IMPROVING FOOD SECURITY AMONG BLACK CHILDREN UNDER 18 YEARS IN DURHAM COUNTY, NC USING A FRUIT AND VEGETABLE PRESCRIPTION PROGRAM

By

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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 Public Health Leadership Program, Nutrition, and Health Policy and Management

Chapel Hill
2022

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ABSTRACT

Jean Braun, James Carl Burr, Anna Gross, Hannah Isabel Shai: IMPROVING FOOD SECURITY AMONG BLACK CHILDREN UNDER 18 YEARS IN DURHAM COUNTY, NC USING A FRUIT AND VEGETABLE PRESCRIPTION PROGRAM
(Under the direction of Oscar W. Fleming, DrPH, MSPH, Kimberly Parker Truesdale, PhD and Rebecca Slifkin, PhD)

Food security, or consistent access to food, is low among Black children under 18 years of age in Durham County, North Carolina. In addition, racial disparities between Black and White children as it relates to food insecurity continue to persist. Food insecurity in children has been associated with negative outcomes such as decreased diet quality, chronic disease, and negative effects on the social and educational aspects of children's lives.

An evidenced-based fruit and vegetable prescription program has been shown to improve diet quality among children in food insecure households and therefore lessen the negative health impacts of food insecurity. The program is being proposed in collaboration with diverse stakeholders in an effort to improve food security among Black children in Durham County. The program will utilize already in place community assets, such as pediatricians, community clinics, and local farmer's markets, to benefit the prioritized children and the community at large.

Keywords: North Carolina, Durham County, food security, children, racial disparities, fruit and vegetable prescription program

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ABBREVIATIONS

DCDPH	Durham County Department of Public Health
FVP	Fruit and Vegetable Prescription
GusNIP	Gus Schumacher Nutrition Incentive Program
SDoH	Social Determinants/Drivers of Health
USDA	United States Department of Agriculture

Problem Statement and Goals

Food security is a social and community context objective that has been identified as a priority in Durham County, especially among children less than 18 years of age (HealthyDurham.org, 2020). Food insecurity is defined as the "lack of consistent access to food" by the USDA (FeedingAmerica.org, 2022c).

It has been found that children who live in food insecure households have significant differences in food servings per day of nutritionally important foods, resulting in decreased diet quality (Casey et al., 2001). The impact of a low-quality, less nutritious diet is an entire community suffering from chronic disease, the necessity of long-term medical interventions, poor school performance, isolation, and stigma (FeedingAmerica.org, 2022b).

The percentage of children experiencing food insecurity in Durham County increased by 1.5% from 2018 to 2020 and is consistently worse among Black children compared to White children (FeedingAmerica.org, 2020). According to FeedingAmerica.org (2020), approximately 19% of children in Durham County experience food insecurity compared to 14% of all ages overall, while 21% of Black residents are food insecure compared to only 7% of White residents. The rich picture in Figure A1 demonstrates the complexity of this wicked problem for Black children in Durham County and some of the potential root causes of food insecurity disparities including historically racist policies such as redlining (HealthyDurham.org, 2020).

In an effort to combat these significant disparities and health outcomes, our goal is to improve the food security of Black children in Durham County via a fruit and vegetable prescription (FVP) program and decrease the proportion of Black children in Durham County who are identified as food insecure.

Policy and Programmatic Changes

FVP programs aim to provide additional resources to acquire nutritious food among insecure individuals, both alleviating resource constraints and increasing access to nutritious foods. This is especially important among children experiencing food insecurity, who have overall decreased diet

quality and lower consumption of nutritionally important foods (Casey et al., 2001). Studies have shown significant improvements among FVP participants in mean household food security, comparing baseline and follow-up measures (Saxe-Custack et al., 2021).

The target population of the FVP program is the parent/guardian of Black patients, under 18 years-old, seen in pediatric community health clinics that meet food insecurity eligibility criteria measured by the US Household Food Security Module Six Item Short Form (USDA Economic Research Service, 2012). Recruitment and enrollment will occur in year one of the program. Participants will complete pre-intervention measurements at enrollment and post measurements at least 12 months after their FVP distribution, which includes a food security screening, questionnaire, and Block Kids Food Screener (Nutrition Quest, n.d.).

Each participant household will receive a FVP at the first clinic visit that can be utilized over the course of one year. Along with the FVP, participant households will receive a food assistance resource packet. A program staff will discuss the resource packet with the participating household to provide additional assistance and guidance.

The primary advantage of the program recommendation is the direct provision of food-related resources to those experiencing food insecurity for immediate use to alleviate resource concerns. The program has several strengths, including increased clinic capacity to screen and address patient food insecurity and strengthen key clinical-public health partnerships.

Stakeholders

The stakeholders for such a prescription food program as described above need to be incredibly diverse and represent multiple social, technical, economical (environmental), and political aspects of the community (see Figure A2). The most vital group of the stakeholders are represented by Duke Health, Durham County Department of Public Health (DCDPH), and Black parents of the children our program aims to positively impact. We focused on this group in an effort to understand their viewpoints because without the backing of the owners of the regional clinics (i.e., Duke Health and DCDPH), we will be

unable to implement the questionnaire in the clinics. In addition, without the buy-in of Black parents and children to participate, there will be no priority population to create meaningful change.

The second group of stakeholders for which it is imperative to create a cooperative relationship are potential funders, including the USDA and Gus Schumacher Nutrition Incentive Program (GusNIP), and the potential redemption sites for the prescription program, including local grocery stores and farmer's markets. This group of stakeholders holds significant influence because the program will require both funding to support the program and its entities as well as redemption sites for our participants to redeem their fruit and vegetable prescriptions.

Budget

The FVP program will be funded for three years at $202,351.00 through a combination of grant money from the GusNIP totaling $152,000 and approval for $50,351 from the Durham County Board of Commissioners. The money will cover start-up expenses including operative infrastructure such as cellular tablet computers, a folding table and chairs set for the farmers market redemption site, office supplies, brochures, and program infographic posters. The majority of the program implementation will be performed by clinic professionals and therefore clinician salaries and most of the office infrastructure used will be considered in-kind donations by Duke Health and DCDPH. The program director, coordinator, data collection and analyst, and information technology positions are full-time employees within the DCDPH and their clinics and therefore will draw their salaries in whole or in part from their respective employers though money for raises and the program coordinator's salary will be budgeted for in the program expenses. Master of Public Health students from The University of North Carolina looking for practicum assignments will fill the part-time redemption site positions and also help with other data collection, analysis, and related program duties. They will draw a pay of $10/hour for 200 hours from the program budget.

Engagement and Accountability Plan

The rationale behind this engagement plan is first and foremost guided by a perspective that prioritizes individuals who have lived expertise in food insecurity. Lived expertise is thought of as a

critical portion of the community engagement process, acknowledging that people are the experts of their own lives (Dholakia, 2020). Our engagement plan consists of a combination of individual and group level strategies in which we intend to accommodate for the diverse contexts in which our stakeholders come from. We will prioritize individuals with lived expertise in food security, as well as our Duke Health partners. Engagement events will include a town hall event consisting of small group brainstorming activities and feedback sessions, as well as semi-structured interviews with program stakeholders to gain additional insight on the successes and challenges of our work. To ensure roles and responsibilities in our partnership with Duke Health are clear, we have a Memorandum of Understanding that details our expectations, values, and vision.

Program Evaluation

The outcome that will be evaluated is by the end of two years, mean household food insecurity among participants who redeemed a FVP will decrease from baseline by at least one score point, as measured by the US Household Food Security Module.

The study design is quasi-experimental that will compare the intervention group to a comparison group of those who did not receive FVP from a non-participating clinic. Pre and post food security measures will be collected from both groups during year one of the program utilizing the US Household Food Security Module Six Item Short Form. Participants with a score of two or higher will be assigned to the intervention and comparison group based on clinic participation. The pre and post food security measurements will be collected at least one year apart during year two.

In addition, the intervention and comparison group will complete the Nutrition Incentive Hub's pre and post Participant-Level Survey for FVP programs (Nutrition Incentive Hub, n.d.). Information collected includes data on food assistance, use of food assistance, redemption site types, usage of FVP, program satisfaction, key food security information, and demographics.

Pre and post food security mean scores of both groups will be analyzed. The primary analysis will conduct 2 two-sample t-tests to compare food security differences: 1) post food security mean among the intervention versus comparison group and 2) intervention group's food security mean pre

and post intervention. The pre and post questionnaire data will be summarized utilizing frequency of responses for each question, comparing pre and post questionnaire data by group. Comparing key pre and post data by group will further inform the effectiveness and success of the program in addressing food insecurity.

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APPENDIX A: COMMON PROPOSAL FIGURES AND TABLES

Figure A1

Rich picture of Food Insecurity for Black Children less than 18 years-old in Durham County, NC

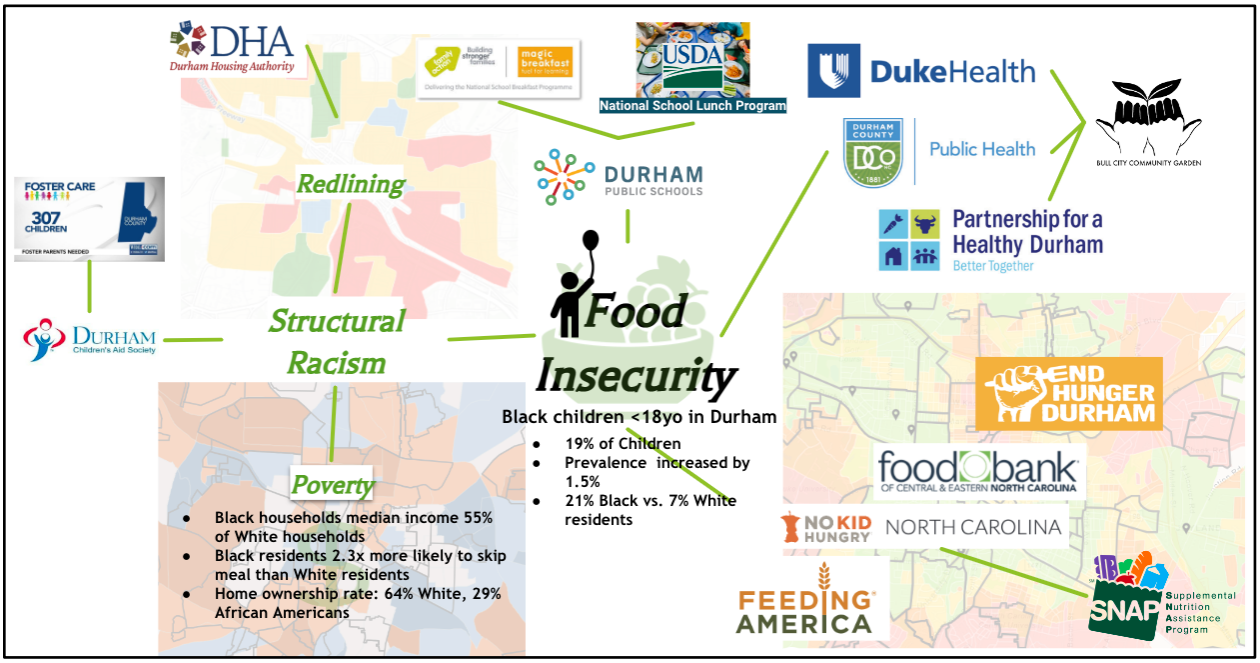
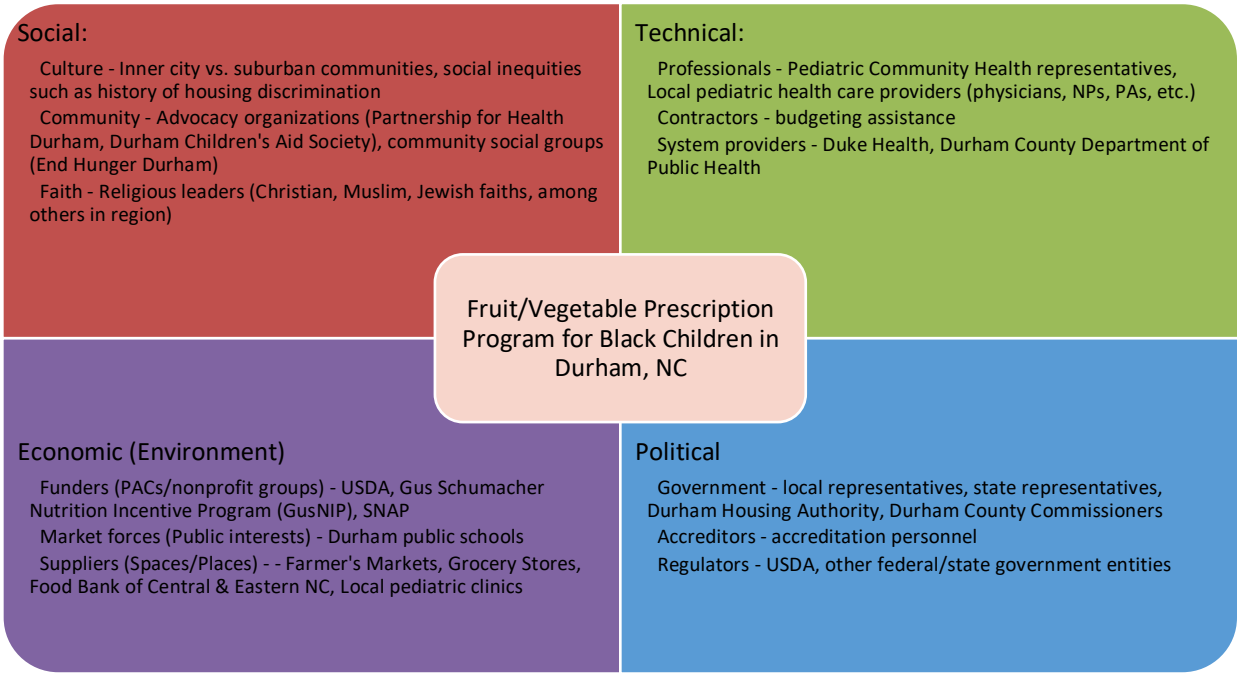


Figure A2

STE(E)P Scan for Stakeholder Identification



APPENDIX B: JEAN BRAUN'S INDIVIDUAL DELIVERABLES

Appendix B.1: Individual Problem Statement

Social Determinant of Health

The Social and Community Context Social Determinant of Health (SDoH) focuses on the relationships and interactions between members at all levels of community, including the family unit, social circles, co-workers, and other peers living, working, and providing goods and services in the same area (Health.gov, 2022a). It is valuable to consider how community members and services impact the health and well-being of individuals and the community at large (Health.gov, 2022b). The mission of our team is to address the health of Durham County by focusing on the Social and Community Context SDoH, specifically the national objective of Nutrition and Healthy Eating. This core objective goal addressed through the social and community context is the elimination of very low food security in children (Health.gov, 2022b). Nationally, the baseline measurement for this SDoH goal was reported at 0.59 which is the "percent of households with children under 18 years that had very low food security in 2018" (Health.gov, 2022b). The most recent data found the number of households experiencing low food security climbed to 0.85 percent which is moving farther from the target of 0.0 (Health.gov, 2022b). Addressing this SDoH and objective will be beneficial in understanding how very low food security is experienced in families with children under 18 years of age and how it is addressed by the community. We will consider the impact of very low food security on the community, the reach it has across multiple levels, and what initiatives can be taken to reduce and eliminate the risk of very low food insecurity.

The short-term impacts of very low food security include under-, over-, and/or malnourished children and adults, decreased school and work performance, and increased social isolation and stigma among peers. The long-term impacts of low food security include greater populations with chronic disease requiring medical interventions and/or long-term care, a decrease in academic success rates resulting in fewer employment opportunities and lower economic benefits in communities, and a greater strain on entitlement programs (Feedingamerica.org, 2021).

Geographic and historical context

Durham County has been considered one of the more prosperous areas of North Carolina since the colonial days when English, Scottish, and Irish peoples settled on land given to the Earl of Granville by the British Crown (Dconc.gov, 2022). The area has evolved from an agricultural, railroad, and manufacturing economy to a global competitor in research and technology with over 300 companies operating in the Research Triangle Park area (Dconc.gov, 2022). The boom in research and technology jobs has brought with it an influx of outsiders which has left little room for lower-skill jobs and pushing many residents out or into narrow areas of the county (Nystrom et al, 2020). Today, much of the central and southeastern part of the county is urbanized by the city of Durham and many surrounding suburbs leaving the northern third of the county rural (Wikipedia, 2022). The county is over 54% white and almost 36% black, with a small proportion of Native American, Asian, Pacific Islander, and other races. Just under 14% of the population is Hispanic or Latino (Census.gov, 2022). The median household income in Durham County is $62,812, while the median household income in the United States (US) is reported to be $67,521 and 56,642 in the state of North Carolina (Census.gov, 2022). According to the US Census data, only 11% of residents of Durham County live in poverty (Census.gov, 2022).

