ABSTRACT

HOGGARD, LYNN BENTON. The School Nutrition Environment in North Carolina's Public Schools. (Under the direction of Dr. R. David Mustian).

The purpose of the research was to explore and describe the current school nutrition environment in North Carolina's public schools. Current practices to increase the availability of healthful foods and beverages in the school breakfast and lunch programs were analyzed. Barriers that limit the availability of healthful foods and beverages in school meals programs were identified and strategies to overcome the barriers were described. A survey instrument was administered to all Child Nutrition Directors and Supervisors in North Carolina. Of 239 instruments distributed, 211 were returned resulting in an 88.3% response rate.

The research found that Child Nutrition Directors and Supervisors were keenly aware of the serious public health problems posed by the epidemic of childhood overweight and recognized that poor food and beverage choices and inadequate physical activity contribute to weight gain among children and adolescents. While healthful foods and beverages were available to students in the school breakfast and lunch programs, competitive foods, which undermined the nutritional and financial integrity of the school meals programs, were also available in approximately one-fourth of elementary schools, half of middle schools and three-fourths of high schools.

The leading barrier that limited the availability of more healthful foods and beverages in school meals programs was school finances; financial goals for the

programs outweighed nutritional goals for students. Other barriers included lack of support from school administrators and local Boards of Education, principals, teachers and parents. Student taste preferences for foods high in fat, sugar and calories was also a barrier. Other barriers included too little nutrition education in the classroom to influence student's food choices, conflicting nutrition messages on school campuses, limited time and space for school meals and the perception that school meals were not a valued part of the instructional day. Multiple strategies were recommended to overcome and/or minimize the barriers.

The School Nutrition Environment in North Carolina's Public Schools

By

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BIOGRAPHY

Lynn Benton Hoggard is a native of Raleigh, North Carolina. She graduated from Millbrook High School in 1976 and enrolled in Meredith College the same year. In 1980, she graduated magna cum laude from Meredith College where she earned a Bachelor of Science Degree in Family and Consumer Sciences with a concentration in food, nutrition and dietetics. In 1983, Lynn earned a Master of Science Degree in Food, Nutrition and Institutional Management from East Carolina University. The same year, she passed the national board examination to become a Registered Dietitian.

Upon graduation, Lynn was employed as a Pediatric Dietitian at Wake Medical Center in Raleigh. She was a member of the faculty at Meredith College for several years where she taught in the nutrition and dietetics program. In 1986, Lynn joined the NC Department of Public Instruction where she coordinated the state's Nutrition Education and Training Program. The program provided training and resources for teachers in public schools to assist them as they integrated nutrition concepts into their classrooms. In 1992, Lynn joined the NC Cooperative Extension Service as an Extension Educator in Wake County. In 1997, she became an Extension Associate at North Carolina State University where she administered federally-funded nutrition education programs for both the Family and Consumer Sciences and 4-H and Youth Development Departments. In 1995, Lynn joined the Health Team at WRAL-TV where she served as a health/nutrition/fitness reporter on a part-time basis for the CBS affiliate. In 2001, Lynn was recognized by the American Dietetic Association for

Media Excellence as a result of her work with WRAL. During her partnership with WRAL, Lynn authored “Never Diet Again – a guide to good food and fitness”. In 2003, Lynn joined the NC Department of Public Instruction as the Section Chief of the Child Nutrition Services Section. Lynn is responsible for administering the federally-funded Child Nutrition Programs for the Department.

Lynn is active member of the School Nutrition Association and the American Dietetic Association. She earned recognition as a Fellow of the American Dietetic Association and has been recognized as a Distinguished Alumni by Meredith College and East Carolina University. In 2004, Lynn was appointed by the Lieutenant Governor to serve on the state’s Childhood Obesity Study Committee; the committee is charged with making legislative and policy recommendations to the N.C. General Assembly to address the rising epidemic of childhood overweight in the state.

Lynn is the daughter of Mr. and Mrs. Howard Benton of Raleigh. She has one sister, Beverly, who is a world-class Kindergarten teacher in the Wake County Public School System.

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CHAPTER I

Introduction

Many American youth are sedentary and do not eat a diet that promotes optimal health (Ebbeling, Pawlak, and Ludwig, 2002). Poor diet and too little physical activity can lead to health-related problems that may begin during school-age years and continue into adulthood. One of the greatest consequences of a poor diet and too little physical activity among children and adolescents is the risk of becoming overweight (Ebbeling, et al, 2002). Nearly 20% of school-aged children and adolescents in the United States (U.S.) are overweight (Hedley, Ogden, Johnson, Carroll, Curtain, and Flegal, 2004). Being overweight as a child or adolescent can lead to complications such as elevated cholesterol and blood pressure, type 2 diabetes, gastrointestinal and orthopedic disorders, respiratory illnesses including asthma and sleep apnea and psychosocial problems (American Academy of Pediatrics, 2003). Being overweight is also linked to poor academic achievement among youth (Freedman, Dietz, Srinivasan and Berenson, 1999).

Schools can play a critical role in combating problems associated with poor nutrition and inactive lifestyles. The ultimate goal of schools is to provide high-quality education to prepare students for responsible citizenship (Action for Healthy Kids, 2004). However, many school practices related to nutrition and physical activity are counterproductive to this goal (Wechsler, McKenna, Lee and Dietz, 2004). For example, 80% of school districts in the U. S. sell foods and

beverages that are low in nutrients and high in calories (U.S. Government Accounting Office, GAO, 2003). A steady diet of foods and beverages that are high in calories and low in nutrients contributes to weight gain. The availability of less nutritious foods during the school day can decrease students' participation in school meal programs that are required to be nutritious and age-appropriate in calories (U.S. GAO, 2003).

While schools have increased the availability of calories to students during the school day, they have simultaneously decreased opportunities to expend those calories. According to the Centers for Disease Control and Prevention (CDC, 2003), schools have reduced the amount of time dedicated to physical education and physical activity in nearly every state in the nation. Schools have been reducing and/or eliminating physical activity and physical education programs during the instructional day primarily to allow for more classroom time to improve test scores and end-of-year grades (Wechsler, et al., 2004)

The physical activity and eating behaviors that affect weight are influenced by many sectors of society, including families, communities, health care providers, business and industry, government agencies, the media and schools. A growing body of evidence suggests the school environment is recognized as having a significant impact on students' food choices and eating habits (Kubik, Lytle, Hannan, Perry, and Story, 2003; Story, Neumark-Sztainer, and French, 2002; French, Story, Fulkerson, and Gerlach, 2003). Schools can lead the nation in reversing the trend of weight gain among children by providing more wholesome, nutritious foods and limiting non-nutritious foods and by providing

adequate opportunities for students to engage in physical activity during the school day (Wechsler, et al., 2004; Ebbing, et al, 2002; French et al, 2003; and Kubik, et al, 2003). While schools cannot solve the problem of childhood overweight on their own, it is unlikely to be resolved without strong school-based policies and programs (Wechsler, et al., 2004). Such policies and programs can establish a school environment where students can adopt and maintain healthy eating and physical activity behaviors.

The Changing School Environment

The school environment has changed tremendously over the past in 25 years. Prior to 1980, reimbursable school lunches that were served as part of the National School Lunch Program (NSLP) were the primary source of foods and beverages for students during the school day (French, et al, 2003). Today, in middle and high schools, reimbursable meals represent a much smaller part of the school environment and this trend is emerging in elementary schools as well (French, et al, 2003). Many schools now provide increased food and beverage choices to students throughout the school day (Rainville, Choi and Brown, 2005).

In North Carolina, the number of students attending public schools is approaching 1.4 million (NC DPI, 2005). Of these students, 48% qualify to receive free or reduced price meals through the National School Lunch Program (NC DPI, 2005). As the numbers of students increase, school districts give higher priority to building and equipping classrooms to accommodate students than to expanding and equipping school nutrition facilities. Food preparation and

service areas are often inadequate to prepare and serve appealing, nutritious meals to all students (Rainville, Choi and Brown, 2005). There is also limited time available during the instructional day for students to consume their meals and snacks. With inadequate dining facilities and insufficient time to eat, many students turn to less nutritious foods that are readily accessible in vending machines and school stores (Conklin, Lambert and Anderson, 2002).

Students' taste preferences are also changing the school environment. Students come to school with established preferences for fast foods, sweetened beverages and salty snacks (Birch, 1999). Many student-favorite foods, which are often less nutritious, may be combined with other more nutritious foods to provide an appealing, healthful meal. Yet, it has been the researcher's observation that many North Carolina school districts may not plan school meals based on the nutrient contribution of the total meal because personnel in the districts are not performing nutrient analyses. As a result, it is difficult to determine the nutrient content of many meals served to students. Without a variety of healthful, appealing meal options, students often choose single *A la Carte* foods and beverages that may be higher in calories, fat and sugar and lower in important nutrients than the reimbursable meal (Kramer-Atwood, Dwyer, Hoelscher, Nicklas, Johnson and Shultz, 2002).

Another change in the school environment is increasing financial challenges. Increasing financial demands accompany student growth and stretch the districts limited resources. With increasing financial pressures and limited funds, academic priorities often outweigh nutrition priorities among

decision-makers within the school districts (Barratt, Cross, Mattfeldt-Berman and Katz, 2004). According to USDA (2004), Child Nutrition Programs, which were once regular line items in local school district operating budgets are now self-supporting and generate revenues for the school district. To remain financially solvent, it has become more lucrative for school districts to promote and sell *A la Carte* foods and beverages to students because they generate profits for the Child Nutrition Program. Child Nutrition Programs in North Carolina are now being assessed indirect costs by the local school district (Andersen, Caldwell, Dunn, Hoggard, Thaxton, Thomas, 2004). In 2005, Child Nutrition Programs throughout the state were assessed nearly $28 million dollars in indirect costs. Child Nutrition Directors in North Carolina have commented to the researcher that the school district's financial dependence upon indirect costs for the general operating budget have contributed to the profit-making priority that drives decisions in the Child Nutrition Programs. State funds that were once available to support the Child Nutrition Program have also been diverted to other academic programs (Andersen, et al, 2004). The researcher has observed that high indirect cost rates, coupled with a loss of state funds, have created a tremendous financial challenge to the state's Child Nutrition Programs.

For many school districts, competitive foods and beverages, especially soft drinks and other snacks available in vending machines, school stores and as fund-raisers, represent a source of additional income that may be spent for discretionary purposes not necessarily related to the Child Nutrition Program. There has been a recent trend for school districts to negotiate exclusive pouring

rights contracts with soft drink companies (Nestle, 2000). Many of these contracts have provisions to increase the percentage of profits school districts receive when sales volume increases (Nestle, 2000). As a result, there is a substantial incentive for schools to promote soft drink consumption by adding vending machines, increasing the times the beverages are available to students and marketing soft drinks to students. According to North Carolina General Statutes (G.S. 115 C – 264), local Boards of Education (BOE) must adopt policies concerning the sale of soft drinks to students. It is unknown whether these policies have been adopted in North Carolina's school districts.

In 2004, the State Board of Education adopted the Healthy Active Children's Policy (HSP-S-000). The policy requires each LEA to establish and maintain a local School Health Advisory Council (SHAC) to help plan, implement and monitor BOE policies related to school health. The SHAC is composed of representative from the eight areas of coordinated school health, including School Nutrition Services, and representatives from the local department of health and school administration. The SHAC is a critical link to the development, adoption, and implementation of local policies that support an optimal school nutrition environment on school campuses (SBE, 2004).

The Role of Child Nutrition Directors and Supervisors in Shaping the School Environment

Child Nutrition Directors and Supervisors administer the National School Lunch and School Breakfast Programs in North Carolina's public schools. (NC DPI, 2005). These professionals are responsible for a variety of tasks within the

school district. According to Martin and Conklin (1999), Child Nutrition Directors and Supervisors are responsible for the following duties:

1. articulating to all stakeholders the role Child Nutrition Programs (CNPs) serve in educating students within the school district;
2. engendering support for the CNPs from school administration, teachers, parents and the community;
3. participating as a full education partner in delivering nutrition education within a comprehensive school health curriculum;
4. designing and directing CNP operations to meet the needs and desires of students while maintaining the nutritional, programmatic and financial integrity of the program;
5. managing a CNP that is accountable to taxpayers and the congressional intent of CNP legislation;
6. committing to continuous quality improvement by benchmarking program performance with best practices in CNPs throughout the nation;
7. advocating for a variety of CNPs and services within the community; and
8. collaborating with education, public health, and other professional groups to deliver seamless services to children.

Child Nutrition Directors and Supervisors are uniquely positioned to shape the school environment directly through menu planning and food and beverage

procurement on behalf of the school district (Martin and Conklin, 1999). To date, no studies have examined the knowledge, skills, experience or academic preparation of Child Nutrition Directors and Supervisors in relation to the availability of healthful foods and beverages in Child Nutrition Programs. According to USDA (2001), there are no national education standards for Child Nutrition Directors and the levels of education vary from advanced degrees to less than a high school education. However, it has been suggested that Child Nutrition Directors and Supervisors recognize that reward systems in school districts are based on education attained, continuing professional education, and certification in professional disciplines. According to Martin and Conklin (1999), if Child Nutrition Directors and Supervisors are to be recognized as full partners in providing educational services to children in the school environment, they need to be evaluated and found equal to other administrators using similar criteria. Martin and Conklin (1999) recommended the Child Nutrition Director and Supervisor attain at least a baccalaureate degree and seek certification as a food and nutrition professional in order to be adequately prepared to administer Child Nutrition Programs.

Appropriate standards are necessary to ensure that Child Nutrition professionals understand the nutrition and health issues associated with school meals (USDA, 2004). Such standards are also necessary for Child Nutrition Directors and Supervisors to handle the varied responsibilities and complexities of the role within the school district such as managing multimillion-dollar budgets, serving as an authority on children's nutritional needs to the school

administration and the community and being included as a full partner in the education process (USDA, 2004).

Need for the Study

According to the Centers for Disease Control and Prevention (2003), childhood overweight and obesity have reached epidemic proportions in the U. S. The body mass index (BMI) is a tool used to measure the condition of overweight and obesity (Centers for Disease Control and Prevention, CDC, 2003). BMI is calculated as weight in kilograms divided by height in meters squared (CDC, 2003). This index more adequately reflects overweight than actual weight in pounds or scale weight because it adjusts bodyweight for height. Since 1980, the number of overweight children has doubled and the number of overweight adolescents has tripled. Almost 14 million children, 24% of the U.S. population ages 2 to 17, are overweight which is defined as a weight that is at or above the 95th percentile of the sex-specific BMI-for-age growth chart (CDC, 2003). Another 8.6 million children are at risk for becoming overweight which is defined as at or above the 85th percentile of the sex-specific BMI-for-age growth chart (CDC, 2003). The increasing prevalence of childhood overweight during the past 25 years has caused health policy analysts to rank the condition among the most critical public health threats of the 21st century. Miller, Rosenbloom and Silverstein (2004) predicted that more than two-thirds of children 10 years of age or older who are obese will become obese as adults which will likely decrease their life expectancy by 5 to 20 years.

In North Carolina, children are becoming overweight at a rate that exceeds the national average. Children in North Carolina are twice as likely to be overweight as children from other states (Molloy, Kovach, Bors, Caldwell and Lebeuf, 2002). According to Molloy et al, (2002), North Carolina is a national leader in the prevalence of childhood overweight and obesity as well as its contributing behaviors. North Carolina's statistics on childhood overweight are alarming; one in four youth 12 to 18 years of age is overweight. One in five children age 5 to 11 years is overweight and one in eight preschool children age two to four years is overweight (Eat Smart, Move More NC, 2003).

Childhood overweight and obesity have serious short and long-term health consequences. A major health consequence of overweight and obesity among children is the development of type 2 diabetes (Must and Strauss, 1999). For children born in the U.S. in 2000, the risk of being diagnosed with type 2 diabetes at some point in their lives is estimated at 30% for boys and 40% for girls (CDC, 2003). Other risks to overweight children's physical health include an increased risk for cardiovascular disease, asthma, orthopedic diseases, sleep apnea, and other chronic medical conditions (American Academy of Pediatrics, 2003).

Overweight children also suffer social and psychological difficulties as a result of the discrimination and stigmatization associated with the condition (U.S. Department of Health and Human Services, DHHS, 2001). Some children and adolescents are at risk of developing serious psychosocial problems related to being overweight in a society that stigmatizes the condition. Overweight children and youth often experience decreased levels of self-esteem and, as a result,

have increased rates of loneliness, sadness, and nervousness that create a diminished quality of life (Strauss, 2000). Often, the psychosocial burdens associated with overweight continue into adulthood as overweight children are 80% more likely to become overweight or obese adults (Hedley, et al., 2004).

Overweight and obesity also have tremendous economic costs. According to Finkelstein, Fiebelkorn, and Wang (2003), annual medical spending attributable to overweight and obesity now rivals that attributable to smoking which makes obesity the second most costly medical condition in the U.S. The prevalence of overweight and obesity burdens the U.S. economy with direct costs, such as health care costs for preventive, diagnostic and treatment services, and indirect costs, such as lower productivity and foregone future earnings due to illness and premature death. In 2002, $92.6 billion dollars in annual medical spending was nationally attributable to overweight and obesity (Finkelstein, et al, 2003). In 2000, North Carolina's taxpayer costs related to overweight and obesity amounted to nearly $8 billion dollars (NC Department of Health and Human Services, NCDHHS, 2003). U.S. Surgeon General, Dr. Richard H. Carmona, in an address before the Joint Economic Committee of the United States Congress on October 1, 2003, called attention to the growing economic burden of overweight and obesity. In his remarks, Dr. Camona commented that as American waistlines have expanded, so have the economic costs of obesity, now totaling about $93 billion in extra medical expenses per year. Overweight and obese Americans spend $700 more a year on medical bills than those who are not overweight. The human toll associated with obesity is

also costly as 300,000 deaths are associated with obesity each year in the U.S. (Carmona, 2003).

In North Carolina, the numbers are equally alarming. According to Molloy, et al, 2002 (p. 291), "the epidemic of childhood overweight will outstrip medical spending, will affect the majority of the state's population, will lead to more hospitalizations, require more medications and underlie the premature maiming and killing of more people than any other condition currently known." The North Carolina Prevention Report Card (Malloy, et al, 2002) indicates that North Carolina has earned an "F" for both nutrition and physical activity, reflecting how far the state has to go to create system-wide changes that will support a healthy weight among its children and adolescents. Considering that children and teens spend at least seven hours a day in schools, school policies and programs have a large impact on the health patterns of students. Yet, results of the 2000 School Health Policies and Program Study (SHPPS) indicated most school districts did not have policies or programs in place to address student health in schools (Wechsler, Brenner, Keuster and Miller, 2001)

School districts acquire significant funds from the sales of fast foods, *A la Carte* foods and beverages and vending snacks and beverages. These foods and beverages are not required to meet the same nutritional standards as meals served in the National School Lunch and School Breakfast Programs. Despite the fact that most students have the opportunity to select a lunch that meets nutrition standards, many do not do so (Molloy, et al, 2002). Approximately 40% of students in North Carolina eat something besides the school breakfast or

lunch on any given day (Molloy, et al, 2002). Studies have shown that school breakfast and lunch participation is inversely related to weekly revenues from the sale of *A la Carte* foods and beverages (Molloy, et al, 2004 and USDA, 2002). Many students prefer individual food items that are high in fat and sugar, and they purchase such items *A la Carte* in the school cafeteria (Molloy, et al, 2002). Other students select the quickest choice, which is often a snack from vending machines or snack bars. Eating a school lunch often requires standing in long lines as cafeteria facilities have not kept pace with increasing student enrollments (Fox, Crepinsek, Connor, and Battaglia, 2001). Molloy, et al (2002) suggested the school environment in North Carolina's public schools that has allowed students to practice unhealthy eating habits may also provide opportunities for changes to reverse the trend of childhood overweight and help students develop healthy eating patterns.

According to the North Carolina Department of Public Instruction (NCDPI, 2005), there are 115 public school districts in North Carolina. Child Nutrition Directors and Supervisors administer the Child Nutrition Program in each school district or Local Education Agency (LEA). As a result of their administrative and managerial responsibilities, Child Nutrition Directors and Supervisors have key decision-making roles in determining the kinds and amounts of foods and beverages available to children through school meals and snacks (American Dietetic Association, 2003). Child Nutrition Directors and Supervisors also control the kinds and amounts of foods and beverages sold *A la Carte* and in vending machines operated through the Child Nutrition Program. Given their

critical role in determining which foods and beverages are available to children in school breakfast, lunch and snack programs, it was important to investigate the school nutrition environment from the perspective of these decision-makers and to examine current practices in Child Nutrition Programs to make healthful food and beverage choices available to students in school breakfast and lunch programs. Such information may be useful in promoting nutrition integrity in schools and subsequently contributing to the development of a healthier school environment as a means of preventing and possibly reversing the growing epidemic of overweight among North Carolina's school-age children.

Statement of the Problem

Recently, public debate has centered on the relationship between foods and beverages available to children and teens in school and the increase in childhood overweight and obesity. A report issued by the Terry Sanford Institute of Public Policy at Duke University (2004), stated that foods and beverages available in North Carolina's public schools were contributing to a rise in the prevalence of childhood overweight and obesity in the state. While foods and beverages served in conjunction with the National School Lunch Program (NSLP), School Breakfast Programs (SBP) and After School Snack Program (ASSP) are subject to specific nutritional standards, the nutritional content of foods and beverages sold outside the NSLP, SBP and ASSP is not regulated. According to the Institute report, entitled *No Child Left Overweight* (Terry Sanford Institute of Public Policy, Duke University, 2004), less healthful foods and

beverages sold as *A la Carte* items, in vending machines, in school stores and as fund-raisers, are often more profitable for schools and more appealing to students than more healthful ones. As a result, school districts have little incentive to improve the nutritional value of the foods and beverages available during the school day (Terry Sanford Institute of Public Policy, Duke University, 2004).

The National School Lunch Act (NSLA), and its subsequent amendments, authorized the National School Lunch Program (NSLP) in 1946, the School Breakfast Program (SBP) initially as a pilot in 1966 and permanently in 1975, and the After School Snack Program (ASSP) in 1998 (US Department of Agriculture, 2001). These nutrition programs provide subsidized, low-cost or free school meals and snacks to children throughout the U.S. To ensure nutritional quality, regulatory guidelines developed under the NSLA, require schools to include specific serving sizes of foods and beverages such as fruits, vegetables, and milk in school meals and snacks (USDA, 2001). In 1994, Congress amended the National School Lunch Act to include the Healthy Meals for Healthy Children Act (P.L. 103-448, 1994); this Act requires schools to serve meals that adhere to the Dietary Guidelines for Americans, which limits total fat to 30% of calories and saturated fat to 10% of calories. Additionally, school lunch must meet one-third and school breakfast must meet one-fourth of the recommended daily allowance for calories and for nutrients including protein, calcium, iron and Vitamins A and C, and school meals must provide a variety of foods moderate in sugar and salt, and high in fruits, vegetables and whole grains (USDA, 1995).

Research conducted by the United States Department of Agriculture (USDA, 2001) indicates that meals served through the National School Lunch and Breakfast Programs contribute to improved nutrition and eating patterns among children who participate in the programs. From 1979 to 1998 however, student participation in the NSLP declined 4.2% nationally (USDA, 2001). North Carolina's decline in NSLP participation was among the largest in the nation with student participation rates dropping from 83% to 63% percent over the same period of time (Andersen, et al, 2004). The timeline of the decline in North Carolina's NSLP participation parallels the timeline of the evolution of the state's childhood overweight/obesity epidemic.

Under the NSLA, schools may allow the sale of foods and beverages in addition to those served through the federally subsidized school breakfast and lunch programs (USDA, 1996). Child Nutrition programs in North Carolina's public schools sell additional foods and beverages to students as *A la Carte* items (Andersen, et al., 2004). Foods and beverages sold as *A la Carte* items are individually priced and are sold separately from the foods and beverages that are included in the planned, reimbursable school meal that contains all the required meal components. Unlike foods served as part of the NSLP or SBP, *A la Carte* foods and beverages are not regulated by federal nutrition standards (Andersen, et al., 2004).

A 2004 report to Congress from the House Appropriations Committee (House Report 106-619), entitled *Foods Sold in Competition with USDA School Meals Programs,* stated that all food and beverages sold outside of the federally-

funded Child Nutrition Programs (which includes the NSLP, SBP and ASSP) are sold in competition with the school's Child Nutrition Program. According to USDA regulations (Code of Federal Regulations, 7 CFR 210, 220), such foods and beverages are considered to be competitive foods because they compete with a child's ability and/or desire to receive and/or purchase a reimbursable school breakfast or lunch through the Child Nutrition Program. Competitive foods include foods and beverages available as *A la Carte* items in school cafeterias, in vending machines, in school stores, in snack bars, in classroom parties, as items for sale as fund-raisers and as foods used as rewards or incentives by school personnel (Rainville, et al, 2005). Competitive foods are generally higher in fat, sugar, and calories and are lower in nutrient density than foods served as part of the NSLP and SBP (U.S. GAO, 2003). Foods and beverages sold in competition with the NSLP and SBP not only contribute to the decline in participation in these important programs, they also undermine the nutritional and financial integrity of these programs (House Report 106-619). When competitive foods replace school meals and snacks available through the NSLP, SBP and ASSP, nutrient inadequacies and over-consumption of calories may occur (USDA, 2001).

The Optimal School Nutrition Environment

Schools provide an important environment for teaching students about healthful food choices that promote optimal health because they are uniquely positioned to teach, model and reinforce both the healthy eating and physical

activity behaviors that children need to develop healthy lifestyles. Schools have the opportunity to teach about nutrition concepts and healthy eating habits in the classroom and reinforce these concepts in the cafeteria by making healthful food and beverage choices available to students. The optimal school nutrition environment exists when nutrition integrity is at the forefront of decisions made about the availability of foods and beverages available to children in the school cafeteria and other areas of the school campus. Nutrition integrity is defined as a "level of performance that assures all foods and beverages available in schools are consistent with the Dietary Guidelines for Americans, and when combined with nutrition education, physical activity, and a healthful school environment, contributes to enhanced learning and development of lifelong, healthful eating habits" (American Dietetic Association, 2006, p 123). Establishing an optimal nutrition environment on school campuses may promote healthier food choices and potentially prevent and/or reduce the incidence of overweight among children (Action for Healthy Kids, 2004).

