to more violence in the home (NASEM 2019, p. 190; Jackson et al, 2019). To promote resilience against the mental health risks of ACEs we propose targeting food insecurity in children by serving free school lunch (FSL) to all students in Durham Public School (DPS) (NASEM 2019, p. 4). This expansion of FSL to the 37 DPS schools that do not currently serve free lunch to all students will be implemented by a team of school foodservice professionals detailed in Appendix 1.

Evidence-Based Evaluation Plan

This evaluation plan assesses the program's intended long-term outcome of improved mental health status of DPS students from reduced school lunch stigma, less stress and anxiety from food insecurity, and more nourishment (Jackson et al, 2018; Cohen, 2021). The reduced stigma in particular will hopefully decrease the disparity in poor outcomes that disproportionately burden Black and Latino students. Normalizing free school meals for all removes the school food program's poverty stigma that can stifle participation through shame and anxiety of separating students by income in the cafeteria, further magnifying food insecurity (Watts et al, 2021).

Study Design and Data Collection

We will use a quasi-experimental design to evaluate the intervention with pre and post tests to collect data. All students at DPS schools will have the option to participate in free school lunch so there is no control group or randomization involved. The evaluation will involve analyzing data from Durham County's Youth Risk Behavioral Survey (YRBS), conducting a survey consisting of relevant parts of validated mental health and school meals questionnaires, and focus groups with both students and school staff.

YRBS is part of the national school-based survey produced by the Centers for Disease Control and Prevention (CDC) and administered to students every other year by the Durham Public School system (DCoDPH, 2019). It is administered to both middle school and high school students and data is disaggregated in the final report by race, ethnicity, and sex when differences are statistically significant (DCoDPH 2019, p. 3). Our focus is limited to the select few questions about mental health including feelings of depression, considering suicide, making a suicide plan, and attempting suicide (DCoDPH 2019, p. 16).

In order to collect more supplementary data about mental health from our schools that received the implementation we will conduct a survey which combines demographic questions (including race, ethnicity, gender identity, and year in school), a school meals survey designed by the nonprofit No Kid Hungry found in Appendix 2, and the depression and anxiety subscales from the Revised Child Anxiety and Depression Scale (RCADS) found in Appendix 3. These surveys were specifically designed for children and adolescents to evaluate their mental health and perceptions about the desirability and stigma around school meals (No Kid Hungry by Share Our Strength, 2022; CORC, n.d). The final evaluation method will be two types of focus groups to collect qualitative data on how the program is received and any areas for improvement specific to DPS circumstances. Sample focus group questions can be found in Appendix 4. Focus groups will be held with four student groups of differing ages and separately school staff and administration will participate in their own focus groups.

Sample and Sampling Strategy

Durham County's YRBS data will be collected independently on its existing CDC schedule and an analysis will be conducted to compare the prevalence of poor mental health status before and after implementation of FSL. The tailored survey will also be conducted pre and post implementation to a selection of five middle schools and five high schools, reaching about a quarter of the 37 participating DPS schools. We will use a stratified sampling strategy by school type and socioeconomic status of the students by choosing both schools that qualify for the

Community Eligibility Provision representing low-income areas, and some that do not qualify which represent more affluent areas (FNS, 2022a). This will ensure that age and income subgroups are properly represented and help us assess if their results differ in any important ways. The survey will be administered to students in health or physical education class in high school and healthy living class in middle schools. It naturally fits into these curriculums and these classes are state requirements, but not in specific years of schooling so we will capture a range of age groups (Durham Public Schools, 2019a, Durham Public Schools, 2019b).

Focus groups will only be conducted after FSL implementation, and participant selection will be done with purposeful sampling of students and staff recommended by school administration and staff. This method is intended to identify information-rich cases related to FSL that will lead to a richer discussion (Palinkas et al, 2015). There will be four student focus groups separated by grade to capture the range of age groups from elementary through end of high school: 6th 8th 9th and 12th graders. Two staff focus groups will be held, one in a middle school and one in a high school, including a mix of teachers, nurses, counselors, and social workers. A fun incentive will be offered for focus group participation such as dessert or catered lunch from a local restaurant depending on the group.

Specific Measures

To evaluate our overarching program outcome of improving mental health outcomes among Black and Latino students in Durham, we will collect data on outputs and outcomes that support this related to program acceptance and mental health status. A breakdown of outputs, outcomes, disparities of interest, and a definition of success for each data collection method can be found in Table 1.

Timing

Timing the implementation and surrounding evaluations will be based on the 2-year YRBS cycle with the program initiating at the start of the school year in the fall after YRBS data collection, which occurs in the spring of odd years. The pre-test tailored survey data can then be collected alongside the YRBS data in the spring. Post-test data could occur as early as spring semester during the second year of program implementation. A full sample timeline is included in Appendix 5.

For YRBS and the combined survey, progress will be indicated by a statistically significant change specific to the data measure as indicated in Table 1. YRBS will show a reduction in suicidal thoughts, plans, attempts and less depression among Durham adolescents. The RCADS subscales will show a reduction in depression and anxiety markers. The No Kid Hungry school meal survey will show progress via responses of increased participation in

school meals, increased motivation to participate due to meals being free, and acceptability of the meals offered. The qualitative data collected from focus groups will indicate progress if we can identify themes of reduced stigma surrounding school lunch, positive impacts of free meals on food insecurity or mental health, and increased motivation to participate in school lunch. If progress is not indicated through this evaluation process, the focus group data and No Kid Hungry school meal survey results will be used to inform specific improvements in the FSL program.

Analysis Plan

We will analyze prevalence data from the YRBS and from that calculate a risk for various poor mental health outcomes among middle and high school students in Durham. Risk ratios will also be used to quantify the differences between Black and Latino students and White students using a null value of 1 and a statistical significance threshold of 0.05. The pre and post quantitative data from the tailored survey will be analyzed using a paired t-test at the same significance level. Data will be stratified by race/ethnicity, gender, and age group to analyze how the FSL program may have impacted these groups differently. Focus group transcripts will undergo thematic coding to identify topical and interpretive codes relating to stigma, mental health, motivations for participation in school meals, and other related themes.

Sources of Funding

Funding will be sought from multiple sources in addition to county funding to sustain the program over the long term. A selection of suggested funding sources can be found in Table 2. If successful, this implementation example can help advocate for funding free school lunch at the state level to free up these county funds later.

Data Use and Dissemination

The evaluation results will be disseminated first to parents and school staff through school newsletters, the school website, social media, and a presentation at Parent Teacher Association (PTA) meetings. The County Commissioner's office will be updated on the program throughout the implementation and will receive a report on the full evaluation. This report will also be sent to any funders. The findings will also be used to advance the available research on FSL to help other advocates secure policies and funding to bring the program to their locality.

Conclusion

A successful evaluation process hinges on the effective collaboration among students, school administrators and staff, and public health professionals for both delivery and completion. This complementary, mixed methods approach to evaluating the program will provide the implementation team with robust insights about the mental health and equity implications of free school lunch in Durham. Improving mental health outcomes certainly requires an interdisciplinary approach across public health specialties, but proper nutrition is foundational for better short- and long-term outcomes from reduced stress due to less food insecurity and impaired MEB development from nutrient deficiencies (DCDPHD 2021, p. 109).

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APPENDIX 2.3.a: NUTRITION PROGRAM EVALUATION FIGURES AND TABLES

Figure 2: Implementation Team (Appendix 1)

- Implementation Director – a school nutrition director with experience implementing free school lunch programs
- Foodservice managers and school nutrition directors from participating schools
- Public health nutritionists and Registered Dietitian Nutritionists will consult on initial launch to help scale food production and ensure meals are desirable while meeting state and federal nutrition requirements.
- Staff from the 19 DPS schools that are already serving FSL will serve as knowledge experts to help advise and train staff in the schools undergoing program implementation.
- Technicians will install new foodservice equipment and train staff on their proper use, cleaning, maintenance, and storage.

Figure 3: No Kid Hungry Survey Questions (Appendix 2)

1. Regardless of whether you have eaten school meals in the past or not, how likely are you to eat school meals?
 - a. Very likely
 - b. Somewhat likely
 - c. Somewhat unlikely
 - d. Very unlikely
 - e. Don't know
2. Here are some descriptions of school meals. Please indicate if you think this describes school meals very well, somewhat well, not too well, or not well at all:
 - a. Are easy to get
 - b. Allow you to eat a meal with other students
 - c. Are convenient
 - d. Are affordable
 - e. Allow your family to save money
 - f. Are free
 - g. Are for people like you
 - h. Allows you to build friendships and community with other students
 - i. Are healthy
 - j. Taste good
 - k. Are high-quality
 - l. Are only for low-income families
3. Additional Motivating Factors for your participation in school meals: (Yes/No)
 - a. Knowing that the meals include food you will like and eat
 - b. Having meals be free, at no cost
 - c. Having a website with detailed information about school meals available
 - d. Knowing that most other students at your school were also eating school meals
 - e. Knowing that school meals have to meet specific standards to ensure students are eating healthy, nutritious meals

(No Kid Hungry by Share Our Strength, 2022)

Table 5: RCADS Generalized Anxiety Disorder subscale (Appendix 3)

Please put a circle around the word that shows how often each of these things happens to you.

There are no right or wrong answers.

		0	1	2	3
1	I worry about things	Never	Sometimes	Often	Always
2	I worry that something awful will happen to someone in my family	Never	Sometimes	Often	Always
3	I worry that bad things will happen to me	Never	Sometimes	Often	Always
4	I worry that something bad will happen to me	Never	Sometimes	Often	Always
5	I worry about what is going to happen	Never	Sometimes	Often	Always
6	I think about death	Never	Sometimes	Often	Always

(CORC, n.d.)

Table 6: RCADS Low Mood (Major Depressive Disorder) subscale (Appendix 3)

Please put a circle around the word that shows how often each of these things happens to you.

There are no right or wrong answers.

		0	1	2	3
1	I feel sad or empty	Never	Sometimes	Often	Always
2	Nothing is much fun anymore	Never	Sometimes	Often	Always
3	I have trouble sleeping	Never	Sometimes	Often	Always
4	I have problems with my appetite	Never	Sometimes	Often	Always
5	I have no energy for things	Never	Sometimes	Often	Always
6	I am tired a lot	Never	Sometimes	Often	Always
7	I cannot think clearly	Never	Sometimes	Often	Always
8	I feel worthless	Never	Sometimes	Often	Always
9	I feel like I don't want to move	Never	Sometimes	Often	Always
10	I feel restless	Never	Sometimes	Often	Always

(CORC, n.d.)

Figure 4: Sample Focus Group Questions (Appendix 4)

Note: Focus group discussions will not be limited to these questions.

Students – will discuss these questions pertaining to times both before and after program implementation.

- Where do you normally get lunch on school days?
- How often do you eat the cafeteria food? (times per week)
- What are 3 words you would use to describe the cafeteria food?
- How healthy do you think the cafeteria food is on a scale of 1-5 with 1 being most unhealthy and 5 being most healthy?
- How would you rate the taste of the cafeteria food on a scale of 1-5 with 1 being terrible and 5 being delicious?
- Think about students you know who do not regularly eat the school lunch. What changes might make them more likely to participate?

Staff

- What have students told you about their perceptions of school meals?
- Do students ever discuss their reason for participating in school meals? What do they say?
- Have students been bullied about their participation in school meals?
- What changes have you noticed in student behavior and mental health after the FSM program was introduced?
- What three words would you use to describe the school meal program at the school?

Figure 5: Sample Implementation and Evaluation Timeline (Appendix 5)

Baseline Data Collection: Spring of 2023

- 2023 YRBS data collected
- Pre-implementation student surveys administered

Implementation round 1: Starts Fall of 2023

- 19 non-CEP schools receive FLS program

Implementation round 2: Starts fall of 2024

- 18 remaining non-CEP schools receive FLS program

Post-Implementation Data Collection: Begins Spring 2025

- YRBS data collected in Spring 2025
- Fall 2025 – post-implementation student surveys and focus groups conducted

Data Analysis:

- Begins following survey and focus group data collection is complete
- Spring 2027: 2025 YRBS data is released and will be analyzed for our evaluation

Dissemination of findings: 2027, following Data Analysis, and beyond

Table 7: Output(s), outcome(s), and definitions of program success associated with data sources used in evaluation (Table 1)

Data Source	Output(s)	Outcome(s)	Success
RCADS general anxiety disorder survey	<ul style="list-style-type: none"> • 100 completed surveys per school • General anxiety scores for each student surveyed (pre- and post-implementation) • Mean general anxiety score with for each strata and overall (pre- and post-implementation) 	<p>Change in overall general anxiety score in sample following implementation of FSL program.</p> <p>Change in general anxiety score among demographic groups of interest following implementation of FSL program</p>	<p>Decreased general anxiety score among Black and Latino students of different age groups following FSL implementation.</p> <p>Decreased overall general anxiety score following FSL implementation.</p>
RCADS low mood (major depressive disorder) survey	<ul style="list-style-type: none"> • 100 completed surveys per school • Low mood scores for each student surveyed (pre- and post-implementation) • Mean low mood score with for each strata and overall (pre- and post-implementation) 	<p>Change in overall low mood score in sample following implementation of FSL program.</p> <p>Change in low mood score among demographic groups of interest following implementation of FSL program</p>	<p>Decreased low mood score among Black and Latino students following FSL implementation.</p> <p>Decreased overall low mood score following FSL implementation.</p>
No Kid Hungry school meals survey	<ul style="list-style-type: none"> • 100 completed pre-implementation surveys per school • 100 completed post-implementation surveys per school • Pre- and post-implementation data on participation in school meals, motivating factors for participation, and perception of school meals. 	<p>Change in participation in school meals.</p> <p>Change in motivating factors for participation in school meals.</p> <p>Change in perception of school meals.</p>	<p>Increase in school meal participation.</p> <p>Statistically significant positive changes in motivating factors for participating in school</p>
YRBS	<ul style="list-style-type: none"> • Data collected pre- and post-intervention 	<p>Change in student reports of depression (overall and by racial/ethnic strata).</p>	<p>Decreased reports of depression, considering suicide, attempted suicide overall and by racial/ethnic</p>

	<i>Note:</i> Our evaluation plan will not directly collect the data for YRBS. We will use the reports published by the Durham County Public Health Department.	Change in student reports of considering suicide (overall and by racial/ethnic strata). Change in student reports of attempted suicide (overall and by racial/ethnic strata).	strata following FSL program implementation.
Student Focus Groups	4 student focus groups conducted (2 schools sampled, 2 focus groups per school) Focus group transcripts coded for topical and interpretive themes of motivation for participation in FSL, desirability of school meals, stigma, and mental health.	Themes discussed in focus groups provide insight into success of implementation and used to inform improvements to the program in the future. Topical and Interpretive themes about topics of interest are identified across focus group transcripts.	Students report increased participation, increased desirability, decreased stigma, improved mental health in focus group themes.
Staff Focus Groups	2 staff focus groups conducted (2 schools sampled, 1 focus group per school) Focus group transcripts coded for themes of desirability of school meals, stigma, behavior changes, and mental health.		Staff report reduced stigma, improved mental health, and increased desirability from their observations of and interactions with students in focus group themes.

Table 8: Potential Funding Sources (Table 2)

The Community Eligibility Provision (CEP)	These federal programs provide ongoing support for school nutrition programs if the school or district continues to qualify based on the eligibility criteria. Any school in DPS that qualifies for CEP will apply for it. CEP is on a 4-year cycle.
Provision 1, 2, 3	Schools that do not qualify for CEP can apply for these other provisions through the USDA to help with the costs associated with providing free meals to students. Provision 1 is on a 2-year cycle, Provision 2 is on a 4-year cycle, and Provision 3 is also on a 4-year cycle.
County Commissioner	Currently, the County Commissioners provide some funding to schools and have increased school funding in the past. For our program we anticipate county commissioners will need to authorize another increase in funding for DPS to support our program implementation. If the program is successful, the County Commissioners could continue to support the program and DPS by increasing property taxes and allocating those funds to the FSL program.
External and Private Grants and Donations (see below)	Grant funding and donations can vary in terms of their duration and availability. Some grants may be one-time only, while others may be renewable annually. Donations from individuals or businesses may also vary in terms of frequency and amount. Therefore, the timeline for sustaining these funding sources would depend on the specific grants and donations received.
National School Lunch Program Equipment Assistance Grant	This grant is typically awarded annually by the USDA, although it is not available every year. Therefore, the timeline for sustaining this funding would depend on the school's eligibility and the availability of the grant.
Food Lion Feeds Grant	This grant is typically awarded annually to non-profit organizations. If the school district partners with a non-profit to apply for funding, the timeline for sustaining this funding would depend on the grant's renewal cycle and the success of the partnership.
No Kid Hungry NC	These grants are typically awarded annually, with a specific timeline for the funding period. Therefore, the timeline for sustaining these funding sources would depend on the renewal cycle of the grants laid out by No Kid Hungry NC.
Carolina Hunger Initiative BCBS NC Child Hunger Impact Project grants	A partnership between Carolina Hunger Initiative and BCBS NC has resulted in a 3-year long partnership that funds different school nutrition proposals. Grants are awarded annually.
Philanthropic groups	Private foundations and philanthropic organizations may provide ongoing support for programs and initiatives that align with their mission and goals. The timeline for sustaining funding from these sources would depend on the terms of the grant or donation agreement.

CHAPTER 3: KAI LARSON'S INDIVIDUAL DELIVERABLES

Section 3.1: Social Determinant of Health Analysis

Social Determinant of Health:

To address the social determinant of health “Social and Community Context,” I suggest that Durham County commissioners focus on the objective of eliminating very low food security among children in our county. Children facing food insecurity have inadequate or limited access to healthy food necessary for a healthy life. The children of Durham County are the future of Durham County. This is why I recommend focusing our efforts on them. Food insecurity exists in multiple forms. Addressing food insecurity amongst children in our county helps students sustain the energy they need to do well in school, the foundation necessary to handle adversity in the future, and set themselves up for healthier lives as adults (Cook, et al., 2013).

A child could not be hungry (lack food volume necessary to satiate hunger) but still be food insecure due to their food having inadequate nutritional value for a healthy life (Cook, et al., 2013). Food insecurity could be a constant in a child's life (chronic insecurity) or more occasional/seasonal (Fraanje and Lee-Gammage, 2018). Food insecurity amongst children must be addressed holistically in Durham County and cover all children from infancy to early adolescence. Food insecurity in children can have many short- and long-term impacts on children's health outcomes. Studies suggest that food insecurity in children is related to poor overall health scores, increased hospitalizations, and obesity (Cook, et al., 2013). More long-term effects include “a higher risk of depression and suicidal ideation in adolescents, and chronic conditions, particularly asthma (Ke and Ford-Jones, 2015).”

Geographic and historical context:

Durham County's population comprised primarily of non-Hispanic whites (54.4% of population) and Blacks (35.9% of population) (Census, n.d.). The median poverty rate in the United States was 11.6% in 2021, Durham County's percent of people in poverty is higher than this number, at 13.4% in 2021 (Creamer, 2022).

During the 1900's, Durham was considered a hub for Black entrepreneurship and was dubbed the “Black Wall Street” (Pashankar, 2022). After a few decades of economic growth and thriving Black-owned businesses,

segregation, and the federal government's "Urban Renewal" initiative led to the construction of the 147 Freeway. The 147 Freeway ran over many key areas of "Black Wall Street" and business declined until "Black Wall Street" eventually collapsed (Pashankar, 2022). Addressing food insecurity due to poverty amongst Black and Latino children is an investment in Durham's youth that can help bring back minority success stories to the county.

There have been previous efforts to address child food insecurity in Durham County. The Food Bank of Central and Eastern North Carolina has partnered with many local agencies (including the Boys and Girls Club of Durham, the Durham Rescue Mission, and Freedom House Durham) to provide 7,741,344 meals (totaling 138 pounds of food) to communities in Durham County (2021). In 2014, the Durham Farmer's began accepting Supplemental Nutrition Assistance Program (SNAP) benefits and many vendors also accept Farmers' Market Nutrition Program (FMNP) checks (Stroot, 2020).

Priority population:

The primary population of interest within Durham County is Black children (ages between birth to 17) that live in low-income households. I chose this primary population to focus on the issue of children facing food insecurity because a 2020 GIS study found that "low-income African Americans are the most impacted from food insecurity in Durham" (Stroot, 2020). This focus would include children that rely on subsidized school lunches for nutrition, and zero-in on the neighborhoods identified as the most impacted by food insecurity.

