Cambridge Public Schools Wellness Policy
Review and Evaluation
May 2017

Kim DeAndrade
Wellness Policy Council
Cambridge Public Schools

Internship Capstone Paper

Submitted by:
Katie Wooten

Master's Applied Program
Eliot-Pearson Department of Child Study & Human Development
Tufts University
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Internship Site: Cambridge Public Schools Wellness Council
Site Supervisor: Kim DeAndrade, Program Leader, Health Education & Social Emotional Learning
Faculty Internship Advisor: Dr. Francine Jacobs

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Key Findings

Strength of the Wellness Policy

The CPS Wellness Policy would be stronger if specific items that are included in the CPS Guidelines and Implementation Procedures were included in the Wellness Policy itself.

Wellness Policy Implementation

Some students are hungry during the school day and there is inconsistency across schools as to how that is handled.

Over one-third of teachers and parents who were surveyed report being unaware of the Wellness Policy.

A quarter of parents state that their child has recess taken away.

A quarter of parents state that their children are given candy as a reward.

Also some parents do not seem to know about the healthy nature of our school meals.

There are concerns about the need for more bike parking.

Part 1: Strength of the CPS Wellness Policy

Wellness Policy Legislation

The Child Nutrition and WIC Reauthorization Act of 2004 required all schools participating in the National School Lunch and/or the National School Breakfast Program develop a district wellness policy and begin implementing the policy at the start of the 2006 school year (Sec. 204, PL No. 108-204). In an effort to further improve child nutrition, the U.S. Congress also passed the Healthy, Hunger-Free Kids Act in 2010 (PL No. 111-296). This legislation allows the USDA to make significant reforms to the school lunch and breakfast programs for the first time in over 30 years. The Healthy, Hunger-Free Kids Act also required schools to strengthen items in the district wellness policy to better promote the health of students and combat health problems including hunger and obesity. (USDA Food and Nutrition Service, 2016).

A Local School Wellness Policy is a written document of official policies that guides educational agencies' and school districts' efforts to establish a school environment that promotes students' health, well-being, and ability to learn by supporting their healthy eating and physical activity (USDA Food and Nutrition Service, 2016). One requirement of the Healthy, Hunger-Free Kids Act is that schools assess their wellness policy at least once every three years. Assessment of the policy helps the district understand to what extent schools are in compliance with the policy, how the local wellness policy compares to model wellness policies, and progress made in reaching goals of the wellness policy (USDA Food and Nutrition Service, 2016). This assessment also sheds light on how the district can strengthen its policy.

In the Winter/Spring of 2017, The Wellness Policy Council with the support of Katie Wooten, a graduate student intern from Tufts University, engaged in a process to assess the strength of the Cambridge Public Schools Wellness Policy using the Wellness School Assessment Tool: WellSAT 2.0.

Wellness School Assessment Tool: WellSAT 2.0

The WellSAT 2.0 is a tool designed to assess the quality of school district's wellness policy. Additionally, the tool also provides guidance and resources for making improvements on specific areas of the policy. The previous assessment of the policy was conducted with the original version of the WellSAT. Local wellness policies were strengthened after the Healthy, Hunger-Free Kids Act was passed in 2010. The WellSAT 2.0 reflects new USDA school food requirements and current best practices in all areas of school wellness (wellsat.org).

WellSAT 2.0 scoring.

School wellness policies are evaluated based on the degree to which they address 78 policy items, which are categorized into six sections. The sections include Nutrition Education, Standards for USDA Child Nutrition Programs and School Meals, Nutrition Standards for Competitive and Other Foods and Beverages, Physical Education and Activity, Wellness Promotion and Marketing, and Implementation, Evaluation and Communication. District wellness policy statements are rated "0," "1," or "2," using the following criteria: 0= Not mentioned in the policy, 1= Weak statement, 2= Meets or exceeds expectations.

The WellSAT calculates each item to provide two scores: a *comprehensiveness score*, which reflects the extent to which recommended content areas are covered in the

policy; and a *strength score*, which describes how strongly the content is stated. Both scores range from 0-100, with lower scores indicating less content and weaker language, and higher scores indicating more content and use of specific and directive language. School districts are not required to report WellSAT scores, so it is difficult to compare the CPS Wellness Policy to other districts in Massachusetts. Furthermore, these WellSAT results reflect a different set of criteria than Wellness Policy assessments before 2015 when the WellSAT was revised. The changes seen on the newer version of the WellSAT reflect new standards set forth by the Healthy, Hunger-Free Kids Act.

The most comprehensive national assessment of school wellness policies in an on-going analysis that started when the Child Nutrition and WIC Reauthorization Act of 2004 mandated that all school districts participating in the National School Lunch Program develop a wellness policy (Piekarz, et al., 2016). Wellness policies from 579-798 public school districts across 48 states were analyzed each school year from 2006-2014. These national data indicate that during the 2013-14 school year, the mean overall comprehensiveness score was 44.08 and the mean overall strength score for that year was 25.27. Complete mean levels of comprehensiveness and strength scores from this data set can be found in Appendix A, with graphs demonstrating the change over time in comprehensiveness scores in Appendix B and strength scores in Appendix C. Below are data collected from these assessments for reference as to how the CPS Wellness Policy compares to other districts.

Results for WellSAT 2.0 for CPS Wellness Policy

Detailed results with each item score are included in Appendix D ("WellSAT 2.0 Results," 2017). Below are notable strengths, areas of improvement, and suggestions for the current policy:

CPS Wellness Policy Strengths

The current CPS Wellness Policy scored significantly higher on each individual section and on the overall district policy score than it did on the previous assessment.

Comparison of Current Policy and Previous Policy Scores

	Current Policy (2017)	*Previous Policy (2011)*
Total Comprehensiveness	67	27
Total Strength	52	7

Areas for Improvement

Though the current Wellness Policy is stronger than the earlier version from 2011 and compares favorably to other district wellness policies across the nation, there are still areas that should be improved to keep progressing with the quality of the policy. The CPS Administrative Wellness Policy Guidelines and Implementation Procedures are guidelines that are set in accordance with the district Wellness Policy. These CPS Guidelines and Implementation Procedures are a separate written document, which provides stronger standards on how the Wellness Policy should be implemented. Below are a comparison of the total comprehensive scores between the Wellness Policy alone and the Wellness Policy with the Guidelines and Implementation procedures:

Comprehensiveness Scores Across Policy Categories

	Comprehensiveness Score	
	Policy alone	*Policy with Guidelines*
Nutrition Education	100	100
Standards for USDA Child Nutrition Programs and School Meals	43	62
Nutrition Standards for Competitive and Other Foods and Beverages	45	45
Physical Education and Physical Activity	70	75
Wellness Promotion and Marketing	60	73
Implementation, Evaluation, and Communication	82	91
Overall District Policy Score	***67***	***74***

Recommendations

Though it has improved since the previous version, there are still standards omitted from the current policy that should be included to strengthen it. These results indicate that the CPS Wellness Policy would be stronger if the specific items, noted below, that are included in the CPS Guidelines and Implementation Procedures were included in the policy itself. The suggestions below are taken directly from the CPS Guidelines and Implementation Procedures written document, and could be added to the Wellness Policy to create a stronger document.

Standards for USDA School Meals

1. Provide a link to the Massachusetts and USDA Competitive Food and Beverage Nutrition Standards: http://www.mass.gov/eohhs/docs/dph/mass-in-motion/school-nutrition-guide.pdf .

2. School food service staff is properly qualified according to current professional standards and regularly participate in professional development activities regarding food preparation and presentation, nutrition, safety and medical emergencies.
3. Principals and Heads of Upper Schools will strive to schedule recess before lunch, especially in younger grades.
4. Free drinking water is available and accessible to all students at meals and during the day.

Nutrition Standards for Competitive and Other Food and Beverages

1. Include these standards to extended school day,
2. Include link to USDA Smart Snack standards (http://www.fns.usda.gov/sites/default/files/allfoods_flyer.pdf)

   OR Massachusetts Competitive Food and Beverage Nutrition Standards (http://www.mass.gov/eohhs/docs/dph/mass-in-motion/school-nutrition-guide.pdf

Wellness Promotion and Marketing

1. Staff should model healthy behavior
2. The Principals and Heads of Upper Schools of each school will:
    a. Not allow staff to give food or beverages as reward, nor withhold food or meals as punishment
    b. Provide suggestions for non-food rewards

3. Classroom teachers will be encouraged to incorporate, as appropriate, physical activity as part of classroom activities and to provide short physical activity breaks between lessons or classes

Implementation, Evaluation, and Communication

1. The wellness policy and policy evaluation will be shared with public via the district website.
2. In collaboration with the CPHD, the school district will provide information to families to encourage healthy eating and physical activity and other healthy behaviors at school and at home.

Conclusions

The strength and comprehensiveness of the CPS Wellness Policy has significantly improved from the last evaluation. Furthermore, the CPS policy scores higher than most wellness policies across the country. That being said, it is important for the school wellness policy to continue evolving in order to meet the needs of students. Including the aforementioned suggestions would improve the policy and offer additional health and wellness requirements that schools must meet.

Part 2: Wellness Policy Implementation

Teacher Wellness Survey: Report on Findings

Background

In collaboration with the CPS Wellness Council, I created a brief survey regarding the implementation of the District's Wellness Policy. Broadly, the CPS Teacher Wellness survey was developed to: 1) gather preliminary data on hunger in CPS classrooms, 2) understand how teachers are promoting wellness in the classroom, and 3) assess teacher's knowledge of the Wellness Policy and the corresponding document on Guidelines and Implementation Procedures.

All questions on the survey are derived from requirements and recommendations of the Wellness Policy and the Guidelines and Implementation Procedures that were described earlier. In relation specifically to hunger, one requirement of the CPS Wellness Policy states that the Cambridge Public Schools will ensure that no student go hungry while in school. In addition to assessing the strength of the policy, the Wellness Council wanted to survey CPS teachers to understand if this standard is being met. Furthermore, the Healthy, Hunger-Free Kids Act specifically mentions research should be dedicated to understanding causes, consequences, and circumstances of childhood hunger and food insecurity (Sec. 141.).

