Breakfast at a K-3 School:
What We Are Feeding Our Children

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A nation is only as healthy as its children and in the US there is an increasing concern about children's health as it relates to diet. The goal of this study was to document the foods offered and chosen by K-3rd grade students in an elementary school in the spring of 2012 in order to help determine if these foods represent the nutritional quality needed to ensure the health of our children.

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Abstract

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Educators spend a huge amount of time preparing and teaching students the skills and concepts they deem necessary for their success. Teachers, schools, and districts are held accountable for student learning, and elaborate systems are developed to assess their achievement. But there is a critical period in our school day that may be negatively impacting student learning and has been left to non-educational agencies to manage. It is an area where the consequences for children may in the end make a more dramatic difference in student's lives than even invaluable academic skills. What area could both be this overlooked and hold such impact on student learning? School meals. This study was designed to document the actual breakfasts selected by K-3rd grade students to determine if these choices equaled a nutritious meal according to the USDA. In addition, breakfast selections were compared to published menus and were reviewed for a number of additives, preservatives, pesticides, sugar levels, and GMOs. The study found the students' highest selected meals consisted of Ready-To-Eat cereals, prepackaged muffins and chocolate or white milk. Nutritional analyses as compared to the USDA regulations showed the meals were within the proper range for total fat, saturated fat, protein, and calcium, but none of the three meals met the recommendations for calories, iron, Vitamin A, or Vitamin C. Students selected fruit with only 19% of the meals, and over 92% of the total meals offered contained high levels of added sugar. In addition, foods were found to contain numerous chemical additives, including GMO's. A fairly extensive history of the National School Lunch Program was included as background for the research project.

Dedicated to my loving family including my parents, Neal & Judy Carroll and Patricia Peil, my dear husband, Bruce Peil, and my precious children, Allen & Mirjam Peil, Ryan Peil, and Kaleigh Peil

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Chapter 1

Introduction

> No nation is any healthier than its children—the well-nourished school child is a better student. He is healthier and more alert. He is developing good food habits that will benefit him for the rest of his life. In short, he is a better asset for his country in every way. ~Harry Truman

It is the responsibility of the United States Department of Agriculture to provide healthy and nourishing meals to the millions of children receiving school lunches every year (USDA, 2012). School meals must meet the nutrition standards established by the Dietary Guidelines of Americans along with decisions made by the USDA. However, parents, pediatricians, and school administrators are increasingly concerned about children's health as it relates to diet. Ideally, children and adolescents should consume a diet that provides all of the essential nutrients needed for normal growth and development. In addition to consuming a variety of nutrient-rich foods and beverages from all of the major food groups, the diet should not only promote health in childhood, but also reduce risk for future chronic disease such as Type 2 Diabetes, obesity, cardiovascular disease, and certain types of cancer. At the present time, however, there is concern that the majority of US children are not consuming a diet that meets these goals.

In United States "Proclamation #8733—National School Lunch Week, October 7, 2011," President Barrack Obama (2011) declared,

> Despite our successes, too many American children go without proper nutrition. One-third of children in our country are overweight or obese, and without a major change, one-third of children born in the year 2000 will develop Type 2 Diabetes during their lifetime. Schools are central to improving child health, as children who eat both school breakfast and lunch may consume more than half their daily calories at school (p.2).

More than one-half of children in the United States eat one of their three major meals in school, and one in ten and adolescents eat two of three main meals in school (Benton, 2007). This means public and private schools can help provide almost all children and adolescents with opportunities to practice healthy eating.

School Breakfast

Eighty percent of Americans consume breakfast on any given day. For hundreds of thousands of children, this means that by eating their first meal of the day at a public school somewhere in America, they are eating breakfast provided by the federal government. Breakfast is an important meal that contributes to the overall quality of a complete diet. Because diet influences the potential for learning as well as health, one objective of the first national education goal was that children receive the nutrition and health care needed to arrive at school with healthy minds and bodies (The National Educational Goals Report, 1992).

Research has shown that breakfast has important nutritional benefits, providing proportionately more of most vitamins and minerals than of energy, supplying from 17-30 percent of mean daily nutrient intakes. It also offers important benefits in terms of improved concentration, and increased productivity (USDA, 2007).

However, according to Ann Cooper in her book, *Lunch Lessons* (2006), a full 78 percent of the meals served in schools in America do not actually meet the USDA's nutritional guidelines. The NSLP serves more than 27 million children in over 97,000 schools daily, with a price tag of over seven billion each day and for some, what they eat at school remains the most nutritious meal of their day.

Problem Statement

At first glance, the menus that guide the nutrition for children at my school look impressive. The menus published online appear deliberate, planned, colorful, and even fun. They display a month's worth of meals with brightly colored pictures of fruit, vegetables and various foods. The published menu plan includes many references to "Home-style/Scratch" meals. These are depicted by smiley faces and seem to provide a good balance of the various food groups that have represented healthy eating for generations. There are "New to the Menu" items along with bits and pieces of information and highlights of certain foods. The menus seem to represent a well thought-out nutritious meal (see Appendix A).

Another reason the menus might seem to signify a nutritious meal for our children is the simple reason they have been posted or sent home by a school. There is an underlying sense of trust that the menus have been created by knowledgeable food service personnel and were guided by strict nutritional mandates from the federal government. It is assumed they have been scrupulously verified to contain the proper amounts of nutritional components deemed necessary for the health and prosperity of our children. Many rely on the USDA-approved National School Lunch Program (NSLP) to provide their children with nutritionally balanced, healthful meals.

A discrepancy between the published menus and what students were actually eating, however, was first noticed when I was assigned the duty of "breakfast monitor" for the elementary school where I was a teacher. I observed many children coming out of the breakfast line with just a prepackaged box of cereal and a carton of milk, often a carton of sweetened chocolate milk. After I checked to confirm the menu did indeed included a "hot food" item, I checked inside the kitchen to see if the hot item had been prepared and was truly an option. I confirmed it had been prepared, although many times it was not a "hot" choice at all, and was

more likely a muffin or sweet roll instead. I then wondered about the term, “Home-style/Scratch” that had been displayed on the menus. I sadly discovered that although those items had been baked in a school oven, their components, such as dough and frosting, had been highly processed. And they had almost always included the addition of chemicals, colorings, and preservatives, were frozen, and sent to schools from some far away facility.

I also wondered if there was a mix up in the milk cooler that allowed children to have continual access to the chocolate milk. When I discovered there was no inherent mix-up and that kids were being allowed to choose chocolate milk with any entrée at every meal, my next question was to wonder how the school filled out their forms to the federal government to conceal what they were actually serving students. It was then that I had the disturbing thought that the government was actually allowing a prepackaged cold cereal and a chocolate milk to count as a nutritious, reimbursable breakfast meal.

Published menus that were distributed to parents, communities, published online on school sites, in newsletters and newspapers, seem to guarantee proper nutrition at school. The nutritional reality, however, may be quite different than what might be expected based on the published menus for these same meals. The actual choice of a five or 10 year-old going through a meal line may affect the nutritional make-up of that meal to the point it no longer meets the government’s intent for that meal. Because students are able to “say no” (referred by the government as “offer vs. serve”) to some items offered at each meal, they may be choosing, and eating, combinations of foods which do not contain the nutrients thought to be included each time a child passes through a meal line.

In addition, highly processed and pre-packaged foods may contain additional additives, preservatives, colorings, high levels of sugar or corn syrup, and genetically modified organisms,

which may cause children to suffer potential harm. What is the reality? Does our government monitor and guarantee a healthy, nutritious meal at school? What are we feeding our children?

Purpose

The purpose of this study was to document the foods and food products students were being offered and chose to eat for breakfast at a public elementary school in a rural western state to see if their choices equaled a nutritious breakfast and how they compared to school menus. In addition, breakfast foods were reviewed for a number of additives, colorings, preservatives, vitamins and nutrients, sugar levels, and GMOs.

Research Questions

The research questions used to guide this study were:

1. What are children choosing to eat for breakfast?
2. How do children's top breakfast choices compare to the published menus for these meals?
3. Do student choices equal a nutritious breakfast according to the USDA?
4. Are there pesticides, colorants, preservatives, HFCS, high sugar levels, GMOs and flavorings in our children's food? What it the likelihood of their presence?

Limitations

In this study, only the food items that were chosen and put on a food tray were observed and documented, and no attempt was made to document what portion of this food was actually consumed by the students. Nutritional analysis was made solely on the packaged list of ingredients. In addition, only the foods served at a public school breakfast were observed in this study. It is not known from this study if food items chosen at lunch would yield similar results.

Chapter 2

Literature Review

In order to understand how school meals have become the fast food, highly processed versions they are today, it is important to gain a sense of the history of the school meal program as it has evolved over time. Many of the rules, policies, and recommendations that were created to ensure children a nutritious meal seem perplexing. For example, given the tradition of state control of education, why are there federal nutrition standards, federal subsidies, and federal commodities enforced by state agencies? Why does part of the federal support come as chicken nuggets and hamburger patties, and some as payments? How did federal policy send a ripple effect throughout the food chain that helped turn cheap materials into highly profitable, highly processed, "value-added" products with minimal nutrition? In the next section, I will attempt to reveal the forces at play in this complicated system.

History of Early United States Food Programs

In the United States, school food service programs have evolved over a long period of time. Historically, the American public has been committed to the idea of serving meals to children in public schools. From the start, both the general public and government officials were convinced that school lunch programs offered huge benefits not only to individual children, but the nation at large (Levine, 2008). Meal programs for students had sporadic beginnings in the mid 1800s, when a few schools provided simple foods to students who were hungry during the school day. This happened because there was speculation that children who did poorly in school were also malnourished (Gunderson, 2003).

Gunderson (2003) reports that in 1905, an influential book on the subject written by John Spargo stated,

> No less than 2,000,000 children of school age in the United States are the victims of poverty, which denies them common necessities, particularly adequate nourishment…. Such children are in very many cases incapable of successful mental effort, and much of our national expenditure for education is in consequence an absolute waste. (p.10)

In Florida in 1914, one health officer decided to offer a half pint of milk a day to each child attending school. In the beginning, a large white cow was placed on the playground, and milk was served. The health officer later suggested they offer a bowl of soup to the children along with the milk. To help with this endeavor, a group of mothers donated meat, potatoes and utensils, and the principal supplied vegetables grown in a school garden. Many such programs began developing in the United States with the help of teachers, community members, churches, and women's groups. In some cases individual families provided food, equipment, and labor. This trend continued to expand, gaining momentum throughout the 1920s and 1930s until it was estimated that by 1931 there were 64,500 cafeterias in operation throughout United States schools (Gunderson, 2003; Levine, 2008).

During the Great Depression through the 1930s, the concern regarding hunger and malnourishment among school children deepened (Gunderson, 2003). In response to both school children and the war efforts of the times, the government recruited experts in science, business, nutrition, and other professions to help create and implement a national food policy. The Food and Nutrition Board (FNB) was asked to develop national nutrition standards that would first govern army meals, and would later be used for meals made at school (Levine, 2008).

Nutrition and recommended daily allowances (RDAs). Although the task to develop nutritional standards seemed straight forward at first, the FNB became politically polarized as the food industries began to first monitor and then lobby the FNB to make sure their products were not overlooked or given a poor nutritional status. Every agricultural industry believed their crop to be entirely wholesome. Despite the difficult situation, the committee settled on a set of RDAs based on international standards of caloric intake. Within a short time, menus and recipes were accompanied by RDAs and appeared in newspapers, women's magazines, radio programs, and posters in school lunchrooms, and Americans were urged to eat from each food group every day.

The food policy recommendations of the FNB had a significant and immediate impact on the fledgling school lunch programs as RDAs were used to help determine optimum nutritional levels for children's meals. Any school participating in the sporadic federally funded school lunch programs that had begun to spring up had to certify that they served "balanced meals" that followed the USDA nutritional recommendations (Levine, 2008).

Federal assistance. Although local and state officials administered school lunches, Congress required the Department of Agriculture to monitor state compliance. This marked the entrance of the federal government into public schools that had previously been the exclusive responsibility of each state. It was this change that put the federal government in the business of overseeing children's health and welfare.

It also became evident that local governments and school districts could not provide the necessary funds to carry the ever-increasing cost of food and preparation. Communities began seriously looking beyond their local and state governments for financial assistance in order to feed the overwhelming number of hungry children, and federal aid became inevitable (Gunderson, 2003; Levine, 2008).

The earliest federal aid was offered to schools in Missouri in 1932-1933. This aid was in the form of loans to cover costs of labor used to prepare and serve lunches. By 1934, over 39 states had taken out loans to cover the employment of over 7,000 women who were hired to help prepare and serve lunches. Many states and municipalities began adopting legislation to enable schools to serve noon meals to children.

Surplus commodities. At the same time, as a result of policies during of the depression, surplus farm produce was sitting in storage with no hope of being sold or consumed. These huge commodity surpluses were of national concern. A group of agricultural economists in the United States Department of Agriculture began to formulate policies to address the severe depression in farm prices and the surplus commodities. These policy makers proposed that the federal government monitor supplies by purchasing surplus commodities. It was a natural decision, once the government had purchased these commodities, to use the surplus food to feed school children. So by 1946, 454 million pounds of these commodities were allotted to schools (Gunderson, 2003). In this decision, the Dept. of Agriculture could, it seemed, help both farmers and children. By the eve of World War II, schools in every state depended on surplus commodities for their lunchrooms (Levine, 2008).

National school lunch enactment. In 1946, legislation was introduced to give the budding lunch program a permanent status rather than operating on an ongoing a year-to-year basis. The legislation was identified as the "National School Lunch Act" (NSLA) and was written as a measure of national security, and to safeguard the health and well being of the Nation's children. In addition, it also encouraged the domestic consumption of nutritious agricultural commodities and other foods. This was an important addition because the purpose then became two-fold in promising to protect the agricultural economy while at the same time

safeguarding the health and well being of children. From the beginning this was an almost impossible and contradictory statement.

In its first year, the NSLA provided food services to 44,537 schools and served over 910 million meals to six million children. During this time, in addition to surplus foods, schools were reimbursed by the federal government for a part of the cost of food used in the preparation of the noon meals. The lunches contained high levels of fat in order to bump up the calorie content of the meals, as nutritionists operated under the assumption that children, particularly poor children, required a high-fat, high-calorie diet in order to thrive (Gunderson, 2003.)

Pilot breakfast program. In 1966 under the provision of the Child Nutrition Act, a special milk program and a pilot breakfast program with specific appropriations was authorized for two years, beginning with 1966-1967 school year and ending in June of 1968. The breakfasts were required to meet the nutritional standards established by the Secretary of Agriculture on the basis of tested nutritional research.

Department of Agriculture. Section 13 of the Child Nutrition Act provided the authority to place all school food services under one agency. Congress decided that the conduct and supervision of Federal programs to assist schools in providing food service programs for children should be assigned to the Department of Agriculture. This was of considerable importance because if the Department of Education been given the task of food service instead (as many had proposed and debated), children's nutrition to help maximize learning might have been given its educational priority.

Budget crisis. Since the beginning of the school lunch program, nutritionists and food-service professionals had carefully guarded the cafeteria boundaries, resisting efforts to allow private, commercial operators into school kitchens. But because school lunches had from the

beginning been intended for poor children who could not afford to purchase or bring a meal to school, funding the ever-increasing number of free school meals by the federal government became an almost impossible burden.

Private companies allowed. In 1969 at The White House Conference, it was recommended to ease the ban on private companies operating in school lunchrooms in order to provide meals at a fair or reduced cost to children who most needed the nutrition. The future of children's lunches, it was argued, lay in convenience foods. Rapidly growing food-service industries such as McDonald's, Pizza Hut, and Taco Bell, who had for years longed for the school market, were now found to be eager allies (Gunderson, 2003).

