

Exploring breakfast consumption among school children in Eleuthera, Bahamas: A mixed-method study

Julia A. Weatherly

Mentor: Allison Karpyn, PhD

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF PUBLIC HEALTH

University of Pennsylvania

Perelman School of Medicine

April 27, 2018

Executive Summary

In 2017, the United Nations launched a Global Action Program to address the challenges Small Island Developing States (SIDS) face in addressing food insecurity. School lunch programs have been proposed as a mechanism to address food insecurity. However, few studies in SIDS have evaluated whether these programs are adequately addressing food insecurity, and whether additional programs, such as a national breakfast program, are needed. In collaboration with a local nonprofit, we assessed current breakfast consumption patterns of children living on Eleuthera, Bahamas, to identify the types of food and drink students have for breakfast, and to determine the need and feasibility for a national school breakfast program. Paper surveys were distributed to approximately 365 students aged 9-15 years at 17 schools on the island. In addition, we conducted semi-structured interviews with 14 school principals and 8 national school lunch vendors. Survey results suggest that children are not regularly consuming breakfast meals of high nutritional quality and have limited fruit and vegetable intake. Findings inform opportunities for local and national stakeholders to fill gaps in policy implementation, and a framework to establish an additional national breakfast program that may further address the nutritional needs of children across the Commonwealth. Key recommendations include piloting a breakfast program in high schools on the island, since high school students consume breakfast less than primary school students. Additional recommendations include creating a curriculum for both parents and children regarding the importance of eating a nutritious breakfast, paying school vendors on time so they are able to provide overall healthier meals to children, and working with local packing houses so that excess produce can be distributed to schools that are in need of nutritious foods for their students.

Introduction

In 2017, the United Nations (UN) created Sustainable Development Goals (SDGs), which are a set of goals that aims to improve the overall global health and well-being. One of the stated goals was to “*End hunger, achieve food security and improved nutrition and promote sustainable agriculture*” (UN, 2017). Inadequate access to high quality food is a major public health problem (USDA, 2017). Food insecurity occurs when populations lack sufficient funds to purchase nutritious food, which is often more expensive than calorie-dense and nutrient-poor alternatives (USDA, 2017). Food insecurity in children is especially concerning, due to its associations with stunted growth, poor physical health, poor emotional well-being, and impaired learning capability among school-aged children (Racine et al., 2008).

Food insecurity is a particularly serious and growing issue in Latin America and the Caribbean, including the island archipelago country of the Bahamas. In response, the UN launched a Global Action Program in 2017 to address the challenges Small Island Developing States (SIDS) face in relation to food security, nutrition, and climate change (UN, 2017). Island nations are particularly vulnerable to food insecurity due to their limited land mass, lack of access to large agricultural markets, land stress due to high rates of tourism, and historical resource manipulation by corporations and wealthy countries (UN, 2017).

There are some unique reasons why addressing food insecurity in the Bahamas is difficult. As an archipelagic country, the Bahamas is vulnerable to extreme weather conditions and depends on foreign imports for most of its food. According to the Food and Agriculture Organization (FAO), the current food consumption patterns found in the Bahamas, in addition to the prevalence of sedentary lifestyles, predisposes the population to obesity and nutrition-related chronic diseases (FAO, 2003). The incidence and negative outcomes associated with food

insecurity are especially high for the children living on Eleuthera, the smallest of the Bahamian Islands. It is estimated that between 70 and 80 percent of Eleutheran residents are unemployed, a rate that is roughly five times higher than the 15.7 percent national rate of unemployment in the Bahamas (Heal, 2017). Additionally, the cost of food on the island of Eleuthera is more expensive than the cost of food in other Bahamian islands, with some types of fresh food, like bananas, costing nearly twice as much as on the neighboring island of Nassau (Karpyn, 2017). According to the FAO, Bahamians spend almost 65 percent of their income purchasing food, of which 90 percent is imported (FAO, 2003). Due to Eleuthera's high unemployment rate resulting in low income, and its expensive food environment, many residents are food insecure; thus, they consume cheaper and less healthy foods and depend on government programs for nourishment.

Policy makers in the Bahamas have sought to alleviate the harms caused by food insecurity by implementing a national school lunch program with similarities to the United States National School Lunch Program (NSLP). Since its inception, the NSLP has assisted 84 percent of U.S. low-income food-insecure households with school-age children by providing free or reduced-price meals (Ralston et al., 2017). Compared with income-eligible non-participants, NSLP participants consume fewer empty calories and more fiber, milk, fruit, and vegetables, and are more likely to have adequate intakes of calcium, Vitamin A, and zinc (Ralston et al., 2017). Overall, researchers have found that NSLP participation is associated with significantly lower rates of food insecurity for households with school-age children (Ralston et al., 2017).

In the United States, The NSLP was first authorized in 1946. Due to the program's success and the research linking good nutrition and learning capability, the National School Breakfast Program (NSBP) was initiated in 1966 (USDA, 2017). Like the NSLP, U.S. school children that meet certain low-income and household size eligibility requirements can participate

in the NSBP. The breakfasts provided to these children must meet nutritional standards set by the Secretary of Agriculture, and schools that serve NSBP can receive reimbursement from the federal government for providing such meals to children in need (USDA, 2017). Schools are able to serve food in a traditional cafeteria style or may implement a “breakfast in the classroom”, which involves serving breakfast to children during a morning class, often while the teacher is taking attendance or giving classroom announcements. Additionally, schools may operate a “grab and go” breakfast option that includes the breakfast meal in a paper or plastic bag, before school or during a morning break (USDA, 2017). As of 2016, more than 14.5 million U.S. children participated in the NSBP at a reduced or no cost to children that are in need of further nutritional support.