Data Collection and Methods

All CPS teachers were emailed the survey through Google Forms and responses were collected over a period of one month (March 2017). The survey consists of two parts: Part I is comprised of five questions related to hunger, and Part II has 11 questions related to snacks, food, and activity, with the last question asking if teachers are aware

that CPS has a Wellness Policy (see Appendix E for full survey). Responses to the survey are anonymous. The only demographic information collected was whether the participant teaches at an elementary, middle, or high school. Names of specific schools and grades taught were not collected to ensure anonymity of the participants.

Results

As shown in Table 1, 232 teachers participated in the survey, with most survey responses from elementary school teachers (45.7%).

Table 1. Characteristics of sample

Survey Respondents (*N* = 641)	**% (*n*)**
Elementary school (ES)	45.7 (106)
Middle school (MS)	28.4 (66)
High school (HS)	25.9 (60)
Total	**36.2 (232)**

Over 92% of teachers surveyed report having a student complain of hunger at least once, with 71.6% of teachers having individual students who express hunger more than three times per month. As for course of action, 64.2% of teachers report giving a snacks to hungry students. Most teachers (81%) notice behavior changes when students are hungry (Table 2).

Table 2. Teacher's experience with hungry students

Hunger categories	**% (*n*)**
Had student(s) express hunger	92.2 (214)
ES	88.7 (94)
MS	95.5 (63)
HS	95.0 (57)
Have individual students hungry <3x per month	71.6 (166)
ES	64.2 (68)
MS	78.8 (52)
HS	76.7 (46)
Give snacks to hungry students	65.7 (157)

ES	71.7 (76)
MS	59.1 (39)
HS	70.0 (42)
Notice behavior changes in hungry students	81.0 (188)
ES	83.0 (88)
MS	78.8 (52)
HS	80.0 (48)

The average number of hunger complaints teachers receive is 9.52 complaints per month (Table 3), with a reported range from 0 to 60.

Table 3. Reported means

Survey categories	***M (SD)***
Hunger complaints per month	9.52 (10.52)
Percent students bringing "healthy snacks"	46.7 (29.4)

Note: *M*= Mean. *SD*= Standard Deviation.

Responses to questions regarding snacks and food in the classroom vary widely depending on school (Table 4). The biggest disparity in responses is generally between elementary and high school teachers. For instance, 95.3% of elementary school teachers allow snacks in the classroom compared to only 58.3% of high school teachers. Over 80% of elementary school teachers report never using food to reward students, while less than half of high school teachers (43.3%) never use food as a reward. Similarly, only 17% of elementary teachers allow candy in the classroom compared to 80% of high school teachers.

Table 4. Teacher's experience with snacks, food, and activity

Survey snacks, food, & activity	**% (*n*)**
Allow snacks in classroom	75.9 (176)
ES	95.3 (101)
MS	60.6 (40)
HS	58.3 (35)
Provide designated snack time	53.0 (123)

ES	93.4 (99)
MS	30.3 (20)
HS	6.7 (4)
Provide snacks to class	64.2 (149)
ES	37.8 (40)
MS	9.1 (6)
HS	26.7 (16)
Allow candy in classroom (sometimes or always)	47.4 (110)
ES	17.0 (18)
MS	47.6 (30)
HS	81.7 (49)
Provide guidelines on snacks	57.3 (133)
ES	82.1 (87)
MS	45.6 (30)
HS	24.2 (16)
Concerned about snacks students bring	65.1 (151)
ES	55.7 (59)
MS	83.3 (55)
HS	61.7 (37)
Never offer food as a reward	60.8 (141)
ES	81.1 (86)
MS	43.9 (29)
HS	43.3 (26)
Provide daily physical activity breaks	53.4 (124)
ES	81.1 (86)
MS	31.8 (21)
HS	28.3 (17)

Well over half (65.5%) of teachers report being aware of the CPS District Wellness Policy and close to 90% are aware of the food allergy guidelines (Table 5).

Table 5. Teacher's awareness of school policies

	AWARE OF POLICIES % (*N*)			
	Elementary School	Middle School	High School	Total
CPS Wellness Policy	70.7 (75)	68.2 (45)	53.3 (32)	65.5 (152)
Food allergy guidelines	93.4 (99)	86.4 (57)	85.0 (51)	89.2 (207)

Limitations to the Survey

First and foremost, there is likely a response bias favoring higher responses to having encountered a hungry student. Teachers were not required to complete this survey nor were they provided incentive for doing so, meaning that it is probable that responses came primarily from teachers who care about the well-being of their students. This type of response bias may have created more profound results on frequency of hunger than if the survey was completed by all CPS teachers. Second, almost half of the responses came mostly from elementary school teachers. This is a limitation because the results do not capture an accurate representation across different age groups.

Conclusions

Findings from this survey indicate that most teachers who completed this survey are aware of current CPS policies. For instance, close to 90% of teachers are aware of the food allergy guidelines and almost 70% are aware of the CPS Wellness Policy. Additionally, a total of 118 comments across two open-ended comment fields indicate that many teachers are genuinely concerned about the well-being of their students. This is an important finding in itself because in order to create healthy changes in the classroom, teachers must be on board with implementing them. For instance, over half of surveyed teachers already provide daily movement breaks for students. This is not required by the Wellness Policy itself, but is included in the Guidelines and Implementation Procedures.

However, these results shed light on a major issue: CPS does not have a fully standardized protocol on how to help students experiencing hunger. This is problematic because teachers may not know what to do if a student is hungry, and there seem to be a wide variety of responses. Over one-third of teachers give hungry students a snack. Many teachers noted that they keep snacks in class for when a student's needs one. If teachers

are purchasing these snacks on their own, that could add up to a significant financial constraint. A nationally representative sample of 2,000 teachers across four states and found that 78% of teachers who have students experiencing hunger provide food at least sometimes (No Kid Hungry, 2013). On average, they found that teachers who buy food for their students spend about $26 per month on food for the classroom. Since there is clearly a need, CPS should consider how to support teachers encountering hungry students.

Another finding from this survey is that there is an extremely wide range of how often students experience hunger. The average, according to this survey, is over nine complaints of hunger per month (Table 3); however, some teachers report never having a student complain about hunger, while some teachers have students experiencing hunger at least two times per day. Over three quarters of teachers notice behavior changes when students are hungry. Reports of behavior changes are in accordance with the literature; CPS teachers note hungry students are "tired, irritable, low-energy, unable to focus, and distracted."

Recommendations to Improve Student Wellness

According to this survey, almost all teachers have encountered a student complaining of hunger at some point. As stated by the literature and CPS teachers, hunger has detrimental effects on a student's ability to perform in the classroom. Moving forward, CPS should consider creating a set of procedures for dealing with the issue of hunger in the classroom. More information should be collected from teachers and school staff to better understand the circumstances surrounding student hunger. This will help the Wellness Council and school administrators understand better ways to support

teachers and students, especially those in need of more resources. CPS may also want to consider developing a protocol for ensuring that families that may be struggling with food insecurity are directed to appropriate food assistance services.

Additionally, it is important to continually educate school staff about the CPS Wellness Policy. Over one-third of teachers who were surveyed report being unaware of the Wellness Policy. This is problematic for two reasons: 1) teachers may not be promoting student wellness to the best of their ability, and 2) because wellness policies are a requirement for schools participating in the National School Lunch Program, if schools do not adhere to wellness policy guidelines USDA funding of school meals is jeopardized. Making a concerted effort to disseminate information in the CPS Wellness Policy to teachers and staff will benefit students and the District as a whole.

Part 3: Wellness Policy Implementation

Parent Wellness Survey: Report on Findings

In collaboration with the CPS Wellness Council, we created a brief parent survey regarding the implementation of the District's Wellness Policy. Broadly, the CPS Parent Wellness survey was developed to: 1) gather preliminary data on parent knowledge of the Wellness Policy, 2) understand if wellness information is reaching parents, and 3) assess parents' concerns regarding recess, candy and other common parental concerns.
All questions on the survey are derived from requirements and recommendations of the Wellness Policy and the Guidelines and Implementation Procedures that were described earlier.

Data Collection and Methods

All CPS families were emailed the survey through Google Forms and responses were collected over a period of one month (March 2017). Responses to the survey are anonymous. The only demographic information collected was their child's school and grade level.

Results

As shown in Table ___, 350 parents participated in the survey, with most survey responses from elementary school parents.

Knowledge of Wellness Policy	35%
Receive information from school regarding:	
o Dressing appropriately for the weather	63%
o Upcoming field trips that may expose students to prolonged sun or heat	75%

o Sending healthy foods and beverages to school	69%
o Safe walking or biking to school	53%
Parents reported that their child	
o Gets 20 minutes of daily recess	82%
o Has recess taken away as a form of punishment	29%
o Has recess used to make up work	28%
o Has recess outside as long as the temperature is above 16F	63%
o Has access to safe and sufficient bike parking	57%
o Gets offered candy as a reward by teachers or other school staff	23%

Parent Comments

In addition to these questions, parents were given space to comment. The comments fell into several categories with representative quotes below. Many of the comments were about the concern that recess was too short. Some comments about school meals reflected a misunderstanding about the ingredients used.

Recess

- Twenty minutes of recess seems short. I think the kids would be calmer and more focused in class if they had longer recess.
- The kids have 30 minutes for lunch and recess combined, including time to get where they need to be and to dress/undress as required by weather conditions. They end up having about 10 minutes outside, at best. Luckily the classroom teacher this year sometimes takes them outside for another brief recess. The playground is very small, so small that they are NOT allowed to jump rope or hula hoop because they are told (by the lunch ladies who monitor recess) that there is not enough space. When weather conditions preclude going outside, they sit in the cafeteria. No jumproping, no hula hooping, no access to the gym. 16 degrees or not, the icy condition of the ground determine whether or not the kids go outside in the winter. This year they spent weeks in the cafeteria.
- Recess is often taken away as far as I know.

