FOOD WASTE IN MANHATTAN, KANSAS ELEMENTARY SCHOOL LUNCH

by

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Field Experience Report

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Preface

In accordance with requirements of the degree of Master of Public Health at Kansas State University, this report serves the dual purpose of presenting a master's thesis and a field experience report. The report is presented in three chapters: a review of the literature, an original research report, and a field experience report.

Chapter 1 presents an original research report examining physical activity levels during youth recreational flag football. The study examines to what extent coach training and coach experience influences a child's physical activity levels.

Chapter 2 reviews the literature on leader behavior strategies that are optimal for children's physical activity within behavior settings. This chapter will provide an overview on the classroom ecology of physical education as well as an overview of intervention strategies of other youth settings targeting leader behavior.

The final chapter describes a field experience project focused on measuring food waste in two elementary school lunchroom. The chapter presents an overview of the field experience, as well as results of two food waste assessments.

Chapter 1 - Food Waste In Manhattan, Kansas Elementary School Lunch

Introduction

In partial fulfillment of the Master of Public Health (MPH) degree, I completed 180 field experience hours with the Riley County K-State Research and Extension Agency. Established in 1914, the Cooperative Extension system, operated through the Land Grant University system, partners with federal, state, and local governments to bring education to surrounding communities. In Riley County, the Cooperative Extension office is operated through Kansas State University. The office provides educational and problem solving help in many areas, with four major emphasis areas that each house an extension agent; Family & Consumer Sciences, Horticulture, Agriculture, and 4-H.

For my experience, I worked with Virginia (Ginny) Barnard, the Family & Consumer Sciences agent, as my mentor. Ginny holds a MPH from Kansas State University, has a number of responsibilities in the areas of food health, safety, nutrition, cooking, and has administrative roles in the Flint Hills Wellness Coalition and the Walk Kansas program. At the time of my field experience, Ginny was beginning to undertake a new project, assessing food waste in Manhattan, Kansas elementary schools. I saw this project as an opportunity to work on developing my measurement skills, as well as use my background in ecological systems and behavioral science to assess food waste and help determine possible evidence-based solutions for the problem.

The School Food Waste Problem

In the United States (US) 133 billion pounds of food was wasted at the consumer and retail level in 2010, resulting in a total loss of 161.6 billion dollars (Buzby, Wells, & Hyman, 2014). This translates into 387 billion calories per day being wasted, of which 96% ends up in

landfills (Buzby et al., 2014). Moreover, decomposing food waste in landfills emits methane, a potent greenhouse gas, that accounts for 20% of all methane emissions (EPA, 2014).

Food waste can come from a variety of sources, including at the farm level (e.g., food lost to a unfavorable environment conditions), the farm to retail level (e.g., foods that do not meet food safety regulations; are misshapen or blemished), the retail level (e.g., dented cans; damaged packaging), and the consumer level (e.g., plate waste; food that spoils before consumption) (Buzby et al., 2014). In 2013 the United States Department of Agriculture (USDA) and Environmental Protection Agency (EPA) launched the U.S Food Waste Challenge in an attempt to reduce, recover, and recycle food waste in the United States (USDA OCE, n.d.). One of the major commitments of the project was to minimize waste in school meal programs, where studies have shown plate waste to be 29-43% of food taken (Cohen, Richardson, Parker, Catalano, & Rimm, 2014).

Scope of Work

The majority of by duties at Research and Extension involved measuring food waste in two elementary schools in Manhattan, Kansas. I was responsible for determining the observation system to assess food waste, for performing the measurement assessment, and to meet with food service personal in the school lunch rooms to discuss results and possible solutions to the food waste problem. In addition, I helped with multiple child education projects throughout my field experience.

Learning Objectives

Before starting my field experience, I worked with Mrs. Barnard to develop four main learning objectives. The first objective was to understand the global public health challenge of feeding a growing population, as well as the need to decrease food waste. This was done

primarily by a review of the literature, as well as consulting with a current administrative dietitian for Kansas State Housing and Dining Services and instructor for the Department of Hospitality Management and Dietetics, who recently completed her PhD with a dissertation focused on food waste. As my emphasis area in the MPH program was physical activity, I had minimal exposure to global public health nutrition issues. However, after consulting these resources I was to gain an understanding of the food waste issue.