Calling the new contracts with private food-service companies the "service company approach," many were hopeful this "marketing strategy" might actually provide better service than before. Where school meals had previously been prepared on site and were almost always hot, three-course meals that included the major food groups, the new changes allowed for the introduction of fast foods, snacks, and "a la carte" offerings that often added up to a less than nutritious meal (Gunderson, 2003).

Vending machines in schools. The intense search for new revenue sources for failing school lunch programs also pushed schools toward the vending machine industry in order to gain additional revenue. When it was initially opposed, the vending industry insisted that any restriction on its access to children was an attempt to "federally control" the market. In fact, it claimed that its snack products actually contributed to children's health and that "quick energy, assimilation of liquid, and enjoyment" (p.162) contributed as much to a child's well being as vitamins and minerals. In 1972, the National Soft Drink Association finally succeeded in an amendment that would eliminate the restriction on "competitive food" (Levine, 2008).

In the end, shrinking budgets and the potential for needed funds won over nutrition, and within a short time school vending machine contracts were worth millions of dollars. Although many believed that children simply should not be allowed to choose unhealthy foods, for the first time in history, such food as candy bars, potato chips and soda pop were allowed to compete with nutritious meals through vending machines. In addition to the revenue that schools received from the vending machines, they often also received sports equipment and other resources directly from the vending companies as incentives. By the end of the 1990s, 98 percent of public senior high schools had contracts with vending machine companies and soft-drink distributors. While many of the machines were closed during lunch hours, some reported as many as one in five high school students could access snack foods at any time of the school day (Levine, 2008).

Minimum nutritional standards. In 1970 the rules were loosened even more when the Department of Agriculture issued new guidelines allowing for the sale of foods of minimum nutritional value in school programs. The rules stipulated that if the "food" supplied more than 5 percent of the RDA of just one basic nutrient in a 100 calorie serving, the item could be served for school lunch. For manufacturers of candy bars, snack foods, cakes and soft drinks, this meant they could simply fortify their product with the required 5 percent of any one of the eight nutrients and have the product declared "minimally nutritious." In the book, *School Lunch Politics*, Susan Levine (2008), quotes Jody Levin-Epstein, an assistant for the Secretary of Agriculture for Food and Consumer Affairs saying "if a candy bar has only one nut in it, we feel it is above our minimal nutrient standards" (p.164).

Big business. Major national food corporations increased their school-focused operations significantly as the Department of Agriculture lifted restrictions. For example, the Sysco Corporation who entered the school food-service business in the early 1970s saw its net worth

increase from $115 million to over $23 billion over the course of two decades. In the meantime, an unintended consequence included the demise of the traditional family farm. They were replaced by industrial farming, large-scale food processing plants, and national networks of food-service providers. Frozen food, dehydrated mixes, and pre-heated or re-heatable entrees found an increasingly important place within these corporations. In addition, microwave ovens helped convenience foods to claim an ever-increasing share of the food market. One of the reasons these new products were embraced so readily was that it gave schools, especially those without kitchen facilities, the ability to serve large numbers of lunches. By 1978, over half of all institutions serving meals relied on pre-prepared convenience foods (Levine, 2008).

Fast food. Susan Levine (2008) reported in her book, *School Lunch Politics*, that a retired supermarket executive, Len Frederick, instituted a lunch program using fast-food restaurant practices to sell better, fresher food for less money in a Las Vegas school system. Frederick replaced the traditional school lunch menu with "super shakes" and "combo meals." Before his entrance into the school market, only 10 percent of the city's students participated in the school lunch program, which ran a deficit of over $200,000. Within one year, Frederick increased the participation rate to 90 percent and claimed a profit of over a million dollars. On the surface, his success seemed incredible. But underneath, there were red flags with many of the nutritional issues. For instance, the Las Vegas "combo meals" provided the requirements for two ounces of protein, three-quarters cup of vegetables, a slice of bread, and a half-pint of milk. But the shakes also were high in fat and chemical additives, and Frederick counted the pickles and lettuce in his hamburgers as the vegetable requirement. After visiting the Las Vegas schools, a New York Times food critic, Mimi Sheraton, reported that fewer than half of the students actually chose complete combo meals. She noticed students choosing "two cinnamon buns and a

Coke, four sugar cookies and a Sprite," or "two bags of French-fries and a milk shake" (p.169) for lunch. Even though these items were fortified, they did not equal a nutritious meal. Worse yet, the Las Vegas schools were federally reimbursed for all of these lunches (Levine, 2008).

Fortification. Private food-service corporations had no trouble tailoring their products for the school market. The problem with fortification was that it encouraged children to believe that fast food was healthy. Although Frederick's combo meals, for example, were fortified with vitamins and protein, they were still not nutritious. At the time, nutritionists warned that fortification would mask the underlying content of fast foods and lull students into thinking they were making healthy food choices. With fast foods in school, a child might not see a proper model of what constituted a balanced meal. And for many of these children, school meals may be their only meal of the day and their primary source of nutrition.

Change of nutritional concern. The 1970's concern with diet began to differ in important respects from earlier malnutrition debates. Where before malnutrition had been thought to result from a lack of nutrients, vitamins, and especially calories, now the issue focused on poor food choices, a person's inability to resist temptation and postpone gratification, and the consumption of too many calories by eating "junk food." The chronic diseases formerly associated with malnutrition such as rickets and anemia were largely replaced by heart problems, diabetes, and obesity.

Faulty reporting. Nutritionists blamed the Department of Agriculture as much as fast-food restaurants for children's obesity (Levine, 2008). School menus reflected the reliance on the food industry in setting nutrition standards. It was thought that as long as the National School Lunch Program continued to be an outlet for surplus food, there would be no incentive to deal with what was nutritionally superior, only what was in surplus. While the USDA published

extensive nutrition tables, recipes, and menus to help food-service managers meet nutritional recommendations, the actual adherence to these standards was largely self-reported. The department only asked schools to make "a good faith effort" to meet nutrition standards when they applied for federal reimbursements. While the private corporations claimed to meet or exceed nutritional requirements, the fact was they often fudged the numbers. In a case in Rhode Island, Marriott, a food service company, measured the nutrition content of its menus over a ten-week period. What they did not do, however, was keep any record of which offerings the children took. Thus a child might end up eating the high fat or high sugar offering each day even though other foods were available (Levine, 2008).

Ketchup as a vegetable. Due to drastic budget shortfalls in the early 1980's, President Ronald Reagan came up with a proposal that would have reclassified ketchup and pickle relish from condiments to vegetables, count the juice in jam as a fruit serving, and the eggs used in making cakes to count toward the allotment of meat. In addition, cakes, cookies, and corn chips would count as bread servings, and six ounces of milk rather than eight would be allowed. Further, hamburgers would be reduced from two to 1.5 ounces, and fruit serving would be reduced from 3/4 cup to 1/2 cup. Both Republicans and Democrats delivered a public outcry against this proposal, even though the ketchup controversy was part of an effort to keep the National School Lunch Program afloat in the midst of drastic budget reductions. In the end popular sentiment saved the school lunch program from these severe cuts, but it could not save it from the fiscal problems that were to come (Levine, 2008).

Current Meal Programs

With the science and technology available in the year 2012, one might think the food we are providing our children to be the most healthy, safest food in all of history. However, just the

opposite might be true. Parents, teachers, administrators, and the general public are all relying on the USDA-approved National School Lunch Program to provide our children with nutritionally balanced, healthy meals. The trouble is, they're not. A full 78 percent of the schools in America do not actually meet the USDA's nutritional guidelines (Cooper, 2006).

USDA Conflict of Interest, Continued

The USDA continues to have a conflict of interest between two of their major areas of responsibility. According to the 1949 Farm Bill, one of the USDA's main areas is to assist farmers and food producers by overseeing a commodity food program. These USDA commodity programs offer a high level of support to food producers who in turn have considerable lobbying power in Washington, D.C.

The other responsibility is to the National School Meal Program, which must guarantee nutritious meals delivered to thousands of students each day, at a total cost of over 12 billion dollars annually. The USDA makes commodity foods available through the national school lunch program, and these commodity foods are available as "brown box" unprocessed ingredients. School districts can choose to send commodity foods they purchase to processing companies. When finished, they usually get back something highly processed such as chicken nuggets or frozen pizza. Once delivered to the public school system, by law these products cannot be sent back, sold, or given away (USDA, 2011). Thus, it's almost impossible for the USDA to act in the best interests of both the United States' food producers and its children (Cooper, 2011). In keeping with its fundamental mission to expand the income of farmers, USDA's focus has been the use of surplus commodities and available foods, NOT on a balanced diet for children. As stated by Ann Cooper in the May, 2011, Educational Leadership publication,

> The state of our nation's food supply is unconscionable. Agribusinesses control 90 percent of that supply and too much of that supply is highly processed and unhealthy. As a chef, an advocate for children's health and lifelong wellness, and currently director of nutrition in a midsize school district, I hope to inspire parents, school administrators, and advocates to act for change -- before it's too late (p. 75-78).

School Nutrition

When a school participates in a School Nutrition Program, they are required by the USDA to meet the nutrition standards established by the Dietary Guidelines of Americans and federal requirements. Averaged over the course of a week, all school meals must meet the recommended daily allowances (RDAs) for calories, protein, calcium, iron, vitamins A & C, total fat and saturated fat. This is based on 1/4 RDA for breakfast, and 1/3 RDA for lunch. Based on a state Department of Education Training Unit (2001), RDA's for children in grades K-11 are shown below:

Figure 1

Recommended Daily Allowances, Grades K-11

SCHOOL BREAKFAST PROGRAM

Minimum Requirements per day for Nutrient and Calorie Levels Averaged over the School Week

For all of the School Meals Initiative Menu Planning Approaches (except the Traditional Menu Planning Approach)

Category	Grades K-11
Energy Allowance (Calories)	554
Total Fat (as a percentage of total calories)	*
Saturated Fat (as a percentage of total calories)	**
Protein (g)	10
Calcium (mg)	257
Iron (mg)	3
Vitamin A (RE)	197
Vitamin C (mg)	13

Note. *Not to exceed 30 percent over a school week. **Less than 10 percent in a school week.

Types of Meal Plans

In order to help schools meet their nutritional goals, schools have been able to choose one of three meal plans to help create their menus; two food-based plans (Traditional or Enhanced) or a nutrient standard plan.

Traditional food-based menu planning. As the oldest menu planning system, it is based on four food groups: milk, meat/meat alternate, bread/grains, and fruits/vegetables. This system requires specific food group components in specific amounts for specific age groups every day. Schools using food-based plans are required to include a certain number of servings from all the food groups daily.

Enhanced food-based menu planning. Similar to the traditional system, this system is modeled after the Food Guide Pyramid and thus requires more servings of Fruits/Vegetables and Grains/Breads.

Nutrient standard menu planning (NSMP). This meal plan is based on nutrients, not food groups. Schools that use this meal plan are required to conduct a computer analysis of their menus to ensure that they meet at least 1/3 of the RDA in specific nutrients for lunch and 1/4 of the RDA for breakfast. Children must take an entree and at least one other item for the meal to be reimbursable. Nutrients are averaged for a whole week, so some meals may be higher or lower in certain nutrients as long as they balance out over the course of a week (USDA, 2010).

Critical Issues

School meals initiative reviews. Since 1995, schools participating in the School Nutrition Programs have been required to undergo a School Meals Initiative (SMI) review at least once every five years. This review entails a nutrient analysis of the school's menus and is based on the Dietary Guidelines for Americans. Schools that do not meet the requirements of the School Nutrition Programs must implement corrective action to help meals meet the guidelines (USDA, 2010A).

Lack of federal funds for meal programs. According to Julian, (2010) subsidy monies from the federal government given to school districts as reimbursement for the school meals program currently cover less than half of a district's total costs. This often forces school districts to rely on additional state funds, or worse yet, vending machine revenue or money made from *ala carte* snack foods sold in large numbers of schools across America. This inconsistent funding inhibits schools' ability to improve meals and, ultimately, nutritional outcomes for children (Peterson, 2011).

Fear of Contamination. The issue of food-borne illness and the problem of liability and safety in the preparation of foods in our school has become a serious issue for food service personnel. In our litigious society, the ever-looming possibility of a costly lawsuit has increasingly become a major deterrent from the fresh preparation of foods in schools. Bertrand Weber, (Levine, 2010) a food service director in a public school, explains what he witnessed when he first began working at his school,

> What I saw was feeding kids fast food to ensure that there was high participation (in the lunch program) and to ensure the program was financially successful. Complete absence of cooking (sic). Everything was premade, right out of a box…fully cooked items. A staff that was very fearful the minute you mentioned fresh food. Very fearful of even touching fresh foods (sic). It's a lot safer not to have to touch the food. That kind of guarantees that you won't have any lawsuits or problems or illness or any of those issues (p. 95).

Obesity. According to the Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans (USDA, 2010A), the most significant adverse health trend among US children in the past 40 years has been the increase in overweight and obesity. The prevalence of overweight children and obesity has doubled among 2-11 year olds, and tripled among 12-19 year old adolescents.

> It is obesity, more than any other factor, that has induced us to take a closer look at what our children are eating, and that scrutiny can only be a good thing, because our children's diets are in bad shape, whether or not they result in excess weight (Poppendiek, 2010, p.11).

In 2004 the Physicians Committee for Responsible Medicine warned of an impending obesity crisis among American children. School meals, the physicians feared, contributed to over-consumption of calories, fat, cholesterol, salt, and sugar. Finding child obesity to be at an all-time high, the committee predicted that this generation might be the first to have shorter lives than their parents (Levine, 2008).

Much of today's obesity crisis stems from the eating of foods with minimal nutritional value along with lack of exercise (Benton, 2007). Sugary foods are a big part of that problem. Empty calories from highly processed breakfast cereals, soda, candy, and snacks add up, causing weight problems in children, and high-fructose corn syrup is not healthy, especially for children. Consumption of added sugars and solid fats in many youth far exceeds the discretionary calorie allowance for children of all ages (Benton, 2007). Adding a soda a day to a child's diet has been shown to increase weight gain by as much as 20 to 30 pounds each year (Cooper, 2006.)

This is a serious public health concern since obesity is associated with adverse health effects both during childhood, and future chronic diseases in adult life. Obese youth are more likely to have risk factors for cardiovascular disease, diabetes, bone and joint problems, sleep apnea, and social and psychological problems. In addition, being overweight and/or obese are associated with increased risk for many types of cancer, including cancer of the breast, colon, esophagus, kidney, pancreas, gall bladder, thyroid, and prostate, as well as multiple myeloma and Hodgkin's lymphoma (Kushi et al., 2006).

High sugar levels. Sugar is a natural component of many foods including fruit, vegetables, and dairy products. Highly processed sugar however, is a concentrated type of sugar derived from sources such as sugar cane and sugar beets. It is frequently added to a wide variety of foods and beverages, is high in calories, offers no nutritional value, can cause overeating, and can even be addictive (Schaub, 2011). Processed sugar stimulates some of the same neurotransmitters as alcohol, cocaine, and other drugs of abuse. In fact, it meets all the criteria for an addictive substance. It has been linked to a variety of health problems including diabetes, heart disease, obesity, hypertension, irritable bowel syndrome, attention and memory problems, hyperactivity, anxiety, and depression (Rossman, 2010).