School Meals

- I don't feel kids get enough time outside during recess, the kids barely eat lunch because the longer they take, the less time they have for playing outside.

- Children do not have sufficient time to eat.
- I love the new healthier and locally grown foods being served. Would love to see more of this.
- A concern I have are that water is not available for students to drink at lunch and my daughter was told recently by a teacher that she could not drink from the water fountain between classes.
- the food provided those receiving state and federal aid is of poor and unacceptable quality if one cares to raise healthy children.

Information from Schools

- The school is generally good about telling parents about good practices in food and such things as the importance of sleep.
- It seems like most of the communication we have gotten regarding wellness has been at the discretion of the individual teacher. I would like to see more notices coming from the school itself, so it feels more like an all-school effort

Biking and Walking to School

- There's bike parking, but no safe bike routes to get to Amigos. Putnam Ave is a narrow, pot-hole-filled road!
- Bike racks are next to playground. Kids (bigger usually) do not treat the bikes with respect during recess and afterschool hours.
- think the schools should do more to promote active lifestyle in general, including encouraging and supporting kids walking, biking, and taking buses and trains to school. Parents driving kids to school is not healthy or independence-building. Nor is it good for the environment or for creating safer sidewalks and streets for those kids who are on bikes or on foot. Things are getting better, but it would be good if schools did a bit more encouragement of kids and their parents to travel to and from school in healthier ways.

Candy and Food as Reward

- I'd prefer no candy or gum (even for sensory purposes) be used in school. I'd also prefer that families don't bring in candy/crap for holidays (valentine's, halloween, treats). There are so many other options!Thanks so much for asking!
- I hope teachers will not give candies to the kids as reward as they are not healthy.
- I am alarmed by the frequent presence of candy in my kids classrooms at school. Some teachers provide candy as a reward a lot more than other teachers do.

Other

- Would love to see food and nutritional health taught, and taught thoroughly and without ceasing, in every class and every year.
- I very much appreciate the gym teachers. They are wonderful, and I like that the kids have gym twice a week.

- My daughter in K, has been sent to the nurse and I do not know until she tells me at the end of the day. I would very much like to have a call from the nurse if she is there so that I can decide what is best for her.
- We are very new to the Cambridge School system and I have been very impressed with what I have seen so far.

Recommendations

Further work should be done to inform teachers and parents of the Wellness Policy guidelines regarding recess and candy. Also some parents do not seem to know about the healthy nature of our school meals. More information about how foods are chosen and prepared might be warranted. Concerns about adequate bike parking could be addressed by a review of need at each school.

Part 4: Hunger in Schools

The committee also assessed how well we are implementing the Wellness Policy goal that no child need be hungry while in school. In order to do this, nurses kept a log of hunger related visits for one month and we surveyed teachers regarding complaints of hunger in the classroom.

Are students hungry at school?

Nurses Hunger Log completed over 1 month of nurse visits

- 5 students complained of hunger
- 57 students came in with symptoms of hunger

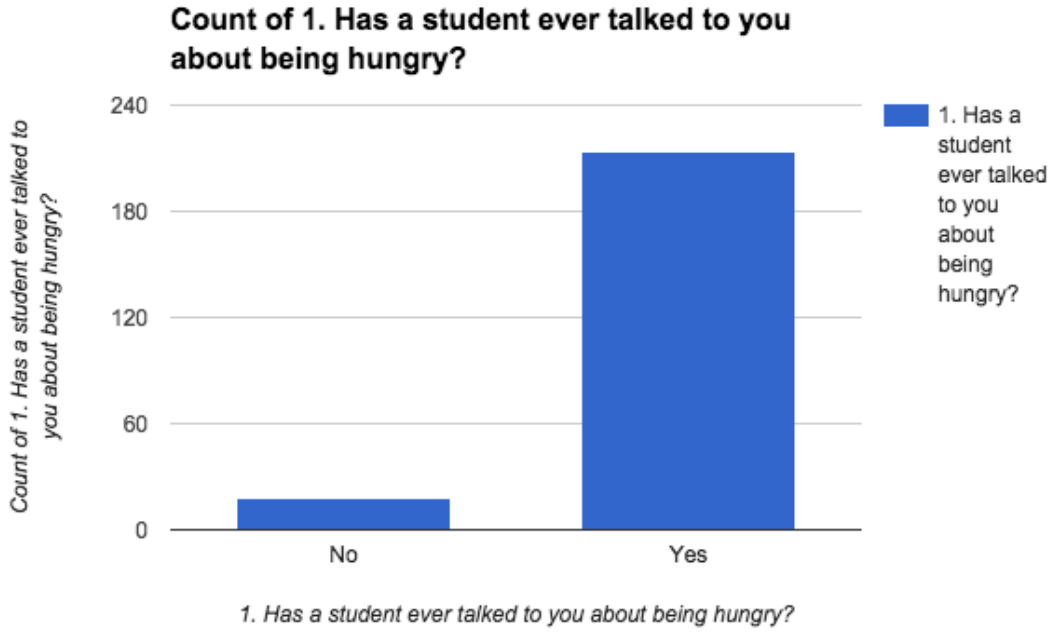
Time of Day

- 54 came in before lunch
- 12 came in after lunch

Stated reasons

- Not enough time to eat= 45
- Wasn't hungry at mealtime=16
- Other= 12

Teacher survey received 232 responses from K-12 staff.



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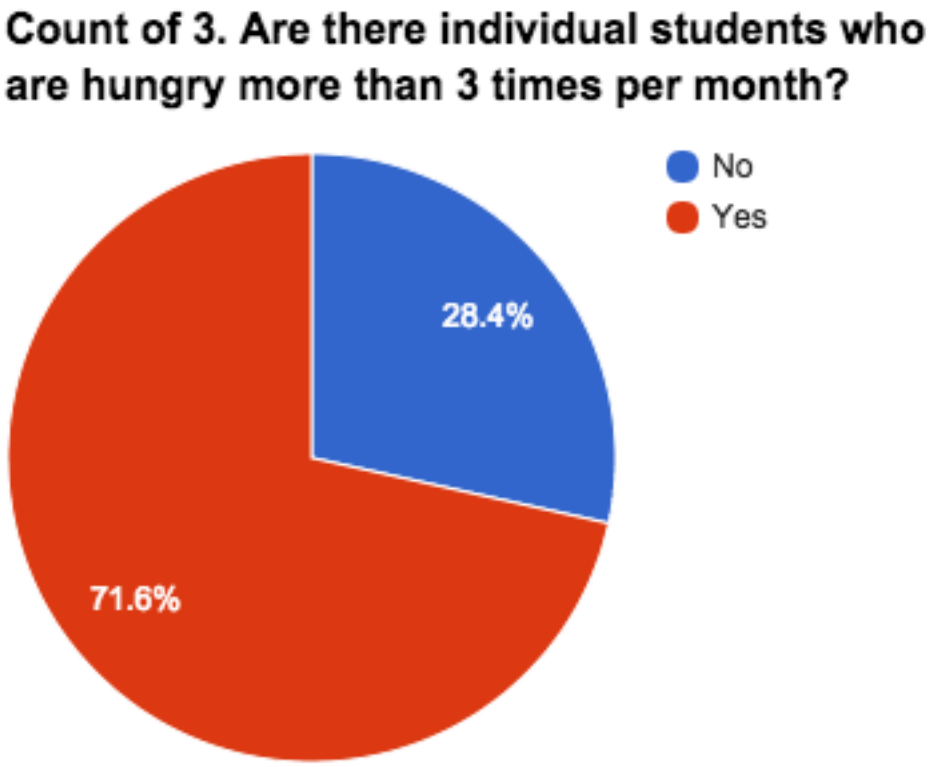
How many times in a month do students talk to you about being hungry



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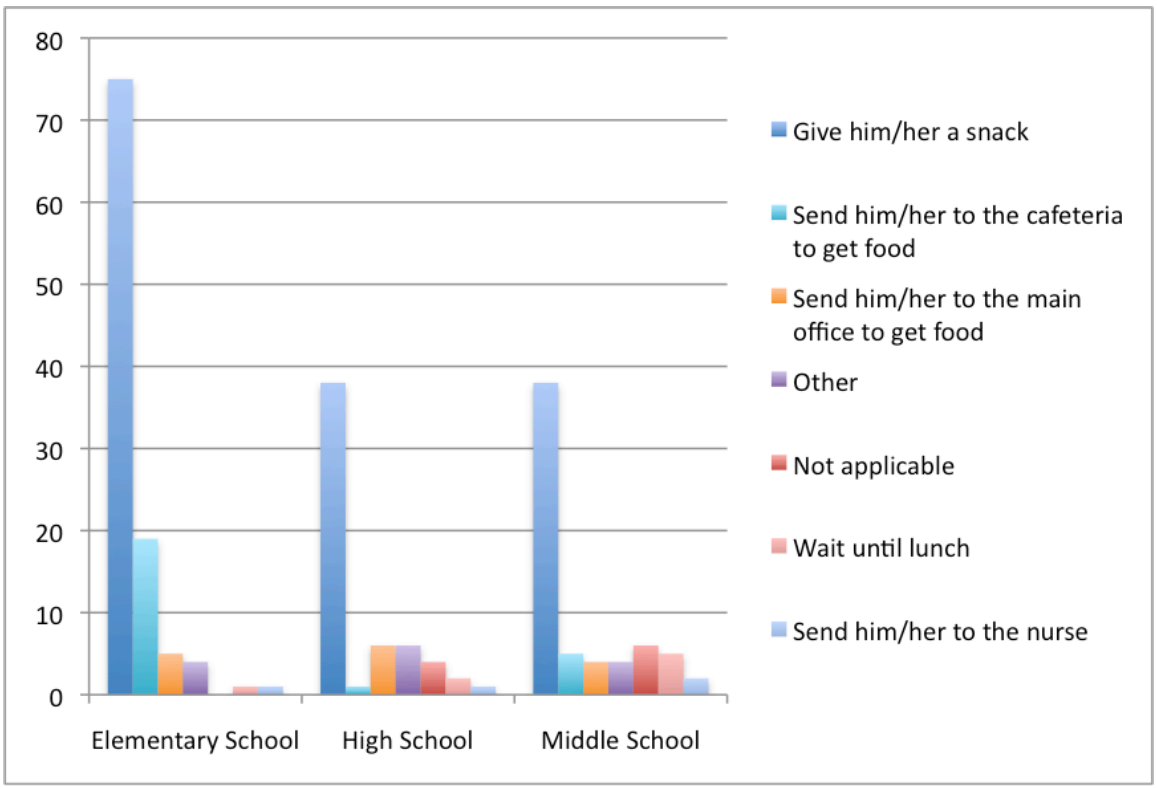
1-2 times= 48 teachers
3-5 times= 53 teachers
6-10 times= 27 teachers
11-20 times= 16 teachers