My second objective was to define amounts of food waste in Manhattan area schools, as well as its financial burden. This was accomplished by measuring the amount of food waste that was accrued during the lunch period in two Manhattan elementary schools. After observation, I was able to determine the monetary amount wasted during each lunch period by using the price of an individual school lunch as reference.

The final objective I met was to understand the importance of community collaboration. This objective was accomplished on a number of levels. First, I was able to observe Ginny interact with multiple community collaborators throughout the project, in order to understand the scope of her position. Secondly, I was able to interact first hand with multiple levels of the community and school system; I worked directly with the school meal providers, had meetings with the USD 383 school lunch coordinator, with the Manhattan chapter of the US Alliance for a Healthier Generation, a school principal, and members of the Flint Hills Wellness Coalition. Through these interactions it opened my eyes at how crucial multi-level community collaboration is when trying to create systems change.

One objective of the field experience I did not meet was to effectively apply a school-based health policy to reduce amount of food wasted and promote increased consumption of fruits and vegetables. Although I did extensive research to find evidence based strategies that

would meet this objective, I learned that community collaboration is important as the process of generating policy change in the school system is a long, difficult process that was not feasible to be implemented in a short 3-month period. However, I provided these resources to two food service workers within the schools that I conducted observations.

Activities Performed

Throughout my field experience, my activities were all related to nutrition and food waste at two Manhattan elementary schools. My major project was to measure food waste in school lunchrooms, but I also had three education sessions with children, covering the topics of gardening, food preparation, and food waste and recycling.

Food Waste In Manhattan Lunchrooms

Background. Upon beginning my field experience, Mrs. Bernard had already recruited two schools to perform assessments. The first school, Manhattan Catholic School, is a private school that serves lunch to children pre-school to seventh grade. The kitchen at the school cooks and serves all food, and the food service director buys food for only Manhattan Catholic School. The second school, Lee elementary, served as a summer feeding school site for Manhattan-Ogden USD 383. As a summer feeding site, any child aged 1-18 can receive a meal for free. During the time we were conducting observations at Lee, the feeding program was also serving the Manhattan Girls and Boys club and the Lee academic academy summer school program. Food for Lee elementary is prepared at a central feeding site responsible for the school lunches at all USD 383 Manhattan-Ogden schools.

Methods. In order to develop the observation system, I largely used the resources provided by the USDA and the EPA, which provided detailed information on how to identify and track food waste from different streams (USDA OCE, n.d.; EPA, 2014). At Manhattan Catholic,

we used 3 separate bins to divide children's leftover plate contents after lunch into milk, food waste, and garbage. At Lee we took the separation a step further and divided waste into 5 categories; 1) a sharing table station (e.g., unopened milk, unopened prepackaged foods, uneaten fruit with a thick skin), 2) opened milk and all other liquids, 3) recycling, 4) food waste, 4) all remaining trash.

We performed observations for 10 consecutive days at Manhattan Catholic during the beginning of May, approximately 3 weeks before the end of the spring semester. During the month of June, I observed 9 consecutive days at the summer feeding program at Lee elementary. At the beginning of the lunch period, I set up the sorting station, then for the duration of the lunch period I stood at the sorting station to help kids sort their plate contents into the proper containers. In between transitions of classes into the lunchrooms, I weighed and recorded the waste, and replaced a fresh garbage bag. Each day the number of kids receiving a school lunch was also reported. Food from children who brought sack lunches was included in the measurement.

In addition, at Lee elementary I performed the Smarter Lunchroom Assessment (SLA) (Table 3-1), designed by the Cornell Behavioral Institute (Just & Wansink, 2009). The SLA has been adopted by the USDA as part of a strategy to combat food waste and promote fruit and vegetable consumption in school lunchrooms, and must be completed for a school to qualify as a Healthier US School. The measure includes a variety of questions that detail behavioral economic techniques to promote healthful nutrition behaviors.

Results. Manhattan Catholic generated approximately 897 pounds of food waste and 25 gallons of milk in 10 observation periods. This equals approximately 1/3 of a pound and 1.2

ounces of milk wasted per child per day. The price of 1 lunch at Manhattan Catholic School is $3.40 (Figure 3-3).

