

FEEDING DPS READING: A COMPREHENSIVE PROGRAM TO ENHANCE
THIRD-GRADE READING PROFICIENCY IN DURHAM PUBLIC SCHOOLS

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in partial fulfillment of the requirements for the degree of Master of Public Health
in the Nutrition and Dietetics Program and the Public Health Leadership Program.

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ABSTRACT

Nicole Jack, Camille Levi, Steven Nordstrom, Cecelia Wall, Katie Wood:
FEEDING DPS READING: A COMPREHENSIVE PROGRAM TO ENHANCE THIRD-GRADE
READING PROFICIENCY IN DURHAM PUBLIC SCHOOLS
(Under the direction of W. Oscar Fleming, Kim Ramsey-White, Dana Rice, and Kimberly Truesdale)

Early education is associated with long-term health outcomes. The suboptimal third-grade reading proficiency in Durham Public Schools (DPS) warrants immediate public health action. Low reading proficiency in elementary school is associated with a greater likelihood of dropping out of school, fewer career opportunities, and a negative impact on overall health and wellbeing. We recommend Feeding DPS Reading, which is a public health initiative to improve low reading scores in DPS through a nutrition-focused intervention. The program will assist elementary schools in collecting and submitting data for Community Eligibility Provision qualification, which provides free meals to all students regardless of individual eligibility. In parallel, students will participate in a reading program led by Duke University undergraduate education students. The program's goal is to increase third-grade reading proficiency by providing healthy meals and targeted reading interventions, with the long-term goal of improving the health and wellness of Durham County residents.

Keywords: North Carolina, Durham County, social determinants of health, education, literacy, nutrition, Community Eligibility Provision, reading proficiency

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LIST OF ABBREVIATIONS

BOY	Beginning of year
CEP	Community Eligibility Provision
DCI	Durham Children’s Initiative
DIBELS	Dynamic Indicators of Basic Early Literacy Skills
DPS	Durham Public Schools
EOG	End-of-Grade
EOY	End of year
FDA	Food and Drug Administration
HHS	Department of Health and Human Services
PDSA	Plan-Do-Study-Act
PfS	Partners for Success
REI	Reading Engagement Index
SDOH	Social determinants of health
SES	Socioeconomic status
UFM	Universal free meal
USDA	United States Department of Agriculture
WCPSS	Wake County Public School System

COMMON PROPOSAL

SDOH Analysis and Goals

Social determinants of health (SDoH) are the conditions in which people are born, live, learn, work, play, worship, and age. Education access and quality is one of the SdoH defined by Healthy People 2030, which is a program that identifies public health priorities to help communities across the United States improve health and wellbeing (U.S. Department of Health and Human Services, n.d.). Education as a SDOH is complex and is impacted by a variety of upstream and downstream factors, as demonstrated in Figure A.1. People with high educational attainment have increased levels of self-reported health and lower morbidity, mortality, and disability than people with lower education levels (Raghupathi & Raghupathi, 2020). Additionally, people with a bachelor's degree have a longer health expectancy by up to a decade than those without a bachelor's degree (Case & Deaton, 2021).

Education access and quality is a key SDOH that can be targeted to improve the overall health and wellbeing of Durham County, North Carolina residents, ultimately increasing Durham County's quality of life and economic output. Academic achievement at the elementary level, particularly when broken down by race, reflects stark disparities in Durham County. Educational disparities are apparent in DPS elementary schools between Black/African American and Hispanic/Latino Durham students compared to White students: 79% of White DPS students in grades three through eight are proficient in reading compared to just 34% of Black students and 30% of Hispanic/Latino students (North Carolina School Report Cards, n.d.).

To improve education as a SDOH in Durham County, we propose targeting low reading proficiency in early elementary school through upstream nutrition-focused efforts. The importance of third-grade reading as a predictor of long-term educational outcomes has been well established (Gallagher & Chingos, 2017). Students who lack reading proficiency may experience more bullying since reading challenges are easy to detect by peers (Turunen et al. 2021). In the long term, students who do not achieve reading proficiency are more likely to drop out or fail to graduate high school, resulting in lower lifetime earnings, higher unemployment, higher rates of imprisonment, and increased reliance on Medicaid and welfare programs (National Center for Education Statistics [NCES], n.d.). Additionally, the impact of nutrition and hunger on educational outcomes is well documented. When children do not have enough food to eat at home, they may experience more behavioral and learning difficulties than children from households with persistent food security (Grineski et al., 2018). Thus, a nutrition-focused intervention

aimed to increase third-grade reading proficiency will improve not only educational outcomes in Durham County, but also the overall health and wellbeing of its residents.

Evidence-Based Nutrition Program

Healthy meals increase student engagement, improve attendance, make students more attentive, and lead to better grades and higher graduation rates (Bartfeld et al., 2020; Cohen et al., 2021). Studies show benefits from universal free breakfast, which DPS has already implemented, and universal free lunch (Hartline-Grafton & Levin, 2022; Soldavini & Ammerman, 2019). Universal free meal (UFM) programs that included lunch reduced household food insecurity via increased spending power for parents and increased participation rates in school meal programs (Cohen et al., 2021). In 2020, Schwartz and Rothbart reported that UFM programs were beneficial for both math and reading scores in poor and non-poor students alike.

Feeding DPS Reading is a proposed intervention aiming to improve third-grade reading proficiency by reducing food insecurity—which can negatively influence academic performance—while also providing tutoring to better reading skills. Student food insecurity and reading proficiency will be addressed with one overarching initiative, making this program preferred to others with a more singular focus. Federal meal programs have a proven track record of alleviating hunger (Bartfeld et al., 2020; Centeio et al., 2021; Cohen et al., 2021; Huang et al., 2015; Huang & Barnidge, 2016), and the reading tutoring component is evidence-based and focuses on five pillars of reading instruction (McCracken, 2013; NICHD, 2000; NRP, 2000). This intervention will reduce food insecurity in the school setting by expanding access to no-cost lunch for all students through the federal Community Eligibility Provision (CEP). The CEP program subsidizes school meals for all students in schools with a high percentage of under-resourced families, mitigating hunger so that students are ready to learn. The first part of the Feeding DPS Reading approach relies on funding from Durham County to cover the difference between the free and paid CEP reimbursement rates. The consultant team has identified five CEP-eligible but non-participating elementary schools to pilot this program. The Task Force will provide support, best practices, and other resources to assist designated schools with navigating CEP application. Schools must choose to participate in CEP to be eligible to participate in the reading tutoring component of Feeding DPS Reading.

To bolster reading skills, the Task Force will collaborate with the Duke Program in Education Partners for Success, which is a service-learning opportunity for education students enrolled at Duke University in which they spend two to three hours per week helping DPS teachers (Duke Program in Education, n.d.). These service learners,

along with additional volunteers from Duke University Literacy Corps, will be trained in the science of reading and will provide evidence-based tutoring at the designated schools.

Community Partners

Several relevant stakeholders have a role to play in increasing the availability of nutritious meals available to children to increase reading proficiency specific to elementary-aged students in Durham County. Internal stakeholders include students, parents, school nurses, DPS dietitians, and social workers, and external stakeholders include Food and Drug Administration (FDA), United States Department of Agriculture (USDA), Durham Children's Initiative (DCI), School Meals for All NC, and Durham County Board of Commissioners (Figure A.2).

Federal agencies such as the USDA and FDA will be treated as low interest/high power stakeholders, which require ongoing efforts to maintain engagement on grant funding and working within the standards outlined for the CEP reimbursement and dietary guidelines. The primary aim is to keep them satisfied and apprised without overwhelming them with unnecessary information. Nonprofit organizations such as DCI and Schools Meals for All NC will be treated as high interest/low power stakeholders given that they already work on policies outlined within the pilot program. It will be important to use the existing infrastructure within each organization as a foundation for success upon which to build the pilot. Internal stakeholders include school staff, such as nurses, teachers, and administrators, as well as broader DPS staff including DPS dietitians who assist in menu planning and Durham County Commissioners who plan the county budget. Additionally, the Duke Partners in Success program will play a significant role in supporting students in their reading advancement, which will supplement efforts on the nutrition programming side. We will rely on parents as priority partners to encourage continuation of the habits developed with teachers and Duke Partners for Success volunteers when students are at home and away from direct supports.

When forming a Task Force, the Durham County Board of Commissioners should consider additional questions about the community partners based on the stakeholder analyses presented above. For example, understanding each partner's individual motivations for participation on the Task Force is important, and asking the community partners who else should be included in the Task Force can provide valuable insight into other actors not identified in this analysis.

Budget

More than half of the necessary funding for Feeding DPS Reading has been awarded through competitive grant processes. Feeding DPS Reading has been awarded grant funding totaling \$240,000 per year for two years

based on the program's use of evidence-based strategies to alleviate food insecurity among elementary school students, fueling their readiness to learn and achieve third-grade reading proficiency. This intervention seeks a comparable \$200,000 per year for two years from the Durham County Board of Commissioners to bring this program to life. After the addition of operational and overhead costs, the total annual budget is \$440,000 per year. The budget for the nutrition program component covers assistance to CEP-eligible schools to initiate participation in CEP by supplementing them at the free meal reimbursement rate. For one school year, this investment will be \$258,759.50. The reading component involves activating a team of volunteers in the education department of Duke University to provide reading-specific tutoring in the selected DPS elementary schools. This component supports a program director, a part-time reading specialist, and five part-time site coordinators who will be dispatched to each of the five elementary schools. The investment in this component is \$168,000. Table A.1 details the budget for the full Feeding DPS Reading program.

Engagement and Improvement Plan

The Feeding DPS Reading program is committed to fostering community engagement and ensuring accountability through the design, improvement and sustainability phases. The program recognizes that community engagement is vital for building trust, securing resources, and enhancing overall health outcomes. The accountability and engagement plans encompass specific methods and a structured approach to track and improve engagement over time. Our plan is summarized in the Measurement Table in Table A.2.

In the design phase, principals from the five participating schools will use the nominal group technique (NGT) and brain swarming to collaboratively generate ideas and address concerns related to the program. This not only encourages active involvement but also identifies specific issues and potential solutions. We will also hold tutor workshops involving various stakeholders to create effective educational strategies, address funding constraints, and ensure efficient use of partner time. This phase ensures that the program is developed with the input and ownership of key stakeholders.

Following program implementation, we will hold quarterly data sharing and curriculum review meetings to provide feedback on program materials and outcomes. These meetings will inform plan-do-study-act (PDSA) cycles to ensure continuous improvements. Principals will collaboratively set improvement goals, choose evidence-based interventions, and measure outcomes. Using PDSA, they will implement changes, evaluate their effectiveness, and

make informed decisions to continuously enhance the program. This data-driven approach helps in optimizing the programs' efficacy and ensures it aligns with its goal of improving academic performance.

To sustain and scale the project, regular meetings of the Task Force and Advisory Committee will be conducted, where program progress and concerns regarding sustainability will be discussed. A charter will define responsibilities and milestones, such as addressing concerns such as the workload on school principals, thus providing clarity and assurance. We will also hold semiannual outreach events in order to recruit a diverse group of tutors that will ensure the program's sustainability and expansion.

The engagement leadership is entrusted to the Durham Children's Initiative (DCI) for their extensive experience in community engagement and their focus on child and family well-being. Their data-driven approach ensures resources are directed where they have the most impact and programs are improved objectively. DCI's role is crucial in coordinating and leading stakeholder engagement efforts throughout the program's lifecycle (Durham Children's Initiative, 2023).

Program Evaluation

This intervention specifies five schools based upon financial need and low reading proficiency. Specific measures, timing, and the analysis plan for evaluation are shown in Table A.3, Table A.4, Table A.5, and Table A.6. The Task Force will conduct an outcome evaluation to assess Feeding DPS Reading's effectiveness toward addressing student in-school food insecurity and increasing third grade reading proficiency in CEP-adopting designated schools. A purposive sampling strategy will be used in this evaluation since participant selection is based upon specific criteria relevant to the research question. To evaluate food insecurity, a dichotomous survey question (yes/no) will ascertain whether the school adopted CEP to address this issue. Schools must adopt CEP to be eligible for the reading tutoring component of the program. A quasi-experimental design will be used to quantitatively evaluate the cohort of students exposed to CEP expansion and tutoring components of Feeding DPS Reading beginning in kindergarten. Pre-test and post-test design will be used inclusive of matched control-group comparisons. Kindergarten through third-grade students may enroll in Feeding DPS Reading at any time, but the sample for evaluation will focus on those who enter the program in kindergarten. The control group enlisted for comparison will be third-grade students attending demographically similar Wake County Public School System (WCPSS) schools that have neither adopted CEP nor implemented the Feeding DPS Reading tutoring strategy. Progress toward established goals will be monitored at the beginning, middle, and end of each school year using the

early literacy screener Dynamic Indicators of Basic Early Literacy Skills (DIBELS), the science of reading–based assessment tool currently in place in North Carolina. Along with these intermediate screening tools, the primary objective will be assessed four years after program implementation to gain an understanding of this initiatives’ full impact throughout the matriculation of the initial cohort. This cohort of students will have attended a designated CEP-adopting elementary school and received specific literacy skills-based tutoring in kindergarten, first grade, second grade, and third grade. At the conclusion of the fourth year, end-of-grade (EOG) exams for the third-grade students who participated in Feeding DPS Reading, will be compared to the pre-implementation baseline DPS third-grade EOGs and the control group’s pre-test and post-test EOG scores during the same timeframe. This approach allows for the assessment of both components of this initiative.

Conclusion

People with more education live longer and healthier lives than those with less schooling (Hummer & Hernandez, 2013). In particular, third-grade reading proficiency is an important predictor of long-term educational outcomes, such as high-school graduation (Gallagher & Chingos, 2017). Feeding DPS Reading is an intervention to address the issues of low reading proficiency through upstream nutrition-focused efforts. Improving educational access and quality within Durham County is necessary as part of a multimodal approach to address systemic inequities and racism, ultimately improving the health and wellbeing of Durham County residents. In addition to the social justice implications, addressing suboptimal educational outcomes will increase economic output by improving career opportunities of residents and incentivizing people to live, work, and play in Durham County.

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APPENDIX A: COMMON PROPOSAL FIGURES AND TABLES

Table A.1

Feeding DPS Reading Budget

Funding Sources	YEAR 1	YEAR 2	TOTAL
Durham County	\$200,000.00	\$200,000.00	\$400,000.00
Belk Foundation	\$150,000.00	\$150,000.00	\$300,000.00
No Kid Hungry	\$15,000.00	\$15,000.00	\$50,000.00
USDA Food and Nutrition Services	\$25,000.00	\$25,000.00	\$50,000.00
National Education Association (NEA)	\$50,000.00	\$50,000.00	\$100,000.00
Total Funding	\$440,000.00	\$440,000.00	\$880,000.00

Budget Categories	YEAR 1	YEAR 2	PROJECT TOTAL
Total program costs	\$432,180.00	\$430,959.50	\$863,139.50
Total overhead costs	\$7,820.00	\$9,040.50	\$16,860.50
Project Total	\$440,000.00	\$440,000.00	\$880,000.00

Category Title	Unit	Unit Cost	Unit Quantity	Year 1	Year 2	Fringe Benefits	Total in U.S. \$
Human Resources							
Program Director (full-time)	salary	\$58,000.00	1	\$58,000.00	\$58,000.00	\$23,200.00	\$139,200.00
Reading Specialist (part-time)	salary	\$30,000.00	1	\$30,000.00	\$30,000.00		\$60,000.00
Site Coordinator (part-time)	salary	\$16,000.00	5	\$80,000.00	\$80,000.00		\$160,000.00
In-Kind Human Resources							
Duke University Program in Education - Partners for Success - Service Learners	hours/week		60				\$0.00
Duke University Literacy Corps - volunteers	hours/week		12				\$0.00
Subtotal A				\$168,000.00	\$168,000.00	\$23,200.00	\$359,200.00
CEP Expansion							
Oak Grove Elementary	meals	\$3.94	1110	\$4,373.40	\$4,373.40		
Parkwood Elementary	meals	\$3.94	3515	\$13,849.10	\$13,849.10		
Holt Elementary	meals	\$3.94	17205	\$67,787.70	\$67,787.70		
Hillandale Elementary	meals	\$3.94	16465	\$64,872.10	\$64,872.10		
Hope Valley Elementary	meals	\$3.94	27380	\$107,877.20	\$107,877.20		
Subtotal B				\$258,759.50	\$258,759.50	\$0.00	\$517,519.00
Supplies and Equipment							
Computer laptops	Unit	\$850.00	1	\$850.00			\$850.00
Printers	Unit	\$350.00	1	\$350.00			\$350.00
Maintenance/ink	Unit	\$220.50	1	\$220.50	\$200.00		\$420.50
Subtotal C				\$1,420.50	\$200.00	\$0.00	\$1,620.50
Communication Materials							
Posters	Unit	\$7.00	500	\$3,500.00	\$3,500.00		\$7,000.00
Subtotal D				\$3,500.00	\$3,500.00	\$0.00	\$7,000.00
Planning and Administration							
Office supplies	Year	\$500.00	1	\$500.00	\$500.00		\$1,000.00
In-kind office space	Unit		5				\$0.00
Subtotal E				\$500.00	\$500.00	\$0.00	\$1,000.00
Overhead							
Internet	Month	\$65.00	12	\$780.00	\$780.00		\$1,560.00
Mileage Reimbursement	Month	\$170.00	12	\$2,040.00	\$2,040.00		\$4,080.00
Miscellaneous/Inflation				\$5,000.00	\$6,220.50		
Subtotal F				\$7,820.00	\$9,040.50	\$0.00	\$16,860.50
				YEAR 1	YEAR 2	Other Donation	
GRAND TOTAL				\$440,000.00	\$440,000.00		\$880,000.00

Table A.2

Measurement Table

Engagement Method	Related Facilitator/Barrier	Timing	Performance Measure		
			Description	Data Source	Frequency
Tutor workshop	- Availability of participants/time - Ability to work collaboratively - Educational experiences/styles	Design	Development of curriculum that can be implemented by tutors	- Meeting minutes - Proposed educational plan	Once
Team Charter	Scope of stakeholder involvement (i.e., projected workload)	Design Improve Sustain	On-time completion of milestones, number of completed post-implementation evaluations	Charter documentation	Initial creation, quarterly revision
Nominal Group Technique	Desire for higher school academic performance Desire for increased student health and wellness	Design Improve	Number of ideas generated, percentage of group participating	Record review	Initially and as needed
Brain swarming	Desire for higher school academic performance Desire for increased student health and wellness	Design Improve	Number of ideas generated participant satisfaction	Record review, participant survey data	Initially and as needed
Data Sharing and curriculum review meeting	- Availability of relevant stakeholders - Availability of data - Tutor experiences with reading recovery program and openness to provide honest feedback	Improve	<i>Objective</i> - 3 rd grade reading proficiency in target schools <i>Subjective</i> - Valuable feedback from tutors to inform PDSA cycles	- Reading proficiency reports - Meeting minutes - Qualitative surveys	Quarterly
Plan-Do-Study-Act Cycles	Desire for higher school academic performance Desire for increased student health and wellness	Improve Sustain	Percentage of group participating, number of cycles performed, proportion of PDSA goals met, participant satisfaction	Record review, participant survey data, project documentation	Quarterly
Duke Outreach Events	- Event attendance and participation - Location - Effectives of the “sales pitch”	Sustain and Scale	Number of new tutors recruited	- Outreach event summary (event attendance, effectiveness, recommendations to improve)	Semi Annual

Table A.3

Evaluation Measures and Timing: CEP Objective

EVALUATION GOAL:			
To overcome in-school food insecurity among students, all 5 of the schools identified by the consultant team will choose to participate in CEP.			
Process Objective:	Activities:	Study design/data collection method:	Timing:
The designated schools will choose to participate in CEP and submit paperwork before June 30 th of the upcoming school year.	<p>Program director and site coordinators will meet with school leadership to educate about CEP.</p> <p>Connect identified DPS schools with DPS schools currently implementing CEP for best practice sharing.</p> <p>Provide paperwork support to adopt CEP.</p>	<p>Program director will complete a dichotomous survey regarding whether each of the schools has chosen to participate in CEP.</p>	After July 1 of the upcoming school year.
		Specific measures:	
		“Yes” or “No”	

Table A.4

Evaluation Measures and Timing: Identification Objectives

EVALUATION GOAL: Increase third-grade reading proficiency among students enrolled in Feeding DPS Reading designated elementary schools that adopt CEP.			
Process Objective:	Activities:	Study design/data collection method:	Timing:
Students testing well below benchmark on beginning of year (BOY) DIBELS tests will be identified and offered participation with parental consent.	Students will take BOY test according to current school practice. Students who test well-below benchmark will be referred to Feeding DPS Reading. Parental consent forms will be sent home with students and via email to parents. Upon receipt of signed consent forms, students will be enrolled in Feeding DPS Reading.	Quantitative data from DIBELS testing will be used. Students who numerically test well below benchmark will be referred to Feeding DPS Reading.	By the end of the first month of the kindergarten year
		Specific measures: The program director will compile a list of eligible students and send consent forms home. The program director will maintain a tally of signed consent forms. Program director will enroll students who have parental consent	
Process Objective:	Activities:	Study design/data collection method:	Timing:
Students testing well below benchmark or below benchmark on end of year (EOY) DIBELS tests will be identified and offered participation with parental consent.	Students will take BOY test according to current school practice. Students who test well-below benchmark will be referred to Feeding DPS Reading. Parental consent forms will be sent home with students and via email to parents. Upon receipt of signed consent forms, students will be enrolled in Feeding DPS Reading.	Quantitative data from DIBELS testing will be used. Students who numerically test well below benchmark or below benchmark will be referred to Feeding DPS Reading.	By the end of the final month of the kindergarten year
		Specific measures: The program director will compile a list of eligible students and send consent forms home. The program director will maintain a tally of signed consent forms. Program director will enroll students who have parental consent	

Table A.5

Evaluation Measures and Timing: DIBELS Objectives

EVALUATION GOAL:

Increase third grade reading proficiency among students enrolled in Feeding DPS Reading designated elementary schools that adopt CEP.			
Outcome Objective:	Activities:	Study design/data collection method:	Timing:
Students enrolled in Feeding DPS Reading will improve their DIBELS composite score as assessed by BOY vs EOY results by 40%.	<p>Enrolled students will be placed in small groups composed of 3-5 students.</p> <p>Students will receive reading skill specific tutoring based on need as identified by teacher/DIBELS results.</p> <p>Groups will meet 2 times per week for 30 minutes per session. Site coordinators at each school will serve as primary liaison with teachers.</p> <p>Site coordinators will communicate reading pillar focus area with tutors.</p> <p>Tutors will complete a form weekly assessing student progress. The site coordinator will maintain weekly student progress data at each site and share with teachers.</p>	Quantitative data from DIBELS testing will be used. DIBELS testing uses a numerical scale.	Assessed annually at the end of each school year using BOY versus EOY testing in line with current practices.
		<p>Specific measures:</p> <p>Site coordinators will share aggregate progress data with program director</p>	
Outcome Objective:	Activities:	Study design/data collection method:	Timing:
Students enrolled in Feeding DPS Reading will show progress on mid-year (MOY) DIBELS testing to assess whether they are on track to reach EOY milestones.	Data will be compiled from MOY testing.	Dichotomous data will be collected. "Is the student on track to reach EOY goals?" Yes or No	By February 15 th of each school year.
		<p>Specific measures:</p> <p>Student performance score on DIBELS numeric scale.</p>	

Table A.6

Evaluation Measures and Timing: Attendance and Proficiency Objectives

EVALUATION GOAL:			
Increase third grade reading proficiency among students enrolled in Feeding DPS Reading designated elementary schools that adopt CEP.			
Outcome Objective:	Activities:	Study design/data collection method:	Timing:
80% of students enrolled in Feeding DPS Reading will attend 90% of scheduled tutoring sessions.	Automated reminders (text messages) will be sent to parents with reminders for upcoming sessions. Parent pledges supporting 100% attendance of their students will be sent home for signature along with program consent. One catch-up tutoring session per week will be offered	Attendance data will be compiled using Microsoft Excel.	Assessed annually at the end of each school year using survey on a scale of 1-5.
		Specific measures: Tutors will submit student attendance data to site coordinators. Site coordinators will compile data for each school site and submit aggregate data to program director.	
Outcome Objective:	Activities:	Study design/data collection method:	Timing:
80% of students enrolled in Feeding DPS Reading will meet or exceed the grade 3 reading proficiency benchmark.	Continued weekly tutoring sessions until students exceed grade level standards.	End-of-Grade Testing level Level – 3 = on grade level; may need some support Level – 4 = thorough grasp of grade level; on track for career or college	By the end of the 4 th year of program implementation.
		Specific measures: At least 80% of students at level 3 At least 20% of students at level 4	

Figure A.1.

Rich Picture Demonstrating the Complexity of Education as a Social Determinant of Health in Durham County, North Carolina

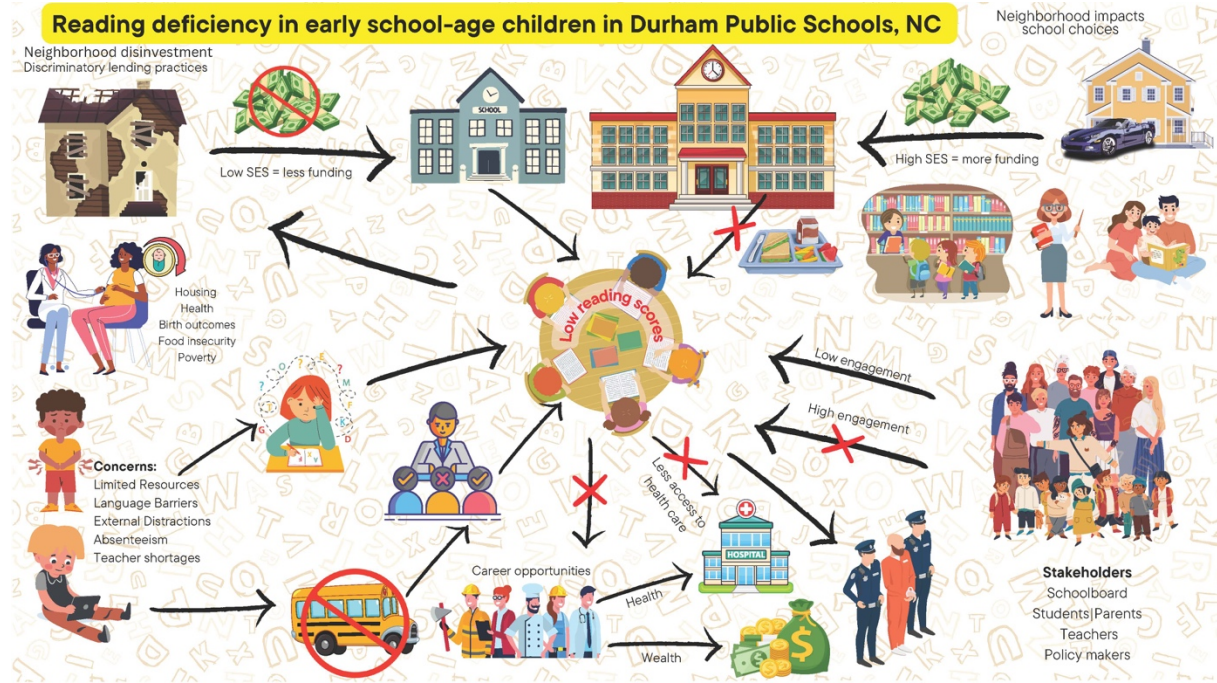
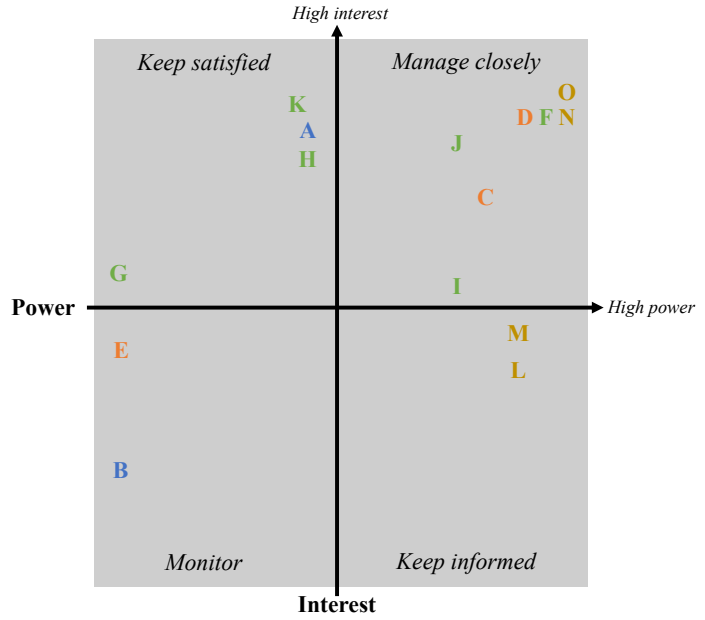


Figure A.2
Stakeholder Power-Interest Grid

A. Stakeholder List


Customers	
A	Parents/guardians
B	Students
Reading program only	
C	Teachers/reading specialists
D	Duke University Program in Education Partners for Success
E	Duke University Literacy Corps
CEP only	
F	DPS school nutrition services regional supervisors
G	USDA
H	Cafeteria manager
I	Data manager
J	Unbox (DPS Youth School Food Council)
K	School Meals for All NC
Reading Program and CEP	
L	Durham County Board of Commissioners
M	DPS Board of Education
N	Principal/assistant principal
O	Durham Children's Initiative

B. Stakeholder Power-Interest Grid



Presentation A.1

Feeding DPS Reading: A Comprehensive Program to Enhance Third-Grade Reading Proficiency in Durham Public Schools

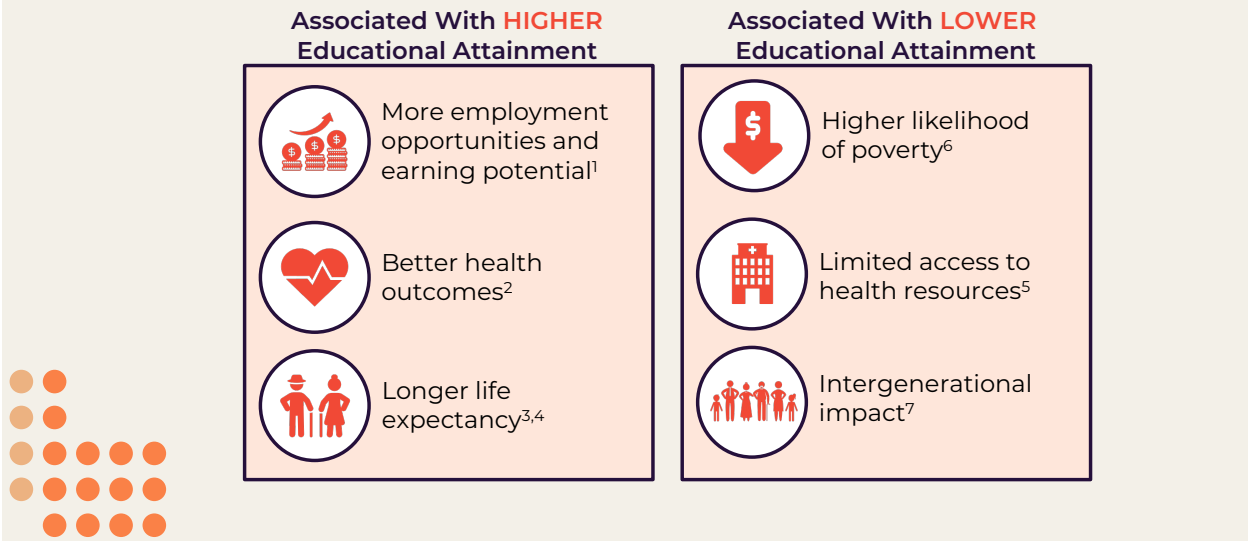


**FEEDING DPS READING: A
COMPREHENSIVE
PROGRAM TO ENHANCE
THIRD-GRADE READING
PROFICIENCY IN DURHAM
PUBLIC SCHOOLS**

Nicole Jack, Camille Levi, Steven Nordstrom,
Cecelia Wall, Katie Wood

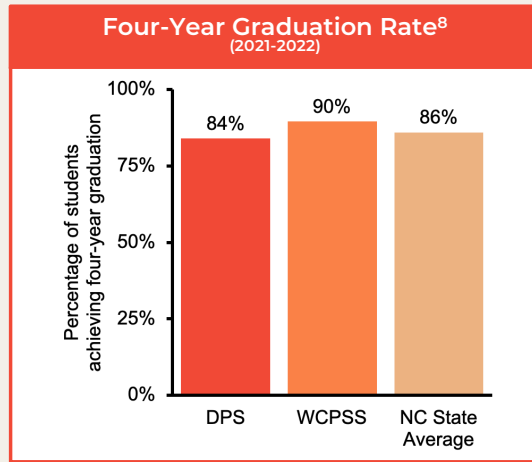
Good evening. We are the Durham County Advisory Committee for Education as a Social Determinant of Health. We thank you for your time and attention as we introduce Feeding DPS Reading, which is a comprehensive program to enhance third-grade reading proficiency and ultimately long-term health outcomes in Durham Public Schools.

Education as a SDoH



Social determinants of health are nonmedical factors that influence health outcomes. In particular, education access and quality is a critical social determinant of health that requires immediate public health action in Durham County. People who have higher educational attainment are more likely to have higher paying and more stable jobs including access to employer-sponsored health care. This can lead to better health outcomes, such as lower morbidity, mortality, and disability, and even longer life expectancy. In contrast, people with lower educational attainment have limited access to health resources and higher rates of poverty, leading to worse health outcomes. These effects last through generations. Parents with higher levels of education tend to have children who are better educated, healthier, and wealthier than parents with less education.

Education in Durham County, NC

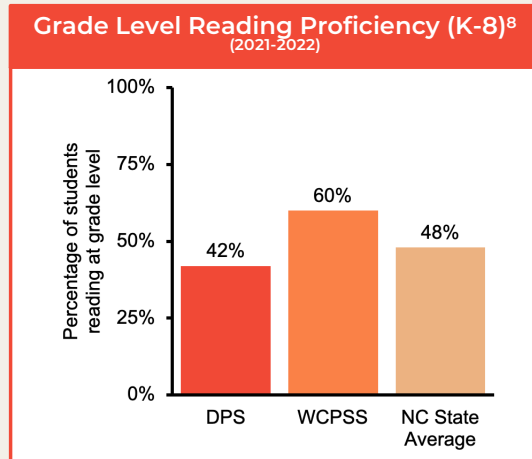


Third-grade reading proficiency is a significant predictor of whether that individual will graduate from high school.⁹

DPS, Durham Public Schools; NC, North Carolina; WCPSS, Wake County Public School System.

The graduation rate in Durham Public Schools is 84%, which is lower than the NC state average of 86% and much lower than the graduation rate in neighboring Wake County. Notably, whether a child is proficient in reading at third grade is a significant predictor of whether that individual will graduate from high school.

Education in Durham County, NC

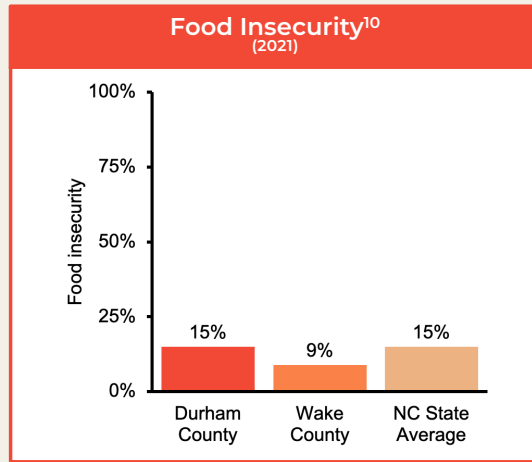


Only 42% of DPS students are grade-level proficient in reading compared to 60% in WCPSS

DPS, Durham Public Schools; NC, North Carolina; WCPSS, Wake County Public School System.

And when we look at reading proficiency in Durham County, there is cause for concern. Only 42% of third- through eighth-grade students are proficient readers in DPS, compared to 60% in neighboring Wake County and 48% statewide.

Education in Durham County, NC



Hungry students do not perform as well in school as students who have enough to eat.¹¹




NC, North Carolina.

We know that hungry students cannot learn as well as students who have enough to eat. Feeding America estimates that 15% of children experience food insecurity in Durham County, as well as in North Carolina as a whole. This is about 67% higher than food insecurity in Wake County.



Priority Population

Durham Public School K-3 Students



Given the research that third-grade reading proficiency is a strong predictor of high-school graduation, we have identified our priority population as DPS students in kindergarten through third grade. By intervening early, we will improve not only the education of Durham County children, but also their overall health and wellbeing throughout adulthood.



Feeding DPS Reading

Improving Third-Grade Reading
Proficiency by Reducing Food
Insecurity and Providing Literacy
Tutoring to Better Reading Skills



Feeding DPS Reading has been developed to address these concerns. Evidence shows that healthy meals increase student engagement and can lead to better grades. The aim of this proposed intervention is to improve third-grade reading proficiency by reducing food insecurity since hunger negatively influences academic performance and to provide tutoring based on the science of reading.

Feeding DPS Reading



Community Eligibility Provision (CEP) Expansion

Free school meals for all children without family contribution or paperwork.



Science of Reading Tutoring

Evidence-based approach to learning to read with tutoring offered by Duke Partners for Success

Feeding DPS Reading consists of two components: the Community Eligibility Provision (CEP) expansion AND Science of Reading–based tutoring. CEP is a federal program that subsidizes free school meals for all students in low-income schools. Though the program is largely federally supported, some schools choose not to participate due to financial concerns. We are asking the Durham County Commissioners to help bridge this financial gap. Five eligible but non-participating schools have been identified by the consultant team based upon high financial need and poor reading proficiency scores. The Task Force will educate school leadership about CEP and provide paperwork support to encourage participation. Food insecurity will be addressed by adopting CEP. Schools that adopt CEP will also be offered literacy-based tutoring.

Feeding DPS Reading: GOALS

1

Adoption

All 5 schools adopt CEP

3

Reading

Improved reading skills



2

Participation

Meal participation increases

4

Graduation

Improved graduation rates and improved income potential

Four goals of Feeding DPS Reading include adoption of CEP by all five schools, increased meal participation rates after CEP adoption, improved reading proficiency throughout every year with marked improvement by third grade, and the longer term expected impact is improved graduation rates and enhanced income potential for DPS students.



