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Nutrition Education to Prevent Obesity in School-Aged Children

Abstract

About 15.3% of children ages 6-11 are obese; an 8% increase since 1980. The National Health and Nutrition Examination Surveys have provided nationally representative data on health statistics since the 1960's. Comparing these surveys, the growing rates of childhood obesity are undeniable, as are the increasing rates of children diagnosed with type 2 diabetes, hypertension, and multiple other conditions associated with obesity. A multitude of theories on the factors that contributed to this trend have been proposed and among those are increasing portion sizes, consumption of high-fat and/or energy-dense fast foods and soft drinks, and an increasingly sedentary lifestyle. Nutrition education is vital to reversing the obesity trend. Using breakfast as a module, school-aged children in southeast Michigan were education regarding the health benefits of breakfast, calcium and cereal fiber. The nutrition education presentations that took place within grades k-2 classrooms, themed around Dexter's Laboratory, a popular televised cartoon on the Cartoon Network, were age-appropriate, interactive and educational. Using the same theme, the school breakfast program aimed to increase student participation by hosting a Dexter's Laboratory breakfast. Participation increased by 11-17 students. The outcomes of my experience reinforce my belief that age-appropriate nutrition education is effective.

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Dr. Judi Brooks

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NUTRITION EDUCATION TO PREVENT OBESITY IN SCHOOL-AGED
CHILDREN

By

Marilyn Susanne Lee

A Senior Thesis Submitted to the

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Supervising Instructor

Department Head

Honors Advisor

Honors Director

Senior Honors Thesis

ABSTRACT

Author: Marilyn Susanne Lee

Department: Human, Environmental and Consumer Resources (HECR)

Area: Dietetics

Supervising Instructor: Dr. Judi Brooks

Honors Advisor: Dr. Judi Brooks

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CHAPTER 1: INTRODUCTION

Upon the induction of the National School Lunch Act in 1946, President Harry Truman said that ‘no nation is any healthier than its children’ (1). Today, our nation is plagued with an obesity epidemic that is indifferent to age. Rates of childhood obesity in America today cannot be paralleled with any other time in our history. The number of obese children with type II diabetes, hypertension, and other diseases is forcing the medical community to redefine the epidemiology of these ‘adult’ disease states.

Emerging into the medical community as a registered dietitian, I am drawn not only by the natural charisma of children, but also that I concur with President Truman on the statement that the health of America is projected by its’ children. I have been empowered with the knowledge of nutrition and am able to deliver the message of good nutrition and overall health to children via a media that entertains, is interactive, and educates. This brings a euphoric feeling of accomplishment and satisfaction.

Haggerty Elementary School, part of the Van Buren Public School district in Belleville, Michigan, welcomed me into 10 separate classes to provide nutrition education for approximately 200 students, kindergarten through second grade. The ever so broad topic of basic nutrition left me with the desire to focus on a smaller aspect and I sought help from my much-respected advisor, Dr. Judi Brooks. She guided me toward using breakfast, and especially the calcium and fiber that can be consumed during this meal, as a vehicle to educate children on good nutrition. Much research has been conducted on breakfast and the

beneficial health implications it has on children. Armed with a creative mind and a message, I designed an educational, interactive, and entertaining lecture on breakfast that was presented on March 10, 2004 and March 11, 2004 at Haggerty Elementary School.

I continued my nutrition education involvement at Haggerty Elementary School by using the National School Breakfast Program to conduct a themed breakfast based on my nutrition education lecture the previous week. In addition to sending flyers to every teacher and posting them around the school, I advertised this event during my education lectures. The National School Breakfast Program has notoriously low participation when compared to the national average of the National School Lunch Program. Haggerty Elementary School has an average participation of 30 to 35 students in the School Breakfast Program. The theme breakfast meal that I organized had a recorded 51 participants. A success not only in numbers, but also that many of the students recognized me and could reiterate a portion of my lecture to me, one week later.

The Eastern Michigan University Undergraduate Symposium XXIV provided a media in which I had the opportunity to share my research and project with peers, professors, and the public. I designed a poster presentation highlighting current data on the progression of childhood obesity, the benefits of breakfast, fiber, and calcium, the nutrition education that I provided to the students, and the themed breakfast meal that was conducted. Even with spending hours discussing my project with multiple collections of people, the wake of the Symposium reached even more. I have heard reports that my

project was discussed in college courses, offices, and amongst groups in the weeks thereafter. This has instilled me with a feeling of joy and hope- hope for our children- hope for the future.

CHAPTER 2: CHILDHOOD OBESITY

RESEARCH INTRODUCTION

Childhood obesity has reached epidemic proportions, as declared by the U.S. Surgeon General in January 2002. The origin and explanations behind this epidemic are varied, but all come to the conclusion that childhood obesity has lead to an increased onset of various disease states and conditions, increased medical cost, and an increased risk of medical problems as adults. A retrospective look at national childhood obesity and overweight rates illuminates the magnitude of concern this epidemic has raised in today's society. After comprehending the data on childhood obesity rates, one must realize the health effects associated with obese children, the various proposed rationale for overweight children, which include increased portion sizes and increased consumption of high fat and energy dense food, and how breakfast might play an important part in reversing the obesity epidemic and in contributing to a healthy diet.

PREVALENCE AND TRENDS IN OVERWEIGHT US CHILDREN

The National Health and Nutrition Examination Survey (NHANES) is a series of cross-sectional, nationally representative examination surveys

conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention (2). The surveys include interviews that question demographic, socioeconomic, dietary, and health-related questions, along with an examination component consisting of medical and dental examinations, physiological measurements, and laboratory tests (3). Currently a NHANES is being conducted that began in 1999. Preceding the current survey were NHAHES III in 1988-1994, NHANES II in 1976-1980 and the first NHANES was conducted in 1971-1974. Additionally, National Health Examination Survey (NHES) cycle 3 was conducted from 1966 to 1970 following the NHES cycle 2 in 1963 to 1965. Together, these surveys provide the data needed to examine the prevalence and trends in the US over an established time frame.

NHANES 1999 to Present

Using a body mass index (BMI) greater than or equal to the 95th percentile as the definition of overweight, the NHANES 1999-2000 revealed approximately 10%, ages two through five as overweight (2). For children ages six through 11 years, 15% were defined as overweight and approximately 15% of 12 year olds to 19 year olds were found to be overweight (2). The prevalence of overweight among males was not significantly different than among females (2).