In the body, carbohydrates break down into glucose, and children need this for energy. But there are large differences between simple carbohydrates and complex carbohydrates. Simple carbohydrates are found in highly processed breakfast cereals, white bread, white pasta, sugary foods, and high-fructose corn syrup which break down very quickly into sugar and often leave a child drained after the initial burst of energy. Complex carbohydrates include vegetables and whole grains which break down more slowly helping to keep blood sugar levels more even (USDA, 2010A).

Although the USDA has made some unofficial suggestions for maximum amounts of recommended sugar per day, they have not set official values for maximum sugar levels, nor do they require compliance with any regulations regarding school meals. Their non-mandated suggestion recommends the maximum sugar level not to exceed ten teaspoons per day for a 2,000 calorie per-day diet (USDA, 2010B).

Both flavored milk and sweetened ready-to-eat cereal significantly raise the total sugar levels in school meals. While many other food and beverage items also contain added sugar, flavored milk is available for both breakfast and lunch in most schools. In addition, a large proportion of children choose some type of flavored milk, usually chocolate or strawberry over white milk. The sugar content in 1/2 pint of chocolate milk ranges from 25- 28 grams, or about 6 teaspoons of sugar. If a student selects flavored milk for both breakfast and lunch, that amount doubles to 12 teaspoons. In the unlikely event a child does not consume any other added sugars throughout the rest of the day; they are still over the suggested 10 teaspoon limit.

Prepackaged breakfast cereals, especially those, which are sweetened, can add even more to a child's total sugar levels. For instance, one popular variety of cereal, Frosted Flakes, adds another 12 grams of sugar, or over three more teaspoons per one ounce serving. Even if a child

consumes only one chocolate milk a day but combines it with a sweetened cereal for breakfast, they are almost up to their daily limit with nine teaspoons of added sugar just for breakfast. A muffin with chocolate milk puts them well over their limit with 11 teaspoons of sugar. It is clear that if the USDA decided to add this maximum sugar level to their requirements, they would no longer be able to serve the high sugared Ready-To-Eat cereals they are presently serving as a reimbursable meal. Perhaps that is the reason it has not been mandated.

Some suggest that the positive contribution of flavored milk to children's diets may outweigh the potential negative effect of the added sugar, as children who consumed it were more likely to drink more milk (Murphy, 2008). However, in a study evaluating the effect of milk on calcium and bone health, it was concluded that scant evidence supports nutrition guidelines focused specifically on increasing milk or other dairy product intake for promoting child and adolescent bone mineralization (Lanou, 2004).

One cook and nutritionist, Ann Cooper (2006), writes that a great breakfast in the morning would consist of two eggs, whole-wheat toast, fruit, hot cereal or wholegrain granola, and 100 percent fruit juice. Starting kids off with sugar first thing in morning is just not ideal. Sugars and high-fructose corn syrup wreak havoc on a growing child's body, depleting their immune system, adding unnecessary calories, and impairing their focus. Breakfast should always include a source of protein, healthy fat, whole grains, vitamins and minerals.

In a study conducted by Valdovinos, 2006, results indicated that when blood glucose levels were determined to be high, the rate of problem behavior in school children was also higher than when blood glucose levels were within the normal range. This showed that lower glycemic levels of food help lower the rate of problem behavior.

Another study compared the performance of 6-7 year olds on memory, sustained attention, and behavior tests after eating one of three breakfasts with different glycemic loads. It was found that after a low glycemic load breakfast (as compared with a moderate and high load) test of memory, attention, and behavior scores all improved in the classroom (Benton, 2007). This study documented the negative effects of high sugar levels eaten by children at breakfast.

Highly processed foods. Highly processed foods of limited nutritive value are served every day in schools. When kids are not eating whole fruits and vegetables, beans, and whole products that provide the nutrients their bodies need, they are likely eating highly processed food-type fabrications. Nearly a fifth of calories consumed by children and youth come from added sugars. More than three-fifths of U.S. children eat too much saturated fat, and French fries are the most popular vegetable. Only two percent of school-aged children meet the Food Guide Pyramid recommendations for all five of the major food groups for a typical day (school and non-school meals combined), and one in six meets none of the recommendations. Less than 15 percent meet the recommendations for fruit, and less than 20 percent for vegetables (Poppendiek, 2010).

In many ways, the growing American reliance on highly processed food is an outcome of the USDA and public policy. Farm subsidies favor seven basic commodities, among them corn and soybeans. These two foods are essential to the processed goods that fill grocery stores and our children's meal trays. For the last 30 years, federal policies have lowered prices of commodity crops and encouraging the food industry to invest heavily in turning cheap materials into highly profitable, highly processed, "value-added" products (Poppendiek, 2010).

Convenience has become one of the main criteria for American's food choices today, leading more and more people to consume ready-to-eat, low cost, highly processed, quickly

accessible meals with minimal preparation (USDA Factsheet, 2005.) The same trend has manifested in our schools, with highly processed convenience foods such as packaged muffins and ready-to-eat prepackaged cereal.

High fructose corn syrup (HFCS). One type of sugar that has flooded the market is high fructose corn syrup, (HFCS). It was developed in the 1970s because it was found to be cheaper than cane and beet sugar to produce. It was also shown to blend in beverages and maintained sweetness better, prevented freezer burn, reduced crystallization, and kept baked goods softer.

However, another characteristic of HFCS is that although fructose, glucose, and sucrose are naturally occurring, high-fructose corn syrup is not. To make HFCS, the glucose syrup made from cornstarch is turned into high fructose syrup by adding an enzyme that changes the glucose molecules into fructose. By mixing fructose and glucose syrups, different formulations of HFCS are made (Rossman, 2011). In the final mixture, the fructose molecules in the sweetener are free and unbound, ready for absorption and utilization. In contrast, every fructose molecule in sucrose that comes from cane sugar or beet sugar is bound to a corresponding glucose molecule and must go through an extra metabolic step in digestion before it can be utilized. Because of this, HFCS converts to fat more easily than any other sugar (Parker, 2010).

In February, 2010, a Princeton University research team demonstrated that rats with access to high-fructose corn syrup gained significantly more weight than those with access to table sugar, even when their overall caloric intake was the same. In addition to causing significant weight gain, long-term consumption of high-fructose corn syrup also led to abnormal increases in body fat, especially in the abdomen. Even when rats were drinking high-fructose corn syrup at levels well below those in soda pop, they still became obese. In humans, these same characteristics are known risk factors for high blood pressure, coronary artery disease,

cancer and diabetes. According to psychology professor Bart Hoebel quoted on the Princeton University website March, 2010,

> Some people have claimed that high-fructose corn syrup is no different than other sweeteners when it comes to weight gain and obesity, but our results make it clear that this just isn't true, at least under the conditions of our tests. When rats are drinking high-fructose corn syrup at levels well below those in soda pop, they're becoming obese – every single one, across the board. Even when rats are fed a high-fat diet, you don't see this; they don't all gain extra weight (paragraph #3).

Corn syrup has another strike against it as it has likely been made from corn that has been genetically modified, another potential problem in our children's food supply.

Genetically Modified Organisms (GMOs)

A GMO is the result of a laboratory process where genes from the DNA of one species are extracted and artificially forced into the genes of an unrelated plant or animal. The foreign genes may come from bacteria, viruses, insects, animals or even humans. These techniques, also known as recombinant DNA technology, use DNA molecules that have desirable characteristics that are transferred into an organism giving it modified or novel genes (Smith, 2009).

The benefits of GMOs. The biotechnology used to create GMO's was an advancement of science that first began in the late 1980's and 1990's, and continues to hold promise today on many levels. For instance, The Advanced Research Projects Agency, Energy (ARPA-E) has begun using biotechnology to genetically modify plants that use light more efficiently, which would help plants become more efficient at converting sunlight into fuel. The Department of Energy has cleverly named the plants, PETROs, an acronym for Plants Engineered To Replace Oil (Laskow, 2011).

Other uses for this type of biotechnology include using genetically modified bacteria to help develop effective treatments for human diseases, and designing key crops with the ability to increase yields or particular nutrients, or drought or salt resistances (Walther, 2012).

Debate of GMO safety. Even though uses for biotechnology offer valuable advancements in numerous fields, a large debate concerning the safety of DNA altered plants for human consumption has been ongoing since the first GMO foods were put on the market in 1987. On one side, companies who produce the seeds and other GM products assert their complete safety. Monsanto Inc. (one of the largest agricultural companies in the business who offers many GMO friendly products including pesticides, animal feeds, and patented GMO crops) guarantees that their biotech products present no harm to human beings and they, on the contrary, are beneficial to society. They claim that their tests on GMO's have proven their safety; they increase the quality of food and nutrition levels; they save plants from diseases and pests; and they even save society from poverty and hunger in 3rd world countries such as Africa (Monsanto, 2012).

Monsanto asserts there are large bodies of documented scientific testing showing currently authorized GM crops are as safe as conventional food. They claim there has not been a single substantiated instance of illness or harm associated with GM crops, and that human clinical trials are not necessary because genetically modified foods have been given the designation "substantially equivalent". According to the Monsanto.com website (2012),

> There is no need for, or value in testing the safety of GM foods in humans. So long as the introduced protein is determined safe, food from GM crops determined to be *substantially equivalent* is not expected to pose any health risks. Further, it is impossible to design a long-term safety test in humans, which would require, for example, intake of large amounts of a particular GM product over a very large portion of the human life span. There is simply no practical way to learn anything via human studies of whole foods. This is why no existing food--

> conventional or GM--or food ingredient/additive has been subjected to this type of testing (p. 1).

Substantial equivalence. Rather than the FDA requiring scientific research and long-term studies of the health and safety of GMOs, they too proclaimed the safety assessment was based on the idea of "substantial equivalence" such that if a new food is found to be substantially equivalent in composition and nutritional characteristics to an existing food; it could be regarded as safe as the conventional food (Engdahl, 2009). Once the FDA approved the release of genetically modified seeds, plants, and products made from these plants, GMOs spread through the food supply worldwide.

No labels. Americans trust government agencies such as the FDA to do a thorough job of monitoring things like additives, pesticides, and bioengineered products, which after all, is their responsibility. However, early in the history of genetically modified (GM) foods, the FDA initiated a “no labeling needed” policy which not only allowed GM products to be produced, but to enter the market without notice or a label to show consumers which foods had been genetically altered. The no label policy had been written by Michael Taylor, a lawyer representing the Monsanto company, who wanted to ensure consumers would purchase foods processed from crops for which they not only held the patent on the seeds, but on the pesticide which could now be liberally sprayed. In 1991, Taylor became a commissioner of policy for the FDA before moving to the USDA as director of food safety, eventually going back to work for Monsanto. The sharing of employees between the government and Monsanto (in combination with enormous profits) accounted for at least a portion of the “no labeling” position (Cooper, 2000).

Not having a label with which to identify food products containing altered DNA meant most Americans (as well as consumers in other countries) did not know anything at all was

different with their food supply. Because in the United States this is still true today, the lack of required labels on GM foods continues to leave consumers as unaware of the genetic alterations in the food supply in 2012 as it did in the year 2000.

Precautionary principle. On the other side, there are a number of campaigns being conducted all over the world trying to force companies like Monsanto to label GM products. Spokesmen for these groups (who are often widely publicized on the internet), state that very little significant research was done before GMO's were introduced, and the safety and regulatory approval process of genetically modified (GM) crops and foods was flawed.

An often-used definition originating from a meeting of the American Academy of Environmental Medicine in the United States in 1998 was the precautionary principle. According to Renn, 2007, it states,

> When an activity raises threats to the environment or human health, precautionary measures should be taken, even if some cause and effect relationships are not fully established scientifically. In this context, the proponent of an activity, rather than the public, should bear the burden of proof of the safety of the activity (p.1).

Surely, the United States did not follow the precautionary principle with regard to allowing GMO's into the food supply. Our public, our country, our world, and especially our children are now bearing the proof of safety with this technology.

Possible dangers of GMOs. The American Academy of Environmental Medicine (AAEM) reports that several animal studies indicate serious health risks associated with GM food. Health risks include infertility, immune problems, accelerated aging, faulty insulin regulation, and changes in major organs and the gastrointestinal system. In 2008 the AAEM took a stand on the threat of GMOs to Americans and asked physicians to caution their patients concerning GMOs and to advise them to avoid GM foods (Dean, 2009).

The only published human feeding experiment revealed that the genetic material inserted into GM soy transferred into bacteria living inside human intestines and could continue to function. This meant that long after stopping consumption of GM foods, a human could still have GM proteins produced continuously inside them**.** Currently there is still zero long-term human research or evidence that altered DNA does not lead to cancer in either man or animals (Netherwood et al, 2004).

Allowance of GMOs into American food supply. Even if an individual did not want to eat genetically engineered foods, he most likely already has. The United States Government through the Food and Drug Administration (FDA) first allowed companies to introduce plants and food altered by DNA manipulation in the 1990s, but not before the FDA's own scientists had repeatedly warned that GM foods could create unpredictable, hard-to-detect side effects, including allergies, toxins, new diseases, and nutritional problems. They urged long-term safety studies, but were ignored (Smith, 2009).

Other countries and GMOs. There are significant restrictions or outright bans on the production of GMOs in 30 countries around the world, including Australia, Japan, Hungary, Ireland, and all of the countries in the European Union. Peru is also following the precautionary principle, and has even passed a law that bans genetically modified ingredients within the nation for ten years. In Europe genetically modified foods and ingredients have to be labeled, and consumers, understanding the health threats, avoid them. In the U.S. they still do not (Mercola, 2012).

Types and amount of food containing GMOs. Scientific American (2010) lists the top four GM plants and percentage of infiltration in the U.S. as; Soy 93%, Cotton 93%, Canola 90%, and Corn 86%. Other plants with altered DNA's include cottonseed, Hawaiian papaya, potatoes,

and some varieties of zucchini, crookneck squash, cotton, sweet potatoes, and golden rice. Sugar beets and alfalfa were added to the list in the last year, and many more are being considered. GMO crops are now found in over 80% of the processed or packaged foods in the United States (Scientific America, 2010) including even some so-called "natural" foods (Benbrook, 2009).

In addition to foods made with grains and flours such as cereals, bakery products, and pizza dough, other foods such as oils, sweeteners and sugar, soy proteins such as soy lecithin, amino acids, vitamin C, flavorings (natural and artificial), maltodextrin, and others contain GMO's. In any given non-organic supermarket, over 75 percent of U.S. foods are genetically altered (Mercola, 2012). There are also reports that Monsanto, the world's largest seed company, is coming out with a GM sweet corn in the summer of 2012. This will be the first time this giant agribusiness company plans to take fresh GM produce straight from the ground to the dinner plate (Schwartz, 2010). Because GM foods look identical to conventional foods, without a label consumers in the United States will not be able to tell the difference from similar corn sold on the market or to avoid it. GM food is detected using technology, which is not readily available. In addition, there may be a lack of availability of GMO reference materials as well as specific sequence information that often can only be obtained from the suppliers such as Monsanto (Miraglia M, 2004).

School food and GMOs. Given that genetically modified plants are routinely doused with the pesticide glyphosate (Round-Up®) the increased residues ends up in both the feed given to feedlot animals, and on the school meal tray. Milk, eggs, chicken and beef are just as likely as cereal, muffins, and biscuits to be tainted with foods either saturated in pesticides or genetically altered to produce pesticides internally. Common foods that contain GMOs are breakfast cereals,

muffins, pizza, hamburgers and hotdogs, French fries, corn chip, tortillas, soymilk, potatoes, sugar, and literally thousands of processed foods (Mercola, 2012).

More Issues

Highly processed and/or prepackaged foods. Children are the people most affected by the chemicals used to produce and process food (Cooper, 2011). Processed foods not only contribute to obesity, they also are laced with additives, preservatives, colorings, pesticides and herbicide residues that are believed to cause a variety of illnesses, including cancer. Current research shows that 40 percent of all cancers are attributable to diet (Cooper, 2006).