BUDGET

\$258,760



Community Eligibility
Provision Expansion

\$168,000

Human resources: Program Director,
Reading Specialist, Site Coordinators



\$13,240

Supplies, Equipment
and Overhead

\$440,000

Total



The budget consists of \$168,000 annually for staffing, including a program director, reading specialist, and five site coordinators. The budget for CEP expansion totals \$258,760. The total budget is \$440,000, inclusive of supply and overhead costs.

BUDGET ALLOCATION REQUEST



\$200,000

from the Durham County Board of Commissioners

ADDITIONAL FUNDING SOURCES

 BELK FOUNDATION <i>Learn. Connect. Achieve.</i>	 nea NATIONAL EDUCATION ASSOCIATION	 USDA Food and Nutrition Service U.S. DEPARTMENT OF AGRICULTURE	 NO KID HUNGRY
\$150,000	\$50,000	\$25,000	\$15,000

Due to the generous grant support of like-minded organizations targeting food insecurity and literacy (as you see displayed on this slide), Feeding DPS reading has secured more than 50% of the program budget. For just \$200,000 per year, Durham County can help to ensure that the children of DPS are fed, focused, and ready to learn key concepts in literacy.

Stakeholder Power-Interest Mapping



We identified the stakeholders using a power-interest grid was utilized to map appropriate levels of engagement, which will ultimately help inform the level of engagement needed for each stakeholder as we track implementation of the program to increase efficiency of communication. Beginning with the top left quadrant, we primarily have our stakeholders in control of funding. These stakeholders will require ongoing efforts to keep them engaged on distribution of grant funding and working within the standards outlined for the CEP reimbursement and Dietary Guidelines. The primary aim is to keep them satisfied and apprised without overwhelming them with unnecessary information. Moving to the second quadrant, we have our stakeholders with the greatest power and influence over the project, which includes our in-school stakeholders such as DPS dieticians, school nurses, and teachers. Moving to the third quadrant we have our vested stakeholders who may already have an existing infrastructure to build off of including Schools Meals for All NC. These may include nonprofits who are important to keep engaged, but may also require less day-to-day progress updates. The fourth quadrant includes the lowest power stakeholders, which includes students, our primary group who will be impacted by this proposal. While they have low power in terms of the broader implementation, they will be the greatest impacted throughout our pilot.

Necessary Community Partners



Duke Partners for Success

Provides field experiences for Duke undergrad students to serve as volunteer tutors in Durham County schools



Durham Public Schools Data Managers

Responsible for auditing necessary data to develop monthly reports on attendance, grading, and behavioral progress



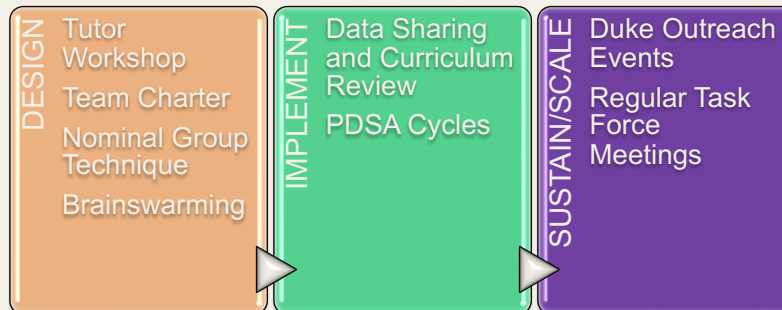
Durham Children's Initiative

Responsible for leading Task Force efforts



We have identified three necessary community partners to prioritize our engagement. First, Duke Partners for Success, which is an undergraduate community service-learning opportunity that places Duke students in DPS settings, provides supplemental resources for students who may be struggling in their reading proficiency. Second, data managers will be responsible for collecting and managing data regarding CEP eligibility and academic achievement. Finally, the Durham Children's Initiative is a non-profit organization providing pathways to success for children from low-income communities, which has an existing presence in the community we can build off of.

Accountability and Engagement Plan



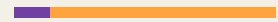
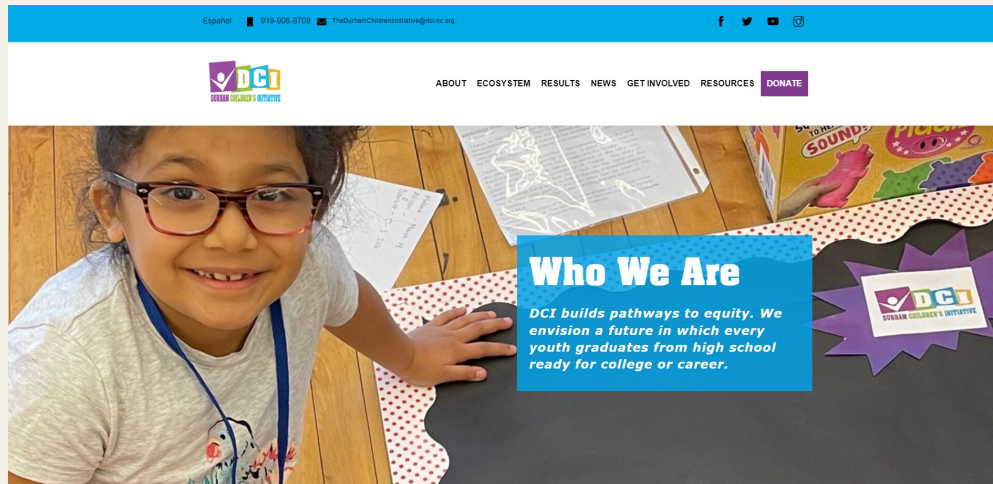
Feeding DPS Reading is a transformative initiative, dedicated to fostering community engagement and ensuring accountability at every phase of development. At the core of the program lies a deep understanding that community engagement is not just desirable, but essential. It is the foundation upon which trust is built, resources are secured, and overall health outcomes are enhanced. Our commitment to accountability and engagement is not a mere statement, but a structured plan.

In the design phase, the collaborative efforts of principals from the participating schools take center stage. Using innovative approaches such as the nominal group technique and brain swarming, these leaders actively generate ideas and address concerns related to the program. This phase is not just about involvement, it's about identifying specific issues and crafting solutions. Additionally, tutor workshops involving various stakeholders ensure that the program is developed with the valuable input and ownership of key stakeholders.

As we transition from design to implementation, our focus shifts to continuous improvement through quarterly data sharing and curriculum review meetings. These sessions serve as crucial checkpoints, providing feedback on program materials and outcomes. The plan, do, study, act cycles that follow ensure that improvements are implemented, evaluated, and refined. Partners collaboratively set improvement goals, choose evidence based interventions, and measure outcomes, creating a data driven approach that optimizes efficacy and ensures alignment with the goal of improving academic performance.

Ensuring the sustainability and scalability of the project is paramount. Regular meetings of the Task Force and Advisory Committee, guided by a clear charter defining responsibilities and milestones, provide a platform to discuss program progress and address concerns regarding sustainability. Semiannual outreach events play a crucial role in recruiting a diverse group of tutors, a key element in ensuring the program's sustainability and expansion.

Task Force Leadership



Central to our engagement leadership is the Durham Children's Initiative, entrusted with their extensive experience in community engagement and focus on child and family well-being. Their data-driven approach ensures that resources are directed where they have the most impact, and programs are improved objectively. The pivotal role played by the Durham Children's Initiative in coordinating and leading stakeholder engagement efforts throughout the program's lifecycle cannot be overstated. Feeding DPS Reading is not just a reading and nutrition initiative; it's a commitment to building a community driven, sustainable and impactful educational ecosystem. Through collaboration, innovation, and a steadfast focus on data-driven improvement, we are confident in the positive outcomes and lasting impact this program will bring to our schools and the communities they serve.

Evaluation Plan Overview



Purpose

To assess effectiveness in addressing student in-school food insecurity and enhancing third-grade reading proficiency.

Methodology

Quasi-experimental design

Focus

Kindergarten through third-grade students in CEP-adopting schools



The evaluation plan aims to assess the effectiveness of Feeding DPS Reading in addressing student in-school food insecurity and enhancing third-grade reading proficiency. The methodology is a quasi-experimental design to evaluate the cohort. The focus is kindergarten through third-grade students in CEP-adopting schools.

Evaluation: Data Collection and Analysis

Methods

Dichotomous survey for CEP adoption and DIBELS assessments

Sample

Students who enter the program in kindergarten



Control Group

Comparison with similar students from WCPSS schools not adopting CEP

Data Analysis

Descriptive statistics to evaluate program impact

A dichotomous survey question (yes/no) will ascertain whether the school adopted CEP and DIBELS assessment. The sample is students who enter the program in kindergarten. The control group will be third-grade students attending demographically similar Wake County schools that have neither adopted CEP nor implemented the Feeding DPS Reading tutoring strategy. Data analysis includes baseline DIBELS performance data and subsequent performance following program intervention.

Evaluation: Funding, Dissemination, and Future of Feeding DPS Reading

- Grants and funds received
- Dissemination strategy
- Long-term vision for expansion
- Emphasis on interdisciplinary collaboration and application of equity lens



Funding will come from multiple entities interested in achieving children's literacy and food security goals. The program aims to expand the initiative throughout the school district and state in recognition of the need to simultaneously address food security and reading proficiency. An equity lens has been applied to overcome sharp disparities in third-grade reading proficiency experienced by Black and Hispanic students.

Thank you for your attention!

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We thank you for your time and attention. We welcome your questions!

APPENDIX B: NICOLE JACK'S INDIVIDUAL DELIVERABLES

Appendix B.1: Social Determinant of Health Analysis

Social Determinant of Health (SDOH)

The social determinants of health (SDOH) are the factors and conditions in the environment where people are born, live, learn, work, play, worship, and age. These factors broadly influence health, functioning, and quality of life (Office of Disease Prevention and Health Promotion [ODPHP], n.d.-a). Rather than look solely at an issue such as obesity or heart disease, the social determinants seek to understand root causes of these issues so that intervention can take place earlier. Metaphorically, the goal of understanding SDOH is not simply to fix contaminated river water downstream, but to understand what went into the water upstream to cause contamination. These upstream SDOH may seem unrelated to health outcomes at first glance, yet they profoundly affect well-being, quality of life, and overall health (ODPHP, n.d.-a). Addressing the SDOH strives to improve conditions for all while being careful to consider health disparities and inequities.

Education access and quality is a SDOH. Higher levels of education are associated with longer life and greater well-being. One of the goals of Healthy People 2030 is to provide access to high quality education for children and adolescents (ODPHP, n.d.-b). Children from low-income families and those who experience social discrimination often struggle with reading and math, so access to education alone is insufficient (ODPHP, n.d.-b). Establishing a supportive infrastructure so that students can succeed in school is desired; therefore, the U.S. Department of Health and Human Services has set clear objectives on improving education measures. One such goal, that of increasing the proportion of fourth grade students with reading skills at or above the proficient level, is a high priority, as proficiency levels have been declining in recent years.

Healthy North Carolina 2030 seeks to improve *third* grade reading proficiency (NCIOM, 2020). The focus in this analysis will be on improving reading proficiency by the end of third grade in alignment with Healthy North Carolina 2030. The importance of third grade reading skills has been well established (Gallagher & Chingos, 2017; Hernandez, 2012; Samuels, 2015). On a short-term basis, students who lack reading proficiency may experience more bullying since reading challenges are easy to detect by peers. (Morgan et al., 2012; Turunen et al., 2017; Turunen et al. 2021). Longer term, students who do not reach this milestone are more likely to drop out or fail to graduate high school. High school dropouts have lower lifetime earnings, higher unemployment, higher rates of imprisonment, and higher reliance on Medicaid and Welfare (National Center for Education Statistics (NCES, n.d.).

Lower education levels have also been associated with poor health outcomes including decreased lifespan, heart disease, high blood pressure, and diabetes (Education, 2021; EBER, 2007; Zajacova & Lawrence, 2018). Early intervention is needed to capitalize on this critical period of development in early grade school. The primary goal of this intervention is to improve third grade reading proficiency in Durham Public Schools (DPS) using an equity lens.

Geographic and Historic Context

Durham County in North Carolina, the home of Durham, is a single city county with a rich history, thriving institutions, and a growing population (Thorsby, 2023). Durham County is in the central part of the state known as the Piedmont region. Historically the area was known for the tobacco and textile industries. Today, Durham is known for medicine, research, and education. It is the home of Duke University, North Carolina Central University, and Research Triangle Park (RTP), a nationally recognized research and development hub (Durham County Department of Public Health, 2020). Durham is also known for its diversity and civic engagement. The 2019 film “The Best of Enemies” depicts the true story of the desegregation of Durham Public Schools in 1971 when two unlikely members of the community, Ann Atwater, a Black community activist, and C.P. Ellis, a leader in Klu Klux Klan, recognize shared goals of the poor and agree to work together (Inge, 2019). Yet today, Durham Public Schools (DPS) have become resegregated, though by choice and not by law (Butchireddygari, 2019). In 2022, Durham’s population demographics were White 54.7%, Black 35.3%, Hispanic 13.9%, and Asian 6% (Figure B.1.A.1) (U.S. Census, 2022). Yet Durham Public Schools have a different demographic composition (Figure B.1.A.1 and Figure B.1.A.2). Notably, there are disproportionately fewer White students (19.4%) (Durham Public Schools, 2023) in DPS, relative to county composition, due to their enrollment in private and charter schools (Butchireddygari, 2019). This may indicate that many who could leave DPS have done so, while kids who are vulnerable have the least amount of choice.

Durham Public Schools consists of 56 schools and served 31,124 kindergarten through 12th grade students during the 2022-2023 school year (Durham Public Schools, 2023). There are 31 elementary schools. The district participates in Read to Achieve, a “kindergarten through third grade comprehensive reading policy that focuses on improving early reading development with the goal of all students reading on grade level by the end of third grade” (NC Read to Achieve, 2017). Read to Achieve passed into law in North Carolina in 2012 and was implemented starting with the 2013-2014 school year. This was due to recognition of the importance of third grade reading proficiency. While some improvements in reading proficiency have been made, persistent gaps remain especially

among Black and Hispanic students. In a district comprised mostly of students of color, where Read to Achieve has been implemented for nearly a decade, limited progress tells us more intervention is needed to improve reading skills among all students within DPS.

Priority Population

Reading proficiency in North Carolina has been declining for a decade, and this trend was noted prior to school closures and disruption due to the COVID-19 pandemic. However, the pandemic amplified existing inequities. For the 2021-2022 school year, 38.2% of DPS students had achieved third grade reading proficiency or better based on statewide end-of-grade exams (EOGs). Just 29.6% of African American students and 23.9% of Hispanic students demonstrated reading skills at or above grade level. This disparity is relevant to engagement because DPS is a majority minority district composed largely of Black and Brown students (72.8%) (Figure B.1.A.2). Current proficiency levels in DPS are a far cry from the Healthy North Carolina 2030 target proficiency level of 80% in every demographic (Figure B.1.A.3). Due to these inequities, culturally appropriate outreach efforts and strategies will be employed to engage African American and Hispanic students and families. All DPS students in kindergarten through third grade, along with their families, are the priority population for this intervention, though students of color may face the highest need. (DPS 2023-b).

Measures of SDOH

Durham Public Schools' strategic plan for 2023-2028 has designated student achievement of grade-level proficiency as priority number one with a focus on Black students, Hispanic students, and other vulnerable groups for reasons described above. Wake County Public School System (WCPSS), a larger neighboring school district, is a reasonable comparator in the region. Disparities still exist within WCPSS between White, Black, and Hispanic students, but Black and Hispanic students fare slightly better in WCPSS than they do in DPS. In WCPSS, 37% of Black students in grades three through eight are proficient or better on reading EOGs while 34% of Black students in the same grades achieved reading proficiency in DPS. Among Hispanic third through eighth graders, 37% achieved grade level reading proficiency in WCPSS, while just 30% achieved this benchmark in DPS. For a closer look at performance differences between DPS, WCPSS, and North Carolina public schools overall, please see Table B.1.A.1 and Figure B.1.A.4 in the Appendix.

Rationale/Importance

Efforts toward attaining third grade reading proficiency should be addressed as soon as students enter elementary school in kindergarten and should be continuous. After third grade it becomes increasingly challenging

to remediate students who lag as they become disengaged with school when instruction shifts from learning to read to reading to learn. When older students lack strong reading skills, they avoid reading thereby hindering the development of targeted reading skills which ultimately limits the growth of their vocabulary, and they can become poor spellers and poor writers (Hernandez, 2012; Moats, n.d.; Samuels, 2015).

Addressing education attacks a root cause of social and economic inequities. Quality education and high literacy rates are related to the type of career and college readiness that brings stability through good paying jobs. According to the Barbara Bush Foundation for Family Literacy, the potential boost in the U.S. economy is \$240 billion with only a 1% increase in literacy skills (Barbara Bush Foundation, n.d.). Research from Gallup estimates economic gains amounting to \$2.2 trillion in annual income for the country when literacy proficiency for all is achieved (Nietzel, 2020). Reading skills are foundational to all other learning, so investment in reading education is an investment in the future of the economy. Benefits to society include lower expenditures on remedial education, less interaction with the criminal justice system, less usage of social safety net programs, and less spending on healthcare. Furthermore, education level is linked to earnings, and higher earnings mean increased tax revenue (Chetty, 2011; Executive office of POTUS, 2014).

Disciplinary Critique

Public health nutritionists have an important role to play by leveraging their knowledge and experience in nutrition and public health practice to help close nutrition gaps that can hinder learning. Social and environmental influences outside of the educational system impact students' readiness to learn, and public health nutritionists are equipped to apply knowledge of these social determinants to real world challenges including food insecurity in schools. They possess the expertise to combine nutrition science, eating behavior dynamics, and school-based nutrition programs. They can advocate for equitable nutrition interventions and customize information based upon stakeholder interests. School district leaders, cafeteria managers, teachers, parents, and students may have different concerns about upcoming changes to something such as school meals. Public health nutritionists can tailor communication strategies for each of these stakeholder types with competence and cultural humility.

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Appendix B.1.A: Social Determinant of Health Analysis Figures and Tables

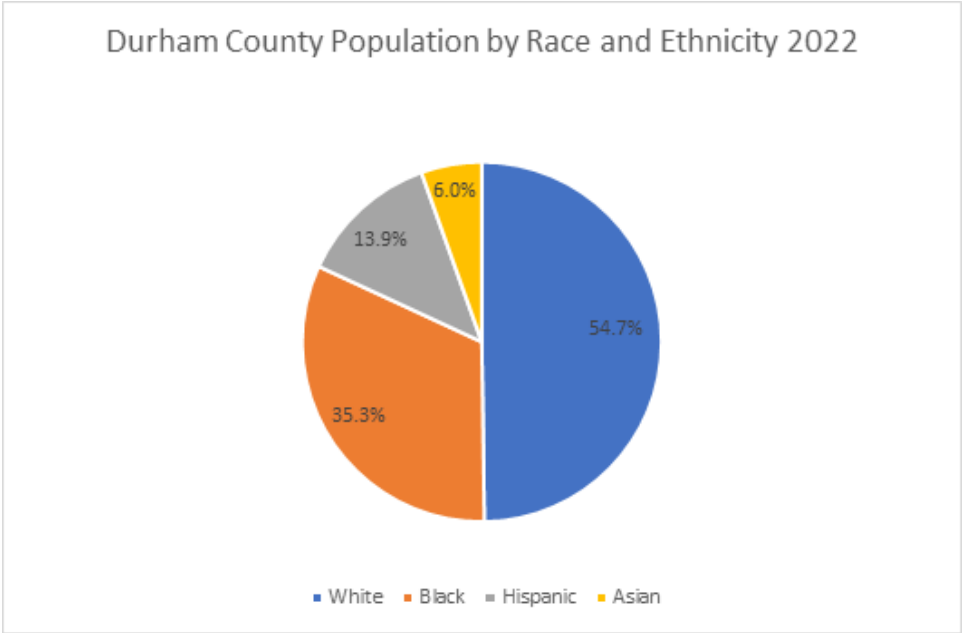
Table B.1.A.1

Reading Performance on End-of-Grade English Language Arts/Reading Assessments in Grades 3-8

Race/Ethnicity	Durham (DPS) (2021-2022)	Wake County (WCPSS) (2021)	NC Public Schools (2015-2022)
White	79%	75%	63.7%
Black	34%	37%	29.6%
Hispanic	30%	37%	39.9%
Asian	57%	84%	81.8%

Figure B.1.A.1

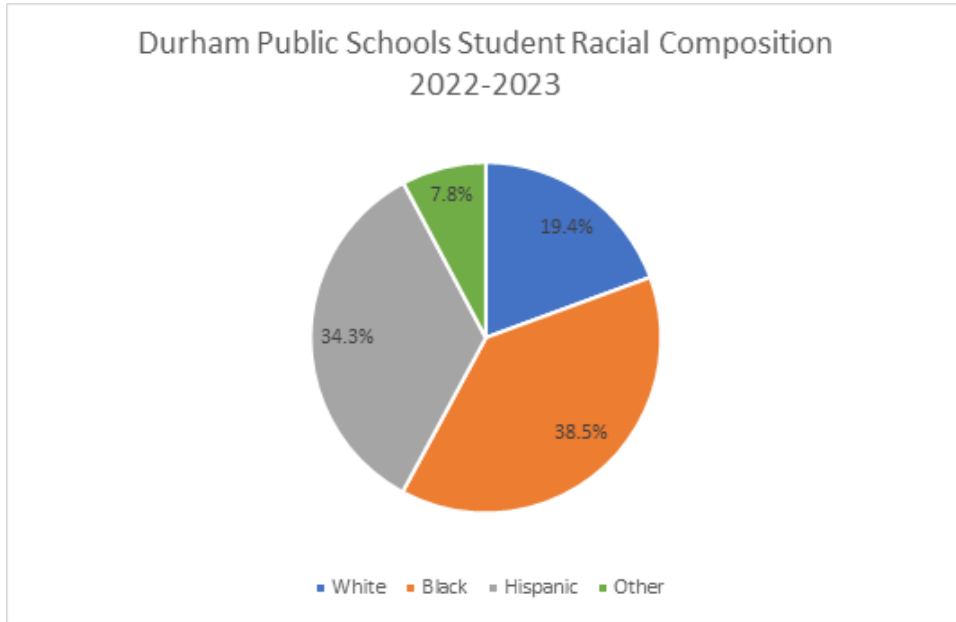
Durham Demographics



(U.S. Census, 2022)

Figure B.1.A.2

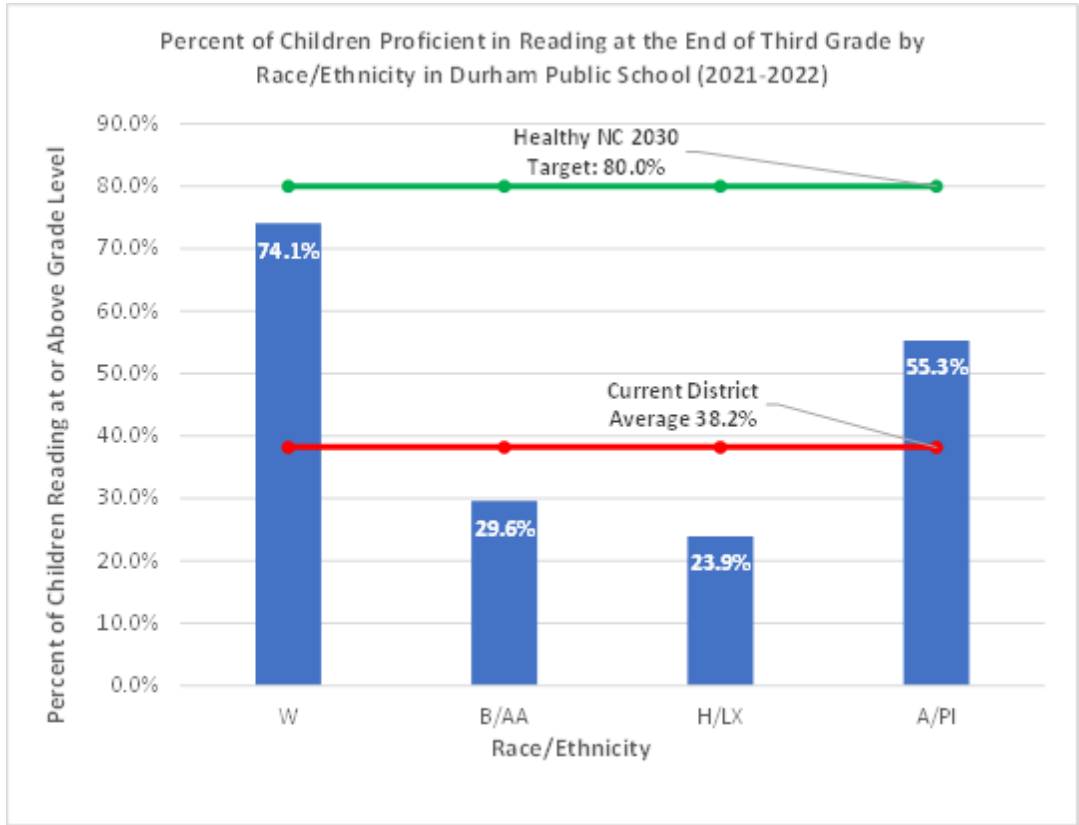
DPS Student Racial Composition 2022-2023



(Durham Public Schools, 2023-a)

Figure B.1.A.3

Healthy North Carolina 2030 Target Compared to DPS Third Grade Reading Proficiency (2021-2022)

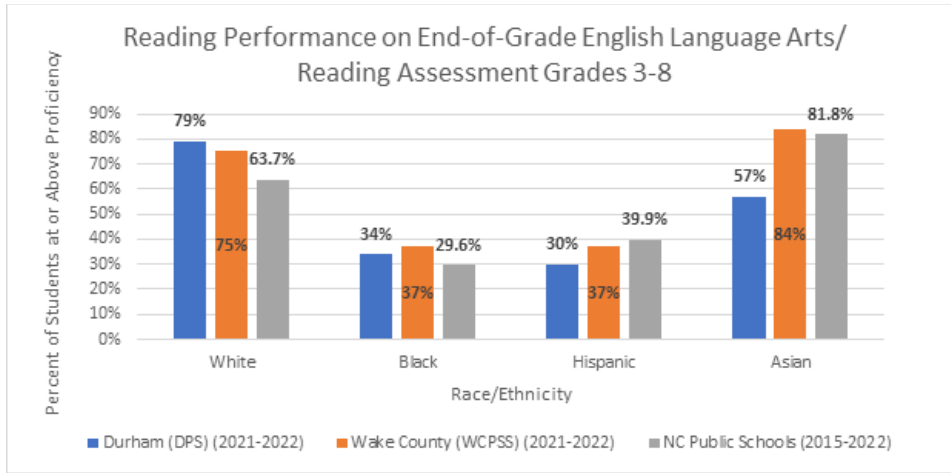


(Durham Public Schools, 2023-b)

Legend
W=White
B=Black/African American
H/LX=Hispanic/Latinx
A/PI=Asian/Pacific Islander
AI=American Indian

Figure B.1.A.4

NC Department of Public Instruction End-of-Grade Reading Assessment Results at DPS vs. Wake County vs. North Carolina (2021-2022 School Year)



(North Carolina Department of Public Instruction, n.d.-a; n.d.-b)

Appendix B.2: Nutrition Program

Introduction

Reading is a foundational skill intertwined with success and wellbeing in life, and the importance of third grade reading skills has been well established (Gallagher & Chingos, 2017; Hernandez, 2012; Samuels, 2015). On a short-term basis, students who lack reading proficiency may experience more bullying since reading challenges are easy to detect by peers. (Morgan et al., 2012; Turunen et al., 2017; Turunen et al. 2021). In the longer term, lack of third grade reading proficiency is associated with a failure to graduate high school (Hernandez, 2012). During the 2021-2022 school year, 61.8% of the students within Durham Public Schools (DPS) did not achieve third grade reading proficiency. Children of color are disproportionately impacted with just 29.6% of African American students and 23.9% of Hispanic students demonstrating reading skills at or above grade level (DPS, 2023b). This disparate performance is likely due to systemic inequities associated with where they are born, live, learn, work, play, worship, and age. These factors broadly influence health, functioning, and quality of life (Office of Disease Prevention and Health Promotion [ODPHP], n.d.). Intervention is required in the early grades to upend these trends so that students enrolled in DPS can avoid the learning disengagement that occurs among older students when they lose interest in schoolwork due to lack of reading proficiency (Moats, n.d.). Intervening in the early grades will bolster the achievement of DPS students helping them to successfully navigate the pivot between learning to read and reading to learn when gaps can widen and become more difficult to close.

Adequate childhood nutrition has been associated with learning capacity and is important for optimal cognitive development (Alderman & Fernald, 2017). In a review of interventions targeting nutrition and growth, Black and colleagues note that “young children with adequate nutrition, . . . and opportunities for learning have the best chances of thriving (2015). Brain development continues throughout childhood, but poverty can limit the brain’s functioning, which may contribute to why children living in poverty have low test scores, poor grades, and low educational attainment (Hair et al., 2015). Food insufficiency impairs “cognitive, academic, and psychosocial development” among children (Alaimo et al., 2001). An integrated approach is required to overcome the downstream effects of insufficient nutrition such as the poor reading proficiency scores among children in DPS.

Evidence-Based Nutrition Program

Evidence shows that healthy meals increase student engagement, improve attendance, make students more attentive, and lead to better grades and higher graduation rates (Bartfeld et al., 2020; Cohen et al., 2021). Studies show these benefits from universal free breakfast, which DPS has already implemented, and studies also show value from implementing universal free lunch (Hartline-Grafton & Levin, 2022; Soldavini & Ammerman, 2019). Universal Free Meals (UFMs) that included lunch reduced household food insecurity (via increased spending power for parents) and increased participation rates in school meal programs (Cohen et al., 2021). In 2020, Schwartz and Rothbart reported that UFMs were beneficial for both math and reading scores in poor and non-poor students alike.

Feeding DPS Reading is a proposed intervention aiming to improve third-grade reading proficiency by reducing food insecurity which can negatively influence academic performance while also providing tutoring to better reading skills. Student food insecurity and reading proficiency will be addressed with one overarching initiative, making this program preferred to others with a more singular focus. Federal meal programs have a proven track record of alleviating hunger (Bartfeld et al., 2020; Centeio et al., 2021; Cohen et al., 2021; Huang et al., 2015; Huang & Barnidge, 2016), and the reading tutoring component is evidence-based and focuses on five pillars of reading instruction (McCracken, 2013; NICHD, 2000; NRP, 2000).

This intervention will target expanding access to no-cost lunch for students through the federal Community Eligibility Provision (CEP) mitigating hunger so that students can learn. The consultant team has identified five (CEP)-eligible, but non-participating elementary schools to pilot this program. The CEP program subsidizes free school meals for all students in schools with a high percentage of under-resourced families. The identified student percentage (ISP) identifies schools comprised of students with the highest financial need. Schools with an ISP lower than 62.5% often chose not to participate in the CEP because all meals will not receive full federal reimbursement leaving budget gaps. This variance makes affording CEP implausible for many schools. Beyond financial concerns, a perceived administrative burden, lack of awareness, and reluctance to change may hamper participation decisions. Schools not already participating in CEP were selected due to having ISPs above 40%, but below 62.5%. Selected schools and their ISPs are shown in Table B.2.A.1. Poor reading performance was another criterion for selecting schools to participate in this initiative as each of these schools had a lower percentage of students than the state of NC meeting the Read to Achieve grade three benchmark as shown in Figure B.2.A.1.

Evidence-Based Outcomes

The primary objective is that all five of the identified schools will elect to participate in CEP, complete the necessary paperwork, and submit it to the North Carolina Department of Public Instruction (NCDPI) by the June 30 deadline for the next school year. This objective is central to this initiative as addressing food insecurity is foundational to learning. The secondary objective is to increase the meal participation rate in each of the five schools to at least 80% of enrolled students within two years. In the 2022-2023 school year, 54.8% of students enrolled in DPS participated in the free or reduced-price meal program (DPS, 2023a), but participation rates among the five selected schools are higher (Table B.2.A.1). The longer-term nutrition objective is that the five schools will independently resubmit paperwork for CEP participation as long as the school remains eligible. CEP runs on a four-year cycle, but schools must notify NCDPI of continued adoption of the program after the initial four years. Schools must choose to participate in CEP to be eligible to participate in the reading tutoring component of Feeding DPS Reading.

The primary objective for strengthening reading skills through the nutrition arm of this initiative is that within two years of program implementation, more students in the selected elementary schools will meet the Grade 3 Read to Achieve Benchmark. Specifically, the first reading objective is that schools currently below 60% achievement (Oak Grove and Hillandale) will reach the 2021-2022 DPS average of 67.3%. The second objective is that schools currently above 60% achievement (Parkwood, Holt, Hope Valley) will reach the 2021-2022 NC average of 74.9% (Figure B.2.A.1). Longer-term objectives for reading proficiency include the following. Within five years of program implementation, at least 60% of students participating in Feeding DPS Reading will achieve grade level reading proficiency based on statewide End-Of-Grade (EOG) standardized tests in grades three through eight. During the 2021-2022 school year, only 42.2% of DPS students and only 48.4% of all North Carolina students met this benchmark (DPS, 2023b). Ultimately, within 10 years of program implementation, high school graduation rates will increase among the participating cohort of students within DPS with more students being college and career ready. In 2023, 84.3% of DPS students graduated in four years. Within ten years, DPS students should achieve a 95% four-year graduation rate, exceeding Wake County (89.9%), and matching neighboring Chapel Hill-Carrboro Schools (94.8%) (NCDPI, 2023b).

Evidence-Based Implementation Strategies and Activities

To achieve multiple goals, Feeding DPS Reading proposes using evidence-based strategies with a multi-pronged approach that includes an expansion of free meals and reading tutoring. The initiative builds on several

existing programs and partnerships to maximize synergies while delivering a high-quality experience for all stakeholders.

Feeding Component Activities

The implementing Task Force will designate a program director with school nutrition expertise and project management experience to coordinate all aspects of the initiative. Human resources will include a part-time reading specialist who will support the training of volunteer reading tutors and five part-time site coordinators who will provide additional support at each school location. The program director will spearhead efforts to engage with stakeholders including the district nutrition director, school principals, teachers, and cafeteria workers at each site. The director and site coordinators will educate school leadership about CEP including how it works and its benefits to both students and staff. They will provide paperwork support with a one-page roadmap containing the steps needed to elect CEP. Feeding DPS Reading will match each of the five schools with a buddy school within DPS that has already implemented CEP to ensure the sharing of testimonials and best practices from these schools. Budget allocations from the Durham County Board of Commissioners are essential to minimizing any financial concerns the schools have related to CEP adoption, as the foundational strategy of this initiative is to ensure county funding for the gap between federal free meal and paid meal reimbursement rates. We expect that the county will choose to appropriate these funds based on the scientific evidence connecting nutrition to learning, the food insecurity in DPS schools, and the need to increase reading proficiency rates. In addition, this initiative has existing financial support from other funders including the Belk Foundation, No Kid Hungry, USDA Food and Nutrition Services, and the National Education Association (NEA). The expected reach of this component of the initiative is approximately 3000 students based upon enrollment data for the 2023-2024 school year.

To drive an increase in meal participation, the Task Force will partner with Unbox. Unbox is the existing DPS Youth School Food Policy Council, a project aimed at increasing school meal participation among students, teachers, and staff through student input into the future of DPS school food. Collaboration with this group will include student-inspired marketing campaigns within each school to drive up interest and input. Gaining student ownership of this project is an important part of its long-term success by minimizing any stigma and normalizing school lunch for all.

Reading Component Activities

The reading component of this intervention employs evidence-based practices to increase reading proficiency. The Task Force will collaborate with Duke Program in Education Partners for Success, which is a service-learning opportunity for education students enrolled at Duke University in which they spend two to three hours per week helping DPS teachers as needed (Duke Program in Education, n.d.). This program will mimic their current program design including student selection, background checks, and the regular cadence of training. However, Duke University students participating in Feeding DPS Reading will undergo additional training on reading-specific tutoring. A second source of service learners will be drawn from Duke University NC Literacy Corps. Training will focus on the five pillars originating from the science of learning to read (Figure B.2.A.2). The Task Force will ask the Duke Program in Education Partners for Success to add the five selected schools to their existing arrangements. The program director will manage the administrative load of the five additional sites. DPS students will be identified by teachers based on the early literacy screener Dynamic Indicators of Basic Early Literacy Skills (DIBELS), which is already used in all North Carolina classrooms for kindergarten through third-grade students. Students will be pulled into small groups in alignment with current practices. This component of Feeding DPS Reading is estimated to reach more than 1,800 students based on greater than 60% of third grade students lacking grade level proficient reading skills (DPS, 2023b). This combined initiative influences three levels of the social-ecological model (SEM) as shown in the Figure B.2.A.3. This school level intervention directly targets the living and learning conditions of students by improving food insecurity and providing tutoring at school. The interpersonal level is impacted by student identification by teachers and interactions with tutors. Finally, the individual level is impacted by improved food security and improved reading proficiency.

Community Partners

Many community partners will be essential to the success of Feeding DPS Reading including principals, DPS nutrition director, nutrition/cafeteria managers, teachers, parents, and students. Additional stakeholders include the DPS Board of Education, Durham County Board of Commissioners, School Meals for All NC, Unbox (the DPS Youth School Food Policy Council), current CEP-participating DPS schools, Duke University Program in Education Partners in Success, and Duke University Literacy Corps. Each partner is important to ensure successful program implementation. See Table B.2.A.2 for a list of these partners, their roles, and responsibilities.

Budget

Feeding DPS Reading has been awarded grant funding totaling \$240,000 per year for two years, due to its use of evidence-based strategies to alleviate food insecurity among elementary school students fueling their readiness to learn and achieve third grade reading proficiency. This intervention seeks a comparable \$200,000 per year for two years from the Durham County Board of Commissioners to bring this program to life. The budget consists of two components. The first component covers the balance of helping CEP-eligible schools start participating in the program by supplementing them at the free meal reimbursement rate. For one school year, this investment will be \$258,759.50. The second component involves activating a team of volunteers in the education department of Duke University to provide reading-specific tutoring in the selected DPS elementary schools. This component supports a program director, a part-time reading specialist, and five part-time site coordinators. The investment in this component is \$168,000. The total budget allocation for both components of Feeding DPS Reading is \$440,000 annually with the balance of these funds representing other operational costs. Over 50% of the funding has been won through competitive grant processes. Table B.2.A.1 details school meal participation rates, Identified Student Percentages (ISP), and meal reimbursement rates by ISP. This table also shows the formula designed by the federal government detailing how school reimbursement rates are calculated. Table B.2.A.3 through Table B.2.A.6 show the difference between the free and paid reimbursement rates, the feeding component budget, the reading component budget, and finally the budget grand total for the full Feeding DPS Reading program.