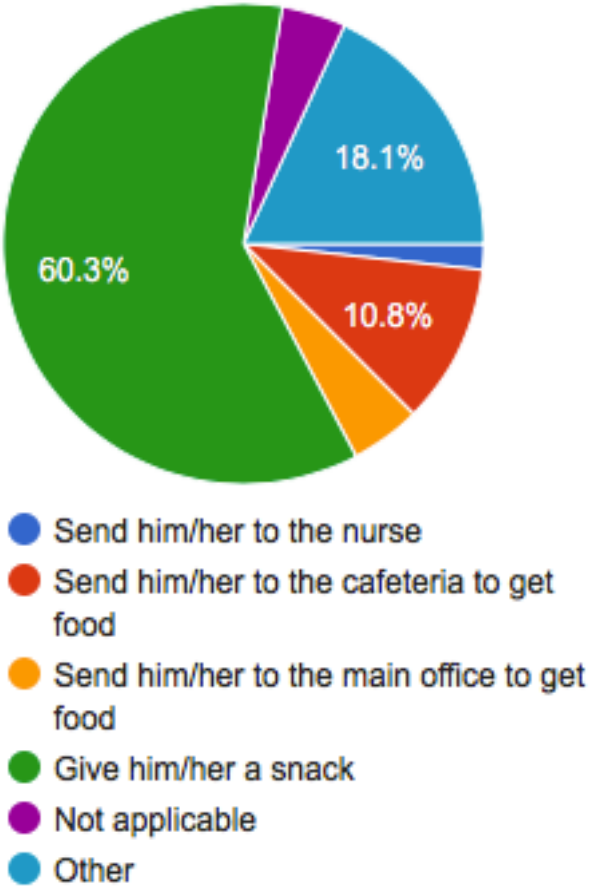
Teen and Middle Grades Health Surveys administered in alternate years
Have you been hungry in the past 12 months because there wasn't enough money at home to buy food?
2015 Middle Grade Health Survey 6.1%
2016 Teen Health Survey 9.0 %

What effect does hunger in school have?
Have you noticed changes in behavior when students are hungry? 81% of teachers reported that they noticed changes when students were hungry.

What are staff doing to support hungry students?
Nurses:
Provide food = 29
Send students to cafeteria= 8
Send students to onsite food pantry= 2
Send students to teacher=2
Educate students=33
Provide water=6

Teachers:


80
70
60
50
40
30
20
10
0
Elementary School
High School
Middle School
Give him/her a snack
Send him/her to the cafeteria to get food
Send him/her to the main office to get food
Other
Not applicable
Wait until lunch
Send him/her to the nurse



Major responses to hunger in school time:
Teachers and nurses are providing snacks and education
Some students are being sent to the cafeteria*
*3 Schools have dedicated meal accounts to pay for students who come to the cafeteria for a snack

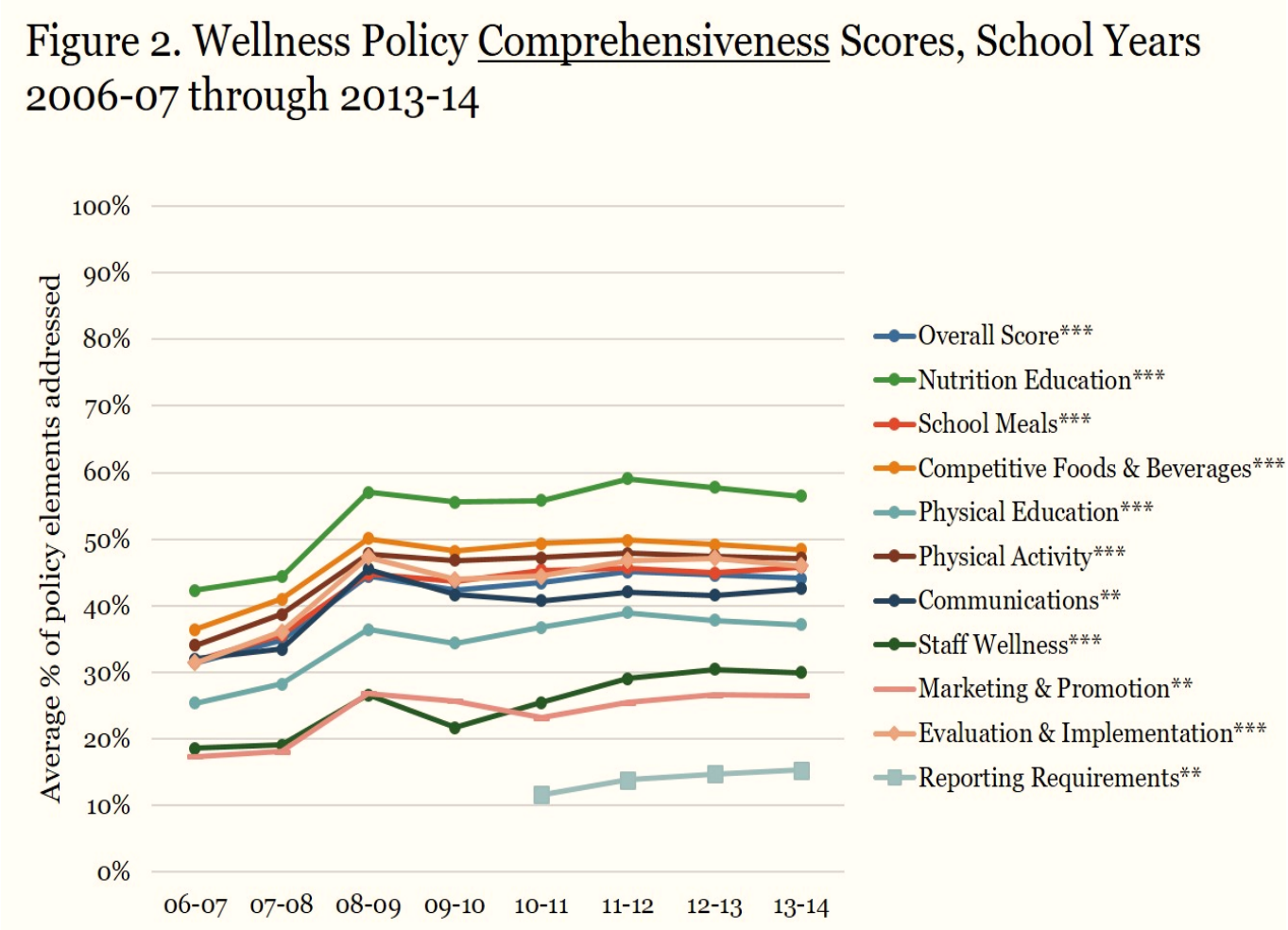
Conclusions

- Some students are hungry in school
- This may be related to food insecurity or not
- Reasons include skipping breakfast, not liking the meal, being rushed
- Hunger has adverse effects on academics
- Staff are using different ways to respond to hunger during the school day
- Providing food, education, water, encouragement to wait
- There is no standardized response to hunger during the school day