The highest concentration of low-income, very low income, and extremely low-income households (at most 80%, 50%, and 30% of the median household income, respectively) are close to downtown Durham (Stroot. Downtown Durham has a high concentration of black and Hispanic residents and is characterized by a low access to food suppliers as seen in Figure 1 and Figure 2 (Stroot, 2020). Many of the farmer's markets and supermarkets with access to fresh food are situated in the more affluent areas and require transportation to access; few are along bus routes or in the downtown area (Census.gov, 2022). Therefore, the black and Hispanic populations are the most impacted from food insecurity in the county (Census.gov, 2022). There is debate whether food deserts in Durham County exist because while there is a lack of grocery stores with wide arrays of fresh produce within a short distance that does not require personal transportation or lengthy travel time, there are more fast food or convenience store food

options in the more densely populated areas that provide less expensive but less healthy options (Nystrom et al, 2020; Stroot, 2020). According to Nystrom et al (2020)., only 11% of Durham's white population lives in a food desert, while 19% of the Black population and 20% of the Latinx populations live in food deserts. Additionally, over half of the neighborhoods in the food deserts have over 80% non-white residents.

Measures of problem scope

The population of interest is Durham County, North Carolina which according to the County Health Rankings (2021a), is one of the healthiest counties in the state faring better than the state average for many health and economic metrics. While Durham County is considered one of the healthiest counties in North Carolina, 55% of children in grades PK-12 are eligible for free or reduced-price lunch in their public school and an overall food environment score of 7.5/10 (Countyhealthrankings.org, 2021a). The food environment score is calculated by weighing percentage with limited access to healthy food and the percentage of those experiencing food insecurity (Countyhealthrankings.org, 2021b). In Durham County, 7% of residents had limited access to healthy food and 14% experienced food insecurity (Countyhealthrankings.org, 2021a; Countyhealthrankings.org, 2021b). Despite the relative wealth of the county compared to the state, Durham County sits in the middle of the range (10-21%) for North Carolinians experiencing food insecurity (Countyhealthrankings.org, 2021). Surprisingly, in the city of Durham, with its greater population of low-income and food insecure populations, only 1.7% of households receive food stamps (Wellfareinfo.org, 2022). However, Statistical Atlas reports the percentage of households on food stamps closer to 12% (Statisticalatlas.com, 2022). In Durham County, 58.1% of households receiving food stamps have children and 49.4% of households receiving food stamps had income below the poverty level (Statisticalatlas.com, 2022). Those families on food stamps are also disproportionately living around the city center areas (Statisticalatlas.com, 2022).

Priority population

The priority population of Durham County for a policy initiative to address food insecurity (very low food security) are families who qualify for free or reduced lunch in their public schools or those households with children living at 130%-185% of the federal poverty level. The County Health Rankings (2021b) only included public school students in grades PK-12 in their methodology for calculating the percentage of eligible students for free or reduced lunches. However, to address the national goal to reduce and eliminate very low food security in children, it is important to also prioritize families with children who are not yet school age or may be attending a homeschool or private academic institution who are living in families with an income 130%-185% of the federal poverty level. Schools have already addressed food insecurity with the school lunch program and more recently school breakfast. During the pandemic many schools also provided meals during the summer (Reiley, 2022). Impoverished families with children of any age, should be considered for programs that provide free or reduced-priced meals year-round in order to ensure proper nutrition from birth and ease the burden of food insecurity on the whole family unit.

Rationale/Importance

The SDoH of social and community context is a public health priority in Durham County among families living at 130%-180% of the federal poverty level because local schools and neighborhoods can have a great impact on children and families experiencing low food security. Children in Durham County spend between 6.5 and 7.0 hours in the school building (Dpsnc.net, 2022) not counting travel time to and from school or in extra-curricular activities and formal instruction beginning as early as 07:45. Focusing policy initiatives and evidence-based programs in this social environment will allow greater reach of the priority population where they spend the majority of their waking hours while engaging in the program with their peers. Tackling low food security in schools will also promote more food security at home, decreasing the percentage of entire households or adults in households where children are present

experiencing low food security. While Durham County has relatively healthy metrics, there is a large enough population that experience food insecurity and has trouble accessing healthy food due to low income, the distance one lives from a grocery store, and reliable transportation. The percentage of those experiencing food insecurity rose during the COVID-19 pandemic and emphasized the vulnerability to food insecurity within the county (Warnock, 2021). By addressing these issues starting in the community schools, evaluation of programs that prioritize and serve both rural and non-rural communities of diverse demographics can be attempted and used as models for other counties of the state which host populations also facing very low food security. The number of corporations that call Durham County home can also play a large role as stakeholders focusing their philanthropic efforts within their community to ensure a healthy environment in which to pull human resources from.

Disciplinary Critique

Public health leaders should address the Social and Community Context SDoH because it emphasizes providing support to priority populations within their own communities among their personal support networks and structures bringing an element of trust and a reduction of barriers to accessing support. Support within one's own community by and with their peers can reduce the negative health impacts that other SDoH might present while building stronger connections within the community. By addressing the community directly, one gains the perspective of what shapes the community, what it needs or wants, and the interconnectedness that impacts the success of a policy or program. Current community level programs that have reduced food insecurity are school based lunch programs and the more recent school breakfast programs. Social policies such as the Supplemental Nutrition Assistance Program (SNAP) make healthy foods more accessible by covering some of the cost. The use of an electronic benefit transfer card made the use of food stamps less visible reducing the stigma for requiring assistance (Miller & Thomas, 2020). Community level initiatives that focus on the social aspects can be quick litmus tests for equity of the initiative by evaluating the sense of community before, during, and after the initiative is put in place. Both qualitative and quantitative measures can be used to evaluate the

equity and the impact of an initiative on a community. The importance community has on the health of its members cannot be overstated or taken for granted.

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

Figure 1: Low income and Low Food Access near Downtown Durham; living further than 0.5 mile from a grocery store (orange), further than 1.0 mile from a grocery store (green), requires vehicle transportation (yellow)

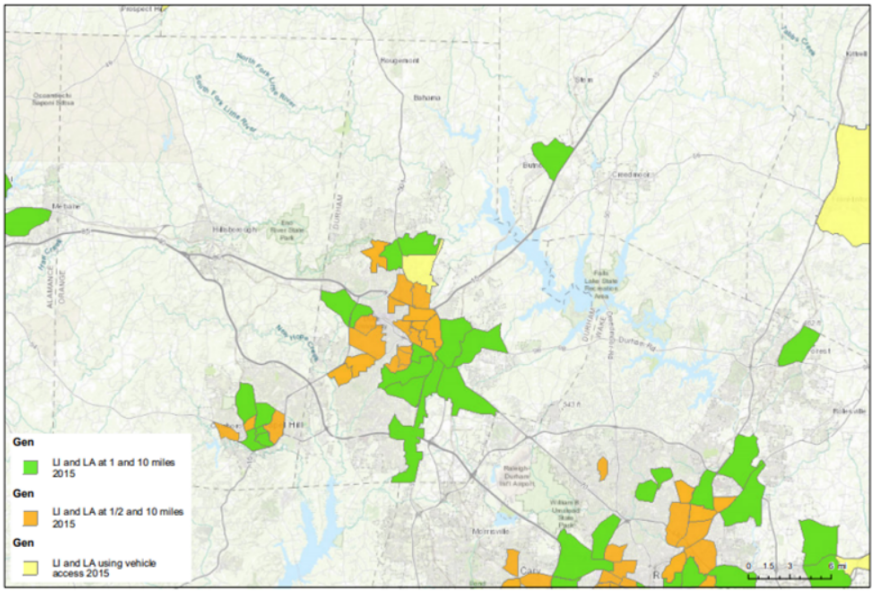
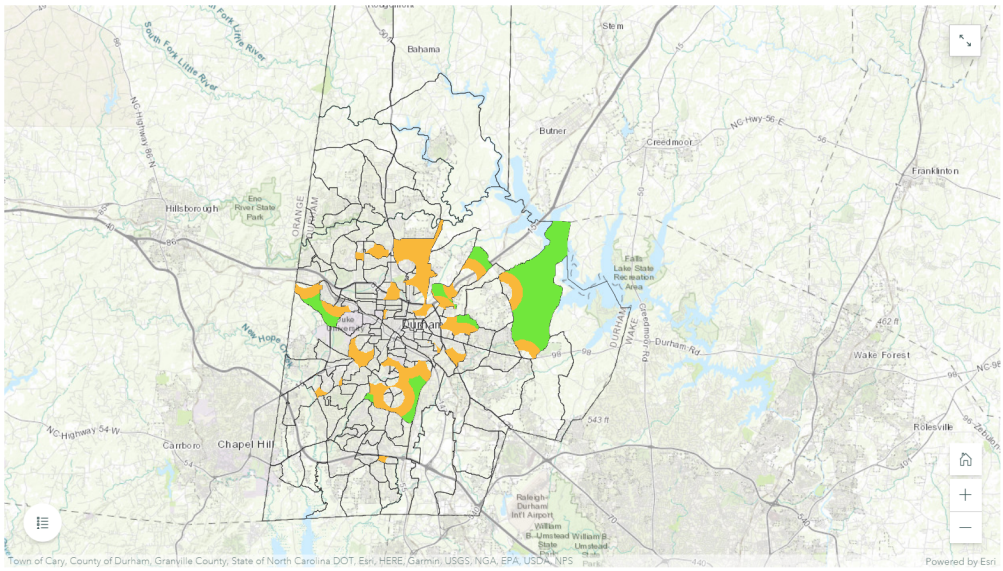


Figure 2: Low-income census block groups living further than 0.5 mile from a grocery store (orange) and further than 1.0 mile from a grocery store (green)



Low Income and Low Food Access Areas in Durham County 2020

Appendix B.2: Policy Analysis

Policy/Program 1: California Assembly Bill (AB) 130, Chapter 44, Statutes of 2021, Education finance – Universal Meals Program

This California policy allows local food authorities to provide universal free meals at all schools and requires schools with high student poverty to participate in a federal provision (Turner et al., 2019). This policy intends to catch the many students who qualify for free or reduced-price meals but did not previously participate in school lunch programs by making school meals free for all students reducing the risk of children experiencing food insecurity. A study of California students showed that offering universal free meals increased the percentage of students eating school provided meals (Turner et al., 2019). Durham County, North Carolina could implement the universal meal policy similar to the California policy in schools to increase food security in families across the county while reducing stigma of participating in free or reduced-priced meal programs. Of the 51 Durham County schools, 30 have free and reduced-priced meal program participation at greater than 40% which makes them eligible to offer universal free meals to all students district-wide if both the federal National School Lunch Program and School Breakfast Programs are utilized under the Healthy, Hunger-Free Kids Act of 2010 Community Eligibility Provision (CEP) (Turner et al., 2019; Dpsnc.net, n.d). The remaining Durham County schools would be covered to provide universal free meals by the state mandate from state allocated funds. It is unclear how many students are eligible to participate in the free or reduced-price meal program that do not participate, but the percentage that do participate indicates a financial struggle to feed the children in Durham County.

Policy/Program 2: North Carolina Farm to School Program backed by the USDA Food and Nutrition Service Procuring Local Foods for Child Nutrition Programs

The NC Farm to School Program brought together North Carolina schools wanting state-grown produce and North Carolina farmers looking for new markets in 1997 (Ncfarmtoschool.com, n.d.). The

NC Department of Agriculture and Consumer Services Food Distribution partnered with the U.S. Department of Defense Produce Merchandising Office to develop a system to distribute state-grown fresh produce to schools across North Carolina (Ncfarmtoschool.com, n.d.). This program allows for schools to use USDA funds to purchase the local produce. NC Farm to School is offered 22 weeks during the school year and all North Carolina schools can participate (Ncfarmtoschool.com, n.d.). Durham County schools already participate in NC Farm to School. According to the Durham Public Schools Budget for Fiscal Year 2019, 1.88% of the Child Nutrition Revenues came from USDA grants for Fresh Fruit and Vegetables. Establishing the percentage of fresh, local produce purchased to at least 33% of daily school meals or mandating requirements for seasonal and nutritionist-devised menus based on local foods available, food procurement programs for local fresh product and other ingredients in Durham County schools could have beneficial effects on the health of students, reduce food insecurity, improve the availability of healthy foods to the community, and provide economic benefits for the local agricultural community. The Los Angeles Unified School District was able to redirect $12 million in healthy produce purchases to local businesses and generated 150 new food system jobs (Growingfoodconnections.org, n.d.). A meta-analysis of 39 studies regarding direct provision of healthful foods showed that intake of fruits and vegetables increased when school food environment policies included direct provision (Micha et al., (2018), made increasingly possible with local food procurement programs such as NC Farm to School.

Policy Analysis

Background: Durham County, North Carolina is one of the healthiest counties in the state yet 14.0% of residents experience food insecurity (Countyhealthrankings.org, 2021b) and up to 12.0% of residents rely on public assistance programs such as Supplemental Nutrition Assistance Program (SNAP) to purchase food items (Statisticalatlas.com, n.d.). Of the households in Durham County receiving SNAP benefits, 58.1% have children and 55.0% of students in grades PK-12 qualify for free or reduced-price lunch in their school (Countyhealthhankings.org (2021a). Children who are food insecure often come

from whole households experiencing food insecurity and are at risk of under-, over-, and malnourishment contributing to chronic disease or the necessity of long-term medical interventions, poor school performance, isolation, and stigma from peers (Feedingamerica.org *(*2021*)*. Much of food insecurity experienced is centered around downtown Durham in which some would classify as a food desert (Nystrom et al, 2021; Stroot, 2020). There is a lack of grocery stores and fresh produce purveyors in these densely populated areas, a lack of transportation options, and/or economic hardship which prevents access to fresh foods. The county is 36% black and 19% of that black population live in food deserts (Nystrom et al, 2021; Census.gov, n.d). About 23.0% of the black population in Durham County live in poverty contributing to the child poverty rate of 27.0% (Census.gov, N.d).

Evaluation Criteria: As seen in Figures 1-3, the evaluation criteria to determine the final policy and program recommendation are as follows: affordability, impact, racial equity, political feasibility, and ease of implementation.

Affordability is defined as the cost to the state government of North Carolina and Durham County schools. It is also important to consider the USDA's reimbursement rate which was increased by $0.68 for lunch and $0.32 for breakfast (Usda.gov, n.d.). and recent decision for Durham County to increase their school lunch prices by $0.85 (George, 2022). The affordability criteria category is given double the weight for policy consideration.

The impact of the policy is defined by the change in percentage of children living with food insecurity. The overall impact goal is to lower food insecurity in five years from 14% to less than 10% and limited access to healthy foods from 7% to less than 2% (Countyhealthrankings.org, 2021a). Food insecurity can have debilitating consequences to those who are over-, under-, or malnourished and increases chronic diseases that are an economic burden for many individuals and health care programs. The impact criteria category is given double the weight.

Racial equity is having resources and opportunities provided so that all students have access to three healthy meals a day without social stigma, isolation, or racial tension between peers. Racial equity is weighted as a 1. There are so many other factors that influence racial equity that cannot be addressed in this context and the proposed policy may not make a large difference in racial equity in five years.

Political feasibility is determined by the ability of the county government's willingness to debate and pass policies that will benefit the county first but also benefit the entire state of North Carolina overall. Political feasibility is influenced by party politics and the values of politicians and their constituents. In the current political climate, policies that are in line with the values of the state's legislature are more likely to be heard, passed, and not overturned to meet political agendas. The partisan nature of the governmental body lends itself to triple value when analyzing the policies.

Ease of implementation is defined as the ease of which the policies can be facilitated by the state government and Durham County Schools or specific agency or group. This would include personnel, financial resources, timing, infrastructure, etc. that need to be established in order to comply with the policy being voted on. The greater the ease of implementation that a policy is to come to fruition, the better chance that a policy will be signed on, so it is weighted as double.

Policy Evaluation and Discussion: Table 1 shows the policy assessment for Universal School meals. Implementation of universal free meals in Durham County schools would allow for greater participation in school meal programs in the short term and reduce the food insecurity many families experience especially following the pandemic. By offering free meals at schools to Durham County students, more students should be consuming two meals per weekday addressing under-, over, and/or malnourishment that is experienced with food insecurity and the long-term impacts of chronic diseases. The School Breakfast Program gives students the opportunity to eat breakfast either in the cafeteria or in the classroom before classes begin addressing potential school performance problems related to hunger.

North Carolina students and parents will also face less stigma and isolation that comes with poverty and relying on school meal programs that are different from their peers.

Despite the eligibility for free or reduced-price meals at school, many students do not participate in the program. Nationally, the USDA's goals for total student participation in 2012 was 57.7%; during the 2009-2010 school year, 40.0% of students eligible for free meals participated in the USDA's School Breakfast Program and 79.0% of students participated in the National School Lunch Program, and 26.0% of students eligible for reduced-priced meals participated in the USDA's School Breakfast Program and 73.0% of students participated in the National School Lunch Program (Statisticalatlas.com. n.d.). Considerations as to why more qualifying students do not participate include the stigma associated with participation, the preferences and perceptions about the meals, family values, and timing and location of the services. In order to increase the participation rate and to address the stigma, policy changes stemming from the Healthy, Hunger-Free Kids Act of 2010 made new options available for schools to consider. Previous provisions allowed schools to offer universal meal services in schools with high poverty rates, but the new provisions allow schools to offer universal meal services to all students at no cost without the requirement of meeting a certain percentage of students qualifying for free or reduced-priced meals. With more schools and all students able to participate in universal free meals, students at risk for food insecurity are more likely to participate in the school meal programs. In the California study, the schools who qualified for CEP showed the most substantial gain in participation in the school meal programs. CEP adoption was generally higher in schools with greater poverty, larger schools, high percentage of Latino students, and in elementary schools (Turner et al., 2019).

