Place as a social determinant of health: Shaping the role of school lunches in Kenya and the United States of America

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Healthcare Leadership
May, 2014

Faculty Adviser: Dr. Christine Stevens

Essay completed in partial fulfillment of the requirements for graduation with Global Honors, University of Washington, Tacoma

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Abstract

It is well known that the place where people live, age, and work affects their health outcomes. In order to understand the complexity and context of place, a pilot study was conducted to explore parents' perceptions of the school lunch program in two different countries, Kenya and USA. This study was conducted using a cross sectional survey thorough email, and its aim was to (1) discover where the food served to the children originated (2) explore parents' perceptions if the school lunch program provided healthy food. The results of the pilot study showed a difference between the two countries; the food in Kenya was healthy and locally grown while schools in affluent neighborhoods in the USA provided healthier school lunches than schools in low income neighborhoods. Parents' responses were intriguing because most of them felt that school lunch was healthy. On the other hand, this study demonstrates that sometimes children were exposed to more than the recommended daily intake of sodium and fat contents in school food. Preliminary findings in this pilot study present a paradox and calls for further research.

My trip to Italy in November 2013 was a once in a lifetime event. The purpose of the trip was to be immersed into the Reggio Emilia approach, an educational philosophy of early childhood learning, founded by Loris Malaguzzi (Gandini, 2013). We visited three different pre-schools within the city; the aroma of food wafting from the kitchen and into the surrounding areas reminded me of home cooked food. In addition to the food, another environmental element that impressed me was the fact that the dining tables were adorned with beautiful lavender and white linen tablecloths and silver cutlery. It was then that I understood how important food was in the Italian culture. The image of those tables and the nostalgic aroma of food in the kitchen made me wonder about the role of place and how place influenced school lunches.

By means of literature review, I explore the role of place as a social determinant of health in the lives of children. Children are defined as boys and girls in preschool to 12th grade, 3-18 years old. As the data permits, I will compare and contrast children's health outcomes in the two countries. I explore the origin of school lunches in Kenya and the United States of America (USA). Using the results of the pilot study, I analyze food preparation, presentation and parents' perception of school food. Since place is interconnected to many other factors such as social, economic and political structures, I will go back and forth between literature review, research on individuals, research on communities, research across space, research across time, small and large scale research throughout the course of this paper.

Place as a Social Determinant of Health

Place

Place is difficult to define because it has such a broad range of meaning. When I think of Kenya, I think of place in terms of Kamirithu village, where I grew up. In my neighborhood, we all knew each other by name for miles away. In the United States of America (USA), place is defined by zip codes which in turn determines health status. According to Lengen and Kistemann (2012),

> Places have been understood as location, concentrations of social relations and social practices and zones of experience and meaning. Places influence our way of thinking, our consciousness, the course our life takes, our social structures, our health and well-being. Both for the individual and society as a whole, the interaction with places leads to perception, creation of mental pictures, ideas, concepts, meanings and symbols of places and landscapes. (Lengen & Kistemann, 2012, p. 1162)

Sunderland, Bristed, Gudes, Boddy and Da Silva (2012), stated that place determines health outcomes which means that the places or neighborhoods in which people live can either have positive or negative outcomes on their health. Carpiano (2009) observed that the perspective people have on their neighborhoods affects their overall well-being. If someone lives in a neighborhood that has sidewalks for example, they may get up and walk outside as opposed to someone living in an area without sidewalks, who might be worried about walking on the street. Carpiano (2009) reported that place plays a role in health outcomes of the individual because the sense of place

evokes emotional attachments, which are created and re-created on an ongoing basis in the context of culture, history and space. Based on these findings about place, it is safe to infer that the places we live, work and age enhance the growth of our roots, and strengthen our sense of being.

Social Determinants of Health

Vartanian and Houser (2010) used 38 years of longitudinal data and discussed that the conditions of the place in which children grow up in and the child's experiences subsequently affects their health outcomes as adults. The Centers for Disease Control and Prevention (CDC) defined social determinants of health as follows:

> The complex, integrated, and overlapping social structures and economic systems that are responsible for most health inequities. These social structures and economic systems include the social environment, physical environment, health services, and structural and societal factors. Social determinants of health are shaped by the distribution of money, power, and resources throughout local communities, nations, and the world (CDC, 2014: WHO, 2008).

As a result of the definition above, it can be concluded that an individual's socioeconomic status plays a major role in the health of not just the individual but the entire community as well. It is what one earns that determines the place where one lives. The place where one lives then influences the type of jobs available, access to food and even access to health services.