> "People in America today simply do not know how to eat properly, and they don't seem to have time to figure out how—so fast food and processed foods take the place of good, healthy cooking. There couldn't be a worse alternative" (p. xiv).

Some recommend that highly processed white flour including refined grains, white pasta, and white rice should be limited to 3 or 4 meals over the course of a week, that includes all meals consumed whether at home or at school (Cooper, 2006.) However, in most schools, menus provide very few opportunities for children to select whole-grain products. No standards currently exist for the type of Ready-To-Eat (RTE) cereals that are allowed in school meals, and the majority contain huge amounts of added sugar and little whole-grain (Condon, 2009).

Highly processed foods contain many chemical preservatives in order for them to not grow bacteria, fungus, or go rancid. Danish rolls and muffins are often served in individually sealed plastic bags, which have a shelf life that far exceeds a home-cooked muffin due to the preservatives. One item that school cook and author Ann Cooper makes particular fun of is the "Uncrustables" sandwich. It is a peanut butter and jelly sandwich on white bread with the crust around the edges cut off into the shape of a circle. Cooper said she once thawed one and kept it

on display on a desk where, because of its preservatives, "it looked exactly the same months later."

Food dyes and colorants. Artificial colors, (FD&C colors)**,** and artificial flavors are cheaply produced chemical mixtures that mimic their natural counterparts. They are mostly derived from coal tar, a carcinogen defined as a substance that could cause cancer. These additives give food back the color or flavor that was lost during processing and that would cost much more to produce with natural flavors. Over the years, many FD&C colors have been banned because of their harmful effects. Some of the worst FD&C colors include: Green #3, Blue #1, Blue #2 and Yellow #6 that cause allergic reactions and cancer in lab animals. Red #3 is a carcinogen, that may interfere with nerve transmission in the brain and causes genetic damage. It is banned in cosmetics, but allowed in food, and it is especially harmful to children (Farlow, 2009).

In a current study to evaluate the toxic effects of synthetic additives of colorants on different organs, the colorants Brilliant Blue, (blue dye, No. 2) Carmoisine, (red dye, No. 3) and Tartazine, (yellow dye, No. 5) were found to induce a significant decrease in body weight as well as decreased hemoglobin concentrations and red blood cell counts in rats exposed for 42 days. In addition, synthetic flavorings such as vanillin, (synthetic vanilla) propylene glycol, and trans-anethole produced equally negative effects. The study concluded that it is advisable to limit the uses of these food colorants and/or food flavor additives especially those used by children (Moram, 2012).

More than 2.5 million children have been diagnosed with Attention Deficit-Hyperactivity Disorder (ADHD). There are over 100 studies validating the hypothesis that food dyes and additives are a factor in attention and behavior disorders and can increase the incidence of

ADHD. In one study, 73 percent of children placed on a diet free from chemical additives, dyes, and artificial sweeteners showed a reduction in hyperactivity and an increase in attention. In addition, artificial colors have been linked to allergic reactions, asthma, skin rashes, hyperactivity, headaches and fatigue (Cooper, 2006).

Hormones and antibiotics. Hormones are chemicals that are produced naturally in the body of all animals, including humans. They are chemical messages released into the blood by hormone-producing organs that travel to and affect different parts of the body. Hormones are produced in small amounts, but they control important body functions such as growth, development and reproduction.

Hormones used in food production can make young animals gain weight faster. This helps reduce the waiting time and the amount of feed eaten by an animal before slaughter in meat industries. In dairy cows, hormones are often used to increase milk production. Thus, hormones can increase the profitability of the meat and dairy industries (Gandhi, 2000).

In 1993 the FDA approved a controversial GE product made by the Monsanto Company to help increase milk output in dairy cattle. The bioengineered replica hormone was called Recombinant Bovine Growth Hormone (rBGH.) This genetically engineered hormone is injected into dairy cows to increase their milk production. Many animal health problems arise from this practice including fertility issues in cows, birth deformities in calves, increased levels of somatic cell count (pus) in milk, diarrhea, and greater rates of mastitis (a clinical udder infection.) It has been used by a large segment of the dairy industry since its approval by the FDA. Although both the FDA and Monsanto say that rBGH milk is the same as non-rBGH milk, other researchers have shown there to be substantial differences (Cooper, 2006).

In particular, saturated fatty acids and levels of antibiotics are both higher in rBGH milk due to the higher use of antibiotics used to treat the cows' higher incidences of chronic mastitis caused by rBGH (which produces pus that can also finds its way into the milk). An even more serious problem with rBGH milk is that it contains high levels of Insulin-like Growth Factor 1 (IGF-1), which regulates cell growth in humans, especially infants and children. IGF-1 is widely regarded as a major cause of cancer, particularly breast and colon cancer, which is not broken down by pasteurization of the milk, or by digestion (Cooper, 2006).

Cooper (2006) reported on a 1988 study of 300 healthy female subjects. This study showed that elevated IGF-1 blood levels were strongly associated with up to a sevenfold increased risk of developing premenopausal breast cancer. This is the highest known risk for this type of cancer. Other studies have shown strong associations between increased IGF-1 blood levels and prostate cancer. Pound for pound, children eat more food than adults, that means that antibiotic and hormone residues in their foods collect in greater concentrations in their bodies (Cooper, 2011).

Pesticides and herbicides. According to Landrigan (2011), at the Mount Sinai School of Medicine, a key policy breakthrough occurred nearly twenty years ago with the discovery that children are far more sensitive than adults to toxic chemicals in the environment. This finding led to the recognition that chemical exposures early in life are significant and preventable causes of disease in children and adults. Governmental rules and regulations for acceptable levels of chemicals like pesticides, additives, and preservatives in the food supply are based on adult body mass. Children also do not often eat the variety of foods adults eat, focusing instead on one or two types of fruits or vegetables that if chemically altered, cause the ingestion of a significantly

greater concentration of poison per pound. In addition, children drink 2.5 times more water, eat three to four times more food, and breathe two times more air than do adults (Cooper, 2000).

A pesticide is any agent used to kill or control any pest. Pests can be unwanted plants (weeds), insects, fungi, or microorganisms such as bacteria and viruses. Under United States law, the term pesticide also applies to herbicides, fungicides, microbiocides, and various other substances used to control pests (Pesticide Action Network North America, 2012). Although using a pesticide to eradicate either weeds or insects has saved thousands of pounds of food crops and produce, they also have the potential to cause health effects when they are ingested in the same foods. Damage to the nervous, hormonal and other systems as well as many types of cancer have been documented (Schneider, 2008). The following sections are listings provided by the Pesticide Action Network (2012) of possible effects of pesticides.

Neurotoxicity. Many pesticides, particularly insecticides, are neurotoxic to humans because their mechanism of action targets the insect nervous system. Most pesticides in this category are organophosphorus or carbamate compounds.

Hormone disruptors. Many widely used chemicals have been linked to the disruption of hormone function in humans. These chemicals have been shown to alter levels of male and female hormones, as well as certain thyroid hormones. Changes in these hormone levels affect children more than adults and can result in abnormalities in growth, development, and reproduction as well as cancer and immune system disorders, even at very low levels of exposure.

Carcinogenicity. Scientific evidence increasingly points to links between cancer and exposure to certain chemicals, including pesticides. Pesticides may play a role in many types of

cancer – including some affecting children, and non-Hodgkin's lymphoma, breast cancer, prostate cancer, some brain cancers, pancreatic cancer and testicular cancer.

Endocrine disruptors. Many pesticides and industrial chemicals interfere with the proper functioning of estrogen, androgen and thyroid hormones in humans and animals. These substances are called endocrine disruptors. Exposures can cause sterility or decreased fertility, impaired development, birth defects of the reproductive tract, and metabolic disorders.

ADHD. In a recent study by the American Academy of Pediatrics on the effects of pesticides, the association between urinary concentrations of pesticides and attention-deficit/hyperactivity disorder (ADHD) in children 8 10 15 years of age was examined. The conclusion stated that their findings support the hypothesis that organophosphate exposure, at levels common among US children, may contribute to ADHD prevalence. Children with higher than the median of urinary pesticide concentrations had twice the odds of ADHD compared with children with undetectable levels (Bouchard, 2010). According to Ann Cooper in her book, Bitter Harvest (2000),

> Today, nearly 325 active pesticide ingredients are permitted for use on 675 different basic forms of food, and residues of these compounds are allowed by law to persist at the dinner table. Childhood exposures to pesticides may lead to greater risks of cancer and immune dysfunction than exposures later in life (p. 178).

One study found traces of 16 pesticides in eight different baby foods purchased in U.S. grocery stores (Cooper, 2000).

Although there are thousands of patented chemicals used to eradicate weed and pests, glyphosate, the active ingredient in Round Up®, is one of the most widely used and well-known herbicide on the market. The Monsanto Company, the same company who since 1997 has produced genetically modified seeds that are able to withstand the use of this chemical, manufactures it. Plants treated with glyphosate generally die within two or three days as the

chemical interferes with the plant's ability to form an amino acid necessary for protein synthesis. Because plants absorb glyphosate, the chemicals cannot be completely removed by washing or peeling the produce, or by milling, baking, or brewing the grains. It has been shown to persist in food products for many years. Besides containing glyphosate, Round-Up® also contains a variety of other chemicals such as solvents, surfactants, and emulsifiers, called the inert ingredients. Although federal law classifies inert ingredients as trade secrets and pesticide manufactures are not required to list them on the pesticide label, these inert ingredients can make up as much as 99 percent of the formulation, and can be even more highly toxic than the active ingredient (Beyond Pesticides, 2005).

Food and food products brought into schools may contain pesticide residues from agricultural use on crops or post-harvest storage. Some of the pesticides found most frequently are also those most hazardous to children's health. In an ongoing study conducted by the USDA Pesticide Data Program, Punzi (2004) reported that for the period 1993–2003, the overall percent of food samples with detectable pesticide residues that the organization sampled was 58%. Approximately 65% of the fresh fruit and vegetable samples had detectable pesticide residues in the washed, edible tissues. Pesticide residues were detected in 34% of the processed commodities, approximately 47% of the grain samples, 15% of the milk samples, and 10% of beef and chicken tissue samples. In addition, fifty-one percent of the water samples contained detectable pesticide residues.

Conclusion

There is much wrong with what we are feeding our children. However, there is also hope for change in many areas of providing children with healthy, nutritious foods and meals. While children ultimately have to make food choices about what they consume, improving the food

options available at school will make it easier for children to select healthful meals (Condon, 2009).

Chapter 3

Methods

To determine the actual foods elementary students were choosing to eat for breakfast, a method for data collection was used at an elementary school. Data were gathered from students in kindergarten, first, second and third grades with ages ranging from five to nine years old. Children are considered a vulnerable population so it was necessary to request permission and receive approval from The Institutional Review Board (IRB) to study children of these ages. It was requested via the IRB process and granted during the fall 2011 semester (see Appendix B). Permission to conduct the study was also granted from the school district superintendent and building principal (see Appendices C and D).

Research Questions

The goal of the study was to increase the knowledge of the foods offered and chosen by students eating breakfast at an elementary school in the spring of 2012 with the following research questions:

1. What are children choosing to eat for breakfast?
2. How do children's top breakfast choices compare to the published menus for these meals?
3. Do student choices equal a nutritious breakfast according to the USDA?
4. Are there pesticides, colorants, preservatives, HFCS, high sugar levels, GMOs and flavorings in our children's food? What it the likelihood of their presence?

Context

A Kindergarten-3rd (K-3) grade school in a rural western state was chosen for this study. The facility was a 1950's school building with a small kitchen and cafeteria positioned on one

end of the rectangular building. Cafeteria tables holding 8-10 children on each side were symmetrically placed within the cafeteria that held the approximately 100 students who ate breakfast each school day.

Population

On December 8th, 2011, the school cafeteria was used to talk to a group of approximately one hundred K-3 students about participating in a study where a researcher would write down each student's breakfast choices as they went through the breakfast line. They were told they would need to sign their own name on a paper as a student assent, (see Appendix E) as well as take home and return a permission slip signed by a parent, (see Appendix F). They were told the researcher would not watch them actually eat what was on their tray, but would just write down what they chose to eat. This would last for two full school-weeks, or ten school days.

Seventy-five forms were handed out to students in grades K- 3, and over the course of the week, six papers were brought back signed by a parent. In order to make sure the forms were getting to the parents, a new batch of permission forms were sent in the mail to the parents of students previously identified as breakfast eaters at school. A total of 102 forms were sent to 87 families, some with multiple children. Using this method, an additional 21 forms were returned.

The last sets of forms were received when it was announced that students bringing in their signed forms would be able to choose a prize from a treasure box. The treasures included small items such as bouncy balls, pencils, paper airplane kits, box of crayons, and writing tablets. This helped to secure the final 34 participants. After each child brought back their signed consent and chose their prize from the treasure box, they were asked to sign their student assent form, in this way, every participant got to choose a prize. This is how the sixty-seven elementary school students (25 males, 42 females) became the participants in this study.

Data Collection

Student data collection began on February 23, 2012. Students were instructed to continue their breakfast routine as usual. This included picking their lunch/breakfast card from a metal rack before entering the cafeteria, depositing their card in a basket, sliding their breakfast tray along a metal table, choosing their breakfast items and putting them on their tray. At the end of the food line, the child would choose either a regular or chocolate carton of milk.

Once all the choices had been made and the student was ready to exit the kitchen area, the items on a student's tray were documented. As the student exited, the researcher checked off, wrote in, or circled items the student had chosen for breakfast. These were recorded by the child's name and anonymity was maintained in that the names of the children were deleted and changed to numbers after the data were collected (see Appendix G). Since a total of 67 student's names and choices fit on 2 printed pages, a total of 20 raw pages of data were gathered. As stated in the IRB, data were kept in a secure location.

Documentation Instruments

A separate documentation spreadsheet was created for each day of the data collection period. The sheet included a list of each of the subjects by name running vertically, and the choices of food that were available each particular day on the horizontal axis. This check-off method allowed the researcher to quickly identify the student and the selected foods, and to help the documentation process run efficiently without holding up the breakfast line as students exited the kitchen.

Data Timeline

Data were collected over a period of two school weeks consisting of ten days total. Initially the IRB had been written to collect data for eight days, but was changed and approved

when I learned that school meal programs typically average their nutrition and calorie requirements over a five-day period. In order to analyze the data the in same way, it was decided to increase the data collection to two five-day periods.

Data Collection for Analysis

This study was written to document the foods and beverages that K-3 students were offered and chose to consume during a school meal breakfast program in a rural elementary school in a rural western state. For the first research question, "What are children choosing to eat for breakfast?" data was collected and analyzed for several parameters. Of a total of 67 students in the population sample (with both parent consent and student assents,) a range from 41 to 53 students chose a school breakfast on each of the ten-days of the study. Breakfast choices were documented on a spreadsheet that displayed all of the breakfast choices possible on each day for each subject who went through the school breakfast line (see appendix G).

From this data, the food combinations were color coded and totaled, and the most popular breakfast combinations were determined by calculating the meals selected most often. The top three meals were determined for each day of the study. From this data, the percentage of times students selected white or chocolate milk could be determined as well as the times added sugar or no added sugar was selected for meals, and the percentages of times students selected a fruit or vegetable with their meal.

For the second question, "How do student breakfast choices compare to the published menus for those meals," published menus were taken from the school district website and used as a comparison to the actual food children chose. In addition, the actual choices students made during the ten-days of data collection were compared to the published school menus to determine

if actual student choices met the nutritional intent of the menus. The breakfast menus for the month of February were found online at the school district's website.