Conclusion

Hungry children cannot focus and learn. More than half of DPS students is not on pace to achieve third grade reading proficiency. Durham County Board of Commissioners must act now to reverse these trends. This proposal prioritizes basic nutrition needs of DPS children and their career and college readiness. The advantages of this multicomponent program are its dual focus on overcoming food insecurity in children while equipping them with foundational reading skills. Other nutrition-based programs focus solely on meals or snacks but lack an evidence-based reading component. Feeding DPS Reading has gained substantial grant funding from the Belk Foundation and No Kid Hungry, and the support of the Durham County Board of Commissioners is essential to fill the gap. The budget allocation should not be viewed as a disadvantage, but rather an investment that will pay dividends.

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Appendix B.2.A: Nutrition Program Evaluation Figures and Tables

Table B.2.A.1

School Meal Participation Rates & Meal Reimbursement Rates by ISP 2023

School	% Participating in Free or Reduced Price Meals	ISP	1.6 Multiplier	% of Meals Reimbursed at the Free Rate	% of Meals Reimbursed at the Paid Rate
Oak Grove Elementary	74.65%	61.78%	x 1.6	99%	1%
Parkwood Elementary	66.34%	60.83%	x 1.6	97%	3%
Holt Elementary	78.13%	53.85%	x 1.6	86%	14%
Hillandale Elementary	64.33%	52.80%	x 1.6	84%	16%
Hope Valley Elementary	60.35%	48.21%	x 1.6	77%	23%

Note: The free reimbursement rate is determined by multiplying the ISP by 1.6. The “magic number” for 100% of meals reimbursed at the free rate is an ISP of 62.5%.

(NCDPI, 2023-a)

Table B.2.A.2*Community Partner and Roles*

Community Partners	Roles and Responsibilities
DPS Students	Will act as recipients of the intervention. They will provide feedback on desirability of meals.
DPS Parents	Parents must provide consent for program participation and to follow students over time.
Selected School Principals	Principals must buy into the initiative and allow its adoption in their school. They can also eat lunch with students to generate mealtime excitement.
DPS Teachers	Teachers will identify students who need additional reading support and work with reading tutors.
DPS Board of Education	The Board will head the Task Force responsible for leading Feeding DPS Reading.
Durham County Board of Commissioners	Allocate funding to support Feeding DPS Reading.
DPS Nutrition Director	Complete paperwork to adopt CEP. Cascade supportive messaging to appropriate region directors and cafeteria managers.
Cafeteria Managers	Help generate mealtime excitement. Act on student suggestions about meals wherever possible.
Unbox (Youth School Food Policy Council)	Contribute to ideas for improving school food by sharing personal and peer insights.
Current DPS - CEP -participating schools	Share best practices and good experiences from CEP adoption with five selected schools.
School Meals for All NC	Share best practices with the Task Force for progressing toward school meals for all.
Duke University Program in Education - Partners for Success	Provide reading tutoring by service-learners. Share successful model for engaging with DPS schools.
Duke University Literacy Corps	Provide a secondary source of program volunteer reading tutors.

Table B.2.A.3

Difference Between Free and Paid Reimbursement Rates

Max Federal Reimbursement for Free Meals	Max Federal Reimbursement for Paid Meals	Difference
\$4.42	\$0.48	\$3.94

Table B.2.A.4*Feeding Component Budget: Cost to Cover Difference in Reimbursement Rates*

School	Number of Students Enrolled (2023-2024)	Number of Meals Reimbursed at Lower Paid Rate	x Difference	Amount Needed
Oak Grove Elementary	518	6	x \$3.94	\$23.64
Parkwood Elementary	623	19	x \$3.94	\$74.86
Holt Elementary	663	93	x \$3.94	\$366.42
Hillandale Elementary	553	89	x \$3.94	\$350.66
Hope Valley Elementary	643	148	x \$3.94	\$583.12
Total	3000	355	Daily Total:	\$1,398.70
			Annual Total x 185 School Days	\$258,759.50

Note: Total assumes 100% student meal participation.

Table B.2.A.5

Reading Component Budget

Human Resources	Stipend (USD)	Total (USD)
Program Director (full-time)	\$58,000	\$58,000
Reading Specialist (part-time)	\$30,000	\$30,000
Site Coordinator (part-time) (5)	\$16,000	\$80,000
Total		\$ 168,000.00

Table B.2.A.6

Feeding DPS Reading Total Budget

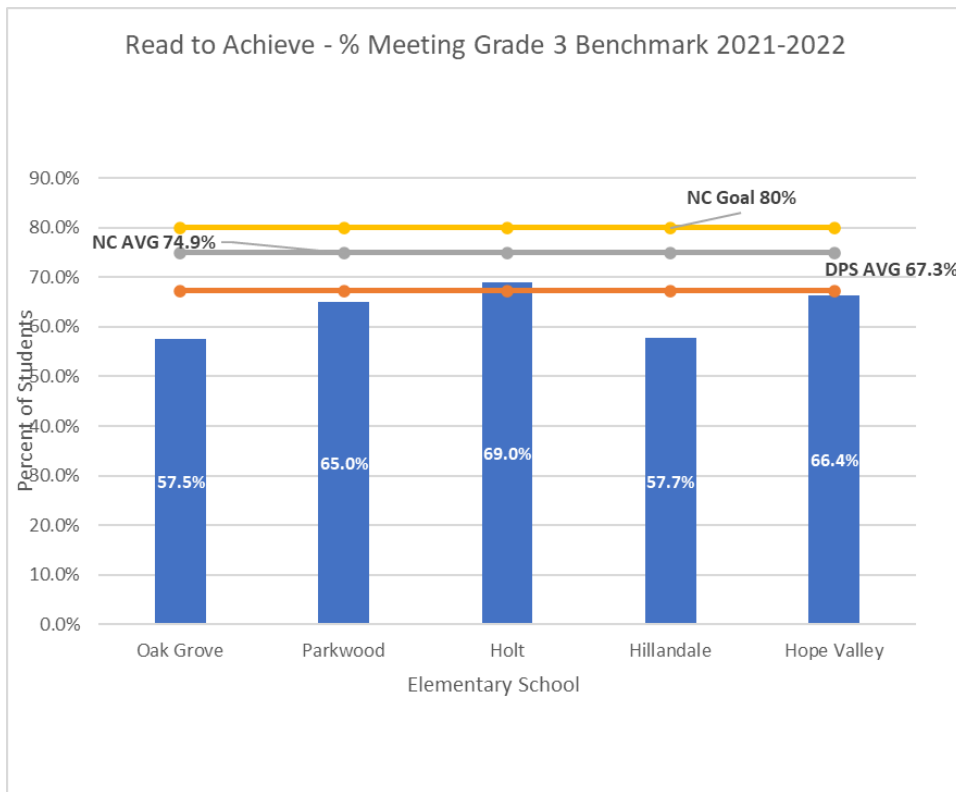
Funding Sources	YEAR 1	YEAR 2	TOTAL
Durham County	\$200,000.00	\$200,000.00	\$400,000.00
Belk Foundation	\$150,000.00	\$150,000.00	\$300,000.00
No Kid Hungry	\$15,000.00	\$15,000.00	\$50,000.00
USDA Food and Nutrition Services	\$25,000.00	\$25,000.00	\$50,000.00
National Education Association (NEA)	\$50,000.00	\$50,000.00	\$100,000.00
Total Funding	\$440,000.00	\$440,000.00	\$880,000.00

Budget Categories	YEAR 1	YEAR 2	PROJECT TOTAL
Total program costs	\$432,180.00	\$430,959.50	\$863,139.50
Total overhead costs	\$7,820.00	\$9,040.50	\$16,860.50
Project Total	\$440,000.00	\$440,000.00	\$880,000.00

Category Title	Unit	Unit Cost	Unit Quantity	Year 1	Year 2	Fringe Benefits	Total in U.S. \$
Human Resources							
Program Director (full-time)	salary	\$58,000.00	1	\$58,000.00	\$58,000.00	\$23,200.00	\$139,200.00
Reading Specialist (part-time)	salary	\$30,000.00	1	\$30,000.00	\$30,000.00		\$60,000.00
Site Coordinator (part-time)	salary	\$16,000.00	5	\$80,000.00	\$80,000.00		\$160,000.00
In-Kind Human Resources							
Duke University Program in Education - Partners for Success - Service Learners	hours/week		60				\$0.00
Duke University Literacy Corps - volunteers	hours/week		12				\$0.00
Subtotal A				\$168,000.00	\$168,000.00	\$23,200.00	\$359,200.00
CEP Expansion							
Oak Grove Elementary	meals	\$3.94	1110	\$4,373.40	\$4,373.40		
Parkwood Elementary	meals	\$3.94	3515	\$13,849.10	\$13,849.10		
Holt Elementary	meals	\$3.94	17205	\$67,787.70	\$67,787.70		
Hillandale Elementary	meals	\$3.94	16465	\$64,872.10	\$64,872.10		
Hope Valley Elementary	meals	\$3.94	27380	\$107,877.20	\$107,877.20		
Subtotal B				\$258,759.50	\$258,759.50	\$0.00	\$517,519.00
Supplies and Equipment							
Computer laptops	Unit	\$850.00	1	\$850.00			\$850.00
Printers	Unit	\$350.00	1	\$350.00			\$350.00
Maintenance/ink	Unit	\$220.50	1	\$220.50	\$200.00		\$420.50
Subtotal C				\$1,420.50	\$200.00	\$0.00	\$1,620.50
Communication Materials							
Posters	Unit	\$7.00	500	\$3,500.00	\$3,500.00		\$7,000.00
Subtotal D				\$3,500.00	\$3,500.00	\$0.00	\$7,000.00
Planning and Administration							
Office supplies	Year	\$500.00	1	\$500.00	\$500.00		\$1,000.00
In-kind office space	Unit		5				\$0.00
Subtotal E				\$500.00	\$500.00	\$0.00	\$1,000.00
Overhead							
Internet	Month	\$65.00	12	\$780.00	\$780.00		\$1,560.00
Mileage Reimbursement	Month	\$170.00	12	\$2,040.00	\$2,040.00		\$4,080.00
Miscellaneous/Inflation				\$5,000.00	\$6,220.50		
Subtotal F				\$7,820.00	\$9,040.50	\$0.00	\$16,860.50
				YEAR 1	YEAR 2	Other Donation	
GRAND TOTAL				\$440,000.00	\$440,000.00		\$880,000.00

Figure B.2.A.1

Read to Achieve Baseline and Goals



(NC School Report Cards, 2023)

Figure B.2.A.2

The Five Pillars of Early Literacy

5 Pillars of Early Literacy

The National Reading Panel identified five key concepts at the core of every effective reading instruction program: **Phonemic Awareness, Phonics, Fluency, Vocabulary, and Comprehension.** Since the panel's report was released in 2000, these concepts have become known as the "five pillars" of early literacy and reading instruction.

#1 PHONEMIC AWARENESS
Phonemic awareness is the ability to identify the different sounds that make up speech.
Word games, rhymes, and tongue twisters can help children identify the individual sounds in words and begin to match the sounds to letters of the alphabet. So, keep talking!

#2 PHONICS
Phonics helps kids match sounds to letters or letter groups.
Phonics is the key to decoding new words. Breaking words down into sounds and syllables allows young readers to connect words on paper with the words they hear and speak every day. Remember, Sam-I-Am did not like green eggs and ham!

#3 FLUENCY
Fluency is the ability to read accurately and quickly.
Fluency is achieved when the reader can concentrate on the meaning of the text, not the individual words. Guided practice helps children learn to read fast enough to keep up with their brains!

#4 VOCABULARY
Vocabulary is the key to knowing more about everything.
Kids absorb language like sponges, learning new words every day. Help expand their vocabulary by talking to them, reading aloud, and even singing with them. Use all the words!

#5 COMPREHENSION
Comprehension happens when the words become ideas.
Once a child is reading fluently with a strong vocabulary, they can read for understanding. Comprehension is that "Oh! I get it now!" moment, repeated. Help with comprehension by asking questions about what they are reading.

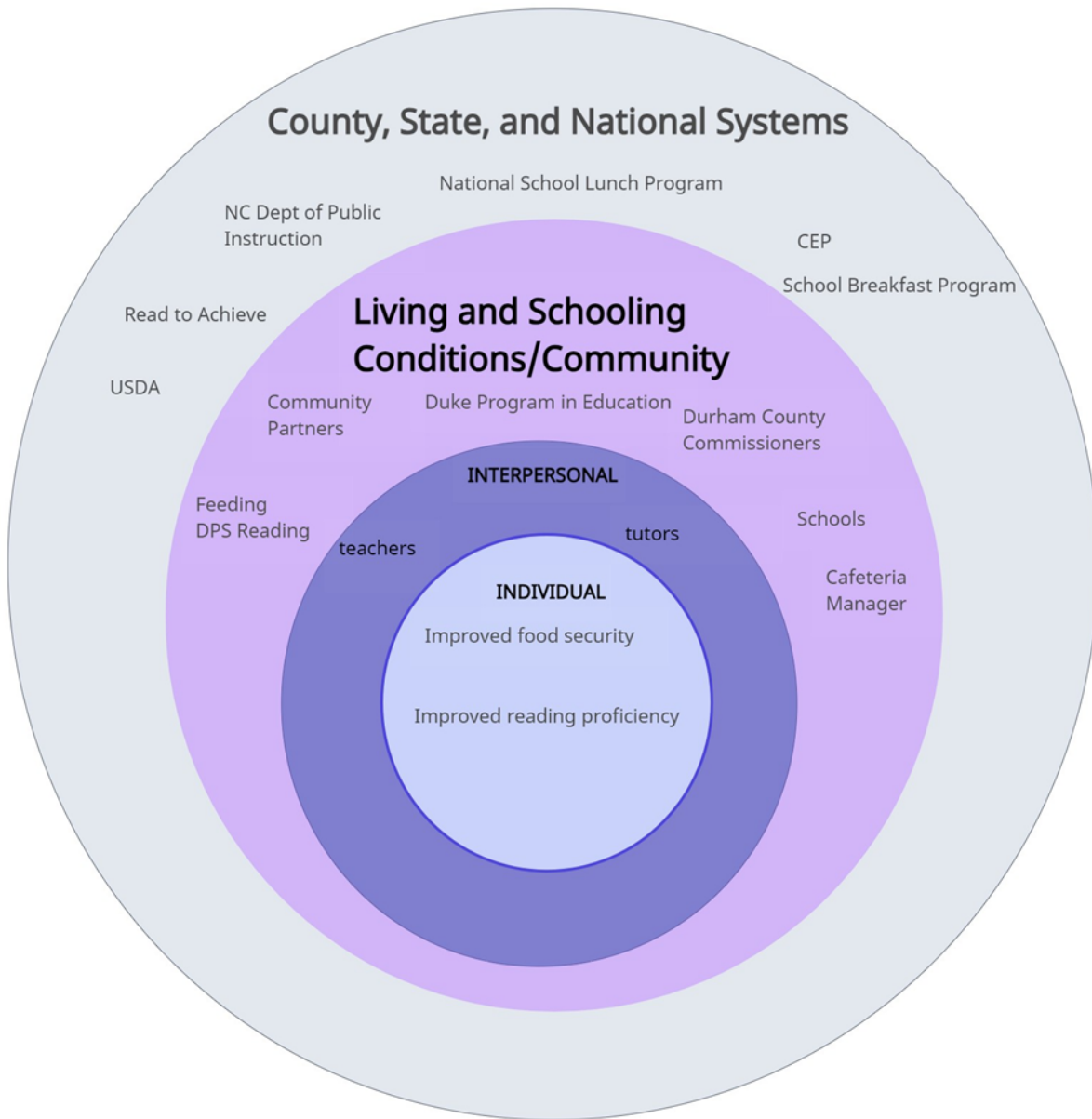
ARIZONA Department of Education

Read 20 AZ

(Arizona Department of Education, 2017)

Figure B.2.A.3

Social-Ecological Model (SEM)



Appendix B.3: Nutrition Program Evaluation

Introduction

The social determinants of health (SDOH) are the factors and conditions in the environment where people are born, live, learn, work, play, worship, and age. These factors broadly influence health, functioning, and quality of life (Office of Disease Prevention and Health Promotion [ODPHP], n.d.-a). Metaphorically, the goal of understanding SDOH is not simply to fix contaminated river water downstream, but to understand what went into the water upstream to cause contamination. Education access and quality is a SDOH. Higher levels of education are associated with longer life and greater well-being. One of the goals of Healthy People 2030 is to provide access to high quality education for children and adolescents (ODPHP, n.d.-b). Healthy North Carolina 2030 seeks to improve third grade reading proficiency (NCIOM, 2020), and the importance of third grade reading skills has been well established (Gallagher & Chingos, 2017; Hernandez, 2012; Samuels, 2015). On a short-term basis, students who lack reading proficiency may experience more bullying since reading challenges are easy to detect by peers. (Morgan et al., 2012; Turunen et al., 2017; Turunen et al. 2021). In the longer term, lack of third grade reading proficiency is associated with a failure to graduate high school (Hernandez, 2012). Feeding DPS Reading is a proposed intervention aiming to improve third grade reading proficiency by reducing food insecurity which can negatively influence academic performance while also providing tutoring to better reading skills. These goals will be accomplished by expanding access to free meals through the Community Eligibility Provision (CEP) and implementing evidence-based strategies to improve third grade reading proficiency.

Evidence Based Evaluation Plan

The Task Force will conduct an outcome evaluation to assess Feeding DPS Reading's effectiveness toward addressing student in-school food insecurity and increasing third-grade reading proficiency in CEP-adopting designated schools. To evaluate food insecurity, a dichotomous survey question (yes/no) will ascertain whether the school adopted CEP to address this issue. Once a school chooses to participate in CEP, that designation is valid for four years. A quasi-experimental design will be used to quantitatively evaluate the cohort of students exposed to CEP expansion and tutoring components of Feeding DPS Reading, beginning in kindergarten. Pre-test and post-test design will be used inclusive of matched control group comparisons. Kindergarten through third grade students may enroll in Feeding DPS Reading at any time, but the sample for this evaluation will focus on those who enter the program in kindergarten. Progress toward established goals will be monitored at the beginning, middle, and end of

each school year using the early literacy screener, Dynamic Indicators of Basic Early Literacy Skills (DIBELS), the science of reading based assessment tool currently in place in North Carolina. Along with these intermediate screening tools, the primary objective will be assessed four years after program implementation to gain an understanding of this initiatives' full impact throughout the matriculation of the initial cohort. This cohort of students will have attended a designated CEP-adopting elementary school and received specific literacy skills-based tutoring in kindergarten, first grade, second grade, and third grade. At the conclusion of the fourth year, the third-grade school year for this cohort, end-of-grade (EOG) exams will be compared to the pre-implementation baseline DPS third-grade EOGs and the control group's pre-test and post-test EOG scores. The control group enlisted for comparison will be third-grade students attending demographically similar Wake County Public School System (WCPSS) schools that have neither adopted CEP nor implemented the Feeding DPS Reading tutoring strategy. This approach allows for the assessment of both components of this initiative. Students at non-designated schools that are not adopting CEP will continue to be eligible to apply for free and reduced-price meals in the typical way, and they will receive standard reading instruction. Feeding DPS reading aims to assist with CEP implementation and increasing meal participation rates among students while providing supplemental tutoring for identified students based on the science of reading.

A purposeful sampling strategy will be used in this evaluation since participant selection is based upon specific criteria relevant to the research question as this intervention specifies five schools based upon financial need and low reading proficiency. Objective testing data and teacher input will be considered to refer students into Feeding DPS Reading. Kindergarten students will be identified by teachers two times during the school year. Students who test "well below benchmark" on beginning of year (BOY) DIBELS assessments and students who test "well below benchmark" or "below benchmark" on end of year (EOY) DIBELS assessments. Students in these categories need the most support, and Feeding DPS Reading aims to come alongside teachers to supplement this support. The specific measures and their timing are described in the Appendices.

Data analysis consists of baseline DIBELS performance data collected before implementing the intervention, and subsequent performance following program intervention. Data will be collected on both the intervention group and the control group during intermediate assessments and after four years of program implementation. Program results will be analyzed according to program attendance for all intervention group students. Results will be analyzed using descriptive statistics such as means and medians.

Feeding DPS Reading has secured grant funding from several entities interested in achieving literacy and food security goals for children. The following funding mechanisms are per year for two years with the possibility of renewal. The Belk Foundation is the most generous funder granting \$150,000 per year as Feeding DPS Reading goals align with their goal to help children achieve third grade reading proficiency through their Campaign for Grade Level Reading. Other funders include the USDA Healthy Meals Incentive Grant for \$25,000, the National Education Association, Community Advocacy & Partnership Grant, \$50,000, and No Kid Hungry for \$15,000. The Durham County Board of Commissioners is being asked to fund the remaining \$200,000 program budget. Partnership with these organizations will improve the delivery of this initiative and provide advocacy allies for broader state and federal funding, and for the push to advance cost-free schools meals for all.

The data from the evaluation of Feeding DPS Reading will be disseminated in different ways with consideration of the needs and desires of various stakeholders. A white paper will be prepared for funders, and public health professionals. The executive summary of goals, objectives, and achievements will be provided to school administrators and school nutrition leaders. Infographics, newsletters, and emails will be shared with teachers, tutoring partners, and parents. Social media posts and press releases will generate awareness with the broader community including local political leaders. Finally, miscellaneous funds in the budget will be used to throw a celebration party at the end of each school year recognizing learners, tutors, and all program staff and volunteers. All stakeholders will be invited to participate in the celebration including families. Evaluation data will be shared with School Meals for All NC to add to their growing body of evidence supporting no-cost meals for all children as a part of our efforts to sustain this initiative long term. Ultimately, Feeding DPS Reading would like to expand this initiative throughout the school district and state in recognition of the need to simultaneously address food security and reading proficiency.

Interdisciplinary collaboration is essential to the success of Feeding DPS Reading. This intervention was designed for all DPS students in kindergarten through third grade as the priority population. Yet, an equity lens has been applied aiming to overcome sharp disparities in third-grade reading proficiency experienced by Black and Hispanic students. The SDOH approach of devising upstream public health solutions is demonstrated in this initiative by making nutrition the foundational tenet of the program through the provision of universal free meals for all students. Adding to this foundation an evidence-based method of building literacy skills is unique to Feeding DPS Reading, and investment in this program will benefit students and Durham County for years to come.

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Appendix B.3.A: Nutrition Program Evaluation Figures and Tables

Table B.3.A.1

Evaluation Measures and Timing: CEP Objective

EVALUATION GOAL:			
To overcome in-school food insecurity among students, all 5 of the schools identified by the consultant team will choose to participate in CEP.			
Process Objective:	Activities:	Study design/data collection method:	Timing:
The designated schools will choose to participate in CEP and submit paperwork before June 30 th of the upcoming school year.	<p>Program director and site coordinators will meet with school leadership to educate about CEP.</p> <p>Connect identified DPS schools with DPS schools currently implementing CEP for best practice sharing.</p> <p>Provide paperwork support to adopt CEP.</p>	<p>Program director will complete a dichotomous survey regarding whether each of the schools has chosen to participate in CEP.</p>	After July 1 of the upcoming school year.
		<p>Specific measures:</p> <p>“Yes” or “No”</p>	

Table B.2.A.2

Evaluation Measures and Timing: Identification Objectives

EVALUATION GOAL: Increase third-grade reading proficiency among students enrolled in Feeding DPS Reading designated elementary schools that adopt CEP.			
Process Objective:	Activities:	Study design/data collection method:	Timing:
Students testing well below benchmark on beginning of year (BOY) DIBELS tests will be identified and offered participation with parental consent.	Students will take BOY test according to current school practice. Students who test well-below benchmark will be referred to Feeding DPS Reading. Parental consent forms will be sent home with students and via email to parents. Upon receipt of signed consent forms, students will be enrolled in Feeding DPS Reading.	Quantitative data from DIBELS testing will be used. Students who numerically test well below benchmark will be referred to Feeding DPS Reading.	By the end of the first month of the kindergarten year
		Specific measures: The program director will compile a list of eligible students and send consent forms home. The program director will maintain a tally of signed consent forms. Program director will enroll students who have parental consent	
Process Objective:	Activities:	Study design/data collection method:	Timing:
Students testing well below benchmark or below benchmark on end of year (EOY) DIBELS tests will be identified and offered participation with parental consent.	Students will take BOY test according to current school practice. Students who test well-below benchmark will be referred to Feeding DPS Reading. Parental consent forms will be sent home with students and via email to parents. Upon receipt of signed consent forms, students will be enrolled in Feeding DPS Reading.	Quantitative data from DIBELS testing will be used. Students who numerically test well below benchmark or below benchmark will be referred to Feeding DPS Reading.	By the end of the final month of the kindergarten year
		Specific measures: The program director will compile a list of eligible students and send consent forms home. The program director will maintain a tally of signed consent forms. Program director will enroll students who have parental consent	

Table B.2.A.3

Evaluation Measures and Timing: DIBELS Objectives

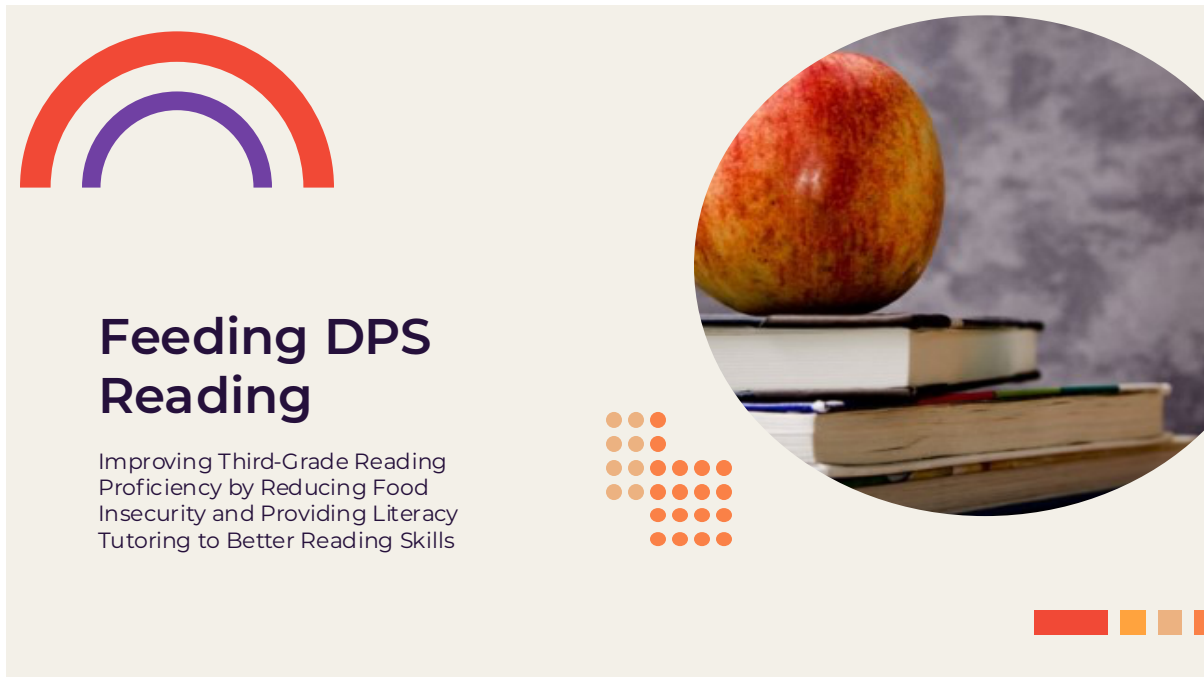
EVALUATION GOAL: Increase third grade reading proficiency among students enrolled in Feeding DPS Reading designated elementary schools that adopt CEP.			
Outcome Objective:	Activities:	Study design/data collection method:	Timing:
Students enrolled in Feeding DPS Reading will improve their DIBELS composite score as assessed by BOY vs EOY results by 40%.	Enrolled students will be placed in small groups composed of 3-5 students. Students will receive reading skill specific tutoring based on need as identified by teacher/DIBELS results. Groups will meet 2 times per week for 30 minutes per session. Site coordinators at each school will serve as primary liaison with teachers. Site coordinators will communicate reading pillar focus area with tutors. Tutors will complete a form weekly assessing student progress. The site coordinator will maintain weekly student progress data at each site and share with teachers.	Quantitative data from DIBELS testing will be used. DIBELS testing uses a numerical scale.	Assessed annually at the end of each school year using BOY versus EOY testing in line with current practices.
		Specific measures: Site coordinators will share aggregate progress data with program director	
Outcome Objective:	Activities:	Study design/data collection method:	Timing:
Students enrolled in Feeding DPS Reading will show progress on mid-year (MOY) DIBELS testing to assess whether they are on track to reach EOY milestones.	Data will be compiled from MOY testing.	Dichotomous data will be collected. "Is the student on track to reach EOY goals?" Yes or No	By February 15 th of each school year.
		Specific measures: Student performance score on DIBELS numeric scale.	

Table B.2.A.4

Evaluation Measures and Timing: Attendance and Proficiency Objectives

EVALUATION GOAL: Increase third grade reading proficiency among students enrolled in Feeding DPS Reading designated elementary schools that adopt CEP.			
Outcome Objective:	Activities:	Study design/data collection method:	Timing:
80% of students enrolled in Feeding DPS Reading will attend 90% of scheduled tutoring sessions.	Automated reminders (text messages) will be sent to parents with reminders for upcoming sessions. Parent pledges supporting 100% attendance of their students will be sent home for signature along with program consent. One catch-up tutoring session per week will be offered	Attendance data will be compiled using Microsoft Excel.	Assessed annually at the end of each school year using survey on a scale of 1-5.
		Specific measures: Tutors will submit student attendance data to site coordinators. Site coordinators will compile data for each school site and submit aggregate data to program director.	
Outcome Objective:	Activities:	Study design/data collection method:	Timing:
80% of students enrolled in Feeding DPS Reading will meet or exceed the grade 3 reading proficiency benchmark.	Continued weekly tutoring sessions until students exceed grade level standards.	End-of-Grade Testing level Level – 3 = on grade level; may need some support Level – 4 = thorough grasp of grade level; on track for career or college	By the end of the 4 th year of program implementation.
		Specific measures: At least 80% of students at level 3 At least 20% of students at level 4	

Appendix B.4: Individual Presentation and Script



Feeding DPS Reading has been developed to address these concerns. Evidence shows that healthy meals increase student engagement and can lead to better grades. The aim of this proposed intervention is to improve third-grade reading proficiency by reducing food insecurity since hunger negatively influences academic performance and to provide tutoring based on the science of reading.

Feeding DPS Reading



Community Eligibility Provision (CEP) Expansion

Free school meals for all children without family contribution or paperwork.



Science of Reading Tutoring

Evidence-based approach to learning to read with tutoring offered by Duke Partners for Success

Feeding DPS Reading consists of two components:


1. Community Eligibility Provision (CEP) Expansion AND
 2. Science of Reading based tutoring
- (CEP) is a federal program that subsidizes free school meals for all students in high-poverty schools. Though the program is largely federally supported, some schools choose not to participate due to financial concerns. We are asking the Durham County Commissioners to help bridge this financial gap.
 - Five eligible but non-participating schools have been identified by the consultant team based upon high financial need and poor reading proficiency scores.
 - The Task Force will educate school leadership about CEP and provide paperwork support to encourage participation.
 - Food insecurity will be addressed by adopting CEP.

Schools that adopt CEP will also be offered literacy-based tutoring.

Feeding DPS Reading: GOALS

1
Adoption
All 5 schools adopt CEP

3
Reading
Improved reading skills



2
Participation
Meal participation increases

4
Graduation
Improved graduation rates and improved income potential

Four goals of Feeding DPS Reading include adoption of CEP by all 5 schools, increased meal participation rates after CEP adoption, improved reading proficiency throughout every year with marked improvement by 3rd grade, and the longer term expected impact is improved graduation rates and enhanced income potential for DPS students.



The budget consists of \$168,000 annually for staffing including a program director, reading specialist, and 5 site coordinators.

- CEP expansion totaling: \$258,760
- With a total budget of \$440,000 inclusive of supply and overhead costs.

BUDGET ALLOCATION REQUEST



\$200,000

from the Durham County Board of Commissioners

ADDITIONAL FUNDING SOURCES

 BELK FOUNDATION <i>Learn. Connect. Achieve.</i>	 nea NATIONAL EDUCATION ASSOCIATION	 USDA Food and Nutrition Service <small>U.S. DEPARTMENT OF AGRICULTURE</small>	 NO KID HUNGRY
\$150,000	\$50,000	\$25,000	\$15,000

Due to the generous grant support of like-minded organizations targeting food insecurity and literacy (as you see displayed on this slide), Feeding DPS reading has secured over 50% of the program budget. For just \$200,000 per year, Durham County can help to ensure that the children of DPS are fed, focused, and ready to learn key concepts in literacy.

APPENDIX C: CAMILLE LEVI'S INDIVIDUAL DELIVERABLES

Appendix C.1: Social Determinant of Health Analysis

Background

Efforts to promote health and address health disparities are centered on the Social Determinants of Health and non-medical factors contributing to health outcomes. Research suggests that social determinants may impact health more than healthcare or lifestyle choices (World Health Organization: WHO, 2019). Education is a critical social determinant of health, as it can improve knowledge, habits, skills, and resources. These resources can improve health behaviors and lifestyle choices, leading to healthier outcomes necessary to promote health equity (Hahn & Truman, 2015). Unfortunately, two-thirds of U.S. third-graders are not proficient in reading (The Annie E. Casey Foundation, 2010), which can impact the likelihood of graduating high school (The Annie E. Casey Foundation, 2011) and suppress individual earning potential, as reading is a prerequisite for most employment and continued personal achievement (What's the Impact, n.d.).

Reading proficiently by the end of third grade is a critical marker in a child's educational development. The short-term implications of failing to meet third-grade reading levels include that students are four times more likely not to graduate high school on time. They are only about half as likely to attend college as proficient readers in third grade (The Annie E. Casey Foundation, 2011). The long-term implications of not meeting third-grade reading levels include suppressing individual earning potential; children with low literacy are likely to be the nation's lowest income, least skilled citizens, as reading is a prerequisite for most employment and continued personal achievement (What's the Impact, n.d.).

Demographics Geographic and Historical Context

Durham County, North Carolina, is a diverse and vibrant region with a population of around 318,000. As of 2018, the largest ethnic group in the county was White (non-Hispanic), with 129,000 residents. This was followed by Black or African American (non-Hispanic), with 112,000 residents (Figure C.1.A.3). The third most populous ethnic group was White (Hispanic), with 27,900 residents. The Hispanic community, encompassing various ethnic backgrounds, represents 13.4% of Durham County's population, or about 41,200 people (Figure C.1.A.3).

Durham County Public Schools serves over 32,000 students. There are 31 elementary schools (ABOUT DURHAM PUBLIC SCHOOLS, n.d.). Durham Public Schools (DPS) is considered above average. It has 31,754 students in grades PK and K-12. The student-teacher ratio is 13 to 1. According to state test scores, 29% of students are at least

proficient in math and 39% in reading. For elementary students, 34% tested at or above the proficient level for reading (Durham Public Schools - North Carolina, n.d.). It's important to highlight that African American and Hispanic students are the least proficient in reading by the end of third grade, with 36.8% and 32.1%, respectively. Very low compared to white students with 76.8% (Figure C.1.A.2).

The low reading level can be impacted by many factors, especially poverty, and food security can affect learning outcomes (Definitions of Food Security., n.d.). Durham County has a food insecurity rate of 15.3% among children, and 13.3% of its population lives below the poverty line (Child (<18 Years) Hunger & Poverty in Durham County, North Carolina | Map the Meal Gap, n.d.), slightly exceeding the national average. Interestingly, Durham is known as the "City of Medicine" because healthcare is a significant industry, with more than 300 medical and health-related companies and medical practices (Welcome to the City of Durham | Durham, NC, n.d.).

Priority Population

The Social Determinants of Health (SDOH) analysis will primarily concentrate on elementary school students from kindergarten through third grade in Durham Public Schools (DPS) because these cohorts have shown a concerning decline in reading proficiency. It is important to note that these educational gaps were already present before the COVID-19 pandemic, exacerbating the situation. Unfortunately, after a year into the pandemic, the number of North Carolina students performing at their grade levels decreased by 14%. This decline was even more severe among Black, Hispanic, and economically disadvantaged students, who experienced a 15-16% decrease in proficiency (Figure C.1.A.1).

Measures of SDOH

Some measures of SDOH that could be used are the percentage of children who were proficient in reading (grade level proficient) at the end of third grade in the county comparison of these rates to state or national averages.

White students were twice as likely as economically disadvantaged and Black students to be proficient in reading (Figure C.1.A.2). The graph shows the reading proficiency levels of third graders in Durham County by race and ethnicity. The data from 2019 shows that white students in Durham Public Schools had the highest reading proficiency, with 76.8% meeting or exceeding grade-level expectations. In contrast, only 32.1% of Hispanic students achieved the same standard, making them the group with the lowest percentage of readers proficient at their grade level. This disparity highlights the need for targeted interventions and resources to close the gap between these groups (Figure C.1.A.2).

Importance

Understanding and addressing the educational disparities among school-aged children, particularly those in the foundational grades of 1-3 in Durham County, is paramount. The early years of education lay the groundwork for a child's future academic trajectory, cognitive development, and overall well-being. Disparities experienced during these formative years can have cascading effects, perpetuating cycles of disadvantage and limiting opportunities in later life.

Identifying systemic barriers and enacting targeted interventions by focusing on the Social Determinants of Health (SDOH) that impact these children is possible. These interventions not only bolster individual success but also contribute to the holistic betterment of the community. In essence, ensuring that every child has an equitable start in their educational journey is both a moral imperative and a strategic investment in the future of Durham County.

Addressing disparities and enhancing educational outcomes during these foundational years can help to reduce long-term socioeconomic inequities. Children with a solid early education foundation are more likely to succeed academically and professionally (Nokali et al., 2010). This success, in turn, creates a skilled workforce that attracts businesses and supports a robust local economy.

Additionally, mitigating educational disparities early can help prevent subsequent social challenges, such as higher unemployment rates, poverty, and related health disparities, which often disproportionately affect underserved populations. By addressing these issues at their root, the county may experience reduced burdens on social services and healthcare systems in the long term (Whats the Impact, n.d.).