Measures of SDOH:

In Durham County, the food insecurity rate is 13.4% as of 2021 (Census, n.d.), 20% of children living in Durham County in 2021 were food insecure, and 63% of children received free or reduced lunches in school (Food Bank, 2021). A community health assessment conducted by the Partnership for Healthy Durham, found that 14.9% of Black residents and 12.6% of Latino reported skipping meals due to cost, compared to only 6.6% of White residents (2019).

Rationale/Importance:

America, and the South especially, has long suffered from racial, health, and social injustice. Ensuring children in Durham County (especially Black children from low-income households) have access to the food they need is an investment in the future of Durham County. While Durham may no longer be the "Black Wall Street," it can still become an example of how a community should raise up its children who are food insecure and help to create a community of successful adults who are at lower risk of various illnesses.

Disciplinary critique:

The public health leader's role in eliminating very low food security among children in Durham County is an important one. Not only is it important because the health of a child is necessary for ensuring a healthy future for the community, but also because it addresses health inequities in the county. For this reason, an empathetic public health leader that understands the principles of community engagement is vital. The public health leader must be able to collaborate with the community and create allies to co-lead with so that this goal of eliminating exceptionally low food security can be a project not just for the public health leader, but truly for the community.

As mentioned before, food insecurity in children can lead to various negative health outcomes (Cook, et al., 2013). Unfortunately, in Durham County Black children who live in low-income households are impacted by food insecurity disproportionately (Stroot, 2020). Addressing this inequity could have momentous results. A new generation of healthy, happy, and energized kids ready to learn and improve their community is a strength for Durham County. Imagine a new "Black Wall Street," one built upon equity, health, community engagement, and businesses that benefit both Durham's economy and its' community members. That is a bright future.

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APPENDIX 3.1.a: SOCIAL DETERMINANT ANALYSIS TABLE

Table 9: Durham County Food Insecurity Statistics (Table 1)

Number of Food Insecure Persons (2018)	Food Insecurity Rate (2021)	Food Insecurity Rate for Children (2021)	Percentage of children who received free or reduced lunches (2021)	Percentage of Black Children who are food insecure (2021)	Percentage of Latinx Children who are food insecure (2021)	High School Obesity Rate (2017)
41,310 (Stroot, 2020)	14.4% (Census, n.d.)	20% (Feeding America, n.d.)	63% (Feeding America, n.d.)	22% (Feeding America, n.d.)	18.5% (Feeding America, n.d.)	12% (Stroot, 2020)

Section 3.2: Community Partner Analysis

Background

Adverse childhood experiences (ACEs) affect a child's resilience to challenges later in life. Social and community context is important when assessing a child's mental, emotional, and behavioral (MEB) development. Factors such as housing, education, work, built environment, and food accessibility are social determinants of health (SDoHs) that have a long-term influence over a child's resilience to stressors as an adult.

Redlining is a policy that has historically contributed to these SDoHs. Redlining refers to the practice of grouping neighborhoods (often by race) and ranking them in terms of investment risk to banks and the government (Swope, et al., 2022). This policy led to racial segregation and housing loans being inequitably granted to white families over families of color (Swope, et al., 2022). Consequently, some historically redlined neighborhoods, comprised mostly of people of color, experience lower family income, lower self-reported mental and physical health, higher food insecurity and higher housing instability than mostly white, not historically redlined neighborhoods (Lynch, et al., 2021).

In Durham County, the food insecurity rate is 13.4% as of 2021 (Census, n.d.), with 20% of children living in Durham County in 2021 being food insecure (Food Bank, 2021). In 2021, 22% of Black children and 18.5% of Latinx children were food insecure (Feeding America, n.d.). Durham County suffers from a history of segregation (historically redlined communities) and consequently features racial health disparities (Weaver, 2019). Children from non-Hispanic white or high-income households have a lower prevalence of food insecurity than who come from lower socioeconomic backgrounds or are Black or Latinx (Feeding America, n.d.).

In this analysis, I will focus on food insecurity as an ACE that affects child resilience to adversity later in life. Furthermore, I will provide evidence-based reasoning that providing free lunch for all students in Durham County Public Schools will help to reduce ACEs in school children and consequently improve their resilience to stressors later as an adult.

Evidence-Based Policy

Studies suggest that food insecurity in children is related to poor overall health scores, increased hospitalizations, and obesity (Cook, et al., 2013). More long-term effects include “a higher risk of depression and suicidal ideation in adolescents, and chronic conditions, particularly asthma” (Ke and Ford-Jones, 2015). The policy that my team and I propose to address this health inequity and improve the chances of resilience to childhood adversity is to grant free school lunches for all Durham Public Schools students.

Two factors that contribute to food insecurity in children are that the children who could benefit from free or reduced lunches often suffer from the stigma surrounding needing a free or reduced-price lunch and that there is a need for parents to be able to correctly complete the necessary paperwork to get access to free lunches for their children. This inequity has been perpetuated by putting the burden of food insecurity on those who may already be marginalized. If school lunches are made to be free for all students, it will lower the administrative need for the lengthy paperwork needed to assess the eligibility of individual students. (Long et al., 2021; Martinelli et al., 2022; Landry & Simmons, 2022). Free school lunches for all students will also reduce the stigma of needing a free or reduced lunch. One study in California found that after implementing free school lunches, there was an increase of 79.2% in students participating in the meal program and that 39% of students reported noticing a reduction in the stigma of participating in the free lunch program (Zuercher et al., 2022).

Community Partner Analysis

The community partners that we are going to focus on involving in this transformation are food insecure students, the school district administration, Durham Public Schools nutrition services, Durham Public Schools teachers, and the Durham Public Schools Parent-Teacher Association (PTA). We believe that these five potential partners have diverse interests and resources that can greatly benefit our free lunch program.

Food insecure students are, of course, one of our community partners. As the people who have lived experience with food insecurity and would most directly benefit from our program, they can provide powerful insight into the roots of food insecurity and how we can best address it. Their role is to inform and guide our program. Still, a key factor that influences this community partner’s ability to participate in transformative change is that they are minors, which makes privacy a concern. To remedy this issue, we will partner with students anonymously through surveys distributed to high school students in the Durham Public Schools (with parent

permission) and share these findings with other community partners. Surveys will not be distributed to middle school or elementary school students for the purpose of increased privacy and clarity of responses.

The school district administration is also very important to collaborate with because they oversee what goes on in the schools. They have enough power to help implement new programs and have first-hand experience with the students and nutrition services. Durham Public Schools nutrition services are key community partners because they help to pick and provide the food to the students. Nutrition services will be essential for advising what economic and logistics changes are necessary to have free lunches for all students. Durham Public Schools teachers are the true “boots on the ground” community partners for this program. Teachers interact with the students and can see first-hand the effects of adverse childhood experiences on students. The Parent-Teacher Association (PTA) of Durham Public Schools are a powerful ally. Their influence on policies to be implemented, their interest in school programs, and their overall connection to school administration and other community partners make them a cornerstone partner for this program. Their role will be to act as a liaison and advocate for this policy to high-up policy makers. A barrier that influences equitable representation and participation in this project for transformative change is that the PTA is an organization that requires parents to have the time and resources available to volunteer. Parents and families with the privilege of more free time and economic stability may be overrepresented in the PTA. Still, we must get the support of the PTA because of their strong influence in the school community. We must be able to convince enough members that free school lunches for all students is beneficial and worth the costs (both economic and opportunity). I will go into further detail on this matter in the next section.

Engagement Tools: CATWOE Analysis and Root Definitions

A community partner analysis map as well as two CATWOEs (one community partner with lived experience with food insecurity and one community partner who may have concerns about and/or be opposed to the evidence-based policy or program we are proposing) with root definitions are available in the appendix.

The community partner analysis map (Table 1) is used to help identify possible community partners. The community partner analysis map acts to gauge each potential partner’s interest in our program and ability to influence those who can help make the program happen. Their influence could be of an economical or political nature. Their influence could also come from their reputation as a subject expert or a community figure. The community partner analysis map aids in creating an engagement plan with community partners so that we can strengthen our program with what they can bring to the table in the way the partners are most likely to help.

CATWOE analysis and root definitions (Tables 2 and 3) are tools that help to understand the perspectives and motivations of key actors/community partners. Using these tools helps to “get inside the head” of key community partners so that we can better understand how to implement them into a program and, when necessary, persuade them to aid in our project for the mutual benefit them and the communities we are serving. These tools are also helpful when comparing potential community partners to identify points of conflict and common interests between the partners.

Comparing the food insecure student and PTA member’s differences in their CATWOE and root definitions, the food insecure student sees the school lunch system as another inequitable system that may withhold nutrition from students who barely do not make the free lunch threshold. The food insecure student wants free school lunches so that they and their classmates can have the energy and focus to do their best in school. The PTA member wants to see students thrive, but not necessarily through a free lunch program. They view the school lunch system as one that works like a cafeteria, people pay for food and food is given. They do not see it as the school’s responsibility to feed all students and believe that it is up to the parents to make sure that their kid has the proper nutrition to succeed.

My team and I must show the benefits of having all kids thrive and the economic benefits of free school lunches for all. One such benefit is that providing free lunches for all students reduces the need for administrative paperwork to find confirm student eligibility, and that higher spending for these lunches can be paired federal reimbursements that incentivize expanding school lunch price reductions (Long et al., 2021; Martinelli et al., 2022). Focusing on the economic viability and its corresponding benefits can help to assure PTA members that this program is not based in politics (some families not paying their fair share for meals), but rather in the desire to create a healthy school environment at a justifiable cost.

Community Partner Questions

Some questions I have about the community partners we proposed to be included in our program include: how informed are the partners on food insecurity? Do the community partners understand what food insecurity is and how it affects children? There are many upstream factors that lead to food insecurity, how sensitive and aware are the community partners of this? I also would like to know who has the most time and resources to work on this program. This program would benefit from leaders representing the PTAs of schools within DPS put pressure on the Durham County Commissioners to support the free school lunches program. If we have a lot of interest from our

partners but no one has any influence or time to help make this program happen, then we will not have the most effective partnerships. Additionally, I want to know if the PTA board and district administrators are good at compromising. Both groups have high influence, the more they can compromise, the better. If they do not like working with each other then my team will have to brainstorm ways to address that problem. Finally, we must know if there are privacy, political, or legal considerations that partners need to consider before working on this program. No program or policy can be effective if they are unlawful or exploitative.

Strengths and Limitations

There are a few strengths to my community partners analysis that I would like to highlight for the County Commissioners. All the community partners are invested in helping students succeed. This is a strength that my team and I will lean on throughout the program. Also, a strength in this community partner analysis is that a few of the partners have high influence in Durham County. This means that if we can get all the partners on board that there is a good chance, we will be able to create a program and policy that is approved and properly resourced.

Still, this community partner analysis has limitations. One limitation is that three of these community partners are organizations with many people and many opinions/personalities. It is impossible to have a group of people who all agree on every topic. It is hard to say whether we will be able to get enough support from, for example, the PTA. Even if there are multiple members who want to help us, if they cannot convince the rest of the board, the PTA may not be able to use their influence to help us make this transformation. Another limitation of this community partner analysis is that it relies on collaboration and compromise between partners. This is not always possible, and it is very hard to predict the exact types of issues that our partners will refuse to compromise on. While some community partners may refuse to cooperate with each other, it is our job as public health professionals to mediate these conflicts so that we can all work towards the goal of healthier and more resilient children in Durham County.

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APPENDIX 3.2.a: COMMUNITY PARTNER TABLES

Table 10: Community Partner Analysis Map (Table 1)

Stakeholder	Stakeholder Interest(s) in the Universal Lunch Program	Assessment of Impact	Potential Strategies for Obtaining Support and/or Reducing Obstacles
District Administration	- Improving resilience in school children -Improving the number of students successful academically -Balanced budget	Medium interest/ high influence	Obtaining Support: Identify at least one member in support of policy. Reducing Obstacles: Strong, evidence-based policy work to share with administrators
Food Insecure Student	-Access to nutritious food to help improve success in school and promote overall resilience	Moderate-high interest/ high influence	Obtaining Support: Partner with any student who is vocal about student health Reducing Obstacles: Keep the student’s privacy, gain permission to work together from parents.
Durham Public Schools Teachers	-Improved concentration and emotional stability in students -Remove boundaries that inhibit learning and more equitable classroom space	High interest/ low influence	Obtaining Support: Find teachers that find food insecurity to be a barrier towards resilience and success inside the classroom Reducing Obstacles: Gain approval to collaborate with teachers from district administration and maintain teacher’s privacy
Durham Public Schools Nutrition Services	-Improve the health of students through healthy meals that are freely available to all students	High interest/ medium influence	Obtaining Support: Offer to partner in a way that demonstrates the importance of their work to the public. Reducing Obstacles: Make relationship one of collaboration and co-leading
Parent-Teacher Association (PTA)	-Healthy students, and accountability for allocation of local taxes	Medium interest/ medium influence	Obtaining Support: Attending PTA meetings. Explain the positive potential of this policy Reducing Obstacles: Build relationships with at least one member who is passionate about this issue

Table 11: CATOWOE: Food Insecure Student (Table 2)

One community partner with lived experience of the SDOH you have selected.

Customers	Fellow food-insecure classmates
Actors	County and district administrators that have influence over lunch prices
Transformation	Access to affordable (free) nutritious lunches for all students
Worldview	The education system tend to favor the students who are already privileged, and the ability to afford nutritious food 3 times a day is a big advantage
Owners	Policy makers, district administrators
Environment	Hungry or food insecure, other students have the same problem. I am embarrassed to let others know they are struggling due to food insecurity.

i. Root Definition

The school lunch system in Durham County is a system:

- To provide students with meals (P)
- Through making food cheap enough (or free) for all to buy (Q)
- In order to give students the energy needed to do their best through all of the challenges school presents (R)

Table 12: CATOWOE: Parent-Teacher Association (PTA) (Table 2)

One community partner who may have concerns about and/or be opposed to the evidence-based policy or program you have proposed.

Customers	PTA board members, parents and teachers in the schools
Actors	PTA president, teachers, parents, and district administrators
Transformation	Wants to see their kids thrive, hopes that money can be put towards after-school programs to improve resilience
Worldview	Believes that hardship is part of life and giving free lunches creates “soft” children that are not resilient to stressors.
Owners	Teachers, parents, “woke” politicians and activists
Environment	People are fighting over how to improve child resilience, but no policy suggestion makes everybody completely satisfied.

i. Root Definition

The school lunch system in Durham County is a system:

- To deliver food to students (P)
- Through payment by the parents of students (Q)
- In order for students to have the nutrition necessary to succeed in school (R)

Section 3.3: Engagement and Quality Improvement Plan

Introduction

Adverse childhood experiences (ACEs) affect a child's resilience to challenges later in life. Food insecurity is one such ACE and in Durham County, the food insecurity rate is 13.4% as of 2021 (Census, n.d.), with 20% of children living in Durham County in 2021 being food insecure (Food Bank, 2021). Through collaboration between the Mental, Emotional, and Behavioral (MEB) Development team and Durham County community partners, we aim to address child food insecurity through a program providing free school lunches to all Durham Public Schools students.

Engagement Strategy

In this engagement strategy and quality improvement plan, we will be focusing on our team's partnership with Durham Public Schools Nutrition Services. The purpose of engaging Durham Public Schools Nutrition Services is because they possess the necessary expertise, experience, and influence to help address child resilience to stress by reducing the impact of the ACE food insecurity through nutritious lunches accessible for all students. Durham Public Schools Nutrition Services has experience with a similar program, the free school breakfast program (DPS, n.d.). This experience will be paramount when creating an adaptation plan for the free school lunch program.

Barriers and Facilitators

There still may be a few barriers to Durham Public Schools Nutrition Services full participation in this program. One barrier is the political climate that may surround this policy initiative. Not all community partners may be in support of using funds to allow free school lunches for every student. Durham Public Schools Nutrition Services is a service division of Durham Public Schools and may need to appear apolitical. This may interfere with their ability to suggest policy measures and advise on student health. Another barrier could be disagreements on what the best policy is within the Durham Public Schools Nutrition Service team. No organization is homogenous, and there may be differing opinions on how, or if we should implement a free lunch policy. Some members may think that free lunches are not necessary because of the free breakfasts offered. Other members may disagree on the

quantity of food that should be offered for free lunches. Furthermore, some members may not want free lunches at all because they want school funds to be invested elsewhere. These limitations may create roadblocks down the line.

We may also have positive facilitating factors that help us work with Durham Public Schools Nutrition Services. This organization has a lot of experience with school nutrition services and other community partners may trust their judgement. Another facilitator to Durham Public Schools Nutrition Services' participation in our program is that they work for the district, so they already have a partnership with district administration (DPS, n.d.). Established relationships are invaluable because it allows for insight and experience with high-influence community partners.

Methods, Timing, and Measures

To engage Durham Public Schools Nutrition Services, we will focus on three methods. This first method is the “six conversations” tool (Morrison, 2019). This tool outlines 6 topics (invitation, possibilities, ownership, dissent, gifts, and agreement/commitment) that are important when establishing relationships and entering into a program with community partners (Morrison, 2019). This is a group participation format that requires an outreach level of participation (HHS, 2011). A facilitator that this method addresses is identifying possible political issues that can arise during the program. It also gives the members of the Durham Public Schools Nutrition Services a chance to voice dissenting opinions. This will allow us to communicate more clearly with our community partner and establish expectations. This engagement strategy does not require much from the County Commissioners because it is mostly an introduction and interest tool. They may, although, be helpful by setting up a meeting between the MEB Development team and Durham Public Schools Nutrition Services so that we can go through the six questions.

The six conversations method will be applied during the design phase because it must take place during the initial engagement with Durham Public School Nutrition Services. One performance measure for this method that would tell us how well it is working is to survey team members after the conversation to see what they think went well and what didn't during the conversation. This can be done anytime the six conversations method is used and the collected data can help to adapt the way we converse with Durham Public School Nutrition Services team members.

The next method we will use to engage with Durham Public School Nutrition Services is called an “appreciative inquiry interview” (Morrison, 2019). This engagement tool is an interview with a representative from Durham Public Schools Nutrition Services after they have expressed their interest in working with us. This engagement method uses an individual format and involves a collaborative level of participation (HHS, 2011). This process facilitates a commitment to each other and to the program. In this way, we can have a formal agreement on deliverables and the direction we plan on taking our program. We will record all pertinent information during this process because the County Commissioners will want to know what we learned from our appreciative inquiry interview. We will also conduct an appreciative inquiry interview with County Commissioners before the one with Durham Public Schools Nutrition Services so that we can be clear on what is and not feasible within our program.

The appreciative inquiry interview method will be applied during the design phase because it is the beginning of creating a proposal with Durham Public School Nutrition Services before showing it to the County Commissioners to be approved/adopted. One performance measure for this method that would tell us how well it is working is to count the number of community partners that express a solid interest in the project (signed up for next steps meeting). We aim for at least 4 community partners signing up to participate in next steps. This can be done within a few weeks of the inquiry interview and the collected data can help us to see if our appreciative inquiry interview is sufficiently persuasive.

The third method we will use to engage with Durham Public School Nutrition Services is called the “30/30” tool (Morrison, 2019). This tool calls for 30-day goals, meetings every 30 days, and necessary adjustments to the action plan every 30 days (Morrison, 2019). This engagement method uses a group format and involves a co-leading level of participation because it requires all parties to keep each other accountable to meeting deliverables (HHS, 2011). The 30/30 method allows for early wins by setting manageable goals to obtain each month. Lost enthusiasm for a project, a barrier to success, is addressed by the 30/30 method because it uses the momentum of small wins to keep community partners excited. County Commissioners will need to stay informed on all goals and achievements and may wish to send a representative to the monthly meetings.

The 30/30 method will be applied during the improvement phase because it involves implementing our program and looking for early wins. One performance measure for this method that would tell us how well it is working is creating monthly deliverable completion reports. These reports track what objectives defined in the deliverable statements have been met. If we are consistently meeting most of our deliverables, then our performance

is good. If we are not consistently meeting most of our deliverables, we will need to adjust. The reports must be done every 30 days so that the collected data can help to us to assess the effectiveness of our program.

Memorandum of Understanding (MOU)

Accountability Plan

An accountability plan between the MEB Development team, Durham County Commissioners, and Durham Public School Nutrition Services team ensures that all parties are committed to delivering on the plans created for the program. An MOU is a tool to clearly outline each partner's responsibility to the program and to each other. It is also an agreement between the partners that they will deliver on what is required of them.