Comparisons between racial/ethnic groups showed that the prevalence of overweight among 12 year old to 19 year old Mexican Americans (23.4 %) and

non-Hispanic blacks (23.6%) was significantly higher than among non-Hispanic whites (12.7%) (2). See Appendix.

A BMI of 30 or greater is defined as obese. A reported 11.2% of 12 year old through 19 year old children were considered obese (2). Approximately 10% of non-Hispanic white females, 20% of non-Hispanic black females, and 16% of Mexican-American females are obese.

NHANES III: 1988 to 1994

Overweight trends from 1988 to 1994 established by NHANES III reported a total of 7.2% of boys and girls the ages two through five as overweight, 3.2% lower than 1999 to 2000 NHANES figures (2). Total boys and girls, ages six to 11 years, had an overweight percentage of 11.3, 4% lower than 1999 to 2000 NHANES figures. Ages 12 through 19 had a total of 10.5% defined as overweight from 1988 to 1994. Adolescent boys (12 to 19) had 11.3% overweight, 4.2% lower than 1999 to 2000 data and adolescent girls (12 to 19) had 9.7% overweight, 5.8% lower than 1999 to 2000 data. See Appendix.

NHANES II: 1976 to 1980

Overweight trends from 1976 to 1980 established by NHANES II reported a total of 5% of boys and girls the ages two through five as overweight, 2.2% lower than NHANES III figures and 5.4% lower than 1999-2000 NHANES (2).

Total boys and girls, ages six to 11 years, had an overweight percentage of 6.5, 4.8% lower than NHANES III figures and 8.8% lower than 1999-2000 NHANES (2). Ages 12 through 19 had a total of 5.0% defined as overweight from 1976 to 1980. Adolescent boys (12 to 19) had 4.8% overweight, 6.5% lower than NHANES III and 10.7% lower than 1999-2000 NHANES ². Adolescent girls (12 to 19) had 5.3% overweight, 4.4% lower than NHANES III and 10.2% lower than 1999-2000 NHANES (2). See Appendix.

NHANES I: 1971 to 1974

No change in overweight percentages was found in the age group of two years to five year-olds from NHANES I (5%) to NHANES II (5%). For ages six to 11 year olds, 4.3% of boys and 3.6% of girls were overweight, resulting in a total of 4% overweight (2.5% lower than NHANES II, 7.3% lower than NHANES III, and 11.3% lower than 1999-2000 NHANES) (2). For ages 12 years to nineteen years, the total overweight percentage was 6.1%, an increase of 1.1% from NHANES II (5.0%).

NHES 3: 1966 to 1970

Accessible data from NHES 3 was limited to total overweight trends for adolescent boys and adolescent girls in the age group 12 year olds to 19 year olds. Total overweight adolescent boys and girls was 4.6% (lower 1.5% from

NHANES I, 0.4% from NHANES II, 5.6% from NHANES III, and 10.9% lower than 1999-2000 NHANES) (2).

NHES 2: 1963 to 1965

Accessible data from NHES 3 was limited to total overweight trends for boys and girls in the age group six year olds through 11 year olds. Total overweight boys and girls for this age group was 4.2% (an increase of 0.2% from NHANES I, 2.3% lower than NHANES II, 7.1% lower than NHANES III, and 11.1% lower than 1999-2000 NHANES) (2).

CONCLUSION

Dramatic increases in total overweight percentages, for all age groups, began between NHANES II (1976 to 1980) and NHANES III (1988 to 1994) and continued to have statistically significant increases between NHANES III (1988 to 1994) and 1999-2000 NHANES. In 1999 to 2000, more than 15% of six through 19 year olds, and more than 10% of two through five year olds were considered overweight. The increase in prevalence of overweight between 1988-1994 and 1999-2000 is similar to the increase seen between 1976-1980 and 1988-1994 (2). The most prominent increases have been seen among non-Hispanic black and Mexican-American adolescents. The prevalence in these groups increased more than 10% between 1988-1994 and 1999-2000 (2). More than 23% of non-

Hispanic black and Mexican-American adolescents were overweight in 1999-2000 (2).

An imbalance in the energy consumed and energy expenditure is evident, however, the sources, and explanations behind this imbalance that has led to the ever growing rates of obesity are under speculation. However, the realities of the health effects associated with childhood obesity are not speculated.

See appendixes for NHANES study results in table format.

HEALTH EFFECTS OF CHILDHOOD OBESITY

The American Obesity Association has identified many adverse health effects associated with overweight and obese children and adolescents. Along with an increase in morbidity and mortality later in life, childhood obesity is positively associated with asthma, type 2 diabetes, hypertension, orthopedic complications, psychosocial effects and stigma, and sleep apnea (4). The Center for Disease Control and Prevention reports \$127 million spent on national hospital costs related to childhood obesity: a number that has tripled in the past 20 years (5).

Severe asthma is a more prevalent in overweight children and adolescents with severe asthma when compared to a peer group (4). Obese children with asthma use more medicine, wheezed more, and a greater

proportion made unscheduled visits to emergency rooms than non-obese children with asthma (6).

The increase in type 2 diabetes among children and adolescents is reported to be directly related to the parallel increase in obesity in children and adolescents. By 1994, 16% of all children diagnosed with diabetes were type 2 diabetics. This number was up from 12% to 14% of children and adolescents before 1992 (a 2% to 4% increase) (4). Obese children and adolescents are also reported to be 12.6 times more likely than non-obese to have high fasting blood insulin levels, a risk factor for type 2 diabetes (4). As obesity rates within non-Hispanic blacks and Mexican-American are higher than whites, type 2 diabetes is more predominant among African Americans and particularly high rates among those of Mexican descent (4).

Hypertension, defined as persistently elevated blood pressure levels, occurs approximately nine times more frequently among obese children and adolescents than in non-obese peers (4). Obese children and adolescents are reported to be 2.4 times more likely to have high diastolic blood pressure and 4.5 times more likely to have high systolic blood pressure than non-obese children and adolescents (4).

Orthopedic complications found within obese children and adolescents result from developing bone and cartilage not being strong enough to bear the excess weight. Results include a variety of orthopedic complications, including bowing and overgrowth of leg bones (4). An estimated 30% to 50% of children

that experience hip pain and limited range of motion due to increased pressure on the growth plates of the hip are overweight (4).