Appendix A: Overall Scores by Wellness Policy Category

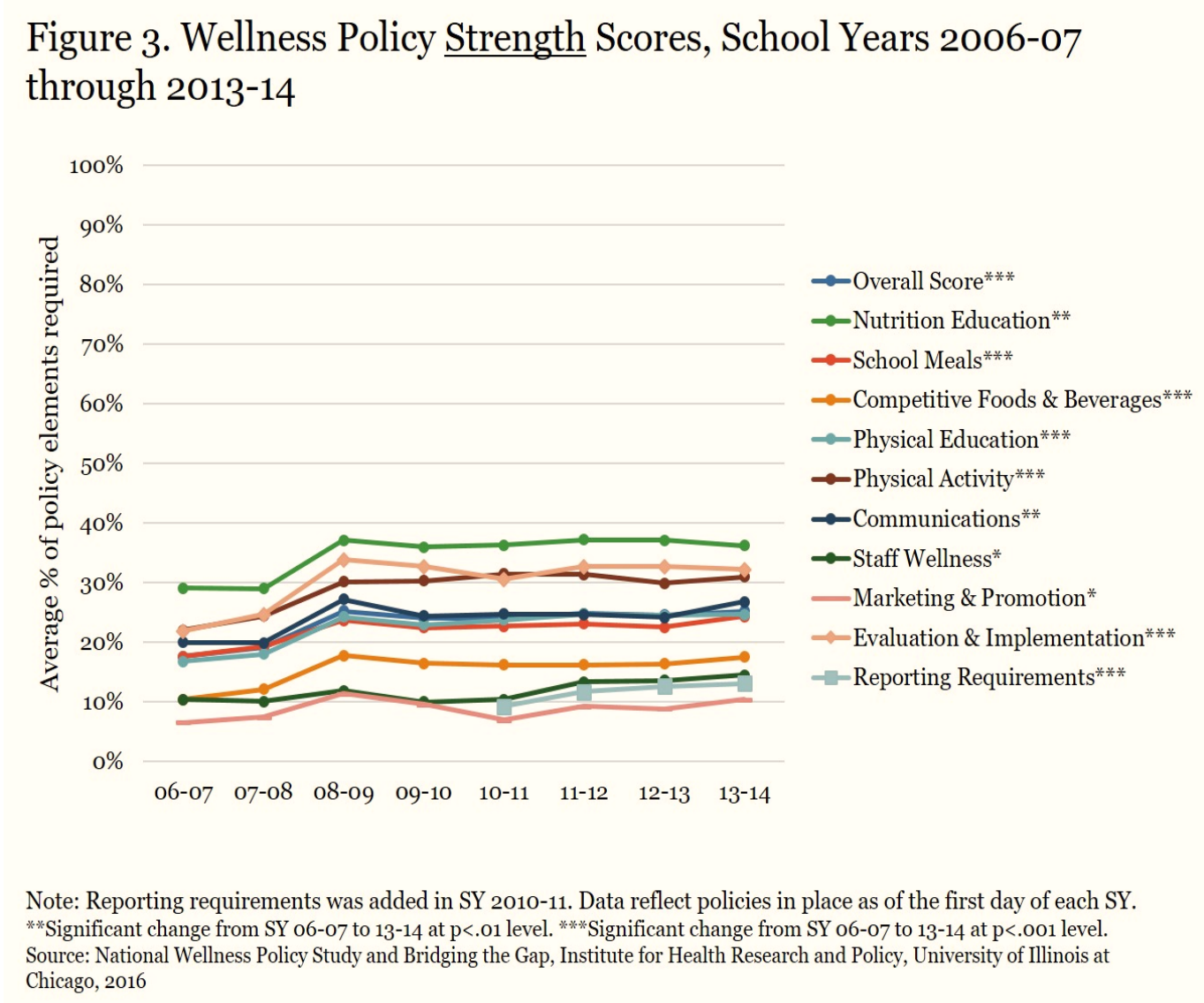
	COMPREHENSIVENESS SCORES (OUT OF 100)				STRENGTH SCORES (OUT OF 100)			
POLICY CATEGORY	'06-'07	'09-'10	'13-'14	Sig. Diff.†	'06-'07	'09-'10	'13-'14	Sig. Diff.†
Overall Score	31.35	42.29	44.08	.000***	17.65	24.05	25.27	.000***
Nutrition Education	42.24	55.50	56.45	.000***	29.14	35.95	36.26	.003**
School Meals	31.70	43.65	45.78	.000***	17.66	22.43	24.37	.000***
Competitive Foods & Beverages	36.39	48.19	48.45	.000***	10.44	16.46	17.56	.000***
Physical Education	25.28	34.36	37.09	.000***	16.78	23.00	24.66	.000***
Physical Activity	33.99	46.76	47.06	.000***	22.06	30.30	31.00	.000***
Communication & Stakeholders	31.98	41.59	42.48	.001**	19.97	24.40	26.78	.005**
Staff Wellness	18.53	21.65	29.87	.000***	10.45	10.01	14.51	.019*
Marketing & Promotion	17.32	25.67	26.48	.001**	6.60	9.62	10.39	.033*
Evaluation & Implementation	31.40	43.87	45.99	.000***	21.86	32.68	32.25	.000***
Reporting Requirements	--	11.59	15.23	.001**	--	9.29	13.12	.000***

Appendix B: Wellness Policy Comprehensiveness Scores



Note: Retrieved from Piekarz et al. (2016). Wellness Policy Comprehensiveness Scores, School Years 2006-07 through 2013-14 [Figure 2]. *School District Wellness Policies: Evaluating Progress and Potential for Improving Children's Health Eight Years after the Federal Mandate, Volume 4*.

Appendix C: Wellness Policy Strength Scores



Note: Retrieved from Piekarz et al. (2016). Wellness Policy Strength Scores, School Years 2006-07 through 2013-14 [Figure 3]. *School District Wellness Policies: Evaluating Progress and Potential for Improving Children's Health Eight Years after the Federal Mandate, Volume 4*.

Appendix D: WellSAT 2.0 Results, 2017

Section 1. Nutrition Education		Rating
NE1	There is a standards-based nutrition curriculum, health education curriculum, or other curriculum that includes nutrition.	**2**
NE2	All elementary school students receive nutrition education.	**1**
NE3	All middle school students receive nutrition education.	**2**
NE4	All high school students receive nutrition education.	**2**
NE5	Links nutrition education with the school food environment.	**2**
NE6	Nutrition education teaches skills that are behavior-focused.	**1**
NE7	Nutrition education is sequential and comprehensive in scope	**2**
Subtotal for Section 1	**Comprehensiveness Score**: Count the number of items rated as "1"or "2" and divide this number by 7. Multiply by 100. Do not count an item if the rating is "0."	**100**
	Strength Score: Count the number of items rated as "2" and divide this number by 7. Multiply by 100.	**71**

Section 2. Standards for USDA Child Nutrition Programs and School Meals		Rating
SM1	Addresses access to the USDA School Breakfast Program.	**2**
SM2	Addresses compliance with USDA nutrition standards for reimbursable meals.	**1**
SM3	School meals meet standards that are more stringent than those required by the USDA.	**2**
SM4	District takes steps beyond those required by federal law/regulation to protect the privacy of students who qualify for free or reduced priced meals.	**0**
SM5	USDA National School Lunch Program and School Breakfast Program standards are described in full (or a link to the standards is provided in the wellness policy)	**0**
SM6	Specifies strategies to increase participation in school meal programs.	**0**
SM7	Addresses students leaving school during lunch periods.	**0**
SM8	Ensures adequate time to eat.	**2**
SM9	Ensures annual training for food and nutrition services staff in accordance with USDA Professional Standards.	**0**
SM10	Addresses school meal environment.	**2**
SM11	Nutrition information for school meals (e.g., calories, saturated fat, sodium, sugar) is available to students and parents.	**0**
SM12	Specifies how families are provided information about determining eligibility for free/reduced priced meals.	**0**
SM13	Recess (when offered) is scheduled before lunch in elementary schools.	**0**
SM14	Free drinking water is available during meals	**2**
Subtotal for Section 2	**Comprehensiveness Score**: Count the number of items rated as "1"or "2" and divide this number by 14. Multiply by 100. Do not count an item if the rating is "0."	**43**
	Strength Score: Count the number of items rated as "2" and divide this number by 14. Multiply by 100.	**36**

Section 3. Nutrition Standards for Competitive and Other Foods and Beverages		Rating
NS1	Addresses compliance with USDA minimum nutrition standards for all FOODS sold to students during the school day (commonly referred to as Smart Snacks)	**1**
NS2	Addresses nutrition standards for all FOODS sold to students during the EXTENDED school day (includes regular school day plus after school programming and clubs. Do not count snacks provided in before/aftercare (child care) programs)	**0**
NS3	Addresses nutrition standards for all FOODS AND BEVERAGES served to students while attending before/aftercare on school grounds.	**0**
NS4	Regulates food served during classroom parties and celebrations in elementary schools.	**2**
NS5	Addresses compliance with USDA nutrition standards for all BEVERAGES sold to students during the school day (commonly referred to as Smart Snacks)	**0**
NS6	Addresses nutrition standards for all BEVERAGES sold to students during the EXTENDED school day (includes regular school day plus after school programming and clubs).	**0**
NS7	Addresses foods and beverages containing non-nutritive sweeteners (High School)	**2**
NS8	Addresses foods and beverages containing caffeine at the high school level* *As of 2014, USDA Smart Snacks standards prohibit the sale of foods and beverages containing caffeine in elementary and middle schools.	**2**
NS9	USDA Smart Snack standards are described in full (or a link to the standards is provided in the wellness policy)	**0**
NS10	Addresses availability of free drinking water throughout the school day.	**0**
NS11	Regulates food sold for fundraising at all times (not only during the school day).	**2**
Subtotal for Section 3	**Comprehensiveness Score**: Count the number of items rated as "1"or "2" and divide this number by 11. Multiply by 100. Do not count an item if the rating is "0."	**45**
	Strength Score: Count the number of items rated as "2" and divide this number by 11. Multiply by 100.	**36**

Section 4. Physical Education and Physical Activity		Rating
PEPA1	There is a written physical education curriculum for grades K-12.	**2**
PEPA2	The written physical education curriculum is aligned with national and/or state physical education standards.	**2**
PEPA3	Addresses time per week of physical education instruction for all elementary school students.	**2**
PEPA4	Addresses time per week of physical education instruction for all middle school students.	**2**
PEPA5	Addresses time per week of physical education instruction for all high school students.	**2**
PEPA6	Addresses teacher-student ratio for physical education classes.	**2**
PEPA7	Addresses qualifications for physical education teachers for grades K-12.	**2**
PEPA8	District provides physical education training for physical education teachers.	**2**

PEPA9	Addresses physical education waiver requirements for K-12 students (e.g., substituting physical education requirement with other activities).	**1**
PEPA10	Addresses physical education exemptions for K-12 students.	**2**
PEPA11	Addresses physical education substitution requirements for K-12 students (e.g., substituting physical education requirement with other activities).	**0**
PEPA12	District addresses the development of a comprehensive school physical activity program (CSPAP) plan at each school. Click here for information on CSPAP.	**1**
PEPA13	District addresses active transport for all K-12 students.	**2**
PEPA14	District addresses before and after school physical activity for all K-12 students.	**0**
PEPA15	District addresses recess.	**2**
PEPA16	Addresses physical activity breaks for all K-12 students.	**2**
PEPA17	Addresses staff involvement in physical activity opportunities at all schools.	**0**
PEPA18	Addresses family and community engagement in physical activity opportunities at all schools.	**0**
PEPA19	District provides physical activity training for all teachers.	**0**
PEPA20	Joint or shared-use agreements for physical activity participation at all schools.	**0**
Subtotal for Section 4	**Comprehensiveness Score**: Count the number of items rated as "1"or "2" and divide this number by 20. Multiply by 100. Do not count an item if the rating is "0."	**70**
	Strength Score: Count the number of items rated as "2" and divide this number by 20. Multiply by 100.	**60**