An MOU serves as a record of what is agreed upon by all parties. It can be referenced in the future and may even help to resolve disputes. A MOU may not be legally binding, but it does represent a good-faith effort by all agreeing partners to do their part in supporting the free school lunch project. In the context of this team proposal, the teams (partners) are the MEB Development team, Durham County Commissioners, and the Durham Public School Nutrition Services team. Leadership is defined as the MEB Development team partner liaison, Durham County Commission public schools committee chair, and Durham Public School Nutrition Services vice president.

MOUs serve to outline the methods and commitments expected of each partner, such as agreeing to review all proposals in a timely fashion and advising further on approved plans. Each member of the leadership team will get the chance to review and endorse each goal for the program deliverables. Each member will get the chance to express any questions, doubts, or opinions regarding the goals for the deliverables. After all parties are satisfied, leadership team members will endorse and sign the MOU. The leadership team is responsible for printing the MOU using funds from the administrative portion of the budget and sharing it with each other. The members will then disseminate copies of the MOU throughout their respective organizations. A copy should also be kept on the programs' official internet drive for future reference.

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APPENDIX 3.3.a: ENGAGEMENT AND QUALITY IMPROVEMENT PLAN TABLES

Table 13: RASCI Table (Table 1)

RASCI Table		
Policy/Program – Our aim is to improve child resilience to adversity. Studies suggest that food insecurity in children is related to poor overall health scores, increased hospitalizations, and obesity (Cook, et al., 2013). To address food insecurity and increase child resilience, we suggest by implementing free school lunches for all Durham Public Schools students.		
RASCI Levels Who is...	Community Partners	Rationale
Responsible =owns the challenge/ project	The MEB Development Team (Us)	As the ones pushing for and co-leading this project, it is our responsibility to ensure the success of the program.
Accountable =ultimately answerable for the correct and thorough completion of the deliverable or task, and the one who delegates the work to those <i>responsible</i>	District Administrators County Commissioners	All outcomes of any program within the Durham Schools District is a reflection of the district administrator’s ability to correct and follow-through on deliverables. Providing us with funding and approving our plans makes them equally responsible for the program’s success.
Supportive =can provide resources or can play a supporting role in implementation	Durham Public Schools Teachers	School teachers are a resource that combines lived experience with expertise on the behavior of school-aged children/students.
Consulted =has information and/or capability necessary to complete the work	Durham Public Schools Nutrition Services	They have much of the knowledge and experience regarding school lunch nutrition.
Informed =must be notified of results, process, and methods, but need not be consulted	Parent-Teacher Association	PTA is often a politically charged organization. It is important to leverage their influence and keep them informed, but it may lead to conflicts of interests to consult with them.

Table 14: Methods, Timing, and Measures Table (Table 2)

Engagement Method	Facilitator/ Barrier	Phase(s)	Performance measure	Assessment method	Frequency
Six Conversations	Identify possible political troubles	Design	Number an of potential community partners with perceived interest (and qualitative assessment of interest level)	Survey team on perceived interest.	Once
Appreciative Inquiry Interviews	Establish commitment to program actions	Design	Number of potential community partners signed-up for next steps meeting	List of next steps meeting signups	As needed
30/30	Continued enthusiasm for program	Improve	Number of deliverables met vs. not met	Monthly progress reports	Monthly

CHAPTER 4: LISA PHAM'S INDIVIDUAL DELIVERABLES

Section 4.1: Social Determinant of Health Analysis

Social Determinant of Health (SDoH):

Conditions in the places where individuals are born, live, study, work, play, worship, and age are referred to as social determinants of health (SDoH), and they affect several health, functional, and quality-of-life outcomes, and risks (Healthy People 2030, n.d.). SDoH intersects elements that can either support or hinder people's ability to maintain good health individually and collectively (Healthy People 2030, n.d.). Our team's goal is to improve Durham County's health by concentrating on the Social and Community Context of SDoH, specifically on food insecurity (Healthy People 2030, n.d.). The goal of eliminating very low food security in children is addressed through the social and community context (Healthy People 2030, n.d.). Addressing this SDoH and objective will help understand how very low food security affects families with children under 18 years of age and how the community addresses it. The impact of very low food security on the community, its reach across multiple levels, and potential initiatives to reduce and eliminate the risk will be considered.

There are different levels of food security, ranging from very low security (significant disruptions to appropriate food intake due to limited resources) to high security (no issues acquiring enough food) (USDA - Economic Research Service, n.d.). The USDA defines food security as having consistent access to enough food for each person in a household to live an active, healthy life. This can be a short-term or long-term issue for a family and is one indicator of the number of individuals who cannot afford to eat (Feeding America, n.d.). Studies have linked food insecurity to detrimental health effects, such as an increased risk of anemia, nutrient deficiencies, dental health concerns, and cognitive issues (Gundersen & Ziliak, 2015). Research also shows that individuals who have experienced childhood adversity, such as child abuse and neglect, family conflict, poor parent-child connections, low socioeconomic position, or extreme poverty, have a higher risk of morbidity and early death (Chen et al., 2021). Children raised in food-insecure households are more likely to suffer from vitamin, mineral, and protein deficiencies, which can negatively impact their academic success and adult economic output, creating a cycle of

poverty that is hard to break (Chilton et al., 2007). Children who are food insecure are more likely to suffer linguistic, motor, and social developmental impairments, as well as low academic achievements (Chilton et al., 2007).

Geographic and historical context

Past discriminatory practices by the U.S. government have led to a lack of supermarkets in neighborhoods with Black, Indigenous, and People of Color (BIPOC) populations (Durham County Community Health Assessment, 2020). Results from the Durham County CHA Survey County found a significant racial discrepancy in the number of residents who miss or cut a meal owing to expenses, with more Black participants than white participants reporting skipping a meal due to costs (3.5% of the population in Durham County, North Carolina, 41k out of 303k persons, live below the poverty line, greater than the national average of 12.8%, Data USA, 2020). Additionally, eight historically redlined communities in Durham have a higher risk of extreme precipitation events due to lower-than-average tree coverage and higher than the average impervious surface (Demarco & Hunt, 2018). Results from the 2019 Community Health Assessment survey found that one in ten respondents (10.2%) said they skipped meals because they did not have enough money to buy food. Compared to white residents (6.6%), black people (14.9%) and Latino residents (12.6%) were more likely to have skipped a meal occasionally or regularly in the previous year.

The Food Bank of Central and Eastern North Carolina (FBCENC) aims to combat hunger through their food distribution program and children's nutrition programs for families, children, seniors, and individuals (Food Bank of Central Eastern North Carolina, n.d.). Another organization, Root Causes, focuses on promoting sustainable and equitable food production and access to nutritious food through engaging the Duke medical community (Root Causes, n.d.). The Fresh Produce Program in Durham has put in place a meal delivery system for low-income patients in response to the COVID outbreak (Root Causes, n.d.). According to the Fresh Produce Program's 2020 Report, 12 referral clinics, as well as other Durham-area organizations, sponsored 47 local family farms with an investment of \$13,000, and 90% of its members are BIPOCs (Root Causes, n.d.).

Priority population

Prior to the COVID-19 pandemic, 1 in 4 Latine and 1 in 6 Black residents in the area reported skipping meals or consuming less food due to financial constraints (North Carolina Cooperative Extension, 2020). This includes school-aged Black, Indigenous, and people of color (BIPOC) children as well. Data shows that 11,570

individuals in Durham County are considered food insecure (Feeding America, 2019). Additionally, children aged 0 to 6 make up 46% of those living below the federal poverty line in Durham County (Durham's Children Initiative, 2021). In Durham, as in many areas in the United States, Black and Brown communities experience higher rates of economic insecurity and health concerns (Durham County Community Health Assessment, 2020). Approximately 54% of the county's population is white, nearly 36 percent is black, and 14% of the population is Hispanic or Latine (Census.gov, 2022). Black and Hispanic or Latine populations have greater rates of poverty in Durham, which causes these communities to suffer more from its effects, such as a lack of health insurance and higher rates of food insecurity (Durham County Community Health Assessment, 2020). Additionally, 69.3% of the children were between 36 and 71 months old. Based on these findings, it is crucial for the county to prioritize addressing childhood food insecurity among BIPOC children in their strategy for addressing social determinants of health.

Measures of SDoH

Food insecurity negatively impacts the productivity of the American workforce (According to Children and Families, n.d.). In 2020, the rate of food insecurity increased by 24.8%, with 35.5% being newly food insecure (Niles et al., 2020). Low-income families experienced an 80% increase in food insecurity (Dubowitz et al., 2021). In Durham County, 14% of people were food insecure, compared to the national level of 10.2% (Food Bank of Central and Eastern NC, 2020). Additionally, 20% of children under 18 in Durham County were food insecure, compared to 12.5% nationally (Food Bank of Central and Eastern NC, 2020). However, only 63% of children in Durham County received free/reduced school meals in 2020 (Food Bank of Central and Eastern NC, 2020). The U.S. provided over 3.2 billion meals, with 76.9% being served free or at a reduced price (USAD – National School Lunch Program, n.d.). The poverty level is the key contributor to food insecurity. In Durham County, 14.2% of the people whose poverty status is assessed live below the poverty line, and the national level is 12.8% (Data USA, n.d.). In 2020, data showed that 26.1% of White, 29.5% of Black individuals, and 16.8% live on the poverty line (Data USA, n.d.). Data is presented in Table 15. On a national level, 8.2% of non-Hispanic Whites lived in poverty in 2020, while 17.0% of Hispanics lived in poverty. 19.5% of Black individuals had the most effective poverty rate among the major racial groups (U.S. Census Bureau, 2021).

Rationale/Importance

Addressing food insecurity among children of color is a public health priority. One of the most crucial approaches is to improve children of color general health and well-being. Food insecurity is associated with poor

nutrition, resulting in various health issues such as obesity, diabetes, and other chronic diseases (Moreles & Berkowitz, 2016). Due to systemic issues, children of color will be more likely to grow and develop appropriately if they have nutritious foods, resulting in improved long-term health results (Odoms-Young, 2018). Food Research and Action Center (FRAC) states that well-nourished children are likelier to do well in school, leading to higher academic accomplishment and subsequent economic opportunities (FRAC, n.d.). This can also reduce the demand for public assistance programs, lowering the county's overall fiscal load. Durham County may assist in reducing the inequities between BIPOC and other groups. Food insecurity impacts BIPOC populations disproportionately and tackling this issue can help to establish a more equitable society.

Disciplinary Critique

Registered dietitians and nutritionists use food to promote various outcomes for people. However, nutrition specialists working in public health recognize that structural constraints frequently lead to nutritional disparities since certain parts of the community have higher access to nutritious foods and simply adequate food than others (USDA ERS - Definitions of Food Security). Dietitians and nutrition experts are ideally positioned to advocate for structural reforms that promote equal access to nutritious meals because of this expertise and extensive knowledge of the necessity and effect of adequate nutrition. In addition, they are the bridge between physicians and patients. Doctors communicate current health issues to patients, but people are rarely given tools to modify their lifestyles based on a single doctor's visit.

Reducing child food insecurity can boost a country's economy by increasing productivity and decreasing healthcare expenditures (Feeding America, n.d.). Additionally, it is connected to the rise in the prevalence of chronic health conditions like diabetes and obesity, which raises the cost of healthcare (Feeding America, n.d.). In the long term, addressing child food insecurity can result in a workforce that is healthier and more productive as well as lower healthcare costs. In addition, it can lessen local poverty and social inequality, which are crucial for the growth and stability of the economy. Community stakeholders, such as educators, parents, social service workers, and local organizations, can address food insecurity. Organizations such as FBCENC, Root Causes, and PORCH are working to alleviate this issue by providing supplementary meals to needy children and families in Durham County (PORCH, n.d.). Additionally, providing communities a voice in decisions that impact their lives and neighborhoods. Community engagement is essential for increasing awareness and knowledge of issues. A comprehensive strategy that pinpoints and addresses system deficiencies is required to successfully address food insecure.

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APPENDIX 4.1.a: SOCIAL DETERMINANT OF HEALTH ANALYSIS TABLE

Table 15: Comparison of Food Insecurity in Durham County vs. On The National Level

Measure	Durham County (2020-2021)	National level (2020-2021)
People are food insecure	14%	10.2%
Children who are under 18 years of age are food insecure	20.0%	12.5%
Receiving free/reduced school meals	63%	76.9%
Total percentage of individuals who lives below the poverty line	14.2%	12.8%
Percentage of White individual who are living in poverty	8.2%	17.7%
Percentage of Black individuals who are living in poverty	11.1%	N/A
Percentage of Latine/Hispanic individuals who are living in poverty	29.5%	19.5%

Section 4.2: Nutrition Program Analysis and Implementation

Introduction

An individual's social and community context is composed of the connections they make with others in their home and neighborhood, which are essential to fostering their mental, emotional, and behavioral (MEB) health (NASEM et al., 2019). Adverse childhood experiences (ACEs) can take many forms, including physical and mental abuse, neglect, sexual abuse, substance abuse, and neglect (Kerker, 2015). The more ACEs a child experiences, the more likely they are to suffer from chronic illnesses such as heart disease, diabetes and higher odds of chronic anxiety, depression, and suicidality (Harvard University, n.d.). Data from 2016–2017 indicate that 23.6% of kids in North Carolina have had two or more ACEs (DCPHD et al., 2021; Healthy Communities NC, n.d.) Due to systematic racism, the effects of poverty brought on by a lack of educational and employment opportunities, or both, resilient children may have additional exposure to toxic stress arising from past and continuing traumas (CDC, n.d.). ACEs can exacerbate an intergenerational cycle of underdeveloped MEBs, which also includes racism and poverty (DCPHD et al., 2021). The most common ACEs reported were that 26.2% had parents or adults swearing at them, insulting them, or putting them down (Mwachofi et al., 2020). Black and Latino students in Durham County are particularly vulnerable to the harmful cycle of economic injustice, resource disparities, and health effects that can be brought on by the toxic stress from ACEs in childhood, which impedes development and impairs a person's capacity to cope (DCDPH, 2021).

Evidence Based Nutrition Policy or Program

Individuals who experience food insecurity have limited access to healthy, nutrient-dense foods, leading to a diet that is high in calories but low in essential nutrients (Morales & Berkowitz, 2016). Lack of a nutritious diet impairs MEB formation, which has an adverse effect on stress resistance (NASEM et al., 2019). The influence of ACEs on nutritional status is exacerbated by food insecurity (Jackson et al., 2019). Poor mental and behavioral health in adults can contribute to food insecurity for children by creating an ACE for a child because they live in a household where a parent cannot prepare food (Ke & Ford-Jones, 2015). Food insecurity can result in malnutrition and stress, both of which can have a poor influence on academic performance. This might aggravate emotions of

helplessness and poor self-esteem (Food Research & Action Center, 2018). Food insecurity can result in a lack of access to a range of nutritious foods, leading to diets deficient in vitamins, minerals, and other vital elements (Siddiqui et al., 2020). Another contributing factor to ACEs and increasing domestic violence is food insecurity (Jackson et al, 2019). Researchers found that long-term food insecurity considerably raises one's chance of seeing violence and being a victim of it at home (Helton 2018; Jackson et al, 2018; Jackson et al, 2019).

Black and Latino youth in Durham County have a more significant food insecurity rate. Approximately 20% of children who are under eighteen years old are food insecure in Durham County (Food Bank of Central & Eastern North Carolina, 2021). In Durham, the poverty rate is greater among Black and Hispanic groups, and these populations also face more of poverty's detrimental impacts, such as increased ACEs and food insecurity (DCDPH, 2021). Youth Risk Behavior Survey (YRBS) is stratified by grade level, gender, and race/ethnicity to ensure that the sample is representative of the population of high school students in the country. In order to analyze YRBS data and comprehend the needs and difficulties of different student subpopulations, stratification is a crucial tool (CDC, 2021). Researchers can create targeted treatments and policies to advance the health and wellbeing of all youth by recognizing these characteristics.

In Durham Public Schools, 54.8% of students participate in the free and reduced lunch program (Durham Public Schools, 2023). The significant demand for free lunches among children who do not qualify for free lunch in Durham is evidenced by the fact that 58% of middle school students and 50% of high school students are enrolled in the free lunch option (Durham Public Schools, 2022).

We propose a free school lunch (FSL) program to address the problem of food insecurity, which has a detrimental influence on healthy MEB development among Black and Latino adolescents in Durham. To help prevent this trauma and foster resilience, FSL can help to reduce the stress and financial burden associated with food insecurity, which can further contribute to better health outcomes for children (Jackson et al, 2019; Cohen et al., 2021). FSL in public schools can help reduce ACEs' impact on children's nutritional status (Wagner, 2022). Additionally, an FSL program's cost may be mitigated by an increase in reimbursement under the federal reimbursement scheme for school meals due to serving more meals (Cohen et al., 2021). By lowering household food prices, the implementation of an FSL program throughout all Durham Public Schools will not only improve food security for our group of interest, but also for whole households (Cohen et al., 2021). A FSL program's cost

may be mitigated by an increase in payment under the federal reimbursement scheme for school meals because of serving more meals (Cohen et al., 2021).

Stigma is considered a harmful, health-adverse outcome regardless of its effects on free and reduced meal programs participation (Bhatia et al., 2011). There are various advantages from free and reduced meal programs, such as greater school lunch attendance, reduced stigma for children from low-income homes and their families, and no longer encountering unpaid meal costs and debt (Cohen, 2022). In Maine, school food programs have seen less stigma linked with free lunches after implementing a universal meal program during the COVID-19 pandemic (Cohen et al., 2022). For example, a high school FSL advocator, Aminata Abdouramane states, “I experienced the humiliation of having other students announce that I was in line for the “free-free.” This displays the stigma on socioeconomic status and bullying. Abdouramane suggested “the best way to get rid of this system is to make lunch free for all students” meaning the stigma of free meals can reduce altercations between students (Chalkbeat contributors, 2016). As a result of peer pressure, 18.5% of high school students skip eating at the school cafeteria (Cossitt-Glesner, 2021).

Evidence-Based Outcomes

Students' participation in the free school lunch program will be an immediate indicator of enhanced food access. Presently, 54.8% of Durham Public Schools (DPS) children get free or reduced-price school meals, which is lower than pre-COVID levels (Durham Public Schools, 2023). Nevertheless, after two years of county-wide program implementation, the short-term goal is to boost participation to 60% of children, in line with pre-pandemic levels. Table 16 provides a comprehensive analysis of participation rates since 2019, revealing a considerable drop following the pandemic. Yet, the demand for inexpensive food in North Carolina has not diminished, and the successful introduction of a comparable program in New York City resulted in a resurgence in participation rates (Watts et al., 2021).

After five years, the long-term effects of an FSL program include a potential reduction in poor mental health outcomes among students, as evaluated by the YRBS results in Durham County. YRBS is a nationally renowned survey done by the Centers for Disease Control and Prevention (CDC, n.d.). The survey is conducted anonymously with a sample of students that is representative of the whole student population, guaranteeing that the findings are precise and accurate, thereby, it is a reliable and valid examination of mental health in Durham County (CDC, 2020).

FSL benefits mental health by lowering worry and stress associated with food insecurity, as well as the stigma associated with consuming school meals (Cohen, 2021; Jackson et al, 2018). Reduction in hyperactivity, anxiety, and depression, as well as a decreased spike in disciplinary violations near the end of the month when SNAP benefits are often used up, are behavioral outcomes linked to FSL (Hanks, n.d.). Feelings of sadness and suicidal ideation are among the mental health indicators assessed on the YRBS (CDC & DCoDPH, 2019).

Evidence-Based Implementation Strategies and Activities

Our goal is to extend the FSL program to all 56 schools in the DPS system, following the lead of five other states (Durham Public Schools, 2023). It is based on the USDA's Community Eligibility Provision (CEP), which enables eligible schools to provide breakfast and lunch at no cost to all children (FNS, 2022). Presently, CEP is available to 19 of the DPS system's 56 schools (Durham Public Schools, 2023; Food and Nutrition Service, 2019). The 19 Durham schools that qualify for free lunch will serve as models for scaling and budgeting the logistics of food production as we draw from the lessons learned from the statewide policy extensions of free school meals in all public schools in Maine and New York City (Cohen et al., 2022; Watts et al, 2021).