Key stakeholders for the Universal Meal Program are pediatricians and parents/guardians of children in Durham County schools. Pediatricians will be able to detect health changes and/or concerns prior to implementation of the program and after. Pediatricians have a moderate amount of power as they can speak out, write prescriptions for fresh produce and work with health departments to monitor diseases and other health issues observed more frequently in children facing food insecurity. Parents or guardians

will have less economic worries and burdens if their child is able and willing to eat school prepared meals. Households experiencing food insecurity will typically skip meals, cut down on portions, or choose the family members who will not eat so that their child will not go hungry. Parents may not have much direct power but as political constituents they have the power of the vote to remove those not considering the best interests of school children and their families.

Table 2 shows the policy assessment for the food procurement program, NC Farm to School. The North Carolina Farm to School program brings North Carolina schools in contact with local farms to bring in fresh fruit and vegetables into the schools while supplying business to farmers. The program started with a pilot program to bring strawberries and apples into the school, and it has grown from there. Schools and farmers are asked to meet several regulatory standards and follow the USDA's guidelines for procurement (Ncfarmtoschool.com, n.d.; Cde.ca.gov, n.d). Increased funding and implementation of this procurement program will enable Durham County who is already a participant in NC Farm to School, to better provide nutritious fresh produce to their students with the possibility of creating better eating habits, sticking to snack and meal guidelines, and providing economic benefits to the local agricultural businesses (Ncfarmtoschool.com, n.d.; Growingfoodconnections, n.d). This program brings fresh produce directly to Durham Country students which reduces some food insecurity and addresses access to these foods in what might otherwise be a food desert.

Key stakeholders for the food procurement program are farmers and program or school nutritionists. Farmers have the benefit of acquiring new markets by partnering with schools. Farmers have some political power with their votes but also participate in an economy which more people are willing to help and keep in business. Nutritionists either with the school district or hired by the program can make a difference by creating menu items and recipes that use the ingredients introduced to the schools. They would have little power.

Recommendation

The evaluation scores for the Universal Meal Policy and food procurement policy for recommendation are seen in Table 3. The expansion of Food Procurement Programs such as NC Farm to School was determined to be more financially feasible for Durham County Schools and economically beneficial for the state's agricultural industry. Food procurement could be budgeted for specifically by the County or school district without requiring additional state funds to be allocated as a universal meal program would require. There are financial incentives for farmers to participate in food procurement programs in which new markets will be introduced. There is also less political divisiveness in forging closer school and farm alliances than in providing free meals to all Durham County public school children. Food procurement programs like NC Farm to School can provide the fresh produce that is missing from many communities, especially communities of color, without requiring additional transportation to access it. Students will have an opportunity to learn about community agricultural products and potentially bring them home to the families. As Durham County already participates in NC Farm to School, other food procurement programs

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

Table 1: Universal Meal Program Policy Assessment

Policy Assessment #1: Universal Meal Program		
Political Feasibility (Given triple weight)	(2/5)	This policy would require a new policy to be enacted in Durham County though during the pandemic, North Carolina did provide free meals to students through the federal program. Breakfast is still currently free for all Durham County schools' students. There is political tension regarding providing free meals to all students and many law makers were eager to end the federal program started during the pandemic.
Affordability / Costs to the State or local Government (Given double weight)	(3/5)	It was already shown to be economically feasible to provide universal free meals to all students during the pandemic. The county's economy might make it more difficult to find funding though the USDA is increasing reimbursement rates. Numerous grants are available to ease some economic burden.
Impact / Lower Food Insecurity and eliminate very low Food Security in 5 years (Given double weight)	(5/5)	Participation in the School Meal Programs is made more difficult when familial support, social stigma, and family values do not match with the needs of a hungry student. It has been shown than children will participate more in the School Meal Programs when their peers are also participating.
Ease of Implementation (Given double weight)	(4/5)	Once this policy is passed, it should be fairly easily implemented. The policy will require less paperwork than the current school lunch program needs, and school districts had experience providing free meals to all students during the pandemic and still providing breakfast to everyone currently.
Racial Equity	(5/5)	This policy will promote racial equity because it ensures all students have access to free meals at school without the persistence of racial or economic stigma. Many of those who qualify for free or reduced-price meals are black and Latino, impoverished, and live in food deserts which just build up the stereotypes and racial tension.

Table 2: Food Procurement - NC Farm to School Policy Assessment

Policy Assessment #2: Food Procurement – NC Farm to School		
Political Feasibility (Given triple weight)	(5/5)	This policy would not require a new policy to be enacted in Durham County. Politically the Farm Bill, agriculture, and rural lifestyle and values are appreciated and programs that help our farmers are looked at more favorably.
Affordability / Costs to the State or local Government (Given double weight)	(4/5)	It was already shown to be economically feasible as Durham County already participates in this program. The county's economy would benefit in increasing the number of farmers partnered with. It is also important for the county to seek out grants from the USDA and work with stakeholders to reduce the economic cost to the county. Numerous grants are available to ease some economic burden.
Impact / Lower Food Insecurity and eliminate very low Food Security in 5 years (Given double weight)	(4/5)	Food procurement programs allow fresh, locally sourced produce to enter into the schools while providing extra business to the local farmers and business owners. This program brings in food, nutrition information, cooking classes in order ensure the health and well-being of their students. The nutrients provided by the fresh produce can help prevent malnutrition and chronic health diseases.
Ease of Implementation (Given double weight)	(5/5)	Durham County already participates in NC Farm to School so increasing the amount ordered from local farmers and implementing the programs within NC Farm to School should have a minor impact of how to incorporate procurement into the school district.
Racial Equity	(3/5)	This policy will minorly promote racial equity because it ensures all students have access to fresh produce at school that might not be available in food deserts or less accessible due to transportation or cost. Bringing foods into the cafeteria, classroom, and the numerous programs within NC Farm to School make it easier for all students to experience fresh, locally sourced foods.

Table 3: Evaluation for Policy Recommendation

Policy Option	Affordability	Impact	Racial Equity	Political Feasibility	Ease of Implementation	Total Score
Weight	x2	x2	x1	x3	x2	
Universal Free Meals	3	5	5	2	4	35
Food Procurement (Farm to School)	4	4	3	5	5	39

Appendix B.3: Program Budget

Fruit and Vegetable Prescription (FVP) Program Budget Summary

The three-year, $200,000 FVP program focuses on black children in food insecure households of Durham County, North Carolina. About 23% of the black population in the county live in poverty and food deserts. These areas do not have grocery stores within a mile of one's residence and access to transportation and poverty prevent households from visiting the grocery store. Physical distance and economic status create barriers to fresh fruit and vegetable consumption which contribute to food insecurity and poor health outcomes. The FVP Program seeks to increase the distribution and consumption of fruits and vegetables in this population and decrease the percentage of households with children experiencing food insecurity.

The key activities and components of the FVP program include clinicians from three participating pediatric community health clinics distributing fruit and vegetable prescriptions and monitoring receipt of prescriptions and redemption of produce using electronic medical records (EMR). The FVP program coordinator will train clinicians and medical assistants at the clinics to identify qualifying families based on questionnaire responses and train grocery store managers and clerks on how to accept prescriptions and submit reimbursement requests. During clinic visits in the first year of the program, qualifying households that meet food insecurity criteria will be identified using the US Household Food Security Module: Six Item Short Form tool. Clinic patients will complete a baseline questionnaire and participant enrollment and distribution will occur during year 1. A second questionnaire will be given to participants no sooner than 12 months after FVP distribution. An FVP will be given to each household valued at $15/month for 3 non-consecutive months totaling no more than $45 per household/year. Prescription distribution sites include three Duke Health-affiliated pediatric clinics in Durham County. Prescriptions can be redeemed at three participating redemption sites including two grocery stores in the downtown area and the Durham Farmers' Market.

One of the specific program goals is to show that 60% of prescriptions for food are redeemed by participants. This will be measured by clinicians entering the food prescription in a patient's EMR during their office visit and then tracked when the prescription or FVP voucher is presented to participating redemption sites (either one of two grocery stores or the Durham Farmers' Market. The other specific program goal is to see that food insecurity experienced by participating households that redeem the FVP will decrease by one point.

Budget Justifications

The FVP program was designed in the Durham County Department of Public Health (DCDPH) Nutrition Clinic to improve children's intake of quality foods. It will be carried out for three years with a grant from the Gus Schumacher Nutrition Incentive Program (GusNIP) and paid in part by a budget line item for new programming in Durham County.

Salaries/Wages:

The FVP program is being implemented within the DCDPH in collaboration with clinicians employed by Duke Health network. The salaries of the program director, coordinator, and data analyst are listed in the budget for transparency but as they work in DCDPH and are involved in other nutrition-related projects, their salaries are not drawn from the budget of this program in total. The salaries of the clinicians providing the prescriptions and IT assistance are listed in the budget for transparency but as they are employed by Duke Health they are not drawn from the budget of this program. The program will not require full-time active effort from the DCDPH employees or clinicians as the program is designed to fit within a clinician's patient assessment and evaluation. The initial phase of the program will require more effort at the DCDPH in the form of training sessions for clinicians and redemption site team members, design and distribution of program materials, and data acquisition and criteria matching and will be an additional project that current employees will add as the day-to-day impact will be minimal. The data collection and analysis will be performed alongside the current workload of the Nutrition clinic

with assistance from Master of Public Health students completing practicum work. Two percent raises for cost of living and all fringe benefits offered will be provided by the DCDPH and Duke Health funding. Four total Interns/Practicum Student positions will be available and paid at $10 per hour or calculated at $2500 per year to man the Durham Farmers' Market Food Program table as a representative of the DCDPH FVP program. The Durham Farmers' Market is open approximately 250 hours per year and interns/practicum students will be on-site to log fruit and vegetable prescriptions for reimbursement purposes, for data collection and analysis, and to answer questions regarding the program. They will also pass out program brochures to increase awareness and participation in the program.

Prescription/Vouchers:

Fruit and Vegetable Prescriptions/vouchers will be printed by the clinic during patient office visits for qualifying pilot households. The cost of the fruit and vegetables will be subsidized through the FVP program and reimbursed through the GusNIP grant funds.

Operating Expenses:

Office supplies and equipment utilized at the clinics include copying and printing services on clinic printers and the use of clinic desktops or laptops for clinicians. These expenses for consumables will be reimbursed to the clinic through the program funding. Three desktop/laptop computers and three printers are listed on the budget as only three clinic sites will be utilized in the pilot program and their use will be considered in-kind donations. Two tablet computers will be purchased: one for our program coordinator and one for the interns/practicum student position for use in training sessions, presentations, and use at the Durham Farmers' Market. A folding table and chair set will be purchased for use at the Durham Farmers' Market at the Food Program Information Center where program interns/practicum students will speak with people who received prescriptions, answer questions regarding the FVP program, and pass out program brochures to increase awareness of the problem and proposed solutions to the food insecurity problem facing Durham County households.

Other Expenses:

Posters: One hundred posters will be printed and distributed to Durham County clinics, grocery stores, the Durham Farmers' Market Pavilion at Durham Central Park, the DCDPH, and school administrative offices. The purpose of the posters is to educate community members and build awareness of the program including contact information.

Brochures: Twenty-five hundred brochures will be printed and distributed by clinicians to qualifying households during the first year of the program. An additional twenty-five thousand brochures will be printed throughout the remainder of the program to be passed out at clinics and the Durham Farmers' Market and made available at registers at grocery stores and school administration or nurses offices.

Funding Sources:

The GusNIP supports health initiatives and programs to reduce food insecurity by increasing the purchase and consumption of fruits and vegetables. The GusNIP program for Produce Prescription (PPR) grant provides funding for clinicians to issue prescriptions for fruit and vegetables to low-income patients through incentives offered to local grocery stores and farmers markets. The Nutrition Clinic team wrote the GusNIP grant proposal for the FVP program as part of their efforts to improve children's intake of food and reduce food insecurity.

Durham County Commissioners: The Nutrition Program in the Public Health budget will cover expenses for fresh fruit and vegetable reimbursement not covered by the GusNIP grant. Additionally, funding for the clinic office space supplies and wages for part-time interns working with the pilot program will come from the county budget.

In-Kind Donations:

This program is a collaboration between the DCDPH and the Duke Health network. The partnership with these stakeholders allows this project to reach at least 2,500 households in this pilot project. Clinicians will be trained on the prescription program and will offer the incentives to qualifying households as part of their patient visit. Information technology (IT) support including the use of clinic computers, printers, and IT troubleshooting will be offered as in-kind donations through Duke Health.

Appendix B.3.a: Program Budget Figures and Tables

Table 4: Proposed Budget for Food Prescription Pilot Program

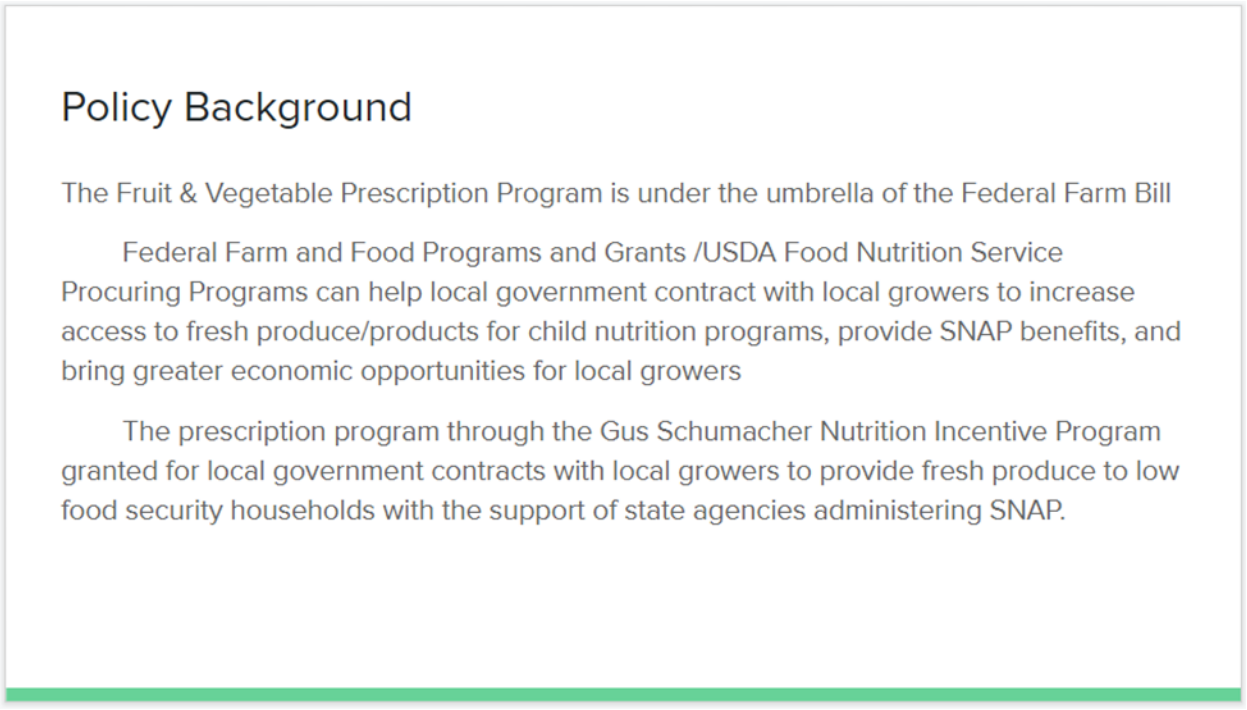
Project Expenses	Cost per unit	Quantity	Cost Per Year	In-kind Donation	Total Cost	Source
Start-up Expenses (Year One)						
Operations						
Laptop/desktop computers	$700.00	3	$2,100.00	$2,100.00	$0.00	LCHC
Cellular Tablet computer	$130.00	2	$260.00	$0.00	$260.00	Amazon
Printer	$300.00	3	$900.00	$900.00	$0.00	LCHC
Folding table and chair set	$196.00	1	$196.00	$0.00	$196.00	Target
Office supplies	$100.00	12	$1,200.00	$0.00	$1,200.00	Office Max
Prescription Vouchers						
Participant prescription vouchers	$45.00	830	$37,350.00	$0.00	$37,350.00	
Salaries and wages						
Full-time Program Director	$64,474.00	1	$64,474.00	$64,474.00	$0.00	Salary.com
Full-time Program Coordinator	$47,340.00	1	$47,340.00	$30,000.00	$17,340.00	Salary.com
Full-time Data Collection and Analysis	$50,000.00	1	$50,000.00	$50,000.00	$0.00	Salary.com
Part-time Redemption site workers	$2,500.00	2	$5,000.00	$0.00	$5,000.00	MPH practicume student
IT Assistance	47000	1	47000	$47,000.00	$0.00	Salary.com
Fringe Benefits						
Social Security	$12,378.77	1	$12,378.77	$12,378.77	$0.00	Uprinting
Medicare	$1,447.68	1	$1,447.68	$1,447.68	$0.00	
State Retirement	$24,377.50	1	$24,377.50	$24,377.50	$0.00	
Medical Insurance PPO	$7,397.00	3	$22,191.00	$22,191.00	$0.00	
Other expenses						
Brochures	$0.11	2500	$275.00	$0.00	$275.00	Uprinting
Posters	$0.60	100	$60.00	$0.00	$60.00	Uprinting
Total Cost:				**$194,474.00**	**$61,681.00**	
Ongoing Operating Expenses (Year Two)						
Office operations						
Office supplies	$100	12	$1,200.00	$0.00	$1,200.00	OfficeMax
Prescription Vouchers						
Participant prescription vouchers	$45.00	840	$37,800.00	$0.00	$37,800.00	
Salaries and wages						
Full-time Program Director	$65,753.00	1	$65,753.00	$54,474.00	$11,279.00	Salary.com
Full-time Program Cooridator	$48,286.00	1	$48,286.00	$30,000.00	$18,286.00	Salary.com
Full-time Data Collection and Analysis	$51,000.00	1	$51,000.00	$50,000.00	$1,000.00	
Part-time redemption site workers	$2,500.00	1	$2,500.00	$0.00	$2,500.00	MPH practicum student
IT Assistance	$47,940.00	1	$47,940.00	$47,000.00	$940.00	Salary.com
Fringe Benefits						
Social Security	$12,625.48	1	$12,625.48	$12,625.48	$0.00	Uprinting
Medicare	$1,475.90	1	$1,475.90	$1,475.90	$0.00	
State Retirement	$24,852.80	1	$24,852.80	$24,852.80	$0.00	
Medical Insurance PPO	$7,397.00	3	$22,191.00	$22,191.00	$0.00	
Other expenses						
Brochures	$0.11	25000	$2,750.00	$0.00	$2,750.00	Uprinting
Total Cost:				**$181,474.00**	**$75,755.00**	
Ongoing Operating Expenses (Year 3)						
Office operations						
Office supplies	$100	12	$1,200.00	$0.00	$1,200.00	OfficeMax
Prescription Vouchers						
Participant prescription vouchers	$45.00	830	$37,350.00	$0.00	$37,350.00	
Salaries and wages						
Full-time Program Director	$67,068.00	1	$67,068.00	$64,474.00	$2,594.00	Salary.com
Full-time Program Cooridator	$49,251.00	1	$49,251.00	$30,000.00	$19,251.00	Salary.com
Full-time Data Collection and Analysis	$52,020.00	1	$52,020.00	$50,000.00	$2,020.00	
Part-time redemption site workers	$2,500.00	1	$2,500.00	$0.00	$2,500.00	MPH practicum student
IT Assistance	$48,898.00	1	$47,000.00	$47,000.00	$0.00	Salary.com
Fringe Benefits						
Social Security	$12,877.93	1	$12,877.93	$12,877.93	$0.00	Uprinting
Medicare	$1,504.68	1	$1,504.68	$1,504.68	$0.00	
State Retirement	$25,337.41	1	$25,337.41	$25,337.41	$0.00	
Medical Insurance PPO	$7,397.00	3	$22,191.00	$22,191.00	$0.00	
Other expenses						
Brochures	$0.11	0	$0.00	$0.00	$0.00	Uprinting
Total Cost:				**$191,474.00**	**$64,915.00**	
Grand Total:				$567,422.00	$202,351.00	