Disciplinary Critique

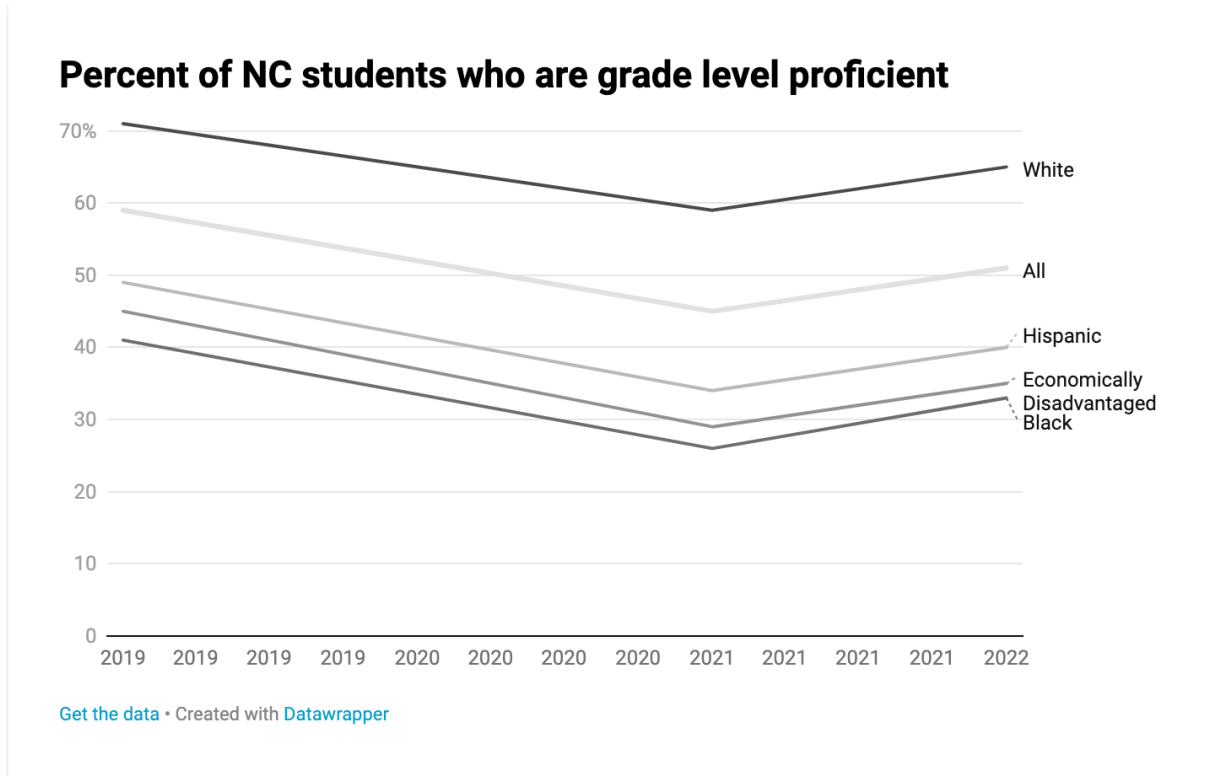
The educational disparities in early-grade reading proficiencies in Durham Public Schools (DPS) are a symptom of larger, systemic issues related to Social Determinants of Health (SDOH). These disparities, which are particularly evident between students of different racial and economic backgrounds, are not just an educational problem. They are also a sign of deeper socioeconomic and public health challenges that permeate society. Public health leaders and organizations need to work with a wide range of stakeholders to develop comprehensive, root-cause solutions to these challenges. Addressing reading deficiencies without addressing their socioeconomic origins and the cascading impacts of these origins will not provide sustainable solutions to the intertwined challenges of educational and health equity.

Holistic strategies that reach beyond the educational sector and permeate through various societal structures, policies, and norms are essential. Achieving better reading proficiency and, consequently healthier life trajectories, requires a concerted effort that breaks down silos and integrates health, education, and societal well-being into a cohesive unit that confronts and reshapes systemic barriers to equitable educational and health outcomes.

Appendix C.1.A: Social Determinant of Health Analysis Figure and Tables

Figure C.1.A.1

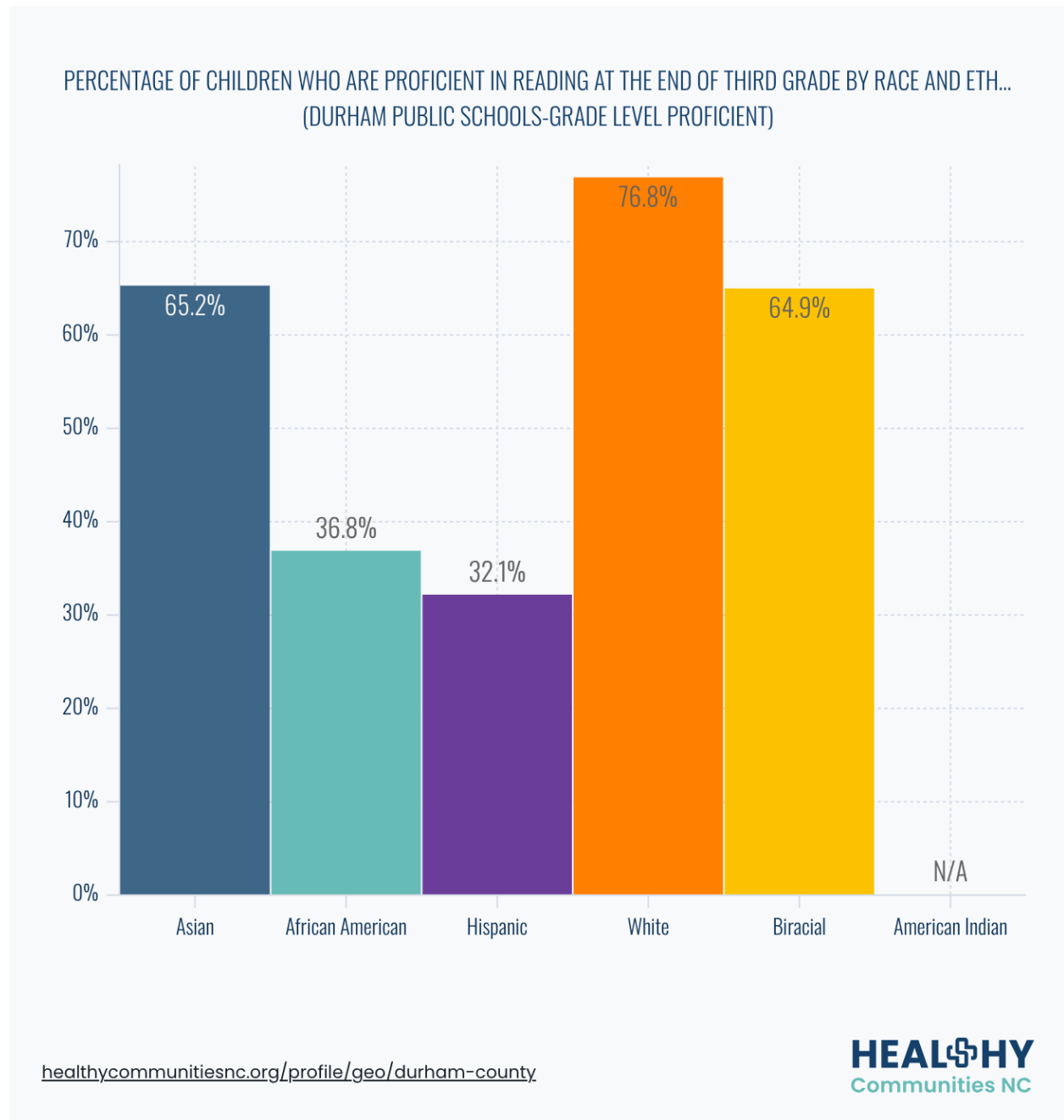
Percent of NC Students Who Are Grade-Level Proficient



<https://www.dpi.nc.gov/data-reports>

Figure C.1.A.2

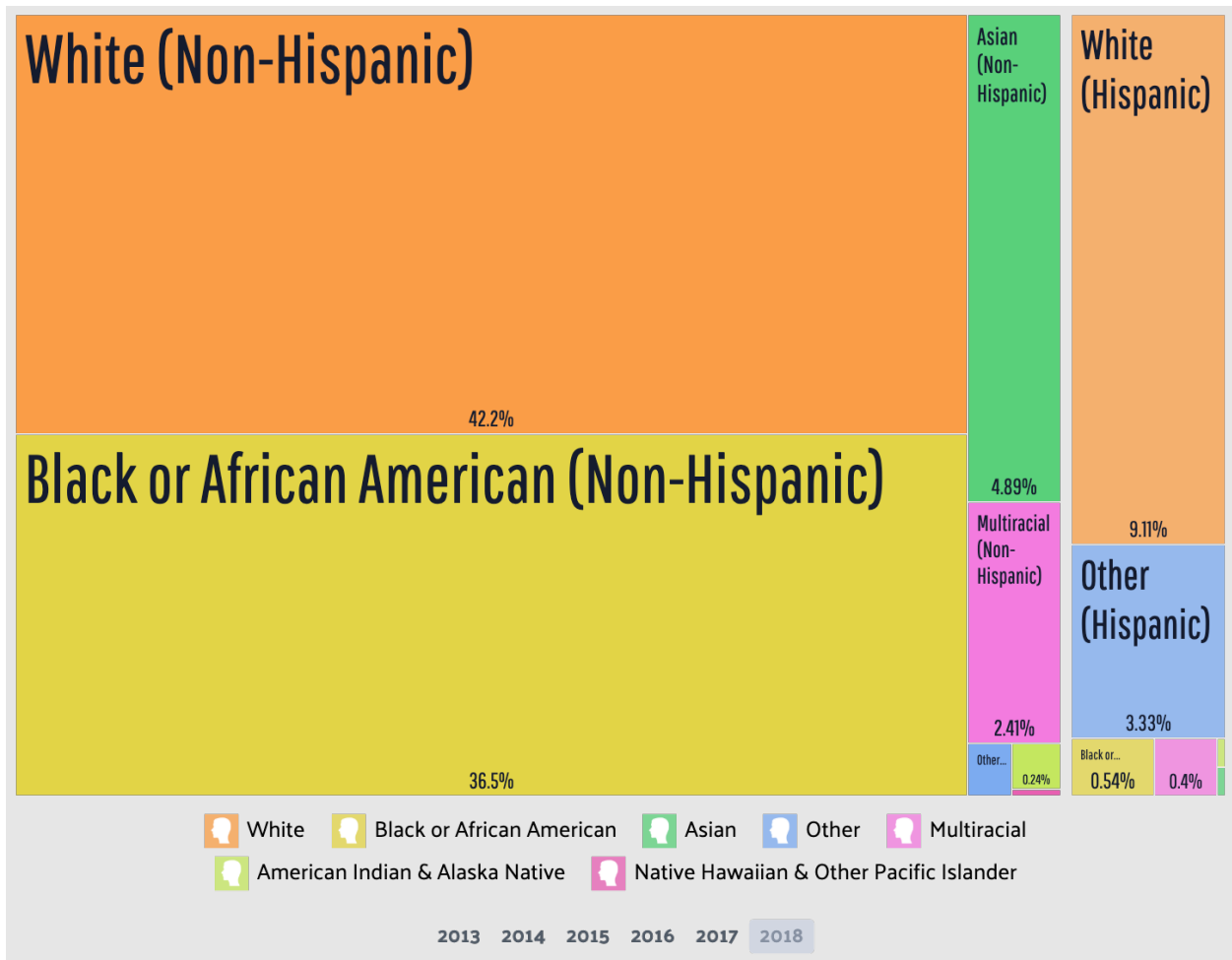
Percentage of Children Who Are Proficient in Reading at the End of Third Grade by Race and Ethnicity



<https://healthycommunitiesnc.org/profile/geo/durham-county#third-grade-reading-proficiency>

Figure C.1.A.3

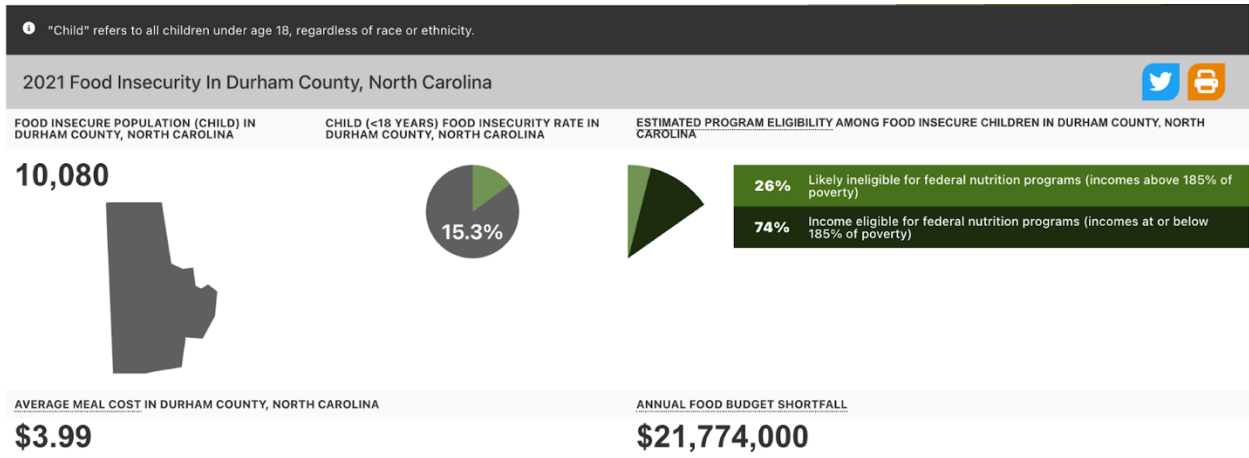
Durham County Demographics



<https://datausa.io/profile/geo/durham-county-nc>

Figure C.1.A.4

Food Insecurity in Durham County



<https://map.feedingamerica.org/county/2021/child/north-carolina/county/durham>

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Appendix C.2: Community Partner Analysis

Introduction

Efforts to promote health and address health disparities are centered on the Social Determinants of Health and non-medical factors contributing to health outcomes. Research suggests that social determinants may impact health more than healthcare or lifestyle choices (World Health Organization: WHO, 2019). Education is a critical social determinant of health, as it can improve knowledge, habits, skills, and resources. These resources can improve health behaviors and lifestyle choices, leading to healthier outcomes necessary to promote health equity (Hahn & Truman, 2015). This analysis focuses on education, specifically third-grade reading proficiency, emphasizing that reading skills are essential for long-term success in school and life and that children of color and children living in poverty are more likely to struggle with reading proficiency. Unfortunately, two-thirds of U.S. third-graders are not proficient in reading (The Annie E. Casey Foundation, 2010), which can impact the likelihood of graduating high school (The Annie E. Casey Foundation, 2011) and suppress individual earning potential, as reading is a prerequisite for most employment and continued personal achievement (*What's the Impact*, n.d.). In Durham County, the situation is worrisome. In the 2021-2022 school year, more than 62% of Durham Public Schools (DPS) third-grade students did not read at grade level (*State Testing Results (Green Book) | NC DPI*, n.d.). Therefore, it is a significant concern for Durham County because it can significantly impact children's health and well-being.

As reflected in the Rich Picture (Figure C.2.A.1), housing, health, birth outcomes, poverty, and food security can impact learning outcomes (Definitions of Food Security., n.d.). Low neighborhood SES (socioeconomic status) leads to less funding for schools, resulting in fewer resources for preparing students. This contributes to low reading scores and limited career opportunities, affecting future health and wealth. The Rich Picture also shows affluent neighborhoods have higher SES and more school funding. Some stakeholders in this issue are students, parents, teachers, and policymakers. Another important point the Rich Picture highlights is that lack of parent participation can impact child development (Nokali et al., 2010). Also, transportation can be a barrier for students, causing them to miss class and ultimately contributing to low reading scores.

Reluctance to participate in the Community Eligibility Provision (CEP), a relevant policy, can contribute to third-grade low reading deficiency. The reluctance might be due to financial concerns, lack of awareness, and the perceived administrative burden. Specifically, schools with a certain Identified Student Percentage (ISP) might not receive the total reimbursement rate for free meals, making the program financially challenging.

The proposed intervention, "Feeding DPS Reading," aims to address food insecurity and improve reading skills. The nutrition side seeks to expand access to free meals through the CEP by partnering with schools and encouraging them to participate. The reading component focuses on improving reading proficiency through tutoring and specialized programs, aiming to bring together existing programs and partnerships to provide a rich, high-quality experience for Durham Public Schools (DPS) stakeholders.

Financially, the initiative seeks Durham County to subsidize the difference between free and paid meal reimbursement rates for each school. This will be done using a federal formula to determine the financial specifics for each school, ensuring that all students, particularly those at high-need schools, receive free meals. This approach aims to reduce hunger-related distractions from learning and increase meal participation by removing financial barriers for families.

Key collaborations will be forged with "Unbox," the DPS Youth School Food Policy Council, to increase school meal participation among the entire school community, enriching the nutrition aspect of the program. The intervention includes a reading program with evidence-based practices to improve reading proficiency in selected schools. A partnership with the Duke Program in Education will integrate structured, explicit tutoring on phonemic awareness, phonics, vocabulary, fluency, and comprehension. Duke students will provide consistent service learning opportunities through a well-managed program with full-time coordinators. The program will focus on nutrition and reading to support DPS students holistically.

The "Feeding DPS Reading" program's nutrition and reading components are evidence-based. For nutrition, studies have shown that healthy meals can improve student engagement, attendance, attentiveness, better grades, and higher graduation rates (The Annie E. Casey Foundation, 2011). On the reading side, the program is based on the science of reading as initially defined by the National Reading Panel, focusing on five pillars of reading instruction: phonemic awareness, phonics, fluency, vocabulary, and comprehension (*Five (5) Components of Reading: Read Naturally, Inc.*, n.d.).

Community Partner Mapping

To improve third-grade reading proficiency levels in Durham County, it is necessary to collaborate with various sectors to improve health, resulting in several notable community partners for our SDOH transformation (see APPENDIX 2). For the "Feeding DPS Reading" intervention, a Power-Influence Grid was chosen as the mapping tool because it enables visualization and strategic analysis of stakeholders, categorizing them based on their power (ability to influence the program) and influence (level of engagement) into four quadrants: High Power, High Influence; High Power, Low Influence; Low Power, High Influence; and Low Power, Low Influence. The tool was chosen due to its value in discerning which stakeholders to prioritize in communication and involvement (see APPENDIX 3).

Based on the Power-Influence Grid mapping, the following partners should be prioritized in the SDOH Task Force for active involvement in systemic change. DPS Board of Education: Due to their inherent role in student well-being and academic success and their influence over policy and program implementation in schools, teachers are in a unique position to make a difference in the lives of their students. Durham County Commissioners can allocate resources and influence local policies, which makes them essential for obtaining the necessary support and ensuring that the policy environment is conducive to the program's success. Principals/Assistant Principals as school administrators have a direct impact on the implementation of programs at school sites and a deep understanding of the specific needs and challenges of their student populations. Parents/Guardians play a vital role in accounting for the perspectives and needs of those most directly impacted by the educational disparities being addressed and in supporting their children's academic development. Principals and parents/guardians are in the high power, low influence quadrant, reinforcing inequitable power structures and diminishing the power of those whose experience could contribute a lot because of its value.

Lastly, Unbox – DPS Youth School Food Policy Council also plays a vital role due to their existing involvement in school food programs and the potential to influence the nutritional aspect of the intervention directly.

Two critical factors influencing equitable representation and participation are parental involvement and resource accessibility. Parental involvement can be a facilitator because it benefits literacy and educational achievement and positively impacts social and emotional development. Children with involved parents tend to have better social skills and emotional regulation (Nokali et al., 2010). Resource accessibility (time, financial, human) can be a barrier because it can impact how stakeholders can dedicate their efforts to the program transformation, which

could influence their ability to participate equitably. For example, parents/guardians might face obstacles such as work schedules, childcare needs, or transportation that prevent them from being actively involved. These families often have difficulty getting their children to educational programs due to cost or transportation (Bonitatibus, 2022).

Partner Worldviews

CATWOE is an acronym for Soft Systems Methodology to ensure a holistic view of system challenges. It represents Customers, Actors, Transformation Process, Worldview, Owner, and Environmental Constraints. By considering each perspective, decision-makers can achieve well-rounded solutions that address both technical and social facets of a problem.

Two CATWOE analyses with root definitions for two community partners were conducted to highlight system views, environment constraints, and worldviews of a student, a community partner with lived experience (APPENDIX 4), and a county commissioner (APPENDIX 5).

Both root definitions stress the need for a holistic approach to improving educational and nutritional outcomes for DPS students. They emphasize the importance of a supportive system, whether in the form of academic and nutritional assistance for students or as a structured, collaborative program management for Commissioners. Both stakeholders (students and commissioners) are essential to successfully implementing the intervention.

The differences noticed are that the student-centered root definition emphasizes the immediate and direct impacts of the program (improved nutrition and reading support), with a relatively straightforward and immediate worldview. For the Commissioners, the root definition highlights a multifaceted decision-making process influenced by various variables, including financial stewardship, political ramifications, policy alignment, and the long-term strategic outlook.

When considering the possible implications of participation in the Task Force and SDOH Change Effort, students are the direct beneficiaries and are central to the program. However, their participation in the task force may be mediated through representation by parents, guardians, or advocates who can voice their needs, experiences, and feedback. Commissioners play a complex role, highlighting the importance of their involvement in the task force, not only as potential funders but as key decision-makers whose support and endorsement will be crucial for sustainable implementation.

The program could lead to direct and tangible improvements in students' well-being (social and health) and educational outcomes, linking to broader Social Determinants of Health by potentially impacting future educational attainment, employment prospects, and overall socio-economic stability for participating students.

Ensuring that the program is effectively implemented and sustainably and delivers the anticipated benefits is crucial for the Commissioners to justify the investment and potentially scale or replicate the model. Given their strategic, financial, and political influence, their participation is fundamental in steering, endorsing, and potentially expanding SDOH change efforts in the region.

The program could directly and positively impact students' well-being (social and health) and educational outcomes, improving broader Social Determinants of Health by influencing participating students' future educational attainment, employment prospects, and overall socio-economic stability.

Conclusions

The community partner analysis for the "Feeding DPS Reading" program reveals a mix of strengths and limitations that the County Commissioners must carefully navigate. The program's holistic approach, which includes diverse stakeholders, provides a foundation for a student-centered, comprehensive, and interdisciplinary strategy. This diverse collaboration could bring various insights, experiences, and resources to the table, enhancing the robustness and inclusivity of the intervention. However, while these strengths form a solid foundation, the complexity of managing diverse partners, along with the resource implications, requires careful coordination and meticulous operational planning, maintaining a relentless focus on equity to ensure uniform access and benefits across all student demographics and establishing clear metrics to gauge program efficacy and impact present nuanced challenges. Therefore, while the involved community partners collectively bring immense value and potential to the initiative, the County Commissioners must skillfully navigate the multifaceted operational, strategic, and equity-oriented considerations to ensure that the program is well-conceived, implemented, and sustainably impactful and equitably accessible.

The program's complexity and multifaceted approach raise questions about the community partners:

1. How will the varied community partners align their strategies and operations to ensure a seamless and effective integration of efforts within the "Feeding DPS Reading" program?
2. Do all proposed partners have the resources and expertise to contribute meaningfully to the program?
3. How will partners' contributions and impact be evaluated during and after program implementation?

4. What are Durham County's most significant weaknesses and strengths in education?
5. Are there other community partners who should be engaged?
6. What cultural, historical, or political events in Durham County should be considered?

Appendix C.2.A: Community Partner Analysis Figures and Tables

Table C.2.A.1

Stakeholder List

DPS Board of Education	Reading Program and CEP
Durham Children's Initiative	Reading Program and CEP
Principals/Assistant principals	Reading Program and CEP
Durham County Commissioners	Reading Program and CEP
Unbox – DPS Youth School Food Policy Council	CEP only
School Meals for All NC	CEP only
DPS nutrition regional supervisors	CEP only
USDA	CEP only
Cafeteria manager	CEP only
Data managers	CEP only
Teachers/reading specialists	Reading Program only
Duke University – Duke Program in Education, Partners in Success	Reading Program only
Duke University Literacy Corps	Reading Program only
DPS Students	Costumers
Parents/ Guardians	Costumers

Table C.2.A.2

CATWOE Analysis for Third-Grade Student

CATWOE analysis for a third-grade student's perspective regarding the "Feeding DPS Reading" program:

Customers	Third-grade student
Actors	Teachers and reading specialists, School cafeteria staff, Peer students, Duke University students
Transformation	To provide both student's physical well-being and enhance reading proficiency.
Worldview	A school is a place for learning and socializing, and eating tasty meals and getting extra help with reading without feeling stigmatized is positive.
Owners	DPS Board of Education (responsible for educational policies and practices), Durham County Commissioners (potential funders for the program)
Environment	School schedule and resource limitations, Peer Perceptions, Family Dynamics (e.g., homework or reading practice at home).

Root Definition: A system to provide physical well-being and enhance reading proficiency through free meals and improved reading support to achieve better academic outcomes in third-grade reading proficiency levels in Durham County

Table C.2.A.3

CATWOE Analysis for Durham County Commissioner

CATWOE analysis for Durham County Commissioners regarding the "Feeding DPS Reading" program.

Customers	School staff and administration, Program partners, County staff
Actors	Durham County Commissioner
Transformation	To improve Durham County's reading proficiency level
Worldview	The program can impact Durham's community, and it is necessary to weigh the costs and benefits of the program, considering fiscal responsibility and political feasibility.
Owners	DPS Board of Education, Local Government officials
Environment	Budget, political, and regulatory constraints can impact funding decisions.

Root Definition: The system to improve Durham County's reading proficiency level through nutritional assistance through free meals and improved reading support to enhance DPS students' educational and nutritional well-being while simultaneously assessing and ensuring alignment with broader county priorities, strategies, and regulatory frameworks.

Figure C.2.A.1

Rich Picture

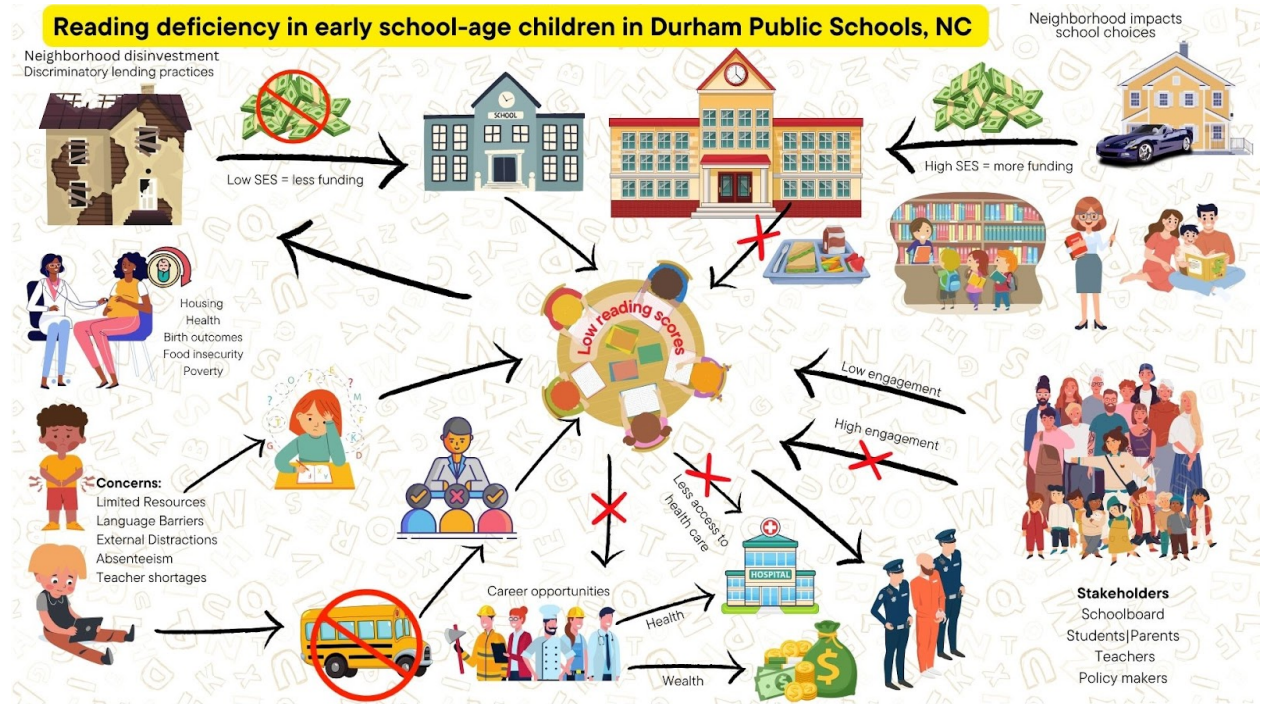
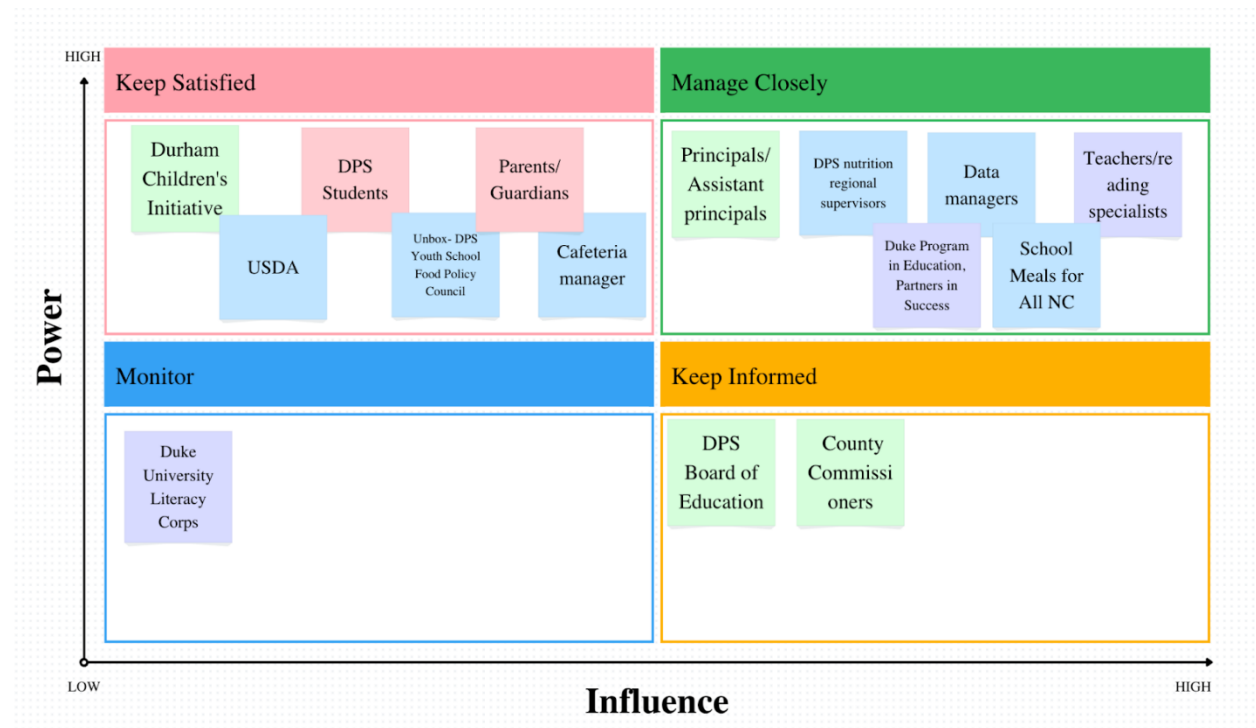


Figure C.2.A.2

Power-Influence Grid



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Appendix C.3: Accountability and Engagement Plan

Purpose

Addressing the social determinant of third-grade reading proficiency in Durham County demands a collective effort, moving beyond isolated solutions. Engaging community partners is paramount in creating a sustainable, transformative change in this critical determinant of health. Deeply embedded in Durham's fabric, these partners understand the community's unique needs, challenges, and assets firsthand. The "Feeding DPS Reading" program demonstrates the powerful connection between nutrition and education, emphasizing the interconnectedness of various determinants. Uniting forces can address immediate educational disparities and lay a foundation for a more equitable, prosperous, and healthful future for Durham County's children.

Priority Partner

County Commissioners play a vital role in addressing third-grade reading proficiency in Durham County by allocating resources and shaping local policies. They can prioritize and channel funding towards initiatives that directly impact the community's well-being, such as nutritional assistance programs that enhance reading proficiency. Additionally, their position and ability to influence policies allows them to create an environment conducive to successfully executing programs like "Feeding DPS Reading."

Moreover, given the interconnectedness of various determinants, County Commissioners have the broader responsibility of ensuring alignment between the proposed initiatives and the overarching goals, strategies, and regulatory parameters of Durham County. Their ability to understand and act upon these intertwined complexities is instrumental in addressing the immediate challenge of third-grade reading proficiency and laying the groundwork for long-term systemic change.

Engagement Barriers and Facilitators for County Commissioner:

1. Resource Allocation and Budgetary Constraints:

Barrier: County Commissioners must manage many community needs within a finite budget. Allocating resources to one initiative can mean redirecting funds from another, leading to potential hesitancy in committing significant resources without clear evidence of substantial impact.

Facilitator: Demonstrating the long-term economic benefits of investing in education and nutritional support, such as reduced healthcare costs and increased earning potential of the community, can sway commissioners to see the program as a worthy investment.

2. Public Perception and Accountability:

Barrier: County Commissioners care about how the public sees them, so they may be hesitant to support initiatives that need clear community support or are seen negatively.

Facilitator: By building public support and demonstrating community demand for the program, it will be easier for commissioners to support and champion the cause publicly.

Barrier: Public opinion influences County Commissioners' decision-making process, as they are accountable to their constituents and must consider the impact of public perception on their political standing.

Facilitator: To address this barrier, build community support for the program. Demonstrate public demand and highlight benefits to empower commissioners to support it.

3. Bureaucratic and Policy Challenges:

Barrier: Introducing policies can delay new initiatives, making it difficult for County Commissioners to support them as they can be complex, with many regulations, policies, and stakeholders.

Facilitator: Commissioners can prepare and be informed to navigate policy challenges. Addressing challenges in advance can streamline the process and empower Commissioners to act decisively.

Engagement Methods:

1. Stakeholder Workshops:

Timing: The Design phase - deciding what to do &/or how to do it.

Format: Group setting involving various stakeholders.

Level of Participation: Collaborative, involving active participation from diverse stakeholders.

Evidence: Workshops are great places to develop new ideas, share them with others, and learn about different points of view, helping people feel involved in the decision-making process. Stakeholder workshops increase participant engagement and contribute to more informed decision-making processes (Ansell & Gash, 2007).

Addressed Facilitator/Barrier: Engaging County Commissioners through stakeholder workshops directly addresses the facilitator of public perception and accountability. Witnessing the enthusiasm and support from diverse stakeholders can significantly influence commissioners. It provides them with firsthand evidence of community backing and the potential positive impact of the initiative, making them more likely to advocate for and support it (Bryson et al., 2014).

2. Cost-Benefit Analysis Presentation:

Timing: The Design phase - providing evidence to help in deciding what to do &/or how to do it.

Format: Individual or small group.

Level of Participation: Informative, aiming to provide detailed and factual data to support decision-making.

Evidence: A well-done cost-benefit analysis can show the benefits of an initiative over time, which can help decision-makers see why it is worth supporting (Cost-Benefit Analysis: What It Is & How to Do It | HBS Online, 2019).

Addressed Facilitator/Barrier: This method addresses the barrier of resource allocation and budgetary constraints by demonstrating the program's long-term economic benefits.

Facilitating Informed Decisions: Cost-benefit analysis can guide policymakers in understanding the economic implications of various programs, ensuring more informed and transparent decisions. (Levin, 2001).

Resource Allocation and Budgetary Constraints: A cost-benefit analysis shows commissioners how the program could save money in the long run, making it a worthwhile investment despite budgetary constraints.

3. Policy and Implementation Roadmap:

Timing: The Improve phase (first year of implementation) – helps guide the process after the commissioners have adopted the proposal.

Format: Individual or group session.

Level of Participation: Consult.

Evidence: A clear roadmap alleviates concerns about bureaucratic delays and policy challenges by offering a clear path forward.

Addressed Facilitator/Barrier: The roadmap addresses the bureaucratic and policy challenges barrier, offering a transparent, streamlined process that anticipates potential roadblocks and proposes solutions.

4. Progress Reviews and Feedback Sessions:

Timing: The Sustain/Scale phase (one or more years beyond initiation) – to monitor the program's success and gather feedback for continuous improvement.

Format: Group or individual sessions.

Level of Participation: Collaborate.

Evidence: Regular reviews ensure the program remains relevant, effective, and aligned with changing community needs and resources.

Addressed Facilitator/Barrier: This method can build on the positive public perception, showing that feedback is valued and adjustments can serve the community better.

The Measurement Table (Table C.3.A.2) serves as a comprehensive guide for assessing the engagement strategies, focusing specifically on their effectiveness in meeting the needs of students and the County Commissioners. This table presents a structured approach to evaluate how the engagement methods are resonating with these key stakeholders and aligning with the overarching objectives of the initiative. It underscores the significance of Stakeholder Workshops as a critical platform for capturing a wide range of perspectives and insights, particularly emphasizing the importance of including and recognizing the voices of students and the broader community in the decision-making process. This ensures that the strategies for engaging both the County Commissioners and the student community are not only effective but also inclusive, fostering an environment where every stakeholder's input is valued and considered.

Engagement Leadership:

The Durham County Board of Education should lead the SDOH effort with Durham County Commissioners. The Durham County Board of Education has inherent authority in shaping the educational landscape and directly addressing third-grade reading proficiency levels. As policymakers and influential figures in the county, their decisions and actions have a wide-reaching impact. The Board possesses expertise in the educational challenges faced by DPS students, making them well-suited to lead engagement initiatives. Elected officials and County Commissioners have already established trust and credibility with stakeholders. This foundation will foster productive collaborations and negotiations, ensuring a holistic, county-wide approach. Given their capability to allocate resources and influence local policies, their collaboration would ensure alignment between educational initiatives and broader county priorities.

The leaders would analyze the data to identify successful engagement strategies, noting areas that require modification or enhanced focus. Feedback from engagement activities would be pivotal in refining strategies for maximum impact and continuous improvement. Additionally, regularly updating stakeholders based on collected data fosters transparency and trust. By demonstrating that feedback is valued and acted upon, stakeholders are more likely to remain engaged and contribute meaningfully.