Several operational elements, including receiving funds from private, district, county, state, and/or federal sources, are necessary to launch an FSL program. Private donations, budget reallocations, grant wins, and government reimbursement via the National School Lunch Program reimbursement structure can all be used to accomplish this (USDA FNS, 2022b). Funding will be secured under the management director's supervision and by public health nutritionists. Using a prototype methodology to allow for any required revisions, the program will be implemented over two years, with 19 schools participating in year one and the remaining eighteen in year two (Lister et al., 2017). This approach is realistic since all North Carolina public schools temporarily provided free lunches during the pandemic, which gives a basic grasp of what is required to scale up the program. Prior to finishing the program across the whole school system, the two-year split implementation will address any substantial issues or resource deficiencies identified from the initial set of schools.

Staff must be recruited and trained for the program. A director of management, representatives from participating schools such as food service supervisors or school nutrition directors, and experts such as registered dietitians (RDs) and public health nutritionists would form a central management group. The management director will be an experienced school nutrition director with a track record of implementing comparable programs.

To prepare for a projected increase in the use of school meals, production must be scaled back, and menus must be improved. In order to scale up production to meet the rising demand for meals and to guarantee that meals deliver more than enough nutrition, RDs and public health nutritionists will collaborate with school employees to develop menus, recipes, and operational methods. Staff members from the 19 schools that already offer free meals will be used as subject matter experts to guide training sessions for other employees and to set the tone for the planning process at every stage.

Throughout the program's introduction and continuation, data on meal consumption, spending, and student attitudes will be collected for evaluation purposes. The food service management and service systems' computerized record-keeping system will be used to acquire meal utilization and financial information. The data will be evaluated at the end of each semester to track participation and financial outcomes. In addition, middle and high school students will be included in focus groups to gather their opinions on the program and any potential influence on the stigma associated with free lunches. The YRBS will be conducted in accordance with the previously stated timetable. At the end of each school year, all available data on participation, stigma, attitudes, and results will be collated and reviewed, and the program will be revised accordingly. In addition, outreach efforts can include school newsletters, flyers, or direct mailings and are meeting the goal of 60% participation.

In anticipation of the FSL program's requirements, we expect to acquire extra equipment. The current equipment will undergo inventory by the school's food service staff, and any defective or missing items will be purchased and installed. Whenever necessary, technicians will provide training on equipment usage and installation to personnel.

The program will be implemented using a prototyping framework to allow for necessary adjustments and changes before being broadly implemented throughout the school system (Wilson et al., 2022). A trial group of 19 schools out of 38 in the DPS system will launch the program for the first time in the fall of the summer of 2022-2023 year. Next, the remaining eighteen schools will join; this will enable the collection of data on any potential challenges, necessary resources, and areas for improvement. By the end of the two years, the program will be accessible to all 56 schools within the DPS system, ensuring that each student has equitable access to FSL. The implementation will be spread out over two years, though, just in case there are any major obstacles or resource shortages that must be fixed before the program is fully implemented across the whole school system, as determined by the first set of schools.

The priority population is Black and Latino children, but the FSL program includes all DPS students. By offering the FSL program to all students, we can effectively reach our priority population without singling them out or causing them to feel isolated or marginalized. Our decision to include all students in the FSL program is a crucial step towards achieving our goal of providing a more equitable and inclusive education for all students. The FSL program addresses the socioecological model on several levels, including the individual, intrapersonal, living and working conditions, and regional, national, and global system. View Figure 6 in the Appendix.

Stakeholders

The major contributors to our program are dispersed across DPS and the surrounding area. The DPS student and parents who will be taking part in the program are our main stakeholders. School foodservice personnel and school administration will be the next most directly impacted group and will be responsible for putting the program into action. View Table 17 of the stakeholders table in Appendix.

Budget

This funding can come from local, state, federal, or private sources. This component entails creating and implementing menus that offer children nourishing meals and adhere to government nutrition standards. Staff from the school district, caterers, and nutritionists often carry out this. View Table 18 of the budget table in the Appendix.

Conclusion

A FSL will ensure that Black and Latino students receive a balanced diet, which is crucial for their physical and cognitive development. This can improve their overall health and reduce the risk of chronic diseases. Hungry children are less likely to focus and learn in school. Free school lunches reduce hunger, food insecurity and improve students' health (Food Research & Action Center, n.d.). When students receive free school lunches, their attendance and enrollment in school are likely to increase. This is particularly important for low-income families who often struggle to provide meals for their children. Although, implementing FSL can be expensive, as it requires a significant investment in infrastructure and personnel to manage and distribute food. Despite this, the advantages of enhancing food security for Black and Latino youth in Durham County and promoting positive physical and mental growth in all Durham County youth are well worth the initial financial burden.

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APPENDIX 4.2.a: POLICY ANALYSIS FIGURES AND TABLES

Table 16: Free and Reduced Meal Participation: DPS

Year	Participation (%)	Source:
2019-2020	64.46%	(Durham Public Schools, 2019)
2020-2021	51.65%	(Durham Public Schools, 2020)
2022-2023	54.8%	(Durham Public Schools, 2023)

Figure 6: Impacts of a Free School Lunch program on different levels of the socioecological model



Table 17: Stakeholders

Stakeholder	Program Involvement
Durham County Board of Commissioners	Serves as a key source of funding for Durham Public Schools through the Durham County budget allotment.
DPS parents and caregivers	Encourage their children to use the free lunch program, helped to destigmatize free lunch, and would have better access to food security due to less financial stress.
DPS students	The primary demographics for and beneficiaries of this program are DPS students. Students can share their opinions on the caliber and appeal of the lunch as well as their experiences with stigma.
Teachers	Encourage students and parents to take advantage of the free school lunch program. At parent-teacher conferences and other interactions with parents/guardians, teachers will also assist in providing information about the program. Instructors can also offer feedback by regularly examining program execution in the cafeteria and how program implementation affects student conduct in the classroom.
DPS administration and foodservice staff	Responsible for delivering the program at no cost to all students. Supportive school administration was shown to lead to higher participation in New York City schools when free school lunch was implemented city-wide (Watts et al, 2021).
NC Department of Public Instruction Office of School Nutrition	Works with schools to administer Federally Assisted National School Breakfast and School Lunch Programs (NCDPI, n.d.). They will ensure the program continues to follow all local, state, and federal regulations for funding and nutrition.
Durham Public Health Department	ACEs, food poverty, and demographic disparities were all identified as issues in Durham by the Community Health Assessment, and we're committed to improving health outcomes for our target group and the county's children for the benefit of the whole community.
School counselors, nurses, social workers	These professionals assess children's physical and psychological health as well as the impacts of poor MEB development daily.
North Carolina Pediatric Society	May advocate to better child nutrition and offer credible clinical evidence in favor of free school lunch, as the New York chapter did in New York City lobbying efforts for free school lunches (Watts et al, 2021).

Table 18: Budget Breakdown

Category	Budget Percentage	Description
Operating	10%	Upgrading the equipment including replacement, repair, and maintenance. Upgrading service software as needed.
Labor/Compensation*	65%	This category includes salaries, benefits, and training for kitchen staff, food service workers, and supervisors. It also includes costs associated with hiring and training new staff.
Food Processing	5%	Expenses related to food preparation that is done safely before serving. includes, but is not limited to, labor expenses, cost of spoiled food, containers, plastic wraps, etc.
Food & Supplies**	20%	This category includes costs associated with purchasing food and supplies from local distributors. It also includes costs associated with transportation and storage of food items.

Source: (Food Insight Group, 2021)

* Due to the chronic underpayment of public health professionals, food service employees, and educators, this component of the budget was raised 10% (from 55%) (Kinder 2020; Gould et al., 2021).

** Due to an increase in the government reimbursement per meal provided, which would subsidize higher food expenses, this budget item was cut by 10% (from 30%). (Long et al., 2021).

Section 4.3: Nutrition Program Analysis and Implementation

Introduction

Social connections are crucial for an individual's mental, emotional, and behavioral health, which are formed through their relationships with others in their community (NASEM et al., 2019). Adverse childhood experiences (ACEs) take various forms such as abuse, neglect, substance abuse, and more, and increase the likelihood of chronic illnesses and mental health issues like anxiety, depression, and suicide (Harvard University, n.d.). In North Carolina, 23.6% of children have experienced two or more ACEs, with some resilient children facing additional stress from poverty and racism (CDC, n.d.; DCPHD et al., 2021; Healthy Communities NC, n.d.). ACEs can perpetuate a cycle of underdeveloped MEBs that includes racism and poverty, and the most common ACE reported is parents or adults verbally mistreating children (Mwachofi et al., 2020). Black and Latino students in Durham County are particularly vulnerable to the harmful cycle of economic injustice, resource disparities, and health effects that can be brought on by the toxic stress from ACEs in childhood, which impedes development and impairs a person's capacity to cope (DCDPH, 2021). By expanding access to nourishing meals through a free school lunch (FSL) program in all Durham Public School (DPS) system schools, we want to increase children's resilience to ACEs. A group of school nutrition experts listed in Figure 7. will implement the expansion of an FSL program throughout the entire district.

Study Design/Data Collection

The selected evaluation method is a quasi-experimental which includes pre- and post-test. The test is being used to evaluate the effect of the FSL program on mental health outcomes among Black and Latino students. The YRBS (Youth Risk Behavior Survey) will be used to evaluate. However, YRBSS data is released every two years (DCPHD, 2019). For instance, 2021 data will be released in spring 2023, thereby, 2023 data will need to be collected soon in order to get the result in spring 2025.

To collect data effectively of the FSL, pre and post-test measures would be collected from students and staff. This would involve administering a survey that assesses student's mental health and food perception, and other relevant factors at the beginning of the study. To measure mental health outcomes, the Revised Child Anxiety and

Depression Scale (RCADS), which has components for generalized anxiety disorder and poor mood (major depressive disorder), will be utilized (CORC, n.d.). View Tables 21 and 22. To measure student's food perception, the survey will be model off the No Kid Hungry survey report (Share Our Strength, 2022). View Figure 8. The results of this survey will allow the FSL program's menus, activities, service, advertising, and other elements to be changed for the benefit of the students and to boost participation. The timing of survey collection is described in the section below under Time.

Focus groups will be facilitated by qualified facilitators using a predetermined set of discussion questions to elicit information about perceived stigma associated with school meals, reasons for participation or non-participation, and ways to enhance school meals generally. Figure 9 has a few examples survey-style questions to get a sense of how students feel about school lunches (Center for Ecoliteracy, n.d.).

Sample and sampling strategy

The data collection method involves purposeful sampling, which entails selecting individuals or groups with expertise or knowledge about interest. This type of sampling strategy can be advantageous for qualitative analysis because it “involves identifying and selecting individuals or groups of individuals that are especially knowledgeable about or experienced with a phenomenon of interest,” to provide insight (Palinkas et al., 2015). The study includes five middle schools and five high schools that have adopted the FSL program, representing approximately 25% of all schools in Durham County. We will adopt a stratified sample technique based on school type and socioeconomic status of the children. Our study requires this sampling technique because we aim to evaluate the effectiveness of the FSL program using a diverse sample that reflects a range of experiences, perspectives, socio-demographic groups, and racial and ethnic backgrounds. By selecting both schools that qualify for the Community Eligibility Provision to represent low-income regions and some that do not to represent more affluent areas.

All DPS students must take 1 credit of combined health and physical education (P.E.) in high school, we would conduct survey in health/PE class (Durham Public Schools, 2019a, Durham Public Schools, 2019b) Thereby, survey will be conducted in health and P.E. classes in high school and “healthful living” classes in middle school. Though we will not limit our selection to specific years to ensure that we get a mix of ages instead of just one age group. Demographic data such as self-identified race, self-identified gender, and year in school will be collected

through surveys. All responses will be kept anonymous. The sample will consist of a mix of schools that qualify for the Community Eligibility Provision (CEP) but do not receive it, as well as more affluent schools.

Selected schools will conduct focus groups with qualified students and staff to represent our target population and school demographics. We would collaborate with school administrators and teachers to identify students who meet the criteria. Individuals for focus groups will be selected using a purposeful sampling strategy, which entails selecting individuals or groups with experience or knowledge on the topic of interest. Two separate non-random focus groups will be conducted, one with students and the other with school nurses, teachers, social workers, and counselors. In the student focus group, diversity will be prioritized, considering socio-economic backgrounds and experiences with school lunches. In the staff focus group, perspectives on the issue and strategies for addressing potential stigma surrounding school lunches will be explored. Focus group members will get incentives. Students who engage in focus groups will receive Loco Pops, and staff employees who do the same will receive lunch.

Specific Measures

We will gather information on outputs and outcomes linked to mental health and acceptability of our program in order to assess one of the key goals, which is to improve mental health outcomes among Durham's adolescents, particularly Black and Latino youth. The outputs, results, and disparities linked to the sampling and data collecting mentioned above are listed in Table 19.

Timing

Evaluation and stakeholder engagement activities will be conducted at various stages during the program's lifespan. The baseline evaluation will take place in the spring of 2023, and data from the 2023 YRBS and student surveys will be collected. The first wave of implementation will commence in the fall of 2023, followed by the second round in the fall of 2024. The two-year review period will begin in the fall of 2025, with data from the 2025 YRBS, student surveys, and focus groups collected. When the surveys and focus groups are completed, data processing will begin in 2025, and analysis and conclusions will be disseminated in 2027, following the publishing of the 2025 YRBS report.

The focus groups will provide qualitative data that will help the FSL program identify potential areas for improvement. By identifying themes such as reduced stigma surrounding school lunches, improved impacts of free meals on food insecurity or mental health, and greater motivation to participate in the program, the researchers can

gain insights on enhancing the program's effectiveness. To determine the program's progress, factors such as a decrease in mental health outcomes such as suicidal thoughts, plans, and attempts, as well as ratings on mental health surveys and a decline in ratings on surveys about school lunches and food insecurity, as well as improvements in perceptions of stigma and desirability will be examined. If progress is not achieved, the researchers will analyze the focus group data to determine how to improve the program in future follow-up steps.

Analysis Plan

Mix-method of both qualitative and quantitative methods will be used to assess the program's effects on mental health outcomes. Focus groups will be used to gather qualitative data, and topical and interpretative codes will be identified using thematic coding, a form of qualitative analysis in which sections of text or images are recorded or identified that are linked by a common topic or idea allowing you to categorize the content and thereby create a "framework of thematic thoughts about it" (Gibbs, 2007).

Before and after the program's implementation, quantitative data from surveys, including the YRBS, will be evaluated to find statistically significant drops in depression and anxiety levels. To evaluate its impact, the data will be categorized by race, gender, and age group (early middle school, late middle school, early high school, late high school).

The prevalence of mental health problems will be reported using the YRBS, and its impact on risk will be examined. To find a reduction in RR, the evaluation will also compute the risk ratio (RR) of anxiety and depression among Durham high school and middle school students before and after adopting free lunch. The cutoff for significance will be 0.05 with a 95% confidence interval. The data's linearity will be evaluated using linear regression. Because the software is not doted in this situation, correlation coefficients will not be relevant.

Funding

To keep the program running for an extended period, several financing sources will be used. They might consist of, but not be limited to, the funding sources shown in Table 20. The County Commissioner budget would have a significant role in long-term funding for the program. If the program is successful in enhancing mental health outcomes for Durham's youth, we propose that the Durham County Commissioners raise property taxes and designate those allocate funds to sustain the program.

Data Use and Dissemination

The data could be given at parent-teacher association (PTA) meetings to enlighten parents about the extent of child hunger and the significance of free school meals. Similarly, county commissioners can utilize the data to make educated decisions about financing and resources for schools and child hunger programs. School newsletters and announcements can be an efficient tool to communicate information to parents and the larger community (see Sample Timeline in Figure 10). Providing parents and caregivers helps benefit the program because it increases awareness about the prevalence of child hunger in their community and it can help build a sense of community and support for the program.

The NC No Kid Hungry chapter can use the data to advocate for legislation and actions that address child hunger, as well as publish the data in academic publications to raise awareness and encourage evidence-based policymaking. This includes campaigning for legislation to enhance access to free school meals and boost state financing for child hunger initiatives. These publications will be made accessible to school libraries and administrators for dissemination to parents and families. The data can also be shared at the NC Child Hunger Leader Conference to indicate areas that require additional focus. Sharing the data with the Morgan Stanley Alliance for Children's Mental Health can assist in addressing the link between child hunger and mental health and promote the wellness of children and youth.

Conclusion

In order to promote public health and address disparities in mental health and nutrition, we propose a nutrition-centered strategy for promoting mental health among our target group. An interdisciplinary strategy is needed to address the issue of mental health equality, building on the knowledge of experts in public health and school nutrition. Collaboration between students, staff, administration, the implementation team, and stakeholders like the Durham County Board of Commissioners is essential for the FSL program we propose to be evaluated successfully. A detailed multidisciplinary assessment of the program will reveal how the FSL program affected nutrition and mental health equity among DPS students and promoted health MEB development in Durham County's adolescents using the mixed methods evaluation approach mentioned above.

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APPENDIX 4.3.a: NUTRITION PROGRAM EVALUATIONS FIGURES AND TABLES

Table 19: Outputs, outcomes, and criteria for program success related to the data sources used for the evaluation

Data Source	Output(s)	Outcome(s)	Success
RCADS general anxiety disorder survey	<ul style="list-style-type: none"> • 100 completed surveys per school • General anxiety scores for each student surveyed (pre- and post-implementation) • Mean general anxiety score with for each strata and overall (pre- and post-implementation) 	<p>Change in overall general anxiety score in sample following implementation of FSL program.</p> <p>Change in general anxiety score among demographic groups of interest following implementation of FSL program</p>	<p>Decreased general anxiety score among Black and Latino students of different age groups following FSL implementation.</p> <p>Decreased overall general anxiety score following FSL implementation.</p>
RCADS low mood (major depressive disorder) survey	<ul style="list-style-type: none"> • 100 completed surveys per school • Low mood scores for each student surveyed (pre- and post-implementation) • Mean low mood score with for each strata and overall (pre- and post-implementation) 	<p>Change in overall low mood score in sample following implementation of FSL program.</p> <p>Change in low mood score among demographic groups of interest following implementation of FSL program</p>	<p>Decreased low mood score among Black and Latino students following FSL implementation.</p> <p>Decreased overall low mood score following FSL implementation.</p>
YRBS	<ul style="list-style-type: none"> • Data collected pre- and post-intervention <p><i>Note:</i> Our evaluation plan will not directly collect the data for YRBS. We will use the reports published by the Durham County Public Health Department.</p>	<p>Change in student reports of depression (overall and by racial/ethnic strata).</p> <p>Change in student reports of considering suicide (overall and by racial/ethnic strata).</p> <p>Change in student reports of attempted suicide (overall and by racial/ethnic strata).</p>	<p>Decreased reports of depression, considering suicide, attempted suicide overall and by racial/ethnic strata following FSL program implementation.</p>
Student Focus Groups	<p>4 student focus groups conducted (2 schools sampled, 2 focus groups per school)</p> <p>Focus group transcripts coded for topical and interpretive themes of</p>	<p>Themes discussed in focus groups provide insight into success of implementation and used to inform improvements to the program in the future.</p>	<p>Students report increased participation, increased desirability, decreased stigma, improved mental health in focus group themes.</p>

	motivation for participation in FSL, desirability of school meals, stigma, and mental health.	Topical and Interpretive themes about topics of interest are identified across focus group transcripts.	
Staff Focus Groups	2 staff focus groups conducted (2 schools sampled, 1 focus group per school) Focus group transcripts coded for themes of desirability of school meals, stigma, behavior changes, and mental health.		Staff report reduced stigma, improved mental health, and increased desirability from their observations of and interactions with students in focus group themes.