According to Klawetter (2014), individuals should not be blamed for their poor health outcomes because health inequities are the results of two kinds of social determinants of health-- upstream and downstream. Upstream determinants of health

include factors such as governance, social policies, class, power and discrimination. Downstream determinants of health include such factors such as personal behaviors. LaVeist and Pierre (2014) stated that other determinants of health included factors such as racism, environmental factors, and socioeconomic status. They found that compared to white people, ethnic minority groups are faced with poor living conditions, segregation and bias when receiving medical care--upstream factors which in turn influence downstream determinants of health for people living in the United States.

Health

Health, according to CDC (2014) is defined as "a state of complete physical, mental, and social well-being and not just the absence of sickness or frailty". If a child lives in a place without access to nutritious food, the child may experience hunger and eventually mental anguish, which therefore means that they are not in good health.

Due to sub-standard healthcare access, ethnic minority groups have poor health outcomes and low socioeconomic status, making them more susceptible to both upstream and downstream social determinants of health (LaVeist & Pierre, 2014). According to De Maio, Mazzeo and Ritchie (2013), facing everyday discrimination is linked to health outcomes such as high blood pressure and anxiety. Their research further found that racism and discrimination led to a state of continuous and ongoing stress. Living in a state of chronic stress can have negative health outcomes for generations of people. The effects of racism lasts a lifetime because when stress hormones and anxiety due to racism are experienced continuously as a part of daily existence it causes wear and tear on the body (Unnatural Causes, 2008). It is

unfortunate that children experience stress hormones in utero and then continue to face daily stress, generation after generation.

Comparisons of Place and Health in Kenya and USA

Kenya

Although Kenya is synonymous with tourism activities such as safaris, hot air balloons and white sandy beaches along the Indian Ocean, the United Nations Children's Fund (UNICEF,2009) indicated that out of Kenya's population of 38.3 million people, 46% lived on less than a dollar a day. 75-80% lived in rural areas, 10 million lived in urban areas and 3 million lived in Nairobi, the capital city.

UNICEF (2009) further stated that families and children who live in urban slums and in arid areas, especially in Northern Kenya bear the brunt of poverty given the lack of access to clean water, food and sanitation facilities. As a result of being born in arid and semiarid areas, a child born in Northern Kenya will suffer from malnutrition due to an inadequate supply of food. If the child is a girl, in Northern Kenya, North Eastern or in Coast province, her chances of attending primary school are very minimal due to a culture that embraces early marriage and or even female genital mutilation. In this case, place and gender discrimination means that for a girl, the opportunity to earn an education and lead a better life is next to impossible, given that it is a daunting task to break up this cycle of poverty and illiteracy.

UNICEF (2009) reported that there are disparities in childhood mortality rate, ranging from 54 per 1,000 live births in Central Province to 163 per 1,000 in North Eastern Province and 206 per 1,000 in Nyanza Province. Without a doubt, the place where a child is born determines whether that child will live to see their 5thbirthday. This

is especially true in Kenya because according to the World Health Organization (WHO, 2014) the probability of dying in children under five was 73 per 1000 live births. Apart from the risk of dying at an early age, Kenyan children are also faced with food insecurity. To better understand the benefits of the school feeding program in Kenya, it is necessary to address the issue of food insecurity, and in particular in the slums of Nairobi.

Food insecurity. According to WHO (2014) household food and nutrition security is considered a basic human right. Food insecurity occurs when access to adequate food is limited due to "financial constraints, unavailability of food, inappropriate distribution or inadequate utilization at household level" (WHO, 2014). A correlation therefore exists between socioeconomic status and access to nutritious food both in Kenya and in the USA.

The United States Department of Agriculture (USDA) defined food insecurity as "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways" (2013). Just as availability and access to nutritious food is important, so too is access to money with which to purchase the food.

Faye, Baschieri, Falkingham and Muindi (2011), observed that the significance of food insecurity started being highlighted in 2008 after the global increase in food prices, and further stated that there are various levels of food insecurity ranging from uncertainty and anxiety about food to the extreme case of hunger. Faye et al. (2011) offered a lot of information about Nairobi, as discussed in the following sentences. Some people who live in various slums of Nairobi are faced with a high unemployment

rate, which means that they have limited access to income. Without stable income, it is not possible to have access to nutritious food. Unlike people who live in rural areas, people living in the slums of Nairobi cannot grow their own food. Without stable employment, it is difficult to have access to food. As a result, a vicious cycle of poor nutrition leads to poor health, which leads to low income earning potential followed by food insecurity. Income distribution and the level of education were also factors that played a role in food insecurity in Nairobi's slum areas, where nearly half of all households were food insecure and faced both adult and child hunger. Dixon et al. (2007) indicated that 55% of the population living in Nairobi is poor, and they occupy 5% of the land. Due to poverty, 47% of the population is food insecure.