Similar to the U.S. experience, other countries such as the Bahamas may not be adequately addressing food insecurity despite the existence of their own national lunch program. In Eleuthera, the current Bahamian National Lunch Programme provides meals to eligible low-income students in schools and is an essential nutrition support for the children. However, it may not be sufficient to adequately address food insecurity throughout the day. Thus, there is growing interest among local organizations and policy makers in exploring other interventions, including a subsidized breakfast program.

In addition to being interested in increasing student nutrient consumption, political leaders on Eleuthera may be interested in addressing food insecurity issues among school-aged children to increase educational achievement on their island, as the island has the lowest primary and high school attendance out of all the Bahamian islands (Bahamas Living Conditions Survey, 2001). Additionally, Eleuthera has the largest proportion of its population with only a primary-level education and the smallest proportion of youths who have completed college (Bahamas

Living Conditions Survey, 97). Instituting a school breakfast program may provide a further incentive for children to come to school and provide them with the energy to perform in the classroom. In addition, addressing food insecurity issues on Eleuthera may help students obtain higher academic achievements and close the gap between Eleuthera and the rest of the nation in school attendance and average educational level.

Limited research has been done in the Bahamas regarding food insecurity and breakfast consumption patterns of children. A previous survey done in 1997 by the National Health and Nutrition Survey found that less than half of children between the ages of 10 and 16 in New Providence, Bahamas consumed breakfast daily. Further, of those who ate breakfast, the most common foods consumed were low-fiber, low-nutrition cereals and bread (FAO, 2003). The majority of surveyed children had higher saturated fat intakes than the recommended amount and had an insufficient intake of iron (FAO, 2003). Given the nutritional deficiency found in such surveys, assessing the potential value of a school breakfast program is an important priority.

To explore these significant issues, we collaborated with the One Eleuthera Foundation, a local nonprofit, to conduct a study that assessed the current breakfast consumption patterns of school children in Eleuthera. Specifically, we aimed to identify the types of food and drink students currently have for breakfast and determine the need for a national school breakfast program. This research combines in-depth qualitative interviews with school principals and school lunch vendors, as well as quantitative student survey data, to provide a comprehensive description the breakfast consumption patterns of children and assess the need for further nutritional support. We pursued this work to inform both future research and Bahamian policy makers about food insecurity among school-age children on Eleuthera, with the hope that the recommendations provided can be developed to mitigate this problem.

Methods

Study Design

This project is based on data from a mixed-methods study we conducted in Eleuthera, Bahamas in coordination with the One Eleuthera Foundation (OEF) in January 2018. We developed a student survey and an interview guide for qualitative research with principals and school vendors. Three groups of participants were approached and recruited by research and OEF staff: (1) principals of schools on Eleuthera that participated in the National Lunch Programme, (2) school vendors that provided meals to children, and (3) children in either fifth and sixth or ninth and tenth grades in a public school on Eleuthera. Upon successful recruitment, research study participants indicated their willingness to participate by providing verbal consent to the study team. The research team then conducted interviews in pairs with principals and school vendors. One study team member would interview the subject while the other study team member recorded the interview with an audio recorder and took notes during the interview. The research team then transcribed the interviews verbatim and/or took detailed notes. The study was approved by Institutional Review Boards at the University of Delaware and the University of Pennsylvania.

Student Surveys

Permission was secured from principals, teachers, and parents to administer in-class surveys to students in fifth and sixth grades and ninth and tenth grades at all 17 schools on the island by OEF staff and district superintendents. The research team chose to administer surveys to fifth and sixth grade students because the average reading level on the island is a fourth-grade reading level. The research team also administered surveys to ninth and tenth graders since the

average high school drop-out age is 15. Simple questions were asked in a written questionnaire in a classroom setting with assistance from the principal and/or classroom teacher to students in fifth and sixth grades and ninth and tenth grades that consented participation. The purpose of the survey was to assess how many days a week students eat and skip breakfast, if breakfast is available at school, and the types of food and drink students consume for breakfast. (See Appendix A for specific survey questions.) Students were informed that the survey would take less than 15 minutes to complete and that their names would not be used in the results. Of the 17 schools solicited to participate in student surveys, 14 schools participated in the surveys. One school declined to participate, and the other two schools did not complete the surveys in the researchers' requested timeframe. A total of 365 student surveys were collected during the week-long visit and were returned to the research team for data analysis.

Interviews with School Principals

The study team attempted to conduct and record semi-structured interviews with all 17 school principals on the island in January 2018. School principals received an email prior to the research team's arrival from the school district superintendents that the research team would be in Eleuthera during this time. Of the 17 solicited principal interviews, 14 agreed to have an in-person interview in their offices. The goals of the principal interviews were to understand how hunger affects students' overall academic performance, and whether an additional breakfast feeding program may be necessary given the nutritional limitations of the National Lunch Programme. More broadly, principals were asked about the extent of child hunger in their community, attitudes toward healthy breakfast food, and whether they had any suggestions regarding breakfast consumption among students. The interviews were an average of thirty

minutes long and occurred in-person on school premises. Interviewees were informed that their responses and the name of their school would remain confidential in data analysis and in the final report.