Table 20: Potential Funding Sources

The Community Eligibility Provision (CEP)	These federal programs provide ongoing support for school nutrition programs, if the school or district continues to qualify based on the eligibility criteria.
Provision 2/other provisions	Schools that don't meet the requirements for CEP might apply for these other benefits through the USDA to assist cover the expenses of giving children free lunches. The three provisions cycle every two years, every four years, and every four years, respectively.
County commissioner	typically allocate funding on an annual basis, so the timeline for sustaining this funding would be on a yearly cycle.
External grants/donations	Grant funding and donations can vary in terms of their duration and availability. Some grants may be one-time only, while others may be renewable on an annual basis. Donations from individuals or businesses may also vary in terms of frequency and amount. Therefore, the timeline for sustaining these funding sources would depend on the specific grants and donations received.
National School Lunch Program Equipment Assistance Grant	This grant is typically awarded on an annual basis, although it is not available every year. Therefore, the timeline for sustaining this funding would depend on the school's eligibility and the availability of the grant.
Food Lion Feeds Grand	This grant is typically awarded on an annual basis to non-profit organizations. If the school district partners with a non-profit to apply for funding, the timeline for sustaining this funding would depend on the grant's renewal cycle and the success of the partnership.
No Kid Hungry NC	These grants are typically awarded on an annual basis, with a specific timeline for the funding period. Therefore, the timeline for sustaining these funding sources would depend on the renewal cycle of the grants.
Carolina Hunger Initiative BCBS NC Child Hunger Impact Project grants	A three-year collaboration between Carolina Hunger Initiative and BCBS NC will support various school nutrition initiatives. Grants are given out every year.
Philanthropic groups	Private foundations and philanthropic organizations may provide ongoing support for programs and initiatives that align with their mission and goals. The timeline for sustaining funding from these sources would depend on the terms of the grant or donation agreement.

Figure 7: Implementation Team

Core implementation team:

- Implementation Director: a school nutrition director with experience in implementing a free meal program.
- Food service managers and/or school nutrition directors from participating schools.
- Registered dietitian (RDN) experienced in school nutrition programs.
- Public health nutritionists experienced in school nutrition programs.

Team responsibilities:

- Oversee implementation of the free meal program.
- Apply for funding to support the implementation of the program.
- RDN and public health nutritionists will oversee menu planning and recipe development to ensure efficient production.

Other implementation personnel:

- Staff from the 19 DPS schools that receive CEP will act as knowledge experts and assist with staff training.
- Equipment specialists/technicians will install necessary equipment and train staff on proper use, cleaning, maintenance, and storage.

Table 21: RCADS Generalized Anxiety Disorder subscale

Date: _____

Time: _____

Please put a circle around the word that shows how often each of these things happens to you.
There are no right or wrong answers.

		0	1	2	3
1	I worry about things	Never	Sometimes	Often	Always
2	I worry that something awful will happen to someone in my family	Never	Sometimes	Often	Always
3	I worry that bad things will happen to me	Never	Sometimes	Often	Always
4	I worry that something bad will happen to me	Never	Sometimes	Often	Always
5	I worry about what is going to happen	Never	Sometimes	Often	Always
6	I think about death	Never	Sometimes	Often	Always

Table 22: RCADS Low Mood (Major Depressive Disorder) subscale

Date: _____

Time: _____

Please put a circle around the word that shows how often each of these things happens to you.
There are no right or wrong answers.

		0	1	2	3
1	I feel sad or empty	Never	Sometimes	Often	Always
2	Nothing is much fun anymore	Never	Sometimes	Often	Always
3	I have trouble sleeping	Never	Sometimes	Often	Always
4	I have problems with my appetite	Never	Sometimes	Often	Always
5	I have no energy for things	Never	Sometimes	Often	Always
6	I am tired a lot	Never	Sometimes	Often	Always
7	I cannot think clearly	Never	Sometimes	Often	Always
8	I feel worthless	Never	Sometimes	Often	Always
9	I feel like I don't want to move	Never	Sometimes	Often	Always
10	I feel restless	Never	Sometimes	Often	Always

Figure 8: No Kid Hungry Survey Questions

1. Regardless of whether you have eaten school meals in the past or not, how likely are you to eat school meals?
 - a. Very likely
 - b. Somewhat likely
 - c. Somewhat unlikely
 - d. Very unlikely
 - e. Don't know
2. Here are some descriptions of school meals. Please indicate if you think this describes school meals very well, somewhat well, not too well, or not well at all:
 - a. Are easy to get
 - b. Allow you to eat a meal with other students
 - c. Are convenient
 - d. Are affordable
 - e. Allow your family to save money
 - f. Are free
 - g. Are for people like you
 - h. Allows you to build friendships and community with other students
 - i. Are healthy
 - j. Taste good
 - k. Are high-quality
 - l. Are only for low-income families
3. Additional Motivating Factors for your participation in school meals: (Yes/No)
 - a. Knowing that the meals include food you will like and eat
 - b. Having meals be free, at no cost
 - c. Having a website with detailed information about school meals available
 - d. Knowing that most other students at your school were also eating school meals
 - e. Knowing that school meals have to meet specific standards to ensure students are eating healthy, nutritious meals
 - f. Seeing updates about school meals on social media

Figure 9: Example Focus Group Questions

Note: Focus group discussions will not be limited to these questions.

Students – will discuss these questions pertaining to times both before and after program implementation.

- Where do you normally get lunch on school days?
- How often do you eat the cafeteria food? (times per week)
- What are 3 words you would use to describe the cafeteria food?
- How healthy do you think the cafeteria food is on a scale of 1-5 with 1 being most unhealthy and 5 being most healthy?
- How would you rate the taste of the cafeteria food on a scale of 1-5 with 1 being terrible and 5 being delicious?
- Think about students you know who do not regularly eat the school lunch. What changes might make them more likely to participate?

Staff

- What have students told you about their perceptions of school meals?
- Do students ever discuss their reason for participating in school meals? What do they say?
- Have students been bullied about their participation in school meals?
- What changes have you noticed in student behavior and mental health after the FSM program was introduced?
- What three words would you use to describe the school meal program at the school?

Figure 10: Sample Implementation and Evaluation Timeline

Baseline Data Collection: Spring of 2023

- 2023 YRBS data collected
- Pre-implementation student surveys administered

Implementation round 1: Starts Fall of 2023

- 19 non-CEP schools receive FLS program

Implementation round 2: Starts fall of 2024

- 18 remaining non-CEP schools receive FLS program

Post-Implementation Data Collection: Begins Spring 2025

- YRBS data collected in Spring 2025
- Fall 2025: post-implementation student surveys and focus groups conducted

Data Analysis:

- Following the completion of survey and focus group data collection
- Spring 2027: The YRBS data for 2025 has been released and will be analyzed for our evaluation.

Dissemination of findings: 2027, following Data Analysis, and beyond

CHAPTER 5: RACHEL SMITH'S INDIVIDUAL DELIVERABLES

Section 5.1: Social Determinant of Health Analysis

Social Determinant of Health Analysis

Our chosen social determinant of health is social and community context, and our chosen objective is to increase the proportion of children and adolescents who show resilience to challenges and stress.

In 2021, the U.S. Surgeon General declared a youth mental health crisis as grief, trauma, and isolation related to COVID-19 escalated the already worsening mental health of youth in the U.S. (Murthy 2021). Across both the country and the state of North Carolina, children and adolescents continue to struggle with their mental health as evidenced by recent data from the Youth Risk Behavior Survey (CDC 2019). Further, the high demand for mental health services in youth and adolescents shows no signs of slowing down (Mojtabai et al., 2016). Improving youth resilience could not be more essential considering the stressors that a recent and ongoing pandemic can place on a community.

Poor mental health and its resulting low resilience to stress can impact short and long-term health outcomes. **Short** term impacts of poor mental health in youth include low emotional stability, a higher likelihood of engaging in risky behaviors, behavioral problems in school, and harmful impacts on academic achievement (Agnafors et al., 2021). These immediate outcomes set children back in their development, laying a foundation for maladaptive behaviors and increased struggles on the horizon. Mental health is critical for children and adolescents, and long-term impacts are heavily implicated for youth mental health. The global age of onset for most mental health conditions is in teenage years into early-to-mid-twenties (Kessler et al., 2007), making youth mental health critical not only for current emotional stability and academic achievement, but for long-term mental, emotional, and behavioral (MEB) development (National Academies of Sciences, Engineering, and Medicine; Division of Behavioral and Social Sciences and Education; Board on Children, Youth, and Families; Committee on Fostering Healthy Mental, Emotional, and Behavioral Development Among Children and Youth 2019).

Resilience to stress is a critical protective factor for mental health and healthy development (Song et al., 2020). Showing resilience to challenges and stress means that youth can better handle the trials that life brings, from relationships with friends and family to school to even dealing more constructively with the impacts of covid-19. Combine this information with the insufficient supply of providers and the continued progression of covid-19. For this reason, we need to build capacity for youth in the state to have the best chances possible to be resilient in the face of stressors, both current and ongoing.

Durham County is among the largest counties in North Carolina and has a relatively young and diverse population that continues to grow in numbers (Durham County 2020). The county features the second-largest LGBTQ+ population in the state which is notably diverse, with 1 in 5 LGBTQ+ individuals identifying as African American and 1 in 10 identifying as Hispanic/Latino (Durham County 2020). Durham County overall has a larger share of Latino and Black members than the state of North Carolina (Durham County 2020). Mental health in Durham County was already precarious before the pandemic. According to the 2019 Youth Risk Behavior Survey, thirty-two percent of middle school students and thirty-five percent of high school students reported feeling depressed in the past year (CDC 2019). Despite pressing challenges in youth mental health, Durham County has a rich selection of existing mental health resources and programming, including two chapters of national mental health nonprofit organizations (National Alliance on Mental Illness, Mental Health America), El Futuro (a Latinx mental health organization), and a program that connects adolescents with mental health conditions to psychological services. Durham County Public Health hosts a variety of programs, including Together for Resilient Youth (TRY) and the Positive Parenting Program (Triple P), an evidence-based parenting program that teaches parents skills to have better relationship with their children (Durham County Department of Public Health 2023; Durham TRY 2023). In line with national trends, school mental health remains a leverage point for improving youth access to mental health care. Select Durham County public schools have mental health services collocated in their school health programs, reducing barriers to receiving services (Durham Public Schools 2019). Mental health emerged as one of the top five health priorities in the 2020 Durham County Community Health Assessment (Durham County 2020).

The priority population of focus is Hispanic/Latino youth. According to the CDC's Adolescent Behaviors and Experiences Survey (ABES), youth who faced health inequities prior to the pandemic were much more likely to experience adverse behavioral health outcomes such as suicide and substance use during the pandemic (CDC 2022).

The COVID-19 pandemic hit Hispanic/Latino populations particularly hard in Durham County, with Hispanic/Latino populations being starkly overrepresented in positive cases (Durham County 2020). In Durham County, mental health disparities already existed before the pandemic, with 2019 data from Youth Risk Behavior Survey showing Hispanic/Latino middle school students struggling with the highest rates of depression by race (CDC 2019). Focusing on this population will have a positive impact on Durham County considering the large share of the Hispanic/Latino population in Durham, the preexisting and continuing mental health disparities, and the resources available to youth and Hispanic/Latino individuals in Durham County.

In addition to racial and ethnic disparities in youth mental health, Durham County shows a high prevalence of poor mental health days in the Hispanic/Latino community. In 2019, primary data from the Community Health Assessment neighborhood sample showed that over 1 in 10 Hispanic/Latino individuals had a difficult mental health day for over half of the days in the past month (Durham County 2020). Further, there are disparities in mental health treatment accessibility for Hispanic/Latino youth, supported by the 2019 Durham YRBS data as a potential explanation for mental health disparities (Messias et al., 2014). The National Alliance of Mental Illness (NAMI) identifies such a disparity on a national level as well, with Hispanic/Latino youth having over a ten percent lower rate of receiving mental health services (NAMI 2023).

In summary, social and community context is a critical determinant of health, and supporting increased access to mental health services could be a potential way to bolster social and community environment to address mental health disparities for Hispanic/Latino youth in Durham County. The youth mental health crisis and COVID-19 notwithstanding, Durham County has resources in place to improve resilience on a community level and support the mental health of its Hispanic/Latino youth, paving the way for short-term and long-term improvements in health outcomes.

As a health policy practitioner, I understand the levers available to impact communities both in the present (via programs) and institutionalize these impacts (via policy). Training in policy analysis helps me to get a quick grasp on implications of counterfactual policy options and communicate both the potential benefits and costs of options to stakeholders. Policy experts, informed by health economics and political realities, can bring a balance of feasibility and effectiveness when comparing approaches to changing organizational behavior. There are few other disciplines that target the socioeconomic environment so directly, and this is the very foundation of health equity-influencing the determinants that exist to shape the public's health. Policy analysts think in systems and improving

the system that supports community resilience to stressors in a time of crisis for youth mental health could be pivotal in addressing mental health disparities in Hispanic/Latino youth.

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Section 5.2: Policy Analysis

Problem statement

Our chosen social determinant of health is social and community context, and our chosen objective is to increase the proportion of children and adolescents who show resilience to challenges and stress. Resilience to stress is strongly correlated with positive mental health and facilitates healthy mental, behavioral, and emotional development (National Academies 2019; Hu et al. 2015; Srivastava 2011). It is no surprise that mental health emerged as one of the top five health priorities in the 2020 Durham County Community Health Assessment; even before the pandemic and the ensuing youth mental health crisis, Durham County children and adolescents were struggling with their mental health (Durham County 2020). According to the 2019 Youth Risk Behavior Survey from Durham County, thirty-two percent of middle school students and thirty-five percent of high school students reported feeling depressed in the past year (CDC 2019). Aligning with national trends, Black and Latinx youth in North Carolina were disproportionately affected by the economic and health impacts of the pandemic and faced more barriers to seeking behavioral health treatment, contributing to mental health disparities (Panchal et al. 2021; Durham County 2020). Improving youth resilience and coping could not be more essential considering the stressors that a recent and ongoing pandemic can place on a community.

Summary of policy options

Option 1: Direct All Eligible Durham Public Schools to Apply for and Participate In Universal Free Meals via the Community Eligibility Provision in the National School Lunch Program

Free and reduced school lunches are an evidence-based approach to improving youth resilience to stress by lowering the mental distress associated with food insecurity and better resourcing youth with the nutrition needed to learn, socialize, and cope with everyday challenges (National Academies, 2019). County Commissioners are advised to direct all eligible Durham Public Schools to apply for federal coverage through the Community Eligibility Provision (CEP). Participating in the CEP program will allow all students at qualified schools to have access to free

meals. County Commissioners would allocate limited funding to support application, program setup, and early implementation costs.

Option 2: Support Durham Public Schools' (DPS) Efforts to Expand Implementation of Evidence-Based Social-Emotional Learning (SEL) Programs

Social Emotional Learning is a process that promotes student resilience and development through five core competency areas: self-awareness, self-management, social awareness, relationship skills, and responsible decision-making (CASEL, 2023). In this approach, County Commissioners would fund the expansion of a high-yield SEL program (the Second Step Elementary Program) to all elementary Durham Public Schools (DPS) that elect to participate. Currently, the program operates in eight out of the thirty-one DPS elementary schools. Second Step is an effective program and meets the highest attainable evidentiary standard under the Every Student Succeeds Act (ESSA) (Grant et al., 2017).

Evaluation criteria

The policy options are compared based on four criteria: cost, impact, political feasibility, and equity. Cost and impact taken together provide an idea of how much benefit each unit of value will deliver for its cost. We then consider political feasibility and equity.

Policy Analysis for Option 1

County Commissioners would direct all eligible Durham Public Schools to participate in the Community Eligibility Provision (CEP) of the National School Lunch Program (NSLP). CEP is a voluntary federal program designed to provide universal free lunch to all students at participating low-income schools. CEP participation is an evidence-based approach for decreasing food insecurity, which has a significant impact on mental health and resilience to stress and is a barrier to healthy mental, emotional, and behavioral development (Pourmotabbed et al., 2020) (National Academies, 2019). Under the direction of the County Commissioners, relevant Durham Public Schools personnel (administration and resources staff) would decide whether to apply on an individual school level or as a group of schools, with groups having higher chances of remaining eligible for CEP reimbursements at the end of the four-year cycle (USDA, 2016). Funding would be allocated to the CEP-eligible school or group to support programmatic startup costs. Advantages of universal lunch include higher utilization of free or reduced lunch, a lower likelihood of stigma and bullying for students facing food insecurity, and reductions in administrative

burden for low-income parents (Martinelli et al. 2022), The evidence base for CEP adoption shows improvements in attendance, behavior, and academic performance for students,^{11,12 13} as well as reductions in documentation burden and unpaid meal debt for schools (Zerbino and Franco 2022)(Schwartz and Rothbart 2020; Bipartisan Policy Center 2022).

Performance on criteria

Cost- School-level CEP eligibility data is readily available (at least 40% of students in school must be eligible for another means-tested national food program, e.g., SNAP or TANF, and costs for application and program start-up are expected to be limited (FRAC, 2023; NC DPI, 2023). Federal reimbursements are calculated generously and often raise school revenues, but schools could use the allocated county funding as a backup to cover outstanding costs if reimbursements were ever insufficient (USDA, 2016) (Department of Education 2014)(Landry & Simmons, 2022).

Equity- Since all students in a qualified school are eligible to receive meals at no cost to the individuals or families, this option scores high on equity. Serving free/reduced meals to all will allow those facing food insecurity to receive meals without being separated from others. Further, the onus of applying for free/reduced lunch will not be on the households of low-income youth.

Impact- Currently, 19 out of 37 CEP-eligible and near-eligible Durham Public Schools participate in the program, 10 of which currently meet criteria but have not yet adopted CEP (FRAC 2023). CEP adoption in these 10 schools would serve the approximately five-thousand students enrolled (DPS 2022; FRAC 2023; NC DHHS 2021).

Political feasibility- Since CEP is effective in reducing school debt from unpaid meals, the program will likely garner strong public support from the influential Durham Public Schools Board of Education.

Policy Analysis for Option 2

Support Durham Public Schools' Efforts to Expand Implementation of Evidence-Based Social-Emotional Learning (SEL) Program

County Commissioners are advised to appropriate county funding to expand evidence-based Social-Emotional Learning (SEL) interventions in Durham Public Schools (DPS). SEL is a well-known approach to promoting youth mental health and resilience through interventions that develop students' interpersonal and emotional regulation skills and decrease the likelihood of engaging in risky behaviors (Payton et al. 2000)(Mahoney

et al. 2018). Durham Public Schools (DPS) is required under North Carolina law to incorporate SEL into their curricula and has made strides in doing so, with SEL programs underway in all age groups (NASBE 2023; DPS 2023). In this approach, County Commissioners would appropriate county funds to support the expansion of the Second Step Elementary Program (currently operating in eight DPS schools) to all interested DPS elementary schools. The program, validated in randomized controlled trials, has the highest attainable evidentiary standard under ESSA and shows efficacy in schools with student characteristics similar to Durham County ((CASEL 2023). Teachers would attend onsite curriculum trainings by program administrators, and the school's cross-functional SEL team would oversee program implementation and fidelity (DPS 2023).

Performance on criteria

Impact- Up to 11,983 elementary students in newly adopting schools (up to 23 potential expansion schools* 521 average DPS elementary enrollment) could benefit from the universal program's capacity to improve behavior and reduce emotional distress (CASEL 2023)(CASEL 2023)(NC Reports 2018). Choosing to expand an elementary SEL program maximizes impact, as elementary school SEL programs have shown greater effectiveness than middle and high school SEL programs (Wrabel et al., 2018).

Cost- The approach likely would not perform well on cost if several schools elected to adopt the program. The Second Step Elementary Classroom Kits alone cost approximately \$2400 per school, with maximum adoption reaching a total of \$55,200.

Political feasibility- According to North Carolina's state statute, the local board of education and local community are both key stakeholders and work in tandem to implement SEL. Key community stakeholders could include Durham Together for Resilient Youth (TRY), an organization that promotes resilience in at-risk youth through social support, programming, and knowledge generation (Durham TRY 2023). Durham TRY would be likely to work on this issue as it aligns with their mission of promoting positive health and mental health outcomes for under resourced youth.

Equity- While SEL can promote a positive learning environment for social and emotional development, evidence is mixed on SEL's equity impacts, as many SEL programs were not explicitly designed with an emphasis on equity.(Ramirez et al., 2021)

Conclusion

Option 1, universal free meals in schools that qualify for the Community Eligibility Provision (CEP) is the preferred option for promoting resilience in youth. Food insecurity has devastating impacts on mental health and overall wellbeing in youth, while having guaranteed nutrition for all students will decrease distress and stigma around buying meals. To assess implementation, we will track CEP program participation for each eligible school and student participation rates in free/reduced lunch CEP schools (process measure). For new CEP schools, we will survey students on perceptions of socioeconomic stigma and mental health status before and after CEP implementation (outcome measure).