In a cross sectional analysis that examined 2,206 children ages 5-17, Chi, Masterson, Carle, Mancl, and Coldwell (2014) found that food insecurity was significantly associated with dental caries and observed that children from households with low or very low food security had significantly higher caries prevalence than did children living in fully food-secure households. DeMartini, Beck, Kahn, and Klein (2013) reported that food insecure households face unique barriers in terms of access to food and provided the example of lack of transportation and money with which to purchase food. In a longitudinal study that started when children were in kindergarten, Jeong-Hee and Bartfeld (2012) found that persistent food insecurity is an important public health issue for children and may cause negative health outcomes in the affected children. Clearly, as a result of food insecurity, the government of Kenya stepped in to provide food assistance to children.

Origin of the school lunch program. Walingo and Musamali (2008) reported that Kenya in conjunction with the World Food Program established the school lunch program (SLP) in 1980, in order to address the issue of access to nutritious food targeted especially to children pre-primary school and primary schools in arid and semi-arid areas. As a result of the SLP, primary school enrollment increased and children stayed in school, not only in arid and semi-arid areas, but also in the country as a whole. Their research further indicated that among SLP participating students, there was an increase in vegetable consumption. Equally important, the parents' level of education and profession determined the nutritional status of the children. Clearly, this research indicated that there is a relationship between socioeconomic status, education and access to nutritious food.

According to the World Food Programme (WFP, 2014) 770,000 children in 1,700 schools in arid districts and in the slums of Nairobi were provided school meals by the WFP. The Ministry of Education through the Home-Grown School Feeding program (HGSF), which strives to provide locally grown food to children fed another 750,000 children. WFP stated that when a child has had a meal, the child finds it easy to focus on learning, rather than focusing on a hungry stomach (2014). In Kenya, the parents' socioeconomic status determines which school their child will attend. Public and private schools from elementary to high school charge school fees that are not based on any regulation. For this reason, schools are segregated based on parents' income both in rural as well as in urban areas.

Health outcomes for children. Neervoort, et al. (2013) indicated that school feeding programs were established in Africa in order to decrease the effects of malnutrition and enhance childhood growth and development. Literature review indicated that due to the school feeding programs targeted especially for vulnerable regions in Kenya led to an increase in school enrollment.

Malnutrition. According to the WHO, malnutrition is commonly caused by "lack of access to highly nutritious foods, especially in the present context of rising food prices…offering the wrong foods, and not ensuring that the child gets enough nutritious food" (2014). This definition points out that even though food may be available, if the food does not provide the necessary nutrients or vitamins to a child, the child may eventually become malnourished. Wasting and bilateral edema are severe forms of malnutrition (WHO, 2014). Clearly, it is important to pay attention to the nutritious benefits of food. Feeding children just for the sake of curbing hunger is detrimental to health outcomes of children.

Anemia. Another health outcome of malnutrition is anemia which according to the WHO is "a condition in which the number of red blood cells or their oxygen-carrying capacity is insufficient to meet physiologic needs, which vary by age, sex, altitude, smoking, and pregnancy status" (2014). Anemia is caused by iron deficiency although deficiencies in vitamin A, Vitamin B12 and folate can cause anemia as well. Iron deficiency is reported by the WHO as the most common and widespread nutritional disorder in the world (WHO, 2014). In a study by Neervoort, et al. (2013) they pointed out that 42% of the control group in their study was anemic, a severe health problem by WHO standards. By the end of the study, only 19% of participants were anemic-- a mild

health problem. Although this is so, children in both the study and control groups received medication for health problems, so it is not enough to say that nutritious food contributed to the improved results. However, this study concluded that the school feeding program improved health outcomes of children.