Interviews with Food Vendors

During the week of January 7, 2018, the study team conducted interviews with the proprietors of local food establishments that currently, previously, or may eventually provide meals for the National Lunch Programme. The research team recruited school lunch vendors to participate in in-person interviews on the school premises during the scheduled school lunch time. Of the 17 potential school vendor interviews, 8 agreed to participate in our interviews. Four school vendors declined to participate, three other school vendors were not on the school property when the research team was visiting, and two schools did not have vendors that provided meals to their students. Interviews were completed in thirty minutes or less. Vendors were asked to comment on the typical foods they prepare for student lunches, attitudes toward healthy food, and their ability to potentially prepare breakfast for students, in addition to the lunches they already serve. Interviewees were informed that their responses and the name of the school that they work for would remain confidential in data analysis and in the final report.

Data Analysis

For quantitative data, we conducted descriptive analyses in Excel and STATA software. For some questions, student responses were stratified between fifth and sixth grades and ninth and tenth grades into two categories, primary school (students who were 13 years and younger) and high school (students that were 14 years and older) so that recommendations that may come

from surveyed results can be targeted to either one of these groups of students. For qualitative interviews, we first created initial coding schemes by identifying major themes using four principal and vendor interviews. Coding schemes were then compared and revised into a single version that was then further discussed and revised with the entire research team. The final codebooks were then used to double code the remaining interviews in NVivo by two project team members. Across all codes, the extent of agreement between coders was high (95%), indicating that the codebook was successfully and consistently applied by individual team members. Appendix D depicts central themes identified in both principal and vendor interviews.

Results

Survey Data Demographics

Overall, it was found that students consume breakfast a median of seven days a week and skipped breakfast a median number of zero days a week. However, once we stratified the schools by primary and high school level, we found that primary school students reported consuming breakfast a median of seven days a week, while high school students reported consuming breakfast a median of three days a week. Thus, older surveyed students reported that they ate breakfast less than their younger peers, which may highlight a need for a breakfast program offered in high schools on the island (see Table 1). Additionally, it was found that 65% of all surveyed students reported that there was no breakfast available at their school, 20% reported that they were unsure if breakfast was available, 4% stated that breakfast was available every day, and 11% of surveyed students reported that breakfast was available once a month.

Table 1. Median number of days (interquartile range) that students reported eating breakfast, overall and by school type	
	Median # of days students eat breakfast (interquartile range)
All students	7 (3, 7)
Primary school students <i>(13 years and younger)</i>	7 (5, 7)
High school students <i>(14 years and older)</i>	3 (2, 7)

Additionally, the five most common types of food students ate for breakfast, in order of popularity, were cereal, grits, eggs, pancakes, and tuna (see Table 2). It may be that students listed general breakfast foods for this question, rather than listing the types of food they usually consume before school, because many principals reported that students often come to school with a bag of chips or soda. It was also reported that the five most common types of drink students had with breakfast, in order of popularity, were water, tea, juice, milk, and hot chocolate (see Table 3). It should be noted that the juice consumed for breakfast may not be 100% juice or the healthiest beverage to consume in the morning, especially if a child is not eating food for breakfast.

Table 2: Proportion of students that reported eating each food type, overall					
	Cereal	Grits	Eggs	Pancakes	Tuna
% of surveyed students	12%	11%	11%	9%	6%

Table 3: Proportion of students that reported drinking each beverage type, overall					
	Water	Tea	Juice	Milk	Hot chocolate
% of surveyed students	30%	20%	20%	8%	4%

Principal Interviews

Breakfast consumption was a major theme identified in principal interviews. This theme had the following four additional sub-themes that articulated the reality and need for an additional breakfast program for students in Eleuthera.

Types of food consumed for breakfast

The types of food eaten by students were discussed during principal interviews. Principals noted that children often eat foods such as pancakes, grits and tuna, cereal, and eggs for breakfast before coming to school. However, many principals noted that students will often eat unhealthier food, like chips, soda, and cookies, on their way to the bus and school from local corner stores if they did not eat breakfast at home.

Lack of parental supervision

The lack of parental supervision prior to school was one reason principals believed students do not eat breakfast. Principals stated that many parents have to wake up much earlier than their children in order to get to work on Harbour Island or Spanish Wells, which requires an additional boat to get to and may contribute to why they were unable to prepare breakfast for their children before leaving for work. Principals also noted that even if parents prepare breakfast for the children, children may not eat it because they are not supervised by their parents. Principals mostly discussed lack of time for and supervision by parents as the reasons why students do not eat breakfast, as opposed to having improper education on what to serve their children for breakfast.

Nutritional quality

Principals stated that they often know who eats breakfast in the morning based on the performance in the classroom, complaints of feeling ill, and the emotional state of the child. Principals stated that they notice an overall relationship between hunger and performance in the classroom and that a child's ability to concentrate often is tied to what they eat for breakfast and lunch. Additionally, principals commented on times when children complained of stomach or headaches in the morning, and often times they have to feed these children an emergency supply of food that they keep in the principal's or janitorial staff's office. Principals reported that they often feed children instant noodles (e.g. Cup o' Noodles) or spaghetti (e.g. can of Spaghetti-o's) if a child complains of feeling ill or will tell a child to make a cup of tea to alleviate a headache or stomachache. Principals also stated that a child's emotional well-being is tied to breakfast consumption. Principals often said they could tell if a child did not eat breakfast if they are totally withdrawn from the rest of the children or if the child is over eager to receive free food from a principal or teacher, even in front of their peers.