At the Lee summer feeding program approximately 480 pounds of food and 26 gallons of milk was wasted in 9 observation periods. This equals approximately ¼ of a pound and 2 ounces of milk wasted per child per day. In addition, food that was not eaten off of the sharing table at the end of the lunch period was thrown in the garbage (not included in totals). Items thrown from the sharing table were 115 chocolate milk, 46 white milk, 12 bananas, 11 bags of carrots, 14 apples, and 39 packets of sauce (Figure 3-4). Approximately 90 pounds of recyclable material was thrown in the dumpster.

Of the 100 possible options to be scored on the SLA, Lee elementary scored less than 30, qualifying it below the bronze category (30-50) on the SLA. In order to be considered for a US Healthier School the school must score at least a 30.

After completing the observations and analyzing the data, I held a meeting with the food service director of Manhattan Catholic School, the food service director of Manhattan-Ogden USD 383, as well as two school lunchroom employees at Lee elementary. At the meetings I held with the food service directors, I provided handouts I had developed in the form of info graphics detailing the results of the observation, as well as strategies to combat food waste (Figure 3-2, 3-3, 3-5). At the meeting with the school lunchroom employees, we discussed the results of the observation as well as their views on the feasibility of adapting evidence-based strategies developed for the Smarter Lunch room. Although they were concerned about the amount of food waste, they were unable to commit to implemented strategies to decrease or redirect waste.

Conclusion. There are numerous strategies that can be undertaken to combat the issue of plate waste, from trying to decrease the amount of food that is wasted, to after the food is wasted

how to keep it from entering landfills. These include but are not limited to the strategies detailed in the SLA (Figure 3-1), donating leftover food to a food pantry, composting, or recycling. Although neither of the schools committed to adopting these strategies for the coming school year, they appeared generally concerned and willing to try and reduce the amount of food waste in their lunchrooms.

Child Education Programs

In addition to conducting food waste assessments, I also had three opportunities to work with children on the topics of food preparation, gardening, and reducing food waste and recycling. My first child education program was at a children's cooking class. Ginny holds multiple children's cooking classes throughout the year to teach children the basics of cooking. At the session I helped with, we baked a variety of muffins with the children, and I was responsible for leading a group of children through the cooking process and answering any questions they had. At my second opportunity, I helped Ginny and the horticulture extension agent, Gregg Eyestone, along with another intern, plant a small garden with the kids of Lee elementary. My final opportunity came when I co-led an education session on the importance of reducing food waste and recycling, as well as strategies the kids could take home to reduce food waste in the home setting.

Products Developed

While at Research and Extension, I developed a number of products focusing on food waste. The first product I developed was an observation protocol. I created this protocol as a compilation of already existing USDA and EPA observations protocols (Figure 3-4). If other schools wish to perform food waste observations, Mrs. Barnard and the extension office will be able to continue to use this observation protocol.

Two of the major products I developed were info graphics that detailed the results of the food waste observations. For each school, I created a poster that could be distributed to food service personnel, parents, teachers, and kids that displayed the results of the food waste observations. These posters have minimal words, bright colors, and easy to understand results, thus are easy to use to quickly report the food waste problem (Figure 3-2, 3-3).

The biggest product I developed is a resource binder that is a compilation of information regarding studies of food waste in multiple settings, assessments of food waste, evidence-based strategies to combat food waste, and step-by-step guides from schools who have implemented food waste preventive strategies and recovery strategies. Though I was unable to help any schools adopt these strategies during my field experience, the resources are available for Ginny, and food service directors, to help schools tackle the food waste problem. As part of this binder, I created a third info graphic that briefly described the steps Manhattan schools can take begin a food waste assessment, prevention, and recovery program (Figure 3-5).

Conclusion

During my time at Kansas State Research and Extension, I learned of the problem of global food waste, the food waste problem in Manhattan, Kansas elementary schools, and the importance of community collaboration. The experience allowed me to take a step out of the lab and work directly with the community, and brought to reality the struggle of coordinating competing interests to create a change that would benefit the health of a population. The field experience also allowed me to build my observation skills, and increase my awareness of the active public health interests groups in my community.