Data would guide decisions on where to allocate resources best, ensuring that engagement efforts are effective and sustainable. Also, timely data would allow leaders to proactively address emerging barriers to engagement, ensuring that momentum is maintained.

Disciplinary Critique

Articulating accountability through a Memorandum of Understanding (MOU) is of great value. First, formalizing roles, responsibilities, and expectations between parties is a strategic move to ensure clarity, alignment, and mutual accountability. It provides a structured framework that outlines the agreed-upon terms and objectives, minimizing potential misunderstandings and conflicts. Therefore, in the context of leadership and stakeholder engagement, an MOU becomes a valuable tool to ensure sustained commitment and to guide collaboration toward a shared goal. For the "Feeding DPS Reading" program, the MOU (Document C.3.A.1) serves as a roadmap for collaboration, ensuring that both the Durham County Commissioners and the Durham County Board of Education have their vision, approach, and commitment aligned to improving SDOH, third reading proficiency in Durham County.

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

Table C.3.A.1

RASCI Analysis

RASCI Table		
<p><u>Policy/Program:</u> The program proposed is "Feeding DPS Reading" to address low reading proficiency and food insecurity in Durham Public Schools (DPS). It will work with five Durham schools that qualify for partial reimbursement of school lunches, have reading proficiency levels below the DPS average, and have fewer students meeting the Read to Achieve grade 3 benchmark. The program will have two parts:</p> <ol style="list-style-type: none"> 7. Durham County's funding will cover the difference between the free and paid CEP reimbursement rates so that all students in the five schools can receive free meals. 8. Undergraduate students from Duke University's Program in Education Partners for Success program will work with elementary students on the five pillars of success in reading: phonemic awareness, phonics, vocabulary development, fluency, and comprehension. Feeding DPS Reading aims to improve reading proficiency and address food insecurity in low-performing DPS schools. 		
RASCI Levels	Community Partners	Rationale
Responsible (owns the challenge/project)	<ul style="list-style-type: none"> • Task Force (Led by DCI and assisted by Unbox) 	The Durham Children's Initiative leads a task force with the DPS Unbox project, a policy council of students and staff, to help schools apply for and implement the CEP and the reading portion of the program.
Accountable (ultimately answerable for the correct and thorough completion of the deliverable or task, and the one who delegates the work to those <i>responsible</i>)	Members of the Advisory Committee: <ul style="list-style-type: none"> • Durham County Commissioners • Durham County School Board • School Principals 	School principals are responsible for the resources and processes in their schools, so they are also responsible for implementing program components.
Supportive (can provide resources or can play a supporting role in implementation)	Members of the Advisory Committee: <ul style="list-style-type: none"> - DPS School Nutrition Regional Supervisors - Duke University Partners for Success - Data Managers 	The DPS School Nutrition Regional Supervisors are responsible for developing and delivering the nutrition part of the program. The Duke University Partners for Success program will provide the instructional component. Data managers will help schools qualify for the CEP.

<p>Consulted (has information and/or capability necessary to complete the work)</p>	<p>Parents Duke University Literacy Corps Cafeteria Managers</p>	<p>The Feeding DPS Reading program will involve several community partners, including parents, students, the Duke University Literacy Corps, and cafeteria managers. Parents and students are the program's primary beneficiaries, and parents must provide information to schools to support CEP eligibility. The Duke University Literacy Corps is not the primary source of volunteers but may provide backup or additional support as needed. Cafeteria managers play a crucial role in managing school lunch and student eligibility for free/reduced lunch, a critical source of information for the nutrition part of the program.</p>
<p>Informed (must be notified of results, process, and methods, but need not be consulted)</p>	<p>Durham County Board of Commissioners DPS Board of Education Teachers</p>	<p>Durham County Commissioners have asked for a program to improve downstream health outcomes. The DPS Board of Education is interested in student performance and educational outcomes. Teachers need to know about student progress and interventions so they can support their students' education.</p>

Table C.3.A.2*Methods, Timing, and Measures*

Engagement Method	Related Facilitator(s) / Barrier(s)	Timing	Performance measure-Description	Performance measure- Data source	Performance measure-Frequency
Stakeholder Workshops	The positive influence of County Commissioners & Need for stakeholder input	Design; Improve	# of workshops conducted. % of stakeholders expressing clarity & alignment	Workshop attendance logs. Feedback forms	Bi-monthly
Feedback Forums	Existing community networks & Potential resistance to change	Improve; Sustain/Scale	# of forums held. % of positive feedback. Identified areas of improvement	Forum attendance records. Feedback Survey	Bi-annually
Joint Planning Sessions	County Commissioner's ability to allocate resources & need for policy alignment	Design	# of joint sessions. Degree of alignment in goals and resources	Session minutes & resolutions. Stakeholder interviews	Annually
Data Review Meetings	Emphasis on evidence-based actions and potential misalignment of program data	Improve; Sustain/Scale	# of meetings. Key insights derived. Actions taken based on insights	Meeting minutes. Program Data Analysis	Quarterly

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Document C.3.A.1

Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING (MOU)

Between

Durham County Commissioners

and

Durham County Board of Education

1. The scope and purpose of the MOU:

This MOU formalizes the collaboration between the Durham County Commissioners and the Durham County Board of Education in improving third-grade reading proficiency in Durham County through "Feeding DPS Reading," outlining roles, responsibilities, mutual commitments, methods of engagement, review protocols, and endorsement goals to ensure seamless cooperation and focused action towards improving SDOH for DPS students.

2. The leadership and team in the context of the proposal:

Engagement Leader: The Durham County Board of Education is responsible for spearheading educational initiatives, stakeholder engagement, and aligning efforts with educational outcomes.

Priority Partner: Durham County Commissioners are responsible for policy, resource allocation, and broader county alignment.

Support Teams: Both entities will have dedicated teams for project implementation, data collection, and stakeholder engagement.

3. The methods and commitment:

Methods: The MOU will outline the specific methods through which both parties will collaborate, such as regular joint meetings, resource sharing, and coordinated outreach programs.

Commitment: Both parties pledge to work collaboratively, allocating necessary resources, expertise, and time. There would be a mutual commitment to transparency, timely communication, and continuous improvement based on feedback and data.

4. Review and endorsement goals:

a. Review Process: The terms of this MOU will be reviewed annually to ensure continued relevance and the program's impact on reading proficiency and nutritional well-being.

b. Endorsement Goals: Both parties aim to achieve improved reading proficiency levels and enhanced nutritional support for DPS students while ensuring alignment with broader county priorities.

5. Terms of the MOU:

This MOU will go into effect when signed and will last for as long as the ongoing SDOH project. Any changes or cancellations must be agreed to in writing by both parties.

Signatures:

Durham County Commissioners

Signature: _____ Date: _____


Engagement Leader for the SDOH Effort

Signature: _____ Date: _____

Appendix C.4: Individual Presentation and Script

Evaluation Plan Overview

Purpose	Methodology	Focus
To assess effectiveness in addressing student in-school food insecurity and enhancing third-grade reading proficiency.	Quasi-experimental design	Kindergarten through third-grade students in CEP-adopting schools




The slide features several decorative elements: a grid of orange dots on the left, a large orange circle on the right, a red and purple shape at the bottom left, and a graphic at the bottom right showing children holding hands above the text 'kindergarten to 3rd' with a rocket ship and stars.

The evaluation plan aims to assess the effectiveness of Feeding DPS Reading in addressing student in-school food insecurity and enhancing third-grade reading proficiency. The methodology is a quasi-experimental design to evaluate the cohort of students exposed to the program's CEP expansion and tutoring components. The focus is kindergarten through third-grade students in CEP-adopting schools. This approach allows for the assessment of both components of this initiative.

Evaluation: Data Collection and Analysis

Methods

Dichotomous survey for CEP adoption and DIBELS assessments



Control Group

Comparison with similar students from WCPSS schools not adopting CEP

Sample

Students who enter the program in kindergarten

Data Analysis

Descriptive statistics to evaluate program impact

A dichotomous survey question (yes/no) will ascertain whether the school adopted CEP and DIBELS assessment. The sample is students who enter the program in kindergarten. The control group will be third-grade students attending demographically similar Wake County schools that have neither adopted CEP nor implemented the Feeding DPS Reading tutoring strategy. Data analysis includes baseline DIBELS performance data and subsequent performance following program intervention.

Evaluation: Funding, Dissemination, and Future of Feeding DPS Reading

- Grants and funds received.
- Dissemination strategy
- Long-term vision for expansion
- Emphasis on interdisciplinary collaboration and application of equity lens.



Funding will come from multiple entities interested in achieving children's literacy and food security goals. The program aims to expand the initiative throughout the school district and state in recognition of the need to simultaneously address food security and reading proficiency. An equity lens has been applied to overcome sharp disparities in third-grade reading proficiency experienced by Black and Hispanic students.

APPENDIX D: STEVEN NORDSTROM'S INDIVIDUAL DELIVERABLES

Appendix D.1: Social Determinant of Health Analysis

Introduction

Education is an important social determinant of health as it has a significant and lasting impact on the overall health and quality of life of both individuals and their community. It is “often referred to as the great equalizer” as it can enhance downstream opportunities and outcomes over the course of one’s lifetime (Concern Worldwide US, 2023). There is strong evidence of an association between improved education and positive health outcomes. For instance, there is an association between education and life expectancy. A 2008 study demonstrated that those who obtain a high school diploma have a life expectancy that is 7 years longer when compared to those who do not obtain a high school diploma (Meara, et al., 2008) and is a more reliable predictor than race in determining life expectancy (Roy, et al., 2020), thus educational interventions could help close racial disparities in health.

Education improves *knowledge and awareness* of healthy behaviors, prevention of disease and how to access health services. Evidence shows that people with higher levels of education tend to be better informed of health-related issues which enables them to make healthier choices (Cohen and Syme, 2013). Education also improves *socioeconomic status* and access to *more advantageous opportunities*. Better education leads to more career opportunities, higher income and benefit potential, as well as better access to housing in safer areas, healthier nutrition, the ability to engage in physical activity and recreation, and enhanced access to healthcare (Hahn, 2015, The Lancet, 2020). In 2014, data showed a significant disparity in poverty rates in those who have not obtained a high school diploma. 28% of individuals without a high school diploma in the United States lived in poverty, where the proportion of the population without a high school diploma is 12% (DeNavas-Wal, et al, 2014). Education leads to improved *health literacy* as it strengthens a person’s ability to understand and apply health information (Cohen and Syme, 2013). Education also tends to expand a person’s *social network* which increases the likelihood of having supportive relationships which play an important role in mental and emotional wellbeing (Hahn, 2015).

Education is a fundamental social determinant of health because it influences an individual’s knowledge, socioeconomic status, health literacy, behaviors, and access to resources. Policies and interventions aimed at improving educational opportunities and outcomes can have a significant impact on public health and reduce health disparities in the community (Hahn, 2015). The impact of education on health is cumulative and long-lasting,

benefiting individuals well beyond their formal educational years as it influences their health and well-being throughout their life.

Geographic and Historical Context

Durham County is in central North Carolina, formed in 1881 from Orange and Wake Counties. Historically, the economy relied on tobacco and textiles but has diversified over the last 100 years to be a central hub for research and education. Key characteristics of Durham County are its diversity, civic engagement, and innovation (Durham County, 2020). The region also has significant importance in the healthcare industry, having been dubbed “the City of Medicine”. (Durham County, 2020). Durham County has a population of 324,833 based on data from the 2020 Census. According to data from the 2020 Census, the population of Durham County is 42.2% White, 36.5% Black, 12.44% Hispanic and 4.89% Asian (Data USA 2023). There are significant disparities noted in the county, particularly between racial groups and between lower and higher income residents (Durham County, 2020). For example, the poverty rate in Durham County varies significantly by race. Based on 2020 Census data, white residents of Durham County experience much lower poverty rates (6.93%) compared to Black (19.21%) and Hispanic (37.99%) residents (World Population Review, 2023). Further, median household income is much higher for white residents (\$68,913) compared to black (\$39,989) and Hispanic (\$41,123) residents (Demarco and Hunt, 2018).

Durham County also has noted disparities in educational attainment and race. White residents have a much higher high school graduation rate (87.36%) compared to black (74%) and Hispanic (41.64%) residents (World Population Review, 2023). There have been efforts to address this issue. The state of North Carolina, in 2019, announced the Early Childhood Action Plan. The intent of this initiative is to improve children’s health, safety and well-being, and developmental and academic readiness for school. Durham County was the first county to create their own set of strategies that addressed the local context. The Durham Early Childhood Action Plan’s goal is to address disparities in early childhood outcomes and set the conditions for success during the school aged years (Durham County, 2023). The Durham School District includes 55 public schools with a student population of 30,806. 24% of these schools are considered low performing. The County’s school’s lag in English Learner Progress compared to the state (16.6% compared to 21.1%, respectively) and have comparable graduation rates (84% and 86.4%, respectively) (North Carolina School Report Cards, 2022).

Priority Population

The priority population for this analysis are school-aged children in the early years (grades 1-3). It has long been established that children in less advantaged communities are more likely to do have poor health outcomes and difficulty in school. A 2004 report from Manitoba, Canada shows the dramatic difference in academic performance between children from low, middle, and high socioeconomic status. They also identify the inequalities being present early in a child's development, concluding that children who start off behind their peers are more likely to fall further behind throughout their school years. Thus, it is critical to provide effective programs in the early school years to bridge this gap and allow them the same opportunities for success (Brownell, et al., 2004).

Durham County has already established an initiative to improve disparities during the early childhood years and set the conditions for academic success, acknowledging that all children and families do not share the same advantages. Despite these efforts, there continue to be notable disparities in outcomes during the school aged years which have negative downstream effects on health outcomes (Durham County, 2023). Addressing inequities in the early years would help bridge the gap in disadvantaged children. A county level, universal approach that targets children with the greatest need, regardless of which school they attend would ensure resources are allocated in an equitable manner (Brownell, et al., 2004).

Measures of SDOH

Reading proficiency in the 3rd grade has a strong correlation with high school graduation rates. Figure D.1.A.1 demonstrates data from a 2010 study that shows the relationship between third grade reading level and high school graduation (Lesnick, et al., 2010). Durham County students lag the state and comparable counties, such as Wake County, in reading performance. 58% of Durham public school students are below grade level in reading performance, compared to 40% in Wake County and 52% statewide (North Carolina School Report Cards, 2022).

There are also significant disparities noted among racial groups and socioeconomic status in terms of academic and reading performance. A 2010 report from the Annie E. Casey Foundation demonstrates that 83% of all low-income students read below grade level in third grade compared to 55% of moderate- and high-income students. Further, the reading proficiency of Black, Hispanic, and American Indian students was much lower than the average (Figure D.1.A.2, Annie E. Casey Foundation, 2010). This correlates with data from Durham County which shows that American Indian, Black, and Hispanics have lower graduation rates in Durham County compared to the County mean (Figure D.1.A.3), with graduation rates decreasing in the American Indian Group between 2017 and 2019 (Durham County, 2021).

Rationale/Importance

The 2020 Durham County community health assessment identified five health priorities: i) affordable housing, ii) access to healthcare and insurance, iii) poverty, iv) mental health and v) obesity, diabetes, and food access. Improvements in all these domains can be achieved with upstream interventions to improve reading proficiency in early school years (grades 1-3). Given reading proficiency correlates with high school graduation, and high school graduation/enhanced educational outcomes for the residents of Durham County improve opportunities throughout the lifespan which leads to access to higher paying jobs with better benefits and improves access to safe, affordable housing (based on their income), access to employer sponsored health insurance, and decreases poverty. Further, the psychological benefits of education, enhanced social networks and access to mental and behavioral health care are likely to improve mental health outcomes. Finally, the improvements in health literacy seen with higher education and the ability to read and process information are linked with healthier lifestyle choices and healthier living conditions/nutrition which would reduce rates of obesity and diabetes. In addition to the downstream improvement in health outcomes, there is an economic benefit as the cost associated with each student that does not graduate high school is estimated to be \$260,000 due to lost earnings, taxes, and productivity (Annie E. Casey Foundation, 2010).

Disciplinary Critique

Public health leaders play a critical role in addressing Social Determinants of Health such as education and to ensure the realization of measures to improve health and equity in our communities. The framework of what was thought to be an effective public health leader is evolving to align with the vision of Public Health 3.0. Leadership skills that were historically effective tend to be less desirable as novel leadership frameworks are developed. The systems in which we live, which affect our health and well-being are complex. There are factors outside of the education system that have a strong impact on how well a student will perform (such as geography and income) and have broad implications for the individual and the community. Thus, it is important for Public Health Leaders to understand and study these systems and how social determinants affect downstream health outcomes. Leaders must be adept at forming teams, developing a vision, and leading the collective effort by leveraging the experience and expertise of all team members, vice being a subject matter expert themselves. Leaders must advocate for positive change to our policy makers to promote equity and address disparities in our population. Not all policy makers are concerned with equity. We must take this into consideration, framing our discussions to the audience. For example,

when discussing investments in education to improve downstream health outcomes, we may focus more on the positive economic and political impact of improved education outcomes if this is more appealing to a specific policy maker. Public Health Leaders are important in strategically tailoring advocacy to be understandable, relatable, and appealing to the specific audience.

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Appendix D.1.A: Social Determinant of Health Analysis Figures and Tables

Figure D.1.A.1

Graduation Rates Based on Third Grade Reading Level

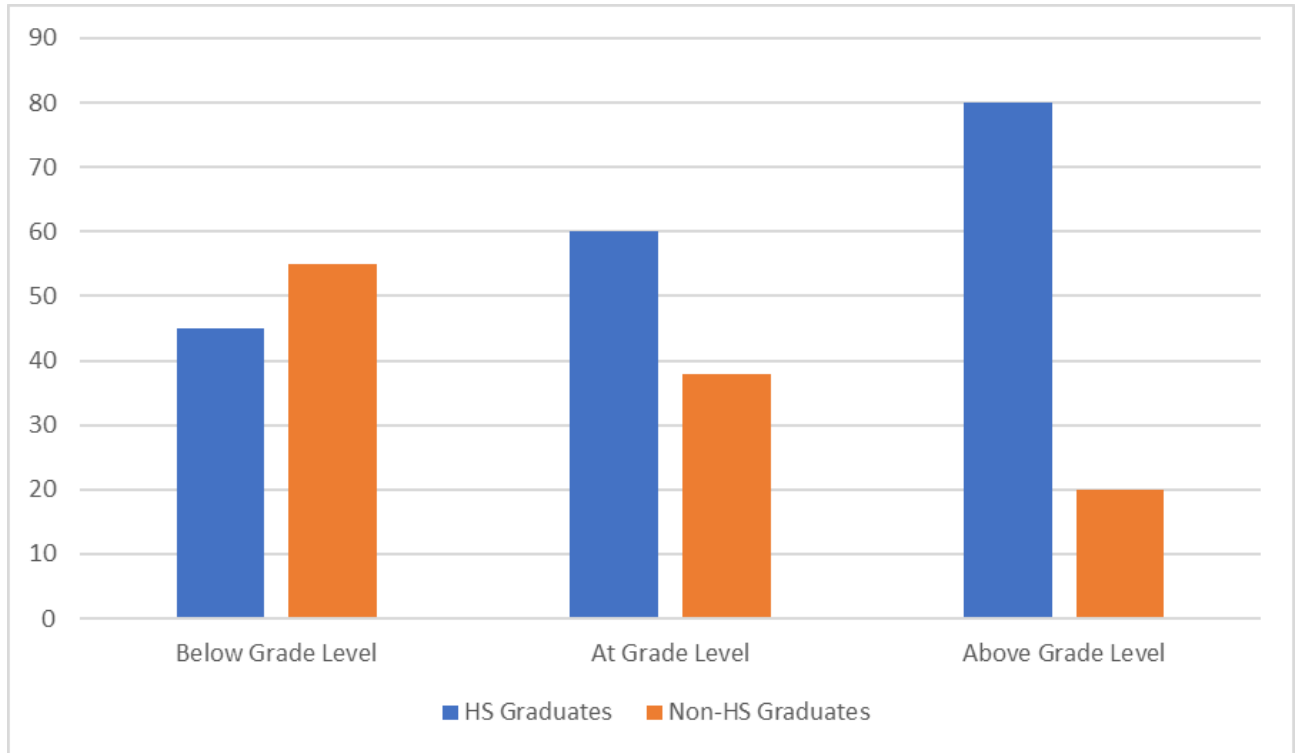


Figure D.1.A.2

Percentage of 4th Graders Reading Below 4th Grade Proficiency

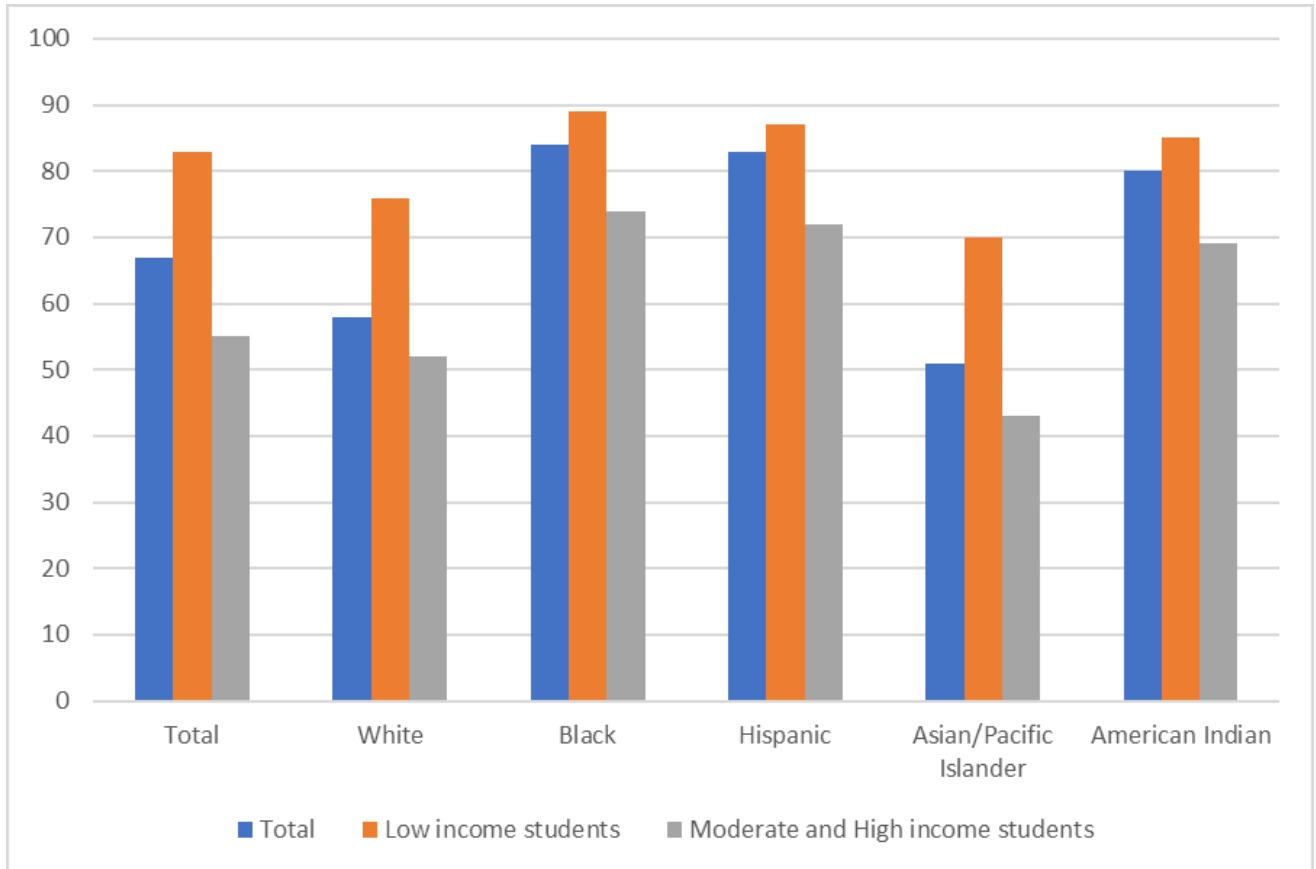
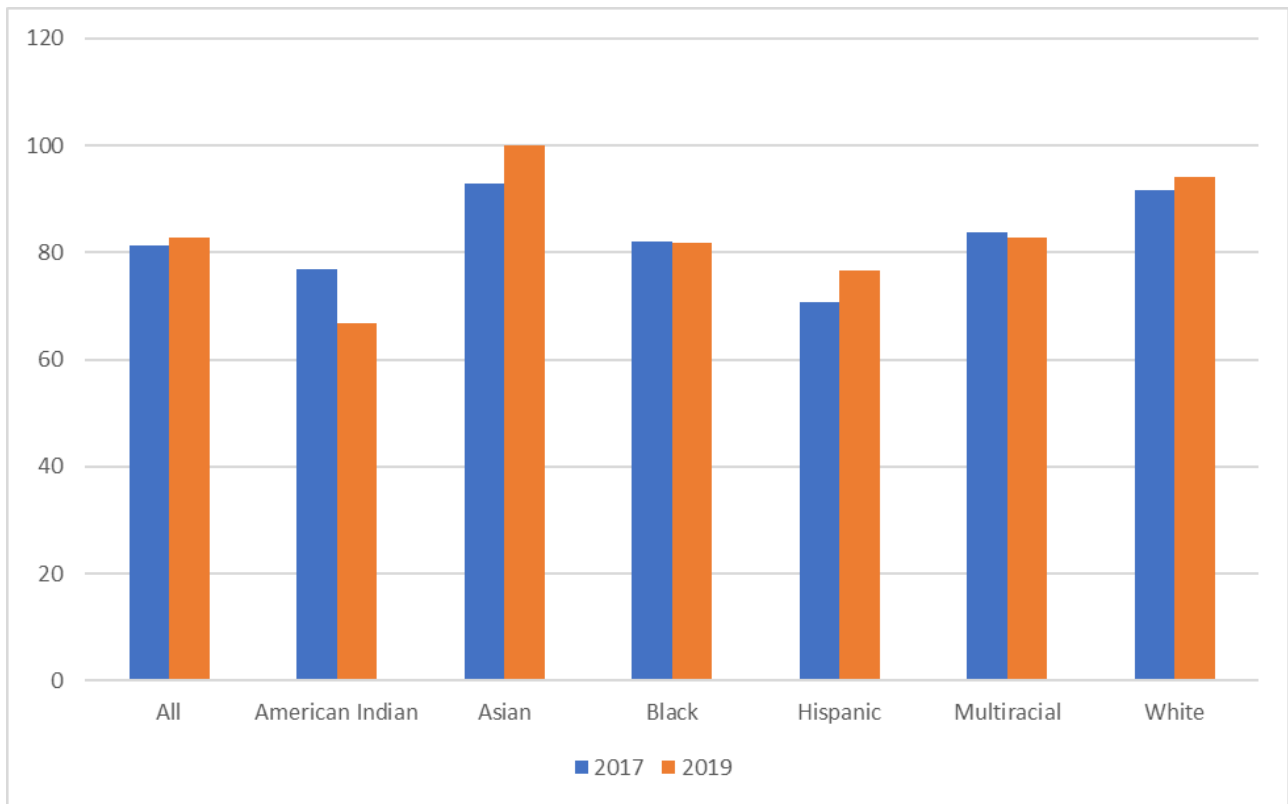


Figure D.1.A.3

Graduation Rate in Durham County



Appendix D.2: Community Partner Analysis

Introduction

Education is a fundamental social determinant of health because of its significant downstream effects; influencing an individual's health knowledge, socioeconomic status, health literacy and behaviors, and access to resources. Policies and interventions aimed at improving educational opportunities and outcomes can have a significant impact on public health and reduce health disparities in the community (Hahn, 2015). The impact of education on health is cumulative and long-lasting, benefiting individuals well beyond their formal educational years, influencing their health and well-being throughout their life. The 2020 Durham County community health assessment identified five health priorities: i) affordable housing, ii) access to healthcare and insurance, iii) poverty, iv) mental health and v) obesity, diabetes, and food access. Improvements in all these domains can be achieved with upstream interventions to improve reading proficiency in early school years (grades 1-3).

Reading proficiency has a strong, positive correlation with high school graduation (Lesnick, et al., 2010). High school graduation enhances educational outcomes for the residents of Durham County, improves opportunities throughout the lifespan which leads to access to higher paying jobs with better benefits (such as employer sponsored health insurance), improves access to safe, affordable housing (based on their income), and decreases poverty. Further, the psychological benefits of education, enhanced social networks and access to mental and behavioral health care are likely to improve behavioral health outcomes. Improvements in health literacy that is seen with higher education and the ability to read and process information are linked with healthier lifestyle choices and healthier living conditions/nutrition which would reduce rates of obesity and diabetes. In addition to the downstream improvement in health outcomes, there is an economic benefit as the cost associated with each student that does not graduate high school is estimated to be \$260,000 due to lost earnings, taxes, and productivity (Annie E. Casey Foundation, 2010).

It has long been established that children in less advantaged communities are more likely to do have poor health outcomes and difficulty in school. A 2004 report from Manitoba, Canada shows the dramatic difference in academic performance between children from low, middle, and high socioeconomic status (Brownell, et al., 2004). One of the reasons that less advantaged communities have poorer outcomes is a higher prevalence of food insecurity. Food insecurity is linked to behavioral and learning difficulties, as well as impaired cognitive development (Alaimo, et al., 2001; Grineski, et al., 2018). Durham County is not immune to these disparities,

experiencing significant disparities in educational attainment. For example, in the 2021-2022 school year, 79% of white students met the standard for reading proficiency compared to 34% of Black students and 30% of Hispanic students (North Carolina School Report Cards, 2022). There have been many public policies in North Carolina's history that have contributed to the inequities in educational attainment noted in Durham County. One such policy was redlining, which began in the 1930's, contributed to racial segregation as African Americans were prohibited from moving to certain neighborhoods as they would be denied the credit to do so, even if they had the financial means. Thus, they did not have access to more desirable neighborhoods with less desirable neighborhoods experiencing factors such as poverty, dilapidated housing, poor or absent plumbing and exposure to an abundance of rodents and cockroaches, that contributed to poorer health and educational outcomes (De Marco and Hunt, 2018).

We have proposed Feeding DPS Reading, which is a program that will seek to improve reading proficiency in the early school years (kindergarten to grade 3) while also addressing one of the contributing causes, food insecurity. The pilot will involve five targeted schools that qualify for partial reimbursement of school lunches through the Community Eligibility Provision (a program that provides breakfast and lunch free of charge to all students). We would rely on funding from Durham County for funding to ensure the entire food cost is covered and collaboration with the Duke Program in Education Partners for Success where undergraduate students are teamed with early school year students to focus on the five pillars of success in reading (phonemic awareness, phonics vocabulary development, fluency, and comprehension) (National Reading Panel, 2000). The goal of this intervention is to improve reading proficiency in lower performing Durham County Schools while addressing food insecurity, with the short-term goal of improved third grade reading proficiency scores and longer-term goal of increased graduation rates.

Community Partner Mapping

To ensure support and adequate investment of resources for our program, it is essential to partner with key stakeholders with key attributes such as power to influence decision making, those with shared interests and those with lived experiences. We have identified fifteen key stakeholders that include The North Carolina Department of Public Safety (DPS), Unbox – DPS Youth School Food Policy Council, Duke University's program in Education, Partners for Success (PFS), Durham Children's Initiative, School Meals for ALL NC, Duke University Literacy Corps, students, and parents. Figure D.2.A.1 shows an Interest-Influence Matrix which was used to prioritize stakeholder engagement. An Interest-Influence Matrix is a tool used in stakeholder analysis that categorizes and

prioritizes stakeholders based on the level of interest in our program and influence over policy and decision making. The benefit of using this tool is to identify and prioritize engagement with stakeholders who have higher interest and influence that is critical to our program's success.

Using our Interest-Influence Matrix, we can prioritize stakeholders to partner with for our program. There are five stakeholders that are in the high interest and high influence quadrant. These stakeholders are the Duke University PFS, DPS school nutrition services regional supervisors, principals/assistant principals, teachers/reading specialists, and school data managers. The Duke University PFS is a key stakeholder with much power and interest in our plan given they will have an important role in implementation of reading instruction. DPS school nutrition services regional supervisors and data managers are highly influential in our effort to support the nutritional component of the program. Teachers and reading specialists have interest and influence over the education and outcomes of their students. Finally, Principals and assistant principals will be key players in implementing any program at their schools and are important stakeholders whose buy in will help to ensure success. Stakeholders that lie outside the high interest, high influence quadrant that are also important to partner with include those with lived experiences, such as parents, as they have much experience to learn from and shape the program for success, are highly motivated, and benefit from the improved outcomes. While parents are traditionally considered to have low influence, there can be strategies to leverage their motivation to improve outcomes for their families. Parents make up a large voting demographic, where grassroots mobilization can lead to significant pressure on policy makers which strengthens the power, they have over policy making decisions.

Therefore, we would recommend the Durham County Board of Commissioners partner with schoolteachers, principals, the Duke University PFS program, DPS school nutrition services regional advisors and parents of students in the priority population. These representatives are well positioned to influence positive change to the systems in order to support our program, as well as have a high level of interest. Further, we would benefit from the lived experiences of these stakeholders.

Equitable representation and participation of key partners in our task force can be influenced by several factors, including facilitators and barriers. The first is historical disparities and inequities related to race, genders, SES, and other factors. Certain groups that have been historically marginalized or excluded from decision making processes have created a legacy of mistrust and hinder their engagement in this task force. Recognizing and addressing these historical disparities through targeted outreach and the inclusion of diverse voices can help

facilitate equitable representation. Another potential barrier to participation is key attributes associated with our stakeholder groups. For example, teachers are overworked and underpaid, and may not be motivated to participate while university students have variable schedules and varying priorities that may hinder their full participation in the task force.

Partner Worldviews

CATWOE is an acronym used in systems thinking to help define and better understand a stakeholder's worldview. By conducting a CATWOE analysis, we can gain a comprehensive understanding of all relevant aspects of stakeholders involved. Figures D.2.A.2 and D.2.A.3 are examples of our CATWOE analysis. Comparing the CATWOE analysis and root definitions for these two stakeholder groups, we can identify several similarities and differences, as well as their implications for participation in the task force and the overall Social Determinants of Health change effort. The two groups share a common goal of providing free, nutritious lunches to early grade students at the pilot schools, recognizing the importance of addressing food insecurity and poor nutrition for better learning outcomes. Implications for participation in the task force include fostering collaboration between diverse stakeholders to achieve a common goal, mobilization of resources to implement both initiatives involved in our program, diversity of thought by recruiting broad expertise and perspectives, in order to develop comprehensive solutions that address both nutritional and reading aspects of our program and measurement and evaluation, as we need to ensure commitment of our partners in measuring outcomes related to nutrition and reading proficiency to ensure the goals of our program are achieved.

Conclusion

While we have identified key stakeholders with whom to partner in the development of a task force to implement our program, there are still important questions that need to be considered. We have conducted an analysis of the stakeholders based on our assumptions, it is still essential to ensure that their goals and objectives align with that of our project. We also want to engage with these stakeholders to identify the experience and resources that they bring to the table. We also want to ensure diversity within our task force to ensure an inclusive decision-making process. Also, do our stakeholders have a history of collaboration with similar projects or initiatives in which to learn and build from. Finally, are there any potential challenges or conflicts that may arise by including these partners.

As with any analysis, there are some strengths and limitations. Strengths in our analysis include diversity, resource assessment and comprehensive understanding. We have included a diverse range of community stakeholders with whom we can partner that will improve the likelihood of success for our program and we have developed a comprehensive understanding of these partners' roles and contributions. This includes those with expertise in the area, those with lived experiences, those who can realize value and gain from this program and those with a vested interest in outcomes. Limitations include unexpected issues, our assumptions, and external factors. There is always a risk of challenges that arise that we did not predict or plan for, including unforeseen conflicts with our partners that arise during implementation. This could include misalignment of goals; therefore, we need to be careful in creating value for our partners. For example, Partners for Success is a critical stakeholder in the implementation of our plan, however they will only participate if partnering with us creates a valuable field experience for their undergraduate students (Duke Program in Education, n.d.). Our analysis is also limited by our assumptions, which may not accurately represent a stakeholder's worldview. Finally, this analysis may not account for unforeseen external factors that arise that influence the partnership. This could include changes in existing programs that we partner with, changes in our partner's worldview or conflicting priorities with our partner that can either take their attention elsewhere or divert their resources. Therefore, we must remain flexible and adaptable as our relationship with our partners evolves.

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Appendix D.2.A: Community Partner Analysis Figures and Tables

Figure D.2.A.1

Influence-Interest Matrix

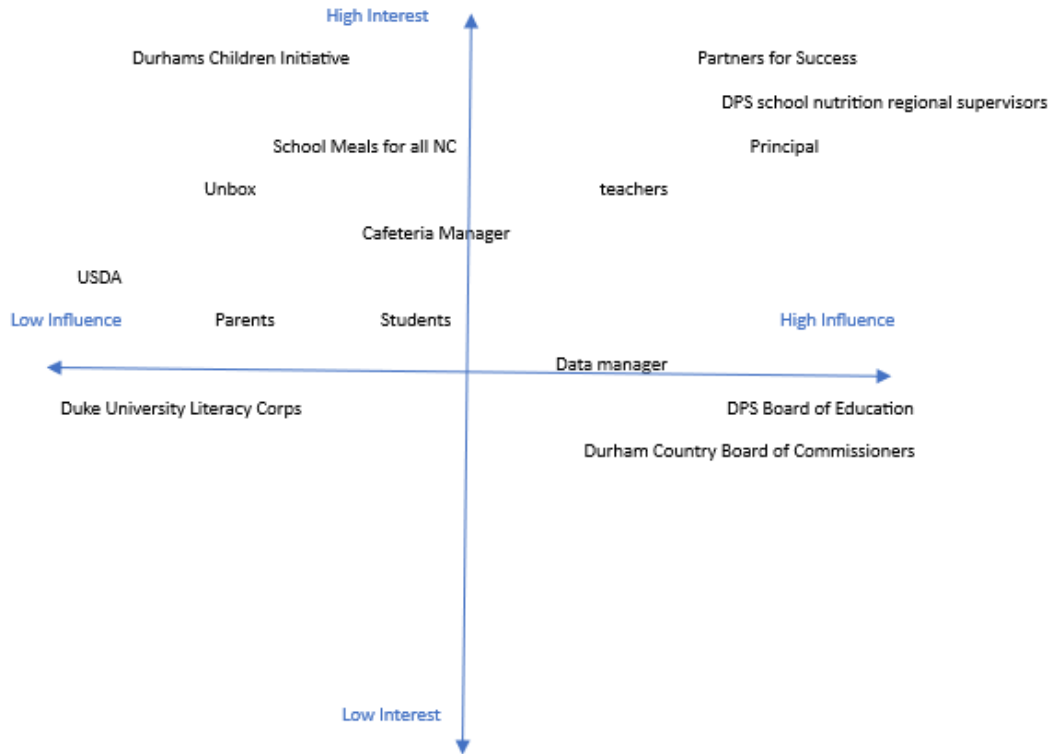


Figure D.2.A.2

DPS School Nutrition Services Regional Supervisors CATWOE Stakeholder Analysis and Root Definition

Customer	Early grade school (K-3) students at pilot schools
Actor	DPS School Nutrition Services Regional Supervisors
Transformation	Facilitate the provision of free lunch to all students at pilot schools
Worldview	All students should have access to healthy foods
Owner	Durham Public Schools, School administration
Environment	Consolidation of data, new administrative processes, budgetary constraints

Root Definition: To facilitate free and nutritious lunches to all students at the five pilot schools by supplementing existing federal reimbursement with funds from Durham County in order to improve the effect that food insecurity and poor nutrition have on learning behaviors.