“Breakfast is a challenge for some students. I have some students that get here at 7:45 and they're leaving their communities around 7:20 in the morning. If parents are working, the child is responsible for feeding themselves, so some kids may not eat. I am discovering that the younger kids tend to be better taken care of than those students that are in 9th or 10th grade. Parents assume that these kids can take care of themselves, and kids also choose the less-healthier options. I had a kid come to school with soda and chips. I think that happens to some kids, like they'll have soda in the morning with a cookie.”

“We don't sell breakfast. A number of kids come to school and don't have breakfast. I don't know if it's out of laziness or if parents don't have it...Sometimes you have students that come to the office because they're not feeling well, and when I ask if they eat breakfast, they say no ma'am. A number of our students take the bus at 7 am to get here, and they come from a small town.”

Fundraising opportunity

The majority of schools in Eleuthera did not have breakfast for children at school. However, principals did state that some schools used to either sell breakfast to fundraise for the teachers' salaries or bonuses, or for school supplies and other necessities, such as air conditioners. Additionally, principals stated that some local churches provide a free breakfast once a month to students at schools. However, these church-sponsored breakfasts occur too infrequently and unreliably, and do not seriously address food insecurity among children. Overall, these breakfast programs were not sustainable according to school principals because of infrastructure challenges (e.g. lack of a proper full kitchen), lack of janitorial staff or teachers available to skillfully implement and manage a breakfast program, lack of food to prepare a healthy breakfast, and the infrequency of church breakfast programs.

“We had 2 teachers that would cook and come early to prepare and serve it. They would use it to raise funds for the classroom, like to get AC in the classrooms, so they were motivated to sell breakfast. I want the lunch vendor to sell breakfast. They would sell so fast. She could sell tuna and grits or sausage and grits, and students I'm sure would pay up to \$2.50 for breakfast. Sometimes though teachers will come together and spend the extra time to do breakfast when they want to raise money for something else. We wish we could do it, we don't have a cafeteria, so students eat outside or in the classroom. I haven't talked to the vendor yet about this idea. We want her to bring breakfast here.”

Vendor interviews

Breakfast consumption was a theme identified in vendor interviews. The breakfast consumption theme had the following two additional sub-themes that articulated vendors' ability to realistically prepare breakfast meals to children as part of their existing job to provide lunches, as well as their preference to prepare breakfast or lunch meals.

Meal preference

Vendors were asked about their ability and desire to potentially prepare breakfast meals to students that would qualify for a free breakfast, similar to the current NLP guidelines. Many vendors reported that they did not have a preference to cook either breakfast or lunch for children, but they did express concern that the additional cost would infringe on their ability to prepare additional meals without adequate and timely reimbursement from the government.

Payment

Vendors also expressed that they were concerned about potentially providing breakfast meals to students because of the Ministry of Education's history on late payments. Vendors were concerned that if they also provided breakfast meals to students they would have to buy more expensive foods out of pocket, which deterred some vendors from wanting to provide breakfast meals to low-income eligible students. Many vendors went on to describe the amount they are currently reimbursed by the government to feed students lunch on the National Lunch Program, and worried that the costs would be too high to even consider preparing breakfast meals.

“No, not with the lack of funds. It doesn't matter if I cooked breakfast or lunch, you have to put love into making both. I just want to be paid on time...It's difficult. I have to make a living. I'm not being paid on time and only getting \$4 per child. Don't get me started on not being paid on time. I have to find money to cook this food. I am waiting for them to call a vendors' meeting with us so this can be fixed. They demand healthy food, but we can't do it.”

“Everyone wants us to provide healthy meals to children, but no one wants to pay for it. It's costly to buy vegetables, like cauliflower or broccoli. They try to give us guidance on what to prepare and how to portion out things. I saw that they suggested fish, and I was like I can't do that with \$4. It costs \$1 to buy a drink and \$1 to buy a juice, so what do you want me to serve and sell for \$2? I discussed this with one lady and I told her that if you want healthy food, you have to pay for it.”

Discussion

Inadequate access to high quality food is a major public health problem and can lead populations in a state of food insecurity (USDA, 2017). There are some unique reasons why addressing food insecurity in the Bahamas is difficult, especially on the island of Eleuthera. Eleuthera, along with other Caribbean islands, vulnerable to extreme weather conditions and depends on foreign nations to import food. Child exposure to food insecurity is associated with many poor health outcomes, including stunted growth, poor physical health, poor emotional well-being, and impaired learning capability among school-aged children (Racine et al., 2008). In order to protect Eleutheran children from food insecurity, it has an existing school lunch program, the National Lunch Programme, which provides meals to eligible low-income students. However, while the Programme is an essential nutritional support for the children, it may not be sufficient to adequately address food insecurity since breakfast consumption patterns are not well studied in Eleuthera. There is growing interest, therefore, in exploring whether a subsidized breakfast program would be beneficial to further support the nutritional needs of school aged children on the island.