Psychosocial effects and stigma are experienced by a large number of overweight children and adolescents. Stigmatization occurs from direct and intentional weight-related teasing, jokes and derogatory name-calling as well as less intentional, potentially hurtful, comments by peers, family members, employers and strangers (4). In addition, overweight children and adolescents report negative assumptions made about them by others including being strong and tougher than others, not having feelings, being unclean, and being inactive or lazy (4).

Sleep apnea, defined as the absence of breathing during sleep and can commonly result in deficits in logical thinking, occurs in about seven percent of children with obesity (4).

As the rates of childhood obesity continue to rise, more research will be conducted on this epidemic and a further understanding of the health effects of childhood obesity, as it relates to adult health as well as childhood illnesses, will be achieved. Other aspects of childhood obesity that will receive more attention and research are the speculated causes and patterns of obesity amongst America's youth.

CHILDHOOD OBESITY: HOW DID IT HAPPEN?

Significant rises in childhood obesity were first distinguished by NHANES studies between the years 1976-1980 and 1988-1994. Dietary intake and physical activity directly affect health status and overweight definitions. Social, economic, and physical environments, which influence both dietary intake and physical activity, have been studied for their individual contributions to the childhood obesity epidemic. Among these theories, many researchers contribute the changes in childhood obesity rates to increasing food portion sizes, consumption of high-fat and/or energy-dense fast foods and soft drinks, and an increasingly sedentary lifestyle (2).

Food portions, from manufactures, marketplaces, fast foods and restaurants, have increased in size and now exceed federal standards. Portion sizes began to grow in the 1970s, rose sharply in the 1980s, and have continued in parallel with increasing body weights (7). Foods consumed outside the home in 1970 accounted for 34% of the food budget, whereas by the late 1990's, 47% of the food budget was spent on foods outside the home (7). Not only are more people eating outside the home, but they are also eating more food each time they eat outside the home. With the single exception of sliced white bread, all of the commonly available food portions measured in a recent study published in the American Journal of Public Health, exceeded USDA and FDA standard portion sizes. The cookie category currently exceeds USDA standard portions by an average of 700%, cooked pasta by 480%, muffins by 333%, steaks by 224%,

and bagels by 195% (7). When foods such as beer, chocolate bars, French fries, hamburgers, and soft drinks were introduced to the market, they generally appeared in just one size, which was smaller than or equal to the smallest size currently available (7). Restaurants are using larger dinner plates, bakers are using larger muffin tins, pizzerias are using larger pans, and fast-food companies are using larger drink and French fry containers (7). Upon comparison of original classic cookbooks to new editions of the same cookbook, such as Joy of Cooking, identical recipes for cookies and desserts indicate fewer servings in the recent editions, meaning that portions are expected to be larger (7). Also reported in the previously mentioned study was the comparison of 181 products for which dates were obtained when portion sizes were increased. According to their data, the trend toward larger portion sizes began in the 1970's and portion sizes increased sharply in the 1980's and have continued to increase (7). A paradigm for fast food restaurants, McDonald's only offered one size of French fries in the mid-1950's; that size is now considered 'small' and is one third the weight of the largest size available in 2001 (7). In 2002, a large fry weighed the same as the 1998 'supersize', while the 2002 'Supersize' weighs nearly an ounce more (7). As McDonald's is an international franchise, Americans have seen the largest increase in portion sizes. McDonald's 'Extra-Large' soft drink portion in London, Rome, and Dublin weigh the same as the US 'Large' and in 1998-1999 the largest order of French fries in the US offered 610 Calories, whereas the largest size in the United Kingdom contained 446 Calories (7). A landmark decision on the behalf of the McDonald's corporation was announced March 3,

2004. By the end of 2004, Supersize will no longer be available at the nation's 13,000 plus McDonald's outlets except in certain promotions' (8). As the world's largest restaurant company, McDonald's yielded to growing public pressure to give consumers healthier food options and to simplify the core menu in order to provide a balance of choices for customers (8). The American public anxiously waits to see if other fast food restaurants adopt smaller portion sizes. While portion sizes have been addressed, the increase in high fat and/or energy-dense food consumption among children continues to grow and displace nutrients found in healthier food options.

HIGH FAT AND/OR ENERGY-DENSE FOOD CONSUMPTION

Whereas the NHANES surveys are responsible for providing data on anthropometric assessment of the population, the Continuing Survey of Food Intakes by Individuals provides data on nutrient consumption of the population. Food consumption for children reported in the USDA's 1989 to 1991 Continuing Survey of Food Intakes by Individuals fell short of reaching recommended servings of foods suggested by the USDA's Food Guide Pyramid. Only two percent of the children surveyed met all recommendations of the food guide pyramid and 11% met none (9). Approximately 35% of children met recommendations for fruit, 46% for meat, 65% met grain recommendations, 45% for vegetables, and 60% met dairy recommendations (10). Children consumed 35% of their energy as fat and 15% of Calories as added sugars. Between 1994-

1996 and 1998, 42% of children reported eating fast food on two non-consecutive 24-hour dietary recalls (11). Consumption of fast food resulted in a higher intake of energy, fat, saturated fat, sodium, carbonated soft drink, and lower intake of vitamins A and C, milk, fruits and vegetables (12).

As fast food consumption increases in America, access to fast food restaurants is becoming easier. In 1970, about 30,000 fast food restaurants spanned the United States (12). That number increased to 140,000 in 1980 and by 2001 there were approximately 222,000 fast food locations, generating sales of more than \$125 billion (12). In efforts to increase fruit and vegetable consumption, the National Cancer Institute launched a '5 A Day for Better Health' campaign targeted toward children and adolescents. However, the budgeted \$1 million per year spent on advertising the 5 A Day campaign is competing with about \$12 billion per year spent on advertising targeted toward children, with a focus on high fat foods and/or energy dense foods (5). McDonald's alone will invest more than \$1 billion each year on advertising (5). As children directly influenced more than \$170 billion spent on food purchases, advertisement for high fat and/or energy dense foods geared toward children have put pressure from certain organizations on the government to ban 'junk food' promotions geared toward children (5). American children will see an estimated 10,000 advertisements each year and 95% are for fast foods, sugary cereals, soft drinks, and candy (5). According to the USDA food and nutrition service, children age nine and older are heavy consumers of soft drinks, with 21% of boys and girls ages nine to 13 drinking three or more servings of soft drinks, and 32% 14 to 18

year old females and 52% of fourteen to eighteen year old males consuming three or more servings of soda a day (10). The staggering effects of soft drinks and other high sugar beverages are seen with the likelihood of becoming obese increasing 1.6 times for each additional can or glass of sugar-sweetened drink consumed every day (12). As soft drink consumption increases, milk consumption decreases (13). The USDA, which oversees the National School Lunch Program, is concerned by the evidence that supports the fact that high sugar and minimally nutritious foods such as soft drinks, are displacing nutrient-dense foods within the school lunch program.