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APPENDIX 5.2.a: POLICY ANALYSIS FIGURE

Table 23: Policy Analysis (Figure 1)

Criteria	Option 1	Option 2
Impact	-	+
Cost	+	-
Political feasibility	+	-
Equity	+	-

Section 5.3: CEP Program Budget

Budget Summary

The national Community Eligibility Provision (CEP) aims to reduce childhood malnutrition by serving universal free lunch to students in qualified schools (schools in which 40% or more of the student body qualifies for a federal nutrition program such as SNAP or TANF). By adopting CEP, qualified Durham Public Schools (DPS) can expect to reduce food insecurity and stress for low-income students while providing nutrition to support healthy development. CEP increases participation in free meal programs by reducing barriers that occur in more traditional programs. For example, compared to the National School Lunch Program (NSLP), students, parents, and schools participating in CEP could see reductions in socioeconomic stigma, administrative burden, and financial strain.

The CEP program will be primarily funded by the federal government, with a substantial quantity of meals reimbursed at the generous federal “free” rate. County Commissioners will appropriate \$6,163,878 in funding overall to support Durham Public Schools in CEP program implementation. Though the proposed program has operational components, most of the proposed county-level funding will act as a financial reserve for schools to use in cases wherein meal costs exceed federal reimbursement amounts, thus encouraging qualified schools to adopt CEP. CEP-adopting schools would no longer need to charge students for meals or process free and reduced lunch applications. Schools would need to count meals served, however. We will employ a cross-functional team to coordinate group efforts across new CEP-adopting schools to manage program implementation, oversight, and marketing. If applying as a group, 14 Durham Public Schools are estimated to adopt CEP, thus providing free lunches for approximately 9,716 students (see Program Costs).

Despite generous federal reimbursements, adopting CEP can be financially burdensome to schools; we thus chose to present an incentive rather than a mandate. Due to the potential for this financial burden, we suggest the County Commissioners appropriate funds to supplement meal costs, both to compensate for any losses schools might sustain and to prepare for the typical five percent increase in participation seen in CEP adopting schools. Further, in providing an incentive rather than a mandate 1) we hope to be consistent with federal requirements, under which individual schools can elect CEP participation and 2) the Durham Board of County Commissioners

typically funds such school efforts. To address program goals, we will employ a cross-functional team that follows CEP implementation best practices such as funding for marketing and outreach to parents (USDA 2016).

Budget Narrative

SECTION 1: STAFF COSTS

Roles and responsibilities of program staff are listed below.

1. Nutrition Program Coordinator- The Nutrition Program Coordinator oversees program implementation, coordination, quality of meal services, and operations (e.g., reviewing progress reports, managing county funds, ensuring that schools meet increased demand for meals, ensuring quality of meals to optimize participation (USDA 2016).
2. Program Specialist- The Program Specialist provides technical assistance (e.g., school program adaptations for meal counting, cafeteria staff reorganization, fielding school staff questions) and manages quality assurance (e.g., implementing best practices, generating progress reports) in CEP-adopting schools.
3. Marketing Coordinator- The Marketing Coordinator creates and disseminates communications to parents and students regarding CEP programming, as is best practice for increasing student lunch participation (e.g., information sessions, marketing emails, clarifying conversations with parents) (USDA, 2016). The Marketing Coordinator will be part-time, managing ongoing communication with households and focusing efforts on key times and events (e.g., back-to-school advertising, school board meetings).

Assumptions: Position salaries and training costs are aligned with market rates (Glassdoor 2023a; Glassdoor 2023c; Glassdoor 2023b)(Markovic 2023). Fringe benefits are specified as 30% of salary for taxes and insurance, and staff costs are expected to increase 2% a year. Regarding travel, staff primarily work remotely and can visit schools as needed to supervise the programs and access materials. Staff are thus expected to cover their own transportation costs but can request mileage reimbursement at the federal rate through the CEP Adoption Award Fund (available for the first two years) or the County Meal Support Stipend line items, contingent on funds remaining at the time of

application (for the CEP Adoption Award Fund) or at the end of the year after meal debt is paid (for the County Meal Support Stipend) (see Section 2: PROGRAM COSTS.)

SECTION 2: PROGRAM COSTS

CEP Adoption Award

The CEP adoption award is an incentive provided for newly adopting CEP schools in their first two years of adoption. Each school will receive \$10,000 annually for the two years. Award funding will be earmarked for improving the school's nutrition program in order to optimize student participation and outcomes (USDA 2016). As noted above, we anticipate 14 schools as new adopters of CEP. Assuming schools do not cancel CEP participation in the two years (once enrolled, they remain eligible for 4 years), County Commissioners would allocate **\$280,000** in total for the CEP Adoption Award. Note that opting into CEP is free of charge and eligibility is already calculated due to the ISP (Identified Student Percentage, the proportion of students in a school who already qualify for means-tested federal nutrition programs); thus funding will not be needed for application costs.

B. County Meal Support Stipend

The County Meal Support Stipend acts as a financial reserve for schools to use in cases where meal costs exceed federal reimbursement amounts. There are 18 eligible and near-eligible schools in Durham Public Schools that have not yet adopted CEP¹. With a median national take-up rate of CEP among eligible schools of 77.9%, 14 DPS schools are projected to adopt CEP. In all 14 schools, yearly meal costs are projected to be **\$6,194,992.62 without reimbursement** (FRAC 2023)(NC Legislature 2004)(SNA 2023).

The **County Meal Support Stipend** is the CEP difference, or the projected difference between expected yearly county **meal expenditures (\$6,194,992.62) and expected federal reimbursement**. The projected difference from one year of federal reimbursement is \$1,770,398.70, with the total county stipend consisting of **\$5,311,196.10** for all three years. Federal CEP implementation guidance provides a formula for calculating federal reimbursement at the paid and free rates. 66 percent of meals will be reimbursed at the federal free rate (GPO 2022)(USDA, 2016).

C. **Equipment**

All staff members will be provided with work laptops to conduct program operations, analysis, and communications. To keep email addresses confidential, the Marketing Coordinator will conduct email outreach on their work laptop. Business laptops of the required quality will cost approximately **\$3,000** (Stowers 2023).

Note on supplies: staff will use school materials such as paper, tape, toner, and other office materials for flyers as needed for marketing and program operations.

SECTION 3: REVENUES

D. **Federal funding**

Processes for calculating federal funding are outlined above under County Meal Support Stipend. We use the federal free and paid rates, as well as CEP implementation guidance, to calculate anticipated federal funding (USDA 2016). Projected annual federal funding for program reimbursement totals to \$13,273,782.

E. **County funding**

County funding encompasses the *CEP difference* (calculated above under County Meal Support Stipend) and all other program and staff costs, reaching a total of **\$6,163,878**.

Supplemental calculations:

The average ISP of the 18 eligible and near-eligible schools is 0.412777777779

((.75+.54+.53+.41+.4+.43+.47+.43+.42+.35+.35+.37+.3+.38+.3+.31+.39+.3)/18)

meaning that if all 18 schools were to apply as a group, they would collectively qualify for CEP (ISP >= 40) (FRAC 2023).

*Projected CEP school uptake: 18 schools * 77.9% take-up rate = 14.022, ~14 newly adopting schools*

Yearly meal costs in all 14 schools: (~694 students (average number of DPS students at each potential CEP school)

*.9046 utilization rate (average CEP utilization rate for DPS students) * 185 school days per year* 14 schools)) **

\$3.81 average cost of school lunch in the US)

*County meal support stipend for 3 years: (\$1,770,398.70 * 3 years)*

*CEP Adoption Award: (\$10,000 * 14 schools * 2 years = 280,000)*

Meals reimbursed at federal free rate: *The ISP (.41, calculated from the average ISP of the 18 potential CEP schools) times the 1.6 multiplier, yielding rate (\$3.93/meal and the remaining 34 reimbursed at the paid rate (\$0.37/meal)*

Cost of business laptops: *(\$1,000*3 people= \$3,000)*

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APPENDIX 5.3.a: SOCIAL POLICY BUDGET TABLE

Table 24: Policy Budget Table

3-Year Budget					
COUNTY REQUEST- Line items					
Year		Y1	Y2	Y3	total
Staff Costs					
	Salaries	117,500			
	Fringe benefits (taxes, health insur	35250			
	Training	3756			
	Travel	0			
Total		156,506	187807.2	225368.64	569,682
Year		Y1	Y2	Y3	
Program Costs					
	County meal support stipend	1,770,399	1,770,399	1,770,399	5,311,196
	CEP Adoption Award	\$140,000	\$140,000		\$280,000
	Equipment	\$3,000	-	-	\$3,000
Total		1,913,399	1,910,399	1,770,399	5,594,196
		Y1	Y2	Y3	
Revenues					
	Federal government meal reimburse	4424593.91	4424593.91	4424593.91	13273781.7
	County commissioners (program c	2,069,905	2,098,206	1,995,767	6,163,878
Total		6,494,499	6,522,800	6,420,361	19,437,660

CHAPTER 6: HALEY WILLIAMS'S INDIVIDUAL DELIVERABLES

Section 6.1: Social Determinant of Health Analysis

Social Determinant of Health (SDoH)

The social and community context one lives in greatly determines health outcomes, both physical and mental. Mental health was one of the health priorities identified in the 2017 and 2020 Community Health Assessments (CHAs) (DCPDH et al., 2021; DCPDH & Partnership for a Healthy Durham, 2021). However, improving mental health in a county is not as simple as providing access to therapy. Experiencing stress is a crucial part of development to learn coping skills and behaviors during childhood, but excess stress, in childhood can affect physical and mental health across the lifespan (Audage & Middlebroks, 2008; NCIPC, March 2022b). Adverse childhood experiences (ACEs) “are traumatic events that occur in childhood (0-17 years)” including physical or emotional abuse, neglect, exposure to violence, and caregiver mental illness and can impact health outcomes across the lifespan (Kaiser Permanente, n.d.). When a child experiences prolonged exposure to stress or ACEs, they are unable to manage the stress on their own and their body undergoes a prolonged stress response (Audage & Middlebroks, 2008).

Short-term effects of prolonged stress include biochemical changes in the brain, altered brain development, and altered functioning of the nervous and immune systems (Audage & Middlebroks, 2008). Long-term effects of ACEs manifest throughout adolescence and into adulthood. The ACEs study found a dose response relationship between experiencing ACEs and many of the leading causes of death in adults at the time of data collection. (Felitti et al., 1998; NCIPC, March 2022b). For example, analysis of the original data set found a 4- to 12-fold increase in risk of alcohol and/or drug abuse, depression, and attempted death by suicide (Felitti et al., 1998; NCIPC, March 2022b). However, the effects resulting from toxic stress and ACEs can be mitigated with appropriate support and intervention from adults (Audage & Middlebroks, 2008). Addressing the issue of toxic stress during childhood will improve children’s health and their health well into adulthood.

Geographic and Historical Context

Durham County is home to three hundred twenty-six thousand people as of 2021 data. Approximately 35.9% of the population is Black or African American and 13.8% Hispanic or Latino. Almost 90% of the population age 25 and older has a high school diploma. Approximately 13.4% of the population is impoverished (U.S. Census

Bureau, 2021). A state-wide analysis found that ACEs were statistically significant predictors of poor mental health in adulthood among North Carolina adults (Mwachofi et al., 2020).

According to the 2021 State of the County Health (SOTCH) report for Durham County, efforts to improve mental health of the county shifted slightly after the pandemic began. The Partnership for a Healthy Durham Mental Health committee developed a mental health resource brochure to distribute to the community following community conversations discussing increased needs for mental health services following the start of the pandemic. In addition, The Durham County Criminal Justice Resource Center (CJRC) received a \$467,696 grant as part of the United States Department of Justice for the Mental Health Court Expansion Initiative to expand the capacity of Durham County's existing Mental Health Court (DCPDH & Partnership for a Healthy Durham, 2021). Durham T.R.Y. is a grassroots organization that seeks to improve mental health, specifically increasing resilience and reducing exposure to risk factors for youth in Durham County using a public health model (Durham T.R.Y., 2023). El Futuro is another community-based organization in Durham County that "provides comprehensive mental health services for Latino families" (El Futuro, n.d.). Their efforts in 2021 reached 1613 clients, 54% of which were unaccompanied minors and 92% of clients reported improved function in social and family roles (El Futuro, n.d.).

Priority Population

The priority population will be defined as BIPOC children in Durham County. Detailed in the Measures of SDoH section below, there is a significant disparity in mental health-related outcomes for BIPOC youth¹ in Durham County, specifically Black and Latino youth. For example, the 2019 Youth Risk Behaviors Survey (YRBS) found that students surveyed who identified as Latino, Black, and other races were four times as likely to have attempted suicide than surveyed white students. Black and Latino students also reported the highest rates of considering suicide and making a suicide plan, both among middle and high school students, compared to white students (Durham County Public Health Department, 2019). Disparities are not limited by age. Mentioned above, exposure to ACEs is associated with several chronic health conditions and health outcomes, including but not limited to heart disease, cancer, diabetes, and suicide (CDC, 2016). Significant disparities in these conditions exist along racial lines. (American Cancer Society, 2023; CDC, 2022; Javed et al., 2022; Meng et al., 2016). These data emphasize the importance of intervening in childhood to address toxic stress resiliency, mitigate the effect of ACEs on adult health,

¹ Youth defined as people age 17 and younger.

and reduce disparities in health outcomes associated with ACEs.

Measures of SDoH

Childhood exposure to toxic stress is not easily captured in data. Most analyses focus on exposure to ACEs, prevalence of mental health diagnoses, and suicidality in childhood and adulthood to evaluate the outcomes associated with toxic stress exposure. There is a clear disparity in suicidality among Black and Latino students in Durham County compared to white students, detailed in Table 25. The rates of attempted suicide among Black and Latino students are much higher than among White students, and non-White students have four times the risk of attempting suicide compared to White students (DCPDH, 2019). Even though Durham County's suicide rate is lower than North Carolina overall, that doesn't mean the issue of deaths by suicide is something to be ignored. In a comprehensive meta-analysis, exposure to only one ACE is associated with 1.99 times the odds of an anxiety diagnosis, 2.01 times the odds of a depression diagnosis, and 2.33 times the odds of suicidality compared to no ACE exposure (Sahle et al., 2022).

Rationale/Importance:

Given that 23.6% of children in North Carolina have experienced two or more ACEs, there is a great need to provide resources to those children to prevent adverse outcomes (DCPDH et al., 2021; Healthy Communities NC, n.d.). ACEs are costly, both economically and socially (CDC, 2021). For example, child maltreatment is associated with an estimated \$428 billion in economic burden in the US (CDC, 2021). Addressing the impact of ACEs by promoting childhood resilience to stress would significantly reduce the health impacts on Durham's population, but also would have other benefits such as decreased depression in adults and increased employment and education levels (CDC, 2016). Reducing the impact of ACEs will also reduce the costs associated with the negative health outcomes that result from ACE exposure (CDC, 2021). Addressing ACEs and toxic stress management in children will help prevent and break the cycle of ACE perpetuation (Raising Children Network, 2021). When children learn healthy coping skills, their mental health will improve, and they are less likely to engage in inappropriate response behaviors such as aggression (Raising Children Network, 2021). Interventions that disrupt perpetuation of ACEs and toxic stress among BIPOC youth in Durham will help reduce their economic impacts on Durham County. Financial resources could then be allocated to other programs to address other public health issues. Investing in a childhood stress resiliency program is an investment in Durham County's future health and economy.

Disciplinary critique:

It is important to have Registered dietitians (RDs) and/or public health nutritionists (PHNs) involved in addressing the issue of ACEs because experiencing ACEs is associated with higher odds of food insecurity (Jackson et al., 2019). RDs and PHNs are in the best position and have the best training and expertise to promote food security for the community. These professionals successfully teach families and children how to create healthy meals and make the most of available resources in programs like SNAP-Ed (Ryan-Ibarra et al., 2020). It is important to integrate a reciprocal relationship between RDs and/or PHNs and a childhood resilience program because addressing food security promotes parent and child-wellbeing and can reduce the impact of circumstances that may contribute to ACEs (Jackson et al., 2019).

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APPENDIX 6.1.a: NUTRITION PROGRAM EVALUATION FIGURES AND TABLES

Table 25: Key measures associated with childhood exposure to toxic stress

Indicator	Population	Measure	Source(s)
Suicide rates (per 100,000 residents)	NC (2018)	13.8%	(North Carolina Department of Health and Human Services & Division of Public Health/State Center for Health Statistics, 2019; Durham County Public Health Department et al., 2021)
	Durham County (2013-2017)	8.6	
	Durham County (2014-2018)	8.5	
	Healthy NC 2030 target	11.1	
Prevalence of children who have experienced 2/+ ACEs	North Carolina (2016-2017)	23.6% of children	(Durham County Public Health Department et al., 2021; Healthy Communities NC, n.d.)
Attempted suicide (prevalence)	Middle school students in Durham County surveyed	Black: 16%	(Durham County Public Health Department, 2019)
		Latino: 21%	
		White: 21%	
Attempted suicide (prevalence)	High school students in Durham County surveyed	Black: 13%	(Durham County Public Health Department, 2019)
		Latino: 17%	
		White: 4%	
Attempted suicide (relative risk)	Middle and high school students that identify as Latino, Black, or other races surveyed	4 times as likely (compared to white students)	(Durham County Public Health Department, 2019)
Odds of anxiety diagnosis given exposure to 1 ACE	Meta Analysis Pooled Data	1.99 times the odds (odds ratio)	(Sahle et al., 2022)
Odds of depression diagnosis given exposure to 1 ACE	Meta Analysis Pooled Data	2.01 times the odds (odds ratio)	(Sahle et al., 2022)
Odds of suicidality given exposure to 1 ACE	Meta Analysis Pooled Data	2.33 times the odds (odds ratio)	(Sahle et al., 2022)

Section 6.2: Nutrition Program Analysis and Implementation

Introduction

The social and community context one lives in is a powerful social determinant of health. Adverse childhood experiences (ACEs) including abuse, violence, neglect and/or other traumas can negatively impact mental, emotional, and behavioral (MEB) development in children, leading to poor resilience to stress and challenges. (NASEM et al., 2019; Petruccelli et al., 2019) The relationship between ACEs and negative health outcomes including chronic diseases, mental health, and risk of substance abuse has been well established (CDC, 2021; Chang et al., 2019; Heron, 2016; Mwachofi et al., 2020). According to data from 2016-2017, 23.6% of children in North Carolina have experienced two or more ACEs (DCPHD et al., 2021; Healthy Communities NC, n.d.). Prioritizing the prevention of ACE exposure will not only align with the Healthy North Carolina 2030 goal of reducing exposure to two or more ACEs, but also will reduce the negative health outcomes and reduce healthcare costs among this population (NCIM, 2020; Office of the Surgeon General, 2020). In Durham County, Black and Latino populations experience a greater burden of ACE exposure than other groups, and addressing ACE exposure among these populations can help to address systemic racism that contributes to inequities in mental and physical wellbeing (DCPHD et al., 2021).

Evidence-Based Nutrition Program

Without proper nutrition, healthy MEB development is impaired, negatively impacting resilience to stress (NASEM et al., 2019). Overall food insecurity prevalence in Durham County in 2020 was 11.3% while the prevalence among children was 18.8%, 21% among Black residents, and 19% among Latino residents compared to 7% among white residents (Feeding America, 2020a; Feeding America, 2020b; Feeding America, 2020c; Feeding America, 2020d; Feeding America, 2020e). These data indicate the Black and Latino populations in Durham County experience a disproportionate amount food insecurity, especially children and youth. Children in households with low food security are at greater risk of experiencing violence in the home, and violent behaviors in the home may be activated by stress from food insecurity (Helton et al., 2019; Jackson et al., 2019; Jackson et al., 2018). Food

security programs present as an unconventional yet critical tool in the prevention of ACEs in children (Helton et al., 2019).

Results from the 2017 Youth Risk Behavior Survey (YRBS) found 13% of Black students and 17% of Latino students reported attempting suicide compared to 4% of white students, indicating disparities in mental health are present among Durham County's students. (DCPHD, 2019). Food insecurity is associated with behavioral outcomes including apathy, lack of motivation, lower classroom engagement, impaired social skills, and greater involvement in physical altercations in school-aged children and teenagers (Hanks, n.d.). Additionally, mental health outcomes including risk of anxiety and irritability in children and risk of depression, bipolar disorder, and suicidality in teenagers are also associated with food insecurity (Hanks, n.d.).