This study sought to identify the types of food and drink children consume for breakfast, the frequency of which students eat breakfast, principals' perspectives on the challenges surrounding breakfast consumption for their students, and vendors' perspectives on the feasibility to which they could manage an additional feeding program outside of the national lunch program in Eleuthera, Bahamas. It was generally found that students reported that they consumed breakfast on a regular basis, although interviews with principals detailed alternative accounts of students coming to school hungry, feeling sick, or eating unhealthy foods like chips and soda. It may be that students misinterpreted our survey question and did not fill out typical foods that they eat before school on a weekday, or it is possible that students may have been

embarrassed to answer whether or not they skip breakfast. We heard from several teachers that stigma around not having enough to eat exists among school aged children, therefore, it is possible that students, aware of this stigma, may have answered that they ate breakfast more times per week than they truly did. Further, many school principals noted that the island community was very small and may have contributed to the overall sensitivity students felt towards our questions. It was also found that the majority of surveyed children did not have a breakfast program at their school (65%), and that only 4% of surveyed children had breakfast available every day for purchase, which indicates that a breakfast program is needed given the lack of availability of such a program on the island. Future research among students on Eleuthera should conduct more in-depth interviews with principals and school staff to understand a complete picture around breakfast consumption and stigma that may exist from either not eating any food for breakfast, or for eating socially unacceptable foods that may be healthier than food items such as soda and chips. The OEF and local policy makers should consider how a breakfast program would nutritiously benefit their students, especially in high schools on the island.

Our study team also found that principals described the lack of nutritional quality of breakfast foods consumed among their students, and commonly described a scenario that included lack of parental supervision and being ‘on the go’ to school that prevented many students from consuming a proper meal. Specifically, many principals noted that students come to school with a cookie and soda, instead of a more well-balanced meal that includes necessary protein that supports concentration and performance in the classroom. Principals also expressed that previous breakfast initiatives existed as fundraising opportunities, either for teachers or for the whole school, which occurred too infrequently to influence students’ eating habits or substantially affect students’ overall food insecurity. Many school principals expressed that their

school lacked the infrastructure to support an in-house breakfast program but did think that vendors would want to take on additional revenue from a potential breakfast program.

Our study team also found that vendors did not prefer to prepare breakfast or lunch meals to students but were more concerned about being paid on time for taking on a potential program. Many vendors expressed affectionate sentiments towards the children that they served, often times stating that they prepare meals as if they were their own children. Even though vendors cared for their students, they thought that taking on an additional breakfast program would require them to spend more money than they already do out of pocket in order to supply the ingredients needed for breakfast meals. Overall, vendors stated that they would need a steady flow of income via reimbursement in order to shop for both breakfast and lunch meals. Therefore, OEF and local policy makers should consider alternative groups or additional vendors that may be interested in potentially preparing breakfast meals, so that current vendors are not overwhelmed by the demand. Alternatively, OEF and local policy makers should consider a more streamlined approach to reimbursing vendors on time and in the proper amount so that current vendors may be willing to take on an additional national breakfast program.

Study Limitations

The majority of the research was conducted during a one week long in-country visit. Although the research team went to all 17 schools on the island during this week, this time frame may not have yielded a complete picture of consumption patterns and culture surrounding breakfast on Eleuthera. Further, the research team was unable to meet with other important stakeholders, such as social services, the Bahamian Ministry of Education, packing houses that were mentioned as having excess produce on the island, food store owners, and other

government officials. These stakeholders may have been able to provide valuable information about the overall food insecurity experienced by residents, which is exacerbated by Eleuthera being a Small Island Developing State and overall expensive food environment. Second, it is difficult to say whether or not the results of our study are generalizable to other Bahamian islands, and if the breakfast consumption patterns and overall need for an additional government feeding program is the same across the Commonwealth. Despite these limitations, this study sheds important and novel light on the breakfast consumption patterns found on Eleuthera and that the physical characteristics of Eleuthera (SIDS status, vulnerability to climate change, expensive food environment) are similar hardships that other neighboring islands face. The study results can be utilized by both local and national policy makers that seek to alleviate nutritional challenges students experience in The Bahamas.

Recommendations and Future Work

The research team recommends that the OEF use these results to help inform local and national policy makers on the state of food insecurity in Eleutheran schools. Based on our findings, we recommend that that the Ministry of Education establish and pilot a national breakfast program in order to further meet the nutritional needs of school-age children. If the Ministry of Education is not able to create an additional national breakfast program, we recommend that the Ministry consider updating its nutritional guidelines that vendors follow so that fried foods, foods with high sugar or salt, and sugary drinks are not served to students during lunch time. Given that we found that most students do not consume breakfast on a daily basis, we also recommend that the Ministry increase vendors' reimbursement so that healthier lunches can be prepared and given to students, especially if a national breakfast program is not feasible to implement at this time. Further, we recommend that the Ministry of Education attempt to pay

vendors on time for providing school lunches so that vendors are more motivated to provide healthier meals and to potentially serving breakfast in the future.

On a local level, we recommend that schools reform on-campus food stores (called tuck shops) so that healthier items are offered to students throughout the day and so that students are unable to purchase items like chips or soda on the school premises. We believe that reorganizing campus tuck shops will decrease the consumption of calorie-dense and nutrient-poor foods and may improve the overall concentration of students that is affected by unhealthy foods.

Additionally, we believe that if the OEF and school principals work together to create educational materials for students and parents regarding healthy and quick breakfast food options, then more students and parents may consume healthier foods. We believe that schools can present on this material or distribute information regarding healthy eating during back to school nights, parent-teacher conferences, or other forums.