Purpose of the Research

The purpose of this research was to explore and describe the current school nutrition environment in North Carolina's public schools. The research questions that guided the study were:

1. What characteristics describe the school environment in general as related to the availability of foods and beverages

to students? Specific characteristics that were explored included:

a. Size of the School District or LEA;

b. Percentage of students that participate in the National School Lunch and School Breakfast Programs;

c. Amount of time students have to eat breakfast and lunch at school;

d. Nutrient analysis of school meals and snacks;

e. Leading *A la Carte* food and beverages sales on school campuses;

f. Financial demands including the sale of *A la Carte* items to generate revenues, the assessment of indirect costs to the Child Nutrition Program and the availability of state matching funds;

g. Competitive foods and beverages, including foods available in vending machines, school stores and as items used as fund-raisers during the school day;

h. Pouring rights contracts with soft drink vendors;

i. Local Board of Education (BOE) policies that address foods and beverages on school campuses;

j. School Health Advisory Councils (SHAC); and

k. Child Nutrition Directors' involvement in decisions concerning the school nutrition environment.

2. What characteristics describe Child Nutrition Directors and Supervisors in North Carolina? Specific characteristics that were explored included:
   a. age;
   b. years of experience;
   c. educational background; and
   d. professional credentials.
3. What perceptions do North Carolina's Child Nutrition Directors and Supervisors have about the school environment and childhood overweight?
4. What practices are being implemented in Child Nutrition programs to make more healthful foods and beverages available to students during the school day?
5. What barriers, if any, may limit the availability of healthful foods and beverages in school breakfast and lunch programs?
6. What, if any, possible strategies may exist to minimize and/or overcome the barriers to making more healthful foods and beverages available within the school breakfast and lunch program?

Definition of Terms

A la Carte – a French phrase meaning "from the menu." The term is used in food service and restaurant establishments and refers to a menu of items priced and ordered separately rather than selected from a list of preset multi-course meals at set prices. In the school meals programs, *A la Carte* foods and beverages are individual foods or beverages sold in the school cafeteria that are not part of the USDA reimbursable meal; *A la Carte* items are not regulated for nutrient content.

After School Snack Program (ASSP) – Federally funded Child Nutrition Program that offers cash reimbursements for serving snacks to children in after school activities aimed at promoting the health and well being of children and youth.

Body Mass Index (BMI) – An index of body weight for height used to classify overweight or obesity in adults. BMI, adjusted for age and gender, is also used to identify children or adolescents who are overweight or at risk for overweight.

Childhood Obesity - A BMI equal to or greater than the 95th percentile of the age-and gender-specific BMI charts of the Centers for Disease Control and Prevention. In most children, such BMI values are known to indicate elevated body fat and to reflect the presence or risk of related diseases. Because of the stigma and discrimination often associated with an obesity diagnosis, the CDC and other federal government organizations avoid the phrase “obese” when categorizing children and adolescents, limiting the definitions to “normal weight”, “at risk of overweight:, and “overweight” (CDC, 2003).

Childhood Overweight – The CDC suggests two levels of childhood overweight: 1) the 85th percentile of BMI is “at risk for overweight”, and 2) the 95th percentile of BMI is “overweight” (CDC, 2003).

Childhood/Children/Adolescent – The term “childhood” refers to both children and adolescents. In general, the term “children” refers to 6 – 11 years of age and “adolescents” to 12 – 17 years of age.

Child Nutrition Director – The individual administratively and programmatically responsible for implementation of the Child Nutrition Programs, including the National School Lunch Program, School Breakfast Program, After School Snack Program, Seamless Summer Feeding Program and/or Special Milk Program within each school district.

Child Nutrition Supervisor – The individual(s) who assists the Child Nutrition Director in administering and implementing the Child Nutrition Programs within the school district or LEA.

Child Nutrition Program - In North Carolina, the Child Nutrition program includes the National School Lunch Program (NSLP), School Breakfast Program (SBP), After School Snack Program (ASSP), Seamless Summer Food Service Program (SSFP) and Special Milk Program (SMP).

Competitive Foods – Foods and beverages which are offered at school, other than meals and snacks served through the federally reimbursed school breakfast, lunch and after school snack programs. Competitive foods also include extra foods and beverages sold as *A la Carte* items (which offer other food items for sale alongside the federally reimbursed school meals).

Competitive foods also include foods sold in snack bars, student stores, vending machines, as fund-raisers and offered to students as rewards for good behavior or good grades. Any food or beverage sold in competition with the National School Lunch Program, School Breakfast Program or After School Snack Program is considered a competitive food.

Local Education Agency (LEA) - an educational agency at the local level that exists primarily to operate elementary, middle and high schools. In North Carolina, the school district is referred to as the LEA.

National School Lunch Program (NSLP) – Program under which participating schools operate a nonprofit school lunch program in local school districts. Children may qualify to receive free or reduced price meals based on family income. Meal costs are subsidized by for children who do qualify for free or reduced price meals.

Nutrition Integrity in Schools – A level of performance that assures all foods and beverages available in schools are consistent with the Dietary Guidelines for Americans, and when combined with nutrition education, physical activity, and a healthful school environment, contributes to enhanced learning and development of lifelong, healthful eating habits.

School Breakfast Program (SBP) – Program under which participating schools operate a nonprofit breakfast program in local school districts. Children may qualify to receive free or reduced price meals based on family income. Meal costs are subsidized by for children who do qualify for free or reduced price meals.

Reimbursable School Meal – Meal that meets specific nutrition requirements as established by federal regulations; reimbursable meals may include breakfast, lunch and after school snacks; such meals qualify for federal cash assistance from USDA.

Assumptions of the Study

A basic assumption of the study is that respondents provided responses that accurately and honestly described the current practices in school meals programs to make more healthful food and beverage choices available to students. Another assumption is that respondents were aware of the barriers that limit the availability of healthful foods and beverages based on their own experiences in administering the school breakfast and lunch programs.

Limitations of the Study

The study is limited by the fact that all information obtained for the study was self-reported by the respondents. Self-reported data contain several potential sources of bias. No actual quantitative measures to document of the availability of healthful foods and/or beverages were obtained.

Summary

Children are becoming overweight at alarming rates in North Carolina and in the nation. Overweight youth are often at risk for developing chronic health problems during childhood and adolescence that may limit their optimal growth

and development. Overweight children are likely to become overweight adults, so their chronic health problems are exacerbated as they mature. The presence of lifetime chronic diseases may affect an individual's quality and length of life.

Overweight children are also at risk for psychosocial problems and poor academic performance. These conditions may impair a child's ability to establish positive self-esteem and self-confidence and may prevent their ability to achieve their academic best. Further, the economic costs of childhood overweight may be devastating to the family's finances as more dollars are diverted to health care costs. The economic costs of childhood overweight may also have an adverse effect on the state and national economy as health care for conditions related to childhood overweight, such as premature cardiovascular disease, type 2 diabetes, stroke and other chronic medical conditions will consume a large portion of local, state and federal budgets.

While schools cannot solve the problem of childhood overweight alone, schools can play a critical role in preventing childhood overweight. Improving and intensifying efforts to promote nutrition integrity in schools is consistent with the fundamental purpose of schools which is to educate young people to become healthy, active, productive citizens who can make meaningful contributions to society. This study explored the current school nutrition environment in North Carolina's public schools. Characteristics of Child Nutrition Directors and Supervisors and the LEAs in which they operate the Child Nutrition Programs were described. The investigation also described the perceptions of Child Nutrition Directors and Supervisors about the school environment and childhood

overweight and assessed current practices to include more healthful foods and beverages in school meals programs. Finally, the investigation identified barriers that may limit the availability of healthful food and beverage choices in schools, and by described multiple strategies to minimize and/or overcome the barriers.

CHAPTER II

Conceptual Framework and Review of Literature

North Carolina is in the midst of an epidemic of childhood overweight. At least 1 in 5 children in the state faces severe health problems in the future as a result of their overweight or obese status (Terrell, 2002). Poor food choices combined with limited physical activity are putting North Carolina's children at great risk of developing chronic diseases which may impact their physical, social, and psychological well-being (Terrell, 2002). Given the rapid growth of the epidemic of childhood overweight, it is imperative to identify possible strategies that may prevent and/or reverse the epidemic and its physical, social, psychosocial and economic consequences (Devlin, 2002). Schools can play an important role in preventing childhood overweight by helping students adopt and maintain healthy eating habits and physical activity behaviors. The purpose of this study was to explore and describe the current school nutrition environment in North Carolina's public schools. The study examined the characteristics of Child Nutrition Directors and Supervisors and the LEAs in which they manage the Child Nutrition Programs. In addition, the perceptions of Child Nutrition Directors and Supervisors about the school environment and childhood overweight were examined. The study also assessed current practices in school breakfast and lunch programs to make more healthful food and beverage choices available to students during the instructional day. Barriers that limit the availability of healthful foods and beverages in Child Nutrition Programs were identified and

possible strategies for minimizing and/or overcoming the barriers, in order to provide an optimal school nutrition environment on school campuses, were described

Conceptual Framework

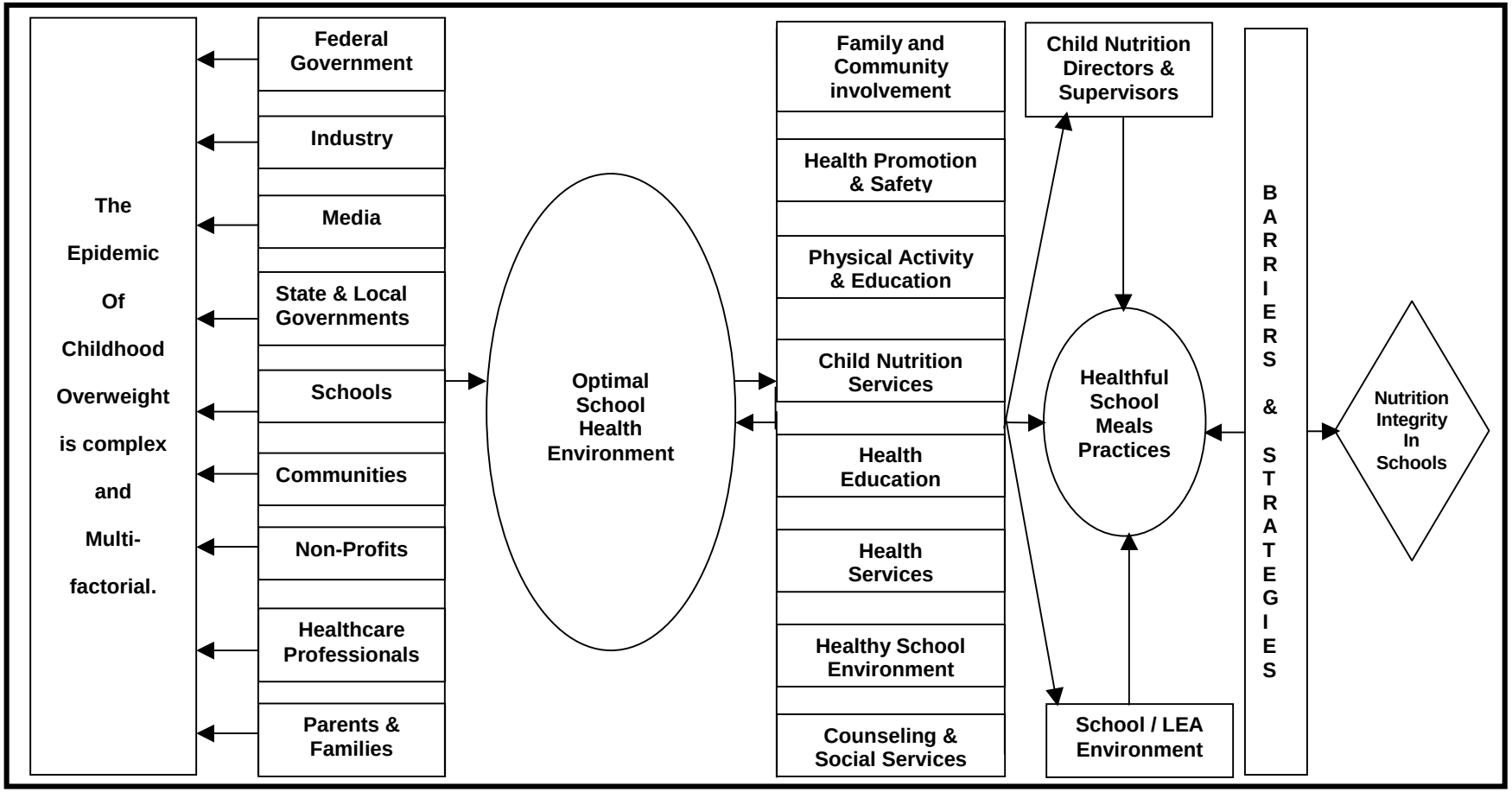
A conceptual model was developed as a framework for the research. The model was developed to conceptualize the complexity of the epidemic of childhood overweight and to demonstrate the multi-factorial approach that will be required to adequately address childhood overweight. The model also demonstrates the linkage between childhood overweight and school nutrition integrity. The conceptual model is shown in Figure 1.

Involvement of key stakeholders in the prevention of childhood overweight

Given the over-arching nature of the issue and the national public health priorities associated childhood overweight, prevention efforts need to be coordinated at the highest federal levels. The federal government must establish national initiatives to adequately address the epidemic and expand funding for prevention and intervention research, experimental behavioral research and community-based population research while strengthening surveillance, monitoring and evaluation efforts of federal programs. In addition, state and local governments should take on a leadership role by raising childhood obesity prevention to a top priority and making sustained commitments to support

Figure 1: Conceptual Framework

Factors influencing the School Nutrition Environment in North Carolina's Public Schools



Addressing the problem of childhood overweight will involve various stakeholders, including the federal government, industry, media, state and local governments, communities, non-profit organizations, healthcare professionals, parents and families. Schools can play a critical role in addressing the epidemic by developing policies that foster an optimal school health environment. As part of the Coordinated School Health Model, Child Nutrition Services are instrumental in developing and implementing optimal school meals practices. Child Nutrition Directors and Supervisors, as critical decision-makers are involved in establishing optimal school meals practices within the LEA. Various conditions within the LEA and/or individual school environment should be identified within the context of establishing an optimal school meal environment. Identifying possible barriers that may limit the availability of healthful foods and beverages in school meals, while simultaneously identifying strategies to overcome the barriers, will be a major step toward creating nutrition integrity in school meals in North Carolina's Public Schools.

policies and programs that match the scale of the problem. State and local governments must expand and promote opportunities for physical activity in the community through changes to ordinances, capital improvement programs and other planning practices. The food and beverage industry must take a key role in developing healthier food and beverage products and packaging innovations while expanding nutrition information to consumers. The media must also be charged with providing clear, consistent messages about healthy lifestyles that promote healthful food choices, physical activity and stress management. Health care professionals must seek reliable, affordable methods for diagnosing and treating overweight and obesity among children and adolescents; prevention must also become a priority for health care insurers. Communities must also actively engage in addressing this epidemic. Mobilizing communities to address childhood obesity will necessitate changes in both the social and built environments and will also require concerted efforts by many partners including citizen groups, community organizations, public health agencies, business, and governments. Interventions through non-profit organizations will also be necessary to adequately ensure that all segments of the population are taking efforts to reduce or eliminate obesogenic conditions. Private and public efforts should coordinate to eliminate health disparities and should support community-based collaborative programs. Parents and families play a critical role in preventing childhood overweight. Parents have a profound influence on children by promoting certain values and attitudes, by rewarding or reinforcing specific behaviors, and by serving as role models. Schools are one of the primary

locations for reaching the nation's children and youth. Research suggests that children today are spending more of their time away from home in school, after-school programs and day care. Both inside and outside the classroom, schools present opportunities for students to learn about healthful eating habits and regular physical activity, engage in physical education, and make food and physical activity choices during school meal time and through school-related activities. Ultimately, schools should provide a consistent environment that is conducive to healthful eating behaviors and regular physical activity.

Optimal school health environment

The optimal school health environment exists when schools focus on the complete physical, emotional, intellectual, and social well-being of students and staff. An optimal school health environment is governed by an organized set of policies, procedures, and activities designed to promote and protect the health, safety, and well-being of students and staff. There is a growing acknowledgment that children's health status directly affects their ability to learn and achieve academically. It is difficult for children to be successful if they are tired, hungry, stressed, using drugs or alcohol, or being abused. Coordinated school health is a way to improve children's health and remove barriers to learning. The coordinated school health model includes the following eight key components.

1. Health Education: A planned, sequential, K-12 curriculum that addresses the physical, mental, emotional and social dimensions of health. The curriculum is designed to motivate and assist students to maintain and improve

their health, prevent disease, and reduce health-related risk behaviors. It allows students to develop and demonstrate health-related knowledge, attitudes, skills, and behaviors.

2. Physical Education: A planned, sequential K-12 curriculum that provides content and learning experiences in a variety of activity areas such as basic movement skills; physical fitness; games; team, dual, and individual sports; tumbling and gymnastics; and aquatics. Quality physical education should promote each student's optimum physical, mental, emotional, and social development.

3. Health Services: Services provided for students to appraise, protect, and promote health. These services are designed to ensure access or referral to primary health care services or both, foster appropriate use of primary health care services, prevent and control communicable disease and other health problems, provide emergency care for illness or injury, promote and provide optimum sanitary conditions for a safe school facility and school environment.

4. Counseling and Psychological Services: Services provided to improve students' mental, emotional, and social health. These services include individual and group assessments, interventions, and referrals. Organizational assessment and consultation skills of counselors and psychologists contribute not only to the health of students but also to the health of the school environment.

5. Healthy School Environment: The physical and aesthetic surroundings and the psychosocial climate and culture of the school. Factors that influence the physical environment include the school building and the area surrounding it, any

biological or chemical agents that are detrimental to health, and physical conditions such as temperature, noise, and lighting.

6. Health Promotion for Staff: Opportunities for school staff to improve their health status through activities such as health assessments, health education and health-related fitness activities. These opportunities encourage school staff to pursue a healthy lifestyle that contributes to their improved health status, improved morale, and a greater personal commitment to the school's overall coordinated health program.

7. Family/Community Involvement: An integrated school, parent, and community approach for enhancing the health and well-being of students. School health advisory councils, coalitions, and broadly based constituencies for school health can build support for school health program efforts.

8. Child Nutrition Services: Access to a variety of nutritious and appealing meals that accommodate the health and nutrition needs of all students. School nutrition programs reflect the U.S. Dietary Guidelines for Americans and other criteria to achieve school nutrition integrity. The school nutrition services offer students a learning laboratory for classroom nutrition and health education, and serve as a resource for linkages with nutrition-related community services.

Child Nutrition Directors and Supervisors as Decision-Makers

Each school district in North Carolina employs a Child Nutrition Director to administer the federally-funded Child Nutrition programs in elementary, middle and high schools within the district. In medium and large school districts, Child

Nutrition Supervisors are employed to assist the Director in the administration of the program. In extremely large school districts (greater than 40,000 students), the Child Nutrition staff consists of an Executive Director, that has administrative oversight of the Child Nutrition programs, a Director that performs various other administrative functions and a team of Child Nutrition Supervisors that work directly with the elementary, middle and high schools.

While the State Board of Education does not require Child Nutrition Directors and Supervisors to be nationally certified, they do strongly encourage local boards of education to select candidates for these roles who meet national certification criteria. Such criteria include completion of a Bachelors Degree in a subject related to administration of nutrition programs and advanced degrees in an area related to nutrition programs management. Local boards of education are also encouraged to select candidates that have specialized professional credentials such as Registered Dietitian (R.D.) or School Food and Nutrition Specialist (SFNS). These credentials are earned by advanced coursework in the area of study and through national board examinations.

LEA/School Environment

There are two primary organizational factors within the school district or LEA that should be considered within the context of the school nutrition environment. These organizational factors include the demographics of the district and the establishment of local school board policies related to Child Nutrition programs. Demographically, the size of a school district often

determines the educational resources available the district. There are currently 115 school districts in North Carolina. Seven school districts have student enrollments that exceed 40,000; 16 school districts have student enrollments between 20,000 and 39,999; 48 school districts have student enrollments between 10,000 and 19,999 students; the remaining school districts have student enrollments of fewer than 10,000 (NCDPI, 2005).

The size of the Child Nutrition staff is often determined by the number of students enrolled in the school district; therefore, larger school districts generally have larger Child Nutrition staffs to administer and monitor the Child Nutrition Programs. The size of the Child Nutrition staff is generally a reflection of the Child Nutrition Program's ability to effectively and efficiently administer and monitor the school breakfast and lunch programs.

Local Boards of Education have the authority to establish local policies that influence the school district's day-to-day operations. These policies may also influence the school nutrition environment. Local policies that may have the greatest influence the healthfulness of the school meal environment include policies that address the sale of competitive foods and soft drinks during the instructional day and policies that establish minimum nutrition standards for foods available on the school campus. The presence of a School Health Advisory Council, as required in the Healthy Active Children Policy adopted by the State Board of Education, and the involvement of the Child Nutrition Staff in the Council may further influence the school meals environment; many School Health Advisory Councils have established guidelines for an optimal school

health environment which may preclude the sale of less nutritious foods during the instructional day.

Another organizational factor that may influence the school meals environment includes the amount of administrative and financial support provided to the Child Nutrition Program by the school district, The availability of a healthful school meals environment may also be influenced by the percentage of students who qualify to receive free or reduced-price meals, as these meals receive maximum reimbursement from USDA and are a source of predictable revenue for the Child Nutrition Program. The type of Menu Planning method adopted by the school district may also influence the school meals environment. Some meal planning methods require the school district to document minimum nutrition standards required by USDA.

Child Nutrition Director's and Supervisor's Perceptions of the School Environment and Childhood Overweight

Child Nutrition Directors and Supervisors are in key positions to determine the nutritional quality of foods served in the school district's Child Nutrition programs including school breakfast, lunch and after-school snack programs. As a result, the Child Nutrition Director's and/or Supervisor's perception may contribute to the kinds of foods and beverages available in school meals. For example, if the Child Nutrition Director or Supervisor perceives a relationship between foods available in Child Nutrition Programs and the prevalence of childhood overweight, they may be more inclined to implement a limit on the availability of less healthful foods and increase the availability of more healthful

foods and beverages. This perception may be reflected in the current practices of the school district to enhance the nutritional integrity of school meals and include practices aimed at limiting fat, saturated fat, and cholesterol, limiting refined sugar, increasing fiber and including foods that are nutrient dense and calorically appropriate for students' ages.

Barriers that May limit the Availability of Healthful Foods and Beverages

Several barriers that may limit the availability of healthful foods and beverages in school meals have been identified by school administrators, teachers, parents, Child Nutrition personnel and other school personnel through focus groups. The leading barriers that may influence the school nutrition environment include: school financial management practices that require Child Nutrition programs to produce revenues for the school district; lack of Administrative support for a healthful school meal environment; failure to recognize school meals as part of the school district's obligation to promote the well-being of the whole child; limited time and/or space for students to eat school meals; little or no nutrition education in the classroom to influence children's eating habits; and conflicting messages within the school environment. Students' preferences for less healthful foods coupled with parents' desire for their children to exercise their right to choose any foods they desire during the school day may also be barriers to the availability of healthful foods and beverages.

Strategies to Overcome Barriers

One outcome of this study was the identification of specific strategies to minimize and/or overcome the barriers listed in the previous section on the school meals environment. Many of these strategies, if implemented at the federal, state and/or local levels, may allow progress towards the development of an optimal school meals environment which is reflected in meals and snacks that adhere to the School Meal Initiative (SMI), 2005 Dietary Guidelines for Americans, adherence to the state's recommended nutrition standards and adherence to the State Board of Education's future policies on Healthful School Meals. A conceptual framework depicting the framework that guided the research study is shown in Figure 1.

Prevalence of Childhood Overweight

According to the Centers for Disease Control and Prevention (CDC, 2003), nearly 66% of adults in the U.S. are overweight or obese. The problem among children and adolescents is similar, but it is increasing at a faster rate. Over 15% of school-age children in the U.S. are overweight; there are almost twice as many overweight children and three times as many overweight teens in 2004 as there were two decades ago (Wechsler, et al., 2004). Data from the 1999 – 2000 National Health and Nutrition Examination Survey (NHANES) show the percentage of overweight among children ages six to eleven tripled between 1965 and 1999, from four percent to thirteen percent. For older children ages 12 to 19 years of age, rates of overweight increased from 5% in 1970 to 14% in

1999 (Ogden, Flegal Carroll, and Johnson, 2002). The rates of overweight among preschool children have also escalated in the past decade. In 2000, over 10% of children between the ages of two to five were overweight (Ogden, Toriano, Breifel Kuczmarski, Flegal and Johnson, 1997). Since 1980, childhood overweight has escalated to the point that the condition is the most prevalent nutritional problem facing children and adolescents and is now placing the health of the nation's youth at risk (Deitz and Klish, 2001, Institute of Medicine, 2005).

The prevalence of childhood overweight in North Carolina is even higher. Twenty-six percent of children ages 12 to 18 years of age are overweight (Terrell, 2002). Among children five to eleven years of age, 21% are overweight, and among young children two to four years of age, more than 13% are overweight (Terrell, 2002).

Minorities are disproportionately affected by overweight and obesity. Studies pertaining to childhood overweight consistently report a higher prevalence of overweight in African Americans and Mexican Americans compared with the white, non-Hispanic population (Birch and Fisher, 1998; Harris and Smith, 1983). The highest percentage of overweight exists among Mexican American boys and African American and Mexican American girls (Rosner, Prineas, Loggie and Daniels, 1998). Data from the National Health and Nutrition Examination Survey II (NHANES II, 1999 - 2000) indicate 23.6% of non-Hispanic blacks and 23% of Mexican American adolescents were overweight, which is nearly double from the 13.4% and 13.8% respectively over the past decade.

The Influence of Dietary Habits on Childhood Overweight

The causes of childhood overweight are complex and multifaceted. Overweight and obesity are chronic conditions that develop when energy intake exceeds energy expenditure, resulting in excess body weight. There are multiple etiologies for this energy imbalance which has led researchers to conclude that the rising prevalence of childhood overweight and obesity cannot be addressed by a singe etiology (Dehghan, Akhtar-Danesh and Merchant, 2005). For each individual, body weight is determined by a combination of factors including genetic, hormonal, metabolic, environmental and behavioral factors including physical activity and dietary habits. Among these factors, dietary habits have been reported as a leading contributor to childhood overweight (Center for Weight and Health, 2001).