Table 5: Budget Overview

Budget categories	Year 1-3
Start-up Expenses (Year 1)	$61,681.00
Ongoing Operating Expenses (Year 2-3)	$140,670.00
In-Kind Donations	$567,422.00
Grand Total Requested for Grant	$202,351.00
Revenue-Expenses	$0.00

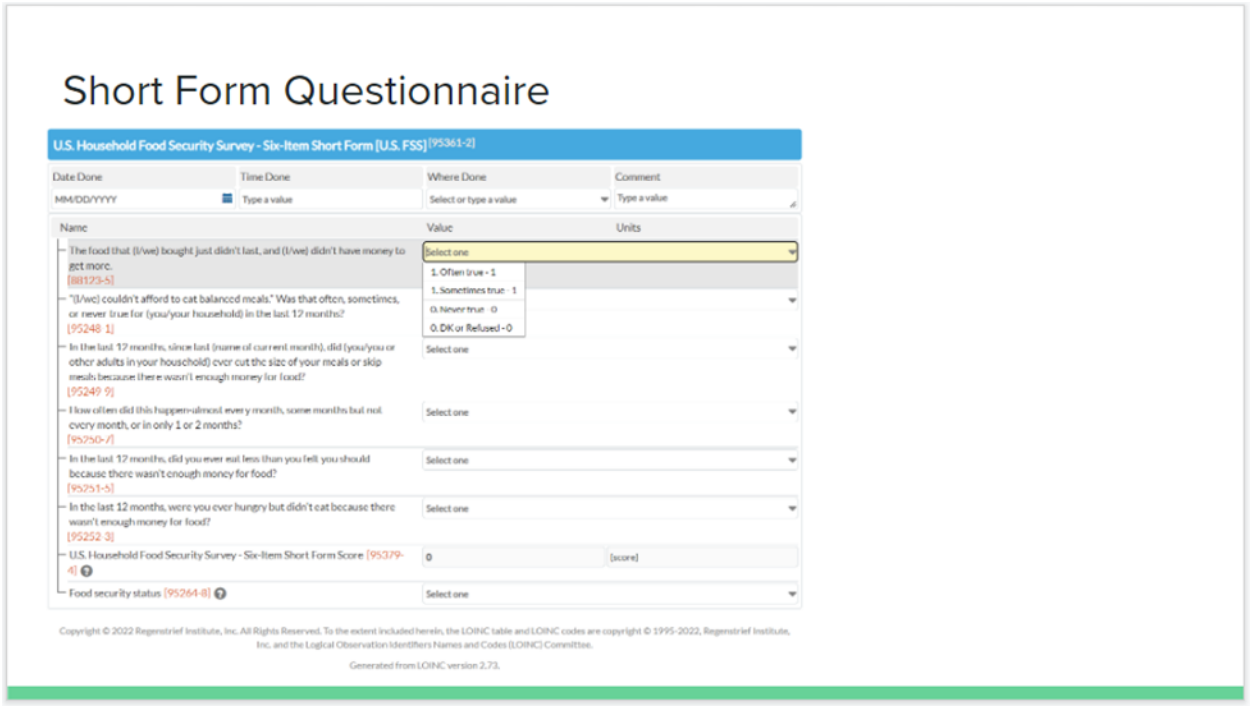
Revenue Source	Amount
Gus Schumacher Nutrition Incentive Program	$152,000.00
Durham County Board of Commissioners	$50,351.00
Total Revenue:	$202,351.00

Appendix B.4: Individual Presentation Slides and Script



The federal farm bill platform outlines policies and programs to support farmers and ranchers, some of which are designed to strengthen their local communities and support local food systems. Food procurement programs and grants allow local governments to contract with local growers providing access to fresh produce to the community while building economic opportunities for local agriculture. The food prescription program through the Gus Schumacher Nutrition Incentive Program will help Durham County government partner with local food suppliers to reduce barriers to fresh produce, experienced by households with low food security.

This three-year program hinges on the cooperation between local pediatric clinics and food markets to identify food insecure households with children ages 2-17 and give access to fresh produce. The Durham County Department of Public Health will train clinicians how to identify food insecurity, educate participating grocers about the program redemption and reimbursement process, and provide education through townhalls, social media campaigns, and stakeholder visits. Duke Health clinicians will determine program eligibility using a questionnaire during their visit. Eligible households will be given a prescription voucher for fresh fruit and vegetables that can be redeemed across three participating redemption sites. Grocery store managers and a farmer's market liaison will be available if questions arise when trying to redeem prescription vouchers (designed to look like coupons). Records of prescriptions given and redeemed will be recorded and analyzed to determine the utilization of the program and a post-assessment questionnaire for participating households will be conducted at the end of the program to determine how the vouchers were received and ease of use.



This is the short form food insecurity questionnaire given at the clinic. It has six questions and with basic value responses worth 0 or 1 points. The sum of the responses answered is the raw score. A raw score of 0-1 is high or marginal food security; a raw score of 2-4 is low food security; a raw score of 5-6 is very low food security.

The Durham County Department of Public Health secured a grant from the Gus Schumacher Nutrition Incentive Program totaling $152,000.00 which will cover the reimbursement to participating grocery stores and farmers of produce purchased through the prescription vouchers.

Employees of Duke Health, participating grocery stores, and the Durham County Department of Public Health will have their wages and benefits covered through their respective employer and labeled as “in-kind donations” through wage increases will be granted through program funding. The program coordinator will be partially compensated through program funding and practicum/internship students will be paid by program funding. As much of the costs are covered through a grant and in-kind donations, we are asking the Durham County Board of Commissioners for $50,351.00.

Budget

Budget categories	Year 1-3
Start-up Expenses (Year 1)	$61,681.00
Ongoing Operating Expenses (Year 2-3)	$140,670.00
In-Kind Donations	$567,422.00
Grand Total Requested for Grant	$202,351.00
Revenue-Expenses	$0.00
Revenue Source	**Amount**
Gus Schumacher Nutrition Incentive Program	$152,000.00
Durham County Board of Commissioners	$50,351.00
Total Revenue:	$202,351.00

General breakdown of the budget showing startup costs, ongoing costs, total of in-kind donations including the salaries, grant funding, and requested funding from Durham County.

APPENDIX C: JAMES CARL BURR'S INDIVIDUAL DELIVERABLES

Appendix C.1: Individual Problem Statement

Social Determinant of Health (SDoH)

Our team has been tasked by the Durham County Commissioner to identify a social determinant of health (SDoH) that can be improved in the county and to propose evidenced-based programs and/or policies that would meet this goal of improvement if implemented. The SDoH domain which we have identified to focus on in Durham County is the social and community context (Health.gov, 2022b). One specific social and community objective that has been identified as a priority in Durham County is food insecurity, especially among children less than 18 years of age (HealthyDurham.org, 2020). Food insecurity is defined as the "lack of consistent access to food" by the USDA (FeedingAmerica.org, 2022b). Food insecurity in children is tied to such short-term outcomes as delayed health care and increased ED usage, as well as to long-term impacts such as higher rates of asthma, depression, and eczema in addition to higher levels of stress that could potentially affect development and overall mental health (Thomas et al., 2019).

Geographic and Historical Context

Durham County, NC is one of the most populous counties in NC, containing approximately 3% of the total population in the state (CountyHealthRankings.org, 2021b). The county is considerably more urban than the rest of the state. Around 20% of the population is below 18 years-old and it has a higher proportion of non-Hispanic Black and Hispanic residents than the state average, at 35.6% and 13.7% compared to 21.4% and 9.8%, respectively. Durham County conducts a county health assessment (CHA) every three years and food insecurity has been identified as a recurrent issue (HealthyDurham.org, 2020). The most recent CHA in 2020 presented as one of its key findings that multiple issues are linked, for example the lack of affordable housing and food insecurity. In addition, the county has publicly stated that racism is a public health crisis associated with historic policies such as redlining that has affected multiple health and social outcomes such as housing and employment. Durham has had multiple issues

with affordable housing including an increase in rent by over 16% in a four-year period, one-third of the population is utilizing more than 30% of their income to pay for housing, and Black residents were much less likely to own their own homes compared to White residents. On top of this data regarding housing is the ongoing evidence that Black residents are "disproportionately being gentrified out of long-standing communities" (HealthyDurham.org, 2020). Other factors that may be contributing to food insecurity according to the CHA include significant disparities in poverty, where Black households made approximately $30,000 less per year than the White households, as well as up to 30% of Durham residents lack access to grocery stores. As for previous and ongoing efforts by the county to combat food insecurity, there is "Bully City Community Garden" currently being created from which produce will be delivered to local food pantries (HealthyDurham.org, 2020).

Priority Population

The priority population for food insecurity is children, and specifically Black children living in Durham County. The reason this population is a priority in Durham County is two-fold. First, children experiencing food insecurity puts them at a significant disadvantage compared to their peers in regards to both social and educational performances, as well as chronic health diseases. Secondly, Black children are more likely to experience food insecurity compared to White children, which indicates a significant effect of systemic racism (FeedingAmerica.org, 2022a).

Measures of Problem Scope

According to County Health Rankings (2021a), Durham County has 41,310 residents who are identified as being food insecure, which correlates to 14% of the county's population. This percentage is consistent with the overall average in the state of 14%, where food insecurity ranges per county from 10-21%. However, this percentage is not equally distributed and increases when considering children less than 18 years of age. According to FeedingAmerica.org (2020), approximately 19% of children in Durham County experience food insecurity compared to 14% of all ages overall while 21% of Black

residents are food insecure compared to only 7% of White residents. In addition, a recent Durham County Community Health Assessment identified Black individuals as 8% more likely to skip meals because of cost concerns than White individuals in the county (HealthyDurham.org, 2020). This disparity in food insecurity among children and especially Black children is not unique to Durham County with recent research estimating that around 22% of Black children in the U.S experience food insecurity or approximately three times that of White Children (FeedingAmerica.org, 2021).

Rational/Importance

Food insecurity in Durham County, specifically among Black children, is an important SDoH to address not only because the residents of the county have identified it as such, but also because of the significant disparity between Black and White residents of the county (HealthyDurham.org, 2020). In addition, food insecurity in children has been associated with multiple negative health outcomes such as higher rates of hospitalization and development of chronic health diseases and can even negatively affect social and educational aspects of children's lives. For example, children who are food insecure are more likely to repeat an elementary school grade, have developmental delays (i.e., language, motor, etc.), and have behavioral problems both at home and at school compared to those who receive adequate amounts of food (FeedingAmerica.org, 2022a). By addressing these issues, we will be not only decreasing usage of an already stressed healthcare system early during a child's life but setting up these children for better long-term outcomes and overall health while improving racial equity given the already stark disparities.

Disciplinary Critique

Public health leaders should be drawn to improving this SDoH because it has been an objective that is routinely getting worse across the United States in children. In fact, the percentage of U.S. households with children that had very low food security increased by almost 1.5 times from 2018 to 2020 (Health.gov, 2022a). This is also true in Durham County where the percentage of children experiencing food insecurity increased by 1.5% from 2018 to 2020 and is consistently worse among

Black children compared to White children (FeedingAmerica.org, 2020). The problem of food insecurity affects many different groups of people. However, there are certain groups that are at higher risk, such as children, as well as low-income, and Black or Hispanic communities (FeedingAmerica.org, 2022b). Food insecurity is a complex and wicked problem that requires the input and effort of multiple stakeholders, which public health leaders should identify and facilitate collaboration among the many stakeholders in a community to attack this problem.

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Appendix C.2: Stakeholder Analysis

Introduction

SDoH Background

Our team has been tasked by Durham County Commissioner to identify a SDoH that can be improved and how to improve it with an evidence-based program/policy. Food insecurity in Black Children <18 years-old in Durham County was identified as the specific SDoH and priority population. Food insecurity is defined as the "lack of consistent access to food" by the USDA (FeedingAmerica.org, 2022b). According to County Health Rankings (2021), Durham County has 41,310 residents who are identified as being food insecure, which correlates to 14% of the county's population. The percentage of children experiencing food insecurity in Durham County increased by 1.5% from 2018 to 2020 and is consistently worse among Black children compared to White children (FeedingAmerica.org, 2020). Children experiencing food insecurity are at a significant disadvantage compared to their peers in regards to both social and educational performances, as well as chronic health diseases (FeedingAmerica.org, 2022a). For example, children who are food insecure are more likely to repeat an elementary school grade, have developmental delays (i.e., language, motor, etc.), and have behavioral problems both at home and at school compared to those who receive adequate amounts of food (FeedingAmerica.org, 2022a).

Program Background

Our nutrition lead is proposing a fruit and vegetable prescription program. The priority population of Black children would be identified via the pediatric community health clinics that serve them. Eligibility would be determined by food insecurity criteria developed by the U.S. Household Food Security Module. Eligible individuals would complete both a pre- and post-questionnaire at their clinic determining their change (if any) in food insecurity criteria. Eligible individuals would also receive a fruit/vegetable prescription at their first visit that is valued at $15 per month for three months (totaling

$45). These prescriptions could be reimbursed through participating local health food producers such as farmer's markets, grocery stores, etc. The short-term goal is to increase redemption of fruit/vegetable prescriptions from 0 to 60% by one year. The long-term aim is to decrease the proportion of Black children in Durham County who are identified as food insecure.