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Table 1-1 Smarter Lunchrooms Self-Assessment: Examples of Smarter Lunchroom Strategies (Just & Wansink, 2009)

Focusing on Fruit	Promoting Vegetables and Salad
✓ At least two types of fruit are available daily	✓ At least two types of vegetable are available daily
✓ Sliced or cut fruit is available daily	✓ Vegetables are not wilted, browning, or otherwise damaged
✓ Fruit options are not browning, bruised or otherwise damaged	✓ At least one vegetable option is available in all food service areas
✓ Daily fruit options are given creative, age appropriate names	✓ Individual salads or a salad bar is available to all students
✓ All targeted entrée names are written and legible on menu boards	✓ The salad bar is highly visible and located in a high traffic area
✓ All targeted entrée names are included on the published monthly school lunch menu	✓ Self-serve salad bar utensils are at the appropriate portion size or larger for all fruits and vegetables offered
✓ Daily fruits are easily seen by students of average height for your school	✓ Self service salad bar options are smaller for croutons, dressing, and other non-produce items

Figure 1-1 Manhattan Catholic Results

Figure 1-2 Lee Results

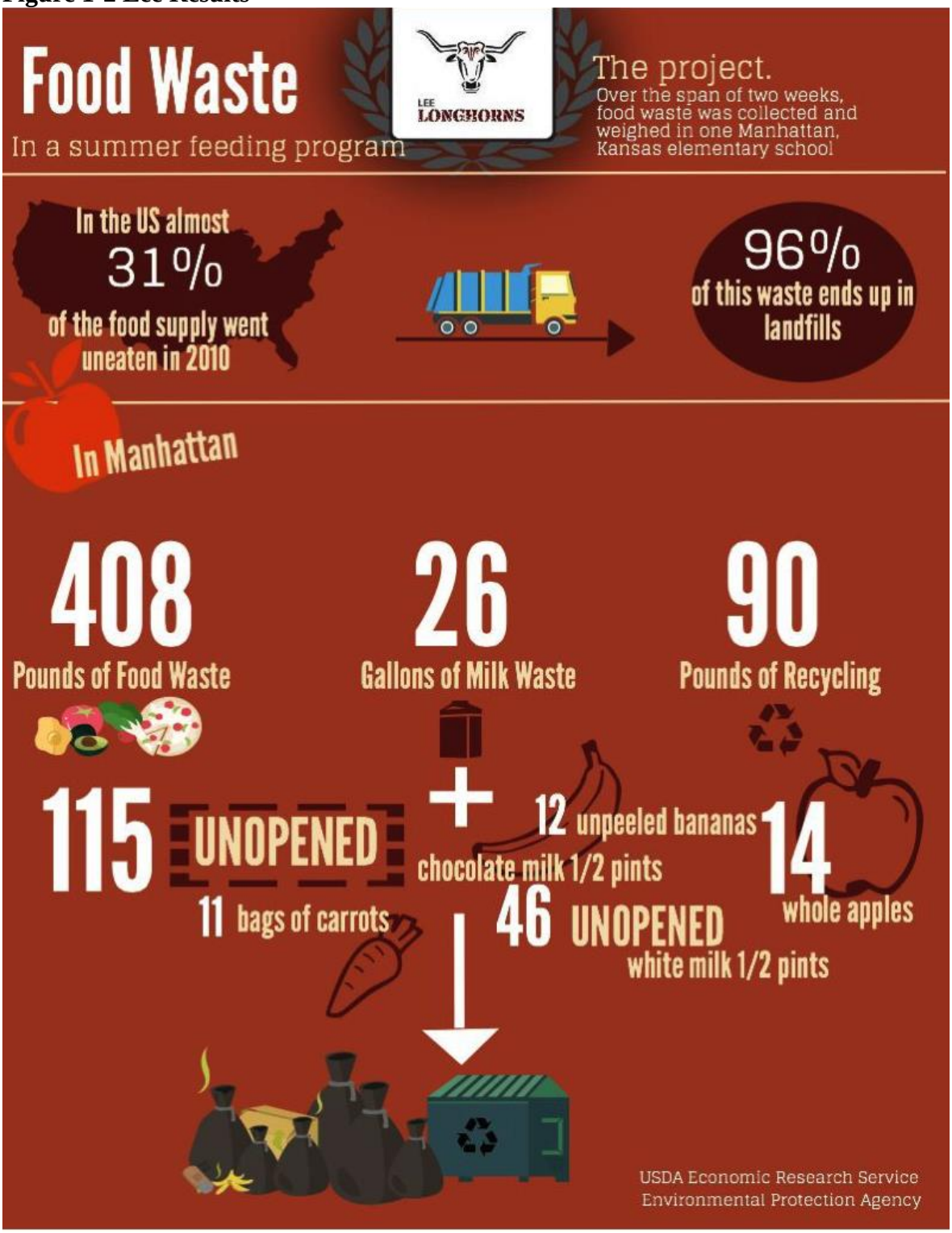

Figure 1-3 Waste Observation Record

	A	B	C	D	E	F	G
1	Trash						
2	Day	lbs of food waste	Liters	Recyclable	Sharing table	# of Kids served	
3	6/1/15	40	9	15	8 white milk, 25 chocolate milk, 9 juice boxes, 6 apples	180	
4	6/2/15	52	13	10	3 white milk, 1 chocolate milk, 8 apples, 9 salsa	190	
5	6/3/15	46	11	10	16 chocolate milk, 6 white milk, 10 sauce	190	
6	6/4/15	36	11	9	23 chocolate milk, 9 white milk	190	
7	6/8/15	45	8	11	5 white milk, 2 chocolate milk	190	
8	6/9/15	55	11	10	13 chocolate milk, 1 white milk, 19 whole bananas, 12 ketchup	190	
9	6/10/15	41	17	10	8 chocolate milk, 6 white milk, 12 bananas, 3 ranch	190	
10	6/11/15	61	13	10	21 chocolate milk, 7 white milk, 11 bags of carrots, 3 ranch, 2 honey mustard	200	
11	6/12/15	32	6	5	3 chocolate milk, 1 white milk	120	
12	Totals	408	99	90	115 chocolate milk, 46 whilte milk, 12 bananas, 11 bags of carrots, 14 apples, 39 packets of sauce	1640	
13							
14							
15							

Figure 1-4 Strategies to Assess and Reduce Food Waste

Alignment with Public Health Core Competencies

Throughout my time in the KSU MPH program I was able to accomplish multiple core competencies by conducting research, taking courses, and doing my field experience with Research and Extension.

Biostatistics. I accomplished the biostatistics core competency on a number of levels. First, I completed biostatistics course, which gave me a general overview of statistics and study design. Since then I have used the skills I learned there to critically analyze peer-reviewed evidence on research design and statistics. In addition, I used those skills to design and conduct a thesis research study, as well as analyze the data.