SCHOOL LUNCH PROGRAM

School lunch programs are associated with a high intake of dietary protein, complex carbohydrates, dairy products, fruits, and vegetables (13). The National School Lunch Program (NSLP), which began in 1946, was revised in 1994 to be consistent with the Dietary Guidelines for Americans. When analyzed over a week, lunches can provide no more than 30% of total calories from fat and less than 10% of calories from saturated fat. They must also provide at least one-third of the Recommended Dietary Allowances (RDAs) for protein, vitamins A and C, iron, calcium, and calories (14). An increasing number of competitive food options, often low nutrient density foods, high in fat, sodium and sugar, are being purchased from school vending machines, school stores, snack bars, and a la carte cafeteria foods (14). Most notably, the increasingly prevalent

'exclusive pouring rights' contracts in which a school agrees to promote one brand of beverages exclusively in exchange for money- more than \$200 million in unrestricted revenue has already been rewarded due to 'exclusive pouring rights' (13). The fact that some superintendents, school board members, and principals claim that the financial gain from soft drink contracts is an unquestioned 'win' for students, schools, communities, and taxpayers displays only one challenge facing school meal programs. As the soft drink war wages on, minor battles are being won across the nation. California banned the sale of junk food and soft drinks in elementary schools and the sale of soft drinks in middle schools as of January 1, 2004 (12). Texas banned the sale of soda, candy, foods of minimal nutritional value from hallways, lunchrooms, and common areas during mealtimes in April of 2002 (12). Los Angeles (LA) banned the sale of soft drinks in all LA public schools as of January 1, 2004 and San Francisco banned the sale of soda and candy in cafeterias beginning with the 2003-2004 school year (12). Another challenge facing school meal programs is student participation, especially within the School Breakfast Program

SCHOOL BREAKFAST PROGRAM

The school breakfast program (SBP) was established in 1966 as a pilot study and nationally enforced in 1975. Approximately 8.2 million children in more than 76,000 schools and institutions participate in the SBP. In the 2002-2003 school year 79% received free or reduced price breakfasts (15). Overcoming the

stigma that the SBP is for poor or financially unstable households is one challenge of increasing total participation. However, the importance of breakfast for the health of children has lead some school districts to adopt a universal school breakfast program, ensuring all children, regardless of income, have access to breakfast each school day. The universal school breakfast program provides breakfast for all students at no charge (15). Nutrition standards for the SBP are designed to provide one-fourth of the recommended daily allowances for protein, vitamins A and C, iron, calcium and calories, as well as, being consistent with Dietary Guidelines that state no more than 30% of calories come from fat and less than 10% from saturated fat. Although all children who consume breakfast have higher rates of consumption of grains, fruit, and milk than those who do not have breakfast, children who consume a school breakfast have a statistically significant better diet, as measured by the Healthy Eating Index (16).

THE ROLE OF BREAKFAST IN OBESITY PREVENTION

The consequences of consuming breakfast everyday have been distinctly researched and the results show that breakfast benefits one's health and mind, regardless of age. The American Heart Association found that obesity and insulin resistance syndrome rates were 35% to 50% lower among people who ate breakfast everyday when compared to those who frequently excluded breakfast (17). Along with a reduced risk of type 2 diabetes and cardiovascular

disease, breakfast might have beneficial effects on appetite and energy metabolism, reported a research associate at Children's Hospital in Boston and assistant professor at Harvard Medical School (17). The American Dietetic Association recognizes the role breakfast might play in weight reduction and as part of a healthy diet (18).

As researchers continue to examine what people are consuming for breakfast, part of the benefits of breakfast may stem from the data that shows people who eat breakfast have higher scores of grains, fruit, and milk products, as measured by the Healthy Eating Index (16). Fiber, found in whole grains and fruits, along with calcium found in milk products have been researched documenting a positive correlation between increased consumption and decreased body weight. Dietary fiber is essential for optimum health. Recommended levels of fiber intake for children are their age plus five to 10 grams of fiber per day (19). A study published in the Journal of the American Dietetic Association found that children whose diets included plenty of calcium, mostly from milk and dairy products, tended to have less body fat (20). Results showed that children with lower calcium intakes had between 4.5% and 9% more body fat (20). Another study focused on yogurt and the role it played in weight reduction. Yogurt was found to augment fat loss and reduce central adiposity during energy restriction in obese subjects (21). With only 54% of children meeting daily dairy intake recommendations, increasing calcium consumption has been targeted to help fight childhood obesity (9).

Along with the health benefits, breakfast has been shown to facilitate educational improvements in children. Students consuming school breakfast have been shown to have more improvements in math and reading scores when compared to those who do not consume breakfast (22). Also, students increasing their school breakfast participation not only showed significantly larger gains in math grades, but also had decreased rates of tardiness, absences, hyperactivity, depression, and anxiety than students whose school breakfast participation did not increase (23). Links have been associated between those children experiencing hunger and those having a large number of behavior problems, especially fighting, stealing, having difficulties with teachers, not acknowledging rules and clinging to parent (23). As more and more advantages of breakfast are revealed, it is alarming to know that as a nation, breakfast consumption is decreasing.

Trends in breakfast consumption for children in the United States have declined since 1965 (24). Most markedly, the decline in breakfast consumption for adolescents aged 15 to 18 has decreased from 89.7% for males and 84.4% for females in 1965 to 74.9% for males and 64.7% for females in 1991 24. The nutritional quality of breakfast compared to that consumed in 1965, has improved, with significant shifts toward the consumption of lower-fat milk (23). However, given the association of obesity with less frequent breakfast consumption, the improvements in the quality of breakfast is offset by the growing percentage of adolescents and children, especially children 11 years old or younger, who do not participate in breakfast (23).

SUMMARY

A retrospective look at national childhood obesity and overweight rates displayed the magnitude of concern this obesity epidemic has raised in today's society. The health effects associated with obese children, the various factors contributing to children becoming increasingly overweight, and how breakfast might play an important part both in reversing the obesity epidemic and in contributing to a healthy diet are all aspects that continue to be researched. As much of the professional community agrees that nutrition education is vital in extinguishing the escalating rates of childhood obesity, the responsibilities of dietitians are earning more respect.