Social and psychological outcomes. If one takes a close look at a child, it is easy to tell if the child has experienced long term effects of hunger or if they lack food because of tell-tale signs on their body. On the other hand, research by Faye et al. (2011) indicated that it is not easy to quantify the social and psychological outcomes experienced by households facing food insecurity. The unseen consequences of food insecurity and other social determinant should also be addressed. Neervoort et al. (2013) found that school feeding programs have significant positive effects on growth and cognitive performance in children. It is easy to measure a child's physical growth but cognition might not be such an easy measure. Literature review indicated that place is a social determinant of health not only in developing countries like Kenya, but also in developed countries like the USA.

United States of America

When USA is mentioned, the images that come to mind are images of power, development and abundance--of food, money and other resources, and yet there are poor people living in America. According to Feeding America (2014), 15% of Americans lived in poverty in 2012. According to the United States Census Bureau (Census Bureau) (2013), income is used to compute poverty status. Poverty thresholds (measure of need) are then used to determine poverty status. Thresholds vary according to family size and ages of the member. Census Bureau further reported that

the weighted average poverty threshold for a family of four in 2012 was $23,492. The same threshold measures are used throughout the United States. If total family income is less than the threshold appropriate for that family, the family is considered to be in poverty, and all family members are considered to have the same poverty status. Research indicates that poverty is linked to negative health outcomes, not only in children but also in entire communities as well.

United States Census Bureau (2014) reported that in 2012, 14.7 million people in USA had family incomes ranging from 100% to 125% of poverty threshold, and further reported that 84.6% of individuals lived with a family member who received a free or reduced lunch in school. According to USDA (2010), 17.6 million households in America had difficulty providing enough food due to a lack of resources in 2010. WHO (2011) reported that America's population was 313,085,000 in 2011 and 82% of these lived in urban areas. There were 74,165,000 children (under 18) in the United States in 2010. It is difficult to understand how such a high income economy country can be faced with an issue such as food insecurity.

Food insecurity. USDA (2012) indicated that lack of access to food is determined by household income. It is understandable that without adequate income, it is not easy to put food on the table. Feeding America, a non-profit organization that is committed to fighting hunger reported that 1 in 6 people in the USA face hunger; food insecurity was more common in large cities and rural areas than in suburban areas and other outlying areas around large cities (2014). Feeding America (2010) further reported that 16,208,000 children lived in food insecure households. The child food insecurity rate for the United States was 21.6% while the overall food insecurity rate was 16.1%.

In Washington State, there were 1,559,990 children and 378,020 lived in food insecure households in 2010.

USDA (2013) reported that globally, 700 million people are food insecure, and stated that approximately 14.5% of American households were food insecure at least some time during the year in 2012. Of these, 8.8% experienced low food security while 5.7% (7 million households) were faced with very low food security. Low food security is considered as having reduced quality or variety, but not necessarily reduced food intake, which means that households with low food security had enough food and their eating patterns were not disrupted. In households with very low food security, eating patterns were disrupted and food intake was reduced (2013). Feeding America stated that Los Angeles County is the most food insecure county in the United States with more than 640,000 living in food insecure households (2010).

Origin of the school lunch program. According to the USDA, the National School Lunch Program (NSLP) was established under the National School Lunch Act and was signed by President Harry Truman in 1946. The NSLP is funded by the federal government and operates in more than 100,000 public and non-profit private schools as well as residential childcare institutions. In the year 2012, more than 31 million children received free or low-cost lunches through the NSLP. School lunch is expected to meet nutrition standards as stated in the *Dietary Guidelines for Americans.* In contrast, Peterson (2011) found that only 4-7% of schools offer school lunches that meet the USDA's nutritional guidelines. Free meals are provided for children from families with incomes at or below 130% of the federal poverty level. Reduced price meals are offered to children whose family income falls between 130% and 185% of the federal poverty

level. Children whose family income is above 185% of the federal poverty level pay a full price. In the year 2012, more than 31 million children received lunch through the NSLP, at a cost of $11.6 billion (2013).

Peterson (2011) stated that through the NSLP, schools receive foods purchased by the USDA to support food prices. Schools also receive cash and commodity foods, which make up 12% of each state's federal funding for the NLSP. Peterson (2011) found that only 4-7% of schools offer school lunches that meet the USDA's nutritional guidelines Consequently, one of the paradoxes associated with the school lunch program is that children receiving free or reduced-price lunches are more likely to face negative health outcomes compared to nonparticipants (Gundersen, Kreider & Pepper, 2011). These findings no doubt need to be researched further to find out why this is so.

Health outcomes for children in USA. While many children in Kenya grapple with malnutrition, many children in the USA are faced with several healthy challenges pertaining to access to nutritious food.