Section 5. Wellness Promotion and Marketing		**Rating**
WPM1	Encourages staff to model healthy eating/drinking behaviors.	**0**
WPM2	Addresses staff not modeling unhealthy eating/drinking behaviors.	**0**
WPM3	Encourages staff to model physical activity behaviors.	**0**
WPM4	Addresses food not being used as a reward.	**0**
WPM5	Addresses using physical activity as a reward.	**0**
WPM6	Addresses physical activity not being used as a punishment.	**2**
WPM7	Addresses physical activity not being withheld as a punishment.	**2**
WPM8	Specifies marketing/ways to promote healthy food and beverage choices.	**1**
WPM9	Specifies ways to promote physical activity.	**1**
WPM10	Specifies that family wellness activities will be planned and will include nutrition and physical activity components.	**0**
WPM11	On signs, scoreboards, sports equipment.	**2**
WPM12	In curricula, textbooks, websites used for educational purposes, or other educational materials (both printed and electronic)	**2**
WPM13	On exteriors of vending machines, food or beverage cups or containers, food display racks, coolers, trash and recycling containers, etc.	**2**
WPM14	On advertisements in school publications, on school radio stations, in-school television, computer screen savers and/or school-sponsored Internet sites, or announcements on the public announcement (PA) system.	**2**
WPM15	On fundraisers and corporate-sponsored programs that encourage students and their families to sell, purchase or consume products and/or provide funds to schools in exchange for consumer purchases of those products.	**2**
Subtotal for Section 5	**Comprehensiveness Score**: Count the number of items rated as "1"or "2" and divide this number by 15. Multiply by 100. Do not count an item if the rating is "0."	**60**

	Strength Score: Count the number of items rated as "2" and divide this number by 15. Multiply by 100.	**47**

Section 6. Implementation, Evaluation & Communication		**Rating**
IEC1	Establishes an ongoing district wellness committee.	**2**
IEC2	District wellness committee has community-wide representation.	**2**
IEC3	Designates one district level official accountable for ensuring each school is in compliance (ensuring that there is reporting up)	**2**
IEC4	Designates a leader in each school accountable for ensuring compliance within the school.	**2**
IEC5	Addresses annual assessment of school wellness policy implementation/progress towards wellness goals.	**2**
IEC6	Progress report on compliance/implementation is made to the school community (Board of Education, superintendent, principals, staff, students and parents)	**1**
IEC7	Progress report on compliance/implementation is made available to the public	**2**
IEC8	Progress report ensures transparency by including: the web address of the wellness policy, a description of each school's activities and progress towards meeting wellness goals, contact details for committee leadership and information on how to join the committee.	**1**
IEC9	Addresses a plan for updating policy based on best practices.	**2**
IEC10	Addresses methods for communicating with the public.	**0**
IEC11	Specifies how district will engage families to provide information and/or solicit input to meet district wellness goals (e.g., through website, e-mail, parent meetings, or events.	**0**
Subtotal for Section 6	**Comprehensiveness Score**: Count the number of items rated as "1"or "2" and divide this number by 11. Multiply by 100. Do not count an item if the rating is "0."	**82**
	Strength Score: Count the number of items rated as "2" and divide this number by 11. Multiply by 100.	**64**

Overall District Policy Score

Total Comprehensiveness Add the comprehensiveness scores for each of the six sections above and divide this number by 6.	**District Score** **67**
Total Strength Add the strength scores for each of the six sections above and divide this number by 6.	**District Score** **52**

Appendix E: Cambridge Public Schools Teacher Wellness Survey

Part I: Hunger
1. Has a student ever talked to you about being hungry?
2. In a typical month, how many times do students talk to you about being hungry?
3. Are there individual students who are hungry more than 3 times per month?
4. What do you typically do if a student tells you that they are hungry?
5. Have you noticed changes in behavior when students are hungry?
Part II: Snacks, Food, and Activity
1. Do you allow snacks in the classroom
2. Do you provide students with a designated snack time?
3. If students eat snacks in class, where do they usually get their snacks?
4. Do you allow students to have candy in the classroom?
5. Do you provide guidelines for snacks, what are they?
6. About what percentage of your students do you think bring “healthy” snacks?
7. Are you concerned about some of the snacks students bring?
8. Are you aware of the school’s food allergy guidelines?
9. How frequently do you offer food as a reward?
10. How often do you provide physical activity breaks in class for students?
11. Are you aware of the CPS Wellness Policy?

Appendix F: Hunger

Introduction

Although the United States is considered a food-rich country, millions of Americans still face challenges associated with living in food insecure households. Food insecurity is a serious public health problem that is associated with negative physical, emotional, and cognitive outcomes during development. Currently 1 in 6 children in the U.S. live with food insecurity, meaning 13 million children do not have consistent access to adequate and nutritious foods (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2015). This means that millions of children and families lack consistent access to safe and nutritious foods they need to live healthy lives, and these children will likely suffer long lasting consequences as a result. Symptoms of hunger include lack of concentration, fatigue, irritability, headache, and stomachache. So even if it is not a result of food insecurity, hunger can still produce problematic effects on cognitive and psychosocial function.

I completed my capstone internship with the Cambridge Public Schools (CPS) Wellness Council and the 5-2-1 Subcommittee of the Healthy Children Task Force. The Wellness Council is responsible for updating and evaluating the CPS District Wellness Policy every three years. The Wellness Policy is a written document of official policies that provide guidelines on nutrition, physical activity, and health and physical education in schools; this policy serves an important role in promoting student health and well-being. The Wellness Policy specifically states that no student should go hungry while in school—this portion of the policy became the central focus for this year's evaluation. I developed the Teacher Wellness Survey that was administered to CPS teachers to gather data on

hunger in CPS classrooms and understand how teachers are promoting wellness.

The overall purpose of this paper is to: 1) review the literature on food insecurity, hunger, and their implications for child development; 2) discuss the importance of local school wellness policies and introduce the CPS Wellness Policy; 3) offer an assessment of the CPS Wellness Policy and suggestions as to how the policy can be strengthened; and lastly, 4) provide findings from the CPS Teacher Wellness Survey.

Literature Review

This review begins by "unpacking" the terms food security and hunger, and what each phenomenon looks like in the United States. Focus then shifts to the effects of food insecurity and hunger on various domains of children's development and functioning; it concludes by discussing what national and local school-based solutions are currently in place to help children ward off hunger.

Food Security

The term food insecurity was originally used to describe lack of access to food at the national level due to general food scarcity. Household food security in the U.S. became a measurable phenomenon in the 1980s. The Task Force on Food Assistance launched by President Reagan concluded that a measure was needed to quantify the number of people who are hungry. After these findings from the task force were released, government and private sector researchers began developing projects to understand hunger and instruments to measure food insecurity in the U.S. (Wunderlich & Norwood, 2006).

The most widely accepted definition of food security is "access by all people at all times to enough food for an active, healthy life," including "at a minimum: (1) the ready

availability of nutritionally adequate and safe foods, and (2) an assured ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency good supplies, scavenging, stealing, or other coping strategies" (Bickel, Nord, Price, Hamilton, & Cook, 2000, p. 6). Low food security, or food insecurity, on the other hand is having "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire food in socially acceptable ways" that may or may not lead to periodic reductions in food intake (Bickel et al., 2000, p. 6). In 1995, the USDA partnered with the Census Bureau to include questions on food security in the Current Population Survey. The Current Population Survey is nationally representative survey that is the primary source for providing statistics on employment, income, food security, and poverty to help better understand the economic and social well-being of the population. The Household Food Security Module in the Current Population Survey consists of 10 food-related questions for households without children, and 18 questions for households with children under age 18. The Household Food Security Module portion reflects research that has identified a particular set of conditions, experiences and behavior pattern that serve as indicators for level food insecurity (Bickel et al., 2000). Household food security scales are designed to identify food insecurity as a result of lack of financial resources (Cook et al., 2004). Level of food security is classified on a continuum divided into four categories based on severity: High, marginal, low, and very low food security. The USDA characterizes each category as follows:

1. High food security— Household had no problems, or anxiety about, consistently accessing adequate food.
2. Marginal food security— Households had problems at times, or anxiety about,

accessing adequate food, but the quality, variety, and quantity of their food intake were not substantially reduced.

3. Low food security— Households reduced the quality, variety, and desirability of their diets, but the quantity of food intake and normal eating patterns were not substantially disrupted.
4. Very low food security— At times during the year, eating patterns of one or more household members were disrupted and food intake reduced because the household lacked money and other resources for food.

Households are classified as food insecure if in the last 12 months they report (1) worrying whether their food would run out before they got money to buy more, (2) the food they bought did not last and they did not have money to get more, and (3) they could not afford to eat balanced meals. These criteria reflect the least severe conditions that result in a household being classified as food insecure (USDA Economic Research Service, 2017).

Hunger

Food insecurity and hunger are terms that are often used together and sometimes used interchangeably. However, they are fundamentally different conditions. Hunger is defined as "the uneasy or painful sensation caused by lack of food" (USDA Economic Research Service, 2017). Hunger is experienced by everyone at some point, regardless of level of food security. There are many reasons not related to food security that someone may experience hunger, for instance if one is dieting or too busy to eat (Bickel et al., 2000). Although hunger can certainly be a consequence of food insecurity, they are each a separate phenomenon. Level of food security is a household-level economic and social condition, while hunger is an individual-level physiological symptom that may or may not

result from food insecurity. Before 2006, households with very low food security were described as "food insecure with hunger." However, that term was replaced with "very low food security" to reflect the distinct differences between hunger and food insecurity (USDA Economic Research Service, 2017).