Environmental Toxicology. I was first exposed to the importance of environmental health in my Environmental Toxicology class, where I conducted a review on the effects of ozone exposure during exercise. In addition, while completing my field experience, I learned of the dangers of methane gas, and how food waste contributes substantially to methane gas production. I also touched upon the importance of food safety and how certain practices can lead to food borne illness at a children's cooking class.

Epidemiology. Epidemiology has been a prevalent topic in nearly all of my courses, as well as in my research. Epidemiological studies are responsible for establishing links between behavior and health thus, much of the evidence for the need to study physical activity behaviors stems from epidemiological sources. I used epidemiological evidence regarding a population estimate of children's physical activity levels in my literature review and my thesis, and used population level of nutrition behavior to help meet my learning objective of understanding the global health problem of feeding a growing population.

Health Service Administration. A strong emphasis in the MPH program is the importance of targeting multiple levels of an ecological system to create change. Health service

is an important part of the ecology of systems, which reaches a large number of the population. Though I did not work directly with Health Service, I conducted an interview with the CEO of a regional hospital, and was exposed to his view of healthcare and the steps he was taking to better ensure quality care to all patients.

Social and Behavioral Science. As I was in the emphasis physical activity emphasis of the MPH program, I was exposed to a large number of social and behavioral science courses. From these courses I was able to understand theories and concepts behind human behavior, research methods of social and behavioral science, and the application of these concepts to create interventions translatable to practice. In addition, I have been extensively involved with developing observation systems to describe setting behavior in order to determine the impact on an individual behavior response.

Conclusion

In conclusion, my two years in the MPH program at Kansas State University has provided me with multiple opportunities to enhance my understanding of the field of public health. I have met the core competencies through classwork, research, my field experience, and through interactions with my peers and professors. The information gained through this program will allow me to think critically about public health issues and mechanisms of behavior change, and help create translatable evidence-based practices to improve population health.