Obesity. The CDC indicated that childhood obesity rates have doubled and tripled in adolescents since 1980 in the USA. As a result, children and adolescents are faced with both short and long-term health risks, such as cardiovascular disease in the short term. Obese children and adolescents have a likelihood of being obese adults, which means more susceptibility to health problems such as diabetes and several types of cancer in adulthood. Obesity occurs due to an imbalance between calories consumed and calories expended. A person's behavior, the place where one lives or works as well as genes play a role in health outcomes (2014).

Several factors can lead to childhood obesity, for example, low socioeconomic status, consumption of unhealthy food and lack of safe places to engage in physical activity. According to the CDC approximately 17 % (12.5 million) of children and adolescents aged 2-19 years are obese. Obesity is measured in terms of Body Mass Index (BMI), which is determined using a child's height and weight. A child is considered obese if he/she is at or above the 95th percentile for children within his/her sex and age (2014).

Anemia. Another health issue in the US is anemia. According to Skalicky et al. (2006), research conducted in a low-income place in Boston Massachusetts indicated that deficiency in iron was linked to biophysical effects. As seen in the figure below, access to food was connected to income, while deficiency in nutrient intake was connected to food insecurity, which in turn led to both psychosocial and biophysical effects.

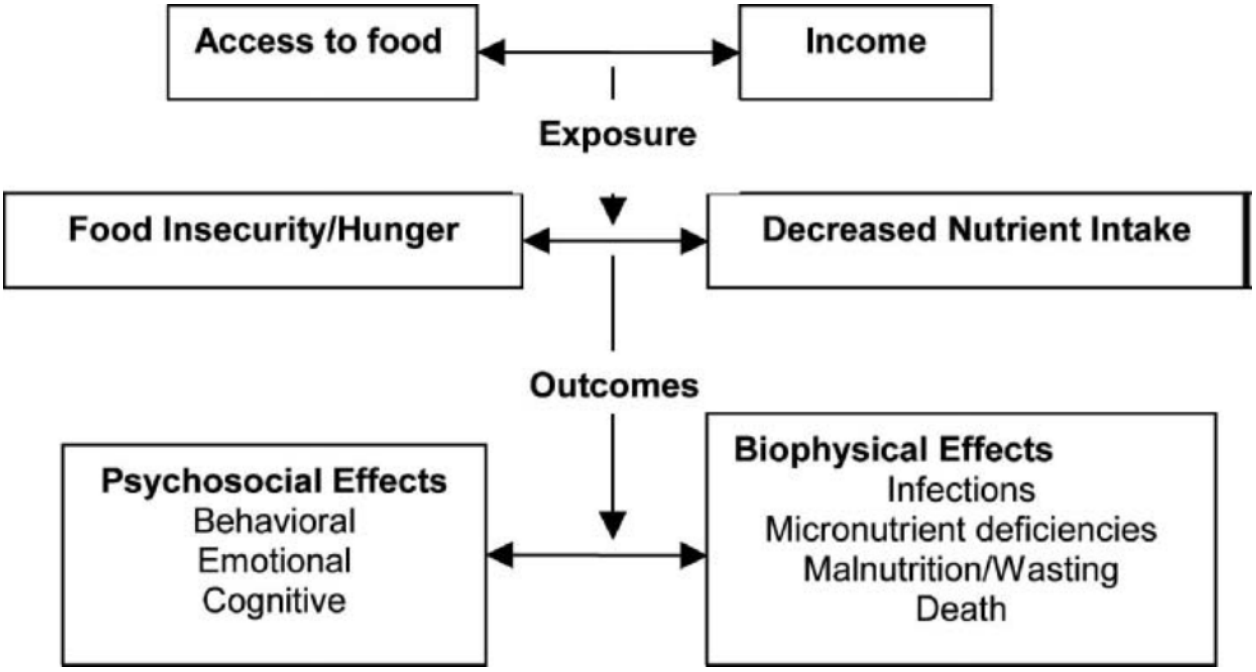

Figure 1: Theoretical relationship between food insecurity and iron deficiency (Source: Skalicky et al.).

Social and Psychological Outcomes. According to Gundersen and Kreider (2009), children who grow up in food insecure homes have poor health outcomes. Howard (2011) in a longitudinal analysis of elementary student classroom behavior found that food insecurity ranges from intermittent disruptions of meals to long term lack of nutritional intake. Howard (2011) further found that food insecurity in children impairs the development of social relations, discipline and even learning. Psychological measures may not be as easily identified as the physical components of food insecurity. For this reason, educators and primary care providers should be on the lookout for signs of food insecurity expressed in social and psychological behaviors in children.