Currently 54.8% of students in all Durham Public Schools (DPS) utilize the free and reduced lunch program (Durham Public Schools, 2023). Additionally, 58% of middle school students and 50% of high school students are enrolled specifically in the free lunch option, indicating a high need for free meals for children in the county (Durham Public Schools, 2022). To address the issue of food insecurity compounding the negative impact of ACEs on healthy MEB development among Black and Latino youth in Durham, we propose a free school lunch (FSL) program.

Free meal programs are growing in popularity and number in European countries and in some US states (Cohen et al., 2022). After adopting a universal free meal (UFM) program during the COVID-19 pandemic, Maine enacted a policy to continue UFM statewide for the 2022-2023 school year (Cohen et al., 2022). Surveys completed by public and charter school food authorities (SFAs) in Maine were analyzed to assess the impact of this policy. Participation in school meal programs increased, stigma for students from lower-income households and their families was reduced, and burden of unpaid meal debt was reduced (Cohen et al., 2022). The main challenge reported was the increase in costs associated with the program (Cohen et al., 2022).

Durham County's annual budget shortfall to meet the food security needs in the county is \$20.538 million (Feeding America, 2020d). The creation of an FSL program in all Durham Public Schools would not only likely increase food security among our population of interest, but also would promote food security for entire households by reducing household food costs (Cohen et al., 2021; Marcus & Yewell, 2022). Additionally, the federal reimbursement structure for school meals may result in an increase in reimbursement from an increase in meals served (Cohen et al., 2021; Long et al., 2021). Administration burden will also be lowered, as less paperwork will

need to be processed to evaluate students' free/reduced status on an individual basis (Landry & Simmons, 2022; Long et al., 2021; Martinelli et al., 2022). Producing greater quantities of meals is also more cost effective; combined with reduced administrative burden and increased federal reimbursement, the cost of a FSL program can be offset (Long et al., 2021; Martinelli et al., 2022).

Stigma plays a significant role in students never participating or discontinuing participation in free and reduced meal programs (Bhatia et al., 2011). A first-person perspective piece described the constant bullying and hierarchical social class system that resulted from a non-universal free and reduced meal program. The author states "the best way to get rid of this system is to make lunch free for all students;" if everyone can get a free meal, there would be less "othering" of students who need it (Chalkbeat Contributors, 2016). One analysis found up to 18.5% of high school students do not participate in school meals because their peers do not participate (CFSAC, 2021). Of school food authorities in California that implemented UFM, 79.2% reported increased participation in school meal programs and 39% reported reduced stigma surrounding school meal participation (Zuercher et al., 2022).

Evidence-Based Outcomes

An analysis of data from 508 schools that participated in the Community Eligibility Provision (CEP) of the Healthy Hunger Free-Kids Act that were eligible to supply UFM found that lower costs for a UFM program can be achieved without compromising the nutritional quality of the free meals provided (Long et al., 2021). Behavioral outcomes shown to be associated with FSL or similar programs include reduction in hyperactivity, anxiety, and depression, and a reduced surge in disciplinary infractions at the end of the month when SNAP benefits are typically depleted (Hanks, n.d.). Additionally, school attendance may also improve after introduction of FSL (Cohen et al., 2021; Hanks, n.d.).

Previous DPS free and reduced meal participation data is presented in Table 26. A significant decrease in participation occurred following the start of the COVID-19 pandemic, but the need for affordable food in North Carolina has not (Parry, 2021). Implementation of UFM in New York City saw a rebound in participation following a downward trend (Watts et al., 2021). Therefore, our goal is to increase participation in free meals to near pre-pandemic levels. After two years, we aim to increase participation in the FSL program from 54.8% of students (currently) to 60% of students. Long-term impacts of a FSL program after five years of the program include reduction in stigma associated with free school lunches and decreased adverse mental health outcomes as measured by the YRBS. We will also create additional objectives in collaboration with the DPS administration and other key

stakeholders to further their engagement. Some potential measures and how the data could benefit the implementation are listed in Figure 11.

Evidence-Based Implementation Strategies and Activities

Currently, nineteen out of fifty-six schools in the Durham Public School (DPS) system qualify for the CEP, which allows for non-pricing meal services in low-income areas (Durham Public Schools, 2023; Food and Nutrition Service, 2019). Following the example of five other states, we aim to expand the FSL program from the current nineteen schools to all fifty-six schools in the DPS system (Cohen et al., 2022).

Personnel will need to be hired and trained to implement this program. A core implementation management team will include a management director, food service managers and/or school nutrition directors from the participating schools, registered dietitians (RDs), and public health nutritionists. The management director will be a school nutrition director well-experienced in implementing such a program.

Initiating an FSL program will require multiple implementation components. The cornerstone of the program is funding. Funding will be secured from private, district, county, state, and/or federal sources such as private donations, budget reallocations, and/or grant awards (such as the National School Lunch Program Equipment Assistance Grant) in addition to federal reimbursement from the National School Lunch Program reimbursement framework (USDA FNS, 2022b). The management director and the public health nutritionists will oversee securing funding.

Scaling of production and menu development is necessary to meet an anticipated spike in utilization of school meals. RDs and public health nutritionists will work with school staff to create menus, recipes, and operating procedures to scale-up production to meet increased demand for meals and to ensure meals provide more-than-adequate nutrition. Students will also be involved in menu planning as student participation in menu design is associated with greater participation in school meal programs (Jessiman et al., 2023). Staff from the nineteen schools that already have a free meal program will be utilized as knowledge experts to help with training other staff and orient the planning process at all steps in the process.

We expect new equipment to be needed to meet the FSL program's needs. Existing equipment will be inventoried by food service staff in the schools and equipment missing or needs replacement will be purchased and installed. Technicians will install said equipment and train staff on proper equipment use as needed.

To meet our goal of 60% participation after two years of the program, we will also engage in advertising efforts. During the school year before the program's initiation, information about the free school lunch program will be delivered to all parents/guardians. Social media is a powerful tool for advertising these kinds of programs following the COVID-19 pandemic (Whitesell and Fitch, 2022). Limited data is available for the effectiveness of other advertising methods (Plank et al., 2022). However, more advertising will likely lead to greater participation. Other electronic delivery methods such as emails and newsletters, mailed fliers, will be used and as well as announcements and fliers at events attended by parents, and communications during the enrollment process.

Once school begins, all classes of students will visit the cafeteria and be shown how to order a meal. These activities will be made engaging, fun, and appropriate for each grade level to reduce the stigma associated with program meals. Active engagement activities to encourage participation include cooking demonstrations, taste testing activities, and extended lunch periods, all of which have been found to be more effective than passive strategies to promote healthy eating among children (KSHFP et al., 2016).

Data on meal usage, budget and cost, and student perceptions will be collected throughout the program implementation and continuation for evaluation purposes. Meal usage and financial data will be collected via electronic record-keeping integrated into the food service management and service systems using the existing software or updated software if needed (examples: Health-e Meal Planner, NUTRIKIDS, TrakNOW) (USDA FNS, 2022a). Data will be collected and analyzed at the end of each semester to track participation and financial outcomes. Students in middle and high school will participate in focus groups to assess the perceptions of the program and potential impacts on stigma associated with free meals. The YRBS will be conducted following the already-established schedule. The available data on participation, stigma, perceptions, and outcomes will be compiled and assessed at the end of each school year and will be used to improve the program in future school years.

The Food and Nutrition Service provides guidance on implementing district-wide free meals but provides little information on how quickly the program should be at full operating capacity (USDA FNS, 2016). However, we believe a prototyping model is the best strategy for implementation. During the early parts of the COVID-19 pandemic, school districts had to adapt rapidly to provide free meals to students and encountered many challenges along the way (Zuercher et al., 2022). A prototyping model will allow time for adaptation to implementation challenges and improvements in the program before expansion to the full school district (Lister et al., 2017). During

the summer between the 2022-2023 school year, the above implementation will take place at a pilot group of 19 schools (total of 38 schools in the DPS system). The pilot group will allow for data collection on unforeseen challenges, additional resources needed, and areas for improvement before expansion to the rest of the school system. The following summer, the program will be implemented at the remaining 18 schools to reach the total 56 schools. Full implementation will be complete by the end of two years to ensure equitable access to free meals for all DPS students. This staggered implementation will also allow staff and production activities to better adjust to the increased participation, the new menu(s), software, operating procedures, et cetera (IOM et al., 2010).

Although our priority population is Black and Latino students, our program is geared toward all students. By allowing all students access, we will reach our priority population without “othering” them or increasing stigma by creating a program specifically for low-income and/or Black and Latino students. Additionally, the YRBS already includes racial stratification of data in the analysis, allowing the program’s effect on MEB outcomes among Black and Latino students to be readily assessed using the existing YRBS structure (DCPHD, 2019).

Our program addresses multiple levels of the socioecological framework, detailed in Figure 12.

Stakeholders

Key stakeholders in our program are present throughout the DPS system and the greater Durham community. The table in Table 27 lists key stakeholders, their role in the intervention and/or their investment in the program’s success.

Budget

A breakdown of the budget can be found in Table 28.

Conclusion

A FSL program is the best nutrition-centered approach to reducing the impact of ACEs on Black and Latino youth in Durham County. Such a program streamlines food service activities and reduces administrative duties required to verify eligibility for free and reduced lunch programs. In addition, a strong body of evidence points to free meal programs being cost effective while maintaining nutrition standards and having potential for greater reimbursement from federal programs. Despite all the advantages, there is a significant up-front cost for an FSL program in Durham County. The necessary training, equipment, and food purchasing will require significant financial resources. However, the long-term benefits of improved food security for Durham County Black and

Latino youth and supporting healthy MEB development outcomes and stress resilience among Durham County youth far outweighs the up-front investment burden.

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APPENDIX 6.3.a: NUTRITIONAL ANALYSIS FIGURES AND TABLES

Table 26: Free and Reduced Meal Participation: DPS (Table 1)

Year	Participation (%)	Source:
2019-2020	64.46%	(Durham Public Schools, 2019)
2020-2021	51.65%	(Durham Public Schools, 2020)
2022-2023	54.8%	(Durham Public Schools, 2023)

Figure 11: Potential short-term objectives to measure during program implementation

- a. *Number of meals served per month*
 - i. This would track the short-term growth as the program is implemented.
 - ii. Additionally, this could be collected during the first round of program implementation, then collected again during the second round, and the rates of participation growth compared to allow for any adjustments to the program that might improve participation.
- b. *Number of students newly participating in school meals*
 - i. This could be measured on a monthly, quarterly, semesterly basis – whatever is appropriate. If not, many students are newly participating, a wider period of collection may be necessary to track the outcome.
 - ii. These students could then be surveyed about why they began participating. This qualitative data would inform advertisement strategies.
- c. *Measuring perceived stigma of school meals at different grade levels before and after implementation.*
 - i. Collecting data on the perceived stigma could provide key insights into why the program is not being taken up if the participation remains low.
 - ii. Additionally, younger students may be more receptive to a program than older students, so having data from multiple grade levels can help target advertising interventions to increase participation.
- d. *Focus groups conducted to provide insight into what meals students want, why they are/are not participating in the program, and other key qualitative information.*
 - i. Focus group data could also take the place of some of the above measures. Small groups of students could inform the implementation strategy, improving the second round of program implementation and further improvements to the program in the future.
 - ii. These could be conducted in the short-term, but also in the long term if participation in the program starts to drop at some point.

Figure 12: Impacts of a Free School Lunch program on various levels of the socioecological model

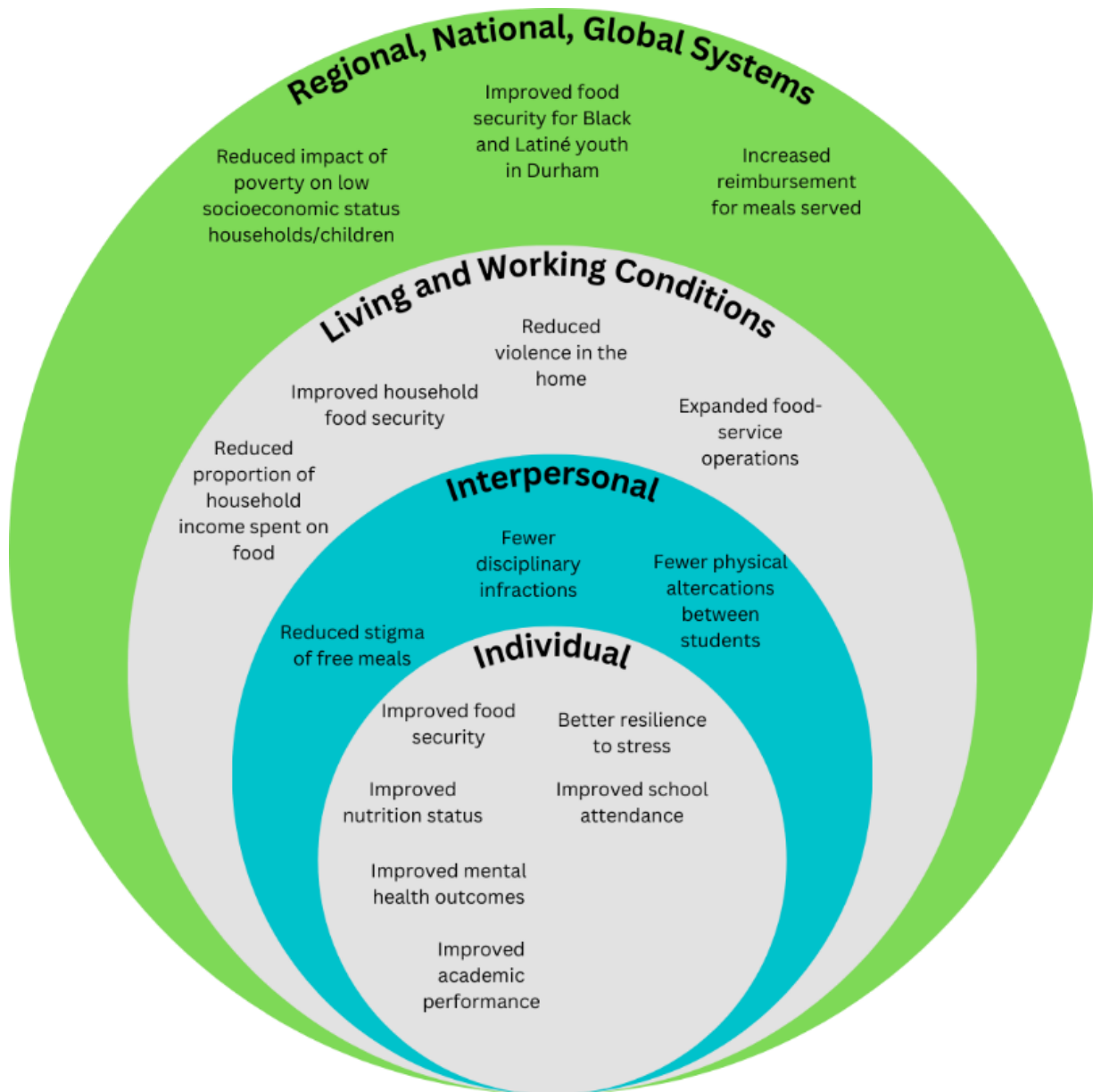


Table 27: Stakeholders

Stakeholder	Program Involvement
Durham County Board of Commissioners	A significant portion of the DPS budget comes from the Board of Commissioners budget [DCBOCC]. They also approve implementation of our program.
DPS students	DPS students are the primary recipients and beneficiaries of this intervention. Students can provide feedback on experiences of stigma, and the quality and desirability of the lunch.
DPS parents/guardians	Parents/guardians will encourage their children to take advantage of the free lunch. Parents may have improved food security status from reduced financial burden of student food costs.
Durham Public Health Department	Identified the problem of ACEs, food insecurity, and demographic inequities in Durham through the Community Health Assessment. Invested in the downstream community impact of improved health outcomes for our priority group and children in the county because of our program.
DPS administration and foodservice staff	Responsible for delivering the program at no cost to all students. Food service workers are integral to the program implementation strategy. Supportive school administration was shown to lead to higher participation in New York City schools when free school lunch was implemented city-wide (Watts et al, 2021). Administrative staff that handles disciplinary infractions will likely see decreased infractions as students’ mental health improves.
NC Department of Public Instruction (NCDPI) Office of School Nutrition	This NCDPI office works with schools to administer Federally Assisted National School Breakfast and School Lunch Programs (NCDPI, n.d.). They will ensure the program continues to follow all local, state, and federal regulations for funding and nutrition standards for school meals.
Teachers	Teachers can promote participation in free school lunch to both students and parents. Teachers will also help disseminate information about the program to parents/guardians during parent-teacher conferences and other contact with parents/guardians. Teachers can also provide feedback from observing the program implementation regularly in the cafeteria and how student behaviors in the classroom change after program implementation.
School counselors, nurses, social workers	These professionals observe the daily effects of negative MEB development in children and their physical and psychological wellbeing.
North Carolina Pediatric Society	May advocate for improved child nutrition and provide compelling clinician experience in support of free school lunch as the New York chapter did in New York City advocacy efforts for free school meals (Watts et al, 2021).

Table 28: Budget Breakdown

Category	Budget Percentage	Description
Operating	10%	Upgrading the equipment including replacement, repair, and maintenance. Upgrading service software as needed.
Labor and Compensation Costs*	65%	This category includes salaries, benefits, and training for kitchen staff, food service workers, and supervisors. It also includes costs associated with hiring and training unfamiliar staff.
Food Processing	5%	Costs associated with proper processing of food prior to food service. Includes, but not limited to: items required for food storage (containers, plastic wrap, etc.), spoilage, and
Food & Supplies **	20%	This category includes costs associated with purchasing food and supplies from local distributors. It also includes costs associated with transportation and storage of food items.

Source: (Food Insight Group, 2021)

* This portion of the budget was increased 10% (from 55%) due to systemic underpay of public health professionals, food service workers, and education professionals (Kinder 2020; Gould et al., 2021).

** This portion of the budget was reduced by 10% (from 30%) as federal reimbursement per meal served will increase, subsidizing additional food costs (Long et al., 2021).

Section 6.3: Nutrition Program Evaluation

Introduction

The social and community context one lives in is a powerful social determinant of health. Adverse childhood experiences (ACEs) including abuse, violence, neglect and/or other traumas can negatively affect mental, emotional, and behavioral (MEB) development in children, leading to poor resilience to stress and challenges. (NASEM et al., 2019; Petrucci et al., 2019) The relationship between ACEs and negative health outcomes including chronic diseases, mental health, and risk of substance abuse has been well established (Heron, 2016; Chang et al., 2019; CDC, 2021; Mwachofi et al., 2020). According to 2016-2017 data, 23.6% of children aged 0-17 years in North Carolina have experienced two or more ACEs, including 18% of children aged 0-5 years (DCPHD et al., 2021; Healthy Communities NC, n.d.; NCIM, 2020). Prioritizing the prevention of ACE exposure will not only align with the Healthy North Carolina 2030 goal of reducing exposure to two or more ACEs, but also will reduce the negative health outcomes and healthcare costs among this population (NCIM, 2020; Office of the Surgeon General, 2020). In Durham County, Black and Latino populations experience a greater burden of ACE exposure and food insecurity than other groups, and addressing ACE exposure among these populations can help to address systemic racism that contributes to inequities in mental and physical wellbeing (DCPHD et al., 2021; Feeding America, 2020a; Feeding America, 2020b; Feeding America, 2020c; Feeding America, 2020d; Feeding America, 2020e). Without proper nutrition, healthy MEB development is impaired, negatively impacting resilience to stress (NASEM et al., 2019). We aim to improve childhood resilience to ACEs by increasing access to nutritious meals through a free school lunch (FSL) program in all schools in the Durham Public School (DPS) system. The FSL program will be implemented by a team of school nutrition professionals detailed in Figure 13.

Evidence Based Evaluation Plan

Study design/data collection:

To evaluate the impact of the FSL program on mental health outcomes among Black and Latino students, we will use a quasi-experimental pre- and post-test evaluation method. Two sources of data will be used: YRBS

(Youth Risk Behavior Survey) reports and sampling of schools. YRBS is part of a national school-based survey created by the Centers for Disease Control and Prevention (CDC), administered every other year by DPS to assess health risk behaviors in the student population (DCPHD, 2019). The YRBS data is collected in the spring semester, analyzed, and a report is released in the spring two years following data collection (DCPHD, 2019; DCPH, n.d.). Implementation timed so YRBS data will be collected pre- and post-implementation (see Timing section).