U. S. dietary patterns have changed tremendously over the past few decades. Food has become more affordable to larger numbers of people as the price of food has decreased substantially relative to income. The concept of food has changed from a means of nourishment to a marker of lifestyle and a source of pleasure (Dehghan et al., 2005). Over-nutrition has replaced malnutrition or under-nutrition as the largest nutrition-related problem facing children and adults (CDC, 2003). Although the percent of calories from total fat has declined over the past 30 years, total calories have increased. Between 1989 and 1996, children's caloric intake increased by approximately 80 to 230 extra calories per day (USDA, 2001).

The increase in children's caloric intake is attributable to several factors. Among these factors is the amount of food eaten away from home. Recent research (Bowman, Gortmaker, Ebbeling, Rereira and Ludwig, 2004) suggests food eaten away from home tends to be higher in total fat, saturated fat and sodium, and lower in fiber. In addition, when people eat meals away from home, they are more likely to eat more foods and in larger portions. (Bowman, et al, 2004). According to Paeratakul, Ferdinand, Champagne, Ryan and Bray (2003), approximately 25% of total food spending in 1978 occurred in restaurants. By 1995, 40% of food dollars were spent away from home (Paeratakul, et al, 2003). During the same period of time, the percentage of children's meals and snacks eaten away from home increased from 16% to 30% (USDA, 1996). By 2002, the percentage of meals eaten away from home increased to 46% (USDA, 2003). When meals are eaten outside the home, children consume more calories, likely due to the large portion sizes provided in most eating establishments. Food eaten away from home constitutes twenty 20% of total energy intake in young children; among older children, 6 to 19 years of age, outside food consumption constitutes 66% of total caloric intake (USDA, 1996). According to Zoumas-Morse, Rock, Sobo and Neuhouser (2001), children eat nearly twice as many calories (770 calories) in restaurants as they do during a meal at home (420 calories). When families regularly sit down together for a shared meal in the home, children consume fewer fried foods and more fruits and vegetables and generally, the overall nutritional quality of the meal is improved over meals eaten

away from home (Gillman, Rifas-Shiman and Frazier, Rockett, Camargo, Field, Berkey, and Colditz, 2000).

One of the most remarkable changes in children's dietary intake has been the consumption of fast food. The number of fast food restaurants is growing at a rapid rate. Between 1970 and 1980, the number of fast food outlets in the U.S. increased from about 30,000 to 140,000 and sales of fast foods increased by about 300% (Paeratakul, et al, 2003). American's spending on fast food increased from $6 billion to $110 billion over the last 30 years (Schlosser, 2001). The percentage of food consumed by children in fast food outlets nearly tripled between 1977 and 1996. American children have transitioned from eating approximately 7% of their meals as fast food meals in 1970 to 30% in the 1990s (Ebbeling, et al, 2002). On average, children ages 11 – 18 have been reported to eat at fast food restaurants at least three times per week (Paeratakul, et al, 2003). According to Ebbeling et al, (2002) the pattern of eating in fast food restaurants has led to an increase in the calories consumed by children and a decrease in the nutritional quality of their diets including a diet that is high in saturated fat, low in fiber, low in micronutrients and low in antioxidants. When children and teens eat fast food, they consume more total fat, carbohydrates, added sugars and sugar sweetened beverages; they also consume less milk and fewer fruits and non-starchy vegetables (Bowman, et al, 2004). A typical fast food meal contains 2,000 calories and 84 grams of fat; a single fast food meal meets the daily calorie and fat requirements for most children (Paeratakul, et al, 2003).

While a substantial percentage of food eaten away from home comes from fast food restaurants, food and beverages consumed at school represents another major source of calories for school age children. Studies consistently show that for many children, meals and snacks consumed at school make a major contribution to many children's total daily consumption of food and nutrients (Gleason and Suitor, 2001). Meals provided through the National School Lunch Program (NSLP) and School Breakfast Program (SBP) are required, by law, to be balanced and nutritious. Despite the many nutritional benefits of school meals, some items offered in conjunction with school meals have been shown to exceed the recommended dietary guidelines for total fat and saturated fat as a percentage of food energy (Burghardt, 1995). Foods and beverages sold to children on school campuses that are not part of the NSLP or SBP are exempt from dietary guidelines and other nutrition standards. Consequently, these foods are usually higher in calories, fat and sugar and lower in nutrients than foods available through the Child Nutrition program (USDA, 2001).

Another change that has occurred regarding children's dietary habits that may affect weight gain is the prevalence of large food and beverage portion sizes. Portion size is the amount of food one chooses to eat; there are no standards for portion sizes (USDA, 2002). A serving size is a standard amount that gives guidance about how much to eat or identifies how many calories and nutrients are in a particular quantity of food (USDA, 2002). The introduction of larger-size portions in away-from-home and marketplace foods has increased

significantly (Young and Nestle, 2003). According to Nicklas, Baranowski, Cullen and Berenson (2001), when first introduced in to the marketplace, bagels weighed between two to three ounces; the size has increased to between four to seven ounces. The eight-ounce soft drink has become 20-ounces and the average theater serving of popcorn has gone from three cups to 16 cups. A typical hamburger in 1957 contained a little more than one ounce of cooked meat compared to as much as six ounces in 1997 (Nicklas, et. al, 2001). The trend toward larger portion sizes has been most evident in restaurants and fast food outlets, but is also significant in homes. One example is observed in recipes used at home. Newer editions of classic cookbooks such as *The Joy of Cooking,* contain recipes identical to earlier versions, but yield fewer servings and therefore, larger portions than before (Nielsen and Popkin, 2003). Young and Nestle (2003) compared current food portion sizes to the same products when they were first released into the marketplace. Foods included in the comparison included children's and adolescents favorites such as pizza, hamburgers, soda, French fries, and pasta. In general, most marketplace portions were at least twice the standard serving sizes, and portions offered by fast-food chains were often two to five times larger than the original size (Young and Nestle, 2003).

Children's increased caloric intake is also influenced by the increased availability of foods and beverages in schools that are high in added sugars like soft drinks and snack foods (USDA, 2002). The number of calories children consume from snack foods increased by 30% between 1977 and 1996 (Jahns, Siega-Riz, and Popkin, 2001). Studies have shown that consumption of

sweetened beverages, including soft drinks, sports drinks, juice, sweetened juice drinks and sweetened iced teas, many of which are available on school campuses, is associated with childhood overweight (Subar, Krebs-Smith, Cook, and Kahle, 1998; Harnack, Stang and Story, 1999; Ebbeling, 2002). Children who drink soft drinks consume 55 to 190 additional calories per day than children who do not drink soft drinks (Ebbeling et. al, 2002). A study conducted by the Harvard School of Public Health found that for each additional can or glass of soda or juice drink a child consumed per day, the child's chance of becoming overweight increased by 60% (Harnack et.al., 1999).

According to the Continuing Survey of Food Intakes by Individuals (CSFII), soft drinks were the sixth leading food source of energy and the second leading food source of carbohydrate among U.S. children age two to eighteen years (Subar, et al, 1998). Data from NHANES III for the period of 1988 – 1994 (CDC, 1996) corroborated this finding; NHANES III data revealed soft drinks were the major beverage contributor of calories among adolescents, providing nearly 10% of total energy.

Consumption of soft drinks and other sweetened beverages have begun to displace healthier foods from children's diets like low-fat or skim milk which are lower in calories than most sweetened beverages (Harnak, et al, 1999). This trend has been observed among young children as soft drink consumption increased by 23%, while fluid milk consumption decreased by 16% between 1979 and 1990 (USDA, 1996).

Direct associations have been observed between children's diets and the incidence of childhood overweight. Diets low in fruits and vegetables have been associated with childhood overweight (Ennis, et al, 2002). It is estimated that only 30% of children meet the goals for daily intake of grains, fruits and vegetables (Ennis, et al, 2002). Further, discretionary fat and added sugars represent 40% of the energy intake of 2 to 17 year olds (Ennis, et al, 2002). The high percentage of fat and sugar in the diets of children is associated with the incidence of childhood overweight.

Of all food groups, children are most likely to have a low consumption of vegetables (Kennedy and Powell, 1997). Although vegetable consumption appears to level off as children become adolescents, the most popular vegetable choices are often the least nutritious and most calorie dense. According to USDA (2001), the most widely consumed vegetables by children and adolescents include potatoes (including French fries and potato chips), followed by tomato products (including catsup and spaghetti-type sauces). The diets of children are extremely low in nutrient-rich dark green and deep yellow vegetables (USDA, 1996). However, it has been shown that when fruits and vegetables are added to the diets of children and adolescents, dietary fat and total calorie intake tends to decrease (Kennedy, Bowman, Spence, Freedman and King, 2001).

Many children, particularly adolescents, skip breakfast and other meals and eat more food later in the day (Siega-Riz, Popkin and Carson 1998). Overweight children and adolescents are more likely to skip breakfast and consume a few large meals or snacks per day than their non-overweight

counterparts who are more likely to consume smaller, more frequent meals. Data from the Child and Adolescent Trial for Cardiovascular Health (CATCH) Study, indicate that African American and Mexican American adolescents were more likely to skip breakfast than Caucasian adolescents (Hoelscher, Mitchell, Dwyer, Elder, Clesi, and Snyder, 2003). Data from the CATCH Study indicated meal skipping was more common among African Americans, older adolescents and children from single parent households.

Even when they consume breakfast, overweight children have been reported to eat smaller breakfasts than their non-overweight peers. According to Dwyer (2001), eating breakfast reduces fat intake and limits snacking over the remainder of the day. In a study of 7 to 11 year old children, Maffeis, Provera, Filippi, Sidoti, Schena, Pinelli and Tato (2000) found that while diet composition was not related to adiposity, the distribution of energy intake among the different meals was related to adiposity. Specifically, the higher proportion of energy intake at the dinner meal was associated with greater adiposity.

Overweight children are known to eat faster than non-overweight children (Birch, 1998). This problem has been exacerbated in recent years by shortened school breakfast and lunch times in schools. The problem of rapid eating is also present in homes were meals are not structured or are rushed in order to fit with busy lifestyles.

Paradoxically, moderate to mild food insecurity may play a role in the etiology of overweight among children. Nationwide, approximately five percent of all households with children and nearly 80% of low-income families have been

reported to experience food insecurity (Casey, 2001). In North Carolina, over 48% of all students that attend public schools qualify for free or reduced price meals at school (NC DPI, 2005). According to Olson, C.(1999) children who are eligible for federal food assistance programs may experience some degree of food insecurity at some time. Food deprivation, either in the form of starvation or self-imposed dieting, appears to result in preoccupation with food and eating binges once food is again available (Olson, 1999). Dietz (1995) and Olson (1999) hypothesized that cyclical food shortages may increase reliance on high fat or empty calorie foods, resulting in weight gain over time. An increased reliance on high fat and/or empty calorie foods may represent a strategy to cope with limited finances as such foods are often less expensive. Food insecurity has also been associated with a low intake of nutrient dense, low calorie foods such as fruits and vegetables (Olson, 1999).

Health Consequences of Childhood Overweight

Opinions concerning overweight and obesity have shifted in recent years. Overweight and obesity have generally been considered cosmetic problems. However, medical experts recognize that childhood overweight is not simply an aesthetic problem; instead childhood overweight is a medical condition that, if left untreated, can result in serious co-morbidities and severe medical and psychosocial consequences for children. Recent research suggests that if childhood overweight and obesity continue to increase, these conditions could cut two to five years from the average lifespan causing the current generation of

children to become the first in American history to live shorter lives than their parents (Institute of Medicine, 2005).

Compared to normal-weight children, overweight children are more likely to develop early risk factors for various chronic diseases. Among the most common risk factors associated with childhood overweight and obesity are hypertension, hyperlipidemia, insulin-resistance syndrome, pulmonary complications including asthma and sleep apnea, digestive and orthopedic problems (Freedman, et al, 1999). Many of the risk factors associated with childhood overweight contribute to the development of chronic diseases including cardiovascular disease, stroke and type 2 diabetes which are among the leading causes of death and disability in North Carolina.

Once considered rare, hypertension in children has become increasingly common in association with childhood overweight. Overweight children are at a three-fold higher risk for hypertension than children of normal weight (Sorof and Daniels, 2002). Almost 60% of children with elevated blood pressure have relative weights greater than 120% of the median for their sex, height and age. In a study of 6,600 school children ages 5 to 18 years, persistently elevated blood pressure occurred nine times more frequently among those who were obese (Rames, Clarke, Connor, Reiter and Lauer, 1978). Possible consequences of hypertension in children include hypertensive heart disease, stroke and cerebral hemorrhage.

One of the most common conditions associated with childhood overweight is type 2 diabetes mellitus, formerly termed “adult-onset diabetes” (Institute of

Medicine, 2005). Although once virtually nonexistent in adolescents, the American Diabetes Association (2000) reports that type 2 diabetes now accounts for 8% to 45% of newly diagnosed cases of diabetes in children and adolescents, especially minority youth . Due to the rapidly rising rates of diabetes in children and adolescents, type 2 diabetes can no longer be called “adult onset” diabetes.

In an ex-post facto study, the incidence of type 2 diabetes in adolescents was shown to have increased ten-fold between 1982 and 1994 as a result of the increase in childhood overweight (Pinhas-Hamiel, Dolan, Daniels, Standidford, Khoury, and Zeitler, 1996). Rates of diabetes are rising so rapidly that it is estimated for babies born in 2000, barring major changes in diet and lifestyle, the lifetime risk of developing diabetes is 33% for males and 40% for females. Among Hispanics, the risks are even greater; 45% of males and 53% of females born in 2000 will develop type 2 diabetes in their lifetimes. (Narayan, Boyle, Thompson, Sorenson, and Williamson, 2003). These predictions are particularly alarming given that diabetes has no known cure, impairs quality of life, and requires expensive and extensive medical care over many years to adequately manage the disease.

Hyperlipidemia, or increased blood lipids, is common among overweight children and adolescents. The pattern of hyperlipidemia observed in overweight children consists of elevated total cholesterol, serum low-density lipoprotein (LDL) cholesterol and triglycerides and lowered high-density lipoprotein (HDL) levels (Deitz, 1998). Data from the Bogalusa Heart Study indicate that 90% of overweight children had elevated triglyceride levels (Nicklas, et al., 1996). The

prevalence of hyperlipidemia increases a child's or adolescent's risk for cardiovascular disease and premature death in adulthood.

Insulin-resistance syndrome (IRS), also known as metabolic syndrome, has begun to emerge in overweight and obese children. IRS consists of three primary risk factors, hyperinsulinemia, hypertension and hyperlipidemia, in the presence of excess adiposity (de Ferranti, Gauvreau, Ludwig, Neufeld, Newburger, and Rifai, (2004)). These risk factors are typically associated with middle age adults. According to de Ferranti et al, (2004), about two-thirds of adolescents in the U.S. already have at least one of these risk factors. In a recent study of 2,000 children aged 12 to 19, one in three were diagnosed with insulin resistance syndrome; one in ten children had three or more of risk factors associated with insulin-resistance syndrome (de Ferranti, et al., 2004). Children and adolescents with metabolic syndrome are at very high risk for developing diabetes, heart disease, and atherosclerotic disease.

Childhood overweight has also been shown to be related to increases in childhood pulmonary complications including sleep apnea, asthma and exercise intolerance (Ebbeling et al., 2002). Obstructive sleep apnea is a breathing disorder characterized by episodes of stopped breathing during sleep. Loud snoring, mouth breathing, frequent awakening, daytime sleepiness and hyperactive behavior in children are all symptoms of sleep apnea. Consequences of untreated sleep apnea include attention-deficit disorder, behavior problems, poor academic performance and cardiopulmonary disease (Ebbeling, et al, 2002). In a study of nearly 300 children, one-third of children

whose body weight was greater than 150% of ideal body weight were found to have sleep apnea (Mallory, Fiser, and Jackson, 1989). Studies suggest that sleep apnea occurs in approximately 17% of obese children and adolescents, and that many of these children are academically compromised as a result of being unable to stay awake during school hours (Chan, Edman, Koltai, 2004).

Asthma and exercise intolerance can have a compounding effect in childhood obesity by limiting physical activity and causing further weight gain. Gennuso, Epstein, Paluch and Cerny (1998) examined the relationship between obesity and asthma in asthmatic and non-asthmatic children and found 30% more children with asthma were severely overweight (greater than 95th BMI percentile) compared to only 11% with asthma who were not overweight. Children with asthma were also found to be significantly more overweight than non-asthmatics. Digestive problems are increasingly being diagnosed among overweight children and adolescents**.** Cholelithiasis, or the presence of stones in the gallbladder, typically occurs with more frequency in obese adults compared with other adults. Although gallstones occur less frequently among children and adolescents who are overweight than obese adults, nearly 50% of the cases of cholecystitis in adolescents may be associated with overweight (Crichlow, Seltzer and Jannetta, 1972).

Orthopedic complications also accompany childhood overweight. Tensile strength of bone and cartilage does not evolve to carry substantial quantities of excess weight (Deitz, 1988). Consequently, excess weight in young children can lead to bowing of the tibia and femur (Deitz, 1988). In addition, increased weight

can cause the epiphysis, or cartilage plate, at the top of a child's femur to slip out of place causing a condition known as slipped capital femoral epiphysis (Deitz, 1988).

Overweight children and adolescents have an increased risk of becoming overweight or obese adults. Over 50% of overweight children and teens remain overweight as adults (Deitz, 1998). The correlation between childhood and adult overweight and obesity has established the next generation to be more at risk for chronic, debilitating diseases than past generations. According to the Centers for Disease Control and Prevention (2003), the epidemic of childhood overweight has positioned the current generation of children and teens for a life-expectancy that is shorter than their parents.

In addition to medical conditions, being overweight has serious and persistent psychosocial consequences for children as well. Evidence from experimental and longitudinal cohort studies shows that overweight children are likely to suffer from psychological problems (Strauss, 2000; Harris and Smith, 1983; French, Story and Perry, 1995 and Dietz, 1998). Strauss (2000) reported that the likelihood of an overweight or obese child or adolescent having impaired health-related quality of life was 5.5 times greater than a healthy child or adolescent. Overweight children become targets of early and systematic discrimination which increases their risk for low self-esteem and poor body image (Strauss, 2000). As they mature, the effects of discrimination become more culture-bound and insidious. Children as young as five years old perceive overweight as undesirable (Feldman, 1988). According to Harris and Smith,

(1983), children identified thin body types as having more friends, being better looking, smarter and neater that large body types. Preference tests have demonstrated that 10 to 11 year old boys and girls prefer to have friends with children with a wide variety of disabilities as opposed to children who are overweight (Richardson, Goodman and Hastorf, 1961). Overweight children are ranked lowest as those with whom they would like to be friends. Furthermore, children ranging in age from six to ten years already associate obesity with a variety of negative characteristics such as laziness and sloppiness (Staffieri, 1967).

It has been observed that by six years of age, children have picked up societal messages that overweight is undesirable, and overweight children may encounter rejection and become socially isolated, or they may develop a distorted body image (Gortmaker, Must, Perrin and Dietz, 1993). The social burden of obesity affects educational achievement and interpersonal relationships. Recent research has shown poorer outcomes for overweight and obese boys than for girls (Wake, Salmon and Waters, 2000). Feelings of low-self-esteem, depression and adverse socialization have been reported among overweight teens (Strauss, 2000; Dietz, 1998 and French, Story and Perry, 1995). Overweight adolescents have been found to suffer more emotional problems and consider themselves to be poorer students compared to adolescents of normal weight (Falkner, Neumark-Sztainer, Story, Jeffery, beuhring and Resnick, 2001). Must and Strauss (1999) reviewed the literature pertaining to the consequences of pediatric overweight and concluded that few problems in childhood may have

as significant an impact on childhood emotional development as being overweight. Severely overweight children and adolescents report impaired quality of life at six times the rate of normal weight children. The self-reported quality of life scores of overweight children are disturbing. Schwimmer, Burwinkle and Varni (2003) discovered that quality of life scores of overweight children are lower than the quality of life scores reported by children diagnosed with cancer and undergoing chemotherapy. Clearly, obese children have an increased risk of psychosocial and psychological problems that can persist into adulthood.

Economic Costs of Childhood Overweight

The prevalence of overweight and obesity has significant implications for both individuals and the American public; it is a public health concern that affects economic productivity, federal, state and local budgets as well as personal family well being. Poor diet and physical inactivity are estimated to contribute to 300,000 deaths annually and in the United States are likely to overtake smoking as the nation's leading cause of preventable death in the next several years (Mokdad, Marks, Stroup, and Gerberding, 2004). Overweight individuals, both adults and children, are at increased risk for chronic diseases which require costly treatments and ultimately place a tremendous strain on the U.S. health care system and its financial resources. According to Sturm (2002), overweight and obese individuals expend personal income on health care costs at a rate significantly higher than other Americans, even higher than smokers and

excessive drinkers. Estimates of annual medical expenditures caused by overweight and obesity vary. Finkelstein, et al, (2003) estimate the total U.S. annual medical costs of overweight and obesity at $93 billion annually. Wolf and Colditz (1998) reported overweight and obesity account for an estimated 31% of the total direct costs of 15 co-morbid diseases. The U.S. Surgeon General, in measuring both direct medical expenditures, including costs of diagnosis, prevention, and treatment of obesity and related diseases, as well as indirect costs, including the costs of lost wages due to sickness or disability as well as the value of future wages lost due to premature death, estimated the annual cost of obesity in the United States at one $117 billion dollars (US Department of Health and Human Services, 2001). Pediatric hospital costs due to obesity also tripled from 1979 to 1999 (Wang and Dietz, 2002).

A recent study focused on state-level estimates of total, Medicare and Medicaid obesity attributable to medical expenditures (Finkelstein, Fiebelkorn and Wang, 2004). Researchers used the 1998 Medical Expenditure Panel Survey (MEPS) linked to the 1996 and 1997 National Health Interview Surveys (NHIS), and three years of data (1998 – 2000) from the Behavioral Risk Factor Surveillance System (BRFSS) to predict annual state-level estimates of medical expenditures attributable to obesity. The data from these expenditures indicate that states are paying heavily for obesity and its care. The estimated obesity-attributable expenditures for North Carolina are $341 million dollars for the Medicare population; $269 million dollars for the Medicaid population and $320 million dollars for the remaining population (National Governor's Association,

2002). A recent report issued by North Carolina's Health and Wellness Trust Fund Commission (HWTFC), estimates that obesity-related medical expenses in North Carolina cost state taxpayers more than $2 billion dollars annually (HWTFC, 2005) . Cumulatively, state-level estimates of medical costs of obesity alone placed them cumulatively at $75 billion dollars annually. Of this amount, the researchers note that the government and ultimately the taxpayer are responsible for financing about half or $39 billion dollars (Finkelstein et al., 2004).

Approximately 80% percent of Americans believe that adult obesity is a major problem and three-quarters of Americans are similarly concerned about childhood overweight. There is general agreement among experts that prevention of childhood overweight is easier and more cost-effective than treatment. In order to prevent childhood and adolescent overweight, healthful behaviors must be introduced, modeled and reinforced early in childhood (National Institute for Health Care Management (NIHCM), 2003).

Nutritional Adequacy of Children's and Adolescent's Diets

Several longitudinal and cross-sectional studies have investigated the dietary intake and food consumption patterns of children and adolescents over the past three decades (Nicklas, Forcier, Farris, Hunter, Webber and Berenson, 1989; Nicklas, 1995; Lytle, Ebzery, Nicklas, Montgomery, Zive, Evans, Snyder, Nichaman, Kelder, Reed, Busch, and Mitchell, 1996; Harris, Paine-Andrews, Richter, Lewis, Johnston, James, Henke and Fawcett, 1997). One of these studies, the Bogalusa Heart Study, is a long-term, epidemiologic investigation of

early cardiovascular disease in a biracial community in Louisiana. The population of Bogalusa Heart Study was comprised of children ages six months to seventeen years of age; 65% of the children were white; 35% were black. Fifty percent of the study participants were male and 50% percent were female. Participants have been studied since 1973 with no attempts to change their eating habits (Nicklas, et al., 1989).

Findings from the Bogalusa Heart Study (Nicklas, et al., 1989) provide a snapshot of the nutritional status of children's diets. Results indicate children's total caloric intake increases with age. The distribution of calories is approximately 13% from protein, 49% from carbohydrate and 38% from fat. When these percentages are compared to the national standards of 10% to 15%, 55%to 60% carbohydrate, and 30% fat, it is clear that children are consuming more calories from fat and fewer calories from carbohydrate than is recommended for healthy people. Children's diets tend to be high in saturated fat ranging from 14% to 16% of calories and low in polyunsaturated fat with an average of 6% of calories. By the age of two years, children have average cholesterol intakes that are recommended during adolescence; more than 75% of children consume more total fat, saturated fat, and cholesterol than the recommended amounts. In addition, as children get older, mean intakes of vitamins and minerals per one 1,000 calories decrease (Nicklas, 1995).

Data from the Centers for Disease Control and Prevention mirrors that of the Bogalusa Heart Study and indicates that children consume too much fat, saturated fat and cholesterol, and not enough fruits, vegetables or calcium (CDC,

1996). According to the CDC (1996), only 16% of children ages 6 to 11 meet recommended limits for fat intake and 9% for saturated fat intake. Among adolescents ages 12 to 19, only 15% meet guidelines for fat intake and only 7% for saturated fat intake (CDC, 1996).