We recommend that the OEF and school principals meet with local packing houses, which are storage areas that house excess produce on the island that often go to waste due to the lack of distribution to stores and consumers, so that a breakfast program could be potentially supported and supplied. Local schools could have either vendors or janitorial staff prepare excess food items, such as pumpkins or onions that are from the packing houses, and create various dishes, such as roasted vegetables and noodles, vegetable soup, roasted vegetables and eggs, and roasted vegetables and grits, for students to buy at a low-cost. Establishing a partnership with local packing houses may be one way to sustain and provide meals to children that would benefit from consuming breakfast.

We also recommend that the OEF work to identify additional donor and corporate partners that may have corporate connections to food company foundations. Organizations such

as The Kind Bar Foundation and The Cliff Bar Foundation, which have available grant opportunities and partnerships. These foundations may be able to offer innovative ways to provide breakfast meals to students in need, by funding pilot programs that seek to improve the nutritional consumption patterns of populations that suffer from food insecurity.

The results collected from this project will be informative to the OEF on how it can further address food insecurity among school-age children in Eleuthera. Overall, we recommend that the OEF work to address food insecurity among children through a piloted breakfast program by considering alternative funding opportunities and local partnerships to oversee the establishment of the program.

Acknowledgements

I would like to thank my capstone mentor, Dr. Allison Karpyn, PhD for the amazing opportunity to work on this project as part of her Fulbright scholarship in the Bahamas. Dr. Karpyn allowed me to develop a project that not only complimented her own work, but one that allowed me to showcase my passions regarding food insecurity, agriculture, and general public health issues on island nations. I would also like to thank the OEF for allowing me to collaborate with them on a project that was of interest to their community. I hope that this information will be useful to them as they think of ways to improve children's nutritional quality and overall breakfast consumption on the island. I could not have done this project without the support from my capstone 1 and 2 professors, Dr. Evan Anderson, JD, PhD and Dr. Allison Curry, PhD, MPH. Additionally, this project could not have been possible without the collaboration and teamwork from Kristen Ward and Jason Hammer, who were integral in the development of my capstone project and double coding of interview transcripts. Kristen and Jason were amazing travel companions during our time in Eleuthera and made my capstone experience enjoyable. This project was externally funded by the U.S. State Department, Fulbright Commission as part of Dr. Karpyn's Fulbright award in the Bahamas.

References

1. Bahamas Living Conditions Survey 2001. Department of Statistics, Ministry of Finance. Nassau, Bahamas. 2004.
2. Definitions of Food Security. United States Department of Agriculture. Economic Research Service. 4 October 2017. <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security/>
3. Heal, Jorian. Economic Sustainability of Eleuthera. Inquiry in ACES: College of Agricultural, Consumer and Environmental Sciences University of Illinois at Urbana-Champaign. Vol. 3 No. 1 (2017).
4. Karpyn, Allison. Rice, cream, grits and tomato paste: a snapshot of Bahamian food security. University of Delaware Center for Research in Education & Social Policy. Presentation. 31 March 2017.
5. Racine, E. F., Jemison, K., Huber, L. R., & Arif, A. A. (2009). The well-being of children in food-insecure households: Results from the eastern caribbean child vulnerability study 2005. *Public Health Nutrition*, 12(9), 1443-1450.
doi:10.1017/S1368980008004229
6. Ralston, et al., USDA's National School Lunch Program Reduces Food Insecurity. Economic Research Service. United States Department of Agriculture. 2017.
7. The Bahamas. FAO-Nutrition Country Profiles. Food and Agriculture Organization of the United Nations. August 2003.
8. The School Breakfast Program. USDA's Food and Nutrition Services. November 2017.
<https://fns-prod.azureedge.net/sites/default/files/sbp/SBPfactsheet.pdf>

9. Wong, J. C., Scott, T., Wilde, P., Li, Y., Tucker, K. L., & Gao, X. (2016). Food insecurity is associated with subsequent cognitive decline in the boston puerto rican health study. *The Journal of Nutrition*, 146(9), 1740-1745. doi:10.3945/jn.115.228700

8. Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture. *Sustainable Development Goals: 17 goals to transform our world*. United Nations. 2016.

Appendices:

Appendix A: Student Survey

**National School Meal Programme Student Survey
January 2018**

School Name: _____
Your age: _____ Your grade: _____ Today's date: _____

1. When it comes to eating **lunch** on school days, where does your **lunch** usually come from?

- I bring my lunch from home
- I buy my lunch from: _____
- I get a free lunch from the lunch program at school
- I go home for lunch
- I do not eat lunch
- Prefer not to answer

2. What do you eat for **lunch**?

3. What do drink with your **lunch**? _____

4. How much does it cost to buy **lunch** at your school? _____ Unsure

5. Do you receive lunch from the National School Lunch Programme?

- Yes Not now, but I used to No, never Unsure/Do not want to answer

6. How many days a week do you **skip lunch** because you can't afford it or don't have food at home?

- 1
- 2
- 3
- 4
- 5

7. Please check the box that corresponds to each item.

	Very bad	Bad	Okay	Good	Very good	I don't know
a. Overall, how would you rate the lunch you usually eat?						
b. How <i>healthy</i> is the lunch you usually eat?						
c. Overall, how would you rate the lunch served at school?						
d. How <i>healthy</i> is the lunch served at school?						