There is no standard measure of hunger. It is difficult to measure hunger for many reasons, in part because the term itself lacks a consistent definition (USDA Economic Research Service, 2017). Although food security scales reflect the condition of the household, not individual conditions for particular members, scales measuring food security can provide information about social and economic contexts in the household that may lead to hunger. Furthermore, despite the fact that one cannot determine hunger from level of food security it is well established that children living in food insecure households are at a significantly higher risk of hunger than children from food secure households (Bickel et al., 2000).

Hunger in developed nations differs from hunger seen in developing regions. Typically hunger in countries like the U.S. is not as severe. This means that there are generally no overt signs of malnutrition, hence the term "hidden hunger" is often used. Hidden hunger occurs when the quality of diet does not meet adequate nutrient requirements, resulting in vitamin and mineral deficiencies. This is a global and national public health issue because currently two billion people worldwide experience vitamin and mineral deficiencies, with women and children in low-income families at the highest risk (WHO, 2014). One major reason this is such a public health concern is that lacking essential nutrients during infancy and childhood can disrupt growth and development, leading to health problems and cognitive impairments (McCann & Ames, 2007)

Who Is at Risk?

The literature has established socioeconomic and demographic factors that are associated with food insecurity. Not surprisingly, financial constraints and low socioeconomic status are primary risk factors. Food insecurity is strongly associated with low household income (Nord, Coleman-Jensen, Andrews, & Carlson, 2010). In the U.S., food insecurity tends to be a result of insufficient financial resources. What is surprising, however, is that almost half of food-insecure families earn incomes above the federal poverty level (Gundersen, Kreider, & Pepper, 2011). These families with income above the poverty line yet struggling with food insecurity may be so because the household income is too high to qualify for federal assistance programs, but too low to cover basic expenses including food. Households with children experience food insecurity at higher rates than does the general population. A USDA report regarding food insecurity found that 17% of households with children under age 6 are characterized as food insecure compared to 10.2% of married couples and 8.3% of non-married couples (Coleman-Jensen et al., 2015). Moreover, food insecurity affects 30.3% of households headed by a single woman with children.

The literature has also established racial and ethnic disparities in food insecurity. In 2015, food insufficiency was more than twice as prevalent among children in households headed by someone who is black or Hispanic (Coleman-Jensen, 2015). Additionally, families with an immigrant parent are also at a higher risk. Households with immigrant mothers, even those who have been in the United States for over 10 years, are at a significantly higher risk of food insecurity than mothers born in the U.S. (Chilton et al., 2009). This is especially alarming, as 25.8% of U.S. children under the age of 18 have

a parent who is an immigrant (U.S. Department of Health and Human Services, 2014). Other demographic risk factors include households headed by someone who is never married, separated, or divorced; someone who is a renter (does not own a home); a younger person; a less educated person, and living in a metropolitan area (Nord et al., 2010).

Massachusetts: A Tale of Two Commonwealths

Massachusetts is ranked the best state in the country in which to live in 2017, according to U.S. News & World Report. With a highly educated population (40.5% over age 25 hold a bachelor's degree) and optimal healthcare opportunities (only 3.3% of residents under age 65 are uninsured), the state has much to offer to its inhabitants. In spite of this, many children and families live in poverty and struggle with food insufficiency. In Massachusetts, 11.5% of residents live in poverty and 9.6% of all households are food insecure; an estimated 16.5% of children are food insecure (U.S. Census Bureau, 2016; Feeding America; Status Report on Hunger in Massachusetts, 2015).

Massachusetts is a progressive state and there are effective programs currently underway to help fight hunger and food insecurity; however, there are still underlying issues hindering parents from being able to provide adequate food for their children. One issue is that cost of living in Massachusetts is high, and minimum hourly wages are not keeping up. Of course, this is especially problematic for parents who are working minimum wage jobs. In January 2017, the Massachusetts minimum wage was increased from $10 to $11 per hour. As costs go up, this is not a significant increase. Many people working full-time minimum wage jobs do not earn enough money to support a family.

This is troubling considering that (in 2015) over 200,000 children in Massachusetts have a parent that earns less than $11 per hour (Project Bread, 2015). Of course, cost of living and income varies by different regions and cities in the state.

Cambridge, MA.

Cambridge is quite an exceptional place. Home to some of the world's most prestigious universities and a booming biotechnology industry, Cambridge is a thriving hub for academics, scientists, and engineers. In most respects, Cambridge is considered an affluent city. Seventy-five percent of residents over the age of 25 has a bachelor's degree. High educational achievements tend to bring along high income. According to Cambridge Community Development Department, the median household income for the city has increased 16.3% from 1999 to 2015 (from $68,273 to $79,416 in inflation adjusted dollars). This rise in income is much higher than is seen in other parts of the U.S., as across the country, median household income has remained relatively stagnant since 1999 at around $56,000-$58,000 (U.S. Census Bureau, 2016).

However, the encroaching industries and wealth in the city may be occluding the many low-income residents struggling to pay to live in the city. It is important to understand this other side of the city's residents that is not as well-to-do. In 2015, about 14% of all persons and 9% of all families in Cambridge had incomes below the poverty line (City of Cambridge Community Development Department, n.d.). In the public school system, 45.4% of Cambridge students received free or reduced lunch in 2015. Furthermore, the 2014 Teen Health Survey, which focuses on various issues related to student health, revealed that 9% of high school students have "been hungry in the past 12 months because there was not enough money at home to buy food" (Social Science

Research and Evaluation Inc., 2016).

Looking at the city's demographics, 11.7% of residents are Black or African American and 7.6%, Hispanic or Latino, and over 27% are born outside of the U.S. (U.S. Census Bureau, 2016). Though being a racial or ethnic minority or an immigrant are not risk factors themselves, these groups unfortunately are disproportionately affected by food insecurity than U.S. born white residents. Moreover, 10% of residents have only a high school diploma, and 5.6% lack even that.

Effects of Food Insecurity and Hunger on Children

Not long ago, there was doubt that the level of food deprivation in the U.S. is severe enough to affect children's outcomes (Alaimo, Olson, & Frongillo, 2001). However, food insecurity has been associated with negative developmental consequences for children. And hunger does not have to be present in food insecure households for there to be detrimental effects on children. A prevalent pattern in food insecure households with children is for parents to prioritize children's food needs before their own so that the children do not experience hunger (Bickel et al., 2000). Despite this, the literature has illustrated vast and numerous consequences of food insecurity on children's development.

Physical Problems

Malnutrition and chronic health conditions during childhood can have a long lasting, sometimes lifelong impact on health and socioeconomic status in adulthood (Case, Fertig, & Paxson, 2004).

Malnutrition and iron deficiency. Iron deficiency is more prevalent in children from food insecure households (Skalicky, Meyers, Adams, Yang, Cook, & Frank, 2006). Iron deficiency and iron deficiency anemia are the most prevalent nutritional deficiencies

in the United States and are common in toddlers and women of childbearing age (Looker, Dallman & Carroll, 1997). An estimated 30-50% of anemia in children is caused by iron deficiency (WHO, 2007). In developed countries such as the U.S., iron deficiency primarily occurs as a result of low dietary iron consumption. Naturally iron-rich foods include red meat, seafood, beans, and dark leafy vegetables. Socioeconomic factors may play a role in inadequate iron intake; because the cost of these foods can be high, low-income families may opt for less nutritious and cheaper food alternatives that also have a longer shelf life (Marx, 1997).

Iron is an important nutrient for neurodevelopment and cognitive functioning. Micronutrient deficiencies, including iron deficiency, are positively correlated with psychosocial problems. Though it is difficult to establish a causal relationship because of many confounding factors, there is some support for a causal relationship between depressed iron levels and cognitive and behavioral function (McCann & Ames, 2007). Dietary supplementation has been shown to improve iron stores leading to improved cognitive outcomes in children (Skalicky et al., 2006). Studies have shown that iron deficiency affects neuronal energy metabolism, the metabolism of neurotransmitters, myelination, and memory function in animal models (Baker & Greer, 2010). These mechanisms may account for behavioral and cognitive changes seen in children who are iron deficient. Moreover, micronutrient and protein deficiencies due to inadequate dietary intake can impair immune function and wound healing ability leading to higher risk of illness and infection (Cook et al., 2004).

Obesity. Another major health problem associated with food insecurity is obesity. Obesity has been on the rise in the United States among the general population since the

1980s. Childhood obesity has become an epidemic and, similar to food insecurity, disproportionately burdens children of ethnic minority groups and lower socioeconomic status households. Although it may seem counter-intuitive, children from food insecure households have a greater risk for being overweight or obese (Casey et al., 2006). Physician William Dietz first raised the hunger-obesity paradox in 1995. He noted that one of his pediatric patients he was treating for obesity came from an impoverished and food insecure household. A case study on this patient revealed that both of her parents had a history of obesity while also struggling with household food shortages (Dietz, 1995).

The World Health Organization defines obesity as "abnormal or excessive fat accumulation that may impair health" (WHO, 2016). A child or teenager is considered obesity if body mass index is at or above the 95th percentile for age and sex (CDC, 2015). Obesity is deemed a disorder of 'energy imbalance,' which reflects the imbalance of excess energy, or caloric consumption, and insufficient output resulting in excess weight. In contrast, hunger reflects an inadequate intake of food. Many Americans struggle to live a healthy lifestyle and maintain a healthy weight, and those living with food insecurity face this struggle and many more. There is a multitude of reasons as to why food insecure and low-income people have higher rates of obesity. Firstly, healthful foods can be more expensive, and fresh fruits and vegetables are perishable which run the risk of perishing. Cheaper food alternatives with stable shelf lives are typically nutritionally poor and calorically dense. With mild food insecurity, daily caloric needs are maintained, and often exceeded, by these foods (Seligman, Bindman, Vittinghoff, Kanya, & Kushel, 2007). However, when people are living in food insecure households with hunger, there may be a "feast or famine" situation occurring; when food is available, there is the tendency to

overeat or binge eat leading to disordered eating and metabolic patterns (Bruening, MacLehose, Loth, Story, & Neumark-Sztainer, 2012).