CHAPTER 3: NUTRITION EDUCATION

HAGGERTY ELEMENTARY K-2 GRADE NUTRITION EDUCATION

Haggerty Elementary School is part of Van Buren Public School District and is located in Washtenaw County, Michigan. Hosting grades kindergarten through fifth, 513 students are enrolled at Haggerty Elementary. Nutrition education to be taught within the classroom is organized through the Van Buren School District Food Systems Management department. Working in association with the Van Buren Public Schools Food Systems Director and Assistant Director, nutrition education for grades kindergarten through second was scheduled. On March 10, 2004 and March 11, 2004, a total of four second grade classes, four first grade classes, and three kindergarten classes, accounting for 215 students, received 25 minutes to 35 minutes of nutrition education. Each education session was to be age appropriate, educational, and interactive.

Delivering nutrition education to children in a manner that captivates their attention enhances education retention. The age appropriate, captivating media used as a theme for the nutrition education was 'Dexter's Laboratory', a televised cartoon on the Cartoon Network. Popular among today's youth, the figures 'Dexter', a boy genius, and his destructive, energetic sister, 'Dee Dee', were universally recognized in all classrooms at Haggerty Elementary. Dexter is a young boy who has a secret laboratory in his room where he is continually conducting experiments and building machines and robots. Dee Dee, a hopeful

ballerina, is constantly tutu totaling Dexter's experiments, which evoke the response- 'Dee Dee, Stay Out of My Laboratory!' Students attentively waited to discover the reasons why their favorite cartoon characters were at Haggerty Elementary, the message they had to share and what 'experiment' the students would take part in.

Breakfast, and the importance of eating it, was the message Dexter's Laboratory helped me deliver to the young students. PowerPoint slides designed to look like Dexter's notebook were printed out and used as an educational tool to discuss the importance of breakfast, the benefits it has on one's health, the School Breakfast Program, and examples of healthy breakfast foods. Consumption of breakfast is associated with a decrease in body weight and an increased consumption of nutrient-rich food groups such as fruits and dairy. Knowing the benefits of breakfast, my goal was to educate the students on those benefits and encourage them to make a healthy breakfast part of their daily routine.

See Appendix for Nutrition Education Tool: Dexter's 'notebook' PowerPoint Slides.

Being aware of the short attention spans of kindergarteners, first and second graders, having a presentation that was interactive with the students was desirable. I developed a 'pre-experiment' survey along with a 'post-experiment' survey, in keeping with the Dexter's Laboratory theme. The students were given time both at the beginning of the education session and at the end to complete the survey. Although the surveys were collected and the information compiled, all

surveys were not complete and the reliability of the data is considered questionable. The surveys were originally intended to provide information to compute measurable outcomes of the nutrition education sessions. However, they proved to be useful in acquiring full participation and interaction from all first and second grade students. Only one out of a total of three kindergarten classes participated in the survey. Completing the survey in kindergarten classes proved to be a more time consuming activity than planned. Another interactive activity incorporated into the educational sessions was an experiment for the students. The 'experiment' included making 'Power Breakfast Bead Bracelets'. Containers of Cheerios, Honey Nut Cheerios, Apple Jacks, and Fruit Loops were set out and each student was given a twelve-inch plastic string with a knot at one end. The students then laced the breakfast 'rings' onto the plastic string and the string was then tied around their wrist. The 'experiment' was extremely well received and all students participated.

See Appendix for Survey examples and survey results.

The outline of the nutrition education session was maintained for all classes, excluding the two kindergarten classes that did not participate in the surveys. Upon entering each classroom, all students were gathered onto a carpeted area and I introduced myself. No introduction was needed for the cutouts that represented Dexter and Dee Dee. I explained to the students that Dexter and Dee Dee were there to help me explain the benefits of breakfast and to help conduct an

experiment. They were instructed to return to their seats to complete the 'pre-experiment' survey and after they did, to return to the carpeted area. Once all students returned to the carpeted area, I began the nutrition education using 'Dexter's notebook' PowerPoint slides. When I finished with the slides, I asked if the students wanted to do their own experiment. When the excitement died down, all students were instructed back to their seat and while the supplies for the experiment were being passed out, they were to complete their 'post-experiment' survey. Each student was given a plastic string and a bowl of breakfast 'rings' were given to each group of students. When they successfully laced the breakfast 'rings' onto the string and it was tied upon their wrist, they students were gathered once again onto the carpeted area. An overview and questions pertaining to the nutrition education were asked, group pictures were taken, and I advertised my themed school breakfast to all the students. Scheduled one week after all education sessions, I organized a Dexter's Laboratory themed breakfast.

THEME MEAL

Quality over quantity is usually applied to the school breakfast program at Van Buren Public Schools. With low participation numbers at breakfast, my theme meal was not as involved, complex or extensive, as a school lunch theme meal would have been. However, with the research that supports the importance of breakfast for school aged children, I find that quantity is becoming more and more of an emphasis. Through the use of age appropriate nutrition education, a themed

meal with a free toy, and flyers, my goal was to increase the participation of school breakfast on March 18, 2004.

Nutrition education was conducted in 10 classes, grades kindergarten through second grade. The vehicle used to share the message of the importance of breakfast to promote health, improve schoolwork, attendance, and energy to 215 children was a Dexter's Laboratory theme. Boy genius from Cartoon Network, Dexter, and his energetic sister, Dee Dee, provided the ideal theme for the education session and the breakfast.

Promoting for my theme meal breakfast began with mentioning my theme, menu and date of the breakfast during my nutrition education sessions one week prior to the themed meal. Three days prior to the themed meal, flyers were distributed to all teachers and posted in hallways.

March 18 was the date of my themed breakfast, and to this breakfast I brought the same Dexter and Dee Dee cutouts used during the nutrition education sessions, and also 'laboratory' props. Each place setting was given a Dexter themed place mat and a free toy. Yoplait Go-gurt was special ordered for this event and was well received.

Average participation in school breakfast at Haggerty Elementary is 35 to 40 students. For my theme breakfast, 51 students participated. The theme meal successfully increased participation by approximately 35%.