To help determine if "their choices equal a nutritious breakfast" in the third question, first a list of ingredients from each day's meal with the highest level of consumption was gathered and documented from food packages or food service personnel. Next, nutrients listed on food labels were documented. Tables, graphs, documents and narratives were searched on U.S. government sites. They were used to determine the values and RDA's suggested by the USDA for children in America. Finally, all these values were compared.

For the final question, "Are there additives, preservatives, high sugar levels, pesticides/herbicides, colorings, hormones, or genetically modified organisms in our children's food," an approximation was developed using current research on the possibility or likelihood that a certain food could contain the toxin. These values were written for each of the possible contaminants found in the food that were given a rating of 0 – 4, with the rating scale as follows: 0= Does Not Contain, 1=Small Possibility, 2=Somewhat Likely 3=Extremely Likely, 4= Does Contain.

Limitations

During the collection of the data, I noticed a gradual increase in food choices for students. For example, instead one choice of canned fruit, two kinds were offered, or in addition to the two fruits, a dried fruit/nut mix was offered as well. I felt this might have been due to the meal preparers' attempt to boost the amount of choices students were able to make while the researcher was present. In fact, it had the effect of making it much more difficult to determine the students' favorite breakfast. For instance, instead of a student choosing a chocolate muffin, chocolate milk and a banana, now they could choose a chocolate muffin, chocolate milk, a banana or canned peaches or dried fruit, spreading out the options and decreasing the likelihood

of several students picking the exact same thing. In the end it didn't alter the calculations, and it showed the thoughtful manner of the school cook to make things look as good as possible.

Chapter 4

Findings

Findings for Research Question One

From the collected raw data from each of the ten days in the study, food combinations were color coded and totaled, and the most popular breakfast combinations were determined by calculating the meals selected most often. The top three meals were determined for each day of the study (see appendices H and I).

Most popular meal of all ten days. Once the most highly selected meal for each day was calculated and determined, the top three meals for the entire ten-day sampling period were calculated (see appendix J). The results from this sampling showed the following to be the most selected breakfast combinations from the ten-day sample:

Table 1

Top 3 Meals Chosen over 10-day Sample

Food Item, Milk	Times Selected	Percentage Selected	Ranking
RTE Cereal, Chocolate Milk	74	16%	#1
Muffin, Chocolate Milk	62	13%	#2
RTE Cereal, White Milk	34	7%	#3

When RTE cereal and muffins in all of their combination were totaled, they accounted for 53% of the totals meals selected over the ten days. All other meals combined totaled 47%.

Table 2

RTE Cereal and Muffins in all Combinations

Food combinations with Cereal & Muffins	Times Selected	% Selected
RTE Cereal + White or Choc Milk, Fruit, Bread/Jelly	138	30%
Muffin + White or Choc Milk, Fruit	113	23%
Totals	251	53%

Note. RTE Cereal and Muffins were likely selected the most often because they were offered every day of the sample.

Cereal choices

Of the seven types of Ready-to-Eat Cereals that were available each day, the most selected breakfast cereal was Marshmallow Mateys followed by Cocoa Crispies and Apple Jacks.

Table 3

Rank Order of Highest Selected Cereals and Added Sugar

Cereal Choices	Added sugar (g)	Rank Order
Marshmallow Mateys	12	1st
Cocoa Krispies	12	2nd
Apple Jacks	8	3rd
Frosted Flakes	10	4th
Cinnamon Toast Crunch	6	5th
Trix	5	6th
Cheerios	1	7th

Note. The rank order follows the amount of added sugar fairly closely.

Milk choices

Table 4 shows the milk choices, including what was available, the number of times selected and their corresponding percentages.

Table 4

White vs. Chocolate Milk Choices

Milk Choices	Times Selected	Percentages
1% Lowfat White	129	27%
Non-fat Chocolate	343	73%
Totals	472	100%

Fruit choices

Of the 472 meals selected, 91 (19%) included a fruit in the form of a canned fruit, or fresh fruit, or 100% fruit juice.

Table 5

Fruit Selected with Breakfast

Fruit Choices	Times Selected	Percentages
Canned Peaches	2	< 1%
Canned Pears	8	2%
Canned Pineapple	2	< 1%
Canned Mixed Fruit	4	1%
Apple Wedges	3	1%
Orange Slices	20	4%
Banana Quarters	18	4%
Apple Juice	8	2%
Grape Juice	26	6%
Totals	91 of 472 meals	19%

Meals with added sugar. In addition to the top three meals all having high added sugar levels, it was determined that 92-100 percent of the meals selected during the ten-day study contained high levels of added sugar.

Table 6

Percentage of all meals offered with added sugar

	Day 1	Day	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
Percentage	100 %	100 %	100%	96%	92%	92%	94%	100%	96%	100%

Note. Sugar levels for meals ranged from approximately 4 to 8 teaspoons of added sugar per meal. A meal of 3 teaspoons or under of naturally occurring sugar such as is in a carton of white milk or fruit was not counted as added sugar.

Findings for Research Question Two

For this question, observations from the school menus were compared with the results of the meals that were selected most often in order to determine in what ways they were similar or dissimilar. The following five points illustrate the findings.

1. Meals entered onto the published menu give the impression that children may have a "hot food" item for breakfast. The majorities of meals that students selected were not hot, or intended to be hot. The most popular foods selected in this study consisted of both Ready-To-Eat cereal and prepackaged muffins, that were considered cold breakfasts.

2. The menus show many smiley faces positioned by "homestyle/scratch" items to draw attention to the nature in how these meals were prepared. Through observation and conversation with school breakfast personnel, it was discovered that these made-from-scratch meals were not prepared from "scratch" using individual ingredients such as flour, sugar, eggs, etc. They were made from dough that was received already highly processed and prepared into items such as a cinnamon rolls, and arrived frozen at the school. These items were then thawed and baked in the school ovens.

3. Although the main entrée was always featured prominently in the menu, cereal and muffins were chosen 53 percent of the time demonstrating that the majority of children selected something besides the main entrée.

4. Although fresh, frozen, or canned fruit was always displayed on the menus and even featured in some of the extra features, fruit in any form was only selected on average with 19 percent of the meals.

5. Although both chocolate and white milk were listed as choices in the menus, the menu did not publicize, and it may not be well known, that sugar-added chocolate milk could be chosen for any meal on any day.

Findings for Research Question Three

School breakfasts must meet the applicable recommendations of the Dietary Guidelines for

Americans that recommend that no more than 30 percent of an individual's calories come from fat, and less than 10 percent from saturated fat. In addition, breakfasts must provide 1/4 of the Recommended Dietary Allowance for protein, calcium, iron, Vitamin A, Vitamin C and calories. Surprisingly, the government documents count only seven of the 14 or so nutrients that are commonly listed on food product labels. What they include is protein, fat, calcium, iron, Vitamin A, Vitamin C and calories. What they do not include is sugar, cholesterol, carbohydrates, fiber, potassium, Vitamin D, Thiamin, Riboflavin, Niacin, Vitamin B6 and B12, Folic Acid, and Zinc.

The discussion will be based on the top three meals selected from the ten-day sample. Initially, a nutritional analysis was conducted in order to determine if these choices equaled a nutritious meal according to government regulations. In order to do this, the ingredient list was determined for all items in a breakfast combination; for example, RTE cereal and chocolate milk were selected and the ingredients listed on the containers were compared to the government's key indicators of nutrition for calories, protein, calcium, iron, vitamin A and vitamin C. This nutritional analysis was compared to the recommended daily allowances for the 6 nutritional components found in the Dietary Guidelines for Americans (USDA, 2005).

These comparisons show that according to the guidelines, they meet some of the requirements, but fall short in other areas.

Table 7

Top 3 Meals Compared to Minimum USDA Requirements

Nutrient	Grades K -11 RDA's	#1 Selected RTE Cereal Chocolate Milk	#2 Selected Muffin Chocolate Milk	#3 Selected RTE Cereal White Milk
Calories	554	380	234	204
Total Fat (g)	*	13g	13g	5.5g
Sat. Fat (g)	**	3g	3g	2.5g
Protein (g)	10g	12g	12g	10g
Calcium (mg)	25%	34%	34%	36%
Iron (mg)	25%	8%	8%	22%
Vitamin A (RE)	25%	10%	10%	17%
Vitamin C (mg)	25%	2%	2%	12%

Note. * Not to exceed 30 percent; ** Less than 10%.

Based on Table 6, none of the three meals met the amount for recommended calories or were within the proper range for Iron, Vitamin A (although it was the closest) and Vitamin C. All meals were within the proper range for total fat, saturated fat, protein, and calcium. Since RTE Cereal and Muffin combinations were chosen more than all other meals combined, the nutrients that were reported on the labels of the cereals and muffins were documented (see Appendix K). In addition, a list of the 72 ingredients found in the seven cereals choices and the muffins were documented (see Appendix L).

Findings for Research Question Four

To determine if the top three breakfast combinations chosen by students ages 5-9 contained food contaminants and additives, an approximation was given of the likelihood of its presence in particular food combinations. This was based on current research for GMOs and pesticides, and ingredient lists for other inclusions.

Table 8

Highest 3 Selected Breakfasts with Undesirable Chemicals

	Pesticides	Color	Preservative	HFCS	Sugar	GMOs	Flavors
White Milk	2	0	0	0	0	0*	0
Chocolate Milk	2	0	0	0	4	1**	4
RTE Cereal	3	4	4	4	4	3	4
Muffins	3	1	4	0	4	3	4

Note. Rating Scale; 0 Does Not Contain, 1=Small Possibility, 2=Somewhat Likely 3=Extremely Likely, 4= Does Contain

*Both White and Chocolate Milk were labeled, "Our Farmers Pledge not to use Artificial Growth Hormones."

**Chocolate Milk contains sugar that may have GMOs due to the introduction of genetically modified Sugar Beets into the food supply.

Chapter 5

Discussion

According to Poppendieck (2010), the very regulations designed to protect the quality of school food can ironically end up undermining it. This was the case in the school where this study was conducted. Compliance with federal standards can lead to unhealthy offerings, when schools add sweetened, flavored milk in order to meet required calorie minimums. Also, the fear of losing reimbursements if the meals are under the recommended requirements has caused the use of highly processed prefabricated products that have been given a federal Child Nutrition (CN) label. Manufacturers of these products guarantee they provide specified components of the federal meal plan and assume the financial risk if they fall short. Unfortunately, while this system may guarantee that a product has a particular amount of vitamin C; it does not guarantee that it is truly healthy. More than once I asked myself how many teachers or parents would consider themselves to have eaten a good, balanced breakfast if they ate the most popular student selected breakfast in this study, a RTE cereal and chocolate milk. Results of these analyses offer insight into potential weaknesses of the menus and foods provided to children in school meals.

Many of the entrees listed on the school district's menus were rotated on a one or two week schedule, and were only available once or twice during the ten-day sampling period. Other meal combinations such as RTE cereal, muffins and chocolate milk were available every morning and qualified as a USDA reimbursable meal. Because of their constant availability, some were chosen each day and in the end, were the most frequently selected meals of the ten-day sampling. Even though the published menus had numerous nutritional sounding meals complete with fruit choices, the majority of time students selected a cold prepackaged cereal, a

thawed, plastic wrapped muffin, and more times than not, a carton of highly sugared chocolate milk.

Implications

This has implications on several levels. It is quite possible for a student to never have a piece of fruit, fruit juice, or a vegetable on their tray at breakfast for an entire year. It is likely that some students will select chocolate-flavored cereal and milk every day they eat at school, for their first four years of grade school. It is also possible they will continue eating this meal as they continue through the grade levels. Although allowable, it is unfortunate that instead of solid nutrition, many children may not be getting enough calories and less the bare minimum when it comes to nutrition. Because children's eating habits are formed by the time they are twelve years old (Cooper, 2006), allowing a child to choose this combination every morning at school can impress in children's minds that this is a healthy meal supported by the school, cooks, and even teachers like me who monitor the breakfast cafeteria.

There were very few choices that offered better alternatives to the highest selected meals at our school breakfast program. Although often cooked in an oven, main entrees and other choices were just as likely to be as highly processed, sugar added, chemically impure as the cereal and muffin choices. Less than 10% of the meals students selected contained no added sugar. They, however, were still very likely to contain pesticides, preservatives, GMOs and food coloring, and artificial flavorings that may be just as harmful to children's health.

The Centers for Disease Control and Prevention (CDC) has concluded that if the body weight of children in the United States continues to increase, their anticipated health problems will significantly shorten their lives and make them the first generation in U.S. history to die at younger ages than their parents. It is predicted that one of every three white children will contract diabetes in their lifetime, most before they are graduated from high school. For Latinos

and Blacks, this increases to an incredible one in two ratio (CDC, 2011). By 2018, this may mean that from 33 to 50 percent of all school-age children could be insulin dependent. The health ramifications are overwhelming. Yet, most of these problems are preventable, if we improve our children's nutrition.

Study Observations

Before concluding this study by offering recommendations for the health of our children, I would like to present some anecdotal observations that were made during the 10-day sampling period. On one certain day of the study, there was a big difference between what K-1 grade students and 2-3rd graders selected for breakfast. Generally there was not a noticeable difference between the grade levels. When it came to Dr. Seuss's birthday meal on March 2, however, where green eggs (really green) and ham were served, not one kindergarten or 1st grade student in the study took the entrée. On the other hand, 2nd and 3rd graders selected the green eggs and ham nine times. I have read that it can take 8-10 exposures of an unfamiliar food before a child might take a risk to try something new -- the younger the child, the more resistance. If true, there must be a special group of kids reading Dr. Seuss's Green Eggs and Ham books multiple times, gaining the exposure they need to be one of the nine students ready to try the meal.

One day a girl brought her own milk from home because she didn't like the "water-milk" that the school served. The school serves 1% white milk and non-fat chocolate milk. Her milk was in a plastic bottle, and contained whole milk. Other than this incident, I did not hear anything either positive or negative about the milk, other than for the many requests to help open the cartons, that were glued so tightly they often needed extra teasing.

Bread and jelly "sandwiches" (one piece of bread folded over jelly) were offered every day of the study but students were only allowed to take these if a RTE cereal was selected, and

they could not be combined with other foods. On three occasions during the study, a student chose their meal and then put a jelly sandwich on their tray. Because this did not count as a reimbursable meal, the cook had to take it off their tray. Because once food was put on a tray it could not be returned, the cook had to take it off their tray and throw it away. In one case a mother and her young girl watched the cook take the sandwich off the child's tray and throw it away. All I could do was watch them shake their heads in disbelief. I felt especially bad when I did a quick mental math calculation and figured that what was left on her tray was likely less the minimum calories the USDA "guarantees."

Because of the state's standard assessments, all students at the school could get a free breakfast during the month of March. Although the cooks reported that more students ate breakfast at school than usual during this month, (12 more than the average per day) the numbers did not increase at the same ratio in this study. This could be because somehow the students who were in the study were coming to eat breakfast just as much at the beginning of the sample period (in February) as they were when the meals became free. There was no noticeable difference in the selections, quantity, or quality of the food during the "free breakfast" month.

When grape or apple juices were offered, they were taken much more frequently than a canned or fresh fruit choice, buy a large margin. They were however, only offered one day of the study. If they would have been served more often, it could have significantly boosted the percentage of times students selected fruits.