8. How much of your lunch do you usually throw away because you do not like it or it does not taste good?

- None A little bit About half Most All of it

9. Do you ever eat fruit with your **lunch**?

- Yes. If yes, what kinds? _____
 No. If no, why not? _____
 Unsure / I do not want to answer

10. Do you ever eat vegetables with your **lunch**?

- Yes. If yes, what kinds? _____
 No. If no, why not? _____
 Unsure / I do not want to answer

11. How could school lunch be improved?

Breakfast

12. How many days a week do you eat breakfast?

- 0 1 2 3 4 5 6 7

13. How many days a week do you skip breakfast because you can't afford it or don't have food at home?

- 0 1 2 3 4 5 6 7

14. Is breakfast available at your school?

- Yes, every day Yes, once a month No Not sure

15. What do you usually eat before school, or for breakfast (if anything)?

16. What do you usually drink with breakfast, or before school (if anything)?

Thank you for taking the time to complete our survey!

Appendix B: Principal Interviews

Guide for Semi-structured Interviews with Principals

Each numbered question below should be used to initiate discussion. Additional questions are listed beneath each numbered question in case follow up and probing questions are necessary. Not all lettered questions must be asked. They should be used based on relevance to the participant's answers, role in program, and need for probing.

Prior to asking each question, make sure the question has not already been answered. If more information is necessary, ask them to expand on their previous answer.

1. Can you tell us about the history of the National Lunch Programme at your school?
 - a. How long has the National Lunch Programme been operating at your school?
 - b. In your experience (either as a principal or student) how has lunch at school changed since the introduction of the National Lunch Programme?
2. Can you talk about your role in the operations of the National Lunch Programme at your school?
 - a. Do you have any day-to-day responsibilities in operating the lunch program at your school?
 - b. Who at your school is responsible for the daily operations of the lunch program?
 - c. What do the daily operations of the lunch program entail?
3. About how many students at your school receive lunch from the national program?
 - a. Do you know if most students bring their lunch from home?
 - b. Where do students who don't receive lunch or bring lunch from home usually get their lunches?
 - c. Are there other options to purchase lunch outside of school?
4. In your opinion, do you think the students who receive lunch at your school like the food?
 - a. What are the lunches like?
 - b. What kind of food do they typically receive?
 - c. Do you think the meals are healthy?
 - d. What parts are healthy?

5. From your perspective, what may prevent a child from being enrolled in the program if they would otherwise qualify?
 - a. Are there any potential administrative or logistical barriers?
 - b. Do you see any potential familial barriers preventing enrollment?
 - c. Is there any stigma associated with receiving the school lunch?

6. For students not enrolled in the national school lunch program, can you suggest any ways the enrollment process could be improved or made easier?
 - a. What is the enrollment process like?

7. How difficult is it to sustain the school lunch program in your school? (*Probe for discussion of finances, principal or teacher time associated with administering program*)
 - a. Do you ever feel that you need any additional support in operating the program?
 - b. Are there any other resources you would like to have access to? (*financial or administrative support*)

8. Is there anything that you think would help to make the school lunch program more beneficial to your students?
 - a. Is there any additional support you think of for students or parents in the program?

9. From your perspective, do you think the lunch program is beneficial to students' concentration or performance in the classroom?
 - a. Do you feel that any of your students are hungry throughout the day?
 - b. How many students wouldn't eat lunch if it weren't for the program?
 - c. Do you think lunch or meals help with academic performance or behavior?
 - d. Do teachers ever comment on classroom productivity due to student hunger?
 - e. Are you or your teachers emotionally affected by student's hunger?

10. Do you think the National Lunch Programme is an effective way of reducing hunger in your students? Why or why not?
 - a. Do you think the program could be effective?
 - i. How? *Potential probes: improved, expanded, extended to breakfast*

- b. Is there something else that you think would be more effective at reducing childhood hunger in the community?
- 11. From your perspective, are there any changes that you would like to see in the operation of the program?
- 12. Breakfast is another time when children may not be able to get the food they need. Do most children get the nourishment they need before school starts?
 - a. What proportion don't?
 - b. Is it that they don't eat at all, eat chips/soda, or not enough food, or something else?
- 13. Do you think a school breakfast program is needed here?
- 14. Do you already have any program that feeds children breakfast?
- 15. How often do children get breakfast?
 - a. Which children participate?
 - b. Is it easy to administer?
- 16. What would the ideal school breakfast program look like here?
 - a. Would you like to see a breakfast program here which operates like the lunch program? Why/why not?
 - b. How would you hope it would be different?
 - c. Or the same?
- 17. I've been asked which is more important, a school breakfast program or a school lunch program. What are your thoughts on how to answer that?

Appendix C: Food Vendor Interviews

Guide for Semi-Structured Interviews with Food Vendors

Each numbered question below should be used to initiate discussion. Additional questions are listed beneath each numbered question in case follow up and probing questions are necessary. Not all lettered questions must be asked. They should be used based on relevance to the participant's answers, role in program, and need for probing.

Prior to asking each question, make sure the question has not already been answered. If more information is necessary, ask them to expand on their previous answer.