Preparation, Presentation and Parents' Perceptions of School Lunch: Research with parents in Kenya and USA

Approval

The cross sectional survey was carried out in compliance with the Human Subjects Division of University of Washington and was approved in April 2014. In order to protect confidentiality, we will not mention the name of the parent, school, village, town or city when we do public presentations neither to classmates nor in this written report.

Methodology

The sample for this survey was taken from parents living in different places in Kenya and Washington State in the USA. Surveys were conducted by email,

questioning parents whether their child took lunch to school, participated in the school feeding/ lunch program or bought lunch.

Participants

Participants were parents aged 25-42 years old with children in K-12th grade. The surveys were emailed to many parents but due to time and internet limitation only 6 participants from Kenya and 8 participants from Washington State responded.

Questions

We used one questionnaire to find answers from parents to the following questions:

1. Does your child take lunch to school? Yes/No. If yes, how? In a flask or container? (In Kenya, a flask is a container that is used to keep hot foods hot)

   If your child does not take lunch to school, where does lunch come from?

2. School Lunch Program:
   a. How is the food prepared?
   b. Who prepares the food?
   c. Do the food preparers need any training?
   d. Where does the food come from?
   e. How much does the school lunch program cost?
   f. What is on the menu and do you see the menu beforehand?
   g. Does your child eat in a formal dining area, or can they eat in class or outside?

3. Buying: If your child buys lunch, where do they buy? What do they buy? Is the food they buy healthy in your opinion? How much does it cost per week on average? How much time does your child have for lunch

4. Going home for lunch: Do children go home for lunch like we sometimes did?

Results of the research

For the responses, see appendix D. None of the respondents reported their children going home for lunch although one parent reported, “I would like that” (Parent, USA, 2014). In Washington State, parents of children who take lunch to school packed the lunch either in insulated containers or in Ziploc bags.

A parent from Kenya observed that in rural areas, parents pack lunch in recycled containers and in worst case scenarios these children carried food in polythene (plastic) bags. 9 out of 14 parents perceived that school lunches were healthy for their children and only 5 thought school lunches were not healthy. Most parents from Kenya reported that their children’s food came from the local farmers market or the school farm. This means that in Kenya, the food did not have to be preserved in order to traverse long distances. Although only 2 of the 6 parents from Kenya saw a menu, all parents perceived that the food offered to their children was healthy. One of the parents who reported seeing the menu beforehand hand also stated that they were allowed to visit the kitchen at any time, and they could also amend the menu if they did not like what was on it. Parents in Kenya knew what was in the menu because foods like spinach, sukuma (kale) or even roast potato were what the family would typically eat at home too. These foods are healthy, nutritious and locally grown, and the kids got dessert once or twice a week. The only limitation though was that nutritional values of these foods were not provided in the menu. (See Appendix A).

A parent from United States provided a sample school menu (see Appendix B). On December 10, 2013 for example, the menu has listings of food such as beef nuggets which has a sodium content of 908mg and 6.43g of saturated fat; brown rice with a

sodium content of 5mg and 0.18g of saturated fat; ham & Cheese sandwich with sodium content of 1114mg and 2.98g of saturated fat; tuna salad sandwich with a sodium content of 1128mg and 1.51g saturated fat. Looking at this sample menu, it is clear that most of the foods provided to children are processed and refined. The "view nutrients" link provides an in depth look at the nutritional values provided on a daily basis.

Since we cannot ascertain what or how much a child would choose for lunch on any given day, it is important to provide education to children about making healthy choices beginning in childhood. The National Institute of Health (NIH) recommends somewhat active boys to consume 1,400-1,600 calories and very active boys consume 1,600-2,000 calories each day. On the other hand, somewhat active girls (ages 4-8) should consume 1,400-1,600 calories and very active girls should consume 1,400-1,800 calories (2010). Most parents from the USA reported that food was provided either by the school or school district, and one actually stated "I have no idea" in response to the question, "Where does the food come from?" Although only 2 parents saw the menu in Kenya, parents in Kenya reported that food was locally grown either in school farms or from farmers markets. Based on parents' responses, it is clear that disparities still exist between place and access to school lunch.