Changes to Increase Health

Low Calories. Results from this study indicate the amount of calories in the top three meals selected were all well under the recommended values. With a recommended caloric requirement for breakfast of 554 calories for children in grades K-11, the three top meals in this

study scored only 234, 380, and 204 calories for the top three meals respectively. There are at least two ways to address this issue using the foods that were offered during the ten-day sample period. One way is to serve more of what was already offered to boost the calories (serve two ounces of cereal instead of one.) The other is to increase the quality and nutrient levels of what is offered. Because adding more ounces of sweetened cereal to increase calories has the negative effect of adding even more sugar, and because a lower calorie count at breakfast can be made up during other meals in the day, (Broughton, 2012) increasing the quality and the nutrients within the given calories is the most advantageous option.

High sugar. This study indicated that over 90 percent of the meals offered to students included added sugar; often well above the total a child should consume in an entire day. To address the issue of high sugar and/or high fructose corn syrup, it would be necessary to eliminate the high sugar sweetened cereal choices and replace them with whole grain, high fiber, and low-sugar alternatives. It would also be necessary to eliminate other meal offerings with high sugar levels such as muffins, French toast, cinnamon rolls, and others. In addition, the high sugar chocolate milk should be decreased to possibly once a week; perhaps chocolate milk Friday, and then only at one meal rather than at both breakfast and lunch.

After looking at the data from this study, a nutritionist from the University of State name, Dr. Broughton, commented that the amount of sugar students were consuming at this school were a “sugar bomb” (personal communication, April 11, 2012) and he considered this to be the most serious issue in the findings of this study.

Whole grain and fiber. There were very few breakfast choices in this study that contained whole grains or fiber. It is possible to offer a large variety of choices including oats,

barley, whole wheat, brown rice, corn, and others. Granola type cereals can include rolled oats, whole grains, seeds, spices, nuts, coconut, and a wide variety of dried fruits.

Fruit selections. Only 19% of the breakfast meals in the ten-day sample included fruit in any form, even though either canned or fresh fruit was offered every day. One possible reason at this particular school was that it was difficult for the young children to dip the fruit from a bowl and maneuver their tray without spilling. To help increase the percentage of fruit consumption, it would be better to have fruit already placed into small cups for students to put on their tray without dipping. Another problem, that may have deterred students from taking fruits at this school, was the inappropriate height of the counter top holding the large bowl of fruit causing it to be too high to reach, especially for the younger children. Also, if a picture of a bowl of cereal with fruit on top was displayed somewhere close by to view, it may encourage children to try putting bananas or strawberries on their own cereal.

Table 9

Possibilities for Breakfast Offerings

	Changes That Could Be Made Immediately	Changes That Could Be Made as New Food Orders Are Placed	Additional Information
Cereals	Eliminate the availability of high sugar RTE cereals to encourage choices of lower sugar meals	Offer only low-sugar, high-fiber cereals	Rice Krispies, Corn Flakes, Mini-Wheats, Kix, Grandy Oats, Grape-Nuts, Bran Flakes, and Honey Bunches of Oats
		Offer various flavors of granolas with low-sugar, high-fiber	From "scratch" granola with rolled oats, nuts, dried fruits, coconut, etc.
		Offer hot cereals	Oatmeal, Cream of Wheat or Rice with cinnamon, raisins, almonds, cranberries, etc.
Muffins	Eliminate the availability of high sugar muffins	Offer whole wheat bagels in several flavors such as blueberry or cheese	Offer with fruit/cream cheese spreads or nut butters
Milk/dairy	Decrease the availability of high sugar chocolate milk to one special meal per week	Offer white milk	
		Offer cheese sticks or cubes, cottage cheese, yogurt or Greek yogurt	Combine yogurt with granola and fruits
Fruit	Serve fruit in small pieces and encourage eating with cereal	Offer fruit in small cups (Dixie type) to encourage selection without dipping/dripping	Strawberries, blueberries, peaches, bananas, pineapple, etc.
		Offer calcium fortified no sugar added 100% orange juice	Also apple or grape 100% juice
		Offer applesauce	No sugar added applesauce with other flavors such as peach, mango, or banana
Breads	Eliminate highly processed, high-sugar breads such as French toast, cinnamon rolls, etc.	Offer whole grain toast, English muffins, bagels	Serve with no sugar added jams, almond butter, or fruited cream cheese
		Offer breakfast burritos with corn or wheat tortillas	Serve with salsa/vegetables
Eggs		Offer scrambled, hard boiled, or omelets	Serve omelet with sautéed onions or vegetables

Additional Changes

Because of President Obama's new food act of 2012, the way school meals will be planned and the types of foods emphasized will change over the next three years. These new regulations are likely to help children get the whole grains, fruits, and vegetables into their diet they are desperately lacking, and might be one of the best attempts in recent years to increase nutritional levels for children, and that is very good news. On the other hand, because the USDA's regulations do not monitor or set maximum levels for GMOs, pesticides, preservatives, colorings, or artificial flavoring, food served to children will likely continue to come with additional contaminants and poisons that could offer as much harm as good.

Young children are the age group most easily influenced by change. If we educate young children to make better food choices today, they will likely carry these lessons well into adulthood. Many people have begun to work to create a better system, better food, and healthier meals for our children. Two of these people who have been prominent in this research are Ann Cooper and Alice Waters. Both have made profound attempts at shaping ways to acquire better foods and prepare healthier meals for our children. Ann Cooper is director of nutrition services for Boulder Valley School District in Colorado and author of Lunch Lessons: Changing the Way We Feed Our Children (Harper, 2006). Alice Waters is well-known for introducing food awareness to schools with her Edible Schoolyard program. By actively involving a thousand students in all aspects of the food cycle, the program is nationally recognized for its efforts to integrate gardening, cooking, and sharing school lunch into the core academic curriculum.

Using expertise, knowledge, and insights from these two pioneers, we might see a glimmer of what excellent school meals could look like in the future. The following section highlights some of their recommendations.

A foundation of "from scratch" cooking. According to Cooper (2006), a strong school lunch program emphasizes whole foods cooked from scratch as the focus of any exemplary school lunch program. The Boulder, Colorado school system was able to make changes to completely prepare and cook whole foods by taking a look at the resources they had available and figuring out what they could do in terms of food preparation before making the switch to "from scratch" cooking. The central question was whether the district had the facilities, human resources, and finances to cook from scratch and what could be done if they did not. When Cooper moved to Boulder, she had to install cooking, serving, heating and refrigeration equipment, and repair, build, remodel, or retrofit cooking facilities so they could provide fresh-cooked food for the district.

By moving and remodeling their production kitchens, the Boulder school district shortened the time needed to prepare food, and lessened their staffing costs. To help offset some of the other costs; they were able to reduce costs of food by purchasing whole ingredients and cooking from scratch, which cost less than buying processed foods. Cooper used only unprocessed commodities available through the USDA's school lunch program, avoided sending foods out to be processed that is routinely done when kitchens don't have the capacity to cook, and purchased the rest of their lunch ingredients on the open market (Cooper, 2006).

She suggests that districts need to find ingredients from local providers within a narrow price range and use surplus food from local farms as well as from the school's gardening classes, if available. Cooper (2006) admits that choosing fresh, locally grown foods presents schools with all kinds of challenges, but however difficult, her district eventually moved to 95 percent "from scratch" cooking.

According to Cooper (2006), saying yes to foods cooked from scratch means saying no to

highly processed foods full of sugar, fat, additives, preservatives, colorings, GMOs, trans fat, high-fructose corn syrup, foods produced with hormones and antibiotics, and refined flours. It also means removing vending machines selling soda, candy, and chips, cookies, and candy bars.

Cooper (2006) also made staff development trainings mandatory for food service personnel and emphasized the importance of attractive advertising and packaging. This technique had been shown to increase consumption of a larger variety of school lunch foods to a larger number of students – and helped make meal programs financially stronger. Marketing was essential because it was often difficult to get kids to eat food in which they were not familiar. Many successful school lunch programs around the United States employ traditional marketing techniques that treat children as potential customers; they "sell" the food. In Boulder, they also held fun events like annual Iron Chef Competitions for their high school cooking classes and added the winning meals to their menus for the next school year to help market school food as "cool food".

Gardening classes. The Edible Schoolyard created by Alice Waters (2008) included a one-acre garden, an adjacent kitchen-classroom, and an "eco-gastronomic" curriculum. It involved students in all aspects of the food cycle and continues to be a model public education program that helps instill the knowledge needed to first grow food and then create healthy meals. The success of The Edible Schoolyard led to the School Lunch Initiative, and has been touted in numerous publications calling for a change in children's nutrition.

Waters (2008) also supports hands-on cooking and gardening classes for students. This has become extremely effective in connecting children with healthy foods. For instance, students learn that carrots and potatoes grow underground and that a freshly picked ripe tomato tastes remarkably different from one bought in a store. Cooking classes are run by school chefs where

students not only learn cooking skills, but also expand their knowledge of a variety of foods and their place in healthy meals. “Food tastings” are one way she gets students to try unfamiliar foods.

Conclusion

After conducting research and completing this study on what elementary students are selecting to eat for breakfast at a K-3 public school, the following recommendations for a healthier breakfast program are proposed:

1. Eliminate the availability of high sugar RTE cereals, muffins and breads and replace them with high-fiber, low-sugar whole grain alternatives.
2. Decrease the availability of high sugar chocolate milk to perhaps one meal per week.
3. Encourage selection of fruits by serving in small containers and make it more accessible to choose.
4. Offer eggs in many forms, scrambled, hard boiled, and in omelets.
5. Offer dairy products in a variety of forms besides milk such as cheese sticks, cottage cheese, cream cheese, and yogurt.
6. Offer the least amount of pre-packaged, highly processed foods possible and replace with whole foods.
7. Re-check amount of calories and nutrients such as Vitamin A and C to make sure they comply with government regulations.
8. Dedicate funds to rebuild school kitchens in order to prepare foods from scratch.
9. Provide funding to hire train school food service staff to cook real food.
10. Promote fresh fruits, vegetables, and whole grains that are not GMO or chemically laden.
11. Institute hands-on cooking and gardening programs to help encourage students to understand where foods come from, and to eat a variety of healthy foods.

We need to make the health of our children and our food supply a priority. Just as educators are constantly looking for ways to improve the methods, curriculum, and standards to help increase student learning, we need to be constantly and persistently looking for ways to

improve the quality and nutritional levels of the food we are providing our children. If we get this right, we just may be able to help increase both student learning and the health of our children.

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Fremont County School District No. 25

FEBRUARY 2012 BREAKFAST MENU

Breakfast Choices
Available every day :
Breakfast includes:
- Breakfast entrée or choice of cereals
- Fruit
- Milk choices

Cereal Choices
With Toast
Available every day

Other Choices Daily
4-12th grades
- Muffins
- Pancake on a Stick

Entree Note:
Homestyle/Scratch

Mon	Tue	Wed	Thu	Fri
		1 Homestyle Sausage Gravy over a Fresh Baked Biscuit Fruit Milk Choices	2 Breakfast Pizza Fruit Milk Choices	3 NO SCHOOL
6 Breakfast Pizza Fruit Milk Choices	7 Breakfast Biscuit Sandwich made with a Fresh Baked Biscuit Fruit Milk Choices	8 Scrambled Eggs Tri-Tator Hash brown Fruit Milk Choices	9 Pancakes with Syrup Fruit Milk Choices	10 Fresh Baked Cinnamon Roll 100% Fruit Juice Milk Choices
13 Waffle with Syrup Fruit Milk Choices	14 *Blueberry* Yogurt Parfait Fruit Milk Choices FARMERS MARKET SELECTIONS HAPPY VALENTINES DAY!!!	15 Homestyle Sausage Gravy over a Fresh Baked Biscuit Fruit Milk Choices	16 Breakfast Pizza Fruit Milk Choices	17 Fresh Baked Cinnamon Roll 100% Fruit Juice Milk Choices
20 NO SCHOOL 	21 Fresh Baked Fruit Muffin Square Fruit Milk Choices	22 Breakfast Biscuit Sandwich made with a Fresh Baked Biscuit Fruit Milk Choices	23 Pancake Sausage Stick Fruit Milk Choices	24 Fresh Baked Cinnamon Roll 100% Fruit Juice Milk Choices
27 French Toast Sticks with Syrup Fruit Milk Choices	28 Homestyle Sausage Gravy over Fresh Baked Biscuit Fruit Milk Choices	29 Homestyle Breakfast Quesadilla Fruit Milk Choices		

Meal Prices

ES Paid Breakfast	$1.25
MS Paid Breakfast	$1.30
HS Paid Breakfast	$1.30
Reduced Price Breakfast	$0.30
Free Breakfast	$0.00
Adult Breakfast	$1.50

Applications for Free and Reduced price meals are available at the school office.

Extras Available

Extra Cereal	$0.75
Extra Hot Entrée	$1.00
Extra Milk	$0.30

Attention!!

Eating breakfast helps you to pay attention in class. It also helps you with problem-solving skills and improves your memory. So if you have a test coming up...**EAT BREAKFAST!!**

Questions Comments

Mary Maple-Borns,
Food Service Director at
(307) 856-8759,
mary@lunchtimesolutions.com

Lunchtime Solutions, Inc.
Creative Solutions to School Food Service®

APPENDIX B

INTERNAL REVIEW BOARD (IRB)

Institutional Review Board
Street and Department
Town, State ZIP

Phone: Phone number
Fax: Phone number
email: IRB@ University.edu

(Electronic submission via email is encouraged.)

Application for Review of Research Involving Human Subjects

Name: Name of Researcher	**Title:** Teacher
Department: Education	
Office Address: Town, State, ZIP	
Phone number: phone number	**Fax number:** Phone number
Email address: Researcher@university.edu	
NAME OF UNIVERSITY Status (Faculty, Staff, Student): Graduate Student	
Name: None	**Title:**
Department:	
Office Address:	
Phone number:	**Fax number:**
Email address:	
NAME OF UNIVERSITY Status (Faculty, Staff, Student):	
Name: Advisor	**Title**: Assistant Professor
Department: Elementary and Early Childhood Education	
Office Address: Address	
Phone number: Phone number	**Fax number:**
Email address: advisor@Name of University.edu	
NAME OF UNIVERSITY Status (Faculty, Staff, Student): Faculty	
What We Are Feeding our Youth: A Comparison of Breakfast Menus vs. Actual Student Selections at a K-3 School.	
Include specific dates: During the dates of November 1, 2011 – December 20, 2011 data will be gathered 2 times/week for a total of 8 data sets.	

In LAY LANGUAGE, summarize the objectives and significance of the research:
The objective of this research is to document a set of foods children are choosing to eat in an elementary school breakfast program. The significant portion of the research is the information that documents the food students at a K-3 elementary school in State name are actually choosing to eat as opposed to what is listed on the menu. The results will be analyzed and compared to current research on food and nutritional values.

Summarize the literature related to this study in two paragraphs:
The research available on issues related to the actual choices students make at school breakfasts is somewhat limited, and generally related to foods preferred by students, not necessarily tied to nutrition. There are many pieces of research to show how the latest USDA regulations are being met by the menus school districts submit to them. However, there is little information on what students are actually choosing when they go through the breakfast line and what implication that has on nutritional values.

Current research will be used to show how these choices may be lacking in nutrition, high in processed and simple carbohydrates, and likely full of growth hormones and genetically modified organisms (GMOs), and the implications this may have on student learning.

A. **Age-range and gender:** Ages 5-10, male and female

B. **Describe how the participants will be selected:**
All students choosing to eat breakfast within the given dates will be invited to return a signed parental consent form. Each student who then assents to the study will be selected to be in the study.

C. **Describe how the participants will be recruited:**
Students showing up for breakfast on a regular basis will be given information in age-appropriate language of the opportunity to be in a study about food choices. They will be given a parental permission slip to take home to their parent/guardian in order to get a signature. Once the student has given their own assent, the subject will have been recruited.