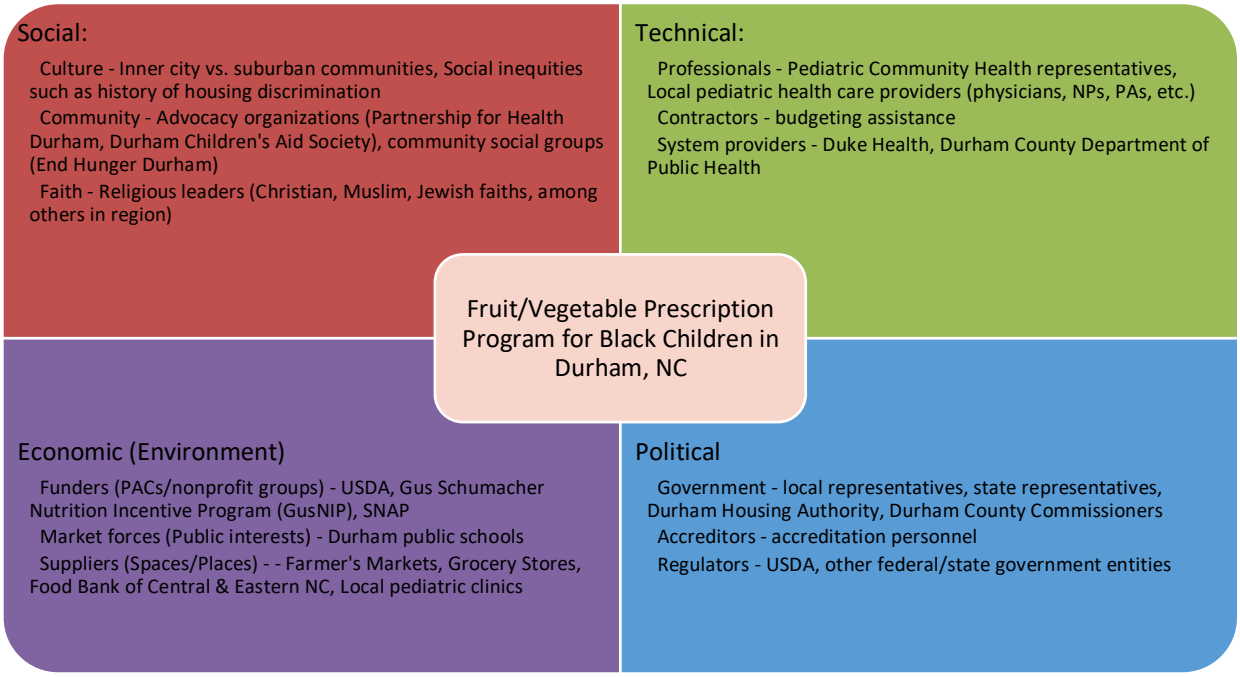
Stakeholder Analysis

The stakeholders for such a prescription food program as described above will be incredibly diverse secondary to the complex public health change that our team is seeking. It will require support from not only a federal and state political level but also from community social, economic, and technical contexts. To facilitate this analysis, our team has chosen a three-step process that includes identifying the stakeholders via a STE(E)P Scan, prioritizing stakeholders by considering their interest and influence, and mapping those same stakeholders by those that have the highest and lowest amount of interest and influence. We have chosen this process because it allows the community to prioritize those with interest and influence in an effort to gain the resources that are needed to successfully implement and sustain solutions. The following three-steps are outlined with our specific process and community goals in mind.

1. Identify Stakeholders

The STE(E)P Scan for stakeholder identification is an analysis tool that focuses on the social, technical, economical (environmental), and political aspects of a community (PESTLEanalysis, 2015). This scan allows a public health team to consider these aspects and break them down in detail to assure that all relevant stakeholders are identified. In our fruit/vegetable prescription program, this scan is represented by Figure 1 below in the context of food insecurity in Durham County.

Figure 1. STE(E)P Scan for Stakeholder Identification



2. Prioritize Stakeholders

After utilizing the STE(E)P scan for stakeholder identification, the next step was to prioritize those same stakeholders. The stakeholders were prioritized by what was deemed as their influence to potentially drive or even block the initiative as well as their overall interest in the project based on their goals and objections. Figure 2 in the appendix demonstrates the prioritization of the already mentioned stakeholders in Durham County. Those same stakeholders were then mapped in the following section for a clearer representation of their level of interest and support for the prescription fruit/vegetable program.

3. Map Stakeholders

Utilizing the previous prioritization, we were able to organize stakeholders into four categories as demonstrated by Figure 3 in the appendix. The most vital group are the stakeholders who hold both high interest in and high influence of the program (Community Tool Box, 2022). The stakeholders that

represent this vital group include Duke Health, Durham County Department of Public Health, and Black parents of the children our program aims to positively affect. We will be focusing on this group in an effort to understand their viewpoints because without the backing of the owners of the regional clinics (i.e., Duke Health) and Durham County DPH, we will be unable to implement the questionnaire in the clinics. In addition, without the buy-in of Black parents to participate, there will be no priority population to create meaningful change.

The second group of stakeholders for which is imperative to create a cooperative relationship is the high influence, low interest group. The main stakeholders are potential funders, including the USDA and Gus Schumacher Nutrition Incentive Program (GusNIP), and the potential redemption sites for the prescription program, including local grocery stores and farmer's markets. This group of stakeholders holds significant influence because the program will require both funding to support the program and its entities as well as redemption sites for our population of interest to redeem their fruit and vegetable prescriptions. There is not necessarily a prior interest of these groups in seeing success of this specific program, so it will be essential to develop a meaningful relationship from the start and gauge interest.

Next Steps

The next steps of this process, gaining an understanding of the stakeholder perspectives as well as incorporating stakeholders in co-design and involving them in multiple ways, will be outlined in an upcoming engagement and accountability plan. In that plan it will detail both why it is imperative and how we will accomplish collaboration between the diverse groups in charge of developing and maintaining a fruit/vegetable prescription program.

Summary/Rationale

The most influential groups are those that would house the prescription program, i.e., the pediatric clinics and their ownership (Duke Health, Durham County DPH), as well as the redemption sites

for those prescriptions (local farmer's markets and grocery stores). Without these key stakeholders, the prescription program would not be a feasible implementation. It is also imperative that the program receive federal funding that is already available via the Gus Schumacher Nutrition Incentive Program (GusNIP, 2021). Lastly and most importantly, the people most affected by food insecurity in Durham County (Black children and their families) need to have a seat at the table when ideas are being shared, programs are being developed, and decisions are being made. We want to empower this population and create an environment of shared decision making to ensure the sustainability of this program moving forward.

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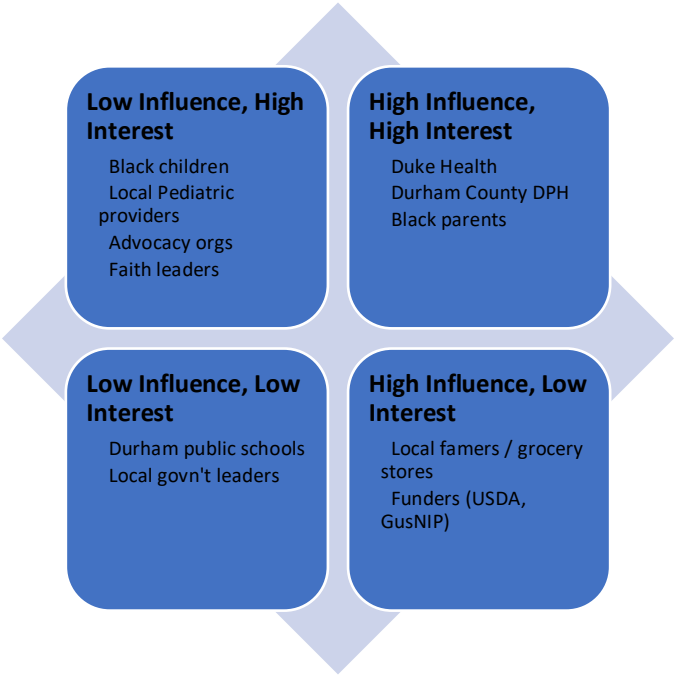
Appendix C.2.a: Stakeholder Analysis Figures and Tables

Figure 2. Stakeholder Prioritization

Stakeholder / Position	Influence (0-10)	Interest in Project (Lo-Hi)	Goals	Objections to Project
Black Children	3	Hi	Be able to thrive.	How will this help me?
Black Parents	8	Hi	Safety of my child(ren).	Will my child(ren) be taken advantage of?
Local Pediatric Health Care Providers	5	Hi	Reduce food insecurity in my patients.	Is this sustainable?
Duke Health	7	Med-Hi	Reduce food insecurity in community.	How will this be funded?
DC DPH	6	Med-Hi	Reduce food insecurity in community.	Can we find redemption partners?
Advocacy Organizations	4	Hi	Decrease impact of systemic racism on food security.	How do we know this will impact the people who need it?
Faith Leaders	3	Med	Improve community resilience	Will it lead to a positive impact in their congregations?
Funders	10	Lo-Med	Support mission to eliminate hunger.	Is there evidence to back this type of program?
Durham Public Schools	2	Lo	Feed our students healthy meals.	How does this impact us?
Local farmers / grocery stores	9	Lo	Sell our products and increase profit.	Will this hurt our bottom line?
Local Government Leaders	5	Lo-Med	Reduce % of food insecurity in my district/region.	Does this help my constituents?

Figure 3. Stakeholder Map



Appendix C.3: Engagement and Accountability Plan

Statement of Proposed Program Purpose

Our proposed program is a fruit and vegetable prescription (FVP) program. The priority population of the FVP program are Black children under 18 years of age living in Durham County, North Carolina that are suffering from food insecurity. The purpose of the FVP program is to increase food security among Black children under 18 years in Durham County, NC.

Summary/Rationale of Engagement Plan

Our program requires a very diverse set of stakeholders ranging from pediatric community health representatives to redemption sites for the prescriptions such as local grocery stores in addition to both large and small funders as well as members of the priority population itself. The stakeholder analysis already conducted has provided us with a prioritization on which key stakeholders require the most communication and collaboration based on their level of interest and influence. These stakeholders and their corresponding responsibilities are outlined in Table 1 in Appendix B. The most influential groups include pediatric clinics and their ownership (Duke Health, Durham County DPH), as well as the redemption sites for those prescriptions (local farmer's markets and grocery stores). The most interested groups include those most affected by food insecurity, i.e., Black children and their families living in Durham County.

The reason behind engaging the most influential groups is based on the need for accountable organizations who have the infrastructure (i.e., the staff and the clinics) to conduct such a program. Without the ability to leverage already existing healthcare organizations who service the priority population, it would be impossible to create such a structure from scratch. In addition, without sites for our families to redeem their fruit and vegetable prescriptions, we would be handing them nothing more than a piece of paper and a nutritional recommendation. The rationale for engaging those affected by food insecurity is multiple, but perhaps the most important is that without the buy-in of the vulnerable

population itself, we will be unable to create meaningful change and therefore increase food security for that of Black families and their children.

To engage this diverse group of stakeholders, our team has decided on three different engagement methods in an effort to more appropriately collaborate with both individual and group level stakeholders (see Table 2 in Appendix C). The first is an individual level engagement strategy of conducting empathy interviews. We wish to perform empathy interviews in an effort to evoke specific stories from the individuals who are currently experiencing food insecurity and from those who are interacting with these same people on a regular basis (Plattner, 2015). Our second engagement strategy is brainswarming, which will be focused more on the group level. Brainswarming will be used in group settings of similar stakeholders (i.e., Duke Health and DCDPH) in an effort to uncover additional resources and actions that can utilize those resources for the development of the FVP program (Jarosz, 2020). The third and last engagement strategy is another focused on the group level called the six thinking hats. This strategy will be used in concert with brainswarming by reviewing the ideas generated during the brainswarming session and refining them in a shared-decision making process that allows participants to view the ideas from different perspectives (MindTools.com, 2022). It is important to note that these strategies are designed to engage our stakeholders at the beginning of the program and other strategies will need to be considered for later program engagement, especially for sustainment of the program.

The following section will further outline the specific engagement methods we plan on utilizing as a public health team to develop creative ideas and gain specific insights from our multiple different stakeholders.

Engagement Methods

The first engagement method will be one-on-one empathy interviews. These one-on-one empathy interviews will be conducted with stakeholders from which we need to gain their lived experiences and insights. The specific stakeholders we prioritize for interviewing are Black parents, both for a family perspective and as a proxy for their children, and the Pediatricians serving them. The questions for each

of these stakeholders are outlined in Appendix D but will be focused on evoking their stories in an effort to understand what they do, think, and feel about food insecurity and a potential FVP program (Plattner, 2015). Our preferred method of interviewing would be face-to-face, either virtually or in person, and we will make arrangements for both depending on the preference of the interviewee.

The second engagement method will be brainswarming. Brainswarming will be conducted in a group format with both the most influential and the most interested stakeholders with the single goal of implementing the FVP program in our priority population. We will begin placing the resources on the bottom of a written board, divide the implementation of said program into actions that achieve its implementation, and connect these actions to resources in an effort to identify the most efficient, effective, and cost friendly manner to implement the program (Jarosz, 2020). There will be multiple sub-committees of stakeholders that will work in concert with each other. The first sub-committee will be composed of Duke Health and DCDPH. The second sub-committee will include potential redemption sites such as farmer's markets and local grocery stores. The third and last sub-committee will be composed of pediatricians and Black parents, who will also represent their children's interests. These group meetings will be held in person with virtual options for those who prefer this method or their schedule makes attending in person too difficult.

The third and last engagement method is the six thinking hats technique. We will also utilize this technique in the previously created sub-committees to refine and enhance the multiple ideas created during the brainswarming sessions. This will allow our stakeholders to view each idea through a different lens, whether that be via a data perspective, through feelings/emotions, a positive outlook, a cautious outlook, a creative outlook, or lastly a process control perspective (MindTools.com, 2022). This will encourage and facilitate shared-decision making in a prioritization of solutions for the FVP program.

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

MOU

We are: Durham County Department of Public Health (DCDPH) - facilitating program planning and implementation process and convening all stakeholders

MOU with: Duke Health - DCDPH will partner with Duke Health to plan and implement fruit and vegetable prescription (FVP) program

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MEMORANDUM OF UNDERSTANDING BETWEEN DURHAM COUNTY DEPARTMENT OF PUBLIC HEALTH AND DUKE HEALTH

1.0 PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to establish an agreement between the Durham County Department of Public Health (herein referred to as DCDPH) and Duke Health to develop and implement a program that allows the prescribing of fruit and vegetable by Duke Health providers to their patients for utilization at redemption sites. In addition it is to outline responsibilities and provide support on the advocacy and education related to said program.

2.0 PARTNERSHIP PRINCIPLES

2.1 Promote collaboration and exchange of knowledge

2.2 Share networks of contacts of both organizations

2.3 Communicate directly and transparently

2.4 Ensure both parties are contributing by leveraging their expertise and maximizing their strengths

3.0 SCOPE OF ACTIVITIES

3.1 DCDPH will provide project management to guide program and policy process in collaboration with Duke Health

1. Duke Health to confirm representative who will serve as main delegate and correspondent with DCDPH
2. Duke Health reviews MOU developed by DCDPH to ensure it is in agreement with all of the language within
3. Duke Health reviews RASCI chart developed by DCDPH to confirm responsibility and accountability levels
4. DCDPH and Duke Health will collaborate to assign due dates for the items outlined below

3.2 DCDPH and Duke Health will collaborate to create an implementation process for the fruit and vegetable prescription program within their pediatric clinics

1. DCDPH will develop a pre and post questionnaire to distribute at pediatric clinic sites that models the USDA U.S Household Food Security Module
2. Duke Health will review these questionnaires and provide recommendations for changes and/or alterations prior to distribution to Duke Health pediatric clinic sites
3. DCDPH and Duke Health will meet to develop a joint training program to educate their pediatric clinic staff on how to distribute and collect questionnaire in addition to what patient population falls underneath the eligibility criteria

3.3 DCDPH and Duke Health will collaborate on creating partnerships with local farmer's markets and/or grocery stores as redemption sites for said fruit and vegetable prescriptions

1. DCDPH and Duke Health will identify representatives from each organization responsible for outreach with potential local redemption sites
2. DCDPH and Duke Health will meet to develop a secondary MOU to be utilized between this joint partnership and local redemption sites

3.4 Duke Health will contribute to promoting public education of the FVP program during its implementation and sustainment periods

1. Duke Health representative will work with DCDPH members facilitating information gathering and material development necessary to educate the public
2. Duke Health will provide any relevant contacts that can contribute to education (both in providing information and physically educating public)
3. Duke Health representatives will attend at least 75% of all education activities

4.0 ACTIVITY AGREEMENTS

4.1 This MOU shall be reviewed semi-annually by DCDPH and Duke Health in order to address issues identified by either party to this agreement.

4.2 The representative Duke Health selects will find a suitable replacement within Duke Health if unable to fulfill duties outlined above.

4.3 All activities implemented through the DCDPH and Duke Health partnership will prioritize the outcome of improving population health.

5.0 RENEWAL, TERMINATION, AMENDMENT

5.1 This MOU shall remain in force for a period of 3 years from the date of the last signature. This MOU may be extended by the written consent of both parties.

5.2 This MOU may be terminated by either party giving written notice to the other party at least 3 months in advance of the stated termination date. Termination of this MOA shall not affect activities in progress pursuant to specific activity agreement, which shall continue until concluded by the parties in accordance with their terms or as otherwise agreed to by the parties in writing.