Limitations

The most important limitation was the small sample of parents. The University of Washington human subjects' application process took 3 months and therefore we had four weeks within which to conduct our study. Another limitation is the fact that internet connectivity in Kenya is limited; therefore, it was not possible to get responses in time. Some parents did not respond to all questions in the survey.

Conclusion based on this pilot study

Evidence from this research suggests that most children participate in the school lunch program, and parents expressed satisfaction with the food their children consumed. Although it was not possible to get a nutritional breakdown of the Kenyan school menus for comparisons with the US menu, most parents from both countries observed that the school lunch program provided healthy and nutritious food to their children. On the contrary, a parent from Washington Stated indicated that the school lunch program "should be overhauled". A nutritional overview of food from the United States school menu suggests that schools and school districts should focus on providing nutritious food and bear in mind the caloric requirements of growing children.

Conclusion

Literature review throughout this project indicated that although the school lunch program provided food to hungry children, the food was not nutritious enough. On the contrary, based on our pilot study, many parents indicated that the school lunch program provided food that was healthy for their children. A paradox therefore exists between what some researchers previously found and what our preliminary findings demonstrated. Further research to include a larger sample size, and possibly a longitudinal survey is needed to find out if parents perception of school lunch program change over time.

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Appendix A: Sample Menu from Kenya

DAYS	1st Week	2nd Week	3rd Week	4th Week
Monday	Vegetable Rice Minced Meat Spinach Fruit in Season	Spaghetti Bolognaise Sausage in sauce Fruits	Ugali Beef Stew Spinach Fruits	Ugali Spinach Beef Stew Fruit
Tuesday	Chapati Mixed Vegetable Carrot & Pineapple Salad Black forest slice	Ugali Beef Stew Spinach Fresh Juice	Mukimo Minced Meat Cabbage Ice cream	Brown Chapati Beans Stew Cabbage Fruit
Wednesday	Mashed Potatoes Meat Balls in sauce Carrot & Zucchini in butter Fruit	Chinese noodles Mixed Vegetables Spinach Custard & Cake	Fried rice Beans Stew Red & White cabbage Fruit	Turmeric Vegetable Rice Mixed Vegetables Spinach Fruit
Thursday	Coconut Rice Bean Stew Red & White cabbage Custard & vanilla cake	Roast Potatoes Fish fingers Coleslaw Fresh Juice	Brown Chapati Lentils French Beans Black Forest slice	Roast Potatoes Meat balls in sauce Spinach Yogurt
Friday	Spaghetti Stewed chicken Spinach in cream Fruit	Creamed Potatoes With peas & corn Minced meat Spinach Fruit	Coconut Rice Chicken in sauce Creamed spinach Fruit	Vegetable rice Fish fillet Yellow lentils Spinach & Sukuma Fruit

Appendix B: Sample Menu from USA (December, 2013)

Monday	Tuesday	Wednesday	Thursday	Friday
2 Chicken Burger Sweet Potato Puffs Chicken Sesame Salad Ham & Cheese Sand Elem/MS Yogurt, Cheese, Wh Gr Roll Fruit/Veg Choice Bar Elem/MS Milk, Average Condiment Bar View Nutrients	3 Franks,Chicken,8/1 - 5" Bun, hot dog, whwht, Franz1.75 BAKED BEANS (VEGETARIAN) Ham Salad Tuna Salad Sandwich Yogurt, Cheese, Wh Gr Roll Fruit/Veg Choice Bar Elem/MS Milk, Average Condiment Bar View Nutrients	4 Burrito, Fernando El Extremo Fruit/Veg Choice Bar Elem/MS Milk, Average View Nutrients	5 Corn Dog, chicken Sweet Potato Puffs Fruit/Veg Choice Bar Elem/MS Milk, Average View Nutrients	6 PIZZA, CHEESE Fruit/Veg Choice Bar Elem/MS Milk, Average View Nutrients
9 Beef, patty Bun, burger, wh wht 4", Franz FRENCH FRIES Chicken Sesame Salad Ham & Cheese Sand Elem/MS Yogurt, Cheese, Wh Gr Roll Fruit/Veg Choice Bar Elem/MS Milk, Average Condiment Bar View Nutrients	10 Beef Nuggets Rice, Brown, cooked Ham & Cheese Sand Elem/MS Tuna Salad Sandwich Yogurt, Cheese, Wh Gr Roll Fruit/Veg Choice Bar Elem/MS Milk, Average Condiment Bar View Nutrients	11 Nachos elementary REFRIED BEANS Taco Salad Hummus Plate - Elem Yogurt & blueberry mini loaf Fruit/Veg Choice Bar Elem/MS Milk, Average Condiment Bar View Nutrients	12 Chicken, drumstick, savory Potato, Red Skin, Rstd Roll, Whole Wheat Chef's Salad PBJ Sand w/cheese & pot chips Yogurt, Cheese, Wh Gr Roll Fruit/Veg Choice Bar Elem/MS Milk, Average View Nutrients	13 PEPPERONI PIZZA Chicken Caesar Salad High School Turkey w/ co Yogurt, Cheese, Wh Gr Roll Fruit/Veg Choice Bar Elem/MS Milk, Average Condiment Bar View Nutrients
16 Chicken Nuggets Sweet Potato Puffs Chicken Sesame Salad Ham & Cheese Sand Elem/MS Yogurt, Cheese, Wh Gr Roll Fruit/Veg Choice Bar Elem/MS Milk, Average Condiment Bar View Nutrients	17 Beef, patty Cheese, sliced, American Bun, burger, wh wht 4", Franz FRENCH FRIES Ham Salad Tuna Salad Sandwich Yogurt, Cheese, Wh Gr Roll Milk, Average Condiment Bar View Nutrients	18 Soft Taco REFRIED BEANS Taco Salad Hummus Plate - Elem Yogurt & blueberry mini loaf Fruit/Veg Choice Bar Elem/MS Milk, Average Condiment Bar View Nutrients	19 Chicken Teriyaki & brown rice Chef's Salad PBJ Sand w/cheese & pot chips Yogurt, Cheese, Wh Gr Roll Fruit/Veg Choice Bar Elem/MS Milk, Average Condiment Bar View Nutrients	20