D. **Describe the number and type of participants expected (e.g. 44 - 4th grade students, 2 - 4th grade teachers):** There will be approximately 30-40 students in grades K-3 who will likely choose to participate.

E. **Incentive (if any) to be provided for participation** :
No incentives will be provided for this study.

F. **Description of special classes:** **(e.g. cognitively impaired, minorities, students, etc...)**

G. None

H. **Criteria for inclusion/exclusion from participant pool:**
None

A. Description of subjects' participation: **(e. g. what will they do and how long will it take?)** As students pick up their breakfast tray, their choices of type of milk, cereal, fruit, or other food items will be documented on a paper held by the researcher. This will not stop or slow down the normal flow of movement through the cafeteria as students choose their food. There will be no dialog or conversation with the subjects.

B. What will non-participants do while subjects participate? **(If applicable)** If a student chooses not to participate or the researcher does not have permission for the student to be included in the study, the researcher will simply not write that child's food choices down on the written documentation sheet. The student will still move along the same direction and choose the foods

they want, just as usual.

C. What will subjects be told about the research project? Students will be told the researcher is interested in what they choose to eat for breakfast, and to choose whatever they would like, just as any other day they go through the breakfast line.

D. Description of deception (if any): None

E. Subject time involved (frequency/duration): There will be no extra time involved than what it would take for a student on any other day to get their tray and chose their items.

F. Where will research take place? _____ Elementary School is a K-3 School and the research will take place in the school cafeteria, Town, State.

G. Method of data collection? (e.g. survey, interview questions, etc...) The method of data collection is by observation followed by the researcher writing down the information on a tally or documentation sheet held on a clipboard.

H. When and how may subjects terminate participation? (Under what circumstances procedures will be stopped?) Any parent or student indicating to the researcher they would like to opt-out of the study will be immediately taken off the documentation sheet and excluded from further observation.

I. Description of biological samples? (If applicable) NA

J. Description of equipment to be used on or by subjects: NA

K. Where is data collected in classroom setting? (Provide specifics about what data will be collected for research analysis outside of the classroom (actual coursework samples, test scores, observation notes, etc.) and describe how it will be used; clarify whether the entire class will take the curriculum being studied, or if only a part of the class will use the curriculum being studied and part will continue the old/current curriculum as a control) The data being collected will be the choices students make concerning their breakfast in a cafeteria, not in a classroom.

A. Explain whether or not subjects be identified by name, appearance, or nature of data (e.g. age, gender, ethnicity, affiliations) ? Subjects will not be identified by name, only using a code.

B. Explain the procedure that will be used to protect privacy and confidentiality? The data being collected will be done with no verbal interaction with the subject as it is with visual observation and documentation. Because students are used to having 1-2 cooks/adult monitors helping students in the breakfast line on any given morning and the researcher is often one of them, it will likely not cause the subject to feel their privacy has been violated in any way. Data will be collected on a clipboard, and since names of students will not be used, student confidentiality is protected.

C. How and where will data be stored? Data gathered will be stored on a password protected computer in a school office with a locked door. This is an office not accessible to students or the public.

D. How long will it be stored? Data will be stored on a password protected computer and will be kept for no longer than 2 years.

E. Who will have access to the data (and under what circumstances?) No other person will have access to the data in its raw form. After this data has been disaggregated, aggregated, and analyzed, the results will be written in the research paper.

F. Other confidentiality issues? None

A. Describe the indirect research benefits for the participants (to the class of participants represented, the general body of knowledge, or society at large): Studying the types of food children are choosing to consume at breakfast during a typical school day will help increase the body of knowledge in this area. Although foods that are offered to students each day can be documented simply by consulting a menu plan, this study will document the choices students are actually making, which is a more unique data set with different implications.

B. Describe the direct research benefits **(including monetary compensation or other tangible incentives to participate)** **or state there are no direct benefits to the subjects:** There are no direct benefits to the subjects.

Describe the risks to subjects: There are very minimal risks to the subjects as a result of this data collecting procedure. It is possible a student may become embarrassed that someone is noticing what they have chosen to eat. Because the researcher has breakfast duty with these same students every week and has already established a relationship, it is thought the potential for embarrassment to be low. Therefore the risk is minimal and not greater than that ordinarily encountered in daily life; i.e., choosing breakfast any other day.

How, when and by whom will the subjects be approached to obtain consent?

Informed consent will be solicited through a parent permission form given to children who eat breakfast at school. These permission slips will be passed out to students by the researcher who will explain the procedure to the students. Students will be directed to bring back the signed parent permission slips to the researcher; however as happens on many occasions, they may take the signed slip to their teacher. In this case the teacher will pass the slips to the researcher.

How will information be relayed to subject (read to, allowed to read, audio-recorded, video-recorded)? Information will be read to the subjects.

If information will be audio or video recorded, the following information must be included in the proposal and the informed consent form:

1. **Who will have access to the audiotapes, where the tapes will be stored, when the tapes will be destroyed (or that they will be kept indefinitely and why), and whether the tapes will be used in other studies or for future research**
2. **If the recordings will be kept indefinitely, the consent should state that subjects have the right to review and delete recordings that will be kept indefinitely or shared outside of the research team; and**
3. **A check-box or signature line for consent to be audio or video recorded (separate from the signature line for consent to participate) must be included on the form.**

Provide a description of feedback, debriefing, or counseling referral that will be provided:

Feedback and/or debriefing will be provided by the researcher as necessary.

Explain the procedure that will be used to obtain assent of children of an age and mental capacity deemed capable of providing such. **(Note: Assent must be obtained in a separate document and/or in a separate location from the parent(s). Assent can be oral or written depending on age and maturity of the child.)** Assent of each student will be obtained from the subject before the observation begins, and their signature will be recorded on an assent document. It is possible due to the young age of some of the participants that their signature is not readable. In this case an oral consent will be requested and documented. The researcher will ask the student for assent while at school in a separate location from their parent.

Instrument Name	Description	Source
Instrument 1:	Parental Informed Consent Form	Researcher
Instrument 2:	Student Assent Form	Researcher

Instrument 3:	Documentation of Data Form	Researcher
Document Name	**Description (e.g.) letters, fliers, or advertisements used to solicit participation**	**Source**
Document 1:	Letter from faculty advisor	
Document 2:	Letter from School Principal	
Document 3:	Letter from School District Superintendent	

APPENDIX C

STUDENT ASSENT FORM

School Breakfast Consent Form

(Student asks) Who are you?

My name is Mrs. Researcher and I work at School Name School. You have probably seen me in the mornings at breakfast when students need help opening milk or cereal boxes, or helping students when there are spills. I would like to ask your help for something important I am working on.

What are you doing?

I am hoping to help make the food we choose for breakfast as healthy as it can be. To do this I would like to ask your permission to watch and write down what you choose to eat for breakfast some mornings.

What will I need to do?

To help me, you won't have to do anything special. I just want to watch what you put on your tray at school breakfast, and then write it down on my clipboard. I want to you pick whatever you would like, just like any other breakfast.

Will it make me feel funny?

I don't think that having me watch what you choose to eat for breakfast will make you feel funny. I think it will feel just about like every other morning when there are adults in the lunchroom to help you. It won't slow you down as you go through the lunch line, and I won't watch you eat. I will just watch what you put on your tray.

What if I don't want to?

You do not have to agree to be in this study. Even if your parent has signed the permission form, you can still tell me you don't want to. Anytime you want me to stop, just ask and I won't write anything down when you come by.

Will I get in trouble?

It is OK to say no, and you won't get in trouble or make me feel bad if you don't want me to watch what you choose for breakfast.

Are you going to tell people what I eat?

No one will be told what you are choosing to eat, including any of your teachers, Mrs. Baltes, other students, or anyone else at school. When I write down what you choose to eat, I don't even write down your name, just your choices.

Why are you asking me?

I am asking you because you sometimes eat breakfast at school in the morning. Since I would like to know more about what kids choose to eat for breakfast, it will help me to watch you and other students.

What are the good things or bad things that may happen to me if I am in the study?

There are no bad things that will happen if you agree to be in the study. The good thing is that it might help our school to make breakfasts healthier for students in the future.

Do you have any questions?

Assent

Signature _____

Name _____Date: _____

_____Age: _____

APPENDIX D

PARENTAL CONSENT

RESEARCH STUDY

Description of the Research

I would like to invite your child to participate in a research study conducted by me, Researcher Name, as a graduate student at the UNIVERSITY OF STATE NAME in the Masters of Science in Natural Science Program. Your child was selected as a possible participant in this study because they sometimes or often participate in the school breakfast program at School Name Elementary School. By doing this study I hope to learn more about how breakfast food choices may or may not affect the health of elementary school children.

What my Child will be Asked to Do

If you decide to allow your child to participate, your student's breakfast choices will be documented. They will be asked to go through the breakfast line just as normal, however during this study, I will be writing down their choices on a clipboard as they walk by. This should not take any longer than usual and after they choose their food they will go to lunchroom to eat, just as always. In other words, the only thing I will do is to record your child's breakfast choices. Students choosing to participate will be documented for a total of 8 days in the period of about a month at School Name School.

Risks and Possible Benefits

There will be very little inconvenience or risk involved in this study, as it is observational. If your child does feel uncomfortable in any way, you or they may ask at any time to be taken out of the study. There is no cost for participating, and this study will help further our knowledge about some of the choices we provide our students at breakfast. However, I cannot guarantee that your child personally will receive any benefits from this research.

Protection of Privacy and Confidentiality

Your child's name will not be used in any way during this study. The information that is obtained in connection with this study will be kept confidential by using a coding procedure so that your child is not identified by name. No other person besides the researcher will have access to the information.

Choosing to be in the Study

Your child's participation is voluntary. Your decision whether or not to allow your child to participate will not affect you or your child's relationship with School Name School or its staff in any way. If you decide to allow your child to participate, you and/or your child are free to withdraw your consent and discontinue participation at any time without being a problem.

Contact Information

If you have any questions about the study, please feel free to contact Researcher Name, Phone number at School Name School, or her University of State name advisor, Dr. Advisor Name, at Phone number. If you have questions regarding your rights as a research subject, please contact the IRB (irb@university.edu). You will be offered a copy of this form to keep.

Consent

Your signature indicates that you have read and understand the information provided above, that you willingly agree to allow your child to participate. You and/or your child may withdraw your consent at any time and discontinue participation without penalty, that you will receive a copy of this form, and that you are not waiving any legal claims.

Signature

_____Date_____

APPENDIX E

PERMISSION LETTER FROM SUPERINTENDENT

Name of County School District #
Address
Town, State, ZIP

November 7, 2011

Institutional Review Board
Name of Chair, Chair
Associate Vice President for Research
Building
Street and Department
Town, State ZIP

Please note that Researcher Name, NAME OF UNIVERSITY Graduate Student, has the permission of Fremont County School District #25 to conduct research at School Name Elementary School for her study, "**Breakfast at a K-3 School: What We are Feeding our Children.**".

Mrs. Researcher will recruit K-3 students by talking to them as they eating breakfast in the School Name School Cafeteria. They will be given a parental permission form to take home and return to school if they would like to participate. After the parental permission form has been returned, the student will be asked to sign a student assent. Her plan is to observe and document the food products students choose for breakfast over the course of 8 days, to be completed approximately one month after IRB approval and no later than the end of the 2011-2012 school year.

Mrs. Researcher has agreed to provide to our office a copy of the University of State name IRB-approved, stamped consent document before she recruits participants at School Name.
If there are any questions, please contact my office.

Signed, Mr. Superintendent

APPENDIX F

PERMISSION LETTER FROM BUILDING PRINCIPAL

Name of County School District #
Street Address
Town, State, ZIP

November 7, 2011

Institutional Review Board
Name of Chair, Chair
Associate Vice President for Research
Building
Street and Department
Town, State ZIP

Please note that Researcher Name, NAME OF UNIVERSITY Graduate Student, has the permission of Name of County School District # to conduct research at School Name Elementary School for her study, "**Breakfast at a K-3 School: What We are Feeding our Children.**".

Mrs. Researcher will recruit K-3 students by talking to them as they eating breakfast in the School Name Cafeteria. They will be given a parental permission form to take home and return to school if they would like to participate. After the parental permission form has been returned, the student will be asked to sign a student assent. Her plan is to observe and document the food products students choose for breakfast over the course of 8 days, to be completed approximately one month after IRB approval and no later than the end of the 2011-2012 school year.

Mrs. Researcher has agreed to provide to our office a copy of the University of State name IRB-approved, stamped consent document before she recruits participants at School Name.

If there are any questions, please contact my office.

Signed,

Mrs. Principal

APPENDIX G

SAMPLE DOCUMENTATION SHEET

School Breakfast List

Teacher	Student	Returned Permission	Student Assent
Novotny	John Sample		
	John Sample		
	John Sample		
	John Sample	X X	X
	John Sample	X X	X
	John Sample		
	John Sample		
	John Sample		
	John Sample		
	John Sample		
Muir	John Sample	X X	X
	John Sample	X X	X
	John Sample	X X	X
	John Sample		
	John Sample		
	John Sample	X X	X
	John Sample		
	John Sample	X X	X
	John Sample		
	John Sample		
	John Sample		
	John Sample		
Wood	John Sample	X X	X
	John Sample		
	John Sample	X X	X
	John Sample	X X	X
	John Sample	X X	X
	John Sample	X X	X
	John Sample	X X	X
Evans	John Sample	X X	X
	John Sample	X X	X
	John Sample	X X	X
	John Sample		
	John Sample		
Howerton	John Sample		
	John Sample		
	John Sample		
	John Sample		
	John Sample	X X	X
	John Sample		
	John Sample	X X	X
	John Sample	X X	X
	John Sample	X X	X
	John Sample	X X	X
	John Sample		
	John Sample		
Souza	John Sample		
	John Sample		
	John Sample	X X	X
	John Sample	X X	X
	John Sample		
	John Sample	X X	X
	John Sample		
	John Sample	X	X
	John Sample		
	John Sample	X X	X
	John Sample	X X	X
	John Sample		
		26	

Teacher	Student Name	Returned Permission	Student Assent
Hansen	John Sample	X X	X
	John Sample		
	John Sample		
	John Sample	X X	X
	John Sample		
	John Sample	X X	X
	John Sample	X X	X
	John Sample		
	John Sample		
	John Sample	X X	X
Karlen	John Sample	X X	X
	John Sample	X X	X
	John Sample	X X	X
	John Sample		
	John Sample	X X	X
	John Sample	X X	
	John Sample		
	John Sample		
	John Sample	X X	X
	John Sample	X X	X
	John Sample	X X	X
McFarland	John Sample		
	John Sample		
	John Sample	X X	X
	John Sample	X X	X
	John Sample		
	John Sample		
	John Sample		X
	John Sample	X X	X
Bekken	John Sample	X X	X
	John Sample	X X	X
	John Sample		
	John Sample	X X	X
	John Sample	X X	X
	John Sample	X X	X
	John Sample		
Fustos	John Sample	X X	X
	John Sample		
	John Sample	X X	X
	John Sample		
	John Sample		
	John Sample	X X	X
	John Sample	X X	X
	John Sample	X X	X
	John Sample	X X	X
	John Sample		
	John Sample		
	John Sample	X X	X
	John Sample	X X	X
Olson	John Sample	X X	X
	John Sample		
	John Sample	X X	X
	John Sample	X X	X
	John Sample	X X	X
	John Sample		
	John Sample		
	John Sample		
	John Sample	X X	X
	John Sample	X X	X
	John Sample		
	John Sample	X X	
	John Sample	X X	X
	John Sample		
	John Sample	X X	X