The Go-gurt was successful also. Fifty-one tubes, out of a case of 96, were used for my theme meal. The remaining Go-gurt was sold within two days for \$0.50 each during lunch periods. Van Buren Public School Food Service Director

is contemplating adding Go-gurt to the a la carte menu. As yogurt is high in calcium, and 44% of school aged children are not meeting current dairy recommendations, the addition of Go-gurt to the a la carte menu offers another option for children to increase their milk and milk product consumption.

See Appendix D for Theme Meal Flyer and Appendix E for Theme Meal Placemat.

EASTERN MICHIGAN UNIVERSITY'S UNDERGRADUATE SYMPOSIUM XXIV

The Undergraduate Symposium presented a forum in which I could present my research on childhood obesity and the nutrition education sessions I conducted at Haggerty Elementary School regarding the importance of breakfast to my peers, professors and the public.

As a poster presenter, I displayed facts and figures on childhood obesity, the role calcium and fiber play in stemming the tide of the obesity, and the importance of breakfast in a healthy diet. The nutrition education sessions were described and the group photographs taken during both the educational sessions and during the theme breakfast were exhibited. From the hours of 9:00 a.m. to 1:00 p.m., the poster presentations were open to examine by peers, professors and the public. Standing by my poster, I answered multiple questions, conversed

with professors and peers, and was photographed by the University's Photographer.

The extent in which my poster presentation was shared amongst Eastern Michigan University's campus was surprising. I have received multiple reports that in EMU classroom discussions of the undergraduate symposium, my poster was discussed, resulting in a continuation of nutrition education.

CHAPTER 4: FUTURE EXPANSIONS AND APPLICATIONS

Age appropriate nutrition education material is a necessity in successfully relaying a message. As Dexter's Laboratory was a perfect media to use in order to relate to young students, the theme of science, nutrition, and obesity prevention can be applied to students of all ages. Listed below are nutrition education ideas for middle school aged children and high school students. Nutrition affects every life stage, and therefore it should be taught at each.

MIDDLE SCHOOL 'EXPERIMENT' IDEAS

1. Calorie Counts- Give each student/group of students an assigned bag filled with a random assortment of candies, snacks, etc. and the nutrition labels for each- the students then figure out how many calories are in each bag... with a little pre-planning, each number could relate to a letter and all the total calories of the bags would 'decode' a secret- Great for a math class.
2. Measuring Foods- Separate students into groups and have three different methods for ways to measure servings of different foods. Measuring cups, household items, science lab items such as test tubes, beakers, etc., and 'eye-ball' technique for example. Have each group measure out servings of different foods and then compare what they measured to an actual serving. It

might be fun for students wear goggles, gloves, etc. to make it feel more scientific.

3. Food Robot- Take healthier food containers and give students the task of assembling a robot out of the food boxes and containers- Judge robots on different points. Example- All food groups represented= 5 points, All food calories total 30% or less from fat= 25 points
4. Food Fair- Organized like a science fair, students choose something that they are interested in relating to food and nutrition. Examples would be conducting a food survey, preparing a meal, or researching ethnic foods. Students would present their topic at a 'food fair' for classmates, parents, and the community. Blue ribbons would be awarded, along with other appropriate certificates for outstanding displays.
5. Breakfast Jeopardy- Organized like the Television show, 'Jeopardy', different answers about breakfast will be asked and students will provide the questions. To connect it with a science theme, have categories such as food science, Calorimeter (Energy value of certain foods), etc.
6. Food Experiments- To educate about foods around the world, students can 'experiment' with ethnic foods that they might have never tried before and they can rate/ describe what they thought of it.

7. Scientific Name- Have tables set up with samples of certain snack foods, etc. Have the students line up and in order to be awarded the snack, they have to pronounce correctly all the ingredients contained in that snack (students would most likely end up with more natural, healthier snacks).

HIGH SCHOOL 'EXPERIMENT' IDEAS

1. Food Experiments- Try food science projects like making home-made whole wheat bread or dehydrating fruits; determine the energy content of foods; determine ingredient substitutions. This experiment might allow student to become more familiar with preparing foods and healthier ingredient substitutions.
2. Nutrition Jeopardy- Organized like the Television show, 'Jeopardy', different answers about chemical properties of foods, metabolism or other food science topics will be asked and students will provide the questions. Points will be awarded to all correct questions and a prize given.
3. 'Periodic Table' - Create a periodic table with fruit and/or vegetables. Organize them according to caloric value, region grown, tree vs. plant, etc.

4. Nutrition 'IQ' Test- Conduct a timed race and the winner with the most correct answers earns a prize. Examples of prizes could be a cafeteria voucher for \$10, a water bottle, or a box of cereal.

5. Measuring Experiment- Have students bring in some of their favorite snacks or have a variety of nutrition labels available for them. Also, bags of white sugar and a bottle of oil or grease (like Crisco) are needed. Using a scale, have the students measure out the grams of sugar or the grams of fat of the food items available using the white sugar and fat.

6. Diabetic for a Week- with the rise in childhood obesity and type II diabetes, explaining the importance of a healthy diet might be magnified if the students knew what being diabetic entails. Challenge them to follow an exchange meal plan for a week and keep a journal about their experiences. If blood glucose testers are accessible, have students test their level before every meal, or maybe just while they are at school- once in the morning, before lunch and before they go home.

7. Physical Activity- have a table of cards with foods written on one side, and on the other side, their caloric value. Then have cards of various physical activities and how many calories that physical activity burns (explain that this number is an estimate) in 15-20 minutes. Have them gather enough cards so they will burn off all of the food they picked out. Depending on

CHAPTER 5: CONCLUSION

As President Truman used words to spread the message of the importance the health of our nation's children, I hope my actions can show that I believe in that same message, 'No nation is any healthier than its' children'. The obesity epidemic in America is massive and I choose to start at the beginning. Children, being the beginning of so many things, are in need of nutrition education to begin to reverse the growing obesity rates and in order to prevent obesity and the many conditions and diseases that are related to obesity. Researching childhood obesity, conducting nutrition education for elementary students, organizing a theme breakfast, and relaying my passion of nutrition education for young students at Eastern Michigan University's Undergraduate Symposium to my peers and professionals has only strengthened my pursuit to educate America's youth on nutrition.

The plethora of information available on childhood obesity can be staggering to sort through. Staggering, in the sense that the health of our nation's children continues to deteriorate because of diseases preventable with good nutrition and also in the sense that this pattern of deterioration began almost 30 years ago. As our nation waited until childhood obesity rates reached epidemic proportions, we can wait no longer.