Data from USDA concerning the nutritional quality of children's diets suggests diet quality is declining (USDA, 2001). In 1980, approximately 50% of high school seniors reported eating green vegetables nearly every day or more. By 2003, the percentage had dropped to about 30% (USDA, 2001). Studies have indicated that among school-age children, only two percent meet the dietary recommendations for all food groups (USDA, 2001, and Gleason and Suitor, 2001). According to Gleason and Suitor (2001), from 1994 – 1996 for children ages 6 – 19, only 14% met the recommendations for daily fruit intake of two to four servings per day. Only 20% consumed the recommended three to five servings of vegetables per day. According to the 2004 Youth Risk Behavior Surveillance Survey (YRBSS), among high school students, only 23.6% of males and 20.3% of females ate five or more servings of fruits and vegetables per day. Servings of whole grain foods was also less than the several servings recommended daily; from 1994 – 1996, intake of whole grains for children was one serving or less (Gleason and Suitor, 2001). Milk consumption was also lower than recommended. Between 1977 and 2000, milk consumption decreased by 39% in children ages 6 – 11, while consumption of fruit juice rose 54%, fruit drink consumption rose 69% and consumption of carbonated beverages rose 137% (USDA, 2001). In 1999 – 2000, the top 10 foods and

beverages consumed by children ages 6 – 19 included carbonated beverages, low-fat milk, fruit drinks, whole milk, grain mixtures (including pizza and pasta), meat mixtures (including hamburgers), white potatoes (including French fries), sweetened desserts, cakes and cookies and flavored fruit juices (Ennis, Mackle and Goldman, 2003).

Over the past 20 years, children have increased their consumption of added sugars which are often found in carbonated soft drinks, fruit drinks, sports beverages and processed foods (Ennis, Mickle, and Goldman, 2003). Added sugar accounted for 20% of children's and teen's total food energy (USDA, 2001). The average intake of added sugars ranged from the equivalent of 19 teaspoons per day for girls six to eight years old, and to the equivalent of 36 teaspoons per day for males 14 to 18 years old (USDA, 2001). Among other age and gender groups the percentages were even higher (USDA, 2001). Teenage males were major consumers of soft drinks, among whom over one-third consumed three or more servings a day. Among other children, 56% to 85% of children consumed at least one serving of a sugar sweetened beverage per day (USDA, 2001).

Excessive portion sizes have also been shown to be risks risk to children's diets (Lin, Guthrie and Blaylock, 1996). Young children are naturally good regulators of food intake. However, over time, this natural self-regulation is often unlearned. As a result, children are susceptible to overeating when served excessive portion sizes (Hill and Peters, 1998). Between 1977 and 1996, overall caloric consumption, attributable to increased portion sizes, increased by about

nine percent in adolescent boys and about seven percent in adolescent girls (Ennis, Mackle and Goldman, 2003). During this same period, portion sizes for key food groups grew markedly in the U.S. According to Nielson and Popkin, (2003), portion sizes for salty snacks increased from 132 calories to 225 calories, soft drinks increased from 144 calories to 193 calories, French fries increased from 188 calories to 256 calories and hamburgers increased from 389 calories to 486 calories per portion.

Addressing Childhood Overweight and Obesity in Schools

According to the Harvard Health Policy Forum (2003), two-thirds of Americans believe that schools should play a major role in addressing the problem of childhood overweight and obesity in the U.S. School-based programs are integral to the promotion of lifelong healthy eating and physical activity habits. Because dietary and physical activity factors contribute substantially to the burden of preventable illness and premature death in the U.S., the CDC's national health promotion and disease prevention objectives, listed in Healthy People 2000, encourage schools to provide nutrition education and physical activity from preschool through twelfth grade (U.S. Public Health Service, 1991).

Research suggests that efforts to reduce the prevalence of overweight and obesity should target children and adolescents because policy changes can influence behavioral changes more easily among those who are still developing their eating habits (NC DHHS, 2003). Since children spend about a fourth of

their time in school, the school environment may have an extraordinary influence on the development of lifelong behavior patterns.

Schools are uniquely positioned to teach, model and reinforce both healthy eating and physical activity behaviors needed for lifelong optimal health. From the nutrition perspective, schools have the opportunity to provide students with healthy foods to eat, teach healthy eating habits in the classroom and model healthy food choices by ensuring that the school nutrition environment is one that is free from the intense marketing and ready availability of less healthy foods found in the general marketplace (California Center of Public Health Advocacy, 2002). Schools have an additional incentive to promote healthy food consumption as healthy eating plays a critical role in learning and cognitive development. Poor diet has been found to adversely influence the ability to learn and to decrease motivation and attentiveness (Nutrition-Cognition National Advisory Council, 1996). Such findings indicate that young people will not be ready to learn and achieve their full academic potential unless they are healthy and well nourished.

Parents support school efforts to increase physical activity and provide an optimal school nutrition environment. The Center for Health and Health Care in Schools surveyed a representative sample of parents in the U.S. According to the survey, 96% of parents believe that educating students about nutrition and exercise is important. Approximately 95% of parents think physical education should be part of a school curriculum for all students in kindergarten through twelfth grade. Seventy-six percent of parents think more school physical

education could help control or prevent childhood overweight and 95% are of the opinion that daily physical activity helps children perform better academically. Further, 73% would like to see parents and school officials working together to make decisions about what foods and beverages should be available to students at school. Overall, 85% of parents said they would support programs in schools to help fight childhood overweight and obesity (Center for Health and Health Care in Schools, 2005).

The National Association of State Boards of Education (NASBE) also supports the active role of schools in preventing childhood overweight and obesity. According to NASBE (Wechsler, McKenna, Lee and Dietz, 2004, p. 4),

> "today's schools face intense pressure to focus on standardized tests and consequently have placed less emphasis on the broader view of a healthy mind in a healthy body. However, an increasing number of educators and school board members are realizing that health and success in school are interrelated. Schools cannot achieve their primary mission of education if students and staff are not healthy and fit physically, mentally and socially."

NASBE further iterates that schools cannot solve the obesity epidemic on their own, but it is unlikely that the epidemic will be halted without strong school-based policies and programs. Schools can play an important role in preventing childhood overweight for four reasons: (1) over 95% percent of youth are enrolled in schools; (2) promotion of physical activity and healthy eating have long been a fundamental component of the American educational experience, so schools are not being asked to assume new responsibilities; (3) research has shown that well-designed, well-implemented school programs can effectively promote physical activity and healthy eating and reductions in television viewing time and (4) emerging research documents the connections between physical

activity , good nutrition, physical education and nutrition programs and academic performance (Wechsler, MeKenna, Lee and Dietz, 2004).

Federal School Food Policy – The National School Lunch Act

The federal government has actively promoted child nutrition in American schools for nearly 60 years. On June 4, 1946, Harry S. Truman, 33rd President of the U.S., signed the National School Lunch Act (NSLA) into law. The NSLA (Public Law 79-396) was enacted to address the problem of malnutrition among American youth during the era of World War II. Military leaders, the Selective Service and members of Congress were dismayed at how poorly nourished and physically weak many of the young military recruits were when they presented for military service. According to General Lewis Hershey, Director of the Selective Service, over 150,000 young men were rejected for military service and another 150,000 died during the war as a result of their malnourished, weakened state (Gunderson, 1971). The NSLA was implemented as an act of homeland security because malnourished youth weakened the collective strength of the nation and made the U. S. vulnerable to the acts of other nations.

The NSLA laid the foundation for the world's largest Child Nutrition Program. President Truman, referring to the legislation said:

> "Nothing is more important in our national life than the welfare of our children, and proper nourishment comes first in attaining this welfare. Today as I sign the National School Lunch Act, I feel that Congress has acted with great wisdom in providing the basis for strengthening the nation through better nutrition for our school children. The well-nourished child is a better student. He is healthier and more alert. He is developing good food habits which will benefit him for the rest of his life. In short, he is a better asset for his country in every way. I hope all state and local

> authorities will cooperate fully in establishing the cooperative school lunch program in every community" (Gunderson, 1971, p.35).

The NSLP was established to "safeguard the health and well-being of the Nation's children and to encourage the domestic consumption of nutritious agricultural commodities and other food" (Roberts, 2002, p. 593). Federal legislation authorized surplus farm commodities for use in the school lunch programs. From the inception of the program, the United States Department of Agriculture (USDA) established meal pattern requirements to encourage schools to provide students a nutritionally adequate meal. By 1949, almost seven million children in more than 47,000 schools were eating school lunches every day (Gunderson, 1971). Program participation expanded rapidly in the 1950's. School lunches were provided to more than 12 million children in 1959. School lunches no longer depended solely on agricultural surplus; they were supplemented by cash payments from the Federal government (USDA, 1996).

Throughout the 1960's, the program focused on ensuring that children from low-income families had access to school meals. Schools in low-income areas received additional financial support; without the extra help, these schools could not have afforded to participate in the program. By the late 1960's, school lunch program participation had increased to almost 19 million children (Gunderson, 1971). In 1966, the School Breakfast was authorized under the NSLA as a pilot program.

Legislation enacted during the 1970's established basic nutritional standards and further defined and expanded the program. The School Breakfast Program was permanently authorized as part of the NSLA. Laws guaranteed

children from low income families access to free or low cost school meals by eliminating fixed-ceiling state grants and reimbursing schools for all the meals they serve. By 1979, 45%of the 23 million lunches served each day were free or reduced price. Legislation also established national income eligibility guidelines and set guaranteed reimbursement rates and commodity support (USDA, 1996). During this era, legislation was passed that authorized the Nutrition Education and Training (NET) Program to promote a coordinated approach to nutrition education in the classroom and cafeteria and to provide students with the nutrition education they needed to make healthful food choices.

In the early 1980's, policy priorities focused on reducing federal spending. Congress began to tighten eligibility requirements for free and reduced price lunches, reduce subsidies and make fewer adjustments for inflation. Funds for the NSLP were cut by $1.4 billion dollars nationwide. Program participation dropped from 24 million children in 1981 to 21 million in 1982. As the decade progressed, the program proved to be an important tool for meeting children's needs for food assistance caused by the recession. Participation gradually increased, and by 1989, nearly 23 million children were eating school lunches (USDA, 1996).

The decade of the 1990's saw continued program growth with nearly 26 million meals served daily to children in nearly 100,000 schools. Optimal funding for Child Nutrition Programs was restored. Meal quality was a major priority during this era and an increased emphasis was given to the nutritional aspects of all school meals. As a result, in 1994, Congress amended the National School

Lunch Act to include the Healthy Meals for Americans Act (Martin and Conklin, 1999). The amendment required implementation of specific nutrition standards in school meals and provided improvements in the commodity program based on the US Dietary Guidelines for Americans. Further, Congress appropriated $20 million for nutrition education and pubic information and training of parents, teachers and other school personnel.

In addition to enhanced Congressional support, four important events had a major impact on the future direction of child nutrition programs (Martin and Conklin, 1999). The first event was the release of *Healthy People 2000*, the health objectives of the nation. The document contained specific objectives for Child Nutrition programs, and for the first time since the publication of these objectives every decade, *Healthy People 2000* linked school-based nutrition programs to child health. The release of the *Revised Dietary Guidelines for Americans* was the second significant event; the release of the guidelines was instrumental in shifting the focus of school meals from just wholesome to wholesome and nutritious. The third event was the adoption of the educational goals by the nation's Governors that linked nutrition to learning readiness. In 1994, Congress formally adopted *Goals 2000* as an integral part of the Educate America Act, Public Law 103-227 (Martin and Conklin, 1999). The fourth event that impacted the direction of Child Nutrition Programs was the appointment of Shirley Watkins, former Child Nutrition Director of the Memphis City School's Child Nutrition Program, as Undersecretary of Agriculture for Food, Nutrition and Consumer Services. For the first time in history, food and nutrition programs

were administered by an undersecretary who understood the programs, their policies and their direct impact on children (Martin and Conklin, 1999).

Child Nutrition Programs are subject to reauthorization every four years as mandated by Congress. During the reauthorization period, Congress reviews all programs, even those permanently authorized, and makes changes where needed. Sometimes the changes strengthen the programs, and sometimes they do not. Debate began on the reauthorization of child nutrition programs in March, 2003 in preparation for the October, 2003 reauthorization deadline. With an increased emphasis in federal initiatives such as “No Child Left Behind”, Congress began to look at how Child Nutrition Programs contribute the optimal growth and development of the nation’s school children. On June 30, 2004, nine months after the reauthorization deadline and after much discussion about the role of federally-funded Child Nutrition Programs in improving children’s overall health and academic performance, the Richard B. Russell National School Lunch Act was reauthorized with new provisions which will strengthen Child Nutrition Programs. New legislation included provisions for expanding program access, increasing the nutritional integrity of school meals and improving accountability (Public Law No. 108-265, Child Nutrition and WIC Reauthorization Act of 2004).

Currently, the National School Lunch and School Breakfast Programs are administered by the US Department of Agriculture’s Food and Nutrition Service in cooperation with state and local education agencies. USDA subsidizes the cost of preparing and serving all meals at participating schools. The NSLP and SBP provide cash reimbursement for every child receiving a meal through the lunch or

breakfast program. Federal reimbursement benefits are segmented into three categories of participants – free, reduced price, and paid. For school year 2005, children eligible for free lunches were those from families with incomes up to 130 percent of the federal poverty level. Children eligible for reduced-price lunches were those from families with incomes up to 185 percent of the federal poverty level and children eligible for reimbursement for paid lunch were those from families with income over 185 percent of the federal poverty line. The federal per meal reimbursement for each of these categories in school year 2005 – 2006 are $2.32, $1.92 and $.22 respectively (Federal Register, July 18, 2005). The eligibility and reimbursement structures for the School Breakfast Program are similar, albeit at slightly lower reimbursement rates; for 2005 – 2006, the rates are $.23 paid, $.97 reduced and $1.27 free (Federal Register, July 18, 2005). Reimbursement rates for both the School Lunch Program and the School Breakfast Program are indexed for inflation. In addition, each reimbursable lunch entitles the school food authority to a set amount of commodities $ 0.175 cents for school year 2005 (Federal Register, July 18, 2005).

Over time, the National School Lunch Program and the School Breakfast Program have expanded into major sources of federal nutrition support. In fiscal year 2004, the federal government spent $6.8 billion to serve school lunches to an average of 29.1 million children daily and the School Breakfast Program served 8.8 million children daily on average at an annual cost of $1.66 billion (USDA, 2005)..

In accordance with the National School Lunch Act of 1946, the Child Nutrition Act of 1966, and the Healthy Meals for Healthy Children Act of 1994 federally-subsidized school meals programs must conform their meal requirements to meet the recommended standards as described in the School Meals Initiative (SMI). Specifically, school breakfast and lunch programs are required to offer varied and nutritious food choices that are consistent with the recommendations from the Dietary Guidelines for Americans issued jointly by the Department of Agriculture and the Department of Health and Human Services (Roberts, 2002). In order for the meal to qualify for reimbursement with federal NSLP funds, school breakfast and school lunch guidelines require school meals to provide no more than 30% of calories from fat and 10% of calories from saturated fat, as well as to meet recommendations for Vitamin A, Vitamin C, iron, calcium and calories. Reimbursable school meals are also required to provide a variety of foods moderate in sugar and salt, high in fruits and vegetables and whole grains.

Nutritional Contributions of National School Lunch and School Breakfast Programs

School meals make an important contribution to the nutrition of school age children. Increasingly, the school breakfast and lunch programs offer more healthful meals with a variety of foods and appropriate portion sizes. The NSLP and SBP are required to serve meals that are in compliance with national guidelines for fat and saturated fat (USDA, 1996). USDA studies show a steady

reduction in the percent of calories from fat and saturated fat in school meals since the early 1990s (US GAO, 2003).

USDA analyses of school meal participation show that children who participate in the school lunch and breakfast programs consume more than twice as many servings of fruits and vegetables, compared with students who participate in neither program (USDA, 2001). NSLP participants are more likely than non-participants to consume milk and milk products, and meat and other protein-rich foods, both at lunch and over 24 hours. The NSLP is associated with higher average intakes of key nutrients both at lunch and over 24 hours. NSLP participants have substantially lower intakes of added sugar than do non-participants. One of the factors that may account for the reduced sugar content of the diets of children who participate in the NSLP is that they consume one-fourth of the number of servings of soft drinks and sweetened fruit flavored drinks as children who do not participate in the NSLP (USDA, 2001). Students participating in the SBP generally consume higher amounts of calcium, phosphorus and vitamin C than students who do not participate in the program (USDA, 2001).

The School Nutrition Dietary Assessment (SNDA) was conducted during the 1991 – 1992 school year. The SNDA investigated the specific nutrients provided by the NSLP and SBP. The study had three objectives: (1) to describe the nutrient composition of NSLP lunches and SBP breakfasts, (2) to analyze the dietary intakes of students, and (3) to compare the dietary intakes of program participants with non-participants (Burghardt and Devaney, 1995). Data were

collected from 545 schools during a one-week period in the spring of 1992. Approximately 3,350 students in first through twelfth grades provided detailed information about the foods and beverages consumed during a 24-hour period that included a school day (Burghardt and Devaney, 1995).

Results of the SNDA indicated that students consumed recommended amounts of vitamins as based on the Recommended Dietary Allowances (RDAs) with most students eating at least three times daily (Gordon, Devaney and Burghardt, 1995). Overall, students consumed more calories, protein, total fat, saturated fat, and sodium than was recommended (Gordon, et al., 1995). When comparing the nutritional value of lunches of NSLP participants to other lunches eaten, the NSLP lunches were higher in most vitamins and minerals, but were also higher in calories, fat, saturated fat, cholesterol, and sodium. However, non-participant's lunches also tended to be higher than the recommendations for fat, saturated fat, and sodium, but just to a lesser degree. NSLP participation was also associated with higher intakes of vitamin A, calcium, and magnesium and a lower intake of vitamin C (USDA, 2001).

The second School Nutrition Dietary Assessment Study (SNDA II) was conducted during the 1998 – 1999 school year. Data from SNDA II provided information about how schools were progressing toward meeting nutrition standards established through the School Meals Initiative (SMI). Data from SNDA II showed that schools participating in the NSLP and SBP were making statistically significant trends toward lower levels of fat and saturated fat and increased levels of carbohydrate in the meals offered to students. In addition to

improvement in overall means, there was marked increase in the percentage of individual schools that offered lunches that were consistent with the Dietary Guidelines recommendations for fat and saturated fat (USDA, 2001). Elementary schools are doing somewhat better than secondary schools at meeting the Dietary Guidelines; lunches served to students in elementary schools provided, on average, about 33% of calories from fat (compared to SMI standard of no more than 30% and about 12% percent of calories from saturated fat as compared to the standard of less than 10%. The average lunch served in secondary schools provided about 35% percent of calories from fat and about 12% of calories from saturated fat (USDA, 2001). Improvements in fat and saturated fat content were achieved without compromising the overall nutrient contribution of school lunches. Lunches served to students provided more than one-third of the Recommended Dietary Allowances (RDAs) for all targeted nutrients, including Vitamin A, Vitamin C, iron, calcium, and protein (USDA, 2001).

Federal regulations prohibit only the sale of foods of minimal nutrition value in school cafeterias during meal times (7 CFR Part 210.18). A food of minimal nutritional value is defined as a food which provides less than five percent of the Reference Daily Intakes (RDI) for each of eight specified nutrients per serving, in the case of artificially sweetened foods; and in all other foods, as a food which provides less than five percent of the RDI for each of eight specified nutrients per 100 calories and less than five percent of the RDI for each of eight specified nutrients per serving (7 CFR Part 210.11). These standards do not

address foods sold outside of the cafeteria, often within just a few feet of the cafeteria door, or those sold before or after school meal periods. As a result, many schools serve and sell foods and beverages that compete with the reimbursable meals and that are high in added sugar, fat and calories (Kubik, et al., 2003).

Availability and Impact of *A la carte* and Competitive Foods in Schools

While the federal government has established nutrition standards for reimbursable school meals served through the National School Lunch and School Breakfast Programs, there are no federal, state or local standards for competitive foods which include foods and beverages sold *A la Carte*, in vending machines, in school stores, as school fund-raisers or at school-sponsored special events (US GAO, 2003). The shift in providing children with greater access to competitive foods has the potential to erode the positive influences of school meals (USDA, 2001). Most foods sold on school campuses as *A la Carte* items fail to provide the balanced nutrition that should be provided in a children's diets (US GAO, 2003). *A la Carte* sales in the school cafeteria are seen as a competitive tool for Child Nutrition Personnel to counteract sales by principals, school groups, student stores, and other non-school nutrition purchase points (ADA, 2006). The revenues generated from sales of *A la Carte* sales are generally used to support the overall operation of the Child Nutrition Program.

The widespread and ready availability of competitive foods in American schools is well documented. A recent study from the U.S. General Accounting

Office (2003) found that 43% of elementary schools, 74% of middle schools, and 98% of high schools have vending machines, school snack bars, or other food sources outside of the school lunch and breakfast programs. Approximately 65% of high school females and 54% of high school males do not consume lunches obtained through the National School Lunch program (US GAO, 2003).

The nutritional quality of competitive foods has also been found lacking. Competitive foods are high in fat, sodium, and added sugar (US GAO, 2003). Surveys of competitive foods at school corroborate this general conclusion. One inventory found that the largest category of foods offered through *A la Carte* service was in the category of chips and crackers, in which only 10% of the items offered met the low-fat definition used in the study (French, Story, Fulkerson, and Gerlach, 2003). In the same study, fruits and vegetables represented only 4.5% of the total *A la Carte* items available. Another study found that the items most widely available in school vending machines were, in descending order, imitation juice drinks, carbonated beverages, fruit juice, candy bars, cookies, candy, cheese puffs, and potato chips (Story, Hayes, and Kalina, 1996). A study conducted by the American School Food Service Association (ASFSA, 1999) revealed the prevalence of these high-calorie/low-nutrient foods is on the rise, with the largest increase seen in elementary schools. In the ASFSA study, the most popular a la carte items were ice cream, milk, cookies/desserts, snack foods, and pizza (ASFSA, 1999).

According to USDA (2001), the availability of competitive foods undermines the nutritional integrity of the school breakfast and lunch programs

and discourages participation. Specifically, USDA reported three negative impacts of competitive food sales (USDA, 2001). First, competitive foods are relatively low in nutrient density and high in fat, added sugar and calories. When children replace school meals with less nutritious foods, they are at risk for inadequate nutrient intake and excess caloric intake. When competitive foods are purchased in addition to the school meal, there is the risk of over-consumption that may contribute to overweight and obesity. Second, competitive foods stigmatize participation in the school breakfast and lunch programs. As a result, the school breakfast and lunch programs are often viewed as a program only for poor children, since children with money are able to purchase competitive foods. This perception has decreased the willingness of all children to participate in the school breakfast and lunch Programs (California Center for Public Health Advocacy, 2002). Finally, competitive foods convey a mixed message. When children are surrounded by unhealthy foods on the school campus, the effectiveness of nutrition education taught in the classroom is diminished (US GAO, 2003). Clearly, foods and beverages sold in competition with the school meals programs not only compromise the programs' nutritional integrity, but also compromise the program's financial integrity.

A la Carte programs and vending machines displace student consumption of more nutritious foods. One study found that school's *A la Carte* offerings were negatively associated with daily fruit and vegetable consumption (Kubik, Lytle, Hannan, Perry and Story, 2003). Students from schools that did not offer *A la Carte* items consumed approximately half a serving more of fruit per day and a

whole serving more of vegetables per day than children in schools that did have *A la Carte* programs. This study also found that children attending schools without *A la Carte* options met USDA recommended daily guidelines for fat consumption, while those from schools with *A la Carte* programs did not (Kubik et al., 2003). Vending machines also decreased adolescent fruit consumption. For every vending machine present in a school, per-day servings of fruit consumed decreased by 11% (Kubik et al., 2003).

Though not specific to competitive foods offered at school, food portion surveys show that average portion sizes for many types of food items available to children in school are well in excess of USDA recommendations. One survey sampled portion sizes based on portion weights from manufacturers, labels, and direct weighting of foods and found that cookies, pasta, muffins, steaks, and bagels exceeded USDA recommendations by seven 700%, 480%, 333%, 224% 195% respectively (Young and Nestle, 2002).

While the National School Lunch Program and School Breakfast Program set appropriate portion sizes, competitive foods are offered for sale without appropriate portion size guidelines (French, et al, 2003). Competitive foods are often far in excess of suitable portion sizes for children as readily seen in the standard 20-ounce soft drink containers offered in many schools.

Another study tracked fourth grade students who did not have access to *A la Carte* lines and snack bars into fifth grade, where such foods were available to them (Cullen and Zakeri, 2004). From year one of the study to year two, when *A*

la Carte and snack bar foods became available, servings of fruit consumed decreased 33%, servings of vegetables consumed (not fried) decreased 42%, and milk consumption declined by 35%. Conversely, consumption of high-fat (fried) vegetables and sweetened beverages increased 68% and 62% respectively.

Another source of additional calories for students is school fund-raisers that include the sale of baked goods, candy and other non-nutritious items. School fund-raisers also compete with the Child Nutrition Program because they make non-nutritious foods available for sale to students during the school day and during meal times. In a recent study of eighth graders, researchers studied seven campus food practices including classroom fund-raising, school fund-raising, eating and drinking in the hallways and classrooms, and using food and food coupons as rewards (Kubik, et. al, 2005). Students' BMI increased by 10% for every additional food practice allowed on the school campus. One-third of the schools permitted either eating or drinking in the classrooms or hallways, all of which encouraged extra calorie consumption. According to Kubik et. al. (2005) cookies, doughnuts, sweetened drinks, and pizza were the most common foods used as academic rewards in schools. The researchers concluded that more opportunities to eat and drink at school may also promote consumption of more foods and beverages high in calories and low in nutrients and may contribute to childhood weight gain.

The Changing School Nutrition Environment

In the initial years of the NSLP, federally-reimbursable lunches were the primary source of foods for students at schools. Currently, the reimbursable school meal represents a smaller part of the school food environment (Wechsler, Brener, Kuester and Miller, 2001). Many schools provide increased food options for students including foods for sale in vending machines, school stores and snack bars as well as *A la Carte* sales in the school cafeteria. Long considered to be a problem mainly in high school, competitive foods are more often available in middle and high schools where students are particularly vulnerable to peer pressure and even in elementary schools were food preferences are most easily influenced by preferences for less nutritious foods (Story, Hayes and Kalina, 1996).

USDA studies find that competitive foods at school undermine the nutritional benefits provided through the National School Lunch Program and School Breakfast Program (US GAO, 2003). According to USDA (2001), a negative relationship exists between revenue from competitive foods and National School Lunch Program participation. Further, participation in the NSLP decreases on campuses that allow vending machines to operate during the school day (USDA, 2001).