Appendix C: Nutritional Value (Wednesday, Dec 11, 2013)

Recipes	Calories	Sodium mg	Dietary Fiber g	Carbohydrate g	Total Fat g	Saturated Fat g
Nachos elementary	481	1082	5.17	47.67	22.46	5.61
REFRIED BEANS	108	534	6.07	18.16	1.39	0.47
Taco Salad	318	406	4.03	31.54	16.68	5.16
Hummus Plate - Elem	428	757	15.05	72.04	9.61	1.56
Yogurt & blueberry mini loaf	292	168	1.81	50.13	6.38	1.50
Fruit/Veg Choice Bar Elem/MS	99	39	4.17	23.98	0.34	0.06
Milk, Average	129	203	0.00	21.06	0.95	0.57
Condiment Bar	66	407	0.14	8.64	3.12	0.56

Appendix D: Results of the pilot study

	Kenya (N=6)	USA (N=8)
Demographics		
Gender of Parent Male Female	 2 4	 1 7
Age of parent 25-30 31-36 37-42	 1 2 3	 0 1 7
School level of children	K-5th grade	K-12th grade
Source of food at school		
Does your child take lunch to school?	No (6)	Sometimes (3)
Where is the food prepared?	Basic kitchen at school or caterers	Basic kitchen at school
Do you see the menu beforehand?	Yes=2 No=4	Menu available (8)
Who prepares the food?	• Outsourced to a contractor • Chefs led by their chief chef • Cooks who must have a high school education	• Kitchen staff hired by school district • I never thought of this before • We prepare the food at home
Where does the food come from?	• Locally grown or regionally produced • From the local farmers market • From the school farm • Dry ingredients like flour bought from supermarkets	• Bread bought from local bakery • I have no idea • School • School district
Is the food healthy in your opinion?	• Yes, it consists of a balanced diet meal with a fruit daily • Yes, they try to balance as much as possible • Yes, it consists of a starch to meet their energy demands, proteins and either Kale or Cabbages in every meal • Yes, it is healthy for my child • Yes, the food is well balanced	• Yes, the well balanced nutrition is good for the students • Yes, they balance at home what they don't get in school • Yes, they use lean meat in their meals and serve 1% milk • Yes, it has a good portion of nutritional values although there are no parents to monitor intake • No, it is not healthy because it is merely junk food • No, my child does not even like the school food • No, the whole system should be overhauled • No, they should give children more fruits and vegetables
How much does the school lunch program cost?	KSh. 3,000-6000 per term	$2.50-$4.00 daily
Does your child eat in a formal dining area or in class?	• Formal dining area (N=6)	• Cafeteria (N=8)
Does your child go home for lunch?	• No=6	• No=8

Note: $1 is approximately Ksh. 86 depending on the exchange rate