Armed with nutrition education, I am fighting the war on fat. Delivering an effective, informative, and retainable message to children on the importance of a healthy diet required the message to be age appropriate, interactive, and above

all else, educational. The vehicle I used to connect with the young students was Dexter's Laboratory, a popular cartoon televised on the Cartoon Network. A survey was conducted along with an 'experiment' to ensure the educational session was interactive. Dexter's 'notebook' was used to relay the message of the importance of breakfast. All the children participated, interacted with me, and thanked me for coming. If the only thing I accomplished was to teach them that nutrition can be fun, I feel as if that would be a step in the right direction.

The theme breakfast was a creative outlet in which to apply the nutrition education. With the goal of increasing participation in the school breakfast program, I advertised the breakfast using the same Dexter's Laboratory theme by including it in my nutrition education sessions and delivering flyers to all teachers. The participation in the school breakfast program increased to 51 students, from an average of 35 to 40 students, on the morning of my theme meal. I concluded that my theme breakfast was a success and special promotion should continue to be utilized in order to increase participation.

Representing the Dietetics Program and the College of Health and Human Services at the Undergraduate Symposium XXIV this year was an honor and I was exuberant to see the interest manifested in my poster presentation. As with all education, sharing strategies that are both successful and unsuccessful, allow educators to improve their teaching effectiveness.

Science and nutrition have an intricate relationship that makes possible expanding nutrition education around the theme Dexter's Laboratory and applying this education to all ages. Brief educational sessions are possible, as

well as, weeklong projects and complicated presentations. All methods should relay the message that good nutrition should be part of everyday and it can be fun.

In conclusion, the future health of our nation rests with the children, but the responsibility to educate children on health, rest in the hands of parents, mentors, educators, and registered dietitians. By taking on part of that responsibility, I am investing in the future. Donald Trump, a guru on investments, said that you learn from the past, but plan for the future by focusing exclusively on the present. The past has shown what led to the current obesity epidemic and, in order for a healthier nation to be realized in the future, attention needs to be focused exclusively on reversing the growing rates of obesity- starting with children.

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APPENDIX A:

NHANES TABLE AND CHARTS

Table 1. Number of Survey Respondents by Sex, Race/Ethnicity, and Age Groups: NHANES 1999-2000*

Subgroup	Male	Female	Total
Non-Hispanic white			
Birth to 2 y	97	71	168
2-5 y	101	103	204
6-11 y	120	122	242
12-19 y	244	226	470
Non-Hispanic black			
Birth to 2 y	59	58	117
2-5 y	108	97	205
6-11 y	165	158	323
12-19 y	326	304	630
Mexican American			
Birth to 2 y	164	145	309
2-5 y	132	127	259
6-11 y	229	194	423
12-19 y	513	460	973
Total†			
Birth to 2 y	371	314	685
2-5 y	381	358	739
6-11 y	546	508	1054
12-19 y	1155	1089	2244

*NHANES indicates National Health and Nutrition Examination Survey.

†Includes racial/ethnic groups not shown separately (eg, other category).

Table 2. Prevalence of Overweight or at Risk for Overweight in Children by Sex, Race/Ethnicity, and Age Group: NHANES 1999-2000*

Sex	Age, y	Overweight or at Risk†				Overweight‡			
		All§	Non-Hispanic White	Non-Hispanic Black	Mexican American	All§	Non-Hispanic White	Non-Hispanic Black	Mexican American
Both sexes	2-5	20.6 (1.8)	20.5 (2.7)	19.3 (3.5)	22.7 (3.0)	10.4 (1.7)	10.1 (2.4)	8.4 (2.3)	11.1 (2.5)
	6-11	30.3 (2.4)	26.2 (3.6)	35.9 (3.0)	39.3 (3.0)	15.3 (1.7)	11.8 (2.4)	19.5 (2.0)	23.7 (2.0)#
	12-19	30.4 (1.9)	26.5 (2.4)	40.4 (2.2)	43.8 (2.6)	15.5 (1.2)	12.7 (1.7)	23.6 (2.1)#	23.4 (2.1)#
Male	2-5	20.9 (2.4)	21.4 (3.7)	12.6 (3.1)	26.0 (4.9)	9.9 (2.2)	8.8 (3.2)	5.9 (2.4)	13.0 (3.9)
	6-11	32.7 (3.7)	29.4 (5.7)	34.5 (3.6)	43.0 (4.2)	16.0 (2.3)	12.0 (3.0)	17.1 (2.8)	27.3 (3.1)#
	12-19	30.5 (2.1)	27.4 (3.0)	35.7 (2.8)	44.2 (3.0)	15.5 (1.6)	12.8 (2.4)	20.7 (2.6)	27.5 (3.0)#
Female	2-5	20.4 (3.0)	19.7 (4.1)	26.6 (6.4)	19.5 (4.0)	11.0 (2.5)	11.5 (3.3)	11.2 (3.8)	9.2 (2.9)
	6-11	27.8 (3.2)	22.8 (4.7)	37.6 (3.6)	35.1 (4.4)	14.5 (2.5)	11.6 (3.5)	22.2 (3.3)	19.6 (3.1)
	12-19	30.2 (2.8)	25.4 (3.3)	45.5 (3.0)	43.5 (4.2)¶	15.5 (1.6)	12.4 (2.1)	26.6 (2.7)#	19.4 (2.8)

*Values are expressed as percentage (SE). NHANES indicates National Health and Nutrition Examination Survey.

†Body mass index for age is at the 85th percentile or higher.

‡Body mass index is at the 95th percentile or higher.

§Includes racial/ethnic groups not shown separately (eg, other category).

||Does not meet standard of statistical reliability and precision (relative SE >30%).

¶Includes one influential observation. When this observation is deleted, the prevalence (SE) is 39.6 (2.3).

#Significantly different from non-Hispanic whites at $P < .05$ (with Bonferroni adjustment).

Table 3. Prevalence of Overweight by Sex and Race/Ethnicity for Birth Through 23 Months: NHANES 1999-2000*

Subgroup	Total	Male	Female
Non-Hispanic white	10.1 (2.5)	9.2 (3.3)†	11.7 (5.0)†
Non-Hispanic black	18.5 (2.2)	16.2 (3.9)	20.9 (4.5)
Mexican American	13.7 (2.9)	13.6 (3.4)	13.8 (3.6)
Total‡	11.4 (1.7)	10.4 (2.1)	12.8 (2.8)

*Overweight defined as weight for length at the 95th percentile or higher. Values are expressed as percentage (SE). NHANES indicates National Health and Nutrition Examination Survey.