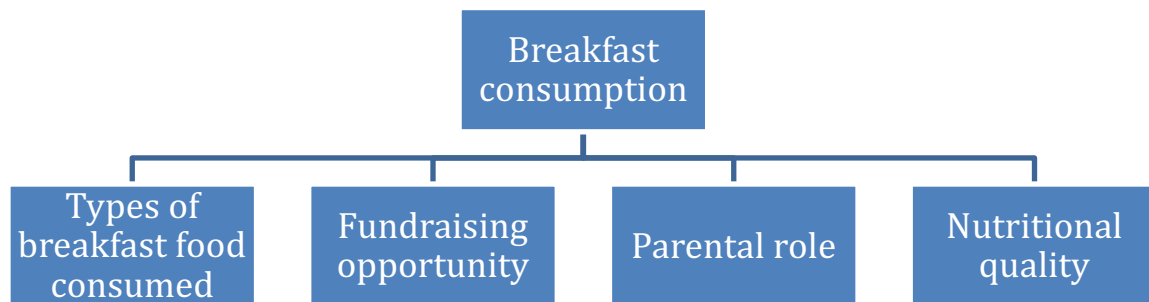
1. Can you tell me about your shop/store/business and what you make in your store?
 - a. Can you tell me about the history of your business?
 - i. How long have you been in business?
 - ii. When are you open?
 - iii. Who are your customers?
 - iv. Do you have a variety of people coming to your business?
 - v. How often do kids come here?
 - vi. Do they come alone?
 - b. What types of food do you make here?
 - i. Do you think your food is healthy?
 - ii. Have you considered selling any foods that are more healthy?
 - iii. What are customers' favorite dishes/items to purchase?
 - iv. Do you think customers would keep coming to your store if the food was healthier?
 - v. Do you sell any non-food items, like toys, candy or household items?
2. Do you think it's appropriate to have the government pay for all or some of the meals for kids who can't afford it?
3. How is it operating a business like yours here?
 - a. Is it difficult?
 - b. Are there other businesses like yours?
 - c. What is the competition like?
 - d. What challenges do you sometimes face in operating your business?
 - e. Are there things that would help you operate your business better?
4. Tell me about your involvement in the school lunch program.
 - a. Do you currently provide food to the school lunch program? Have you in the past? Would you in the future?

- i. IF NOT INVOLVED: Why don't you provide meals to schools for lunch? Is this something that you would consider doing? Why or why not?
 - b. For how long have you been involved in the program?
 - c. What is your role exactly?
 - i. Do you determine the menu, prepare, deliver, and/or serve the food?
 - ii. How is the food served to the students? Probe: packed in a container (paper bag, styrofoam, etc.), served buffet style
 - iii. What do the kids eat? Do they like it?
 - iv. Do you know if there ever meals leftover after lunch has been served?
 - v. Why is this? Probe: Do you intentionally make more food than is requested or are they not being taken by the students?
 - vi. Do you know what is done with any extra food?
5. How many schools do you provide meals to?
- a. In total, how many students do you provide lunches for each day?
 - b. Is this the maximum capacity that you are able to make each day?
 - c. Would you be able to make a school breakfast to a similar number of children in addition to a school lunch?
6. How often do you provide meals to these schools?
- a. How many days a week?
 - b. Are all meals paid for by the school lunch program?
7. Tell me about the meals you typically make in a week for school lunches.
- a. What types of food do you provide?
 - b. Are there guidelines for nutrition or other parameters?
 - c. How do you decide what to make or not make?
8. What do you consider to be healthy lunch options?
- a. What fresh fruits, vegetables, or other produce do you have access to when you make school lunches?
 - b. What do you consider to be healthy breakfast options?
9. How was your food establishment selected to provide school meals?

- a. Did you have to apply?
 - i. What was the application process like?
 - b. Do you have a contract? How long is your contract?
 - c. How often do you get paid for making school lunches?
10. Are there any challenges you face in providing lunches to schools?
- a. If yes: what are they? *probes can be: Time to make food, transportation of food to schools, not enough workers to make food*
 - b. If you could, what would you change or make better in the school lunch program?
11. If you could create a school breakfast program, how would you do it?
- a. Would you face similar or different challenges in making breakfast meals in addition to making lunch meals?
 - b. Are there ways that you could make the breakfast program better than the lunch program?
12. Would you rather make meals for a school lunch program or a school breakfast program?
- a. Why?
13. Are there any other ways you've been involved or experienced the school lunch program?
- a. Did you ever participate or any of your family members?
 - b. What memories do you have of it as a child or parent?
 - c. How has the school meals program changed since you were in school?
 - d. What are your overall feelings about the program?
 - i. Do you think it's beneficial to the children?

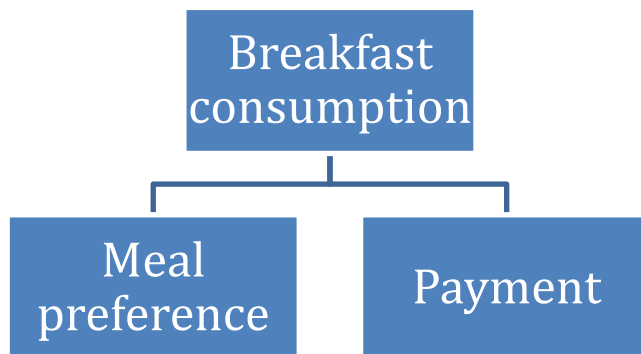
Appendix D: Principal and Vendor Codebook

1. Principal Codebook



Major themes related to breakfast consumption coded in principal interviews.

2. Vendor Codebook



Major themes related to breakfast consumption coded in vendor interviews.