Data will be collected directly from students and staff by sampling schools that receive the FSL program. A survey comprised of validated tools will be administered to assess students' mental health and acceptance and perceptions of school meals. Subsections of Revised Child Anxiety and Depression Scale (RCADS) specific to generalized anxiety disorder and low mood (major depressive disorder) will be used in the survey to capture mental health outcomes, see Figure 14 and 15 (CORC, n.d.). Details of the validity of the RCADS and subscales is included in Appendix 2. To assess acceptance and perceptions of school meals, the survey will also use questions from the No Kid Hungry survey of school and community meal experiences; the purpose of the original survey and a sample survey is included in Figure 16 (No Kid Hungry, 2022). The data from this survey will allow menus, activities, service, advertising, and other aspects of the FSL program to be adjusted to best serve the students and increase participation. Focus groups will be led by trained facilitators using a pre-determined list of discussion questions designed to get insight into perceived stigma surrounding school meals, motivations for participation in school meals, and how to improve the school meals in general. Sample questions modeled after a survey to capture student perceptions of school meals are included in Figure 17 (Center for Ecoliteracy, n.d.).

Sample and sampling strategy

YRBS is conducted by DPS using its own sample and sampling strategy a random sample of middle and high schoolers. Detailed sampling information can be found in the 2019 YRBS Report released by the Durham County Public Health department (DCPHD, 2019).

Evaluation will use a non-random purposeful sample. This sampling strategy is advantageous for qualitative analysis because it “selecting individuals or groups of individuals that are especially knowledgeable about or experienced with a phenomenon of interest,” to provide insight (Palinkas et al., 2015). This type of sampling strategy is important in our evaluation, because we want our sample to be representative of a spectrum of experiences, perspectives, sociodemographic groups, and racial and ethnic backgrounds to best evaluate the effect of the FSL program. Five middle schools and five high schools will be sampled from the schools that received a novel

FSL program; schools already receiving the Community Eligibility Provision (CEP) will not be included in the population sampled. Schools across the range of socioeconomic diversity will also be considered in the sampling of schools. Schools will be stratified by implementation wave (one or two) and average socioeconomic status of the students, determined by if the school meets CEP eligibility criteria or not. From those groupings, random sampling will be used to select the schools for evaluation purposes.

Surveys will be collected from students in health and physical education classes (also called “healthful living” classes) at sampled schools as one health/physical education class is required during high school with other multiple elective options offered, and one healthful living class required per year in middle school (Durham Public Schools, 2019a, Durham Public Schools, 2019b). By administering surveys to these classes, we will capture data across all middle and high school grade levels. The FSL program will be implemented over 2 years; capturing data from current 6th graders during evaluation will capture elementary school experiences because these students were in elementary school when the program was implemented. We are strategically not sampling elementary schools.

Focus groups will be conducted at schools selected for sampling. Teachers and other staff members will help identify and recruit students to take part in focus groups who will be most invested and participatory in the focus group process, who will give honest answers, and who will be representative of our target population as well as the school demographics. Focus groups will also be conducted with staff members including teachers, nurses, counselors, and social workers. Teachers are trained to refer students to the nurse, counselor, or social worker based on the students’ physical and mental health needs, so these professionals are in positions to observe student behavior and mental health (Becker, 2021; Greif Green, 2022; Young, 2020). Incentives will be provided for participants in focus groups. We will offer Loco Pops to all students and lunch for all staff members that participate in focus groups.

Specific measures

To evaluate our objectives of improving mental health outcomes among Durham’s youth, especially Black and Latino youth, we will collect data on outputs and outcomes relating to mental health and acceptance of our program. For example, we hope to receive 100 completed surveys that show the change in average general anxiety score after program implementation. Table 29 lists the main outputs, outcomes, and disparities associated with the sampling and data collection described above.

Timing

The timing of implementation is essential to the evaluation process. YRBS data is collected on a 2-year cycle, so implementation needs to begin in the fall following data collection. This would allow for data to be collected in the spring prior to implementation, and the next round of data collection will occur in the spring of the second year of the program, serving as the post-implementation time point. YRBS data is not released until about two years following sample collection, so analysis of the data will take place over a few years. A sample timeline is included in Figure 18.

For evaluation purposes, “progress” or program success will be defined for each measure. Statistical significance and target improvement goals will be used to define success for quantitative measures and coding will evaluate success for qualitative measures, defined in the Analysis plan below and Table 29. YRBS data and mental health outcome survey data will show progress with decreased suicide thoughts, plans, and attempts as measured by YRBS and decreased scores on the two mental health surveys across strata. In terms of our target population, we also will see progress if the risk of mental health outcomes measured by YRBS decrease among Black and Latino students, as well as decreased scores on the two mental health surveys among these racial/ethnic groups. From the No Kid Hungry Survey questions, progress would be shown by increased participation in school meals following program implementation as well as increased reports of motivating factors including meals being at no cost, acceptability of the meals offered, and building community. Research on similar programs shows an average of 5-8% higher school lunch participation after implementation, which we hope to see from survey data to indicate success (Long et al, 2021). From qualitative data collected from student and staff focus groups, progress would be shown by themes of increased motivation to participate, decreased stigma surrounding school meals, positive impacts of free meals on mental health, and other themes that may present during the coding process.

If progress is not strongly indicated by the evaluation process at the end of the second year following implementation, the program will rely on the focus group data and No Kid Hungry Survey data to inform improvements to the FSL program. Further iterations of surveys and focus groups could be conducted to further evaluate the updated version of the program and its effects on mental health outcomes.

Analysis plan

Mixed analysis will be used as we are collecting both qualitative and quantitative data. YRBS data analysis will be performed by the YRBS team. From the YRBS analysis, we will have prevalence data. We can further

analyze the YRBS data to estimate risk of mental health outcomes among middle and high school students in Durham County. Risk ratios will be used to compare risk of mental health outcomes among our target population to White students. Other qualitative data from the surveys will be analyzed for students overall and by stratified groups. Statistical analysis of the pre- and post-implementation survey data will use a paired t-test using a significance threshold (p value less than 0.05). Data will be stratified by race/ethnicity, gender, and age group (early middle school, late middle school, early high school, late high school) to analyze how the FSL program may have impacted different races/ethnicities, genders, and/or age groups differently. Focus group transcripts will undergo thematic coding to identify topical and interpretive codes relating to stigma, mental health, motivations for participation in school meals, and other themes related to the FSL program and implementation process.

Sources of Funding

Multiple funding sources will be utilized to sustain the program in the long term. A non-exhaustive list of potential sources is listed in Table 30. Long-term funding for the program would also rely heavily on the County Commissioner budget. We suggest that if the program is successful at improving mental health outcomes among Durham's youth, the Durham County Commissioners increase property taxes and allocate those funds to support the program in perpetuity.

Data use and dissemination

Findings will be disseminated following release and analysis of 2025 YRBS data release in the spring following implementation round two (see Sample Timeline in Figure 18). Electronic methods will be used to disseminate findings to parents and staff including email newsletters and announcements and social media. In-person events such as Parent Teacher Association meetings will also allow the findings to be presented to parents and guardians in attendance at these events. The County Commissioners' office will be kept up to date on the program's progress and evaluation findings will be presented promptly via a report compiled after data analysis. This report will also be sent to other funding sources such as the No Kid Hungry NC Chapter and other external public or private donors. In addition, our findings will be used to advance the literature surrounding and awareness of FSL programs or universal meal programs. If successful, the findings would be used advocate at a state level for free school meals in all NC public schools supported by state funding. The findings would also be written up and submitted for publication in relevant academic journals and for presentation at relevant conferences and events, such as the NC Child Hunger Leader Conference put on by the Carolina Hunger Initiative (CDC, 2018).

Conclusion

Our proposal of a nutrition-centered approach to improve mental health among our target population is aimed at improving public health and addressing inequities across mental health and nutrition. Addressing mental health equity requires an interdisciplinary approach, drawing on the expertise of public health and school nutrition professionals. Successful evaluation of the FSL program we propose hinges on effective collaboration between students, staff, administration, the implementation team, and stakeholders including the Durham County Board of Commissioners. Through the mixed methods evaluation plan described above, a thorough interdisciplinary evaluation of the program will shed light on how the FSL program impacted nutrition and mental health equity among DPS students and fostered health MEB development in Durham County's youth.

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APPENDIX 6.3.A: NUTRITION PROGRAM EVALUATION FIGURES AND TABLES

Figure 13: Implementation Team

- Core implementation team:
 - Implementation Director - school nutrition director experienced in implementing a free meal program
 - Other team members:
 - Food service managers and/or school nutrition directors from participating schools
 - Registered dietitian (RDN) experienced in school nutrition programs
 - Public health nutritionists experienced in school nutrition programs
 - Team responsibilities:
 - Oversee implementation of FSL program
 - Apply for funding for implementation of the program
 - RDN and public health nutritionists will oversee the menu planning and recipe development needed to scale up production.
- Other implementation personnel:
 - Staff from the 19 DPS schools that receive CEP will serve as knowledge experts and help train other staff.
 - Equipment specialists/technicians will install the necessary equipment and train staff on proper use, cleaning, maintenance, and storage of equipment.

Figure 14: RCADS validity, Generalized Anxiety Disorder subscale survey

The RCADS and its subscales have been validated and found to have good internal consistency in non-clinical samples and have good concurrent validity with the Children’s Depression Inventory and with the Revised Children’s Manifest Anxiety Scale, both well-established tools to assess mental health in children (Chorpita et al., 2005, Piqueras et al., 2017, Donnelly et al., 2019)

Date: _____

Time: _____

Please put a circle around the word that shows how often each of these things happens to you.
There are no right or wrong answers.

		0	1	2	3
1	I worry about things	Never	Sometimes	Often	Always
2	I worry that something awful will happen to someone in my family	Never	Sometimes	Often	Always
3	I worry that bad things will happen to me	Never	Sometimes	Often	Always
4	I worry that something bad will happen to me	Never	Sometimes	Often	Always
5	I worry about what is going to happen	Never	Sometimes	Often	Always
6	I think about death	Never	Sometimes	Often	Always

Figure 15: RCADS Low Mood (Major Depressive Disorder) subscale survey

Date: _____

Time: _____

Please put a circle around the word that shows how often each of these things happens to you.
There are no right or wrong answers.

		0	1	2	3
1	I feel sad or empty	Never	Sometimes	Often	Always
2	Nothing is much fun anymore	Never	Sometimes	Often	Always
3	I have trouble sleeping	Never	Sometimes	Often	Always
4	I have problems with my appetite	Never	Sometimes	Often	Always
5	I have no energy for things	Never	Sometimes	Often	Always
6	I am tired a lot	Never	Sometimes	Often	Always
7	I cannot think clearly	Never	Sometimes	Often	Always
8	I feel worthless	Never	Sometimes	Often	Always
9	I feel like I don't want to move	Never	Sometimes	Often	Always
10	I feel restless	Never	Sometimes	Often	Always

Figure 16: No Kid Hungry Survey

Original Survey:

FM3 Research, a research consulting firm specializing in tailoring surveys to better serve target populations, helped develop the original survey, which was delivered to teenagers across the US (No Kid Hungry, 2022). The goals of the survey were “(1) to better gauge teens’ perceptions of school and community meals; (2) to determine if and how schools are working with teens to improve these programs; and (3) to find out how much teens want to be engaged in improving the school and community meals experience.” (No Kid Hungry, 2022).

Survey questions for evaluation of FSL program:

1. Regardless of whether you have eaten school meals in the past or not, how likely are you to eat school meals?
 - a. Very likely
 - b. Somewhat likely
 - c. Somewhat unlikely
 - d. Very unlikely
 - e. Don’t know
2. Here are some descriptions of school meals. Please indicate if you think this describes school meals very well, somewhat well, not too well, or not well at all:
 - a. Are easy to get
 - b. Allow you to eat a meal with other students
 - c. Are convenient
 - d. Are affordable
 - e. Allow your family to save money
 - f. Are free
 - g. Are for people like you
 - h. Allows you to build friendships and community with other students
 - i. Are healthy
 - j. Taste good
 - k. Are high-quality
 - l. Are only for low-income families
3. Additional Motivating Factors for your participation in school meals: (Yes/No)
 - a. Knowing that the meals include food you will like and eat
 - b. Having meals be free, at no cost
 - c. Having a website with detailed information about school meals available
 - d. Knowing that most other students at your school were also eating school meals
 - e. Knowing that school meals have to meet specific standards to ensure students are eating healthy, nutritious meals
 - f. Seeing updates about school meals on social media

Figure 17: Example Focus Group Questions

Note: Focus group discussions will not be limited to these questions.

Students – will discuss these questions pertaining to times both before and after program implementation.

- Where do you normally get lunch on school days?
- How often do you eat the cafeteria food? (times per week)
- What are 3 words you would use to describe the cafeteria food?
- How healthy do you think the cafeteria food is on a scale of 1-5 with 1 being most unhealthy and 5 being most healthy?
- How would you rate the taste of the cafeteria food on a scale of 1-5 with 1 being terrible and 5 being delicious?
- Think about students you know who do not regularly eat the school lunch. What changes might make them more likely to participate?
-

Staff

- What have students told you about their perceptions of school meals?
- Do students ever discuss their reason for participating in school meals? What do they say?
- Have students been bullied about their participation in school meals?
- What changes have you noticed in student behavior and mental health after the FSM program was introduced?
- What three words would you use to describe the school meal program at the school?

Figure 18: Sample Implementation and Evaluation Timeline

Baseline Data Collection: Spring of 2023

- 2023 YRBS data collected
- Pre-implementation student surveys administered

Implementation round 1: Starts Fall of 2023

- 19 non-CEP schools receive FLS program

Implementation round 2: Starts fall of 2024

- 18 remaining non-CEP schools receive FLS program

Post-Implementation Data Collection: Begins Spring 2025

- YRBS data collected in Spring 2025
- Fall 2025 – post-implementation student surveys and focus groups conducted

Data Analysis:

- Begins following survey and focus group data collection is complete
- Spring 2027: 2025 YRBS data is released and will be analyzed for our evaluation

Dissemination of findings: 2027, following Data Analysis, and beyond

Table 29: Output(s), outcome(s), and definitions of program success associated with data sources used in evaluation

Data Source	Output(s)	Outcome(s) associated	Success
RCADS general anxiety disorder survey	<ul style="list-style-type: none"> • 100 completed pre-implementation surveys per school • 100 completed post-implementation surveys per school • General anxiety scores for each student surveyed (pre- and post-implementation) • Mean general anxiety score with for each stratum and overall (pre- and post-implementation) 	<p>Change in overall general anxiety score in sample following implementation of FSL program.</p> <p>Change in general anxiety score among demographic groups of interest following implementation of FSL program</p>	<p>Statistically significant decrease in general anxiety score among Black and Latino students of different age groups following FSL implementation.</p> <p>Statistically significant decrease in overall general anxiety score following FSL implementation.</p>
RCADS low mood (major depressive disorder) survey	<ul style="list-style-type: none"> • 100 completed pre-implementation surveys per school • 100 completed post-implementation surveys per school • Low mood scores for each student surveyed (pre- and post-implementation) • Mean low mood score with for each stratum and overall (pre- and post-implementation) 	<p>Change in overall low mood score in sample following implementation of FSL program.</p> <p>Change in low mood score among demographic groups of interest following implementation of FSL program</p>	<p>Statistically significant decrease in low mood score among Black and Latino students following FSL implementation.</p> <p>Statistically significant decrease in overall low mood score following FSL implementation.</p>
No Kid Hungry Survey	<ul style="list-style-type: none"> • 100 completed pre-implementation surveys per school • 100 completed post-implementation surveys per school • Pre- and post-implementation data on participation in school meals, motivating factors for participation, 	<p>Change in participation in school meals as captured by survey questions.</p> <p>Change in motivating factors for participation in school meals as captured by survey questions.</p> <p>Change in perception of school meals.</p>	<p>5-8% increase in school meal participation.</p> <p>Statistically significant positive changes in motivating factors for participating in school meals.</p> <p>Statistically significant positive changes in perception of school meals.</p>

	and perception of school meals.		
YRBS	<ul style="list-style-type: none"> Data collected pre- and post-intervention <p><i>Note:</i> Our evaluation plan will not directly collect the data for YRBS. We will use the reports published by the Durham County Public Health Department.</p>	<p>Change in student reports of depression (overall and by racial/ethnic strata).</p> <p>Change in student reports of considering suicide (overall and by racial/ethnic strata).</p> <p>Change in student reports of attempted suicide (overall and by racial/ethnic strata).</p>	<p>Decreased reports of depression, considering suicide, attempted suicide overall and by racial/ethnic strata following FSL program implementation.</p>
Student Focus Groups	<p>4 student focus groups conducted (2 schools sampled, 2 focus groups per school)</p> <p>Focus group transcripts coded for topical and interpretive themes of motivation for participation in FSL, desirability of school meals, stigma, and mental health.</p>	<p>Themes discussed in focus groups provide insight into the success of implementation and are used to inform improvements to the program in the future.</p> <p>Topical and Interpretive themes about topics of interest are found across focus group transcripts.</p>	<p>Students report increased participation, increased desirability, decreased stigma, improved mental health in focus group themes.</p>
Staff Focus Groups	<p>2 staff focus groups conducted (2 schools sampled, 1 focus group per school)</p> <p>Focus group transcripts coded for themes of desirability of school meals, stigma, behavior changes, and mental health.</p>		<p>Staff report reduced stigma, improved mental health, and increased desirability from their observations of and interactions with students in focus group themes.</p>

Table 30: Potential Funding Sources

The Community Eligibility Provision (CEP)	<p>These federal programs provide ongoing support for school nutrition programs if the school or district continues to qualify based on the eligibility criteria. Any school in DPS that qualifies for CEP will apply for it.</p> <p>CEP is on a 4-year cycle.</p> <p>Reimbursement rates vary based on the identified student percentage (ISP), the percent of students that qualify for free meals. For example, a school with 60% ISP would receive reimbursement for 96% of meals at the free rate) and 4% at the paid rate (\$4.33 and \$3.93, respectively for the 2022-2023 school year) (School Nutrition Association, 2023; USDA FNS, 2016)</p>
Provision 1, 2, 3	<p>Schools that do not qualify for CEP can apply for these other provisions through the USDA to help with the costs associated with providing free meals to students.</p> <p>Provision 1 is on a 2-year cycle, Provision 2 is on a 4-year cycle, and Provision 3 is also on a 4-year cycle.</p> <p>Provisions 1, 2, and 3 do not provide additional or special reimbursement. (USDA FNS, 2014)</p>
County Commissioner	<p>Currently, the County Commissioners allocate \$134 million of the budget to DPS and have increased school funding in the past (Willets, 2017). For our program we predict county commissioners will need to authorize another increase in funding for DPS to support our program implementation. If the program is successful, the County Commissioners could continue to support the program and DPS by increasing property taxes and allocating those funds to the FSL program.</p> <p>The County Commissioner budget is approved annually.</p>
External and Private Grants and Donations (see below)	<p>Grant funding and donations can vary in terms of their duration and availability. Some grants may be one-time only, while others may be renewable annually. Donations from individuals or businesses may also vary in terms of frequency and amount. Therefore, the timeline for sustaining these funding sources would depend on the specific grants and donations received.</p>
National School Lunch Program Equipment Assistance Grant	<p>This grant is typically awarded annually by the USDA, although it is not available every year. Therefore, the timeline for sustaining this funding would depend on the school's eligibility and the availability of the grant.</p>
Food Lion Feeds Grand	<p>This grant is typically awarded annually to non-profit organizations. If the school district partners with a non-profit to apply for funding, the timeline for sustaining this funding would depend on the grant's renewal cycle and the success of the partnership.</p>
No Kid Hungry NC	<p>These grants are typically awarded annually, with a specific timeline for the funding period. Therefore, the timeline for sustaining these funding sources would depend on the renewal cycle of the grants laid out by No Kid Hungry NC.</p>
Carolina Hunger Initiative BCBS NC Child Hunger Impact Project grants	<p>A partnership between Carolina Hunger Initiative and BCBS NC has resulted in a 3-year long partnership that funds different school nutrition proposals. Grants are awarded annually.</p>
Philanthropic groups	<p>Private foundations and philanthropic organizations may provide ongoing support for programs and initiatives that align with their mission and goals. The timeline for sustaining funding from these sources would depend on the terms of the grant or donation agreement.</p>