†Does not meet standard of statistical reliability and precision (relative SE >30%).

‡Includes racial/ethnic groups not shown separately (eg, other category).

Table 4. Trends in Overweight for Children Birth Through 19 Years by Sex and Age Group*

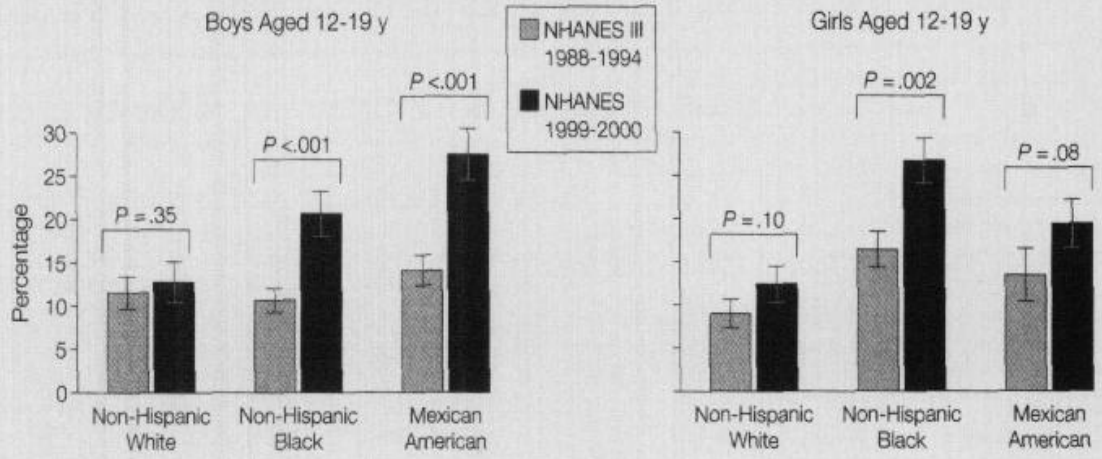
	NHES 2 (1963-1965)	NHES 3 (1966-1970)	NHANES I (1971-1974)	NHANES II (1976-1980)	NHANES III (1988-1994)	NHANES 1999-2000	P Values for NHANES III vs NHANES 1999-2000
6-23 mo†							
Total				7.2 (1.0)	8.9 (0.7)	11.6 (1.9)	.09
Male				8.2 (1.4)	9.9 (0.8)	9.8 (2.2)	.48
Female				6.1 (1.3)	7.9 (1.0)	14.3 (3.5)	.04
2-5 y‡			5.0 (0.6)	5.0 (0.6)	7.2 (0.7)	10.4 (1.7)	.04
Boys			5.0 (0.9)	4.7 (0.6)	6.1 (0.8)	9.9 (2.2)	.06
Girls			4.9 (0.8)	5.3 (1.0)	8.2 (1.1)	11.0 (2.5)	.16
6-11 y‡	4.2 (0.4)		4.0 (0.5)	6.5 (0.6)	11.3 (1.0)	15.3 (1.7)	.02
Boys	4.0 (0.4)		4.3 (0.8)	6.6 (0.8)	11.6 (1.3)	16.0 (2.3)	.05
Girls	4.5 (0.6)		3.6 (0.6)	6.4 (1.0)	11.0 (1.4)	14.5 (2.5)	.11
12-19 y‡		4.6 (0.3)	6.1 (0.6)	5.0 (0.5)	10.5 (0.9)	15.5 (1.2)	<.001
Adolescent boys		4.5 (0.4)	6.1 (0.8)	4.8 (0.5)	11.3 (1.3)	15.5 (1.6)	.02
Adolescent girls		4.7 (0.3)	6.2 (0.8)	5.3 (0.8)	9.7 (1.1)	15.5 (1.6)	.002

*Values are expressed as percentage (SE).

†A weight-for-length at the 95th percentile or higher is considered overweight.

‡A body mass index for age at the 95th percentile or higher is considered overweight.

Figure. Overweight Prevalence by Race/Ethnicity for Adolescent Boys and Girls



Error bars represent SEs.

APPENDIX B.

DEXTER'S EDUCATION MATERIAL: 'NOTEBOOK'

POWERPOINT SLIDES

Dexter's Food Laboratory Research & Experiments

Confidential !!

-Keep out Dee Dee-

Breakfast

- Considered the most important meal of the day
- Fellow scientist and Researchers have proved many benefits of the consumption of an a.m. nutritionally balanced diet

Harvard Medical School Study

- Breakfast = improved math scores & reading scores
- better attendance
- less tardiness
- feel better
- may increase memory

Harvard Study, continued

- Hunger = links to behavioral problems
 - fighting
 - stealing
 - trouble with teachers
 - following rules
 - clinging to the parents

National School Breakfast Program

- More than 76,000 schools offer breakfast to students in the morning
- Haggerty Elementary, Michigan is one example
- 8,200,000 students received school breakfast in the year 2002-2003

School Breakfast, continued

- School breakfast always has milk, which helps my bones
- students that eat breakfast at school eat more fruit, drink more milk, and eat less fat than students who eat at home

School Breakfast, continued

- 25% of my daily food needs are met with school breakfast
- Full pay is \$1.00
- Reduced pay is \$0.30

Haggerty Elementary Food Laboratory

- I will come to Haggerty Elementary's Food Laboratory on March 18th, 2004 to experiment with Breakfast and to observe students eating this most important meal

March 18th, 2004

- Haggerty's Food Laboratory Breakfast
 - nutritious circular grain with missing center
 - creamy white dairy spread
 - vitamin and mineral rich 100% fruit juice
 - cereal bowl with milk

Food Laboratory Breakfast Experiments

- Cereal
- Hot Oatmeal
- Pancakes
- Eggs & bacon
- French Toast
- Waffles
- Donuts
- Bagels
- Yogurt Parfait
- biscuits and gravy
- cold pizza
- fruit
- toast
- omelets

National School Breakfast Week

- March 8th through March 12th is National School Breakfast Week

Confidential Research

- Measurement of Hexanal Production by Myoglobin-Induced Lipid Peroxidation Using a Miniature Incubator and cryofocusing Inlet system with gas Chromatography and time-of-flight Mass Spectrometry