5.3 This MOU may be amended only by the written consent of the parties.

In witness thereof, the parties have offered their signatures hereto:

_____

DCDPH Rep

_____

Date

_____

Duke Health Rep

_____

Date

Table 1

RASCI Levels

Who is…	***Policy/Program*** *Transformation*	*Rationale For Partner Participation*
Responsible=owns the problem / project	Duke Health, Durham County Department of Public Health	Primary parties carrying out the program day to day activities, direct involvement in logistics and decisions surrounding logistics
Accountable=ultimately answerable for the correct and thorough completion of the deliverable or task, and the one who delegates the work to those responsible	Durham County Commissioner - Public Health Team	Provides funding, ultimately responsible for overarching decisions that guide the direction of program [planning and implementation], convenes stakeholders, delegates tasks
Supportive=can provide resources or can play a supporting role in implementation	Redemption Sites (Local Farmers Markets, Grocery Stores), Funders (USDA, GusNIP)	Redemption sites are necessary supportive resources for the use of the prescription program as are the funders for which the redemption sites will be reimbursed.
Consulted=has information and/or capability necessary to complete the work	Black parents and children, Local pediatric providers	Both the priority population and the healthcare providers who serve them are essential to complete the program. These groups however, are not the responsible or accountable parties and will not be answerable for the implementation of the program.
Informed=must be notified of results, process, and methods, but need not be consulted	Local government leaders	The local government leaders not involved in the implementation of public health lead do not need to be directly consulted but should be notified of the process and results since it affects their constituents.

Table 2

Engagement Strategies

Engagement Strategy	**Stakeholder(s)**	**Purpose**
Empathy Interviews	· Black parent(s) · Pediatrician(s)	· Build rapport · Evoke stories · Explore emotions · Begin to understand motivations
Brainswarming	Subcommittee #1 · Duke Health · DCDPH Subcommittee #2 · Redemption sites Subcommittee #3 · Black parent(s) · Pediatrician(s)	· Generate ideas · Connect resources to actions · Encourage participation from all groups
Six Thinking Hats		· Refine and prioritize ideas · View through different perspectives

Questions for Black parent(s)

1. What do you think of when you hear the phrase food insecurity?
2. How often do you worry about your food running out and not having enough money to buy food?
3. Can you tell me about the first time that you worried about your food running out before you got money to buy more?
4. How did you feel at that moment?
5. Walk me through what you do when the food you bought just does not last and you don't have money to get more?
6. How does this affect your children?

Questions for Pediatrician(s)

1. How do you screen for food insecurity in your clinic?
2. What questions do you ask?
3. What happens when you identify a family at risk for food insecurity?
4. What resources do you try to connect food insecure families?
5. How do you follow up with these families?
6. How do you ensure the resources are utilized?
7. What resources do you feel like your clinic needs in regards to food insecurity?
8. What are some barriers/challenges in implementing a potential fruit and vegetable prescription program?

Appendix C.4: Individual Presentation Slides and Script

Good evening everyone, thank you for joining us tonight. My name is Carl Burr and our team consisting of myself, Jean Braun, Anna Gross, and Hannah Shai has been tasked by you, the Durham County Commissioners, to identify a social driver of health that could be improved. We are proposing a fruit and vegetable prescription program to improve food security in the county, specifically among Black children under 18 years of age. The remainder of this presentation will walk you through the background of this wicked problem, our goals, program recommendations, engagement strategies, and lastly, evaluation plans. So without further ado we will dive right in.

Food security, or consistent access to food, is low among Black children in Durham County. The percentage of children experiencing food insecurity in Durham County increased by 1.5% from 2018 to 2020 and racial disparities between Black and White children continue to persist. Approximately 19% of children in Durham County experience food insecurity compared to 14% of all ages overall, while 21% of Black residents are food insecure compared to only 7% of White residents. Food insecurity in children has been associated with negative outcomes such as decreased diet quality, development of chronic diseases, as well as negative effects on the social and educational aspects of children's lives. For example, children who are food insecure are more likely to repeat an elementary school grade, have developmental delays, and have behavioral problems compared to those who are food secure. This rich picture demonstrates the complexity of this wicked problem and root causes of disparities including historically racist policies such as redlining. If you take a closer look at the embedded maps of downtown Durham, you can appreciate how the areas of redlining coincide with areas of poverty as well as areas with poor food access. In an effort to combat these significant disparities and health outcomes, our goal is to improve the food security of Black children in Durham County via a fruit and vegetable prescription

program and decrease the proportion of Black children in Durham County who are identified as food insecure.

APPENDIX D: ANNA GROSS'S INDIVIDUAL DELIVERABLES

Appendix D.1: Individual Problem Statement

Social Determinant of Health (SDoH)

This problem statement will focus on the increasing percentage of children in foster care who attain permanency within 12 months of entering the child welfare system in Durham County. Permanency refers to children being connected to a permanent family through reunification with parents of origin, adoption, or long term legal guardianship with a relative or other guardian (Welfare Information Gateway, n.d.). Generally, permanency means ensuring children have a family with a positive, stable relationship with an adult that can provide for them (Juvenile Law Center, 2016). Foster care is a temporary service provided by state child welfare agencies for children who can't live with their families. Thus, the aim of the child welfare system is for children to move through the foster care system quickly and achieve permanency. (Child Information Gateway, n.d.)

Children in foster care attaining permanency is an example of a social determinant of health related to social and community context. Social and community context refers to the ways in which peoples' social networks (friends, family, neighborhood community, and others) impact their health outcomes (Healthy People 2030, n.d.) There are numerous short- and long-term health related effects of children spending time in the child welfare system without having achieved permanency.

Short term impacts - Because youth in foster care have likely already lived through trauma (including abuse and neglect, discontinuity in education, and losses of relationships), they are susceptible to being negatively impacted in their emotional and social development as they transition into adulthood. Behavioral risks for children in foster care include engaging in unprotected sexual activity, alcohol and substance abuse, and delinquent activities (Youth.gov, n.d.). Additionally, because of discontinuity in living situations, they might have more difficulty attaining stable elementary and secondary education which can lead to barriers to graduating on time. (Youth.gov, n.d.)

Longer term impacts - Long term consequences of prolonged stays in foster care can extend well into adulthood. Due to a combination of the shorter-term impacts listed above, youth who had prolonged

stays in foster care may have a more difficult time attaining employment due to more limited opportunities while they were in the child welfare system [e.g., instability resulting in not being able to participate in extracurriculars, maintain good academic standing etc.]. Additionally, a study showed that 25% of 19-year-olds formerly in foster care reported a higher incidence of health problems than non-foster care youth including increased hospitalizations due to injury, accident, substance misuse, or mental health disorders, among others (Youth.gov, n.d.). There is also a higher risk of involvement with the justice system for youth formerly in foster care due to factors such as limited social connectedness, economic instability, or unemployment (Youth.gov, n.d.).

Geographic and historical context

With a population of around 321,000, the county population makes up 3% of that of the entire state. The percentage of Non-Hispanic White individuals is 43% compared with a state percentage of 62.9%, and the percentage of Non-Hispanic Black individuals is 35.6% compared with a state percentage of 21.4%. Hispanic individuals in Durham County make up 13% of the population while in North Carolina they make up 9.8%. These figures demonstrate a slightly more racially diverse population than other parts of the state. (County Health Rankings, n.d.)

It is estimated that 19.9% of the population in Durham County are children (U.S. Census Bureau, 2021). Child health in Durham County could be impacted by social factors, such as [in the context of child welfare] poverty or living in a single parent household. The number of children living in poverty in Durham County is 21%, which is higher than the state and national averages. Additionally, 34% of children live in single parent households, also higher than state and national averages. Both of these indicators leave children in Durham more vulnerable to entering the foster care system as a result of being at greater risk for being identified as experiencing neglect (Macguire et al., 2017) (County Health Rankings, n.d.)**.**

Priority population

The priority population for this problem statement are the children who enter the child welfare system in Durham County. This includes youth under the age of 18. Stakeholders for this priority population include their biological parents, and potential and active foster families. It is important to engage each of these groups of individuals because they all play an active role in the child welfare system. Additional stakeholders include educators, community organizations (especially those serving youth), and child welfare agency staff.

Problem Scope

The number of youth in foster care in North Carolina has increased by 30.4% from 8,828 in 2010 to 11,213 in 2021. Between 2014 and 2019, the number of children in foster care in Durham County has more than doubled (from 173 to 357), higher than many other counties in the state during the same period (Watson, 2020).

Racial disparities in the foster care system are well documented, showing children of color [Black, Hispanic, Asian, 2 or more races, American Indian/Alaska Native] are more likely to be in the foster care system compared with non-Hispanic white youth. For example, in the U.S. in 2018 Black children under the age of 18 were 13.7% of the population, but 22% of children in foster care were Black (National Conference of State Legislatures, n.d.). Demographic data for children in foster care in Durham County are not publicly available, however based on the demographic data above [geographic and historical context section], one could infer that being a racially diverse county Durham also would have a racially diverse population in the child welfare system, with possible disparities. Collecting these data and making them publicly available is a critical step in addressing permanency in Durham County.

Comparison Across Places

Data comparing Durham County with the other counties in North Carolina was limited or not publicly available. Data comparing N.C. with the U.S. is. The number of youth in foster care across the

nation has increased from 2011 to 2021 (going from 392,211 to 402,410 - ~3% increase). North Carolina experienced an increase of 30.4% of children in foster care during this time. From 2011-2021 there were many more states [37 states] that experienced either a decrease in the number of youth in foster care, or less of an increase than North Carolina. Therefore, North Carolina was in the top 13 states in terms of total increase in the number of children in foster care during this 10 year period. (The Imprint, 2021).

Rationale/Importance

In summary, increasing the number of children in Durham County who exit the child welfare system within 12 months is of the utmost importance. Extended stays in foster care impact children's social, emotional, and physical health. Children who have stability in their living situations have a higher likelihood of success in their future, with more of a chance at finishing high school, attaining employment, and avoiding criminal activity (Youth.gov, n.d.). Additionally, even with limited data available, it is noted that Durham has had a substantial increase in youth in foster care in recent years [2014-2019] (Watson, 2020). This is also true at the state level, with 37 states performing better than North Carolina in controlling the percent increase of children in foster care low (The Imprint, 2021). Because of this, devoting time and resources to helping children exit the child welfare system and attain permanency in Durham County is timely and necessary to ensure children have the best possible chance at a bright future.

Disciplinary critique

When aiming to increase the number of children in the child welfare system in Durham County who attain permanency, a public health leader needs to implement effective stakeholder engagement, strategically collect and analyze data, and maintain a perspective of cultural humility in order to address health equity. There are numerous stakeholders involved in this effort [case workers, families, policymakers, children etc.], and without careful consideration in engagement strategies, it is very possible important partners could be left out. In this case, children are [arguably] the most important party

involved in the child welfare system, and as with many public health issues that involve children, they are frequently not thought of as partners. With this said, leaders need to prioritize not just involving those who are traditionally thought of as having power [government officials, funders], and do whatever they can to include those who this problem is ultimately most affecting [children, families] in solution development. Additionally, as mentioned above, public health leaders need to put considerable emphasis on locating data to help support their efforts. Because large quantities of county-level child welfare data were not publicly available, there is a gap to fill for public health practitioners to better articulate the scope of the issue [how many children are exiting foster care each year, racial demographics, what type of permanency they are attaining – adoption, long term guardianship etc.]. Having this information will help to ensure the child welfare system in Durham is best understood before developing a solution, and any solution developed is prioritizing the right aspect of the issue. Lastly, and potentially most importantly, public health leaders must maintain a perspective of cultural humility when attempting to increase the number of children who attain permanency in a way that embodies health equity. Especially for those leaders who have not had lived expertise navigating the child welfare system themselves, humility must be the top priority, and they should always question what they know as it relates to this issue. Ultimately, children in foster care will have the most valuable insights in how to help children exit care more effectively.

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Appendix D.2: Stakeholder Analysis

Introduction

This consultant group was tasked with developing a solution for a social determinant of health that affects the social and community context of Durham County. As such, addressing food security was selected. The U.S. Department of Agriculture defines food security as "all people at all times have enough food for an active and healthy life" (U.S. Department of Agriculture, 2022). Thus, the goal of this consulting group is to implement a program and policy that helps Durham County to achieve this goal. There are a total of 49,600 people in Durham experiencing food insecurity (16.5% of the county population), including 12,460 children (19.1% of the child population) (Food Bank of Central NC, n.d.). Because of this, the consulting group aims to address food security among Durham County children.

The policy lead on our team is overseeing the efforts to develop and implement a policy to increase funds allocated to Durham County for the N.C. Farm to School Program. The N.C. Farm to School Program was established in 1997 to facilitate the procurement of food from North Carolina farms in schools. All counties are encouraged to participate (NC Farm to School Program, n.d.).

Stakeholder Analysis Overview

Stakeholders are individuals who have an interest in an initiative and a potential influence over its outcome (UNC Institute for Healthcare Quality Improvement, n.d.). However, it is critical to involve stakeholders as early on in an initiative's process as possible, not just because they can help influence the outcome, but because when addressing a community issue like food security, the individuals who are closest to the issue [i.e., experiencing food insecurity or closely connected to someone is] will be the most affected by the outcome. With this in mind, the consulting team conducted a stakeholder analysis to identify and prioritize stakeholders. This will be done in the start-up phase of the policy planning to develop a partnership strategy, which is described in this section of the report.

Identify Stakeholders

To identify stakeholders relevant to the policy initiative to increase supply of healthy food in Durham County Public Schools, a STE(E)P Scan was carried out (See Figure 1). A STE(E)P Analysis assesses the social, technical, economic/environmental, and political influencers that could play a role in a project as a stakeholder (Pestle Analysis Contributor, 2015). This is a beneficial tool, especially for public health issues, because it frames identifying stakeholders in a way that takes multiple systems into account. The scan took place during a brainstorming session at the first consulting team policy proposal planning meeting. Figure 1 (below) lists the results of the stakeholder identification process, in which categories of stakeholders were selected, without yet selecting specific individuals. The largest groups of stakeholders identified fell into the social and technical categories, as a result of their affiliations to the community and school system.

Prioritizing Stakeholders

After identifying stakeholders, individuals from each type of stakeholder group will be recruited and interviewed for an analysis of their perspectives. Recruitment of stakeholders will take place through disseminating flyers in schools, and through the policy lead's connections from a 10-year history collaborating with Durham County schools to implement public health policies. Additionally, our consulting group nutrition lead has a prior working relationship with End Hunger Durham and Partnership for a Healthy Durham, so will be able to recruit stakeholders from those organizations. We propose that stakeholders are compensated at a rate of at least $25 per 30-minute meeting for their time. During these conversations, the information below will be gathered through one-on-one conversations. These questions serve as the basis for the power mapping exercise described in the following section (Community Tool Box, 2022).

- Role in the community
- Interest in the policy

- Potential contributions they could make to developing and implementing the policy
- Goals related to the Policy
- Objections to the policy

Possible results of these interviews, as well as potential individuals identified to recruit, are displayed in Appendix 1. Contrary to some more controversial public health issues, as noted in the possible results, we anticipate a low level of objections and high interest from almost every potential stakeholder for this initiative. The main potential objection we foresee is that school personnel and other stakeholders who have the power to implement the policy will likely have many other competing priorities to balance. We hope to include as much lived expertise as possible from each stakeholder from their unique position to best inform our approach in increasing the procurement of healthy food in schools.

Power Analysis

After this, a power mapping process was carried out to visualize where stakeholders would fit in terms of their influence and level of interest (Community Tool Box, 2022). The results of this power mapping activity, also carried out in an early planning meeting for this policy proposal, are displayed below. The results of the power mapping exercise are displayed in Appendix 2.

It should be noted, that while focusing on potential influence and interest as metrics for prioritization is an important strategic step to developing a policy, the Durham County students and families are ultimately the individuals most affected. With this said, despite not having a high influence, students and families should remain centered throughout this policy development process. Students and families remaining centered means that they are treated as equitable partners through transferring as much ownership as possible of the policy process [recognizing that the power dynamics in the policy-making system in the U.S. limits this]. It means that their lived expertise related to food security is held in the highest regard throughout the entire initiative. Strategies to do this include featuring student perspectives throughout the policy proposal process and ensuring they are consistently able to provide feedback on the policy. Additional strategies will be elaborated upon in the subsequent engagement plan.

Rationale

Each stakeholder will be included for their unique skills and expertise they can provide to best position us to succeed in implementing the policy to increase healthy food procurement in Durham County Public Schools through the NC Farm to School program. First, the Durham County school administration is a critical group to include because they will have insight into logistics of food procurement and distribution in schools, budgeting, a general knowledge of student needs, and connections to folks at levels of the school system. Administration includes those at the county level [superintendent, county school board members, and the Nutrition Services Director] as well as those at the individual school level [principals and vice principals]. These are the individuals who will likely serve as spokespeople for schools and help to serve as a liaison with other government officials.

Additionally, those affiliated with the Durham County government will be critical to include from the beginning, specifically those already involved in policy development around the NC Farm to School Program. It will likely be the most difficult to compete for the time of these individuals [i.e., Durham County House Representative], and because the farm to school program is a statewide initiative, the individuals at the policymaking level will have to balance the interests of Durham County with all the other state counties. Ultimately, county representatives are the ones who will have the power to increase funding towards this initiative.

Representatives from the community organizations End Hunger Now and Partnership for a Healthy Durham are also important to include as a result of their knowledge of healthy food distribution and connections to the community. The vision of End Hunger Durham aligns with the goal of this initiative, to make healthy food available to everyone in Durham (*End Hunger in Durham – Food Is a Human Right*, n.d.). To complement this Partnership for a Healthy Durham is a network of community organizations and leaders with the goal to make Durham more healthy. With their connections, we can connect with health organizations that can help promote the healthy food initiative (*History and Background - Partnership for a Healthy Durham*, n.d.).