APPENDIX H

DOCUMENT OF DAILY FOOD SELECTIONS

DOCUMENTATION: What Students are Choosing for Breakfast

GRADES K-1

2/27/2012

Subject #	Grade Level	Gender	Participated	Hot Food	Entrée	Entrée	Milk	Chocolate Milk	Ready-To-Eat (RTE) Cereal						Fruit	Fruit	Bread
				French Toast Stick with Syrup	Chocolate Muffin	Apple Cinnamon Muffin	MILK	Chocolate Milk	Marsh-mallow Maties	Coco Krispies	Apple Jacks	Cherios	Trix	Frosted Flakes	Cinnamon Toasties	Sliced Oranges	Canned Mixed Fruit	Wheat Bread and Jelly
1	K	M	1					1	1									1
2	K	M																
3	K	F																
4	K	F	1					1		1								
5	K	F	1		1		1											
6	K	F	1		1		1								1			
7	K	F	1					1	1									
8	K	F																
9	K	F	1	1			1											
10	K	M	1	1			1											
11	K	M	1					1			1							
12	K	M	1	1				1										
13	K	M	1		1			1										
14	1	M	1			1		1										
15	1	M	1					1	1									
16	1	F																
17	1	F	1	1			1											
18	1	F																
19	1	F																
20	1	M	1	1				1										
21	1	F	1	1				1										
22	1	M	1					1		1								
23	1	F																
24	1	F																
25	1	M																
26	1	M	1	1			1											
27	1	F	1			1		1										
28	1	F	1					1				1						
TOTALS			19	7	3	2	6	13	3	2	1	1	0	0	0	1	0	1
2 PAGE TOTALS			46	26	7	5	12	34	3	3	1	1	0	0	0	7	1	1

DOCUMENT OF DAILY FOOD SELECTIONS

DOCUMENTATION: What Students are Choosing for Breakfast

GRADES 2-3

2/27/2012

Subject #	Grade Level	Gender		Hot Food	Entrée	Entrée	Milk	Chocolate Milk	RTE Cereal							Fruit	Fruit	Bread
			Participated	French Toast Sticks with Syrup	Chocolate Muffin	Apple Cinnamon Muffin	MILK	Chocolate Milk	Marsh-mallow Maties	Coco Krispies	Apple Jacks	Cherios	Trix	Frosted Flakes	Cinnamon Toasted Crunch	Sliced Oranges	Canned Mixed Fruit	Wheat Bread and Jelly
29	2	M	1	1			1											
30	2	F	1	1			1											
31	2	F	1	1				1								1		
32	2	M	1	1				1										
33	2	F	1	1				1										
34	2	F																
35	2	M	1	1				1								1		
36	2	F	1	1				1								1		
37	2	M																
38	2	M	1	1				1										
39	2	M																
40	2	F	1	1				1										
41	2	M																
42	2	M	1			1	1											
43	2	M	1	1				1										
44	2	F																
45	3	F																
46	3	F																
47	3	M	1	1				1										
48	3	F	1			1	1									1		
49	3	F	1	1				1										
50	3	F	1	1				1										
51	3	F	1	1				1										
52	3	F	1				1			1						1		
53	3	F	1	1			1											
54	3	F	1			1		1									1	
55	3	F	1	1				1										
56	3	F																
57	3	F																
58	3	F	1	1				1										
59	3	F																
60	3	F	1		1			1										
61	3	M	1		1			1										
62	3	M	1		1			1								1		
63	3	F																
64	3	M	1	1				1										
65	3	F	1	1				1										
66	3	F																
67	3	F	1		1			1										
TOTALS			27	19	4	3	6	21	0	1	0	0	0	0	0	6	1	0
2 PAGE TOTALS			46	26	7	5	12	34	3	3	1	1	0	0	0	7	1	1

DOCUMENT OF DAILY FOOD SELCETIONS

DOCUMENTATION: What Students are Choosing for Breakfast

HIGHEST SELECTED BREAKFAST COMBINATIONS

Totals for 2/27/2012

Entrée	Food Combinations	Times Chosen	Percentage Chosen	
French Toast Sticks with Maple Syrup	French Toast Sticks with Maple	6	13%	#2
	White Milk, Fruit	0	0%	
	French Toast Sticks with Maple	17	37%	#1
	Choc Milk, Fruit	3	7%	
Ready - To- Eat Cereal	White Milk	0	0%	
	White Milk, Fruit	1	2%	
	Ready - To- Eat Cereal, Chocola	6	13%	#2
	Choc Milk, Fruit	0	0%	
	Choc Milk, PBJ Bread	1	2%	
	White Milk, PBJ Bread	0	0%	
Muffin	White Milk	3	7%	
	White Milk, Fruit	2	4%	
	Muffin, Chocolate Milk	5	11%	#3
	Choc Milk, Fruit	2	4%	
	TOTALS	46	100%	

APPENDIX I

PERCENTAGE OF TOP 3 MEALS SELECTED DAILY

Top 3 Choices for Breakfasts over 10 Day Sample						
	#1 Choice	**% Chosen**	**#2 Choice**	**% Chosen**	**#3 Choice**	**% Chosen**
Day 1	Sausage Pancake on a Stick, Maple Syrup, Chocolate Milk	38%	RTE Cereal, Chocolate Milk	24%	Sausage Pancake on a Stick, Maple Syrup, White Milk	8%
Day 2	Cinnamon Roll, Chocolate Milk, Fruit (Grape Juice)	35%	Cinnamon Roll, Chocolate Milk	17%	RTE Cereal, Chocolate Milk	10%
Day 3	French Toast Sticks, Maple Syrup, Chocolate Milk	37%	RTE Cereal, Chocolate Milk	13%	French Toast Sticks, Maple Syrup, Chocolate Milk	13%
Day 4	RTE Cereal, Chocolate Milk	25%	Biscuits & Gravy, Chocolate Milk	24%	Muffin, Chocolate Milk	14%
Day 5	Breakfast Pizza, Chocolate Milk	31%	RTE Cereal, Chocolate Milk	17%	Muffin, Chocolate Milk	17%
Day 6	Cinnamon Roll, Chocolate Milk	30%	Cinnamon Roll, Chocolate Milk, Fruit	13%	Muffin, Chocolate Milk	11%
Day 7	Breakfast Pizza, Chocolate Milk	23%	Muffin, Chocolate Milk	19%	RTE Cereal, Chocolate Milk	17%
Day 8	Blueberry Parfait, Chocolate Milk	31%	Muffin, Chocolate Milk	22%	RTE Cereal, Chocolate Milk	16%
Day 9	Sausage Biscuit, Chocolate Milk	26%	RTE Cereal, Chocolate Milk	20%	Muffin, Chocolate Milk	17%
Day 10	Corn Dog with Maple Syrup, Chocolate Milk	32%	RTE Cereal, Chocolate Milk	17%	RTE Cereal, Chocolate Milk	15%

APPENDIX J

THREE HIGHEST SELECTED MEALS OF TEN-DAY SAMPLES

What Students are Choosing for Breakfast

HIGHEST SELECTED BREAKFAST COMBINATIONS for 10 days

Totals for 2/23 - 3/8, 2012

	Entrée	Food Combinations	Times Selected	Percent Chosen	
2/23/2012	Sausage Pancake on a Stick +	White Milk	3	1%	
		White Milk, fruit	0	0%	
		Chocolate Milk	14	3%	
		Chocolate Milk, fruit	0	0%	
2/24/2012 and 3/2/2012	Cinnamon Roll +	White Milk	4	1%	
		White Milk, Fruit	7	1%	
		Chocolate Milk	24	5%	
		Chocolate Milk, Fruit	24	5%	
2/27/2012	French Toast Sticks with Maple Syrup +	White Milk	6	1%	
		White Milk, Fruit	0	0%	
		Chocolate Milk	17	4%	
		Chocolate Milk, Fruit	3	1%	
2/28/2012	Biscuit & Gravy +	White Milk	1	0%	
		White Milk, Fruit	1	0%	
		Chocolate Milk	12	3%	
		Chocolate Milk, Fruit	2	0%	
3/1/2012 and 3/5/2012	Breakfast Pizza +	White Milk	6	1%	
		White Milk, Fruit	1	0%	
		Chocolate Milk	27	6%	
		Chocolate Milk, Fruit	2	0%	
3/2/2012	Green Eggs & Ham +	White Milk	3	1%	
		White Milk, fruit	1	0%	
		Chocolate Milk	4	1%	
		Chocolate Milk, fruit	1	0%	
3/6/2012	Blueberry Parfait +	White Milk	3	1%	
		White Milk, Fruit	2	0%	
		Chocolate Milk	15	3%	
		Chocolate Milk, Fruit	2	0%	
3/7/2012	Sausage Biscuit +	White Milk	2	0%	
		White Milk, Fruit	0	0%	
		Chocolate Milk	12	3%	
		Chocolate Milk, Fruit	1	0%	
3/8/2012	Corn Dog with Maple Syrup +	White Milk	6	1%	
		White Milk, Fruit	1	0%	
		Chocolate Milk	13	3%	
		Chocolate Milk, Fruit	0	0%	
2/23/2012 through 3/8/2012	RTE Cereal +	RTE Cereal + White Milk	34	7%	#3
		RTE Cereal + White Milk, fruit	4	1%	
		RTE Cereal + Chocolate Milk	75	16%	#1
		RTE Cereal + Chocolate Milk, fruit	8	2%	
		RTE Cereal + Chocolate Milk, Bread/Jelly	12	3%	
		RTE Cereal + White Milk, Bread/Jelly	6	1%	
2/23/2012 through 3/8/2012	Muffin +	Muffin + White Milk	24	5%	
		Muffin + White Milk, Fruit	16	3%	
		Muffin + Chocolate Milk	62	13%	#2
		Muffin + Chocolate Milk, Fruit	11	2%	
		TOTALS	472	100%	

APPENDIX K

NUTRIENTS IN CEREAL AND MUFFINS

Nutrient Chart of Ready-To-Eat Cereal and Chocolate Chip Muffin								
Nutrient	***Marshmallow Mateys*** Frosted Whole Grain Oat Cereal with Marshmallows	***Cocoa Krispies*** Chocolatey, Sweetened Rice Cereal	***Apple Jacks*** Crunchy Sweetened Three-grained Cereal with Apple and Cinnamon	***Cheerios*** Toasted Whole Grain Oat Cereal	***Trix*** Naturally and Artificially Fruit Flavored Sweetened Corn Puffs	***Frosted Flakes*** Frosted Flakes of Corn	***Cinnamon Toast Crunch*** Crispy Whole Wheat and Rice Cereal	***Chocolate Chocolate Chip Muffin*** Chocolate Muffin in a bag
SERVING SIZE	**1 oz**	**1.1 oz.**	**.63 oz**	**.69 oz**	**.75 oz**	**1 oz.**	**1 oz**	**2.25 oz**
Sugar (Grams)	12	12	8	1	5	10	6	19
Carbohydrate (grams)	24	28	16	14	18	25	22	32
Protein (grams)	2	1	1	2	1	1	1	4
Total Fat	1	1	0	1	1	0	3	13
Saturated Fat	0	5	0	0	0	0	0.5	3
Trans Fat	0	0	0	0	0	0	0	0
Cholesterol	0	0	0	0	0	0	0	35
Sodium	190	135	85	110	110	135	200	210
Vitamin A	10	25%	6%	10%	6%	0%	8%	0
Vitamin C	10	25%	15%	6%	6%	8%	8%	0
Vitamin E	0	25%	0	0	0	0	0	0
Calcium	50	4%	0	6%	8%	0	40%	4%
Iron	10	25%	15%	30%	20%	20%	20%	6%
Vitamin D	10	15%	6%	6%	6%	8%	8%	
Thiamin	25	25%	15%	15%	20%	20%	20%	8%
Riboflavin	25	25%	15%	15%	20%	20%	20%	8%
Niacin	25	30%	15%	15%	20%	20%	20%	8%
Vitamin B6	25	25%	15%	15%	20%	20%	20%	
Folic Acid	45	25%	15%	30%	20%	20%	20%	6%
Vitamin B12	25	25%	15%	15%	15%	20%	20%	
Zinc	25	10%	6%	15%	20%	0	20%	2%

APPENDIX L

72 INGREDIENTS IN CEREAL AND MUFFINS

	72 Ingredients found in Highest Selected Foods: Ready-To-Eat Cereal and Chocolate Chip Muffins								
	Ingredients	***Marshmallow Mateys*** Frosted Whole Grain Oat Cereal with Marshmallows	***Cocoa Krispies*** Chocolatey, Sweetened Rice Cereal	***Apple Jacks*** Crunchy Sweetened Three-grained Cereal with Apple and Cinnamon	***Cheerios*** Toasted Whole Grain Oat Cereal	***Trix*** Naturally and Artificially Fruit Flavored Sweetened Corn Puffs	***Frosted Flakes*** Frosted Flakes of Corn	***Cinnamon Toast Crunch*** Crispy Whole Wheat and Rice Cereal	***Chocolate Chocolate Chip Muffin*** Chocolate Muffin in a bag
1	Apple Juice Concentrate			X					
2	Artificial Flavor	X	X	X		X			X
3	Baking Soda			X					X
4	BHT		X	X		X	X	X	
5	Blue 1	X		X		X			
6	Calcium Phosphate			X					
7	Calcium Sulfate								X
8	Canola Oil					X		X	
9	Caramel Color								X
10	Chocolate, Unsweetened								X
11	Cinnamon			X				X	
12	Citric Acid					X			
13	Cocoa		X						X
14	Cocoa Butter								X
15	Color Added	X				X		X	
16	Corn Bran					X			
17	Corn Meal					X			
18	Corn Syrup	X				X			
19	Cornstarch			X					
20	Dextrose	X						X	X
22	Dried Apples			X					
23	Eggs								X
24	Flour								X
25	Food Starch, Modified								X
26	Fructose							X	
27	Gelatin	X							
28	Lecithin								X
29	Malic Acid					X			
30	Malt Flavoring		X				X		
31	Malted Barley Flour								X
32	Maltodextrin							X	
33	Milled Corn			X			X		
34	Modified Corn Starch	X		X	X				
35	Mono and Diglycerides								X
36	Monocalcium Phosphate								X
37	Natural Flavoring			X		X			X
38	OAT FIBER			X					
39	Palm Kernel, Palm Oil								X
40	Partially Hydrogenated Vegetable Oil		X						
41	Polydextrose							X	
42	Polysorbate 60								X
43	Potassium Sorbate								X
44	Propylene Glycol Monostearate								
45	Red 40	X		X		X			
46	Rice		X						
47	Rice Bran Oil					X		X	
48	Rice Flour							X	
49	Salt	X	X	X	X	X	X	X	X
50	SemiSweet Chocolate		X						
51	Sodium Aluminim Phosphate								X
52	Sodium Citrate					X			
53	Sodium Stearoyl Lactylate								X
54	Soluble Corn Fiber			X					
55	Sorbitan Monostearate								X
56	Soy Flour								X
57	Soy Lecithin							X	X
58	Soybean Oil								X
59	Sugar	X	X	X	X	X	X	X	X
60	Tripotassium Phosphate				X				
61	Trisodium Phosphate	X				X		X	
62	Vanilla								X
63	Water								X
64	Wheat Flour			X					
65	Wheat Protein Isolate								X
66	Wheat Starch	X			X				
67	Whole Grain Corn Flour			X		X			
68	Whole Grain Oat Flour	X		X	X				
69	Whole Grain Wheat							X	
70	Xanthan Gum								X
71	Yellow 5	X							
72	Yellow 6	X		X		X			