Psychosocial Function

Poverty has been consistently shown to be a powerful predictor of emotional problems in children. Even when controlling for family income, food security status may have its own impact on emotional development. Food insecurity can have psychosocial effects on children as early as infancy. Zaslow et al. (2008) found that food security measured at nine months predicted insecure attachment at twenty-four months. Attachment style was not a result of food insecurity itself, but rather through the influence of food insecurity on maternal depression. This is not surprising, considering that mental health challenges in mothers and children are more common in food insecure households (Whitaker, Phillips, & Orzol, 2006). One encouraging finding from the Zaslow et al. (2008) study is that positive parenting served as a predictor of secure attachment in toddlers from food insecure households. However other studies have found positive parenting to be only a partially mediating factor between food insecurity and child social and emotional outcomes (Whitaker et al., 2006)

The Pediatric Symptoms Checklist (PSC) is a validated tool to identify children with disruptive behaviors and psychosocial dysfunction. Food insecure children are seven times more likely to score in the clinically significant range on the PSC compared to children from food secure households (Kleinman et al., 1998). Alaimo, Olson, and Frongillo (2001) found that food insecurity is associated with negative cognitive and psychosocial psychosocial outcomes in school-aged children even when adjusting for other risk factors, including family income and poverty. There are also psychosocial and

emotional consequences for teenagers. Alaimo et al. (2001) also observed that adolescents who have experienced food insecurity were more likely to have seen a psychologist, been suspended from school, had difficulty getting along with others, and had fewer friends. These effects were seen even in students who were at a lower risk for food insecurity based on background and demographic information. Since it is difficult to measure the effects of hunger as a product of financial constraints, some researchers have investigated the effects of hunger by examining people who are chronic dieters, also called restricted eaters. People classified as restrained eaters exhibit higher anxiety, heightened affective responsiveness, stronger responses to emotion-eliciting stimuli and fear-inducing situations (Polivy, 1996).

Cognitive Function and Academic Performance

Food insecurity also seems to have consequences for cognitive functioning and academic performance. Attentional processes seem to be especially susceptible to the cognitive deficits associated with hunger. This is quite problematic for students who are not getting adequate food before and during the school day. Jyoti, Frongillo, and Jones (2005) found food insecurity during kindergarten to predict later impaired academic performance in reading and math. Even when controlling for confounding factors, food insecurity at kindergarten predicted lower math performance and greater BMI for girls. An analysis of three separate experiments testing the effects of fasting on cognition among school children found that overnight and morning fasting in slowed stimulus discrimination, increased performance errors, and slowed memory recall in cognitive tasks (Pollitt, Cueto, & Jacoby, 1998). These impairments were found in children who did not struggle with food security, and were exacerbated among children who were nutritionally

at risk. Furthermore, a study examining the effects of food restriction through dieting in adults found that the restrained eaters perform significantly worse than non-restrained eaters on proofreading tasks when distracting background noise is played (Peter, Polivy, Pliner, Threlkeld, & Munic, 1978).

Solutions to Food Insecurity and Hunger

Federal Assistance Programs

Food assistance programs are an invaluable resource for low-income families. Supplementary Food Assistance Program (SNAP), previously known as Food Stamps, is the nation's largest child nutrition program. Nearly half of SNAP recipients are children, and almost 30% of children in the U.S. participate in the program (Carlson, Rosenbaum, Keith-Jennings, & Nchako, 2016). There is a wide array of benefits for children participating in SNAP, including improved health, better academic performance, and improved long-term health and economic outcomes (Carlson et al., 2016). Receiving SNAP benefits has been found to attenuate (but not eliminate) adverse health effects of food insecurity on childhood health (Cook et al., 2004).

Another federal assistance program that serves children is the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). WIC differs from SNAP in that WIC has a different target population. WIC offers supplemental foods, health care referrals, and nutrition education for low-income pregnant and postpartum women, and to children up to age five who are at risk for nutritional deficits (USDA Food and Nutrition Service, 2016,). By targeting pregnant and postpartum women, WIC has helped contribute to healthier births, more nutritious diets, improved infant feeding practices, better health care for children, and higher academic achievement for children

(Center on Budget and Policy Priorities, 2017).

There are also resources for children within the school system. The National School Lunch Program is a federally funded meal assistance program for children in public and private schools. In addition to feeding students, this USDA funded program has minimum nutritional standards to meet and offers students an array of nutritious foods. Students with a family income up to 130% of the federal poverty line are eligible for free school meals (income 130% above the federal poverty line is $31,980 for a family of four in 2017 [U.S. Department of Health & Human Services, 2017]). Families with household incomes of less than 185% of the federal poverty line are eligible for reduced price meals (income 185% above the federal poverty line is $45,510 for a family of four in 2017 [U.S. Department of Health & Human Services, 2017]).

In addition to the National School Lunch Program, there is the National School Breakfast Program. Breakfast is an especially important meal for school children. Children who eat breakfast in the morning perform better on cognitive tests involving attention and memory (Wesnes, Pincokc, & Scholey, 2012; Pollitt, Cueto, & Jacoby, 1998). Though the National School Breakfast Program does benefit many students, there are some problematic aspects of the program that may be impeding the program's success.

For starters, there is a major gap in the number of students who participate in school breakfast and school lunch programs; in 2007, the National School Lunch Program served nearly 18 million children, while just over 8 million of the same eligible children received free or reduced price school breakfast (Brown, Beardslee, & Prothrow-Smith, 2008). This disparity is likely due to a variety of intersecting issues. First, the breakfast is served before the school day begins. This means students must make it to the cafeteria

early enough to be served and consume breakfast. Many students are not able to get to school this early, especially if they take the school bus and cannot control when they get to school. Second, students might feel too embarrassed to participate in the program. Breakfast is served in the cafeteria meaning that, unlike lunch, only students from low-income families will be eating there before school starts. In a focus group of teachers on the topic of hunger in schools, one elementary school teacher said, "Most kids know that the children going to the cafeteria in the morning are the ones getting free breakfast. There are kids who make jokes and who say mean things" (No Kid Hungry, 2015)

There are some school-based programs working to remedy these issues to help feed more students in the morning. Some schools provide mobile "Grab 'N' Go" breakfast carts, which offer quick and nutritious meals to students who need breakfast. The way these carts are implemented are decided by the individual school system, but may schools serve Grab 'N' Go breakfasts first thing in the morning, between classes, or during a morning break (USDA "There's More Than One Way to Serve Breakfast," n.d.)
In addition to being a quick and convenient option, students do not have to be singled out in the cafeteria to receive school breakfast; they can socialize while they eat.

In addition to traditional school breakfast, another way to serve breakfast in school is called "second chance breakfast." Second chance breakfast, also called breakfast after first period or a nutrition break, is breakfast served later in the morning. Generally, there are carts or kiosks located in the cafeteria for students to get hot or cold breakfast foods after first period. Second chance breakfast benefits students who are not hungry first thing in the morning and students who do not allot enough time in their morning routine for breakfast. Both Grab 'N' Go carts and second chance breakfast are served by the school's

food service department, meaning that these meals are reimbursed from the federal government the same way as the National School Breakfast Program meals. Because of this, foods served through Grab 'N' Go and second chance breakfast are held to the same nutritional standards as meals served through the National School Lunch and National School Breakfast Programs.

Local School-Based Programs

In 2012, more than 36.1 million students each day received their lunch through the National School Lunch Program (USDA Food and Nutrition Service, 2016). Because many of these children rely on this program for their meals during the day, the Weekend BackPack Program was created by hunger-relief organization Feeding America to help children in need get nutritious meals to eat over the weekend. Last year, the local organization Food for Free adopted the Weekend BackPack Program and began to implement it in the Cambridge public elementary schools. Food for Free is a food rescue organization located in Somerville that rescues fresh food that would otherwise go to waste, and then distributes it to local emergency food systems. On Friday afternoons the program sends students home with two lunches, two breakfasts, and fresh fruit to eat over the weekend.

The Weekend BackPack Program is only implemented in Cambridge elementary schools, but older students in need are not neglected. Food for Free also supplies food to the Falcon's Food Project at Cambridge Rindge and Latin High School. The Food Project is essentially a school food pantry that is open to any student who needs it, offering fresh fruit, shelf-stable groceries, and personal care items. For adults and other family members, Food for Free hosts School Markets at certain Cambridge Public Schools. School Markets

are set up like a farmers' market with fresh produce and groceries, but they are free. These after-school markets are offered once per month and offered to the whole community.

Conclusions

Food insecurity in the United States is a major public health problem. By impacting virtually all domains of development, food insecurity can produce potentially lifelong consequences on children. Despite having national and local programs in place, food insecurity continues to plague children in families in Massachusetts, even in cities as progressive and innovative as Cambridge. As mentioned earlier, 45% of students in Cambridge receive free or reduced price school lunch. This reveals that at least almost half of children live in households earning an income of no more than 185% above the federal poverty level (as a reminder, 185% above the federal poverty level is $45,510 for a family of four in 2017). Since it is well established that household income is inversely related to food insecurity, this is a clear indication that food insufficiency is a serious concern for families in in the city.

One way the Cambridge Public Schools strive to combat childhood hunger is having a school wellness policy. School wellness policies, which are discussed in detail in the next section of this paper, play an important role in promoting the health and well-being of students particularly around proper nutrition. The Cambridge Public School district's wellness policy explicitly states that the school department will ensure no student go hungry while in school.

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