As mentioned, Durham County students and families arguably play the most critical role in developing this policy because of their lived expertise and that they will be most affected by the policy. If they are not at the center of helping to determine what food is distributed to schools, how it is distributed, at what cadence [does it work better to have healthy food days at the beginning of the week vs. end of the week, or other timing], and inform the overall purpose of increasing healthy food to begin with, even if the policy is successfully implemented it may not be successful.

In summary, the inclusion and partnership with stakeholders will be critical to our efforts in implementing this food procurement policy and ensure it positively impacts the food security landscape in Durham.

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

Figure 1

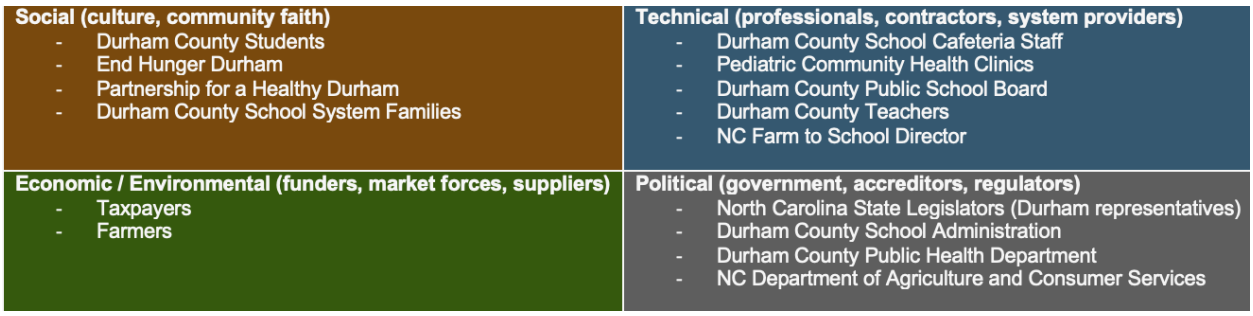
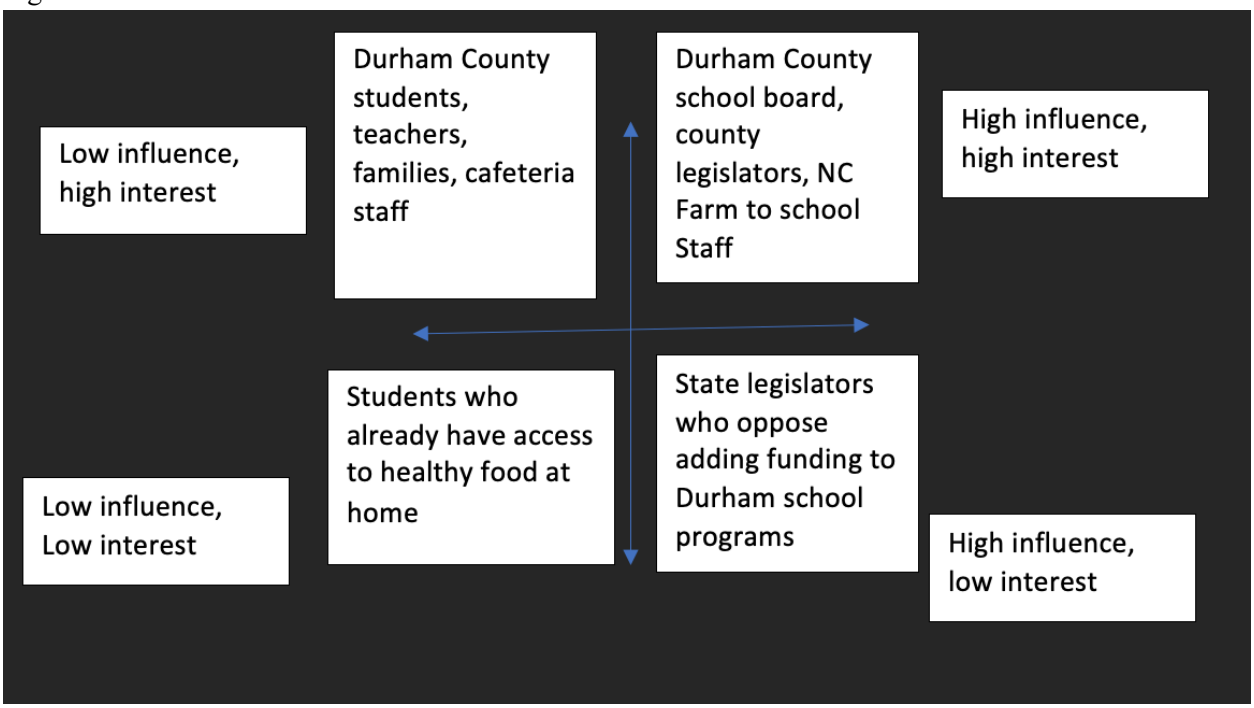


Figure 2

Stakeholder	Position	Influence (0-10)	Interest in Project	Goals	Objections to Project
Pascal Mubenga	Durham County Superintendent	9	High	Implement policy in school system to increase the amount of fresh food in Durham Schools (oversee budget, develop vision, coordinate with all stakeholders)	Likely will not object to project; will have to balance competing priorities
Representative Marcia Morey	Durham County House Representative	10	Medium-High	Introduce bill to North Carolina to increase funding to Durham schools to increase healthy options	Likely will not object to project; will have to balance competing priorities
Emily Connelly	Durham County Teacher	3	High	Assist with developing policy by providing knowledge of logistics, advocating for students, providing their experience working with students of food insecurity	Likely no objections; but might have a difficult time pushing the policy forward due to already experiencing burnout
Kari Miller	Bethesda Elementary School		High	Assist with developing policy by providing knowledge	Likely no objections; but might have a difficult time pushing

	Principal			of logistics, advocating for students, providing their experience working with students of food insecurity	the policy forward due to already experiencing burnout
Taylor Swift	Durham County Student		High	Providing lived expertise surrounding experience with food in school	None
Patrick Dempsey	Durham County Parent		High	Provide lived expertise surrounding experience getting their children fed	None

Figure 3


Low influence, high interest
Durham County students, teachers, families, cafeteria staff
Durham County school board, county legislators, NC Farm to school Staff
High influence, high interest
Students who already have access to healthy food at home
State legislators who oppose adding funding to Durham school programs
Low influence, Low interest
High influence, low interest

Appendix D.3: Engagement and Accountability Plan

Program Purpose

The purpose of the produce prescription program is to improve access to healthy foods among children experiencing food insecurity in Durham County.

Engagement Plan Rationale

The rationale behind this engagement plan is first and foremost guided by a perspective that prioritizes individuals who have lived expertise in food insecurity. Prioritizing lived expertise is a critical portion of community engagement, acknowledging that people are the experts of their own lives (Dholakia, 2020). People who have lived expertise in public health issues are often not thought of as partners, and for this reason those who are most affected by an issue can experience unintended negative consequences of even well-intentioned public health policies and programs. When the intended recipients of a program are not prioritized, opportunities to maximize program effectiveness are often missed. Thus, individuals with lived expertise related to food security will be treated as partners through the strategies described below in this engagement plan. Our lived expertise approach is grounded in the principles of community engagement, which will be mentioned throughout this plan (CDC, 2015).

Acknowledging the importance of trust as a community engagement principle, our team aims to build upon pre-existing relationships with stakeholders through all our engagement strategies. With long standing ties to the community, each member of the consultant team is uniquely positioned in various roles that we will leverage to incorporate our diverse and unique partners throughout the entire program planning and implementation process. Carl Burr, a clinician, will serve as a key link to our partnering clinics with Duke Health with pre-existing working relationships with numerous providers and patients in the network, along with clinical expertise. Hannah Isabel Shai, a nutrition public health specialist, has spent years working with community organizations in Durham [including the NC Farm to School Program] addressing food access on various public health initiatives, and has strong connections with

each of these community networks with lived expertise in little food security. Jean Braun, a health policy analyst, has been contracted with the Durham Public Health Department on numerous projects and will serve as a key liaison with funders because of her expertise in the policymaking and budgeting area. Anna, a community engagement specialist with Partnership for a Healthy Durham, will also serve as a connection to families and children in the community who have lived expertise in food security. With these roles in mind, we will collaborate across these different areas of the community, building on existing relationships, and continuing to move at the speed of trust.

Engagement Methods

Engagement methods will center people with lived expertise in food insecurity by partnering with key community stakeholders to co-facilitate all engagement activities. All community partners will be compensated for their time through the portion allocated in the budget to community partner stipends, and whenever possible we will hire staff [full/part time program staff] who have lived expertise related to food security. Our engagement plan consists of a combination of individual and group level strategies in which we intend to accommodate for the diverse contexts in which our stakeholders come from. These strategies are described below. Engagement strategies are also listed in Table 1.

Bi-monthly community town hall events [virtual/in-person] – At the beginning of the program planning process, we will initiate our series of bi-monthly community town hall events. We will identify a list of names from the aforementioned pre-existing relationships and send out an invitation to them to attend our first town hall. This will be through email as well as through social media channels (Instagram, Facebook, Tik Tok) that we will launch at this point in the process. We will use the inaugural town hall to launch the concept of the produce prescription program, facilitate program brainstorming activities to get feedback on the idea in break-out groups, and pass out interest forms so individuals can indicate the level they wish to engage. They will be given the option to be a partner in the program [through employment opportunities], to only be consulted at future town halls events or focus groups, or simply informed via electronic communication of the program progress. Attendees will be compensated with a stipend for

their attendance. All future community town hall events will consist of an ice breaker, update on program progress, and break-out room brainstorming/problem solving activities. Facilitators will rotate and depending on community stakeholder interest and availability, events will be held virtually or in-person.

Semi structured interviews with stakeholders who express interest to partner – As the program planning process begins, we will conduct semi-structured interviews with those who have indicated they are interested in taking a more active role on the team during the survey distributed during the town hall, as an official partner in the process. These interviews will be a crucial part of informing program design and implementation and recruiting individuals to be more involved in the program implementation process. If enough individuals do not express interest, we will utilize our social media channels for community partner recruitment. However, we are confident that because of our existing ties to our community partners, we will have a team of 5-6 individuals with various ties to the community that will be committed and involved in the program as team members. Interviewees who opt out of joining the official team will still have their feedback incorporated into the program design.

Part II. Accountability Plan Outline

Backbone Agency

Durham County Commissioner Public Health Committee

Responsible Stakeholder

Duke Health

Common Expectations, Vision, Values

Expectations –

- Fair compensation
- Open communication
- Community centered
- Prioritize lived expertise [community members are the experts]

Values –

- Sustainability
- Humility
- Resourcefulness

Vision –

- To improve access to healthy foods in Durham County

Goals, Aims, and Milestones

Goals

- To implement 3 food prescription reimbursement sites within 6 months of program implementation
- To deliver healthy foods to 200 community members within 6 months of program implementation
- To develop a sustainability and scalability plan for the program within 1 year of program implementation

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

Table 1 – Engagement Strategies

Engagement Strategy	Purpose	Cadence	Modality
Town hall events	Gather all community stakeholders, update team on program progress, conduct focus groups in break out rooms / brainstorming activities	Bi-Monthly	1st event in person, subsequent events virtual or in person [depending on stakeholder preference]
Semi-structured interviews	Recruit community stakeholders to be on official program implementation team, gather feedback to inform program design and implementation	Prior to program implementation	Virtual
Social media outreach	Recruit individuals for both above engagement strategies, provide program updates to broader community throughout the program	Throughout program	Instagram, Tik Tok, Facebook

Appendix D.4: Individual Presentation Slides and Script

Stakeholders

Social

- Children and parents our program intends to impact

Technical

- Duke Health
- Potential redemption sites for prescriptions

Economical/Environmental

- Gus Schumacher Nutrition Incentive Program (funder)

Political

- Durham County Public Health Department

Our team has prioritized assembling a stakeholder team inclusive of different perspectives representing the social, technical, economical, and political spheres in the community. First and foremost, our most important stakeholders are the children and parents experiencing food insecurity that our program intends to impact; their partnership is vital in our program planning. Duke Health and the potential redemption sites, including local grocery stores and farmer's markets, are critical to ensuring a smooth program implementation. The Gus Schumacher Nutrition Incentive Program, as the funder, will also be a key partner throughout the program. Lastly, the Durham County Public Health Department will also provide oversight in program implementation.

Engagement & Accountability

Rationale:

- Prioritize lived expertise of stakeholders

Strategies:

- Bi-Monthly Town Hall
- Semi-structured Interviews
- Social Media Outreach

Accountability:

- MOU with Duke Health

Our engagement plan is first and foremost guided by an approach that prioritizes the lived experience of the children and families experiencing food insecurity. This perspective acknowledges that people are the experts in their own lives, and as such, our priority population's expertise will be centered through our engagement. Through our engagement strategies, namely the bi-monthly town hall events and semi-structured interviews, we will gather information from our stakeholders to incorporate into program planning and implementation and identify individuals from our stakeholder groups that would like to be on the program implementation team. Social media outreach will help us to ensure we are continuously disseminating updates and information to the community. To help facilitate the more technical aspects of the program partnership, a memorandum of understanding will serve as the basis for our accountability plan with Duke Health.

APPENDIX E: HANNAH ISABEL SHAI'S INDIVIDUAL DELIVERABLES

Appendix E.1: Individual Problem Statement

Social Determinant of Health: Social and Community Context

Addressing the social determinants of health (SDoH) is critical in solving the complex public health issues occurring in Durham County. One of the most important SDoH is social and community context, which is the way in which relationships, interactions, and community factors influence health (*Social and Community Context*, n.d.). A primary social and community context factor that influences health is discrimination and racism (*Social Determinants of Health Literature Summaries*, n.d.). Specifically, food insecurity is a social and community context objective influenced by discrimination and racism. Both racism and food access have been identified as priorities in the 2020 Durham Community Health Assessment (Durham County Department of Public Health, 2020).

About 13.5% of Durham County residents are food insecure, which is higher than the national prevalence of 11.5% (Durham County Department of Public Health, 2020). It has been estimated that an increase in the frequency of racial discrimination leads to a 5% increase in the odds of having very low food security (Odoms-Young & Bruce, 2018). Of those who experience discrimination in Durham, about 35% are African American and about 50% are Hispanic or Latino (Durham County Department of Public Health, 2020). Consequently, it is estimated that food insecurity among African American and Hispanic households is twice that of white households (Odoms-Young & Bruce, 2018).

Geographic and Historical Context

There are historically important racial segregation policies and practices that have occurred in Durham, such as redlining and residential segregation policies, that have created disadvantaged African Americans communities (Durham County Department of Public Health, 2020). These practices disadvantage communities by limiting investment, opportunities, wealth attainment, and key resources. The chronic disinvestment caused by redlining policies have created neighborhoods with a lack of services, such as access to nutritious food, that contribute to food insecurity. Supermarkets and grocery store chains are deterred from establishing store locations in these areas because they are classified as

low-income (Move For Hunger, n.d.). As a result, these communities have a high density of fast-food establishments and high-priced convenience stores as food options (Durham County Public Health, 2022).

The lack of healthy food-related services and options contributes to the disparities seen in food insecurity among African Americans in Durham. Historically redlined neighborhoods, specifically in east and southeast Durham, have been found to have large areas that have no grocery stores within 1 mile (Durham County Public Health, 2022). In addition, maps have shown that the surrounding downtown Durham census tracts are among those most impacted by food insecurity. These census tracts, such as tracts 20.09 and 20.26, have a large African American population of 73% and 69%, respectively (Stroot, 2020). Further, about 29% of residents in census tracts 20.09 and 20.26 live near fast food establishments and convenience stores (Stroot, 2020).

Priority Population

The priority population in the issue of food insecurity in Durham County is African Americans. One of the primary reasons this population is a priority is that the county has a higher proportion of African American residents compared to North Carolina. The 2020 Durham County population statistics estimate that 35.9% of its residents are African American, compared to North Carolina at 21.5% (Durham County Department of Public Health, 2020). Further, 35% of residents who experience discrimination in Durham are African American (Durham County Department of Public Health, 2020).

In addition, Table 1 shows the demographic breakdown of census tracts in Durham County most impacted by food insecurity. It is evident that food insecurity affects African American communities the most in Durham. Prioritizing the improvement of food insecurity among African American residents will impact a large proportion of affected areas.

Measures of Problem Scope

In 2018, 13.5% of Durham County residents were food insecure and 30% of residents have low access to a grocery store. Overall, the state and county's food insecurity prevalence are higher than the nation's, which is 11.5% (Durham County Department of Public Health, 2020). North Carolina food insecurity is more prevalent among African Americans at 25% compared to whites at 9%. In addition,

African American residents in Durham are more likely than white residents to skip or cut meals either sometimes or frequently in the past year (Durham County Department of Public Health, 2020).

Housing and poverty directly affect the drivers of food insecurity, including accessibility and affordability (Stroot, 2020). The home ownership rate among whites is 64% compared to 29% among African Americans (Durham County Department of Public Health, 2017). Furthermore, 20% of African Americans live below the poverty line compared to 8% of whites (Durham County Department of Public Health, 2020).

Rationale

It is of utmost importance to address food insecurity among African Americans in Durham County. African Americans have been historically disadvantaged through redlining policies, which have led to the chronic disinvestment in these communities. The overall health implications of food insecurity contribute to chronic non-communicable disease risk.