Figure D.2.A.3

Parents of Students CATWOE Stakeholder Analysis and Root Definition

Customer	K-3 students at pilot schools
Actor	Parents of students in Pilot schools
Transformation	To improve reading proficiency and ensure free, healthy lunches to students
Worldview	Students who experience food insecurity and poor nutrition lack energy and experience more difficulty learning
Owner	Durham Public Schools
Environment	Time available to spend with students/participate in program, financial stress contributing to food insecurity, administrative requirements

Root Definition: To provide free, nutritious lunches and interventions targeted for reading proficiency by ensuring funding from Durham County and developing a reading mentorship program in order to improve nutrition, improve reading proficiency and see improved long-term outcomes associated with improved education.

Note: CATWOE analysis and root definitions formed by conversations and the experiences of group members as well as findings in the literature (Grineski et al., 2018; Tamiru & Belachew, 2017)

Appendix D.3: Accountability and Engagement Plan

Engagement Strategy

Purpose

Complex systems change efforts often involve a diverse group of stakeholders that includes policymakers, consumers, and service providers. When pursuing collective action to address reading proficiency in the early primary education years, understanding the roles of community partners is crucial. We have identified key stakeholders and now must plan an effective strategy for engagement and to secure motivated partnerships that create value. A RASCI analysis can be a valuable tool to identify community partners and delineate their roles and facilitate effective collaboration. Our RASCI analysis is available in Table D.3.A.1. An engagement plan provides a blueprint for initiating, measuring, enhancing a sustaining community partner involvement in collective efforts. Community partner engagement is of critical importance in the context of our efforts to address reading proficiency in Durham County. The engagement of our partners ensures that a diverse set of perspectives, resources and expertise are harnessed to develop a sustainable and evolving program.

Priority Partner

In our engagement plan, we have chosen Duke University Partners for Success as the priority partner. Duke University Partners is a support office under the Program in Education at Duke University. They work to support meaningful experiences for undergraduates in service-learning education courses, future teachers, and education minors, as well as any student who has an interest in service learning, child development and education related volunteering. One of their stated goals are to connect Durham teachers and programs with a consistent source of training volunteer tutors, provide opportunities for their undergraduates to participate in school and community based learning environment, encourage their undergraduates to engage prek-12th grade students academically and socially through the cultivation of positive relationships and to facilitate their undergraduate development through critical reflection that connects field experiences with their education coursework (Duke Program in Education, n.d.). Partners for Success has real world experience in supporting this type of educational program, which we can leverage in building an effecting reading recovery program for our pilot schools. Duke University Partners for Success program is a critical partner in the implementation of our program, as we will utilize their resources in implementing the reading recovery aspect, while providing meaningful field experience for their volunteers.

Engagement Barriers and Facilitators

There are factors that can significantly influence our priority partner's participation in our initiative. The first is lack of funding. The absence of significant financial resources to fund this aspect of the program could negatively impact the participation of Partners for Success. While the program relies solely on volunteer tutors, there may be a requirement for educational aids to enhance the tutors instruction and facilitate the reading program. To help mitigate this barrier, we would leverage existing educational resources within our pilot schools and donations of resources from other stakeholders.

Another factor that will influence Partner's for Success' participation is the experience provided for their tutors. The benefit of participation for Partners for Success is the field experience gained by their volunteers and its connection to their coursework. We can maximize the positive impact of this facilitator by ensuring that our program is developed to provide valuable and meaningful experiences for their students which will contribute to the sustainability of the program.

A third factor that influences Partners for Success's participation is time. Time is a valuable resource but can be limited. Volunteer tutors are undergraduate students, likely having to prioritize competing interests for their time, such as school and work. Thus, it is critical that we value their time contributed to this program. If they feel that our program is unorganized, that their time is wasted, or that we are not creating value for their time, then this will become a significant barrier to participation in our program. Thus, we need to ensure that our program is well coordinated, organized, and creates value that contributes to their education at Duke University.

Engagement Methods

To effectively engage with our priority partner, minimize potential barriers and leverage facilitators we have identified three methods for engagement with our priority stakeholder throughout the implementation of our program; tutor workshops (design phase), quarterly data sharing and curriculum review meetings (improve phase), and semiannual outreach events (sustain/scale phase). Our measurement table is available at Table D.3.A.2.

During the design phase, we will host a collaborative workshop that involves experienced and new tutors, program facilitators, teachers, and other educational experts to develop an effective strategy for the reading recovery component of the program. The intent is to have diverse input into developing effective educational strategies that can be packaged and disseminated for use by our tutors. This method addresses lack of funding as it is of minimum to no cost to host and will make optimum use of our partner's time.

During the improve phase (first year of implementation) we will hold quarterly meetings that include tutors, program facilitators, parents, and teachers to share qualitative and quantitative data collected from the program. The qualitative data collection will focus on tutors' feedback on the program materials, subjective opinion on how program was received, and feedback from students and teachers. Over time, as reading proficiency data is obtained, this data will be analyzed to assess the short-term outcome of the program. Through the analysis of this data, improvements to the program will be made to improve outcomes and the experiences of both the tutors and students.

During the Sustain/Scale phase, we will conduct semiannual outreach events at Duke University. As the program scales over time, we will need to replace tutors who complete their education and recruit a larger cadre of tutors as we begin to include more schools. These outreach events will focus on recruiting a broader and more diverse group of tutors with which to draw. In turn, this will ensure the sustainability of the reading recovery portion of our intervention by soliciting continued support from Partners for Success.

Engagement Leadership

The project task force, led by the Durham Childrens Initiative (DCI) and supported by Unbox is well suited to lead engagement efforts for our initiative. The rationale for choosing this stakeholder is that the DCI is a community-based organization and initiative based in Durham. Their focus is on improving the wellbeing and educational outcomes of children and families with their primary goal being to break the cycle of poverty and provide support and resources to children in underserved communities, helping them to succeed academically and in life. One of the key features of the DCI is its experience with community engagement. They have extensive experience collaborating with local schools, community organizations and other stakeholders to create a supportive network that addresses the unique needs of children and families in Durham County. Additionally, they use a data driven approach to identify areas of need and progress, ensuring that resources are directed where they have the most impact and programs are improved in an objective manner. The DCI's experience and interest in improving outcomes for children places them in the optimal position to lead our task force and stakeholder engagement efforts (Durham Children's Initiative, 2023).

Unbox is the Durham Public Schools Youth School Food Policy Council, led by the Assistant Director of Food Systems Planning for DPS. This organization is made up of students with an interest in advocating for food justice and acts as a link between students and their school food system. They prioritize future thinking projects in

DPS school food (Durham Public Schools, n.d.). Unbox would be the ideal group to support DCI's leadership as those with lived experiences and have an interest in the development and sustainability of programs that promote food justice.

Disciplinary Critique

A Memorandum of Understanding (MOU) can be a critical document that establishes accountability and lays a foundation for a successful partnership between the priority partner and the engagement leader. An MOU clarifies the parties' roles, responsibilities and collective goals that are essential for effective collaboration. The MOU would clearly define the scope and purpose of the partnership, ensuring that both parties understand the overarching goals. For our proposal, it would outline the goal of providing reading recovery tutors to our identified pilot school students and the provision of valuable field experience for Duke undergraduate students. The MOU will specify the roles and responsibilities of the leadership and team members involved. In our context it would define the Partners for Success and Durham Children's Initiative roles and contributions of their respective teams. The purpose of this is to ensure accountability by clearly delineating the responsibilities of each stakeholder. The MOU outlines the methods and strategies for collaboration, establishing commitment from both partners and ensuring that resources and efforts are allocated appropriately. This would include the engagement strategies noted above and how tutors will be utilized in order to protect and create value for both parties. Finally, the MOU will set performance metrics for progress evaluation and to ensure transparency and accountability. This fosters a culture of continual improvement and sets the basis for ongoing PDSA cycles. Overall, the MOU acts as a guiding document that improves transparency, ensures accountability and alignment of goals between partners.

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

Table D.3.A.1

RASCI Analysis Grid

Policy/Program: We have proposed Feeding DPS Reading, a dual-pronged intervention to address low reading proficiency and food insecurity in Durham Public Schools (DPS). Program administrators will work with Durham County Commissioners, DPS, and five individual schools that qualify for partial reimbursement of school lunches through the Community Eligibility Provision (CEP), that have reading proficiency levels below the DPS average, and that have a lower proportion of students than the state average meeting the Read to Achieve grade 3 benchmark. The first part of the approach relies on funding from Durham County to cover the difference between the free and paid CEP reimbursement rates. The second part of the approach relies on a collaboration with Duke University Program in Education Partners for Success program, in which undergraduate students work with elementary students on the five pillars of success in reading: phonemic awareness, phonics, vocabulary development, fluency, and comprehension. The goal of Feeding DPS Reading is to improve reading proficiency in low-performing DPS schools while addressing food insecurity within the schools.		
RASCI Levels	Community Partners	Rationale
Responsible (owns the challenge/project)	- Task Force (Led by DCI and assisted by Unbox)	The Task Force is led by Durham Children’s Initiative in close collaboration with the DPS Unbox project, which is a policy council of students and staff. The Task Force is responsible for completion of the program, which involves overseeing school principals in applying to and following through with the CEP and supporting the implementation of the reading portion of the program within their school.
Accountable (ultimately answerable for the correct and thorough completion of the deliverable or task, and the one who delegates the work to those <i>responsible</i>)	Members of Advisory Committee: - School Principals	School principals are accountable for the resources and processes within their respective schools, and therefore have the accountability for implementation of program components.
Supportive (can provide resources or can play a supporting role in implementation)	Members of the Advisory Committee: - DPS School Nutrition Regional Supervisors - Duke University Partners for Success - Data Managers	The DPS School Nutrition Regional Supervisors play a role in the implementation of development and delivery of the nutrition component of our intervention. The Duke University Partners for Success will be supplying the critical component of the instructional part of our intervention. Data managers will be critical in providing information in support of efforts in qualification for CEP.
Consulted (has information and/or capability necessary to complete the work)	- Parents - Duke University Literacy Corps - Cafeteria Managers	Several community partners will be consulted in the development and implementation of the Feeding DPS Reading program. Parents and students are important community partners given that they are the targeted population for benefit with the proposed initiative. Further, parents will need to provide information to schools to support CEP eligibility. Duke University Literacy Corps is not the primary source of volunteers but may provide back-up or additional support as needed by Duke University Partners for Success. Cafeteria managers play a key role in managing school lunch and student eligibility for

		free/reduced lunch, so they will be a critical source of information for the program's nutrition portion.
Informed (must be notified of results, process, and methods, but need not be consulted)	<ul style="list-style-type: none"> - Durham County Board of Commissioners - DPS Board of Education - Teachers 	The Durham County Board of Commissioners has requested an intervention to improve downstream health outcomes. The DPS Board of Education maintains a vested interest in student performance and educational outcomes, especially in response to targeted programs. Teachers must be informed of student progress and interventions to appropriately support the education for their respective students.

Table D.3.A.2

Measurement Table

Engagement Method	Related Facilitator/Barrier	Timing	Performance Measure		
			Description	Data Source	Frequency
Tutor workshop	<ul style="list-style-type: none"> - Availability of participants/time - ability to work collaboratively - educational experiences/styles 	Design	Development of curriculum that can be implemented by tutors	<ul style="list-style-type: none"> - Meeting minutes - Proposed educational plan 	Once
Data Sharing and curriculum review meeting	<ul style="list-style-type: none"> - availability of relevant stakeholders - availability of data - tutor experiences with reading recovery program and openness to provide honest feedback 	Improve	Objective - 3 rd grade reading proficiency in target schools Subjective - valuable feedback from tutors to inform PDSA cycles	<ul style="list-style-type: none"> - reading proficiency reports - meeting minutes - Qualitative surveys 	Quarterly
Duke Outreach Events	<ul style="list-style-type: none"> - event attendance and participation - location - effectiveness of the “sales pitch” 	Sustain and Scale	Number of new tutors recruited	<ul style="list-style-type: none"> - outreach event summary (event attendance, effectiveness, recommendations to improve) 	Semi Annual

Appendix D.4: Individual Presentation and Script



Feeding DPS Reading is a transformative initiative, dedicated to fostering community engagement and ensuring accountability at every phase of development. At the core of the program lies a deep understanding that community engagement is not just desirable, but essential. It is the foundation upon which trust is built, resources are secured, and overall health outcomes are enhanced. Our commitment to accountability and engagement is not a mere statement, but a structured plan.

In the design phase, the collaborative efforts of principals from the five participating schools take center stage. Using innovative approaches such as the nominal group technique and brain storming, these leaders actively generate ideas and address concerns related to the program. This phase is not just about involvement, it's about identifying specific issues and crafting solutions. Additionally, tutor workshops involving various stakeholders ensure that the program is developed with the valuable input and ownership of key stakeholders.

As we transition from design to implementation, our focus shifts to continuous improvement through quarterly data sharing and curriculum review meetings. These sessions serve as crucial checkpoints, providing feedback on program materials and outcomes. The plan, do, study, act cycles that follow ensure that improvements are implemented, evaluated, and refined. Partners collaboratively set improvement goals, choose evidence-based interventions, and measure outcomes, creating a data driven approach that optimizes efficacy and ensures alignment with the goal of improving academic performance.

Ensuring the sustainability and scalability of the project is paramount. Regular meetings of the Task Force and Advisory Committee, guided by a clear charter defining responsibilities and milestones, provide a platform to

discuss program progress and address concerns regarding sustainability. Semiannual outreach events play a crucial role in recruiting a diverse group of tutors, a key element in ensuring the program's sustainability and expansion.



Central to our engagement leadership is the Durham Children's Initiative, entrusted with their extensive experience in community engagement and focus on child and family well-being. Their data-driven approach ensures that resources are directed where they have the most impact, and programs are improved objectively. The pivotal role played by the Durham Children's Initiative in coordinating and leading stakeholder engagement efforts throughout the program's lifecycle cannot be overstated.

Feeding DPS Reading is not just a reading and nutrition initiative; it's a commitment to building a community driven, sustainable and impactful educational ecosystem. Through collaboration, innovation, and a steadfast focus on data-driven improvement, we are confident in the positive outcomes and lasting impact this program will bring to our schools and the communities they serve.

APPENDIX E: CECELIA WALL'S INDIVIDUAL DELIVERABLES

Appendix E.1: Social Determinant of Health Analysis

Education as a Social Determinant of Health

People with more education live longer and healthier lives than those with less schooling (Hummer & Hernandez, 2013). The reasons behind this broadly include higher income and more resources; social and psychological benefits; and better health behaviors (Zajacova & Lawrence, 2018). However, poor health impacts educational attainment. While overall health is associated with a greater ability for high educational attainment, poor health in childhood and young adulthood can limit education opportunities (Center on Society and Health, 2015). Education itself is an important determinant of health outcomes. It can provide individuals with the knowledge and skills to make healthy choices by improving health literacy and increasing capacity to participate in shared decision-making with healthcare professionals (Bayati et al., 2018; De Oliveira et al., 2018; Muscat et al., 2021). Additionally, education influences socioeconomic status (SES), social network, and career opportunities, thereby improving access to healthcare and other health-providing resources.

Social determinants of health (SDoH) are the conditions in which people are born, live, learn, work, play, worship, and age. Education access and quality is one such SDoH defined by Healthy People 2030, which is a program that identifies public health priorities to help communities across the United States improve health and wellbeing (U.S. Department of Health and Human Services, n.d.). Figure E.1.A.1 provides a conceptual diagram that shows the linkage of educational attainment to upstream and downstream SDoH. In the short term, education leads to better health opportunities, such as access to school-based counselors, mental health resources, and school-based insurance coverage. Additionally, health curricula provided in schools increase health literacy and can improve students' lifestyle choices. In the long term, education access and quality significantly impact a person's overall well-being and health outcomes throughout their lifetime via a wide range of interconnected factors:

- **Morbidity and mortality:** People with high educational attainment have increased levels of self-reported health and lower morbidity, mortality, and disability than people with lower education levels (Raghupathi & Raghupathi, 2020). Notably, people with a bachelor's degree have a longer health expectancy by up to a decade than those without a bachelor's degree (Case & Deaton, 2021; Hummer, 2013).

- Income and employment: Education provides higher paying and more stable job opportunities with access to employer-sponsored healthcare benefits. Additionally, financial stability positively influences health through increased healthcare access and reduced stress from financial insecurity (Ryu & Fan, 2023).
- Access to healthcare: People with lower levels of education may experience barriers to healthcare access, such as a lack of adequate insurance coverage, transportation issues, challenges in navigating the healthcare system, and living in neighborhoods with healthcare shortages (Zajacova & Lawrence, 2018).
- Built environment: People with high educational attainment are more likely to live in healthier neighborhoods with better infrastructure, higher-quality schools, reduced environmental pollution, and access to recreational spaces (Nieuwenhuis & Hooimeier, 2016).
- Health literacy and lifestyle choices: People with high educational attainment have more accurate knowledge and beliefs regarding health, a greater ability to self-advocate, and better health behaviors and lifestyle choices over time (Hahn & Truman, 2015).
- Health behavior across generations: Education has intergenerational effects. Parents with higher levels of education tend to have children who are better educated, healthier, and wealthier than parents with less education (Kaushal, 2014).
- Health disparities: People who do not graduate college are more likely to have health problems such as obesity, heart disease, diabetes, depression, substance abuse, and intentional/unintentional injury than individuals who do graduate from college (Centers for Disease Control and Prevention, 2023; Healthy People 2030, n.d.). Further, gaps in health disparities between racial/ethnic groups are widest at lower levels of education (Sherman-Wilkins & Thierry, 2019; Zajacova & Lawrence, 2018).

From early childhood through adulthood, education gives people the tools they need to lead healthy lives and contribute to our communities. However, the level of education that a person can access is impacted by other SDoH, such as poverty and interpersonal relationships. For example, children from low SES households and those who routinely experience bullying are more likely to struggle with math and reading and are less likely to graduate from high school or attend college. Ultimately, this adversely impacts their short- and long-term health outcomes (Morgan et al., 2009). Conversely, other SDoH impact education access and quality. Schools in high-poverty areas have less-experienced instructors, fewer high-level and advanced placement courses, and lower budgets than schools in high-SES areas (Morgan et al., 2009). Students from low-income families are less likely to attend college, which

limits access to high-paying careers and high-quality healthcare systems (National Center for Education Statistics, 2018). Education is essential groundwork needed for individuals to overcome systemic and institutional injustices and generational poverty and for our society to improve the economic market and health outcomes.

Geographic and Historical Context

Durham County is home to renowned institutions of higher learning, including both North Carolina Central University and Duke University. For younger students, Durham offers public, private, and charter school options. However, access to these schools may not be equitable due to high tuition at private schools, the lack of transportation to private and charter schools, and other financial, social, and neighborhood barriers. Durham Public Schools (DPS) is the eighth largest school district in North Carolina, with 55 schools serving more than 32,000 students (Durham Public Schools, n.d.). Along with its higher education institutions and career opportunities, Durham County has a robust network of libraries and rich cultural resources such as museums, art galleries, and historical sites. Thus, Durham County has already set the stage for its primary and secondary students to achieve educational success, and through that education attain better health outcomes.

However, stark disparities exist within Durham County, many of which are tied to educational attainment and result from historical policies, practices, and laws that facilitated systemic racism (Durham County Department of Public Health, 2021). For example, the Federal Housing Administration enacted policies in 1938 that allowed redlining (Durham County Department of Public Health, 2021). Racial deed restrictions prevented Black individuals from buying homes in some Durham neighborhoods. This significantly limited the economic and educational potential of Black families, and the effects of redlining persist through generations (Durham County Department of Public Health, 2021). For example, funding for public schools in the United States is tied to property taxes, which risks systemic underfunding of historically redlined communities (Egede et al., 2023). Inequities within Durham County are tied to redlining and other historic policies, practices, and laws. The 2020 Durham County Community Health Assessment reported a median household income in Durham County of \$58,190. When broken down by race/ethnicity, the median income was \$76,962 for White households, but only \$44,004 for Hispanic households and \$42,417 for Black households (Figure E.1.A.2-A). These differences are likely tied to educational inequities, which result in disparate hiring practices and job opportunities. Notably, 56.6% of White individuals in Durham County have a bachelor's degree compared to just 33.1% of Black individuals and 13.3% of Hispanic/Latino individuals (Figure E.1.A.2-B). Without interventions aimed at mitigating racial/ethnic disparities, these patterns will continue,

and minorities within Durham County will continue to experience worse education and health outcomes than the non-minority population (Durham County Department of Public Health, 2021).

Notably, leaders and residents of Durham County have been working to correct these disparities through diverse leadership and its vibrant and engaged communities. Many programs exist to increase access to a high-quality education within Durham County at a variety of levels. For example, Durham's Partnership for Children works to improve school readiness in children under five years of age, and the Gateway to College program at Durham Technical Community College provides a supportive network to re-engage students who have dropped out of high school (Durham's Partnership for Children, n.d.; Durham Tech, n.d.). These and other programs provide incredible community resources to improve the educational attainment of Durham County residents. Additional focus of the county's resources on the educational system will further improve the health and wellbeing of the population and provide an opportunity for Durham County to improve equity within its communities.

Priority Population

Across the district, DPS reading proficiency for students in grades three through eight in the 2021-2022 school year was only 41% (North Carolina School Report Cards, n.d.). Grade-level proficiency for the five schools included in the intervention is lower than the DPS average, ranging between 32% and 40% (Figure E.1.A.3). Notably, educational disparities are apparent in DPS elementary schools between Black/African American and Hispanic/Latino Durham students compared to White students. These disparities are stark: in the five targeted schools, the percentage of White students reading at grade level range from 59% to 92%, while only 22% to 32% of Black/African American and 21% to 33% of Hispanic/Latino students read at grade level. While Black/African American and Hispanic/Latino elementary students are included in the priority population to improve education and health outcomes in Durham County, educational interventions in public schools cannot focus solely on these groups. Students of all races and ethnicities will be included in interventions that take place in the public school system. However, the targeted schools do have high percentages of minority students (ranging from 47% to 94%), so program funds will be allocated in a manner that considers racial equity.

Measures of Educational Outcomes

Relevant measures for a program targeting elementary-age students in Durham County include the percentage of students below proficiency in the established North Carolina End-of-Grade reading (grades three through five), mathematics (grades three through five), and science (grade five) standardized tests (North Carolina

Department of Public Instruction, n.d.). School engagement (defined as the extent to which students commit to and participate in school activities, including internal thoughts, emotions, and observable behaviors) is an additional measure that will be used to determine the effectiveness of the intervention (Tam et al., 2023). However, no consensus on tools to measure school engagement exists. Given the difficulty in obtaining data from self-report surveys in elementary-age students, the engagement measure will be collected via teacher report using the validated Reading Engagement Index (REI) (National Center for Education Evaluation and Regional Assistance, 2011; Wigfield et al., 2008). In this measure, teachers rate students on aspects of engaged reading. This measure is efficient, with the teacher time commitment of less than one minute per student and provides internally consistent results. Ideally, an improvement in these outcomes would translate to improvements in longer-term metrics, such as higher proportions of students with four-year graduation, pursuit of post-secondary education, and higher SES and better health outcomes.

Role of Public Health Leaders

DPS is the eighth largest school district in North Carolina. A program aimed at improving educational outcomes for such a large population requires strong leadership training and public health experience. Public health professionals are adept at collecting and analyzing health outcomes related to the SDoH, as well as leading the development, implementation, and evaluation of initiatives aimed at improving educational outcomes in Durham County. Further, expertise in identifying and working with relevant interdisciplinary stakeholders can improve the program's efficacy and reach and the use of money and resources. Public health leaders recognize the importance of involving the community in the planning and implementation of an initiative to enhance partnerships and increase the longevity of a program. Given the diversity in Durham County, a public health leader's racially equitable and data-driven approach is required to achieve optimal outcomes.

Rationale/Importance

While many of Durham County's residents are thriving, some populations experience suboptimal educational outcomes, which are directly linked to short- and long-term health consequences. Improving educational access and quality within Durham County is necessary as part of a multimodal approach to address systemic inequities and racism, especially for groups such as Hispanic/Latino and African American residents who continue to experience wide disparities in educational outcomes. In addition to the social justice implications, addressing

suboptimal educational outcomes will increase economic output by improving career opportunities of residents and incentivizing people to live, work, and play in Durham County.

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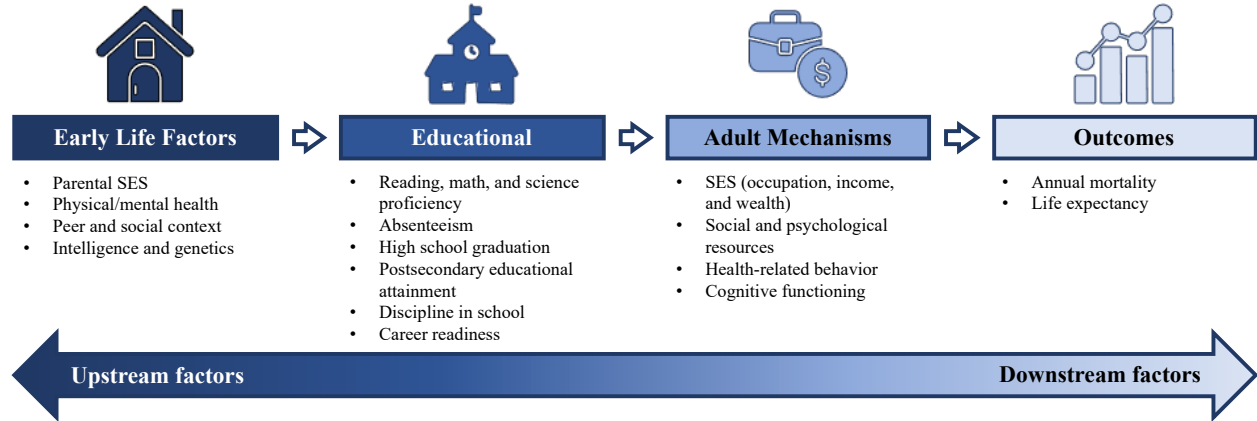
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Appendix E.1.A: Social Determinant of Health Analysis Figures and Tables

Figure E.1.A.1

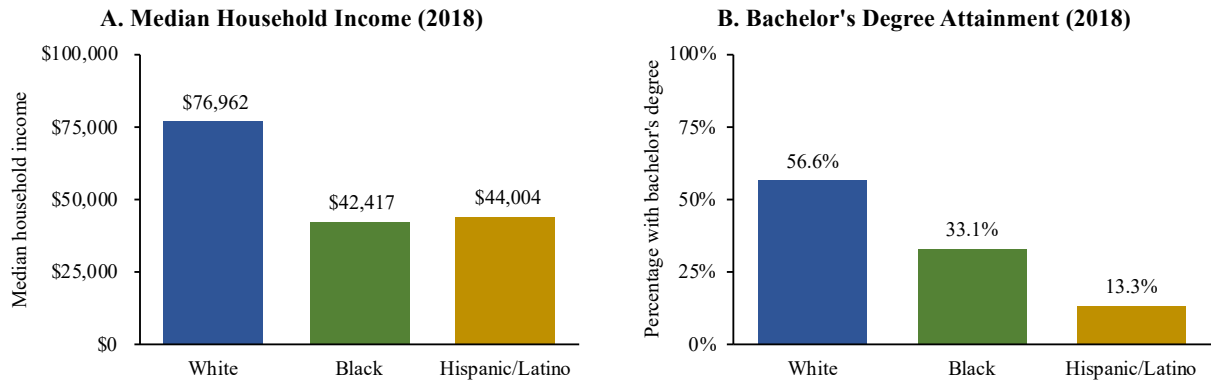
Conceptual Diagram Showing Downstream and Upstream Factors for Education



Note. This figure was modified from Hummer et al., 2013.

Figure E.1.A.2

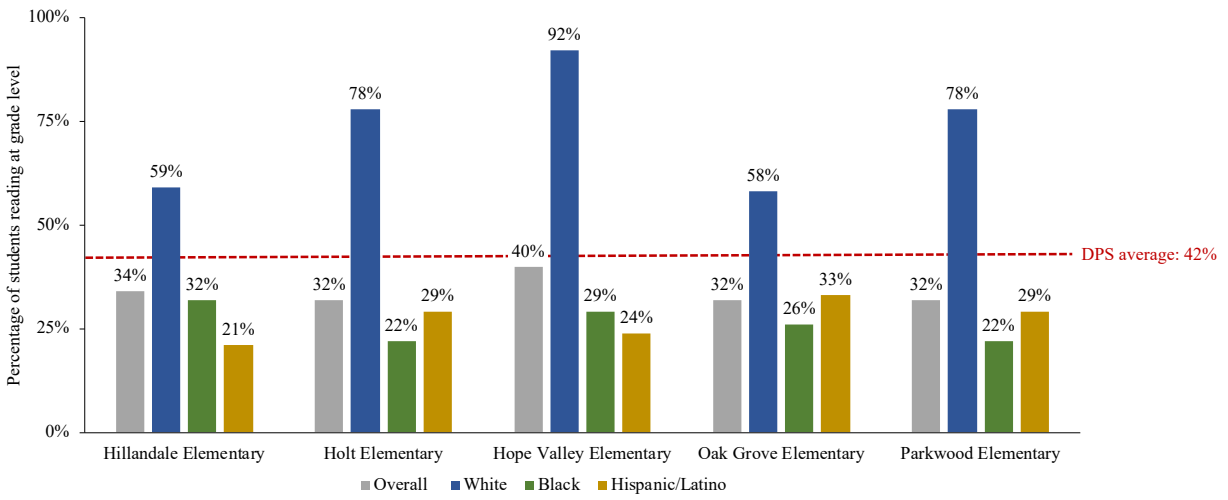
A. Median Household Income. B. Educational Attainment by Race in Durham County, North Carolina (2018)



Note. Data were obtained from Durham County Department of Public Health, 2021.

Figure E.1.A.3

Percentage of Students Reading at Grade Level in the Five Schools Targeted for Intervention



Note. Data were obtained from North Carolina School Report Cards, n.d.

Appendix E.2: Community Partner Analysis

Introduction

People with more education live longer and healthier lives than those with less schooling due to higher income and more resources; social and psychological benefits from enhanced communication and social skills, reduced crime social issues, greater self-esteem and confidence, and better problem-solving and critical thinking skills; and better health behaviors due to access to higher-quality neighborhoods with food resources, green spaces, and health facilities (Hummer & Hernandez, 2013; Zajacova & Lawrence, 2018). Overall health is associated with higher educational attainment, and poor health in childhood and young adulthood can limit education opportunities (Center on Society and Health, 2015).

Durham County is a racially and ethnically diverse area, with 54.7% White, 35.3% Black, and 13.9% Hispanic or Latino residents (U.S. Census Bureau, n.d.). Significant educational disparities exist for these minority groups due to the persistent effects of systemic and institutional racism (North Carolina School Report Cards, n.d.). In the 2021-2022 school year, 43% of Durham Public Schools (DPS) students in third through eighth grades were proficient in reading, which is below the North Carolina state average of 48% (North Carolina School Report Cards, n.d.). However, 79% of White students were proficient in reading compared to just 34% of Black students and 30% of Hispanic students, highlighting systemic educational and social inequities. For example, historic deed restrictions prevented Black individuals from buying homes in some Durham neighborhoods, which significantly limited the economic and educational potential of Black families (Durham County Department of Public Health, 2021). Funding for public schools is tied to property taxes, which risks systemic underfunding of historically redlined communities (Egede et al., 2023). These disparities emphasize the need for culturally sensitive interventions targeting improvement in reading proficiency in Durham County.

Similarly, Durham County experiences high rates of food insecurity among its students, especially among people of color (Feeding America, n.d.b). Food insecurity is defined by the United States Department of Agriculture as the lack of access at times to enough food for an active and healthy life (US. Department of Agriculture, 2023). When children do not have enough food to eat at home, they may experience more behavioral and learning difficulties than children from households with persistent food security, which impacts educational outcomes (Alaimo, et al., 2001; Grineski et al., 2018; Jyoti et al., 2005). Feeding America (n.d.a) estimates that 15.3% of children under 18 years of age in Durham County experience food insecurity, and insecurity is more common in

Black (20.0%) and Hispanic/Latino (17.0%) populations than White populations (7.0%) likely due to discriminatory policies and practices that have led people of color to be more likely to live in poverty and more likely to face unemployment (Feeding America, n.d.b).

DPS offers free breakfast to all students regardless of federal eligibility for the free and reduced lunch program, with 56.4% of elementary-aged students receiving free lunch in 2022-2023 (DPS, n.d.a; DPS, n.d.b). In the 2023-2024 school year, 28 DPS schools are participating in the Community Eligibility Provision (CEP), which provides breakfast and lunch free of charge to *all* students regardless of household income. Schools qualify for the CEP if they have a high percentage of students who are automatically eligible for free lunch based on participation in other federal programs, such as Supplemental Nutrition Assistance Program, Temporary Assistance for Needy Families, or Medicaid (U.S. Department of Agriculture Food and Nutrition Service, 2023). Schools with a high percentage of qualifying students receive full reimbursement for meals for all students, whereas schools with a moderate percentage of qualifying students receive partial reimbursement. Schools that fall in the “moderate” category often do not participate in the CEP due to concerns of covering costs related to operation of the school nutrition program with the reduced reimbursement rate (North Carolina Alliance for Health, n.d.; French, 2022).

To address education as a social determinant of health in Durham County we have proposed Feeding DPS Reading, which is a dual-pronged intervention to address the issues of low reading proficiency and food insecurity in DPS. The Feeding DPS Reading Task Force will work with Durham County Commissioners, DPS, and five individual schools that qualify for partial reimbursement of school lunches through the CEP, that have reading proficiency levels below the DPS average, and that have a lower proportion of students than the state average meeting the Read to Achieve grade 3 benchmark. The first part of the approach relies on funding from Durham County to cover the difference between the free and paid CEP reimbursement rates for the selected schools so that the schools will be reimbursed for 100% of the school meal price. The second part of the approach relies on a collaboration with Duke University Program in Education Partners for Success (PFS) program, in which undergraduate students work with elementary students on reading proficiency. The goal of Feeding DPS Reading is to improve reading proficiency in low-performing DPS schools through upstream nutrition-focused efforts.

Community Partner Mapping

A power-interest grid is helpful to identify key stakeholders and estimate level of interest and support (Figure E.2.A.1-A). This tool facilitates stakeholder engagement and communication, mitigates risk, informs

resource allocation, and improves the strategic use of resources (Mendelow, 1991). First, a list of stakeholders was developed and grouped into categories (Appendix Figure 1-A): customers (parents, students); those whose interest lies in the reading component of the program (teachers/reading specialists, Duke University PfS, Duke University Literacy Corps); those whose interest lies in the CEP component of the program (DPS School Nutrition Services regional supervisors, USDA, cafeteria manager, data manager, Unbox, School Meals for All NC); and those whose interest is in the program as a whole (Durham County commissioners, DPS school board, principals/assistant principals, and Durham Children's Initiative [DCI]). Then, identified stakeholders were plotted on the power-interest grid (Figure E.2.A.1-A).

Stakeholders with high power and influence should be managed closely given that they are the decision makers and have the largest impact on project success. For this proposal, high-power/high-influence stakeholders include DCI, Unbox, Duke University PfS, DPS School Nutrition Services regional supervisors, principals/assistant principals, teachers/reading specialists, and school data managers. Duke University PfS is a main actor in Feeding DPS Reading's operational plan given that they will provide instruction. Teachers/reading specialists at participating schools play an important role in the reading instruction, and their needs and perspectives are critical for successful integration of the program into the required curriculum. For the CEP component, the DPS school nutrition services regional supervisors and school data managers will drive efforts to gather information for CEP qualification and ongoing data collection requirements (e.g., the number of meals served to students) (North Carolina Department of Public Instruction, n.d.). Principals and assistant principals at participating schools are key actors in the program given their involvement and oversight in all school activities, including both nutrition and curriculum (Powers and Duties of Principals, n.d.).

Stakeholders with high power but less interest in the specifics of the program include the Durham County Board of Commissioners and the DPS school board. The Durham County Board of Commissioners controls the county budget and authorizes the county manager to enter into contracts to establish new programs (Durham County, 2017). Support from this stakeholder is critical for successful planning and implementation of the program, as well as its persistence. The DPS Board of Education has general control and supervision over all matters relating to DPS, and thus must be kept informed of the program activities (DPS, 2019). Other community partners have high interest but less power and should be kept satisfied, including U.S. Department of Agriculture, school cafeteria managers, parents, and School Meals for All NC. While these stakeholders have less power to directly impact the

implementation of Feeding DPS Reading, they have personal or professional investment in the program's success. For example, parents can be a powerful source of program support by encouraging school officials to participate in the program and through efforts put forth by larger groups, such as Parent-Teacher Associations. Duke University Literacy Corps was identified as a low-power, low-interest stakeholder, but could play a larger role should Duke University PfS require additional volunteers for the reading component of the program. Elementary students in targeted schools will have relatively low power and interest in the program due to their age.