A growing body of evidence specifically shows increasing consumption of soft drinks and other sweetened beverages on school campuses and the resulting detrimental impacts on child health (Guthrie and Morton, 2000; Harnack, Stang and Story, 1999; Ludwig, Peterson and Gortmaker, 2001,

Institute of Medicine, 2005). Research has documented increased soft drink consumption among children and a negative relationship between the consumption of sweetened drinks by children and their intake of protein, calcium, phosphorus, and Vitamin A (Mrdjenovic and Levitsky, 2003; USDA, 2001; Ballew, Keuster, and Gillespie, 2000). Researchers have also found that soft drinks displace milk consumption and contribute to childhood overweight by adding additional sugar and calories to children's diets (USDA, 2001; USDA, 2003; Institute of Medicine, 2005).

In a recent study of approximately 1,200 school personnel, including Child Nutrition personnel, Rainville et al, (2005) examined the prevalence competitive foods and beverages on school campuses. The researchers found that 54.6% of school districts represented in the study had a contract with a soft drink company; vending machines were reported in 87% of high schools, 70% of middle schools and 42% of elementary schools. Soft drinks, bottled water, juice drinks, sports drinks, and chips were the most common items available to students through vending machines.

The researchers (Rainville, et al, 2005) also examined whether the school district allowed food or beverages to be used as rewards for good behavior or good academic performance. Nearly 60% of respondents reported that teachers and/or administrators used foods as rewards. In order of prevalence, candy, pizza, popcorn, soft drinks and ince cream were most frequently offered to students as rewards (Rainville, et al, 2005).

The availability of foods used in fund-raising activities was also examined by the researchers (Rainville, et al 2005). Over 99% of respondents reported that foods and beverages were used to raise funds for various school-related functions and 63% reported that school organizations conduct fund raisers several times per year. Candy and baked goods were the most popular fund raising items sold; 31% of respondents reported that school stores sold candy, chips, soft drinks and other snack foods throughout the school day.

The decision for schools to provide food and beverage alternatives to students outside the reimbursable school breakfast and lunch programs, including competitive foods available in vending machines, school stores, as rewards for good behavior and/or as fund raisers, is influenced by a variety of factors. Students' food preferences often drive food choices available in schools (Kubik, 2003). Students have established preferences for high fat entrees, sweetened beverages and salty snacks. In addition, students often prefer visiting with friends around vending machines or snack bars to standing in a long line for a school meal and eating it in a crowded cafeteria (Kubik, 2003).

Increasing financial demands and limited financial resources within school districts also influences the decision to provide more food and beverage options to students (Kubik, 2003). With increasing financial pressures and limited resources, schools often choose revenues over children's health and well-being. Child Nutrition programs, which were once regular line items in local school operating budgets, must be financially self-supporting (Andersen, et al., 2004). Many school districts are compensating for the loss of funds due to federal and

state budget cuts by increasing the prices for school meals and/or increasing the sale of *A la Carte* foods and fast food-style options in the school cafeteria (Andersen, et al., 2004)

For many school districts, competitive foods, especially carbonated beverages and soft drinks represent a source of additional income that may be spent for discretionary purposes that support the school's or school district's general operating budget (Nestle, 2000). In order to support the general school budget, there has been a recent trend for school districts to negotiate exclusive pouring rights contracts with soft drink bottling companies (Ballew, Kuester and Gillespie, 2000). According to the Prevention Institute (2005), a pouring rights contract is a legally-binding agreement between a school district and a vending company wherein the school district agrees to sell only one company's products in vending machines at all school events. Contract conditions frequently include the prominent display of advertising and marketing materials on school grounds and may include incentive payments for greater sales at the school sites. Many of these contracts have provisions to increase the percentage of profits schools receive when sales volume increases (Nestle, 2000). Pouring rights contracts have a substantial incentive for schools to promote soft drink consumption by adding vending machines, increasing times they are available to students and even marketing the products to students (Culen and Zakeri, 2004). Some superintendents, school board members, and principals claim that the financial gain from soft drink contracts is mutually beneficial for students, schools, communities, and taxpayers (Zorn, 1999 and Nestle, 2000). Parents and school

authorities generally are uninformed about the potential risk to the health of their children that may be associated with the unrestricted consumption of soft drinks. The decision regarding which foods will be sold in schools more often is made by school district business officers alone rather than with input from Child Nutrition professionals (Johnson, Panely and Wang, 1998).

The decision to provide food and beverage alternatives in schools is also influenced by the limited space for food preparation and service (ASFSA, 1999). As school populations expand and budgets shrink, schools have begun to require Child Nutrition funds to pay for items, like equipment, that heretofore, were included in the LEA's overall operating budget. Food service facilities are often inadequate for preparing and serving appealing meals to all students. In some schools inadequate seating capacity requires lunch periods to begin as early as 10:00 a.m. and end as late as 2:00 p.m. With inadequate dining facilities that may require students to wait in long lines, and insufficient time allocated to consume a reimbursable school meals, many students turn to less nutritious foods that are quickly accessible in vending machines, school stores, snack bars and foods available for fund-raising (ASFSA, 1999).

Inadequate meal periods also influences the decision to provide food and beverage alternatives in schools (ASFSA, 1999). School districts are under increasing pressure to improve academic performance and elevate student achievement. In an attempt to provide additional instructional time during the existing school day, schools frequently reduce the length of meal periods. Many schools schedule tutoring, club meetings and other extracurricular activities

during meal periods. Consequently, students choose foods they can get and eat quickly or they skip meals altogether (ASFSA, 1999).

Conklin, Lambert and Anderson (2002) investigated the actual amount of time students need to eat lunch in elementary, middle and high schools. Once students arrived in their seats in the dining area with their food, the average eating time for students in all grades ranged from seven to ten minutes. The average total time spent in the cafeteria for service, including travel time to the table, time at the table, and consuming the meal was 20 minutes for elementary and middle schools and 24 minutes for high schools. USDA's (2000) recommendation that students have at least a 20-minute period of time for eating meals at the table is consistent with this finding. While it is important to have adequate time for actual meal consumption, the Partnership to Promote Healthy Eating in schools suggested that socializing was an important aspect of school dining because allowing students sufficient time to relate to others provides a break in routine and refreshes them for afternoon classes (American Academy of Family Physicians, American Academy of Pediatrics, American Dietetic Association, National Hispanic Medical Association, National Medical Association, US Department of Agriculture, 2000).

The decision of provide meal alternatives in schools may also be influenced by the knowledge, skills and experiences of the Child Nutrition Director. There are no national standards for Child Nutrition Directors or School Nutrition Managers. As a result, levels of education vary from advanced degrees to less than a high school education. In Louisiana, which has the highest level of

participation in the NSLP and SBP in the country, a minimum requirement for State certification as a Child Nutrition Program Director/Supervisor is a master's degree in Institutional management, family and consumer sciences (or equivalent) or nutrition/dietetics from an accredited institution of higher learning and specific course requirements in nutrition (ASFSA, 1999). According to the American School Food Service Association (1999), appropriate standards are necessary to ensure that school food and nutrition professionals themselves understand the nutrition and health issues associated with competitive foods. Such standards are also necessary for the professional to handle the varied responsibilities of the job, such as managing multimillion-dollar budgets, servings as a spokesperson for children's nutrition needs to the school administration and the community, and being included as a full partner in the education process (ASFSA, 1999).

Child Nutrition Directors increasingly have the opportunity to influence the school nutrition environment to make more healthful foods and beverages available to students during the school day. In a study of 300 randomly selected Child Nutrition Directors that measured the Director's perceptions of childhood overweight, 48% of respondents believed Child Nutrition personnel should play a major role in controlling overweight and obesity in childhood (Price and Telljohann, 1994). In addition, 88% of respondents believed it was their duty to plan and prepare nutritionally balanced lunches for students, and 79% believed that most school lunches were designed to provide nutritionally balanced meals.

Regulating the Kind, Amount and Availability of Competitive Foods in Schools

Federal regulations allow states to establish standards to regulate competitive foods. In Colorado, Idaho and Nebraska, competitive food sales are not allowed from one half-hour before until one-have hour after the breakfast/lunch period (California Center for Public Health Advocacy, 2002). In Illinois, Louisiana, New Jersey and Virginia, the income from competitive food sales must accrue to the Child Nutrition program (California Center for Public Health Advocacy, 2002). In North Carolina, competitive food sales are not allowed during the instructional day until after the last child is served lunch (NC SBE Policy # EEO-S-OOO). NC's General Statute 115C-264 allows the sale soft drinks to students only if there is a local school board policy allowing the practice and only if they are sold after the last student is served lunch for the day.

Increasing concerns about competitive foods in schools are part of a broader set of concerns arising from information demonstrating shortcomings in children's diets in general. In a recent report to Congress (2004), the House Appropriations Committee expressed concern about the negative effect of competitive foods available to children at school:

> "The USDA invests a significant amount of money in the school nutrition programs. The Committee is concerned about the effect foods sold in competition with the school meal programs may be having on the integrity of the programs. Specifically, the USDA should review, and include in a report, information on any statutory limits or judicial rulings that restrict the ability of the USDA to regulate these competitive foods. The Committee urges the USDA to review the effect that competitive foods may have on the school meals programs and report back to Congress on this subject" (House Report 106-619).

Nutrition Standards for all Foods and Beverages Available in Schools

Nutrition standards in connection with federally-funded meals have a long political, legislative and judicial history spanning several decades. Though the federal government has set standards for meals served through the National School Lunch and School Breakfast Programs, Congress in 1970, specifically granted the Secretary of Agriculture broad authority to regulate competitive foods in participating schools as well (Roberts, 2002). Over the years, however, the authority of the Secretary of Agriculture to regulate school foods has been severely curtailed due to amendments to the Child Nutrition Act of 1966, as well as through judicial challenges to federal regulations. As a result, current USDA regulations are limited to foods available as part of the reimbursable breakfast or lunch programs (Roberts, 2002).

Historically, general nutrition guidelines, such as the Food Guide Pyramid or the Dietary Guidelines for Americans, have been developed to address the nutrition needs for individuals over the course of a day or a week. Based on the premise that “no food is a bad food” and that “every food fits,” these guidelines have assumed that people eat whole meals and that the content of those meals can “balance out” over time. If one meal includes a special treat, a piece of chocolate cake, for example, it could be balanced by slightly fewer calories, sugar and fat at other meals (California Center for Public Health Advocacy, 2002, p. 4).

Unfortunately, for many students, school mealtime, rarely consists of a nutritionally balanced meal. Although children may understand that good

nutrition and good health are related, this understanding may not be reflected in their food choices and meal patterns while at school (ADA, 2006). For many students, breakfast and lunch at school consist of individuals items selected daily from *A la Carte* food lines, vending machines and the school store (French et al., 2003). Items available through *A la Carte*, vending, school stores, fund-raisers and other campus venues are typically high in fat, sugar and ultimately calories. Many of these foods are available in portion sizes that are inappropriate for children. These items are also typically low in essential nutrients such as vitamins and minerals, including calcium. When nutritionally inadequate foods are available and promoted to children at school everyday, it becomes increasingly difficult for children and teens to balance their excess meals (California Center for Public Health Advocacy, 2002).

Experts in government and the scientific community recommend improving the nutritional quality of all foods available to children at school and increasing the opportunities for students to learn about nutrition and the development of healthful eating habits through a comprehensive nutrition education curriculum (American Academy of Pediatrics, 2003) The primary goal of nutrition education is to influence students' eating behaviors. Building nutrition knowledge and skills helps children make healthy eating and physical activity choices. To make a difference, school districts should provide nutrition education that is appropriate for students' ages; reflects students' cultures; is integrated into subjects such as math and reading; and provides opportunities for students to practice skills and have fun (USDA, 2000). School districts should also choose

nutrition education curricula that are easy to teach and foster lifelong healthy eating.

The Centers for Disease Control and Prevention recommend schools adopt a coordinated school nutrition policy that promotes healthy eating through classroom lessons and a supportive school environment (CDC, 1996). The Surgeon General is even more explicit, recommending in *The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity* that schools

> "ensure that healthy snacks and foods are provided in vending machines, school stores, and other venues within the school's control; prohibit student access to vending machines, school stores, and other venues that compete with healthy school meals in elementary schools and restrict access in middle, junior and high schools" (US Department of Health and Human Services, 1996, p. 20).

The National Association of State Boards of Education (NASBE) has also recommended that state and local Boards of Education adopt policies to encourage healthy eating (NASBE, 2002). In their sample policies to encourage healthful eating, NASBE (2002, p 41) concludes:

> "healthy eating patterns are essential for students to achieve their full academic potential, full physical and mental growth and lifelong health and well being. Healthy eating is demonstrably linked to reduced risk for mortality and development of many chronic diseases as adults. Schools have a responsibility to help students and staff establish and maintain lifelong, healthy eating patterns. Well-planned and well-implemented school nutrition programs have been shown to positively influence student's eating habits."

In a recent report on children's health, the Committee on Preventing Childhood Obesity and Overweight of the National Academy of Sciences (2004), recommended several short and long-term interventions to prevent childhood overweight and obesity. Specific policy, environmental, social, clinical

and behavioral interventions were recommended. Among the committee's recommendations for immediate action was that federal and state Governments develop nutrition standards for foods and beverages sold in schools and improve the nutritional quality of foods and beverages available to students.

The North Carolina Healthy Weight Initiative was established in October, 2000. The initiative was created to develop a state-wide plan designed to prevent and treat overweight in children 2 to 18 years of age. The initiative has three major components: 1) planning for comprehensive nutrition and physical activity programs to prevent overweight and related chronic diseases in children and youth; 2) implementation of a multi-level pilot intervention that targets preschool children and their families; and 3) enhancement of a statewide nutrition and physical activity surveillance system (Caldwell, Lebeuf, Ammermamn, Cooke, Dunn, Longenecker, Matthews, Ngui, Samuel-Hodge, Shwartz and Ward, 2002). As a result of the state-wide initiative, key recommendations were established to achieve one of the three major components. One of the recommendations is that policy makers establish "state standards for all foods and beverages available in schools" (Caldwell et al., 2002, p. 3).

In December, 2003, the NC Division of Public Health, NC Department of Public Instruction and NC Cooperative Extension Service convened a consensus panel of medical, nutrition and education experts to develop nutrition standards for all foods available in schools. The consensus panel made general recommendations for foods available to students in NC's public schools in all areas of the school campus including foods and beverages available in vending

machines, at school events (including classroom events, celebrations, meetings, concessions, intramural events, fund-raisers and extracurricular events), in school meals, including the NSLP, SBP and ASSP and foods sold as *A la Carte* items. A six-person writing team, consisting of five individuals from the NC Division of Public Health and one individual from the NC Department of Public Instruction, developed the nutrition standards based on the recommendations of the Consensus Panel. The recommendations were published in a final document entitled *Eat Smart: North Carolina's Recommended Standards for All Foods Available in Schools* in May, 2004 (Andersen, Caldwell, Dunn, Hoggard, Thaxton, and Thomas, 2004).

The 2004 Congressional Reauthorization of Child Nutrition Programs (Public Law 108-265) included specific requirements to develop and implement local wellness policies that address nutrition standards for foods and beverages available on school campuses. Effective July 1, 2006, all LEAs participating in the National School Lunch Program must have local wellness policies approved by local Boards of Education that, at a minimum, include four components. Specifically, local wellness policies must include goals for nutrition education, physical activity, and other school-based activities designed to promote student wellness in a manner that the local education agency determines appropriate. The policy must also include nutrition guidelines for all foods available on the school campus during the school day, with the objectives of promoting student health and reducing childhood obesity. In addition, the policies must provide assurances that guidelines for school meals are not less restrictive than those set

by the Secretary of Agriculture (Public Law 108-265). To ensure compliance with the local policies, there must be a written plan for measuring implementation of the local wellness policy, including the designation of one or more persons within the LEA or at each school as appropriate, charged with ensuring the school meets the local wellness policy (Public Law 108-265). Nutrition policies for schools can shape students' consumption of more healthful foods. A recent study conducted by Neumark-Sztainer, French, Hannan, Story and Fulkerson (2005) of high school students, demonstrated that school food policies that decrease access to foods that are low in nutrients and high in fats and sugars are associated with less frequent purchases of these items among students in secondary schools.

In 2004, the Lieutenant Governor of North Carolina commissioned *Fit Families NC: A Study Committee for Childhood Overweight and Obesity in North Carolina.* According to the Lieutenant Governor, "obesity, especially among children, has emerged as a serious threat to the state's health" (HWTFC, 2005, p. 2). Members of the study committee were appointed by the Lieutenant Governor and consisted of state-wide experts on the subject of childhood overweight and the complex factors that influence the condition. The purpose of the Study Committee was to assist the state's policy makers to better understand the complexity of the epidemic and to evaluate the causes and status of obesity among the state's children and to recommend viable policy initiatives to the North Carolina General Assembly and relevant agencies and organizations for addressing this serious health concern (HWTFC, 2005). The author of this

research project was privileged to be appointed to the committee and serve to make policy recommendations concerning the nutrition integrity in school meals.

Among the recommendations from the study committee were two (2) legislative policy proposals that were presented to the North Carolina General Assembly that would influence the nutritional content of foods and beverages available on school campuses. As a result of the policy proposals, two bills were introduced into the House and Senate for consideration (HWTFC, 2005). Senate Bill 961 established minimum nutrition standards for foods and beverages available in school vending. This legislation was signed into law by the Governor on August 8, 2005, and was effective upon enactment. In addition, House Bill 855 (G.S. 115 – 264C) authorized the State Board of Education to work collaboratively with a cross-section of Child Nutrition Directors to adopt minimum nutrition standards for foods and beverages available in the school meals programs in North Carolina's public schools. A core committee of Child Nutrition Directors and Supervisors throughout the state will convene in January, 2006 to begin the process of establishing the standards.

Barriers to an Optimal Nutrition Environment in Schools

The school environment has a powerful influence on student behavior. An optimal nutrition environment provides students the opportunity to learn how to make healthful food choices in the classroom and practice making healthful choices from a variety of healthful food and beverage choices available on the school campus during the instructional day (AFHK, 2004). Clearly, there is

evidence to support the development and adoption of minimum standards for foods and beverages available on school campuses (American Academy of Pediatrics, 2003). However, barriers exist that may interfere with the implementation of standards in schools.

The National School Food Service Management Institute (NFSMI) conducted focus groups among school administrators to identify potential barriers for a healthful nutrition environment in schools and to determine possible strategies for overcoming the barriers (Meyer and Conklin, 2001). School administrators participating in the focus groups identified the following barriers to promoting an optimal nutrition environment: school finances (money), lack of administrative support or school policy, school meals not valued as part of the instructional day, cafeteria environment (including limited time/space for school meals), student taste preferences, too little nutrition education to influence children's eating habits, conflicting messages (Meyer and Conklin, 2001).

Barratt, et al, (2004) surveyed 115 Child Nutrition Directors in North Carolina to explore the barriers to designing and implementing nutrition policies in schools. Barriers included lack of financial support (28%), lack of support from school administrators (39%) and teachers (31%). Lack of time and commitment from principals, parents and community members was also cited as barriers to the development and implementation of nutrition policies in schools.

Strategies for Achieving an Optimal School Nutrition Environment

Government, health, and educational organizations are taking actions to collaborate to support the development of an overall school environment that provides consistent experiences for children that will enable them to develop healthy lifestyle habits. One of these collaborations, The Partnership for Change, was developed with the specific mission of improving children's health. The Partnership for Change is a collaborative effort among the American Academy of Family Physicians, American Academy of Pediatrics, American Dietetic Association, National Hispanic Medical Association, National Medical Association and the U.S. Department of Agriculture (USDA, 2001). The Partnership developed the Ten Keys to Promote Healthy Eating in Schools. The ten keys are as follows:

1. Students, parents, educators and community leaders will be involved in assessing the school's eating environment, developing a shared vision and an action plan to achieve it.
2. Adequate funds will be provided by local, state and federal sources to ensure that the totals school environment supports the development of healthy eating patterns.
3. Behavior-focused nutrition education will be integrated into the curriculum from pre-K through grade 12. Staff that provide nutrition education will have appropriate training.
4. School meals will meet the USDA nutrition standards as well as

provide sufficient choices, including new foods and foods prepared in new ways to meet the taste preferences of diverse student populations.

5. All students will have designated lunch periods of sufficient length to enjoy eating healthy foods with friends. These lunch periods will be scheduled as near the middle of the day as possible.
6. Schools will provide enough serving areas to ensure student access to school meals with a minimum wait time.
7. Space that is adequate to accommodate all students and pleasant surroundings that reflect the value of social aspects of eating will be provided.
8. Students, teachers, and parents and other who practice healthy eating will be encouraged to serve as role models in the school dining areas.
9. If foods are sold in addition to the National School Lunch Program, they will meet specific nutrition criteria that are consistent with the Dietary Guidelines for Americans.
10. Decisions regarding the sale of foods in addition to the National School Lunch Program meals will be based on nutrition goals – not profit making.

Improving the nutritional qualify of foods and beverages available to students at school is clearly challenging, yet the literature presents a compelling case to being taking action to address the epidemic of childhood overweight

(Ebbeling, et al, 2002; Malloy, et al, 2002; Finkelstein, et al, 2003; Wechsler, et al., 2004; Andersen, et al, 2004; and Rainville, et al, 2005). For many students, meals and snacks consumed at school make a major contribution to the total day's consumption of food, calories and nutrients. Therefore, USDA (2001) recommends school districts across the nation begin to implement the "Ten Keys to Promote Healthy Eating in Schools" as quickly as possible.

Summary

Childhood overweight and obesity have reached epidemic proportions in the North Carolina and in the nation. Children are over-fed and under-nourished; they are consuming too many calories too few nutrients needed for optimal growth and development. As a result, children are at risk of overweight and obesity as well as a wide range of chronic conditions like hypertension, insulin-resistance syndrome, hyperlipidemia that have serious long-term health consequences, including cardiovascular disease, diabetes, hypertension, stroke and possibly cancer. Statistical data show dramatic increases in a range of health conditions among children and adolescents who are overweight or obese that are strongly associated with unhealthy diets and too little physical activity. Unhealthy diets not only burden families and individuals with impaired health and related costs but also impose substantial health-related costs on taxpayers, business and governments at all levels.

Food choices at school are influenced by the total eating environment in the schools, including types of foods available throughout the school, nutrition

information in the cafeteria and around the school, nutrition education provided in the classroom and nutrition promotions that reach families. For many students, school mealtime rarely consists of a nutritionally balanced meal. Instead, breakfast and lunch at school consists of individual items selected from *A la Carte* food lines, vending machines, and the school store. Items available at these locations are typically high in fat, sugar, and calories. These items are also typically low in essential nutrients such as vitamins and minerals.

Schools are not the only place where children consume unhealthy diets, but given the amount of time that students spend at school and the quantity of foods and beverages they consume there, the nutritional quality of foods available on school campuses is drawing increasing concern. While meals served as part of the National School Lunch and Breakfast Programs are required to achieve nutrition standards established in the *Dietary Guidelines for Americans,* other foods and beverages available on school campuses are not regulated. Foods and beverages sold in competition with the National School Lunch and Breakfast programs have become risk factors for less healthful diets among students. Empirical surveys show that competitive foods are widespread and readily available in schools and that their nutritional content is heavily imbalanced toward high levels of fat, added sugars and calories. Research also confirms that by virtue of their pervasive presence in schools, competitive foods interfere with healthier diets and are associated with negative, unhealthy changes in students' diets, including increased consumption of sweetened

beverages and high-fat foods and decreased consumption of fruits, vegetables, and milk.

Research, expert opinion and anecdotal evidence all support the conclusion that modifying the nutritional content of foods and beverages available on school campuses would improve the diets and, ultimately the health of students. As a result, federal, state and local efforts are underway to establish nutrition standards for foods and beverages available to students during the school day. The successful implementation of these policies will require an assessment of the barriers that prevent schools from implementing high nutrition standards. Ideally, once barriers are addressed and eliminated, schools may proceed to establish an optimal school nutrition environment which may begin to prevent and possibly reverse the trend of childhood overweight and obesity.

CHAPTER III

Methodology

The purpose of this study was to explore and describe the school nutrition environment in North Carolina's public schools. The study investigated six major areas. First, the study described the characteristics of Child Nutrition Directors and Supervisors who administer the Child Nutrition Programs within North Carolina's Local Education Agencies (LEAs). Second, the study described various aspects of the school environment within LEAs relative to the availability of foods and beverages to students. The investigation also examined the perceptions among Child Nutrition Directors and Supervisors about the school environment and the increasing prevalence of childhood overweight. Current practices in Child Nutrition Programs to improve the nutritional quality of school meals were described. The investigation identified potential barriers that may limit the availability of healthful foods and beverages in school meals programs. Finally, the investigation described possible strategies for minimizing and/or overcoming the barriers to enable Child Nutrition Programs to achieve optimal nutrition standards in North Carolina's public schools. An overview of the research design, population, instrumentation, instrument validity and reliability, data collection, and data analysis is discussed.

Research Design

The research design for the study was exploratory/descriptive in nature. An exploratory/descriptive methodology was the most appropriate design for this study because, to date, there was no data available to describe Child Nutrition Directors and Supervisors in North Carolina and to describe the school environment within the LEAs relative to the availability of foods and beverages to students during the instructional day. Further, there was no evidence of current Child Nutrition practices to promote healthier school meals in North Carolina's Public Schools. No data existed to describe the perceptions of the state's Child Nutrition Directors and Supervisors regarding the school environment and childhood overweight. While possible barriers to implementing healthful food choices have been identified through focus groups using qualitative means, no specific barriers, and possible strategies for overcoming the barriers have been documented in North Carolina.

Population

The population for the study was Child Nutrition Directors and Supervisors employed in North Carolina Public School's Child Nutrition Programs at the time of the study (N=239). The study was a population study; no sample was drawn. The population consisted of 115 Child Nutrition Directors and 124 Child Nutrition Supervisors. The names and addresses of Child Nutrition Directors and Supervisors were supplied by the NC Department of Public Instruction one month prior to data collection.

Instrumentation

A multi-sectioned questionnaire was developed by the researcher as the instrument for data collection. The questionnaire was constructed based on literature describing the availability of less healthful foods in Child Nutrition Programs and the influence of less healthful foods available in schools on childhood overweight. The questionnaire is shown in Appendix B. The instrument contained six sections. Section one of the instrument included statements about childhood overweight, the school meals environment, the adequacy of time for school meals, factors that influence the development of student's eating habits, nutrition education and the influence of school finances on the availability of healthful foods and beverages in Child Nutrition Programs. Respondents were asked to indicate their level of agreement or disagreement with the statements using a five-point rating scale (5 = strongly agree; 1 = strongly disagree).