Food security has been directly linked to obesity. It is estimated that food insecure adults are 32% more likely to be obese than food secure adults (Stroot, 2020). North Carolina has a higher prevalence of obesity among African American adults compared to whites (Durham County Department of Public Health, 2020). Furthermore, food insecurity and obesity have been linked to increased risk of developing diabetes and cardiovascular disease (Thomas et al., 2021). Diabetes disproportionately affects African American residents compared to whites in Durham County, 18.4% compared to 9.2% (Durham County Department of Public Health, 2020).

Disciplinary Critique

Addressing the social and community context, specifically the varying levels of discrimination that lead to health disparities, is key to increasing health equity in Durham County. The history of structural racism in Durham has perpetuated a community in which African American residents have unequal opportunity to achieve optimum health. The disparities in food insecurity and its health consequences, as a result of such inequities, are specifically important to address in the field of nutrition. Nutritionists must work within the social and community context to improve opportunities for

disadvantaged communities in acquiring food. Access to healthful food in adequate amounts for an active, healthy life is a basic human right. As such, it is a crucial role and responsibility for nutritionists to assist communities in achieving this basic human right (Holben & Marshall, 2017).

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

Table 1. Demographic Breakdown of Food Insecurity Impacted Census Tracts (%)

Census Tract	African American	Hispanic	White	Asian
1.01	48	18	34	0
6.00	19	18	53	3
17.06	25	4	53	10
17.09	68	18	11	1
17.10	48	16	30	4
18.01	44	28	27	0
18.02	53	35	8	1
18.06	53	6	40	0
20.09	73	20	2	0
20.26	69	10	15	2

(Stroot, 2022)

Appendix E.2: Evidence-Based Nutrition Program

Background

Food insecurity is relevant to nutrition because it involves the access to an adequate and consistent amount of food for an active and healthy life (Holben & Marshall, 2017). In 2018, 13.5% of Durham County residents were food insecure (Durham County Department of Public Health, 2020). Furthermore, 18.8% of children less than 18 years old in Durham were found to be food insecure in 2020 (Feeding America, n.d.).

One of the root causes of food insecurity is the historical disadvantage among African American communities through discriminatory practices, such as redlining. Historically redlined neighborhoods in Durham County have large areas with no grocery store access within 1 mile and a high density of fast-food establishments (Durham County Public Health, 2022). Census tracts with an African American population of over 60% were found to be among those most impacted by food insecurity (Stroot, 2020). Furthermore, African Americans in Durham County are also more likely to skip or cut meals sometimes or frequently, due to the inability to afford adequate amounts of food (Durham County Department of Public Health, 2020). As public health professionals, nutritionists have the role and responsibility to ensure all have equitable access to the basic human right of food for an active, healthy life.

Purpose

Food insecurity directly affects risk for other nutrition-related diseases. Food insecure adults are 32% more likely to be obese than food secure adults (Stroot, 2020). Food insecurity and obesity have been linked to an increased risk of developing diabetes and cardiovascular disease (Thomas et al., 2021). Nationally, food insecurity is higher in certain populations compared to the national average (12.3%), such as in households with children (16.5%) and African American households (22.5%) (Holben & Marshall, 2017).

It has been found that children who live in food insecure households have decreased diet quality and lower consumption of nutritionally important foods. There were significant differences in food

servings per day among children who lived in food insecure versus food secure households: dark green leafy vegetables (0.03 vs 0.08 servings), other vegetables (0.39 vs 0.52 servings), and fruits (1.3 vs 1.6 servings) (Casey et al., 2001). Overall, the recommended fruit and vegetable servings per day are not being met for all groups of children and are considerably below the recommendations. Other key differences among children in food insecure households include lower consumption of total calories, higher cholesterol intake, and higher prevalence of those being overweight (Casey et al., 2001).

Evidence Based Outcomes

The short-term outcome objective for this program is that by the end of two years, redemption of fruit and vegetable prescriptions (FVP) by participants will increase from a baseline of 0 to at least 60% of all prescriptions distributed (Saxe-Custack et al., 2022 & Esquivel et al., 2020). FVP distribution will be monitored via electronic medical record (EMR) at participating pediatric community health clinics. FVP redemption data will be collected at redemption sites and self-report from participant post-questionnaires.

The health outcome objective is that by the end of two years, mean household food insecurity among participants who redeemed a FVP will decrease from baseline by at least 1 score point, as measured by the US Household Food Security Module: Six Item Short Form. Definitions of score points are as follows: 0-1 (high or marginal food security), 2-4 (low food security), and 5-6 (very low food security) (USDA Economic Research Service, 2012).

Overall, the pediatric FVP aims to accomplish decreased food insecurity and increased self-efficacy among participating households. Prescriptions specific for fruits and vegetables, including pediatrician and clinic involvement, have impact on long-term self-efficacy among participants for purchasing and consuming fruits and vegetables (Saxe-Custack et al., 2022). There will be a decreased proportion of pediatric patients who are food insecure as collected and measured after 5 years by the pediatric community health clinics EMR.

Strategies and Activities: Fruit and Vegetable Prescription (FVP) Program

Intervention components and Implementation overview

The target population is the parent or guardian of African American patients seen in the pediatric community health clinics aged 2 to 17 years old who meet food insecurity eligibility criteria as measured by the US Household Food Security Module. The information collected from eligibility determination among participants will be used as the baseline food insecurity measure. Upon eligibility determination, participants will complete a pre-questionnaire during the initial visit to enroll in the program. The questionnaire will collect demographic information, household income, participation in food assistance programs, knowledge of community food resources, confidence in utilizing community food resources, and self-efficacy in purchasing fruits and vegetables. The participating pediatric patient will complete a Block Kids Food Screener to assess baseline fruit and vegetable consumption (Nutrition Quest, n.d.).

Each participant household will receive one FVP at the first visit valued at $15 per month for any 6 non-consecutive months for a total of $90 that can be utilized within 1 year. Along with the FVP, participant households will receive a food assistance resource packet containing information regarding food resources in their community, including FVP redemption sites, farmer's markets, food pantries, food assistance programs, and food banks. A program staff will discuss the resource packet with the participating household to provide additional assistance and guidance.

Participant enrollment and FVP distribution will occur over year 1 of the project period. Participants will be contacted at least 12 months after their FVP distribution, which will occur over year 2 of the project period. Participants will again complete the US Household Food Security Module, post-questionnaire, and Block Kids Food Screener. The post-questionnaire will ask the same questions as the pre-questionnaire and an additional question to collect participant self-reports of FVP redemption.

Prescription distribution sites will be pediatric community health clinics located in Durham County, who are associated with the Durham County Department of Public Health (DCDPH). Pediatric community health clinics and the DCDPH will work collaboratively on the project along with redemption

sites to capture participants and redemption information. Prescriptions will be monitored at pediatric community health clinics via integration with the clinic EMR.

Rationale

Those who experience food insecurity have limited or uncertain availability of nutritious food for a variety of factors, primarily driven by a lack of resources. Food insecurity contributes to decreased diet quality and increased risk for chronic disease. FVP programs aim to provide additional resources to acquire nutritious food among insecure individuals, both alleviating resource constraints and increasing access to nutritious foods. Consequently, these programs have proven successful in decreasing food insecurity and increasing diet quality (Saxe-Custack et al., 2021 & Esquivel et al., 2020).

Socioecological Model and Program Reach

The program's primary reach will be at the individual level, providing FVP for about 2,760 households. The program will also increase interpersonal support from providers at community health clinics among patients experiencing food insecurity. Living and working conditions will be impacted by the community health clinics' increased capacity to address patient food insecurity through direct provision of resources. The increased collaboration between community health clinics, the DCDPH, and prescription redemption sites will contribute positively to cohesion of county-level systems.

Stakeholders

Key stakeholders include pediatric community health clinics, FVP redemption sites, DCDPH, End Hunger Durham, Partnership for a Healthy Durham (PHP), and the Nutrition Incentive Hub. End Hunger Durham will contribute insight about food and nutrition-related resources for program planning. DCDPH will assist in program implementation, such as providing administrative, evaluation, and data-related roles. PHP's Food Access committee will aid in informing community-based efforts. The pediatric community health clinics and FVP redemption sites are the primary sites for program delivery and target population interaction, as well as data collection. The Nutrition Incentive Hub is a coalition of national partners formed to provide reporting, evaluation, innovation, and technical assistance to Gus Schumacher Nutrition Incentive Program (GusNIP) awardees.

Budget

The average funding provided for FVP programs is about $166,000 per project year from the GusNIP funded by the United States Department of Agriculture (Gretchen Swanson Center for Nutrition, 2021). Hence, a 2-year project will receive about $332,000. The total budget will be able to fund 3 clinic sites and 3 redemption sites. Average direct FVP incentive costs are about 75% of the total budget, which is $249,000 (Gretchen Swanson Center for Nutrition, 2021). The $249,000 will be able to provide about 2,760 households with a $90 FVP. Personnel time on the project can be supplemented with an additional $43,000, either to support the additional time for existing staff or to hire a program assistant. Materials and supplies will be about $40,000 for purchase of the Block Kids Food Screener, printing costs for prescriptions, materials for the participant food assistance resource packet, and other general program promotional materials (Nutrition Quest, n.d.).

Conclusion

The main values prioritized in program analysis are health improvement and social justice. Improving the health of disadvantaged communities by increasing access and resources is central to the efforts proposed. Acknowledging historically disadvantaged African American communities in Durham County and highlighting key disparities in food insecurity and health outcomes advances social justice.

The primary advantage of the recommendation is the direct provision of food-related resources to those experiencing food insecurity for immediate use to alleviate resource concerns. The program also creates and advances partnerships within the county between key sectors and systems, such as the health system, public health, food and hunger-related organizations, and food retail. Clinics increase their capacity in screening, documenting, and addressing food insecurity among patients. A disadvantage is certain program implementation factors require adequate functioning systems in order to capture data and measurements, such as EMR. Another key disadvantage is that this program would require additional time from current personnel, due to inadequate budget allocations for full time personnel.

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Appendix E.3: Program Implementation and Evaluation

Intervention summary

Food insecurity is the access to an adequate and consistent amount of food for an active and healthy life (Holben & Marshall, 2017). Compared to the general county population, food insecurity among children less than 18 years in Durham County is higher at 18.8% (Feeding America, n.d.). Durham County census tracts with an African American population of over 60% were found to be among those most impacted by food insecurity (Stroot, 2020).

The Fruit and Vegetable Prescription (FVP) Program's target population is the parent/guardian of African American patients who are food insecure seen in pediatric community health clinics. Participants will be recruited and enrolled in the program, which includes baseline and post data collection. They will receive an FVP of $15 per month for any 6 non-consecutive months for a total of $90 that can be utilized within 1 year and a food assistance resource packet.

The program's long and short-term term outcomes include redemption of FVP by participants, group mean household food insecurity, and proportion of pediatric community health clinic patients who are food insecure.

Evaluation Plan

Outcome

The outcome that will be evaluated is by the end of two years, mean household food insecurity among participants who redeemed a FVP will decrease from baseline by at least 1 score point, as measured by the US Household Food Security Module: Six Item Short Form.

Study Design and Data Collection

The study design is quasi-experimental that will compare the intervention group to a comparison group of those who did not receive FVP from a non-participating clinic. Pre and post food security measures will be collected from both groups during year 1 of the program. The pre and post food security measurements will be collected at least 1 year apart during year 2. The US Household

Food Security Module Six Item Short Form will be utilized to assess food security: 0-1 (high or marginal food security), 2-4 (low food security), and 5-6 (very low food security) (USDA Economic Research Service, 2012). Participants with a score of 2 or higher will be assigned to the intervention and comparison group based on clinic participation.

In addition, the intervention and comparison group will complete a pre and post participant questionnaire that will collect information on food assistance, use of food assistance, redemption site types, usage of FVP, program satisfaction, key food security information, and demographics. The information collected will further inform any observed changes that occur upon program completion. The Nutrition Incentive Hub's (NIH) pre and post Participant-Level Survey for FVP programs will be utilized (Nutrition Incentive Hub, n.d.).

Sample and Sampling Strategy

All patients at participating FVP pediatric community clinics and a non-participating FVP clinic will be assessed using the US Household Food Security Module. The intervention group is the parent/guardian of African American patients, aged 2 to 17 years, seen in participating FVP pediatric community health clinics that meet food insecurity eligibility criteria and receive intervention components. The comparison group is the parent/guardian of African American patients, aged 2 to 17 years, seen in a non-participating FVP pediatric community health clinics that meet food insecurity eligibility criteria and did not receive the intervention components. Both groups will also complete the pre and post questionnaire.

Specific Measures

The primary outcome, measured by the US Household Food Security Module Six Item Short Form, is the change in mean food security among groups. Secondary data will be collected via the NIH's pre and post questionnaire. FVP redemption data will include the type of redemption site, such as farmers market or grocery store, and the number of times the FVP was used. Key food security questions will collect information such as running out of food, not affording balanced meals, and cutting or skipping meals due to lack of food resources.

Analysis Plan

Pre and post food security mean scores of both groups will be analyzed utilizing data collected from participating clinics and a non-participating clinic. The primary analysis will conduct 2 two-sample t-tests to compare food security differences: 1) post food security mean among the intervention versus comparison group and 2) intervention group's food security mean pre and post intervention. The pre and post questionnaire categorical data collected from the groups will be summarized by question and by group. The data will be summarized utilizing frequency of responses for each question, comparing pre and post questionnaire data by group. Comparing key pre and post data by group will further inform the effectiveness and success of the program in addressing food insecurity.

Timing

During year 1 of the program, baseline data collection will occur for both groups. Post measurement collection will occur at least 1 year from baseline measurement for each participant. Data analysis begins upon completion of post measurements collection. Progress will be measured by process measures, such as the number of enrolled FVP participants and the number of patients screened for food security. Follow-up and progress will be discussed at bi-monthly meetings with partners, including associated clinics, key program personnel, Durham County Public Health, and FVP redemption sites.

Sources of Funding

The Gus Schumacher Nutrition Incentive Program (GusNIP) provides additional resources and funding for FVP program sustainability and capacity (Gretchen Swanson Center for Nutrition, 2021). Additional funding is available and provided by the NIH through the Capacity Building and Innovation Fund to enhance FVP implementation and long-term sustainability. The FVP program can apply for such funding during or after year two. The funds are available to both current and previous recipients of GusNIP awards.

Data use and Dissemination

The data will help to inform the continued work among partners for increasing food security among vulnerable populations, such as African American communities. Program evaluation results will be disseminated via a final report and a presentation to stakeholders. An infographic for program results will be available for the general community, which will be distributed at community health clinics and FVP redemption sites within the community.

Strengths and Challenges

The program has several strengths, including increased clinic capacity to screen, measure, and address patient food insecurity. Further, the program will strengthen key clinical-public health partnerships and community capacity to address multiple levels of the socioecological model. One key challenge is the GusNIP funding is primarily for FVPs and lacks adequate funding for additional personnel to support FVP program implementation.

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Fruit & Vegetable Prescription Program (FVP)

Evidence-Based
- Increase food insecurity
- Increase diet quality

Intervention Components
- Target population: Black patients, 2-17 years old, food insecure
- Participants enrolled at pediatric clinic visits
- FVP utilized over 1 year
- Food assistance resource packet

Key Strengths
- Direct provision of food-related resources
- Increased clinic and community capacity
- Improve social and community context

(Saxe-Custack et al., 2021; Gretchen Swanson Center for Nutrition, 2021)

FVP programs are found to have significant improvements among participants in food security and diet quality. Nationally, these programs have been found to increase food security among participants from 27.5% at baseline to 49% at follow-up. The program's target population is Black patients, 2-17 years old, seen in pediatric community health clinics that meet food insecurity eligibility criteria. Recruitment and enrollment will occur at pediatric clinic visits. Each participant household will receive a FVP at the first clinic visit that can be utilized over the course of one year. Along with the FVP, participant households will receive a food assistance resource packet, which will provide key community information on food resources. Key strengths of the program include the direct provision of food-related resources to those experiencing food insecurity and increasing clinic and community capacity, which results in improved social and community context to address food insecurity.

The program evaluation will compare mean household food security among an intervention and control group, collected at all participating FVP clinics and a non-participating clinic. Pre and post food security measurements will be collected from both groups utilizing the USDA's US Household Food Security Module. The Nutrition Incentive Hub's pre and post participant level survey will also be administered among both groups. The primary analysis will compare differences in post mean food security in the intervention versus comparison group and the intervention group's mean food security pre versus post intervention. The participant-level survey data will be summarized by frequency of responses and group. Key data will include the type of redemption site used, like a grocery store versus farmer's market, the number of times FVPs were redeemed, and key food security questions, such as running out of food and not affording balanced meals.

Date Use and Dissemination

- Report and Presentation
  - Community stakeholders
  - Key program staff
  - Gus Schumacher Nutrition Incentive Program
- Infographic
  - General community
  - Program participants
  - Clinics

(Gretchen Swanson Center for Nutrition, 2021)

The data will inform the continued work among partners to increase food security among vulnerable populations. Program evaluation results will be disseminated via a final report and a presentation to key stakeholders and the program funders. An infographic for program results will be available for the general community, which will be distributed at community health clinics and FVP redemption sites within the community.