We encourage the Durham County Board of Commissioners to create an Education Task Force led by DCI in close cooperation with Unbox. DCI is a nonprofit organization with a mission to “create a pipeline of high-quality services for [Durham County] youth and their families that overcome the barriers to success” (DCI, n.d.). Unbox is a DPS program that provides students with training to be advocates for food justice and a link between their peers and the school food system (DPS, n.d.c). By including Unbox in a leadership position, students will develop leadership and advocacy skills and knowledge of the school food system. Further, they will provide critical insight into program components that will affect the success of the intervention. The Education Task Force should oversee a larger advisory committee, including school principals, DPS School Nutrition Regional Supervisors, Duke University PfS, and school data managers. These stakeholders are positioned to make systemic changes to positively impact both the education and nutrition of Durham County residents. Additionally, the Durham County Board of Commissioners should consider including DPS parents/guardians on the advisory committee given that they are customers of the proposed program. Certain factors may influence the equitable representation and participation of key partners in the task force. For example, school administrators such as principals and data managers are already overworked and may be reluctant to participate in work-related activities without additional compensation. Another barrier that may impact equitable representation is the transient nature of college students in the Duke University PfS. While Duke students and professors may be available during the traditional school year, they may not be available to attend task force meetings/activities during the summer months.

Partner Worldviews

CATWOE is a problem-solving and modeling approach that is used in soft systems methodology (Smythe & Checkland, 1976). CATWOE provides a structured framework to analyze and define complex situations from the worldview of community partners. For example, parents (Figure E.2.A.2) are community partners with lived experiences who are impacted by the upstream social determinants that contribute to low educational attainment,

such as socioeconomic status, neighborhood constraints, and health (Hahn et al., 2015; Lancet Public Health, 2020). While parents strive to provide a healthy and supportive environment to foster their child's growth and development, financial and food insecurity can impact their ability to do so. Parents working multiple jobs may not have time to read with their children nightly, and parents with low literacy may not feel comfortable or confident reading to their children (Kitsaris et al., 2021). School lunches can be financially burdensome even for parents of children who do not qualify for free and reduced lunches; DPS lunch costs nearly \$700 per student per school year (DPS, n.d.b).

DPS school nutrition services regional supervisors would likely support Feeding DPS Reading but with some hesitancy (Figure E.2.A.3). CEP has many benefits, but the program also presents administrative challenges (North Carolina Department of Public Instruction, 2014). For example, the supervisor may worry that the CEP program may result in a loss of revenue from school meals, which can impact financial sustainability (Rothbart et al., 2023). Further, the data collected for CEP differs from the data needed to support free/reduced lunches, so a different data collection and management strategy would be required (French, 2022). Similar to the National School Lunch Program, schools may have difficulties in collecting this data from families. Administrators of the nutrition program may be concerned about long-term sustainability of the program should CEP eligibility change based on the school's demographics. However, participation and support from DPS school nutrition services regional supervisors are critical for the successful implementation of the nutrition portion of Feeding DPS Reading.

Conclusions

When forming a Task Force, the Durham County Board of Commissioners should consider additional questions about the community partners based on the stakeholder analyses. Understanding each partner's individual motivations for participation on the Task Force is important, and asking the community partners who else should be included in the Task Force can provide valuable insight into potential partners not identified in this analysis. It is important to understand not only the scope of power for each partner in the Task Force, but also what each partner is willing to contribute. Knowing the time and resources each community partner is willing to devote to the Task Force will facilitate successful planning and implementation of Feeding DPS Reading.

In this analysis, we identified community partners that can contribute expertise and resources to the Feeding DPS Reading program. The community partners have goals similar to those of the program, and participation will further their own objectives. Limitations include the potential for community partners to have competing interests. Another limitation is the relatively low participation of the community members directly

affected by the intervention (i.e., parents and students) in the development/implementation of the program. To address this, we have suggested Unbox, a student-led initiative within DPS high schools, to take a lead role in the Task Force. While elementary-aged students may not have a role in program implementation, including older students helps to empower the population as a whole. Having student input and ownership in this program will increase trust, relevance, and ultimately the potential for success. Understanding the dynamics of each stakeholder's level of influence, as well as whether they may be in favor of or against the proposed intervention, can inform a strategic engagement plan. It is our hope that the identified stakeholders will participate in Feeding DPS Reading to improve both education and health outcomes in Durham County.

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Appendix E.2.A: Community Partner Analysis Figures and Tables

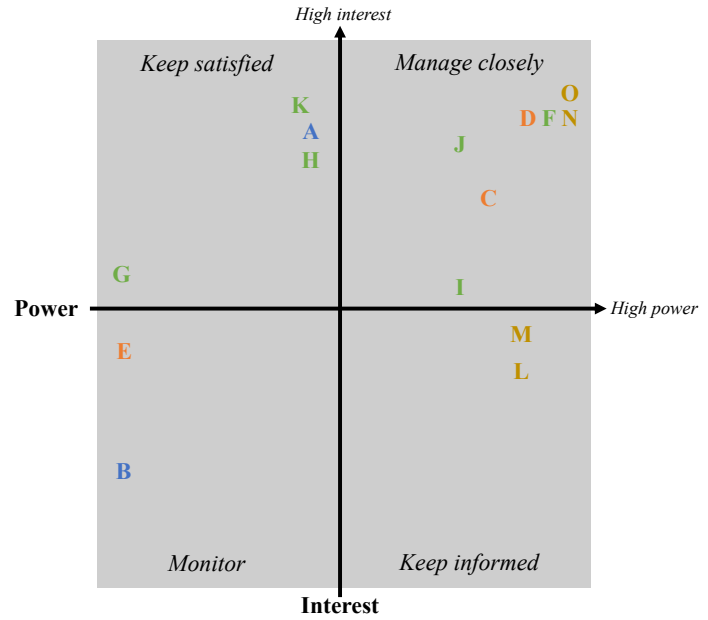
Figure E.2.A.1

A. Stakeholder List by Interest Category. B. Stakeholder Power-Interest Grid

A. Stakeholder List

Customers	
A	Parents/guardians
B	Students
Reading program only	
C	Teachers/reading specialists
D	Duke University Program in Education Partners for Success
E	Duke University Literacy Corps
CEP only	
F	DPS school nutrition services regional supervisors
G	USDA
H	Cafeteria manager
I	Data manager
J	Unbox (DPS Youth School Food Council)
K	School Meals for All NC
Reading Program and CEP	
L	Durham County Board of Commissioners
M	DPS Board of Education
N	Principal/assistant principal
O	Durham Children's Initiative

B. Stakeholder Power-Interest Grid



Note: Letters on the grid represent stakeholders shown in the stakeholder list in panel A.

Figure E.2.A.2

CATWOE Analysis and Root Definition of Parents/Guardians of DPS Students Enrolled in Kindergarten Through Grade 3 in Participating DPS Schools







C		Customers	Students (kindergarten through grade 3) enrolled in participating DPS schools and their parents/guardians
A		Actor	Parents and guardians of kindergarten through grade 3 students enrolled in participating DPS schools
T		Transformation Process	To provide school lunch at no charge to students/parents and to improve the reading proficiency of elementary-age students
W		World View	It is more difficult for hungry children to concentrate and learn in school. Children who are fed healthy meals are better able to learn, which increases their opportunities for success after primary and secondary education
O		Owner	DPS, school administration, and the Durham County Board of Commissioners
E		Environment Constraints	Household constraints in reading with children (e.g., not enough time), food insecurity, financial insecurity, free/reduced lunch application requirements, stigma associated with free/reduced lunch, students already proficient in reading do not require additional reading intervention

ROOT DEFINITION: A system to achieve grade-level reading proficiency by providing free, nutritious meals and reading support to students in order to improve long-term education and health outcomes.

Note: World view and environment constraints are based on personal experience and conversations and findings in the literature (Grineski et al., 2018; Kitsaras et al., 2021; Shankar et al., 2017; Tamiru & Belachew, 2017; Williams, 2014; Zuercher et al., 2022).

Figure E.2.A.3

CATWOE Analysis and Root Definition of DPS School Nutrition Services Regional Supervisors

C		Customers	Students (kindergarten through grade 3) enrolled in participating DPS schools and their parents/guardians
A		Actor	DPS School Nutrition Services Regional Supervisors
T		Transformation Process	To ensure that all DPS students at participating schools receive free, healthy lunch
W		World View	All students should have access to healthy foods
O		Owner	DPS, school administration, and the Durham County Board of Commissioners
E		Environment Constraints	Data gathering, paperwork, budget constraints, learning new processes and systems

ROOT DEFINITION: A system to provide free, nutritious meals to all students by supplementing federal CEP reimbursement with county funds in order to ensure that all children are set up to succeed in the classroom.

Note: World view and environment constraints are based on personal conversations and findings in the literature (Shankar et al., 2017; Tamiru & Belachew, 2017; U.S. Department of Agriculture Food and Nutrition Service, 2023; Zuercher et al., 2022).

Appendix E.3: Accountability and Engagement Plan

Introduction

Community engagement is a critical component of any public health intervention. When addressing education as a social determinant of health, the engagement of community partners can bring to a project local knowledge and expertise, cultural sensitivity, trust and credibility, ownership and empowerment, acceptance and compliance, resource mobilization, and tailored interventions for the target population. Ultimately, involvement of community partners increases the likelihood of success and long-term intervention sustainability. Accountability plans ensure continued stakeholder engagement and encourage clear communication of expectations. One such way to involve and empower the community is through the Feeding DPS Reading project. Feeding DPS Reading is a dual-pronged intervention to address low reading proficiency and food insecurity in Durham Public Schools (DPS). Program administrators will work with Durham County Commissioners and five individual schools that qualify for partial reimbursement of school lunches through the Community Eligibility Provision (CEP), that have reading proficiency levels below the DPS average, and that have a lower proportion of students than the state average meeting the Read to Achieve grade 3 benchmark. The first part of the approach relies on funding from Durham County to cover the difference between the free and paid CEP reimbursement rates. The second part of the approach relies on a collaboration with Duke University Program in Education Partners for Success program, in which undergraduate students work with elementary students to improve reading skills. The goal of Feeding DPS Reading is to improve reading proficiency in low-performing DPS schools while addressing food insecurity within the schools. To develop and implement this program, we suggest the development of an Education Task Force (see RASCI Analysis section). This task force will consult with a larger advisory board consisting of accountable and supportive parties within the program. In turn, the task force will consult with additional stakeholders who hold valuable information for the design and implementation of Feeding DPS Reading.

Engagement Strategy

Purpose

According to the Centers for Disease Control and Prevention, community engagement is an approach of “working collaboratively with and through groups of people affiliated by geographic proximity, special interest, or similar situations to address issues affecting the well-being of these people” (McCloskey et al., 1997). Engaging community partners in the design and implementation of an intervention to address disparities in education as a

social determinant of health is incredibly important. Community partners may provide access to resources, such as funding, facilities, materials, and expertise. Further, inclusion of diverse stakeholders in the design process can provide invaluable insight into the local context, including local norms, challenges, and opportunities. Similarly, selecting the appropriate community partners increases cultural sensitivity to the project by ensuring that the interventions respect and align with local customs, beliefs, and values. Further, by involving community partners, the program seeks to increase its credibility and trust among the population, which ultimately increases the potential reach and long-term sustainability of the intervention. Community partners can provide feedback to program administrators to assess and improve the intervention's effectiveness. Importantly, involving diverse community partners creates a sense of ownership and empowerment, which increases the likelihood that partners will be invested in the success of the program. In this way, involving community partners in the design and implementation of an education intervention can maximize its impact.

RASCI Analysis

The proposed program (Feeding DPS Reading) relies heavily on the involvement of community partners for development and implementation. We developed a RASCI chart (Table E.3.A.1) to clarify roles and responsibilities within the project infrastructure (Cabanillas et al., 2017). The Education Task Force is led by Durham Children's Initiative (DCI), which is a local nonprofit organization with a mission "to create a pipeline of high-quality services for [Durham County] youth and their families that overcomes the barriers to their success" (DCI, n.d.a). DCI already partners with more than 65 organizations, including government agencies, nonprofits, community groups, and DPS, which makes this an ideal organization to lead the Feeding DPS Reading initiative. DCI will be assisted by Unbox, which is a DPS program that provides students with training to be advocates for food justice and a link between their peers and the school food system (DPS, n.d.). By including Unbox in a leadership position, students participating in this council will develop leadership and advocacy skills and knowledge of the school food system. Further, they will provide critical insight into program components that will affect the success of the intervention.

In the RASCI analysis, school principals are the accountable party. They are responsible for the resources and processes within their respective schools and thus have accountability for implementation of their program components within their school (Powers and Duties of Principals, n.d.). School principals will be included on an advisory committee for the Feeding DPS Reading project, which will work with the Education Task Force to

improve and refine the Feeding DPS Reading Program. Community Partners in a supportive role may also participate in the advisory committee. These may include DPS School Nutrition Regional Supervisors, Duke University Partners for Success, and school data managers. The DPS School Nutrition Regional Supervisors are supportive because they are critical for the development, implementation, and delivery of the nutrition component of our intervention. Data managers will heavily support efforts in the CEP qualification process. Similarly, Duke University Partners for Success will supply the instructional part of our intervention.

Other community partners will be consulted given their important insights into both development and implementation of the program. These stakeholders include parents, Duke University Literacy Corps, cafeteria managers, and teachers. The Durham County Board of Commissioners and the DPS Board of Education are additional community stakeholders that must be kept informed of program progress and outcomes but will not be consulted on the program specifics.

Priority Partner

Based on the RASCI analysis (Table E.3.A.1), principals are a priority partner. Principals are key policy makers in DPS elementary schools and have vast experience in implementing programs aimed not only at improving educational outcomes, but also with student health and wellness. In North Carolina, principals have a minimum of a master's degree in school administration, which demonstrates their level of expertise in the social determinant of health of education (North Carolina Department of Public Instruction, n.d.). Principals have critical insights into the needs of their student body and school staff, which is critical to design an effective intervention. Additionally, principals have the authority to collect and submit data for CEP eligibility, as well as to improve instruction (Powers and Duties of Principals, n.d.).

Engagement Barriers and Facilitators

School principals are motivated to improve academic achievement and wellness among their population, which makes them an important source of information. Emerging evidence suggests that schools participating in CEP have improvement in student behavior, academic performance, and nutrition (Hecht et al., 2020). The Education Policy Initiative at Carolina and the North Carolina Alliance for Health found that schools participating in CEP were more likely to have met growth targets and have a higher academic performance than schools with similar income levels that do not participate (Fuller et al., 2021). Notably, schools participating in CEP have seen less student hunger, and one simulation on the effect of CEP on families' food purchasing power and food insecurity

found that CEP may have allowed 3.2% of food-insecure children and their families to move into food security through increased purchasing power (Hecht et al., 2020; Poblacion et al, 2017). Given the purview of school principals on the overall wellness of their student body, this is a significant motivator for principals to participate in the Feeding DPS Reading program (Powers and Duties of Principals, n.d.).

However, school principals also face some barriers for the development and implementation of Feeding DPS Reading. For example, principals are already overworked and have significant administrative responsibility that if not performed, can result in the withholding of pay (Powers and Duties of Principals, n.d.). Further, there may be some concern about CEP reducing revenue from the school lunch program, (Rothbart et al., 2020). Implementing CEP may also increase the number of students who receive lunch from the school, which requires more lunches to be prepared. This may require the procurement of additional food, space, and labor.

Engagement Methods

Community engagement allows groups implementing an intervention to build trust, enlist new resources and allies, create better communication, and improve overall health outcomes (Wallerstein et al., 2015). Because Feeding DPS Reading is a pilot program in five DPS schools, the principals of these schools can come together to discuss the design, improvement, and sustainability of the program. Stakeholder engagement techniques can be used in each of these phases to optimize stakeholder participation and ownership (Table E.3.A.2).

One way that principals can collaboratively participate in the design phase of the project is through the nominal group technique (NGT). In this method, team members (principals at each of the five participating schools) silently writes down as many ideas as possible in a set amount of time. Each member states one idea out loud per round, and a facilitator records it on the flip chart with no discussion. After ideas have been recorded, the participants discuss each idea in turn. For example, this technique can be used in the design phase to come up with ideas to facilitate data gathering or to identify concerns about the program. An activity that can be used to solve concerns identified by principals is brainstorming. In this technique, a single problem to be solved is placed at the top of a display, and the available resources are placed at the bottom. Additional resources may be placed at the bottom as they are discovered. The principals work to connect resources to the various actions that they support. Ultimately, where resources connect with actions in the middle of the graph provides insight into potential solutions. For example, as discussed above, principals may experience reluctance to participate in the program due to an

already high workload. The process described here (NGT followed by brainstorming) can help to identify specific workload-related concerns as well as potential solutions to circumvent these concerns.

To guide the project's development and implementation plan, the Education Task Force led by DCI and assisted by Unbox will conduct evaluations at least quarterly. These evaluations will assess progress in/completion of milestones in the charter and outcomes. Additionally, qualitative data will be included in the evaluation reports to determine level of engagement with and satisfaction of community partners. The Education Task Force will utilize the plan-do-study-act (PDSA) tool in the improve phase to optimize the Feeding DPS Reading intervention. In the "plan" phase, principals will determine collaboratively what they would like to improve, how much to improve it by, the evidence-based intervention that will be used, and how to measure outcomes. For example, they may focus on improving a specific component of the Feeding DPS Reading program in the first cycle, such as phonemic awareness. They would then determine the improvement goal and how to measure that goal (e.g., through the existing DIBELS measures). They also might use techniques discussed above (e.g., NGT, brainstorming) to identify a change to make the improvement. In the "do" phase, principals would work to implement the proposed change. In the "study" phase, principals would evaluate the progress and determine whether the change was effective and other lessons learned. In the "act" phase, principals would decide to adopt, adapt, or discard that change before beginning another PDSA cycle. A facilitator discussed above is the desire to improve academic performance in each school, and using PDSA cycles to improve test scores is a way to do this.

To sustain the project, we will hold regular meetings of the Education Task Force and Advisory Committee, along with other stakeholders as needed, to discuss program progress and any concerns for the sustainability of the program. At the first meeting during the design phase of the project, the Education Task Force and Advisory Committee, including school principals, will create a charter to define project scope, roles and responsibilities, key milestones, communication methods, and other expectations. During the improve phase, team members will ensure that milestones are being met and that the roles, responsibilities, and expectations remain accurate. During the sustain phase, the charter will be updated and revised as needed to outline continuing responsibilities and milestones for program maintenance to ensure the sustainability of the program. As mentioned above, school principals may be concerned about the extra workload of the program on top of other administrative responsibilities. A charter can help to assign responsibilities and will assure principals of the projected additional workload.

Engagement Leadership

DCI is an ideal partner to lead community partner engagement efforts for Feeding DPS Reading given their vast experience working with community partners, including government agencies, nonprofits, community groups, K-12 schools, museums, and thousands of volunteers (DCI, n.d.c). DCI has an existing evaluation team that tracks outcomes within the DCI ecosystem to ensure that its programs contribute to improved outcomes in Durham County (DCI, n.d.b). However, Feeding DPS Reading would require full and part-time staff for the program, which is included in the budget of the program. Ideally, DCI would hire these individuals given that they are an established and trusted community organization. No new policies are required from the Durham County Commissioners to develop and implement Feeding DPS Reading.

Disciplinary Critique

A memorandum of understanding (MOU) provides a structured framework for collaboration and helps to prevent misunderstandings between organizations participating in the project. The MOU ensures that the initiative is well-organized and accountable, increasing the likelihood of the program's success in achieving its health equity goals. Document E.3.A.1 provides the MOU between the engagement leader (DCI) and the DPS principals at the five participating schools. The overarching vision of the Feeding DPS Reading program is to improve the health of Durham County via education as a social determinant of health. The purpose of the MOU is to outline the common vision and establish a strategy to develop and implement the Feeding DPS Reading program with nutrition and academic components. As shown in Appendix Document 1, the MOU provides a scope of activities for DCI as well as for DPS principals to ensure that ownership of specific tasks is clear. Program milestones and outcome metrics are outlined in the MOU. Notably, the MOU may need to be amended as the program progresses to update goals and metrics as the program undergoes improvement cycles.

Conclusion

Engagement of community partners is critical for the success of a public health initiative. Successful engagement will build trust between the community and the organization, increase the likelihood of the intervention's success, and provide a sense of ownership to the community that will ultimately increase the long-term sustainability of the program. In addition, accountability plans help to ensure the community partners remain engaged and committed to the project's success.

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Appendix E.3.A: Accountability and Engagement Plan Figures and Tables

Table E.3.A.1

RASCI Analysis

Policy/Program Description		
<p>Feeding DPS Reading is a dual-pronged intervention to address low reading proficiency and food insecurity in Durham Public Schools (DPS). Program administrators will work with Durham County Commissioners, DPS, and five individual schools that qualify for partial reimbursement of school lunches through the Community Eligibility Provision (CEP), that have reading proficiency levels below the DPS average, and that have a lower proportion of students than the state average meeting the Read to Achieve grade 3 benchmark. The first part of the approach relies on funding from Durham County to cover the difference between the free and paid CEP reimbursement rates. The second part of the approach relies on a collaboration with Duke University Program in Education Partners for Success program, in which undergraduate students work with elementary students on the five pillars of success in reading: phonemic awareness, phonics, vocabulary development, fluency, and comprehension. The goal of Feeding DPS Reading is to improve reading proficiency in low-performing DPS schools while addressing food insecurity within the schools.</p>		
RASCI Levels	Community Partners	Rationale
<p>Responsible <i>Owns the challenge/project</i></p>	<p>Task Force</p> <ul style="list-style-type: none"> Led by DCI Assisted by Unbox 	<p>The Task Force is led by Durham Children’s Initiative in close collaboration with the DPS Unbox project, which is a policy council of students and staff. The Task Force is responsible for completion of the program, which involves overseeing school principals in applying to and following through with the CEP and supporting the implementation of the reading portion of the program within their school.</p>
<p>Accountable <i>Ultimately answerable for the correct and thorough completion of the deliverable or task, and the one who delegates the work to those responsible</i></p>	<p>Members of Advisory Committee:</p> <ul style="list-style-type: none"> School Principals 	<p>School principals are accountable for the resources and processes within their respective schools, and therefore have the accountability for implementation of program components.</p>
<p>Supportive <i>Can provide resources or can play a supporting role in implementation</i></p>	<p>Members of the Advisory Committee:</p> <ul style="list-style-type: none"> DPS School Nutrition Regional Supervisors Duke University Partners for Success Data Managers 	<p>The DPS School Nutrition Regional Supervisors play a role in the development, implementation, and delivery of the nutrition component of our intervention. The Duke University Partners for Success will be supplying the critical component of the instructional part of our intervention. Data managers will be critical in providing information in support of efforts in qualification for CEP.</p>
<p>Consulted <i>Has information and/or capability necessary to complete the work</i></p>	<ul style="list-style-type: none"> Parents Duke University Literacy Corps 	<p>Several community partners will be consulted in the development and implementation of the Feeding DPS Reading program. Parents are important community partners given that they are the targeted population for benefit with the proposed initiative. Further, parents will</p>

	<ul style="list-style-type: none"> • Cafeteria Managers • Teachers 	<p>need to provide information to schools to support CEP eligibility. Duke University Literacy Corps is not the primary source of volunteers but may provide back-up or additional support as needed by Duke University Partners for Success. Cafeteria managers play a key role in managing school lunch and student eligibility for free/reduced lunch, so they will be a critical source of information for the program's nutrition portion. Teachers must be consulted given that the intervention will take place during the school day.</p>
<p>Informed <i>Must be notified of results, process, and methods, but need not be consulted</i></p>	<ul style="list-style-type: none"> • Durham County Board of Commissioners • DPS Board of Education 	<p>The Durham County Board of Commissioners has requested an intervention to improve downstream health outcomes. The DPS Board of Education maintains a vested interest in student performance and educational outcomes, especially in response to targeted programs.</p>

Table E.3.A.2

Methods, Timing, and Measures

Engagement Method	Related Facilitators and Barriers	Timing	Performance Measure		
			Description	Data Source	Frequency
Team Charter	Scope of stakeholder involvement (i.e., projected workload)	Design Improve Sustain	On-time completion of milestones, number of completed post-implementation evaluations	Charter documentation	Initial creation, quarterly revision
Nominal Group Technique	Desire for higher school academic performance Desire for increased student health and wellness	Design Improve	Number of ideas generated, percentage of group participating	Record review	Initially and as needed
Brainstorming	Desire for higher school academic performance Desire for increased student health and wellness	Design Improve	Number of ideas generated, participant satisfaction	Record review, participant survey data	Initially and as needed
Plan-Do-Study-Act Cycles	Desire for higher school academic performance Desire for increased student health and wellness	Improve Sustain	Percentage of group participating, number of cycles performed, proportion of PDSA goals met, participant satisfaction	Record review, participant survey data, project documentation	Quarterly

Document E.3.A.1

Memorandum of Understanding

This memorandum of understanding (MOU) is entered into by and between Durham Children’s Institute and Durham Public Schools (DPS) principals at participating Feeding DPS Reading elementary schools.

1) Purpose

The objective of this MOU is to outline the common vision and establish a strategy to develop and implement the Feeding DPS Reading program. This project’s goal is to improve low reading proficiency in DPS through both nutrition and academic approaches:

- Nutrition component: enroll five DPS elementary schools that eligible but currently not participating in the Community Eligible Provision (CEP)
- Academic component: implement reading tutoring approaches at those five DPS schools for students in grades kindergarten through three to improve reading proficiency

2) Engagement Vision and Values

Vision: To improve the health of Durham County via education as a social determinant of health

Values:

- a. Create transformative change in DPS elementary schools to increase food security and reading proficiency
- b. Develop equitable solutions to address disparities in reading proficiency among students of different races, ethnicities, and socioeconomic statuses
- c. Engage diverse community partners through multifaceted co-design and collaborative processes.
- d. Amplify the voices of parents and students in Durham County, North Carolina.
- e. Be adaptable and willing to make necessary changes to best serve the citizens of Durham County, North Carolina.

3) Scope of Activities

- a. Durham Children’s Initiative agree to perform the roles and responsibilities outlined below:
 - i. Responsible for the administration of the Feeding DPS Reading program

- ii. Provide resources and supports within the program budget for program development, implementation, evaluation, and long-term sustainability of the Feeding DPS Reading program
 - iii. Lead the Education Task Force and engage community partners
 - iv. Collect data and create evaluation reports to assess the project's progress
 - v. Update Durham County Commissioners on the program's progress
- b. DPS principals agree to perform the roles and responsibilities outlined below:
- i. Responsible for data collection for initial CEP qualification and subsequent recertifications every four years
 - ii. Responsible for submitting CEP applications to the United States Department of Agriculture
 - iii. Participate in the Feeding DPS Reading Advisory Committee to develop, implement, and improve the program
 - iv. Allow certified volunteers to enter the school during the school day to perform reading intervention
 - v. Provide Durham Children's Initiative with academic data (e.g., test scores, DIBELS) to aid in the program evaluation

4) Program Milestones (Through End of 2024-2025 School Year)

- a. Initiation of Education Task Force and Advisory Committee
- b. Initial stakeholder engagement (collection of feedback and suggestions for program design) (within 1 month of Education Task Force and Advisory Committee)
- c. Design program framework
- d. Consult necessary stakeholders
- e. Approve program framework
- f. Secure necessary resources (e.g., volunteers for reading program)
- g. Submit CEP applications (by deadline as otherwise stated by the United States Department of Agriculture, estimated June 30, 2024)
- h. Initial implementation of program (targeted for beginning of the 2024-2025 school year)

- i. PDSA cycles as needed
- j. First evaluation report (targeted for middle of 2024-2025 school year)
- k. Second evaluation report (targeted for end of 2024-2025 school year)

5) Program Metrics

- a. Proportion of schools that submit CEP paperwork
- b. Rate of meal participation rate in each of the participating schools
- c. Proportion of students meeting the Grade 3 Read to Achieve Benchmark in participating schools
- d. Proportion of students with grade level–proficient reading in participating schools

6) Timeframe

The term of this MOU is for a period of two years from the date of the last signature. The MOU may be extended with written consent of all parties. The MOU may be terminated by either party with reasonable cause, but the reason and request for termination must be submitted to all parties listed on this MOU with at least 60 days prior notice. The termination of this MOU shall not affect activities in process pursuant to specific activity agreements, which shall continue until concluded by the parties in accordance with their terms or as otherwise agreed by the parties. This MOU may be amended only by written consent and majority vote of the listed parties.

7) Signatures

I hereby agree to serve as the lead agencies for this evidence-based public health pilot program. I agree to abide by the terms and conditions in this MOU between Durham Children’s Initiative and DPS middle school principals for the purpose of the design and implementation of the Feeding DPS Reading program.

Durham Children’s Initiative

Signature: _____ **Date:** _____

Hillandale Elementary School Principal

Signature: _____ **Date:** _____

Holt Elementary School Principal

Signature: _____ **Date:** _____

Hope Valley Elementary School Principal

Signature: _____ **Date:** _____


Oak Grove Elementary School Principal

Signature: _____ **Date:** _____

Parkwood Elementary School Principal


Signature: _____ **Date:** _____

Appendix E.4: Individual Presentation and Script



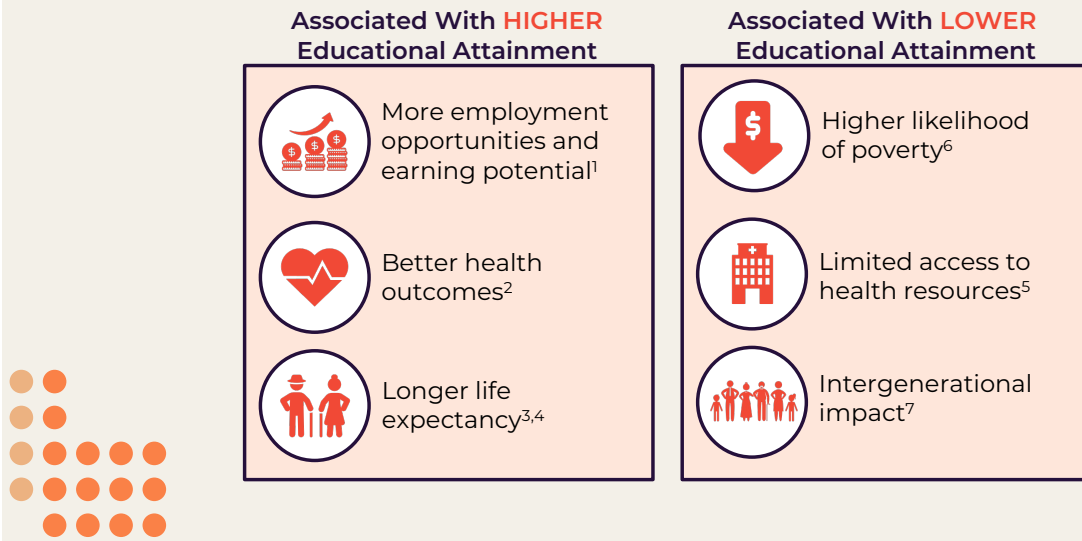
FEEDING DPS READING: A COMPREHENSIVE PROGRAM TO ENHANCE THIRD-GRADE READING PROFICIENCY IN DURHAM PUBLIC SCHOOLS

Nicole Jack, Camille Levi, Steven Nordstrom,
Cecelia Wall, Katie Wood



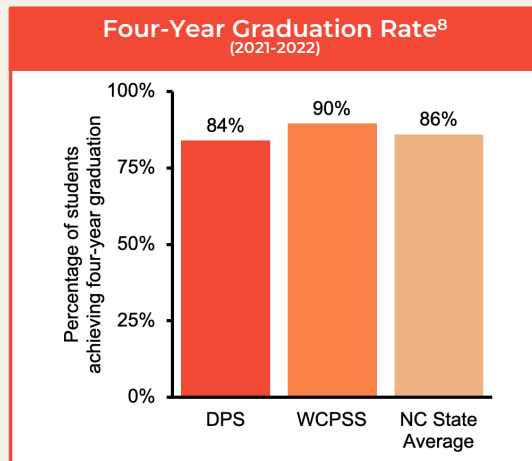
Good evening. We are the Durham County Advisory Committee for Education as a Social Determinant of Health. We thank you for your time and attention as we introduce Feeding DPS Reading, which is a comprehensive program to enhance third-grade reading proficiency and ultimately long-term health outcomes in Durham Public Schools.

Education as a SDoH



Social determinants of health are nonmedical factors that influence health outcomes. In particular, education access and quality is a critical social determinant of health that requires immediate public health action in Durham County. People who have higher educational attainment are more likely to have higher paying and more stable jobs including access to employer-sponsored health care. This can lead to better health outcomes, such as lower morbidity, mortality, and disability, and even longer life expectancy. In contrast, people with lower educational attainment have limited access to health resources and higher rates of poverty, leading to worse health outcomes. These effects last through generations. Parents with higher levels of education tend to have children who are better educated, healthier, and wealthier than parents with less education.

Education in Durham County, NC

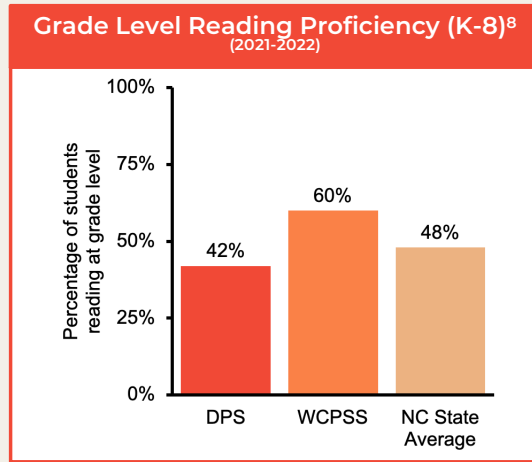


DPS, Durham Public Schools; NC, North Carolina; WCPSS, Wake County Public School System.

Third-grade reading proficiency is a significant predictor of whether that individual will graduate from high school.⁹

The graduation rate in Durham Public Schools is 84%, which is lower than the NC state average of 86% and much lower than the graduation rate in neighboring Wake County. Notably, whether a child is proficient in reading at third grade is a significant predictor of whether that individual will graduate from high school.

Education in Durham County, NC

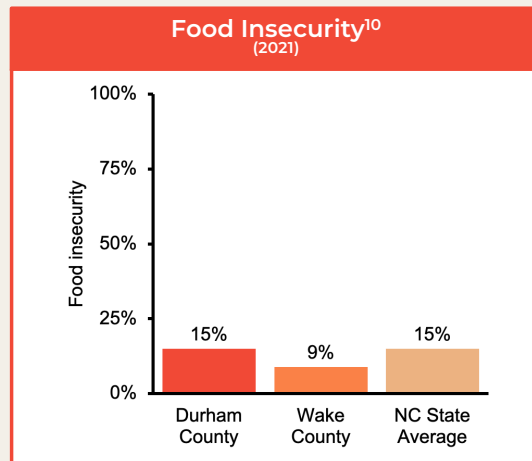


Only 42% of DPS students are grade-level proficient in reading compared to 60% in WCPSS

DPS, Durham Public Schools; NC, North Carolina; WCPSS, Wake County Public School System.

And when we look at reading proficiency in Durham County, there is cause for concern. Only 42% of third- through eighth-grade students are proficient readers in DPS, compared to 60% in neighboring Wake County and 48% statewide.

Education in Durham County, NC



Hungry students do not perform as well in school as students who have enough to eat.¹¹

NC, North Carolina.

We know that hungry students cannot learn as well as students who have enough to eat. Feeding America estimates that 15% of children experience food insecurity in Durham County, as well as in North Carolina as a whole. This is about 67% higher than food insecurity in Wake County.



Priority Population

Durham Public School K-3 Students



Given the research that third-grade reading proficiency is a strong predictor of high-school graduation, we have identified our priority population as DPS students in kindergarten through third grade. By intervening early, we will improve not only the education of Durham County children, but also their overall health and wellbeing throughout adulthood.

APPENDIX F: KATIE WOOD'S INDIVIDUAL DELIVERABLES

Appendix F.1: Social Determinant of Health Analysis

Social Determinant of Health

The World Health Organization (WHO) defines social determinants of health as “the non-medical factors that influence health outcomes,” which can include conditions people are born, grow, work, live, and age into and the systems which shape their daily lives (WHO, 2023). Social determinants of health attribute 30 to 55 percent of total health outcomes. Estimates show contribution from sectors external from health care i.e., education, food insecurity, housing, social inclusion, and working conditions, often exceed the impact of contributions from the health sector (WHO, 2023). Education attainment can be directly associated with socioeconomic outcomes, but also better decision-making skills for mental and physical wellness (Shankar, et. al., 2013). Specifically, third grade marks a critical time in a child’s development and provides a goalpost for measurement of learning outcomes (Huang, 2023). While many factors contribute to these reading outcomes, including access to books at an early age and exposure to reading in a childcare setting, nutrition plays a major factor in a child’s academic performance

The Healthy People 2030 goals, which identify public health priorities to help improve the health and well-being of individuals in the United States, list increased educational opportunities for children and adolescents as a primary goal to improve wellness and health outcomes (Healthy People 2030, n.d.) Children from low-income backgrounds, including those who experience forms of social discrimination and bullying, are more likely to struggle with math and reading, and less likely to graduate from high school or college (Healthy People 2030, n.d.). This in turn correlates with lower paying jobs and increased likelihood of chronic health problems such as heart disease, obesity, and Type 2 diabetes. Lower levels of educational attainment tend to follow a cyclical pattern with low-income families continuing to see patterns of poverty, chronic disease, lower-wage jobs for multiple generations. Adjusting the ability for children and adolescents to receive access to high-quality education opportunities helps to break the cycle of negative indicators for social determinants of health through higher paying jobs, better understanding of physical and mental wellness, and sustained stability to reduce stress.

Geographic and Historical Context

Durham County is the sixth most populous county in the state of North Carolina with more than 320,000 residents (County One Pager, 2022). Situated in what is often referred to as the “Research Triangle” of North Carolina, Durham is home to Duke University, and has close proximity to both Raleigh and Chapel Hill. While the

proximity of universities and several major biotechnology companies makes Durham an attractive home, recent gentrification due to an influx of jobs in the area has deepened the divide for Black and Hispanic residents. The growth rate for Durham County is upwards of 20 percent, while the growth rate of the state is 9.5 percent. In Durham city specifically, the rates of poverty and child poverty are 18.5 percent and 27 percent respectively, which is higher than both national and state averages (De Marco & Hunt, 2018).

As of 2022, in Durham County 54 percent of residents are White alone, 35 percent are Black alone, 14 percent are Hispanic, and 6 percent are Asian (US Census, 2022). Data collected amongst residents ages 25-44 showed 10 percent did not graduate from high school, 14 graduated from high school or received a GED, 20 percent received a certification or associate's degree, 31 percent have a bachelor's degree, and 26 percent have some form of graduate or professional degree. While these secondary and postsecondary numbers exceed national averages, the data for K-12 students indicates lower achievement, a stark indicator of the number of residents flocking to the Durham area for employment opportunities while existing residents are forced to adjust to increased gentrification in certain communities. At the elementary level, just 25 percent of Durham County third graders achieve college or career-ready scores in reading and math, in contrast to the national average of 35 percent, and 32 percent of eligible four-year-old students enroll in Pre-K, below the national average of 40 percent.