Section two of the instrument included questions about current practices in Child Nutrition Programs related to the inclusion of more healthful food and beverage choices. The questions about current practices were derived from recommendations contained in the Dietary Guidelines for Americans (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2000). This section used closed-ended questions and included a list of specific healthful meal practices to which respondents indicated their current level of practice using one of three responses; the three response options available to respondents were yes, no, and considering.

The third section of the instrument explored barriers which influence Child Nutrition Director's and Supervisor's ability to offer more healthful foods and beverages in school meals. Respondents were asked to rank nine barriers from greatest barrier to barrier of least concern (greatest barrier = 1; barrier of least concern = 9). The barriers were generated through focus groups conducted by the National Food Service Management Institute (NFSMI), University of Mississippi. Section four of the instrument included open-ended questions to identify possible strategies for minimizing and/or overcoming the barriers associated with making more healthful foods and beverages available to students. Respondents were asked to list multiple strategies for minimizing and/or overcoming each barrier.

Section five of the instrument collected demographic information about North Carolina's Child Nutrition Directors and Supervisors, including age, job title, years employed in current position, years employed in Child Nutrition Programs in general, professional credentials, degree and area of educational preparation. Section six of the instrument was used to obtain descriptive information about the school district in which the Child Nutrition Director was employed; this section of the questionnaire was administered only to Child Nutrition Directors to avoid repetition in responses from Directors and Supervisors.

Instrument Validity and Reliability

The instrument was reviewed and scored for content validity by faculty and professional staff of the National Food Service Management Institute

(NFSMI). Faculty and professional staff from NFSMI were selected to validate the instrument because of the role of the Institute in improving the operation and accountability of Child Nutrition Programs nationwide. NFSMI was authorized by Congress in 1989 and established in 1990 on the campus of The University of Mississippi in Oxford, Mississippi, for the purpose of improving the operation of Child Nutrition Programs through research, education and training and information dissemination. Faculty and professional staff at NFSMI are experts in the administration of the federally funded Child Nutrition Programs, which includes the National School Lunch and School Breakfast Programs.

The instrument was pilot-tested by ten former Child Nutrition Directors and six former Child Nutrition Supervisors who had retired from service with NC's public schools within the past two years. Pilot-test participants initially received the questionnaire on April 28, 2005; participants received the questionnaire a second time on June 24, 2005. Section one of the instrument was tested for reliability using test-re-test methodology. Results from the initial test of the instrument compared with results from the re-test of the instrument yielded a correlation coefficient of .93. Sections two and three of the instrument were tested for consistency in responses over time. Nearly 99% of participants' initial responses were identical to their re-test responses in section two, and 97.2% of initial responses matched the participants' re-test responses in section three of the instrument. These percentages of agreement between participants' initial responses and their re-test responses reflect the instrument's stability over time.

Data Collection

Prior approval to conduct the study was obtained from the Institutional Review Board at NC State University on June 16, 2005 and from the North Carolina Department of Public Instruction on June 22, 2005. On July 1, 2005, the questionnaire, a postage-paid business reply envelope and a cover letter was sent via U.S. Mail to all Child Nutrition Directors and Supervisors included in the June, 2005 Directory of Child Nutrition Personnel provided by the NC Department of Public Instruction. The cover letter and questionnaire are shown in Appendix A. The cover letter informed recipients of the intent of the study, of the confidential nature of the study and advised that participation was voluntary. Each questionnaire was coded to enable accurate identification of the respondent. Participants were asked to return their completed questionnaires in the envelope provided by August 1, 2005.

As indicated in Table 1, a total of 239 questionnaires, return envelopes and cover letters were mailed to the target population which included 115 Child Nutrition Directors and 124 Child Nutrition Supervisors. The initial mailing of the instrument generated 173 completed questionnaires, of which 106 were completed and returned by Child Nutrition Directors and 67 were completed and returned by Child Nutrition Supervisors.

A second instrument, follow-up letter and postage-paid business reply envelope was mailed on August 5, 2005 to the 66 non-respondents; recipients were asked to return the completed questionnaire by August 20, 2005. No further attempts were made to collect the remaining unreturned questionnaires.

Responses to the second mailing of the instrument generated 41 completed questionnaires; eight questionnaires were returned by Child Nutrition Directors and 33 questionnaires were received from Child Nutrition Supervisors. All returned questionnaires were complete and usable for the study. A total of 211 questionnaires were received resulting in an 88.3% response rate. According to Issac and Michael (1984), non-response error is not problematic when the rate of response is 80% or greater.

Table 1. Results of Data Collection.

Total Questionnaires mailed	239
Questionnaires mailed to Child Nutrition Directors	115
Questionnaires mailed to Child Nutrition Supervisors	124
Total Returns from first mailing (July 1, 2005)	173
Returns from Child Nutrition Directors	106
Returns from Child Nutrition Supervisors	67
Total Returns from second mailing (August 5, 2005)	41
Returns from Child Nutrition Directors	5
Returns from Child Nutrition Supervisors	36
Total returned questionnaires from Child Nutrition Directors	111
Total returned questionnaires from Child Nutrition Supervisors	100
Total Questionnaires for analysis	211
Percent of returns for analysis	88.3%

To increase the early and overall response rate, Child Nutrition Directors and Supervisors, who responded within the initial timeline, were eligible to receive a $250.00 gift certificate from the School Nutrition Association. The names of all respondents who returned questionnaires by August 1, 2005 were entered into a drawing for the gift certificates. The names of five respondents were randomly drawn from all eligible respondents to receive the gift certificates; the five respondents selected to receive the gift certificates were notified by U.S. Mail.

Data Analysis

A codebook was prepared by the researcher to reflect the location of all possible participants' responses from the questionnaire. All participant responses were numerically coded and prepared for data entry and subsequent analysis. Quantitative data were analyzed using the Statistical Package for Social Sciences (SPSS) version 10.0. Population parameters (frequencies, means and standard deviations) were applied to the data to summarize and categorize responses to the questionnaire.

Qualitative data were also collected for the study. Respondents were asked to describe strategies for minimizing and/or overcoming barriers that may limit the availability of healthful foods and beverages in school meals. Respondents were also asked to categorize their responses into three levels based on the agency or entity responsible for implementing the strategy. The three levels included (1) the federal level which would require Congressional action and/or action by USDA, (2) the state level which would require action by the General Assembly of North Carolina and/or the State Board of Education, and (3) the local level which would require activity by local governments, local Boards of Education and/or School Administrators.

The researcher used an inductive approach to analyze the qualitative data and condense the respondents' raw text contained in section four of the questionnaire into a summary format. All strategies described by the respondents were recorded according to three levels (federal, state and local) as they appeared in the questionnaire. Once recorded, the researcher categorized

the responses by key terms and concepts. The researcher recorded the frequency of responses that contained similar concepts. Once the frequencies were determined, the researcher synthesized the responses into single descriptions of the strategies as reported by the respondents. Next, the researcher clustered the strategies into four additional categories based on the kind of action required for implementation of the strategies. The four additional categories included (1) legislative action, (2) policy adoption, (3) enforcement of existing legislation/policies and (4) advocacy.

Summary

This study examined the school nutrition environment in North Carolina's public schools. A six-part questionnaire was developed, validated and tested for use as the instrument for data collection. The instrument was administered to all (N = 239) Child Nutrition Directors and Supervisors employed in NC's public schools at the time of the study. Instruments were distributed via U.S. mail to all members of the study population. After one month, non-respondents were notified by U.S. Mail and asked to respond. Nearly 90% of the population completed and returned the questionnaire. Quantitative data were coded and statistically analyzed. An inductive approach was used to categorize and condense qualitative data to produce a summary of responses.

CHAPTER IV

Results

The purpose of this study was to explore and describe the current school nutrition environment in North Carolina's public schools. The investigation was multi-factorial; the study examined characteristics of Child Nutrition Directors and Supervisors who administer the Child Nutrition Program in North Carolina's public schools. The study also examined the characteristics of the school environment in the LEAs in which the Child Nutrition Directors and Supervisors are employed. The perceptions of Child Nutrition Directors and Supervisors about the school environment and childhood overweight were described. The study also assessed current practices in school breakfast and lunch programs to make more healthful food and beverage choices available to students during the instructional day. Barriers that limit the availability of healthful foods and beverages in Child Nutrition Programs were identified and possible strategies for minimizing and/or overcoming the barriers were described.

The first section of this chapter includes a profile of the respondents and a demographic description of the school districts in which they are employed. The second section includes Child Nutrition Directors' and Supervisors' perceptions of various conditions within the school in environment as related to childhood overweight and is followed by a section describing current practices in Child Nutrition Programs that reflect the availability of healthful foods and beverages in school meals programs. The next section of this chapter describes barriers that

may prevent Child Nutrition Directors and Supervisors from making more healthful foods and beverages available in school meals programs. The final section describes Child Nutrition Director's and Supervisor's recommended strategies for minimizing the barriers to allow for more healthful meals and beverages to be available in school breakfast and lunch programs. Both quantitative and qualitative data analysis procedures were utilized to produce these findings.

Profile of Respondents

All 239 Child Nutrition Directors and Supervisors employed in North Carolina's public schools were invited to participate in the study. One hundred and eleven Child Nutrition Directors and 95 Child Nutrition Supervisors completed and returned the questionnaire. Of 239 questionnaires mailed, 211 were completed and returned yielding an 88.3% response rate for the study.

Distribution frequencies were utilized to construct respondent profiles for both Child Nutrition Directors and Child Nutrition Supervisors. The respondent profiles include various demographic factors, including job title, age, years employed in current position, years employed in Child Nutrition Programs, educational experience and academic area of study and credentials. The respondent profile for Child Nutrition Directors is shown in Table 2.

Of the Child Nutrition Directors that responded, the majority (89.4%) identified their job title as Child Nutrition Director; only 10% were Executive

Table 2. Profile of Child Nutrition Directors (N = 111)

Characteristic	N	%
Job Title		
Child Nutrition Executive Director	10	10.6
Child Nutrition Director	101	89.4
Age		
22 – 30	4	3.5
31 – 40	18	16.0
41 – 50	39	34.5
51 – 60	47	41.6
61 – 70	5	4.4
Years in Current Position		
Less than 2 years	21	18.6
2 – 5 years	24	21.2
6 – 10 years	18	15.9
11 – 15 years	10	8.9
16 – 20 years	16	14.2
More than 20 years	24	21.2
Total Years in Child Nutrition		
Less than 2 years	3	2.7
2 – 5 years	10	8.9
6 – 10 years	22	9.4
11 – 15 years	16	14.2
16 – 20 years	19	16.8
More than 20 years	43	38.0
Highest Degree Earned		
High School Diploma	12	10.6
Bachelors Degree	63	55.8
Masters Degree	29	25.8
Doctoral Degree	1	0.8
Other	8	7.0
Area of Study		
Home Economics/Family and Consumer Sciences	37	32.7
Nutrition	33	29.2
Institutional Management	20	17.7
Business/Accounting	27	23.9
Other	26	23.0
Credentials Earned		
School Food and Nutrition Specialist (CFNS)	18	15.9
Registered Dietitian (RD)	11	9.7
Licensed Dietitian/Nutritionist (LDN)	9	8.0
Certified Nutrition Specialist (CNS)	3	2.7
Other	11	9.7

Directors. Over three-fourths (76.1%) of Child Nutrition Directors were between the ages of 41 and 60 years of age. The level of experience of the respondents was considerable; 44.3% of Child Nutrition Directors reported having been employed in their current position for more than ten years and 69% reported their total years of work experience in Child Nutrition Programs as more than 11 years. Thirty-eight percent of respondents reported over 20 years of work experience in Child Nutrition Programs.

Child Nutrition Directors were also asked about their educational backgrounds. Twenty respondents (17.6%) indicated their highest degree earned was a High School Diploma or an Associate of Arts Degree. The majority (55.8%) of Child Nutrition Directors had earned a Bachelors Degree and twenty-nine (25.8%) had earned a Masters Degree. Of those that had earned degrees, thirty-seven (32.7%) reported earning degrees in Home Economics and/or Family and Consumer Sciences. Thirty-three (29.3%) had earned degrees in Nutrition; twenty (17.7%) earned degrees in Institutional Management and twenty-seven (23.9%) held degrees in Business/Accounting. Twenty-six (23%) reported having earned degrees in other areas including education, economics, management, culinary science, political science, law and English.

Child Nutrition Directors were also asked whether they had earned professional credentials associated with the programs they managed. Eighteen (15.9%) indicated they were School Food and Nutrition Specialists (SFNS) and three (3) were credentialed as Certified Nutrition Specialists (CNS). Eleven responded they were Registered Dietitians (RD); nine of these were Licensed

Dietitians/Nutritionists. Eleven Child Nutrition Directors reported they were credentialed in other areas, including Certified Dietary Manager (CDM), Registered Sanitarian (RS) and Certification in Culinary Arts.

The same demographic data was collected from Child Nutrition Supervisors. The respondent profile for Child Nutrition Supervisors is shown in Table 3. When asked about their job titles, the majority (87%) of respondents indicated they were Child Nutrition Supervisors; only 13% indicated they had other titles including Child Nutrition Assistant, Child Nutrition Associate, Child Nutrition Bookkeeper, Child Nutrition Training Manager and Child Nutrition Consultant. The majority (75%) of Child Nutrition Supervisors were within the ages of 41 and 60.

Child Nutrition Supervisors reported fewer years in their current positions than Child Nutrition Directors. Half of the Child Nutrition Supervisors indicated they had been employed in their current positions for ten or fewer years. Of these, 26% of Child Nutrition Supervisors indicated they had been employed in their current position for less than 2 years. Only 11% of respondents reported employment in their current position for more than 20 years.

Like Child Nutrition Directors, the majority of Child Nutrition Supervisors had been employed in Child Nutrition Programs for a number of years. Forty-three percent of Child Nutrition Supervisors had been employed in Child Nutrition Programs for 16 or more years; of these 27% had been employed in Child Nutrition Programs for more than 20 years. Only 15% of respondents indicated they had been employed in Child Nutrition Programs for less than two years.

Table 3. Profile of Child Nutrition Supervisors (N = 100)

Characteristic	N	%
Job Title		
Child Nutrition Supervisor	87	87.0
Other	13	13.0
Age		
22 – 30	10	10.0
31 – 40	15	15.0
41 – 50	37	37.0
51 – 60	33	33.0
61 – 70	5	5.0
Years in Current Position		
Less than 2 years	26	27.0
2 – 5 years	16	16.0
6 – 10 years	8	8.0
11 – 15 years	14	14.0
16 – 20 years	25	25.0
More than 20 years	11	11.0
Total Years in Child Nutrition		
Less than 2 years	15	15.0
2 – 5 years	12	12.0
6 – 10 years	9	14.0
11 – 15 years	21	21.0
16 – 20 years	16	11.0
More than 20 years	27	28.0
Highest Degree Earned		
High School Diploma	29	29.0
Bachelors Degree	49	49.0
Masters Degree	15	15.0
Doctoral Degree	0	.0
Other	7	7.0
Area of Study		
Home Economics/Family and Consumer Sciences	17	17.0
Nutrition	25	25.0
Institutional Management	9	9.0
Business/Accounting	15	15.0
Other	18	18.0
Credentials Earned		
School Food and Nutrition Specialist (CFNS)	10	10.0
Registered Dietitian (RD)	12	12.0
Licensed Dietitian/Nutritionist (LDN)	7	7.0
Certified Nutrition Specialist (CNS)	4	4.0
Other	8	8.0

When asked about their educational experiences, 36% of Child Nutrition Supervisors responded their highest degree was a high school diploma or Associate of Arts degree. Another 49% responded their highest degree was a Bachelors Degree and 15% indicated they had earned a Masters Degree.

Child Nutrition Supervisors were asked about their area of study for the highest degree earned; 17% of respondents reported the area of study as Home Economics and/or Family and Consumer Sciences; 25% indicated nutrition as the area of study and 9% reported Institutional Management as the area of study. Fifteen percent of Child Nutrition Supervisors reported Business/Accounting as their area of study and18% indicated other areas of study including education, psychology, early childhood development, economics, sociology, mathematics and biology.

When asked about their professional credentials, ten percent of Child Nutrition Supervisors indicated they had earned the School Food and Nutrition Specialist (SFNS) credential; four percent had earned the Certified Nutrition Specialist (CNS) credential. Seven (7%) Child Nutrition Supervisors indicated they were Registered Dietitians and of those seven, four were Licensed Dietitians/Nutritionists. Seven (7%) Child Nutrition Supervisors responded they had earned other professional credentials including Certified Dietary Manager (CDM).

Profile of the School Districts

Child Nutrition Directors were asked to provide descriptive data about the school meals environment within their respective school districts or Local Education Agencies (LEA) as part of this study. The data were used to develop a profile of the 111 LEAs represented in the study. The size of the LEA, as measured by student enrollment, is shown in Table 4. Eighteen (16.2%) LEAs had student enrollments of less than 2,500. Two thirds of LEAs (66.6%) had student enrollments of fewer than 10,000 students. Only 17 (15.3%) LEAs reported student enrollment of 20,000 students or more.

Table 4. Student enrollment in Local Education Agencies (LEAs)

Number of Students	Number of LEAs	%
Fewer than 2,500 students	18	16.2
2,501 - 5,000 students	31	27.9
5,001 – 10,000 students	25	22.5
10,001 – 15,000 students	10	9.0
15,001 – 20,000 students	10	9.0
20,001 – 25,000 students	7	6.3
25,001 – 30,000 students	3	2.7
More than 30,000 students	7	6.3

Child Nutrition Directors were also asked to report the number of Child Nutrition Supervisors employed in the LEA's Child Nutrition Program. The number of Child Nutrition Supervisors per LEA is shown in Table 5. Nearly half (46.8%) of the districts had no Child Nutrition Supervisors; in these LEAs, the only Child Nutrition Administrator is the Child Nutrition Director. Thirty-one (27.9%) had only one Supervisor and 17 LEAs (15.3%) had two Supervisors. The two largest LEAs reported eight and nine Supervisors respectively.

Table 5. Number of Child Nutrition Supervisors employed within the LEA

Number of Child Nutrition Supervisors	Number of LEAs	%
None	52	46.8
One	31	27.9
Two	17	15.3
Three	4	3.6
Four	4	3.6
Five	0	0
Six	1	.9
Seven	0	0
Eight	1	.9
Nine	1	.9

The percentage of students in the LEA that qualified to receive free meals using the criteria established by the National School Lunch Program was provided by Child Nutrition Directors as part of the study. The mean percentage of students that qualified for free meals was 47.9% with a standard deviation of 15.34. The range of percentages of students that qualified for free meals is shown in Table 6. In 19 LEAs (17%), 30% or fewer students qualified for free meals. In over half (51%) of the LEAs, 31% - 45% of students were eligible for free meals. Eligibility for free meals ranged between 46% and 60% in 19 LEAs. Only sixteen (15%) LEAs reported student eligibility for free meals between 61% and 85% of students.

Table 6. Percentage of students that qualify for free meals

Percentage	Number of LEAs	%
Fifteen (15) to thirty (30) percent	19	17
Thirty-one (31) to forty-five (45) percent	57	51
Forty-six(46) to sixty (60) percent	19	17
Sixty-one (61) to eighty-five (85) percent	16	15

The percentages of students that qualified for reduced price meals as defined by the National School Lunch Program was also provided by Child Nutrition Directors. Table 7 shows the range of percentages of students eligible for reduced price meals. The mean percentage of students eligible for reduced price meals was 12.4% with a standard deviation of 12.51. In the majority of LEAs (63.9%), fewer than ten percent of students qualified for reduced price meals. In nearly one-third (30.6%) of the LEAs, student eligibility for reduced price meals ranged from 11% to 20%.

Table 7. Percentage of students that qualify for reduced price meals

Percentage	Number of LEAs	%
Ten (10) percent or fewer	71	63.9
Eleven (11) to twenty (20) percent	34	30.6
Twenty-one (21) to forty (40) percent	3	2.7
Forty-one (41) to eighty-nine (89) percent	3	2.7

The Average Daily Participation (ADP) in school meals programs was also reported by Child Nutrition Directors. ADP is a measure of the percentage of students enrolled in the district that consume breakfast provided by the Child Nutrition Program on the school campus. Students ADP in the school breakfast program is shown in Table 8. The mean ADP for school breakfast was 34.78% with a standard deviation of 19.17. The majority of LEAs (76.6%) reported school breakfast participation rates of 40% or less. Only 9% of LEAs had student participation rates in the school breakfast program that exceed 70%.

Table 8. Students Average Daily Participation in the School Breakfast Program

Average Daily Percentage	Number of LEAs	%
Nine (9) to twenty (20) percent	24	21.62
Twenty-one (21) to thirty (30) percent	34	30.63
Thirty-one (31) to forty (40) percent	27	24.32
Forty-one (41) to fifty (50) percent	9	8.1
Fifty-one (51) to sixty (60) percent	3	2.7
Sixty-one (61) to seventy (70) percent	4	3.6
Seventy-one (71) to eighty (80) percent	4	3.6
Eighty-one (81) to eighty-eight (88) percent	6	5.4

Participation rates in the school lunch program are generally higher than in the school breakfast Program. ADP in the school lunch program, as reported by Child Nutrition Directors, is shown in Table 9. The mean ADP for the school lunch program was 70.19% with a standard deviation of 12.62. ADP ranged from 47% to 93%. The majority of LEAs (85.6%) have participation rates between 61% and 90% in the school lunch program.

Table 9. Students Average Daily Participation in the School Lunch Program

Average Percentage	Number of LEAs	%
Forty-seven (47) to fifty (50) percent	5	4.5
Fifty-one (51) to sixty (60) percent	11	9.9
Sixty-one (61) to seventy (70) percent	34	30.6
Seventy-one (71) to eighty (80) percent	48	43.2
Eighty-one (81) to ninety (90) percent	13	11.7
Ninety-one (91) to ninety-three (93)	2	1.8

The study also measured the amount of time students had to consume meals at school. The amount of time allocated for school breakfast in elementary school is shown in Table 10. The mean amount of time students had to eat breakfast in elementary school was 17.78 minutes with a standard deviation of 7.30. Twenty four (21.62%) Child Nutrition Directors indicated that elementary students have only five to ten minutes for breakfast at school. Over half of the

respondents (55.9%) indicated that elementary students have between 11 and 20 minutes to eat school breakfast.

Table 10. Amount of time (in minutes) students have to eat school breakfast in elementary, middle and high schools

Amount of time (in minutes) for school breakfast	Number of LEAs	%
Elementary School	N	%
Five (5) to ten (10) minutes	24	21.6
Eleven (11) to fifteen (15) minutes	38	34.2
Sixteen (16) to twenty (20) minutes	24	21.6
Twenty one (21) to twenty-five (25) minutes	6	2.7
Twenty six (26) to thirty (30) minutes	18	11.2
Thirty one (31) to thirty-five (35) minutes	1	.9
Middle School	N	%
Five (5) to ten (10) minutes	32	28.8
Eleven (11) to fifteen (15) minutes	39	35.2
Sixteen (16) to twenty (20) minutes	18	16.2
Twenty one (21) to twenty-five (25) minutes	5	4.5
Twenty six (26) to thirty (30) minutes	16	14.4
Thirty one (31) to thirty-five (35) minutes	1	.9
High School	N	%
Five (5) to ten (10) minutes	38	34.2
Eleven (11) to fifteen (15) minutes	32	28.8
Sixteen (16) to twenty (20) minutes	18	16.2
Twenty one (21) to twenty-five (25) minutes	5	4.5
Twenty six (26) to thirty (30) minutes	17	15.3
Thirty-one (31) to thirty-five (35) minutes	1	.9

The amount of time allowed for students to eat breakfast in middle school is also shown in Table 10. The mean amount of time that was devoted to middle school breakfast periods was 16.85 minutes with a standard deviation of 7.42. Thirty-two (28.8%) Child Nutrition Directors responded that students in middle schools have five to ten minutes to eat school breakfast. Over half (51.3%) of the respondents indicated students in middle school have between 11 and 20

minutes to eat school breakfast. Less than 20% of Child Nutrition Directors responded that students have more than 20 minutes to eat school breakfast; (36.9%) allocated less than 20 minutes for students to in elementary school to eat lunch.

The amount of time provided for high school students to eat school breakfast is also shown in Table 10. The amount of time allocated for high school students is similar to that of middle school students. The only difference in the amount of time allocated for middle school and high school students is that more high schools allocate only five to ten minutes for breakfast than do middle schools. The mean amount of time allocated for school breakfast periods in high schools was 16.64 minutes with a standard deviation of 7.61.

The amount of time allocated for students to eat lunch was also measured. Table 11 shows the amount of time allocated for lunch for students in elementary, middle and high schools. The mean amount of time students in elementary school had to eat lunch at school was 24.30 minutes with a standard deviation of 4.80. While the majority (62.2%) of LEAs allocated at least 21 to 30 minutes for students in elementary school to eat lunch, over one-third (36.9%) allocated less than 20 minutes for students in elementary school to eat lunch.

The mean amount of time allocated for students in middle schools to eat lunch was 23.84 minutes with a standard deviation of 5.15. Over half (52.2%) of LEAs allocated between 21 and 30 minutes; over one-third (38.7%) allocated fewer than 20 minutes for students in middle school to eat lunch. The same

trend was reported in high schools with over half (57.6%) of LEAs allocating 21 to 30 minutes for students in high school to eat lunch, while over one third (38.7%) allocated less than 20 minutes for high school students to eat lunch. The mean amount of time allocated for students in high school to eat lunch was 24.77 minutes with a standard deviation of 6.05.

Table 11. Amount of time (in minutes) students have to eat school lunch in elementary, middle and high schools

Amount of time (minutes) for school lunch	Number of LEAs	%
Elementary School	N	%
Ten (10) to fifteen (15) minutes	5	4.5
Sixteen (16) to twenty (20) minutes	36	32.4
Twenty one (21) to twenty-five (25) minutes	37	33.3
Twenty-six (26) to thirty (30) minutes	32	28.8
Thirty-one (31) to thirty-five (35) minutes	1	.9
Middle School	N	%
Ten (10) to fifteen (15) minutes	6	5.4
Sixteen (16) to twenty (20) minutes	37	33.3
Twenty one (21) to twenty-five (25) minutes	38	34.2
Twenty-six (26) to thirty (30) minutes	30	27.0
Thirty-one (31) to thirty-five (35) minutes	0	.0
High School	N	%
Ten (10) to fifteen (15) minutes	7	6.3
Sixteen (16) to twenty (20) minutes	36	32.4
Twenty-one (21) to twenty-five (25) minutes	28	25.2
Twenty-six (26) to thirty (30) minutes	36	32.4
Thirty-one (31) to thirty-five (35) minutes	1	0.9
Thirty-six (36) to forty-five (45) minutes	3	2.7

Child Nutrition Directors were also asked whether they conducted a nutrient analysis of school meals and *A la Carte* items; their responses are shown in Table 12. Forty-six (41.4%) Child Nutrition Directors indicated nutrient analyses were conducted on reimbursable school meals; 65 (58.6%) responded that no nutrient analyses were conducted on reimbursable school meals.

Twenty-three (20.7%) responded that nutrient analyses were conducted on *A la Carte* foods and beverages and 88 (79.3%) responded that nutrient analyses were not conducted on *A la Carte foods* and beverages.

Table 12. Nutrient analyses conducted by the Child Nutrition Program of reimbursable school meals and *A la Carte* items

Nutrient analysis conducted	Number of LEAs	%
Reimbursable school meals		
Yes	46	41.4
No	65	58.6
Unsure	0	.0
A la Carte items		
Yes	23	20.7
No	88	79.3
Unsure	0	.0

The study identified the leading foods and/or beverages sold to students in elementary, middle and high schools as *A la Carte* items. The top selling items in elementary schools are shown in Table 13. Ice cream was reported as the top selling *A la Carte* item in elementary schools by over half (50.6%) of the Child Nutrition Directors. The following foods and/or beverages were reported, in

Table 13. Ten leading *A la Carte* food and beverage sale items in elementary schools

A la Carte Item	Number of LEAs	%
Ice Cream	56	50.6
Cookies	52	46.8
Baked snack chips	50	45.0
Water	46	41.4
Fruit juice and fruit ices (100%)	41	36.9
Milk	38	34.2
Fruit and cereal bars	32	28.8
Fruit drinks (10% - 50%)	30	27.0
Snack crackers	27	24.3
Fresh fruits or vegetables	23	20.7

descending order, as the leading *A la Carte* sale items in elementary schools: cookies, baked snack chips, water, fruit juice and fruit ices, milk, fruit and cereal bars, fruit drinks, snack crackers and fresh fruits and vegetables. The complete list of A la Carte items is shown in Appendix C.

The leading *A la Carte* foods and beverage sale items in middle schools is shown in Table 14. The leading *A la Carte* item sold in middle schools was cookies as reported by 55.8% of respondents. Water was the second leading item, followed by ice cream. The remaining *A la Carte* items in descending order as reported by Child Nutrition Directors included fruit drinks, pizza, French fries, fruit juice, baked snack chips, regular snack chips, and sports beverages. A complete list of *A la Carte* items available in middle schools is in Appendix C.

Table 14. Ten leading *A la Carte* foods and beverage sale items in middle schools

A la Carte Item	Number of LEAs	%
Cookies	62	55.8
Water	44	39.6
Ice cream	43	38.7
Fruit drinks (10% - 50% juice)	41	36.9
Pizza	39	35.1
French fries	34	30.6
Fruit juice (100%)	33	29.7
Baked snack chips	29	26.1
Regular snack chips	29	26.1
Sports beverages	28	25.2

The leading foods and beverages sold as *A la Carte* items in high schools are shown in Table 15. The top selling *A la Carte* item was specialty sandwiches as reported by 53.1% of Child Nutrition Directors. Pizza and cookies were reported as the second leading *A la Carte items.* The remaining top *A la Carte* items in descending order included water, French fries, fruit drinks, regular

snack chips, ice cream, sports drinks and iced tea. The complete list of *A la Carte* foods and beverages available to students in high school is in Appendix C.

Table 15. Ten leading *A la Carte* food and beverage sale items in high schools

A la Carte Item	Number of LEAs	%
Specialty Sandwiches	59	53.1
Pizza	56	50.4
Cookies	56	50.4
Water	50	45.0
French Fries	46	41.4
Fruit Drinks (10% - 50%)	45	40.5
Regular Snack Chips	35	31.5
Ice Cream	33	29.7
Sports Drinks	31	27.9
Iced Tea	24	21.6

The study also measured the percentage of the Child Nutrition Program's operating budget that was generated from the sale of foods and beverages sold as *A la Carte* items; the percentages are shown in Table 16. The mean percent of the Child Nutrition budget derived from *A la Carte* foods and beverages was 21.14% with a standard deviation of 9.83. Twenty Child Nutrition Directors (18%) reported the percentage of the budget generated from the sale of *A la Carte* items was 10% percent or less. Forty-nine (44.1%) reported the percentage was between 11% and 20%. Nearly one-fourth of Child Nutrition Directors (24.3%) reported the percentage of the operating budget generated from the sale of *A la Carte* items as 21% to 30%. Ten respondents (9.0%) indicated the percentage was between 31% and 40%, and five (4.5%) Child Nutrition Directors indicated the percentage of the Child Nutrition Program operating budget generated from the sale of *A la Carte* foods and beverages was between 41% and 52%.

Table 16. Percentage of the Child Nutrition budget generated from the sale of *A la Carte* foods and beverages

Percentage	N	%
ten (10) percent or less	20	18.0
eleven (11) to twenty (20) percent	49	44.1
twenty one (21) to thirty (30) percent	27	24.3
thirty one (31) to forty (40) percent	10	9.0
forty one (41) to fifty two (52)	5	4.5

Within the National School Lunch Program, competitive foods are those foods and beverages sold in competition with reimbursable school meals during the school day. Child Nutrition Directors were asked whether competitive foods were available to students during the school day in elementary, middle and high schools; their responses are shown in Table 17. Twenty-five (22.5%) Child Nutrition Directors reported competitive foods were available to students in elementary schools. Nearly half (48.6%) reported competitive foods were available in middle schools and over two thirds (70.3%) reported competitive foods were available to students in high schools.

Table 17. Availability of competitive foods during the school day in elementary, middle and high schools

Availability of competitive foods	Number of LEAs	%
Elementary Schools		
Yes	25	22.5
No	71	64.0
Unsure	15	13.5
Middle Schools		
Yes	54	48.6
No	44	39.7
Unsure	13	11.7
High Schools		
Yes	78	70.3
No	18	16.2
Unsure	15	13.5

Child Nutrition Directors were also asked about food or beverage-related fund-raising activities and whether or not those activities were in competition with the school breakfast or lunch programs in elementary, middle and high schools; their responses are shown in Table 18. Fifty (45%) Child Nutrition Directors reported fund raising activities in elementary schools, 69 (62.2%) reported fund raising activities in middle schools and nearly 80% of Child Nutrition Directors reported fund raising activities in high schools that were in competition with the Child Nutrition Programs.

Table 18. Fund raising activities conducted during the day that compete with the Child Nutrition Program in elementary, middle and high school

Fund raising activities	Number of LEAs	%
Yes	50	45.0
No	41	36.9
Unsure	20	18.1
Middle Schools		
Yes	69	62.2
No	24	11.1
Unsure	18	8.3
High Schools		
Yes	88	79.3
No	11	9.9
Unsure	12	10.8

Additionally, respondents were asked whether other activities conducted during the school day competed with the Child Nutrition Program in elementary, middle and high schools. Child Nutrition Director's responses are shown in Table 19. Only seven (6.3%) Child Nutrition Directors reported that other activities were conducted in competition with the school meals programs in elementary schools; 12 (10.8%) reported competitive activities in middle schools and 36

Child Nutrition Directors (32.4%) reported activities in competition with school breakfast and lunch programs in high schools.

Table 19. Other activities (club meetings, make-up tests, intra-mural activities, etc.) scheduled during the designated lunch period that compete with the Child Nutrition Program in elementary, middle and high schools

Other activities that compete with school meals	Number of LEAs	%
Elementary Schools		
Yes	7	6.3
No	72	64.9
Unsure	32	28.8
Middle Schools		
Yes	12	10.8
No	64	57.7
Unsure	35	31.5
High Schools		
Yes	36	32.4
No	39	35.1
Unsure	36	32.4

The study also explored the operation of vending machines that dispensed soft drinks and other confections on school campuses. Child Nutrition Directors were asked whether such vending machines were operational before the last child was served lunch in elementary, middle and high schools; their responses are shown in Table 20. Only ten (9.0%) Child Nutrition Directors reported that vending machines were operational in elementary schools before the last child was served lunch. The responses were higher in middle and high schools. Twenty Child Nutrition Directors (18%) indicated vending machines were operational before the end of the lunch period in middle schools and forty-nine (44.1%) indicated the machines were in operation before the last student was served lunch in high schools. Approximately one-fifth of Child Nutrition

Directors were unsure whether or not soft drink vending machines were operational in elementary schools (19%), middle schools (22%) and high schools (19%) before the last student was served lunch.

Table 20. Operation of vending machines that dispense soft drinks and other confections before last student was served lunch in elementary, middle and high schools

Operation of soft drink machines	Number of LEAs	%
Elementary Schools		
Yes	10	9.0
No	82	73.9
Unsure	19	17.1
Middle Schools		
Yes	20	18.0
No	69	16.2
Unsure	22	19.8
High Schools		
Yes	49	44.1
No	43	38.7
Unsure	19	17.1

The presence or absence of a pouring rights contract with soft drink vendors within the LEA was assessed as part of the study. Pouring rights contracts provide financial incentives to LEAs to promote soft drink sales to students during the school day. The exclusive vendor contracts include provisions that link financial incentives to increasing volumes of beverages sales. Exclusive pouring rights contracts may undermine the ability of the LEA to create an optimal school nutrition environment on school campuses. Data concerning pouring rights contracts are shown in Table 21. According to Child Nutrition Directors, 20 of the 111 LEAs that were represented in the study have exclusive pouring rights contracts with soft drink vendors.

Table 21. Pouring rights contract within the LEA

Pouring Rights Contract	Number of LEAs	%
Yes	20	9.2
No	90	81.1
Unsure	1	.9

Policies established by local Boards of Education (BOE) may influence the school meals environment. These policies are often related to the operation of the Child Nutrition Program, the availability of competitive foods on school campuses, use of foods and/or beverages as rewards, use of foods and/or beverages as fund-raisers, nutrition standards for foods and beverages available on school campuses and other policies related to the availability and accessibility of foods and beverages to students. Child Nutrition Directors were asked whether the local BOE had established policies concerning foods and beverages on school campuses. Child Nutrition Directors' responses are shown in Table 22. Ninety Child Nutrition Directors (81.1%) indicated their LEA's BOE had not established policies; 21 (18.9%) responded the local BOE had established policies addressing the availability of foods and beverages available in schools.

Table 22. Adoption of local board policies on foods available in schools

Availability	N	%
Yes	21	18.9
No	90	81.1
Unsure	0	.0

The School Health Advisory Council (SHAC) within the LEA serves in an advisory capacity to recommend policies for the local BOE's consideration and possible implementation. According to the SBE's Healthy Active Children's

Policy (HSP-S-000), the SHAC should be composed of representation from each of the eight areas in the Coordinated School Health Model, including Child Nutrition Services. Child Nutrition Directors were asked whether a member of the Child Nutrition Staff served as a member of the SHAC. Table 23 shows the number of LEAs where the Child Nutrition Program is represented on the SHAC. Over 90% of Child Nutrition Directors responded that a member of the Child Nutrition Program staff served on the SHAC; only 9 respondents (8.1%) indicated the Child Nutrition Program was not represented on the SHAC.

Table 23. Representation by Child Nutrition Personnel on the School Health Advisory Council (SHAC)

Child Nutrition Membership	N	%
Yes	102	91.9
No	9	8.1
Unsure	0	.0

Indirect costs assessed to the Child Nutrition Program have begun to place a huge financial burden on the operation and nutritional integrity of the school breakfast and lunch programs across the state. While LEAs are permitted to assess indirect costs to federal programs, like the Child Nutrition Programs, there is no federal, state or local mandate to do so. The assessment of indirect costs to the Child Nutrition Program in North Carolina is optional. State-wide, Child Nutrition Programs now pay nearly 12% of the total federal reimbursement to the LEA's general operating budget in indirect costs. Because the districts are assessed 100% of the unrestricted indirect cost rates, the amount of indirect cost assessed to the Child Nutrition Program is in excess of the actual costs generated by the program. The excess indirect cost funds are

used to support other programs, personnel and priorities within the LEA. This investigation assessed whether Child Nutrition Programs were charged indirect costs by the LEAs. Indirect cost assessment to the Child Nutrition Program is shown in Table 24. Seventy-five Child Nutrition Directors (67.6%) reported that indirect costs were assessed to the program; 36 respondents (32.5%) reported that indirect costs were not assessed to the Child Nutrition Program.

Table 24. Indirect cost assessed to the Child Nutrition Program

Indirect cost assessed	Number of LEAs	%
Yes	75	67.6
No	36	32.4

Child Nutrition Directors were also asked to indicate whether the Child Nutrition Program received the federally-required state revenue match for program operations. As a result of recent cuts in the state education budget, LEAs are seeking available resources to offset the funding losses and some districts are using the state revenues earmarked for Child Nutrition Programs for purposes other than financially supporting the school breakfast and lunch programs. Table 25 shows responses from Child Nutrition Directors concerning the state revenue match. Forty-one respondents (36.9%) reported the program had received the revenue match while 70 respondents (63.1%) reported the Child Nutrition Program had not been receiving the required revenue match.

Table 25. State revenue match for Child Nutrition Programs

State Revenue Match Received	Number of LEAs	%
Yes	41	36.9
No	70	63.1

Child Nutrition Directors were asked whether they report regularly to the local BOE concerning the operation of the Child Nutrition Programs within their LEAs; their responses are shown in Table 26. Communicating regularly with the local BOE is considered a critical role for Child Nutrition Directors to keep the board members apprised of the Child Nutrition Program's programmatic, nutritional and financial status and to communicate the program's priorities to these decision-makers. Two-thirds (69.5%) of respondents indicated they reported regularly to the LEA's BOE. Forty-five Child Nutrition Directors (40.5%) responded they did not report to the LEA's BOE.

Table 26. Child Nutrition Director reports regularly to the local Board of Education

Child Nutrition Director reports to the BOE	N	%
Yes	66	59.5
No	45	40.5
Unsure	0	.0

The Child Nutrition Director is the LEA's chief administrator of child nutrition programs. These professionals are responsible for collaborating with other school administrators and members of the local BOE to deliver high quality seamless nutrition services to students. Child Nutrition Directors are the primary source of current information and future trends concerning the school nutrition environment within the LEA. The study also examined the Child Nutrition Director's opinion about his/her authority to influence LEA policies concerning the availability of healthful foods and beverages on school campuses. Child Nutrition Directors' opinions are shown in Table 27. The majority (79.3%) of Child Nutrition Directors were of the opinion they had the authority to influence school

policies while 20.7% were of the opinion they had no authority to influence LEA policies related to the availability of healthful foods and beverages on school campuses.

Table 27. Child Nutrition Directors' opinions about their authority to influence LEA policies related to the availability of healthful foods and beverages on school campuses

Child Nutrition Director influences LEA Policies	N	%
Yes	88	79.3
No	23	20.7
Unsure	0	.0

Perceptions of Child Nutrition Directors and Supervisors

To determine Child Nutrition Directors and Supervisors perceptions of the school environment and childhood overweight, study participants were asked to respond to several statements by indicating their level of agreement or disagreement. These statements addressed the epidemic of childhood overweight, the school meals environment, administrators' and teachers' support of school meals programs, adequacy of time for school meals, factors that influence the development of student's eating habits, nutrition education and the influence of school finances on the availability of healthful foods and beverages in Child Nutrition Programs. A five-point Likert scale was used with five (5) indicating strong agreement and one (1) indicating strong disagreement with each statement; three (3) indicated the respondent was unsure or had no opinion.

Study participant's responses to the statements concerning childhood overweight are shown in Table 28. Nearly all (96.8%) Child Nutrition Directors

and Supervisors agreed that childhood overweight is a serious public health problem in North Carolina. Over 98% (211 respondents) agreed that poor food choices may promote weight gain in children and adolescents. When asked if physical inactivity may promote weight gain in children and adolescents, nearly all (99.5%) respondents agreed and 85% strongly agreed.

Table 28. Child Nutrition Directors' and Supervisors' perceptions of childhood overweight

	5 (SA)		4 (A)		3 (U/NO)		2 (D)		1 (SD)			
Statement	N	%	N	%	N	%	N	%	N	%	Mean	SD
Childhood overweight is a serious public health problem in NC.	149	68.7	61	28.1	4	1.9	-	-	-	-	4.68	.51
Poor food and beverage choices may promote weight gain in children and adolescents.	139	65.0	72	33.6	1	0.5	-	-	-	-	4.62	.55
Physical inactivity may promote weight gain in children and adolescents.	182	85.0	31	14.5	1	0.5	-	-	-	-	4.84	.38

Child Nutrition Directors and Supervisors were also asked about the relationship between school meals and childhood overweight. Their responses are shown in Table 29. When asked if some foods available as part of the school breakfast program in their specific school district may contribute to childhood overweight, 51.4% agreed and 38.2% disagreed. In response to the same statement regarding the influence of foods available as part of the school breakfast program on childhood overweight, 59.2% agreed and 30.9% disagreed with the statement. Respondents were asked if foods and beverages sold in school-operated ending machines, school stores and as fund-raisers contributed to childhood overweight; 81.6% agreed and only 6% disagreed.

Table 29. Child Nutrition Directors' and Supervisors' perceptions of the relationship between school meals and childhood overweight

	5 (SA)		4 (A)		3 (U/NO)		2 (D)		1 (SD)			
Statement	N	%	N	%	N	%	N	%	N	%	Mean	SD
Some foods available as part of the school breakfast program in my LEA may contribute to childhood overweight.	11	5.1	99	46.3	22	10.3	70	32.7	12	5.5	3.1	1.10
Some foods available as part of the school lunch program in my LEA may contribute to childhood overweight.	12	5.6	116	53.6	20	9.3	56	26.2	10	4.7	3.3	1.06
Foods sold in school-Operated vending machines, school stores and as school fund raisers in my LEA may contribute to childhood overweight.	101	46.5	76	35.1	24	11.1	11	5.1	2	.9	4.0	1.03

Child Nutrition Directors and Supervisors were also asked about the school meals environment; their responses are shown in Table 30. When asked if Child Nutrition programs should provide only healthful foods and beverage choices to children, over 70% agreed; 13.5% disagreed with this statement. Over 99% percent of Child Nutrition Directors and Supervisors agreed that healthful food choices were available in their Child Nutrition Programs. Fifty-eight percent of respondents agreed that healthful food and beverage choices were available to students through their Child Nutrition Program, but students did not choose them; 35% of respondents disagreed. In response to the statement that children like the taste of healthful foods such as fruits, vegetables and whole grains, nearly 65% of respondents agreed, while only 16.5% disagreed; nearly 20% of respondents were unsure.

Table 30. Child Nutrition Directors' and Supervisors' perceptions of the school nutrition environment

	5 (SA)		4 (A)		3 (U/NO)		2 (D)		1 (SD)			
Statement	N	%	N	%	N	%	N	%	N	%	Mean	SD
Child Nutrition Programs should provide only healthful foods and beverage choices for children	48	22.4	108	50.5	29	13.6	27	12.6	2	.9	3.81	.957
Healthful food choices are available to children in my LEA's Child Nutrition Program	136	63.6	76	35.5	1	0.5	1	0.5	-	-	4.62	.523
Healthful food choices are available to children in my LEA's Child Nutrition Program, but children do not choose them	16	7.5	108	50.5	15	7.0	71	33.2	4	1.9	3.28	1.06
Children like the taste of healthful foods such as fruits, vegetables and whole grains	11	5.1	128	59.8	40	18.7	34	15.9	1	.5	3.53	.837
In my LEA, the majority of foods and beverages sold as *A la Carte* items are higher in fat, sugar or calories than foods served as part of the reimbursable meal	18	8.4	118	55.1	13	6.1	52	24.3	13	6.1	3.36	1.12
Foods that are lower in fat, sugar and calories are not appealing to most students in my LEA	19	8.9	88	41.1	41	19.2	63	29.4	3	1.4	3.27	1.03

When asked if the majority of foods and beverages sold as *A la Carte* items are higher in fat, sugar or calories than foods served as part of the reimbursable meal, nearly two-thirds (63.5 %) agreed and one-third (30.4%) of the respondents disagreed. Fifty percent of Child Nutrition Directors and Supervisors agreed that foods and beverages that are lower in fat, sugar and

calories are not appealing to most students; nearly 20% of respondents were unsure and 30% disagreed.

Child Nutrition Directors and Supervisors were asked their opinions about the perceptions of school administrators and teachers regarding school breakfast and lunch programs. Table 31 shows their responses. Nearly 53% agreed that school administrators viewed the school breakfast program as a valuable part of the instructional day; however, a third of the respondents disagreed with this statement. Over 70% agreed that school administrators viewed the school lunch program as a valuable part of the instructional day, and 16.4% disagreed.

Table 31. Child Nutrition Directors' and Supervisors' perceptions of school administrators and teachers

	5 (SA)		4 (A)		3 (U/NO)		2 (D)		1 (SD)			
Statement	N	%	N	%	N	%	N	%	N	%	Mean	SD
School administrators view school breakfast as a valuable part of the instructional day in my LEA	21	9.8	92	43.0	30	14.0	61	28.5	10	4.7	3.25	1.12
School administrators view school lunch as a valuable part of the instructional day in my LEA	42	19.6	113	52.8	24	11.2	34	15.9	1	.5	3.25	1.13
Teachers view school breakfast as a valuable part of the instructional day in my LEA	16	7.4	78	36.4	44	20.6	65	30.4	11	5.1	3.75	1.08
Teachers view school lunch as a valuable part of the instructional day in my LEA	26	12.1	102	48.1	43	20.1	40	18.7	2	.9	3.52	.963

Teachers were perceived as viewing school breakfast as a valuable part of the instructional day by 43.8% of Child Nutrition Directors and Supervisors while 35.6% disagreed and 20.6% were unsure. When asked if teachers viewed the

school lunch program as part of the instructional day, 60.2% agreed, nearly 20% disagreed and 20% were unsure.

Child Nutrition Directors and Supervisors were also asked whether the amount of time students were given for school meals was adequate; their responses are shown in Table 32. When asked if students have adequate time to eat school breakfast, nearly 70% disagreed; only 25% agreed with this statement. Regarding school lunch, 35.5% agreed that students have adequate time to eat their meal, but nearly 55% disagreed.

Table 32. Child Nutrition Directors' and Supervisors' perceptions of the adequacy of meal times

	5 (SA)		4 (A)		3 (U/NO)		2 (D)		1 (SD)			
Statement	N	%	N	%	N	%	N	%	N	%	Mean	SD
Students have adequate time to eat breakfast at school	5	2.3	49	22.9	19	8.9	92	43.0	49	22.9	2.39	1.14
Students have adequate time to eat lunch at school	7	3.3	69	32.2	21	9,8	83	38.8	34	15.9	2.68	1.18

Given the variety of influences on children's eating habits, Child Nutrition Directors and Supervisors were asked if teachers had a positive influence on students' eating habits; results are shown in Table 33. Forty-six percent of respondents agreed that teachers had a positive influence on student's eating habits, while 22% disagreed and 20% were unsure. When asked if school cafeteria personnel served as positive role models to children in making healthful food choices, 55.1 % agreed, 26.2% disagreed and 18.7% were unsure. Respondents were also asked about the role of parents in the development of

eating habits. Ninety-four percent of Child Nutrition Directors and Supervisors agreed and 65.4% strongly agreed that parents were among the greatest influences on children's eating habits.

Table 33. Child Nutrition Directors' and Supervisors' perceptions of adult influences on children's eating habits

	5 (SA)		4 (A)		3 (U/NO)		2 (D)		1 (SD)			
	N	%	N	%	N	%	N	%	N	%	Mean	SD
Teachers positively influence students eating habits	37	17.3	83	28.8	47	22.0	46	21.5	1	0.5	3.51	1.03
Cafeteria employees are positive role models for children in making healthful food choices	17	7.9	101	47.2	40	18.7	55	25.7	1	0.5	3.36	.97
Parents have the greatest influence on children's eating habits	140	65.4	61	28.5	5	2.3	8	3.7	-	-	4.56	.72

Classroom nutrition education may also influence children's eating habits. Child Nutrition Directors and Supervisors were asked if students received adequate nutrition education in the classroom to prepare them to make healthful food and beverage choices. Seventy-two percent of respondents disagreed; 19.6% were unsure and only 8.3% agreed. Child Nutrition Director's and Supervisor's perceptions of nutrition education are shown in Table 34.

Table 34. Child Nutrition Directors' and Supervisors' perceptions of the adequacy of classroom nutrition education

	5 (SA)		4 (A)		3 (U/NO)		2 (D)		1 (SD)			
Statement	N	%	N	%	N	%	N	%	N	%	Mean	SD
Children receive adequate nutrition education in the classroom to prepare them to make healthful food and beverage choices	3	1.4	15	6.9	42	19.6	105	49.1	49	22.9	2.15	.90

Child Nutrition Directors and Supervisors were also asked about the influence of school finances on the school meals environment. Responses to statements about school finances are shown in Table 35. Over 80% of respondents agreed that the Child Nutrition program would not sell less nutritious foods and beverages if they were not financially dependent upon these items to generate revenues; 11.2% were unsure and 6% disagreed. When asked about the influence of indirect costs on the school meals environment, over 75% agreed that indirect costs assessed to Child Nutrition programs limit the Child Nutrition Director's ability to offer more nutritious foods such as fresh fruits, fresh vegetables and whole grain food choices to students; 22.7% were unsure and 12.2% disagreed with this statement.