Several programs currently exist within the Durham community aimed at combatting low reading attainment and associated nutrition challenges which inhibit learning capacity. One example is the Durham Partnership for Children, which aims to provide community strategies for children to promote healthy development (Durham Partnership for Children, 2023). Another great example is the Duke Partners for Success Program (PFS) operating out of Duke University, which aims to place undergraduate elementary education students in classroom settings throughout Durham County to support teachers while expanding their own interpersonal skills (Partners for Success, 2023).

Priority Population

The priority population for the purpose of this paper is Black and Hispanic elementary-aged students. Minority students are more likely to perform poorly on measures of academic success, which can be associated with additional SDOH such as food insecurity, unsafe home conditions, or additional family obligations such as jobs or caregiving responsibilities (Huang, et.al., 2013). It is important to recognize that while the data supports targeted efforts specific to Black and Hispanic children, there are certainly children from every racial and ethnic background

who face disproportionate burdens when it comes to the external factors impacting academic performance and thus future success.

Measures of SDOH

Data from the 2022-2023 school year reflects that 83 percent of White students scored at or above proficient levels for math composite scores, while 37 percent of Black students and 32 percent of Hispanic students met proficiency levels (Figure F.1.A.1). Additionally, data reflects that for students deemed to be “economically disadvantaged,” just 37 percent received proficient test scores across all subjects, a 5.8 percent increase from the previous school year. A compilation of average grades broken down by each elementary school in Durham County shows a significant association between race and income-level and academic achievement with the majority of white students averaging A’s and B’s and the majority of Black and Hispanic students averaging C’s and D’s with some students even averaging failing grades at an elementary level (Figure F.1.A.2).

Rationale

Durham County is thriving with low rates for unemployment and rising household income levels. However, academic achievement at the elementary level, particularly when broken down by race, reflects a stark divide in the resources being made available to Durham children. Black and Hispanic children are more likely to come from low-income, single-parent, or food insecure homes, each of which provides an indicator for lower academic achievement (Manderscheid, 2008). Durham Public School System works hard to incorporate substantive programs to support these inequities including standing up an office for racial and educational equity policy, operating a mobile meal delivery system during Covid, and developing a pilot program to recruit more teachers from minority backgrounds (Durham Public Schools, 2023). While the public school system has shown a willingness to engage with the community to put these supports into practice, test scores amongst minority students do not reflect the tangible results indicating there is space for further intervention to support academic success and future public health outcomes.

Disciplinary Critique

In the context of this proposal, it is critical to bring a public health leader on board to support the comprehensive use of a socioecological framework to recognize the role each community partner has to play. While the public school system may have experienced success using specific pilot models such as the diversity recruiting model mentioned above, it is important to recognize the interwoven nature a solution of this magnitude requires. A

great example to use is the Moving to Opportunity (MTO) program funded through the Department of Housing and Urban Development, and supported by HHS's Healthy People 2030 goals, which provides housing vouchers to families living in poverty who experience a significant number of relocations, which not only uproots their families from jobs and stability but also impacts a child's learning environment if they are forced to move school districts (US Department of Housing and Urban Development, n.d.). This is a model that shows collaborative efforts across multiple federal agencies aimed at targeting multiple SDOH to achieve a unified result. Using this example, the outcome of a housing program can show secondary benefits including improved academic outcomes, job stability, reduced reliance on welfare benefits, and broader community engagement.

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Appendix F.1.A: Social Determinant of Health Analysis Figures and Tables

Figure F.1.A.1

Subgroup Performance Broken Down by Racial/Ethnic Group Based on Grade Level Proficiency Standards Set by The North Carolina Department of Public Instruction

2 SUBJECT SCORE COMPARISONS BY RACIAL SUBGROUP

The chart below provides subgroup grade level proficiencies by subject. The numbers below are indicative of tests scoring at or above Grade Level Proficiency standards set forth by the North Carolina Department of Public Instruction. An asterisk (*) means the group size is too small to report (n<10).

	ALL	American Indian	Asian	Black	Hispanic	Multi-racial	White
All Subjects	47.9	63.3	63.5	39.5	37.4	56.8	82.7
Math Composite (3-8)	47.7	78.6	64.1	36.6	39.2	55.8	82.6
Math 3	56.4	*	62.0	46.9	48.6	59.9	84.6
Math 4	51.1	*	56.1	39.7	45.2	55.1	80.7
Math 5	51.4	*	68.1	40.3	44.5	56.7	83.5
Math 6	44.7	*	64.1	33.9	35.0	52.6	80.0
Math 7	44.2	*	69.2	32.0	35.2	62.9	83.0
Math 8	37.7	*	65.0	27.6	26.6	44.9	84.2
Reading Composite (3-8)	45.3	71.4	56.0	37.7	32.7	54.5	81.3
Reading 3	39.3	*	42.0	33.1	23.7	46.4	74.0
Reading 4	49.9	*	53.7	43.2	36.7	59.1	82.6
Reading 5	43.2	*	51.1	33.3	31.3	52.9	82.3
Reading 6	46.4	*	53.8	37.8	35.9	54.7	79.8
Reading 7	45.6	*	65.0	38.0	32.5	65.5	82.7
Reading 8	47.5	*	75.0	40.5	35.9	50.0	88.5
Science Composite (5 & 8)	64.9	*	77.0	58.8	55.2	74.4	>95
Science 5	66.0	*	76.6	59.4	55.8	77.7	93.8
Science 8	63.9	*	77.5	58.2	54.5	70.4	>95
EOC Composite	44.1	33.3	66.3	36.8	33.5	53.8	79.1
English II	49.4	*	75.0	43.0	37.2	58.2	84.4
Biology	47.6	*	72.5	38.0	35.4	61.2	80.4
Math 1	28.8	*	36.8	26.6	23.0	31.6	61.8
Math 3	48.7	*	71.2	38.6	39.3	58.9	80.0

Figure F.1.A.2

Subgroup Performance Grades Showing Overall Performance at Each Elementary School in Durham County for the 2022-2023 School Year

	ALL	Black	Hispanic	Multi-racial	White	Economically Disadvantaged	Limited English Proficient	Students with Disabilities
Ignite Online Academy	D	D	F		C	F		F
Bethesda Elementary	D	D	D			D	D	F
Burton Elementary	C	C	C			C	D	
C C Spaulding Elementary	F	F				F		
Club Boulevard Elementary	C	D	D		A	D	D	F
Creekside Elementary	C	F	D		B	D	F	
E K Powe Elementary	C	D	F		B	D	F	F
Easley Elementary	B	C	C		A	C		D
Eastway Elementary	D	D	D			D	D	
Eno Valley Elementary	D	D	D			D		F
Fayetteville Street Elementary	D	D	D			D		
Forest View Elementary	D	F	F		B	F	F	F
George Watts Elementary	B		D		A	D		D
Glenn Elementary	C	D	C			C	D	
Hillandale Elementary	D	D	D		B	D	F	D
Holt Elementary	C	D	D			D	D	
Hope Valley Elementary	D	D	D		A	D	F	F
Lakewood Elementary	D	F	F			F	F	
Lyons Farm Elementary	B	D			A	D		
Mangum Elementary	B				B	C		
Merrick-Moore Elementary	C	C	C			D	D	F
Morehead Montessori	B				A	F		
Oak Grove Elementary	C	D	C			D	D	F
Parkwood Elementary	D	D	D		B	D		F
Pearson Elementary	B	C	B	B	A	C		D
R N Harris Elementary	B	C	B			C	B	
Sandy Ridge Elementary	C	C	C			C	D	F
Southwest Elementary	C	D	C		B	D	D	F
Spring Valley Elementary	C	C	D		C	D	D	F
W G Pearson Elementary	D	D	D			D	D	
Y E Smith Elementary	F	F	D			F	F	
Little River K-8 School	C	D	C		B	D		F

Appendix F.2: Community Partner Analysis

Introduction

Third grade marks a critical time in a child’s development and provides a goalpost for measurement of learning outcomes. Unfortunately, as of 2022 only 47 percent of Durham children were reading at a proficient grade level for the third grade, a critical indicator for students to not finish high school (Hui, 2022). Access to education is listed as a social determinant of health (SDOH) on the Health Department of Health and Human Services (HHS) Healthy People 2030 goals. Accordingly, people with higher levels of education are more likely to live longer and be healthier (Healthy People 2030, n.d.). While many factors contribute to reading outcomes, including access to books at an early age and exposure to reading in a childcare setting, nutrition plays a major factor in a child’s academic performance. For example, while the North Carolina General Assembly requires schools facilitate a summer reading camp for students below a proficient reading level, the availability of nutrition supports remain up to the school and many do not have funding to offer free lunch during the summer months (Chatham County, n.d.). While federal agencies such as the Food and Drug Administration (FDA), and the U.S. Department of Agriculture (USDA) set standards for healthy eating practices through products such as the Dietary Guidelines for Americans and MyPlate, community partners in Durham County are responsible for developing actionable items. These partners include teachers, parents, DPS dietitians, Duke University, and many others. Each stakeholder has a unique role to play in shaping the success of this pilot.

Policy Proposal

“Feeding DPS Reading,” aims to maximize the existing infrastructure provided by several programs in Durham County. For the 2023-2024 school year, 28 DPS schools currently participate in the Community Eligibility Provision (CEP), which allows schools serving the highest number of students living in poverty to provide breakfast and lunch at reduced or no cost to all students without needing to collect eligibility information. Eligibility is instead determined based on the percentage of students enrolled in federal needs-based programs such as the Supplemental Nutrition Assistance Program (SNAP) or Temporary Assistance for Needy Families (TANF) (USDA, 2023). Schools deemed high need receive the full reimbursement level for all students for breakfast and lunch, however schools placed in the moderate need category receive a partial reimbursement based on need (USDA, 2023).

Administrators of Feeding DPS Reading will select five eligible schools currently receiving a partial reimbursement level to pilot an adjustment to school lunch reimbursement up to 100 percent based on a majority display of below-average reading scores amongst their third grade students. Below average scores are defined as

proficiency below the current DPS reading average. The program will require funding either directly through Durham County or grant funding through USDA. The second component of the pilot will incorporate a partnership with the Duke Program in Education Partners for Success (PfS) program, which supports the training of undergraduate students majoring in education by placing them in a local elementary school to train, which in the context of this project will be implementing the five pillars of success to learn to read—phonemic awareness, phonics, fluency, vocabulary, and comprehension (Duke PfS, n.d.). The primary aim is to supplement supports available to students in the classroom by providing one-on-one or small group opportunities for academic growth in partnership with the added nutrition supports.

Community Partner Analysis

Each of the relevant stakeholders has a role to play in increasing the availability of nutritious meals available to children to increase reading proficiency specific to elementary-aged students in Durham County. While internal stakeholders may include students, parents, school nurses, DPS dietitians, and social workers, external workers include FDA, USDA, the Durham Children’s Initiative, School Meals for All NC, and Durham County Commissioners (Table F.2.A.1). The aim is to achieve a 25 percent increase in the number of students measuring at or above proficient reading levels for the third grade within a two-year timeframe following implementation of the 100 percent CEP reimbursement pilot program.

A power-interest grid was utilized to map appropriate levels of engagement, which will ultimately help inform the level of engagement needed for each stakeholder as we track implementation of the program to increase efficiency of communication (Figure F.2.A.1). USDA and FDA will be treated as low interest/high power stakeholders, which will require ongoing efforts to keep them engaged on distribution of grant funding and working within the standards outlined for the CEP reimbursement and Dietary Guidelines. The primary aim is to keep them apprised without overwhelming them with unnecessary information.

Non-profit organizations such as Durham Children’s Initiative and Schools Meals for All NC will be treated as high interest/low power stakeholders given they already work on the specific policies outlined within the pilot program. It will be important to use the existing infrastructure within each organization as a foundation for success to build the pilot upon. It is important to avoid redundancy with work which has already been done in the community, not only to streamline the efficiency of the program, but also to maintain valuable relationships with

community partners. These stakeholders should be kept informed of all details as implementation of the program continues, as their feedback can direct specific changes to the model in practice.

Internal stakeholders will include school staff such as nurses, teachers, and administrators, as well as broader DPS staff including the DPS dietician who assists in menu planning and the Durham County Commissioner who works to plan the county budget. Additionally, the Duke Partners in Success program will play a significant role in supporting students in their reading advancement, which will supplement efforts on the nutrition programming side.

Partner Worldviews

A CATWOE analysis uses a soft-systems methodology taking all stakeholder viewpoints into account to develop a unified approach to the final goal for implementation (CATWOE Checklist, n.d.). The CATWOE allows us to model the system in which stakeholders will be operating to explore factors that will inform each stakeholder's ability to contribute to transformative change (Table F.2.A.2 and Table F.2.A.3). First, we must prioritize engagement with stakeholders offering funding opportunities to stand up pilot programs of this scale, such as USDA and, at the local level the Durham County Commissioner. USDA provides annual funding opportunities for state and local entities to apply for, including Demonstration Projects to End Child Hunger which piloted the impact of providing three meals each day to children in select schools in addition to food during weekends and holiday breaks (Demonstration Projects to End Child Hunger, 2014). At the local level, in 2022 the Durham County Commissioner approved a \$889.5 million budget for fiscal year 2023, a 12.1 percent increase from the previous year. While increases supported a 4 percent increase for teacher salaries and a 1.25 percent increase to retirement benefits, there was no specific line item in the budget dedicated to nutrition services for DPS (Durham County Approved Budget, 2023).

An additional community partner to prioritize is the DPS dietician who will engage with many other stakeholders to develop menus and oversee child nutrition habit. Currently, DPS currently employees one dietician to inform the nutrition information for a school district with more than 32,000 students (DPS Program Services, 2022). Additionally, the influx of data required to evaluate the success of this program throughout the implementation stage may overwhelm DPS data managers and impact the reliability of the results. It is important to emphasize overcommunication with these specific stakeholders who are entrenched in the work being done at the

community level. In reference to the power-interest grid (Figure F.2.A.1), they hold the greatest amount of power in a successful implementation.

Conclusion

In providing an opportunity for all stakeholders to come together in a collaborative manner, an important question to ask of the internal stakeholders is how they gauge students, teachers, and administrators' willingness to adapt to a new model and integrate learning into the additional supports provided through Duke Partners in Success. Understanding the unique role of each stakeholder group, both internal and external, will help to inform communication efforts throughout the implementation of the pilot program as well as primary areas of investment. Recognizing there is a strong foundation set within the community, our role throughout implementation will be to ensure that each stakeholder is appropriately consulted and informed of their individual roles for success.

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Appendix F.2.A: Community Partner Analysis Figures and Tables

Table F.2.A.1

Stakeholder List

Stakeholder	Description
Durham Public Schools	Listed as the 8 th largest school district in North Carolina with more than 32,000 students
DPS Data Manager	Responsible for auditing necessary data to develop monthly reports on attendance, grade reporting, and daily scheduling.
Durham Children’s Initiative	Community-based nonprofit aimed at promoting pathways to equity for children from all backgrounds.
School Meals for All NC	Working to secure funding to ensure all children in a public school setting in North Carolina have access to free breakfast and lunch.
Duke University Literacy Corps	Statewide consortium of AmeriCorps members working to increase the availability of literacy programs through tutoring, small group teaching, and classroom assistance programming.
Durham Partnership for Children	Non-profit aimed at providing supports to children ages birth to five years old to ensure they are ready for success upon entering Kindergarten.
Students	Group that will be most greatly impacted by the implementation of nutrition programming.
Teachers	DPS currently employees more than 2,400 teachers with 200 Kindergarten teachers and 1,440 elementary teachers.
Parents	Responsible for supporting the implementation of nutrition supports and supplemental reading practice while a child is at home.
Social Workers	Often the first access point to support the highest risk students i.e., overaggressive behaviors, social withdrawal, physical or emotional abuse in the home.
School Nurses	May serve as the primary health professional responsible for evaluating a child’s well-being i.e., malnutrition, low/high BMI.
DPS Dietician	Responsible for incorporating standards for school lunches using the USDA MyPlate model and the FDA Dietary Guidelines.
USDA	Primary funding source for schools participating in the CPE reimbursement program.
FDA	Responsible for developing Dietary Guidelines for Americans.
County Commissioners	Responsible for determining the county budget on an annual basis.

Table F.2.A.2

CATWOE Analysis of Students

Customers	<ul style="list-style-type: none">• Students• Parents
Actor	<ul style="list-style-type: none">• Teachers• DPS Dietician• Duke School of Education: Partners in Success Program
Transformation Process	<ul style="list-style-type: none">• Provide all DPS students with the ability to eat a free breakfast and lunch by modeling a 100 percent CEP reimbursement for eligible schools.
World View	<ul style="list-style-type: none">• Access to nutritious meal options on a regular basis helps to boost academic performance and increase long-term career opportunities.
Owner	<ul style="list-style-type: none">• USDA• FDA• Durham County Commissioner• Durham Public School System (DPS)
Environmental Constraints	<ul style="list-style-type: none">• Funding to accommodate full expansion of CEP reimbursement• Staffing constraints to feed additional children

Root Definition: Feed DPS Reading is a system informed by FDA Dietary Guidelines and funded through grants supported by USDA and the Durham County Commissioners designed to provide all DPS students with the ability to eat a free breakfast and lunch because access to nutritious meals increases academic achievement and thereby increases opportunities for long-term success including higher rates of high school graduation.

Table F.2.A.3

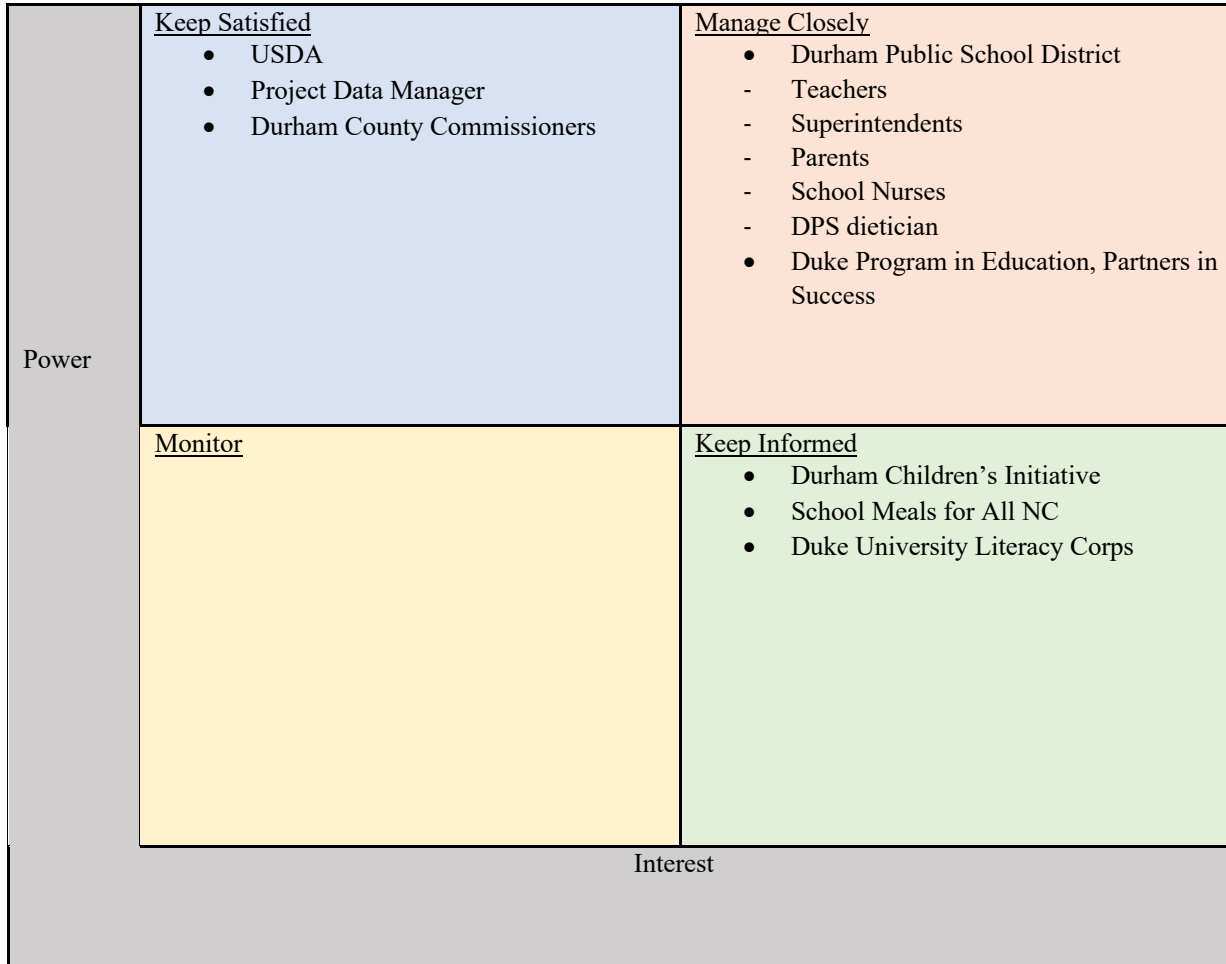
CATWOE Analysis of Duke Partners in Success Program

Customers	<ul style="list-style-type: none">• Students• Teachers
Actor	<ul style="list-style-type: none">• DPS Dietician• Duke School of Education: Partners in Success Program
Transformation Process	<ul style="list-style-type: none">• Supplement nutrition programming with supports for students measuring below the proficient third grade reading level.
World View	<ul style="list-style-type: none">• Children who are already behind in their learning capability will not be able to catch up using solely nutrition supports.
Owner	<ul style="list-style-type: none">• USDA (potential grants)• FDA (potential grants)• Durham County Commissioner• Durham Public School System (DPS)
Environmental Constraints	<ul style="list-style-type: none">• Number of students enrolled in Duke Partners for Success Program willing to teach• Potential language barriers

Root Definition: Feed DPS Reading is a system led by the Duke School of Education Partners in Success Program where current undergraduate students perform supplemental reading supports to third grade students measuring below proficient reading levels because children who are provided additional free lunch and/or breakfast will not be able to make up lost learning capability without additional supports.

Figure F.2.A.1

Stakeholder Power-Interest Grid



Appendix F.3: Accountability and Engagement Plan

Introduction

In evaluating education as our social determinant of health (SDOH)— we recognize people with higher levels of education are more likely to live longer and be healthier (Healthy People 2030, n.d.). At the elementary level, just 25 percent of Durham County third graders achieve college or career-ready scores in reading and math, in contrast to the national average of 35 percent, and 32 percent of eligible four-year-old students enroll in Pre-K, below the national average of 40 percent (Durham Public Schools, 2022).

Our goal in the implementation of Feeding DPS Reading is to increase proficient reading levels amongst third grade students within the Durham County Public School system by expanding access to free and reduced school meals. In order to achieve this goal, sustained communication with external stakeholders will serve as a critical foundation for change. To outline stakeholder engagement, we utilized a RASCI analysis (Responsible, Accountable, Supporting, Consulted, and Informed) to understand the roles each stakeholder will take on and develop a comprehensive engagement strategy to map levels of communication required for each group (Table F.3.A.1). The RASCI analysis allows us to assign roles for each stakeholder and ensure each phase of the implementation of the pilot program has a designated manager in place to achieve success (RASCI, 2022). While each stakeholder has been placed into a specific category it is critical to remember there will be sustained overlap in each of their roles in order to achieve collective action.

Engagement Strategy

Nutrition plays a critical role in our aim to achieve sustained improvement in reading proficiency amongst elementary-aged children. The challenge in addressing educational attainment as a SDOH is the intersectionality of education and nutrition standards, two issues which are often addressed separately in the scope of research as well as federal funding opportunities. For example, the primary federal agencies responsible for education and nutrition are completely siloed from each other—the United States Department of Agriculture (USDA) and the Food and Drug Administration (FDA), and the Department of Education. Additionally, at the local level, teachers and administrators will rarely have training or prior education on nutrition standards for children. The roles teachers take on will range from friend to mental health counselor to social worker and beyond. The capacity educators have in their day-to-day to assist in supervising a child’s nutrition goals are limited, which is why we must lean on our

external stakeholders in the community through partnerships with local universities and engagement with non-profits.

Our first category of community partners will be the designated task force led by the Durham Children's Initiative (DCI), and in close collaboration with the Durham County Public Schools Unbox Project, which provides supplemental nutrition supports to the school district. These stakeholders assigned to the designated task force will maintain ownership over the project and provide hands-on support throughout the implementation phase.

The second category of community partners will be members of the advisory committee, largely led by principals and school superintendents. These stakeholders will maintain accountability over the project, largely in the distribution of funding and resources.

The third category of partners will include those who provide a direct supporting role throughout the project to determine effectiveness of implementation. This includes DPS dietitians, DPS data managers, and the Duke Partners for Success program, which will implement the supplemental reading program for students testing below proficient reading levels. In their role, these partners will have the most exposure to the students themselves and will therefore be best suited to report out on student progress.

The fourth category will include those partners who need to be consistently consulted in order to get the project to a completed phase, which will include parents, cafeteria managers, and the Duke University Literacy Corps, which may need to be engaged to provide additional support to the Duke Partners for Success volunteers. While the "supportive" community partners will provide the primary hands-on support, the "consulted" partners must also serve as a sounding board throughout implementation to determine where minor adjustments can be made throughout the pilot.

Finally, the fifth category of community partners will include those who must be informed of results, but do not necessarily need to be consistently updated on progress. This includes the Durham County Commissioners, the DPS Board of Education, and any federal agency providing grant funding.

Priority Partner

In the scope of the implementation of this pilot program, teachers will serve as a priority partner both internally and externally to gauge the program's success. Data reflects a correlation between earnings and employment rate based on levels of educational attainment showing education will directly impact access to additional resources such as secure housing, access to nutritious food, and safety in the home (Why Education

Matters to Health, 2015). Teachers play an important role in engaging their student population to boost attendance, proficiency levels in the classroom, and growth in social settings (Why Education Matters to Health, 2015). In the scope of the Feeding DPS pilot program, teachers will serve as main “hub” in the hub-and-spoke model of the program. As external stakeholders work to implement new standards for nutrition, updated reimbursement under the Community Eligibility Provision (CEP), and supplemental tutoring with Duke Partners for Success, the primary point of contact to gauge success throughout implementation will be teachers in each classroom.

Engagement Barriers

As highlighted in the RASCI analysis (Table F.3.A.1), teachers are listed as “consulted” community partners, meaning they are providing feedback to inform success of the program, but may not be directly involved from an accountability standpoint. Teachers serve as the foundation for evaluating existing reading proficiency levels. A concern is in some cases teachers may feel targeted if students in their specific classroom are testing below proficient reading levels. With this in mind, our responsibility as implementors will be to foster a collaborative relationship with teachers such that they feel comfortable working within the constraints of the Feeding DPS Reading program to identify students who may be in need of extra resources.

Teachers may also struggle to work in collaboration with Duke Partners in Success as additional tutoring and resources can potentially overlap with efforts being implemented already in the classroom. Our aim is to ensure this is not a critique of the teachers themselves, but rather an emphasis on the opportunity for collaborative work with external stakeholders such as Duke Partners for Success to ensure no child is left behind.

Additionally, one positive factor which will influence teacher participation in the project is it is designed to reduce behavioral problems in the classroom outside of lost learning capacity. These include, but are not limited to, hyperactivity, anxiety, and aggression (Feeding America, n.d.). Our aim in placing teachers in a “consulted” role is to use their feedback to shape the initial implementation and ultimately help us to work in tandem with DPS data managers to determine which students are in need of supplemental supports, both academic and behavioral.

Engagement Methods

Using a six sigma model to more efficiently model our engagement methods, we have identified three specific methods for engagement—tutor workshops (design phase), monthly data sharing (improve phase), and semiannual outreach events (control/scale phase) (Table F.3.A.2) (SSDSI, n.d.). Six sigma can be a useful tool to identify gaps and errors in planning to streamline the initial implementation of the program. As we work through

each phase, there will inevitable be room for revision, and use of a six sigma model will allow us to refer back and improve upon those errors to reduce mistakes in the future (Infinity, 2023).

The first phase of engagement, the design phase, will include a workshop of relevant stakeholders in which teachers, principals, Duke Literacy Corps, and Duke Partners for Success participants will gather to develop the framework for tutoring students targeted as measuring below proficient reading levels. Engagement will be measured in meeting minutes to build out engagement from each relevant stakeholder.

The second phase, the improvement phase, will be conducted using monthly data sharing through DPS data managers to measure reading outcomes across third grade classrooms. DPS data managers will also assist in facilitating survey tools for teachers to measure their engagement in classroom settings in partnership with the Duke Partnership for Success tutors. Currently, DPS utilizes an Excel model for measurement of reading proficiency across schools and individual classrooms. We will rely on teachers to input quarterly academic data as usual, and then require DPS data managers to provide a comparison of our control subset and our Feeding DPS Reading subset to evaluate the success of expanded CEP reimbursement levels and supplemental reading supports from Duke Partners for Success.

The third phase, the control phase, will require semiannual outreach events in coordination with the start of each semester at Duke University to recruit new participants for the Duke Partners for Success program who want to tutor. We will measure engagement based on new volunteers recruited to the program per each outreach event. Additionally, we do anticipate there will be a small set of volunteers who continue to roll over each semester.

Engagement Leadership

Ultimately, teachers, Duke Partners for Success volunteers, and data managers will be the community partners responsible for leading engagement throughout implementation of the program. Teachers inform where the starting point is specific to each student i.e., how do the gaps in reading proficiency differ from child to child, and which children are exhibiting behavioral concerns which may be masking hunger and nutritional deficits. The Duke Partners for Success program will incorporate substantive academic counseling throughout the improvement phase by providing support to students with the lowest reading proficiency. Finally, DPS data managers will be a critical partner in proving the success of the program upon final review using Excel data modeling to compare academic outcomes to a control group. Support for data managers will likely require additional financial support from the County Commissioners as the DPS system currently operates with one data manager for the school district. In order

to ensure we accurately capture the changes made throughout the Feeding DPS program it will require comprehensive data collection specific to third grade students, and close collaboration with school dieticians to track nutrition uptake with free and reduced school meals.

Disciplinary Critique

A memorandum of understanding (MOU) provides a concise framework for stakeholders to operate on the same terms throughout the project, which helps to not only avoid miscommunication but also create a concise background on potential partnerships to be pursued later in the project. The MOU will first outline the purpose of the project, which will outline the problem we aim to address. In the context of Feeding DPS, the purpose is addressing education as a SDOH through a dual-pronged nutrition and tutoring intervention program (DHS Clearinghouse, n.d.). The MOU will also outline the scope of the project, which will list all relevant stakeholders and describe their specific relationship to the project (DHS Clearinghouse, n.d.). The MOU will also elaborate on specific procedural requirements for participating stakeholders, which for example may include Duke Partners for Success tutors being a registered student at Duke University under the supervision of a professor (DHS Clearinghouse, n.d.). Finally, the MOU must elaborate on which stakeholders are responsible for conducting an oversight mechanism of all relevant parties, and ways in which the MOU may need to be updated pending additional changes to the program (DHS Clearinghouse, n.d.).

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Appendix F.3.A: Accountability and Engagement Plan Figures and Tables

Table F.3.A.1

RASCI Table

RASCI Table		
<p><u>Policy/Program:</u> We have proposed Feeding DPS Reading, a dual-pronged intervention to address low reading proficiency and food insecurity in Durham Public Schools (DPS). Program administrators will work with Durham County Commissioners, DPS, and five individual schools that qualify for partial reimbursement of school lunches through the Community Eligibility Provision (CEP), that have reading proficiency levels below the DPS average, and that have a lower proportion of students than the state average meeting the Read to Achieve grade 3 benchmark. The first part of the approach relies on funding from Durham County to cover the difference between the free and paid CEP reimbursement rates. The second part of the approach relies on a collaboration with Duke University Program in Education Partners for Success program, in which undergraduate students work with elementary students on the five pillars of success in reading: phonemic awareness, phonics, vocabulary development, fluency, and comprehension. The goal of Feeding DPS Reading is to improve reading proficiency in low-performing DPS schools while addressing food insecurity within the schools.</p>		
RASCI Levels	Community Partners	Rationale
<p>Responsible (owns the challenge/project)</p>	<ul style="list-style-type: none"> - Task Force (Led by DCI and assisted by Unbox) 	<p>The Task Force is led by Durham Children’s Initiative in close collaboration with the DPS Unbox project, which is a policy council of students and staff. The Task Force is responsible for completion of the program, which involves overseeing school principals in applying to and following through with the CEP and supporting the implementation of the reading portion of the program within their school.</p>
<p>Accountable (ultimately answerable for the correct and thorough completion of the deliverable or task, and the one who delegates the work to those <i>responsible</i>)</p>	<p>Members of Advisory Committee:</p> <ul style="list-style-type: none"> - School Principals 	<p>School principals are accountable for the resources and processes within their respective schools, and therefore have the accountability for implementation of program components.</p>
<p>Supportive (can provide resources or can play a supporting role in implementation)</p>	<p>Members of the Advisory Committee:</p> <ul style="list-style-type: none"> - DPS School Nutrition Regional Supervisors - Duke University Partners for Success - Data Managers 	<p>The DPS School Nutrition Regional Supervisors play a role in the implementation of development and delivery of the nutrition component of our intervention. The Duke University Partners for Success will be supplying the critical component of the instructional part of our intervention. Data managers will be critical in providing information in support of efforts in qualification for CEP.</p>
<p>Consulted (has information and/or capability necessary to complete the work)</p>	<ul style="list-style-type: none"> - Parents - Teachers - Duke University Literacy Corps - Cafeteria Managers 	<p>Several community partners will be consulted in the development and implementation of the Feeding DPS Reading program. Parents and students are important community partners given that they are the targeted population for benefit with the proposed initiative. Further, parents will need to provide information to schools to support CEP eligibility. Duke University Literacy Corps is</p>

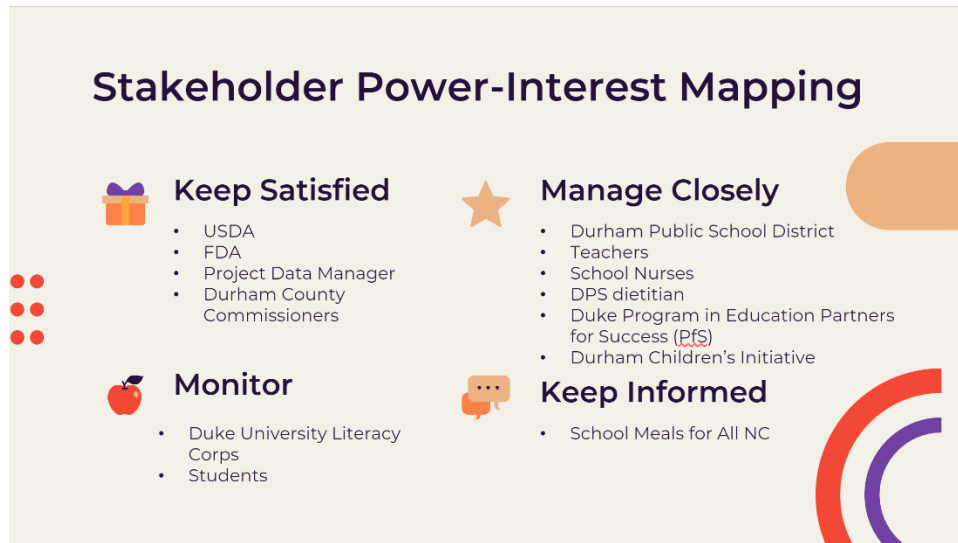
		not the primary source of volunteers but may provide back-up or additional support as needed by Duke University Partners for Success. Cafeteria managers play a key role in managing school lunch and student eligibility for free/reduced lunch, so they will be a critical source of information for the program's nutrition portion.
Informed (must be notified of results, process, and methods, but need not be consulted)	<ul style="list-style-type: none"> - Durham County Board of Commissioners - DPS Board of Education 	The Durham County Board of Commissioners has requested an intervention to improve downstream health outcomes. The DPS Board of Education maintains a vested interest in student performance and educational outcomes, especially in response to targeted programs.

Table F.3.A.2

Measurement Table Template: Methods, Timing, and Measures Table

Engagement Method	Related Facilitators/ Barriers	Timing	Performance measure		
			Description	Data source	Frequency
Tutoring Workshop	Facilitators will include teachers, Duke Partners for Success students, and Duke Literacy program members	Design	Curriculum development for implementation in classroom settings	Meeting minutes	One time implementation
Monthly Data Sharing	Facilitators will include DPS data managers, and barriers may include inability collect efficient data due to limited number of data managers in school system	Improve	Target reading proficiency levels among third graders	Reading proficiency levels/survey tools	Monthly
Semiannual Outreach Events	Facilitators will include participants in the Duke Partners for Success program, barriers will include the availability of students willing to offer tutoring services	Control/ Scale	Number of new tutors in the Duke Partners for Success program	Recruitment numbers based on each outreach event	Biannual

Appendix F.4: Individual Presentation and Script



We identified the stakeholders using a power-interest grid was utilized to map appropriate levels of engagement, which will ultimately help inform the level of engagement needed for each stakeholder as we track implementation of the program to increase efficiency of communication.

Beginning with the top left quadrant, we primarily have our stakeholders in control of funding. These stakeholders will require ongoing efforts to keep them engaged on distribution of grant funding and working within the standards outlined for the CEP reimbursement and Dietary Guidelines. The primary aim is to keep them satisfied and apprised without overwhelming them with unnecessary information.

Moving to the second quadrant, we have our stakeholders with the greatest power and influence over the project, which includes our in-school stakeholders such as DPS dietitians, school nurses, and teachers.

Moving to the third quadrant, we have our vested stakeholders who may already have an existing infrastructure to build off of including Schools Meals for All NC. These may include nonprofits who are important to keep engaged but may also require less day-to-day progress updates.

The fourth quadrant includes the lowest power stakeholders, which includes students, our primary group who will be impacted by this proposal. While they have low power in terms of the broader implementation, they will be the greatest impacted stakeholder throughout our pilot.



Duke Partners for Success: First, Duke Partners for Success, which is an undergraduate community service-learning opportunity which places Duke students in DPS settings, provides supplemental resources for students who may be struggling in their reading proficiency

DPS data manager: Second, data managers will be responsible for collecting and managing data regarding CEP eligibility and academic achievement.

Durham Children's Initiative: Non-profit organization providing pathways to success for children from low-income communities, has an existing presence in the community we can build off of.