Table 35. Child Nutrition Directors' and Supervisors' responses concerning school finances

	5 (SA)		4 (A)		3 U/NO)		2 (D)		1 (SD)			
Statement	N	%	N	%	N	%	N	%	N	%	Mean	SD
The Child Nutrition Program in my LEA would NOT sell less nutritious foods and beverages if they were not financially dependent upon these items to generate revenues	101	47.2	76	35.5	24	11.2	11	5.1	2	,9	4.23	.91
Indirect costs assessed to Child Nutrition Programs limit the CN Director's ability to offer more nutritious foods such as fresh fruits, fresh vegetables and whole grain food choices to students	93	43.5	70	32.7	25	22.7	22	10.3	4	1.9	4.06	1.06

Current Practices in Child Nutrition Programs

The study measured current practices in North Carolina's Public Schools to improve the nutritional quality of meals served in school breakfast and lunch programs. Child Nutrition Directors and Supervisors were asked about the LEA's involvement in various nutrition initiatives that promote healthful food choices in the school cafeteria. The initiatives of interest in this study were the Winner's Circle Program and the USDA Team nutrition Initiative. Table 36 describes the LEAs involvement in these initiatives. Nearly 90% of respondents indicated their LEAs were participating in the Winner's Circle program. Elementary schools were more involved in the Winner's Circle program than middle or high schools;

85.5% of respondents indicated the program was being implemented in Pre-K through fifth grades; 70.1% reported the Winner's Circle program was being implemented in middle schools and nearly 70% reported the program was being implemented in high school.

Table 36. LEA's Participation in healthy school meals Initiatives

Program/Initiative	Y	%	N	%	U	%
LEA participates in Winner's Circle	187	88.2	25	11.8	5	.02
in pre-K – 5th grade	183	85.5	31	15.5	3	.01
in grades 6– 8	150	70.1	64	29.9	3	.01
In grades 9 – 12	141	65.9	73	34.1	3	.01
LEA participates in USDA's Team Nutrition Initiative	137	64.0	77	36.0	3	.01
in pre-K – 5th grade	136	63.6	78	36.4	3	.01
In grades 6 – 8	104	48.6	110	51.4	3	.01
In grades 9 – 12	96	44.2	117	54.9	3	.01
LEA participates in other nutrition Initiatives	141	66.2	72	33.8	4	.02

Sixty-four percent of respondents indicated their LEAs were participating in USDA's Team Nutrition initiative. Like the Winner's Circle initiative, elementary schools were more involved than middle and high schools in the Team Nutrition initiative as 63.6% of respondents indicated the program was active in elementary schools; 48.6% of respondents indicated the Team Nutrition initiative had been implemented in middle schools and 44.2% of respondents indicated the Team Nutrition initiative had been implemented in high schools within their LEAs.

Two-thirds (66.2%) of respondents indicated their school districts were involved in other nutrition initiatives designed to promote a healthful school meals

environment. These initiatives included the 5-a-Day Program, the USDA Fresh Fruit and Vegetable Program, the No-Risk Pilot initiative and the Healthy Carolinians initiative.

Child Nutrition Directors and Supervisors were asked about current food preparation and service practices that improve the nutritional integrity of the school meals programs in their respective LEAs. For each food preparation or service practice, respondents were asked to indicate whether or not they were implementing the practice or service in their Child Nutrition Programs and, if so, at what grade levels. Current preparation and services practices as reported by Child Nutrition Directors and Supervisors are shown in Table 37.

Over 98% of Child Nutrition Directors and Supervisors reported their LEA's Child Nutrition Programs had increased the amount of fresh fruits available to students and 87% of Child Nutrition Directors and Supervisors responded their LEAs had increased the availability of fresh vegetables to students during school breakfast and lunch. Whole grain breads had been increased as a means of improving the nutritional content of school meals in nearly three-fourths of the LEAs. When asked if they had eliminated fried foods in school meals as a means of improving the nutritional integrity of school meals, 71.9% of Child Nutrition Directors and Supervisors responded that the LEA was no longer frying any foods in the school breakfast and lunch programs.

Eliminating whole milk has also been recommended as a means of improving the nutritional content of school meals. Ninety-two percent of Child Nutrition Directors and Supervisors reported their LEAs have eliminated whole

milk in the Child Nutrition Programs. Over 86% of Child Nutrition Directors and Supervisors reported their LEAs have reduced the number of desserts available to students in their school meals programs.

Child Nutrition Directors and Supervisors were asked about foods and beverages available to students as *A la Carte* items. Specifically, they were asked about the availability of high fat foods served as *A la Carte* items. Over 88% of respondents indicated their LEA had reduced the kinds and amounts of high fat *A la Carte* foods available to students. The availability of foods high in sugar as *A la Carte* items was also of interest to the researcher. Over 88% of Child Nutrition Directors and Supervisors reported their LEA had reduced the amount of high sugar foods served *A la Carte* and 87% indicated they had reduced the availability of beverages high in sugar as *A la Carte items.*
In addition to foods high in sugar, respondents were also asked about the availability of beverages high in sugar as *A la Carte* items. Over 87% of respondents indicated their LEA had reduced the availability of beverages high in sugar to students. Each of the food preparation or service practices had been implemented in more elementary schools than in middle or high schools.

Table 37. Current preparation and service practices to improve the nutritional integrity of school meals as reported by Child Nutrition Directors and Supervisors

Practice	Yes		No	
	N	%	N	%
Increased fresh fruits	208	97.2	6	2.8
at breakfast in Pre K – 5	138	64.5	76	35.5
at lunch in Pre K – 5	204	95.2	10	4.7
at breakfast in grades 6 – 8	133	62.1	81	62.1
at lunch in grades 6 – 8	203	94.9	11	5.1
at breakfast in grades 9 – 12	130	60.7	84	39.3
at lunch in grades 9 – 12	202	94.4	12	5.6

Table 37. Continued

Practice	Yes		No	
	N	%	N	%
Increased fresh vegetables	185	86.4	29	13.6
at breakfast in Pre-K – 5	51	23.8	163	76.2
at lunch in Pre-K – 5	181	84.6	33	15.4
at breakfast in grades 6 – 8	52	24.3	162	75.7
at lunch in grades 6 – 8	178	83.2	36	16.8
at breakfast in grades 9 – 12	52	24.5	162	75.7
at lunch in grades 9 – 12	177	81.6	37	17.3
Increased whole grain breads	156	71.9	58	27.1
at breakfast in Pre-K – 5	115	53.7	99	46.3
at lunch in Pre-K – 5	149	69.6	65	30.4
at breakfast in grades 6 – 8	111	51.9	103	48.1
at lunch in grades 6 – 8	147	68.7	67	31.3
at breakfast in grades 9 – 12	108	50.5	106	49.5
at lunch in grades 9 – 12	144	67.3	70	32.7
Eliminated fried foods	162	75.7	52	24.3
at breakfast in Pre-K – 5	128	59.8	86	40.2
at lunch in Pre-K – 5	162	75.7	52	24.3
at breakfast in grades 6 – 8	111	51.9	103	48.1
at lunch in grades 6 – 8	110	51.4	104	48.8
at breakfast in grades 9 – 12	100	46.7	114	53.3
at lunch in grades 9 – 12	82	39.3	132	61.7
Eliminated whole milk	197	92.1	17	7.8
at breakfast in Pre K – 5	194	90.7	20	9.3
at lunch in Pre K – 5	196	91.6	18	8.4
at breakfast in grades 6 – 8	190	88.8	24	11.2
at lunch in grades 6 – 8	194	90.7	20	9.3
at breakfast in grades 9 – 12	187	87.4	27	12.6
at lunch in grades 9 – 12	191	89.2	23	10.7
Reduced the number of desserts	186	86.9	28	13.1
at breakfast in Pre-K – 5	117	54.7	97	45.3
at lunch in Pre-K – 5	186	86.9	29	13.1
at breakfast in grades 6 – 8	107	50.	105	50.0
at lunch in grades 6 – 8	170	79.4	44	20.6
at breakfast in grades 9 – 12	104	47.9	110	51.4
at lunch in grades 9 – 12	162	75.7	52	24.3

Table 37. Continued

Practice	Yes		No	
	N	%	N	%
Reduced availability of high fat foods served as a la carte	189	88.3	25	11.7
at breakfast in Pre-K – 5	138	64.4	76	35.5
at lunch in Pre-K – 5	188	87.9	26	12.1
at breakfast in grades 6 – 8	130	61.0	83	39.0
at lunch in grades 6 – 8	172	80.4	42	19.6
at breakfast in grades 9 – 12	126	58.9	88	41.1
at lunch in grades 9 – 12	162	75.7	52	24.3
Reduced the availability of a la carte foods that are high in sugar	189	88.3	25	11.7
at breakfast in Pre-K – 5	143	66.8	71	33.2
at lunch in Pre-K – 5	187	87.4	27	12.6
at breakfast in grades 6 – 8	131	61.2	83	38.8
at lunch in grades 6 – 8	168	78.5	46	21.5
at breakfast in grades 9 – 12	124	58.2	89	41.8
at lunch in grades 9 – 12	159	74.6	54	25.4
Reduced the availability of a la carte beverages that are high in sugar	187	87.8	24	12.2
at breakfast in Pre-K – 5	136	63.6	78	36.4
at lunch in Pre-K – 5	186	87.3	27	12.7
at breakfast in grades 6 – 8	128	60.1	85	39.9
at lunch in grades 6 – 8	168	78.9	45	21.1
at breakfast in grades 9 – 12	121	56.8	92	43.2
at lunch in grades 9 – 12	157	73.7	56	26.3

Barriers that Prevent Child Nutrition Programs from Making More Healthful Foods Available in School Breakfast and Lunch Programs

The National Food Service Management Institute conducted focus groups to identify possible barriers that may prevent Child Nutrition Programs from providing more healthful foods and beverages in school breakfast and lunch programs. Child Nutrition Directors and Supervisors were asked whether the barriers identified by NFSMI were actual barriers in the Child Nutrition Programs within their respective LEAs; their responses are shown in Table 38. Nearly all (99.1%) respondents agreed that school finances were a barrier to making more

healthful foods and beverages available in school meals programs. Over two-thirds (67.6%) agreed that lack of support from school administrators and the local Board of Education (BOE) was a barrier to the availability of more healthful foods and beverages in Child Nutrition Programs. Lack of support from principals, teachers and parents was reported as a barrier by 78.9%, 80.2% and 82.1% respectively. Nearly 85% of respondents indicated that limited time and/or space for students to eat school meals in a relaxed atmosphere was a barrier and over 90% agreed that student taste preferences for high fat, high sugar, high calories foods was a barrier to making more healthful foods and beverages available in Child Nutrition Programs. Ninety-two percent of Child Nutrition Directors and Supervisors agreed that too little nutrition education in the classroom was a barrier and 86.4% of respondents agreed that good nutrition and healthful school meals are not valued as part of the instructional day. Nearly 90% agreed that conflicting messages on school campuses was a barrier to making more healthful foods and beverages available in Child Nutrition Programs.

Table 38. Barriers that limit the availability of healthful foods and beverages in Child Nutrition Programs

	Agree		Disagree		Unsure	
Barrier	N	%	N	%	N	%
School finances (CN Program must produce revenues)	209	99.1	2	0.9	-	-
Too little nutrition education in the classroom to influence children's eating habits	194	92.0	7	3.3	10	4.7
Conflicting messages (nutrition concepts taught in the classroom while vending machines with less healthful foods are readily accessible outside the classroom)	193	89.9	12	5.5	5	0.5
Student taste preferences are for high fat, high sugar, high calorie foods	192	91.1	11	5.1	8	3.8
Nutrition is not valued as part of the instructional day	183	86.4	20	9.3	9	4.2

Table 38. Continued

	Agree		Disagree		Unsure	
Barrier	N	%	N	%	N	%
Limited time/space for students to eat school meals in a relaxed atmosphere	178	84.9	30	14.2	2	0.9
Lack of support from teachers	174	82.1	22	11.5	13	6.1
Lack of support from parents	174	80.2	20	10.1	17	8.9
Lack of support from principals	168	78.9	34	16.9	9	4.2
Lack of support from superintendent and /or School Board	144	67.6	56	27.2	11	5.2

Strategies Recommended by Child Nutrition Directors and Supervisors to Minimize and/or Overcome the Barriers that May Limit the Availability of Healthful Foods and Beverages in Child Nutrition Programs

Child Nutrition Directors and Supervisors were asked to describe strategies to minimize or overcome the barriers that prevent Child Nutrition Programs from making more healthful foods and beverages available to students in the school breakfast and lunch programs. Respondents were also asked to categorize the strategies according to three levels. The three levels included (1) the federal level which would require Congressional action and/or action by USDA, (2) the state level which would require action by the General Assembly of North Carolina and/or the State Board of Education and (3) the local level which would require activity by local governments, local Boards of Education and/or School Administrators. An inductive approach was used to further cluster the strategies into four additional categories based on the kind of action required for implementation of the strategies. The four additional categories included (1) legislative action, (2) ordinance and/or policy adoption, (3) enforcement of existing laws and/or policies and (4) advocacy. The strategies recommended by Child Nutrition Directors and Supervisors are described in relation to each of the barriers they address.

Barrier: School Finances

The majority of Child Nutrition Directors and Supervisors that participated in the study recommended strategies to minimize or overcome the barrier of school finances. Specific strategies that were recommended to minimize or overcome the barrier of school finances are shown in Appendix D. At both the federal and state levels, strategies that would require legislative action by Congress or the N.C. General Assembly were most frequently recommended. Most strategies requiring legislative action would also require the appropriation of federal or state funds. Strategies requiring Congressional action included the provision of universal free breakfast and lunch (181 responses), an increase in the federal rate of reimbursement to adequately cover all costs associated with producing a healthful, appealing school breakfast or lunch (168 responses), elimination of the reduced price meal category (163 responses), more stringent competitive foods regulations (145 responses), reinstatement of federal funds for food service equipment (121 responses) and the expansion of the USDA Fresh Fruit and Vegetable Program (58 responses).

Strategies requiring legislative action by the N. C. General Assembly included the elimination of the indirect cost assessment to the Child Nutrition Program (177 responses), the provision of financial support to the Child Nutrition Program on a per-meal basis (154 responses) and for training Child Nutrition personnel (14 responses), the appropriation of state funds to pay the cost of state-mandated pay raises for Child Nutrition Personnel (121 responses), expansion of the Kindergarten Breakfast Program to all elementary schools (34

responses), and the development of realistic nutrition standards for all foods and beverages on school campuses that may be measured and monitored for compliance (21 responses). Two strategies were recommended at the local level which would require action by local government or the local school board, and would require additional funds. These strategies included the provision of funds to support the Child Nutrition Program in the same manner that local funds are provided to educational programs (25 responses) and the provision of funds to subsidize LEAs that have a high percentage of students that qualify for free or reduced price meals.

Child Nutrition Directors and Supervisors also recommended strategies that would require adoption of ordinances or policies. The majority of these strategies were made at the local level which would require action by local government, the local Board of Education or School Administrators. These strategies included the elimination of indirect cost assessments to the Child Nutrition Program (179 responses), the provision of local funds to replace those revenues currently generated from school vending to support educational programs and activities (136 responses), the inclusion of funds for cafeteria equipment and/or renovations in local bonds or other new constructions (56 responses), and the provision of funds to pay workman's comprehensive insurance premiums for cafeteria employees like all other LEA personnel (44 responses).

Strategies that would require enforcement of existing laws or policies were also recommended by the respondents. One strategy that was recommended by

Child Nutrition Directors and Supervisors at all three levels was the requirement to provide state revenue matching funds directly to the local Child Nutrition Program. Eighty-seven respondents recommended this strategy at the federal level, 118 recommended it at the state level, and 136 responses recommended the strategy at the local level. Another recommended strategy was to enforce current policies of the State Board of Education concerning competitive foods (93 responses).

Child Nutrition Directors and Supervisors also recommended strategies to minimize or overcome the barrier of school finances that would require advocacy on behalf of the Child Nutrition Program. At the federal level, respondents recommended that policy-makers investigate the adverse affects of indirect costs on the provision of healthful, appealing meals to students (107 responses). Another recommended strategy was that USDA sponsor a national initiative to involve the food industry in providing nutritious, appealing foods for students at affordable prices (64 responses). At the state level, respondents recommended that the state agency implement a state-wide purchasing group to assist local Child Nutrition Programs save money through cooperative purchasing (57 responses). Other recommended advocacy strategies included the development of student-appealing standardized recipes (11 responses), the provision of more “farm-to-school” produce in the Child Nutrition Program (9 responses), rewards for schools that adhere to the competitive foods policies (7 responses) and the development of a state-wide media plan to show the positive aspects of Child Nutrition Programs (6 responses).

Barrier: Lack of Support from School Administrators and the Local Board of Education

Child Nutrition Directors and Supervisors recommended strategies to minimize or overcome the barrier of inadequate support from school administrators and local Boards of Education (BOE). These recommended strategies are listed in Appendix E. Strategies that would require legislative action included the development of federal regulations that would eliminate competitive foods during the school day (152 responses), the allocation and appropriation of funds for mandated nutrition standards (124 responses) and regulations that would hold the LEA accountable for financial losses as a result of competitive foods instead of the Child Nutrition Program (86 responses). Strategies recommended at the state level that would require legislative action included a ban on the sale of soft drinks and other vended sales that compete with the Child Nutrition Program (89 responses) and the allocation of state funds for renovation of school cafeterias to make them appealing and safe for students and equip them to prepare healthful meals for students (81 responses).

Strategies that would require ordinance or policy adoption were also recommended to address the barrier of lack of support from School Administrators and/or local BOEs. Child Nutrition Directors and Supervisors recommended that nutrition standards be developed for all foods on campus, not just foods available through the Child Nutrition Program (103 responses). They also recommended that nutrition standards should be required for all events conducted on the school campus including athletic functions, fund raisers, PTO

meetings, teachers' meetings and School Board meetings (93 responses). Respondents also recommended that Child Nutrition Personnel be included in all ABC financial incentives like all other school personnel who support students' academic achievement (76 responses).

Strategies that would require enforcement of existing policies were also recommended. Child Nutrition Directors and Supervisors recommended that the annual agreement to operate Child Nutrition Programs be revised to directly address responsibilities of the Superintendent, Finance Officer and local BOE to support the Child Nutrition Program by adhering with all federal and state regulations and SBE policies, assure an adequate amount of time for students to eat breakfast and lunch at school, and actively promote the Child Nutrition Program (114 responses).

Advocacy-related strategies were also recommended. At the state level, it was recommended that a social marketing campaign be developed to help school administrators develop a positive attitude about the Child Nutrition Program (44 responses) and help them understand the role of school meals in supporting the academic achievements of students (78 responses). Another strategy would require Child Nutrition Directors to provide at least one annual report to their local BOEs in order to keep them well-informed about the accomplishments, challenges and current status of the Child Nutrition Program (27 responses). It was also recommended that local BOE members visit school cafeterias more often to see the needs and outcomes of the program for themselves (18 responses).

Barrier: Conflicting Messages

Child Nutrition Directors and Supervisors recommended strategies to minimize or overcome the barrier of conflicting messages on school campuses. Conflicting messages occur when nutrition concepts are taught in the classroom while vending machines with less healthful foods are readily accessible outside the classroom. Respondents' recommended strategies are shown in Appendix F. Strategies that were recommended at the federal level which would require legislative action included a modification of Federal Child Nutrition regulations to require schools to serve the healthiest meals possible to students (136 responses) and to prevent brand name marketing to students (75 responses). It was also recommended that No Child Left Behind (NCLB) legislation should be amended to add nutrition education as a required component of the educational curriculum (124 responses). Respondents also recommended that universal free meals should be available to all students, regardless of socioeconomic status, in order to eliminate the stigma associated with the school breakfast and lunch programs (113 responses). Child Nutrition Directors and Supervisors also recommended strategies at the state level for minimizing and/or overcoming the barrier of conflicting messages. One recommended strategy at the state level was to fund more nutrition standards pilots at no financial risk to the Child Nutrition Program to determine the economic feasibility of serving only healthful foods and beverages available in school meals programs (44 responses).

Strategies were also recommended that would require the adoption of ordinances or policies. At the state level, it was recommended that individual

school principals should be held accountable for competitive foods violations, not the Child Nutrition Program (62 responses). Respondents also recommended strategies including the development of reasonable nutrition standards for school meals and *A La Carte* items (92 responses) and all other foods and beverages available on the school campus (41 responses). In addition, respondents recommended that the State Board of Education (SBE) require nutrition education as a component of the Standard Course of Study (88 responses).

Strategies were also recommended for implementation at the local level. Specifically, Child Nutrition Directors and Supervisors recommended that local BOEs establish and enforce local policies that prioritize children's health needs simultaneously with their academic achievement needs (67 responses). It was also recommended that local BOEs ban pouring rights contracts (44 responses) and adopt strict policies on school vending and competitive food and beverage sales (38 responses). Respondents also recommended that policies be established to require school buses to be scheduled in a manner that allows students adequate time to eat breakfast at school as late bus arrivals prevent some students from participating in the school breakfast program (17 responses).

Strategies requiring advocacy on behalf of the Child Nutrition Program were also recommended. Child Nutrition Directors and Supervisors recommended a state-wide media campaign to promote public awareness of the healthful aspects of the school breakfast and lunch programs (62 responses) and would prevent the Child Nutrition Program from becoming the scapegoat for childhood overweight and obesity (24 responses). Respondents also

recommended that School Administrators and local BOE members actively support the school breakfast and lunch programs (74 responses) while addressing the issue of investing in healthful school meals now, as opposed to investing in higher health care costs in the future (51 responses). A recommendation was also made to educate parents, principals, teachers, students, the community and the media about healthy eating and physical activity as a means of providing consistent messages to stakeholders so they may collaborate with schools to prevent childhood overweight and obesity (23 responses).

Barrier: Lack of Support from Principals

Strategies were recommended by Child Nutrition Directors and Supervisors to address the barrier of lack of support from Principals. Recommended strategies are listed in Appendix G. At the federal level, recommended strategies included changes in the law that would assess financial penalties for violations of competitive foods regulations to the individual school's general fund instead of the Child Nutrition Program (113 responses) and that would prohibit the sale of any food or beverage from any source other than the Child Nutrition Program during the instructional day (19 responses). It was also recommended that the No Child Left Behind (NCLB) Legislation be amended to require healthful foods and beverages in school meals (62 responses).

Strategies that would require the adoption of ordinances or policies were also recommended by respondents. At the state level, respondents

recommended that policy-makers fund all school-based programs that have become financially dependant upon the revenues from the sale of items contained in vending machines (104 responses). It was also recommended that principals be required to sign a page of the annual agreement between the LEA and the SBE to operate the Child Nutrition Programs indicating they would abide with all the rules and regulations of the program (79 responses). Another strategy recommended by respondents was to require the Child Nutrition Program Administrators to oversee all vended operations on the school campus as a means of discouraging competitive food sales (78 responses). Respondents also recommended that state and/or local policies be developed to require high school students to be supervised during meals times (18 responses.) At the local level, it was recommended that the local BOE adopt policies to restrict school fund-raising to non food items in order to avoid competition with school meals (40 responses).

Strategies that would require enforcement of existing laws and policies were recommended. Stronger enforcement of rules governing the sale of competitive foods during breakfast and lunch were recommended (128 responses). Similarly, it was recommended that the SBE enforce their policies that govern the sale of foods in competition with the Child Nutrition Program (127 responses).

Strategies that required advocacy on behalf of the Child Nutrition Programs included the provision of incentives to schools and principals that make only healthful food and beverage choices available to students (24

responses). It was also recommended that principals be educated about the relationship between healthful meals and academic achievement (92 responses). Child Nutrition Directors and Supervisors suggested that principals should "set the pace" within their schools by modeling healthy behaviors and by encouraging school personnel to foster a healthy school environment (47 responses).

Barrier: Good Nutrition and Healthful School Meals are Not Valued as Part of the Instructional Day

Child Nutrition Directors and Supervisors recommended strategies to minimize or overcome the barrier that good nutrition and healthful school meals are not valued as an integral part of the instructional day. Many of the recommended strategies for this particular barrier were described in relation to other barriers, and are not repeated in this section of the chapter. All responses are shown in Appendix H. Strategies requiring legislative action included amending the NCLB legislation to include nutrition education as a required educational component (54 responses) and to mandate, at the federal and/or state levels, meal times based on the age of the child to ensure adequate time for meal selection and consumption (33 responses federal; 52 responses state). It was also recommended that principals be required to actively support the school breakfast and lunch programs and to establish a target participation rate and hold principals accountable for the participation rate as part of the principal's performance evaluation (31 responses). The final recommendation pertaining to this barrier would require the adoption of state and/or local BOE policies; it was

recommended to extend nutrition standards to adults on campus as well as to students (8 responses).

Barrier: Lack of Support from Teachers

Child Nutrition Directors and Supervisors recommended strategies to minimize or overcome the barriers associated with the lack of support from teachers. Some of the strategies for this particular barrier were described in relationship to other barriers and are not repeated in this discussion. Respondents' recommended strategies are included in Appendix I.

One of the strategies recommended to address the lack of support from teachers would require an amendment to SBE policies that would include nutrition concepts to be included on end-of-grade tests as a means of promoting nutrition education in the classroom (41 responses). It was also recommended that state certification laws be amended to allow teachers to earn certification renewal credits by attending nutrition and physical activity-related staff development courses (50 responses). Respondents also recommended that an incentive system be implemented to recognize teachers who include nutrition and physical activity as part of their ongoing classroom activities (46 responses) and reward teachers who serve as positive nutrition and physical activity role models for students (41 responses). It was also recommended that local BOE policies be developed to prevent teachers from selling foods to students for any purpose (29 responses).

Recommended strategies requiring advocacy on behalf of the Child Nutrition Program included the provision of training to teachers to serve as mentors and role models to students in the development of healthful eating habits (69 responses). It was also recommended that teachers be adequately educated about the positive relationship between students' healthful eating habits and their academic performance (58 responses).

Barrier: Lack of support from Parents

Child Nutrition Directors and Supervisors recommended strategies for minimizing or overcoming the barriers associated with lack of support from parents. Respondents' recommended strategies are included in Appendix J. Strategies requiring policy adoption included the implementation of a SBE policy regulating the nutritional content of foods brought to school from home (18 responses) and fast food restaurants (41 responses). The remaining strategies involved advocacy on behalf of the Child Nutrition Program and included the development of a social marketing campaign targeting parents as the child's "first teacher" with the message that good eating habits are established at home and reinforced at school (34 responses federal level; 14 responses state level). Another recommended strategy was to develop a national media campaign to educate parents about the current Child Nutrition Program in order to get parents involved in their children's school nutrition environment (25 responses) and to show parents the benefits of school meals to all children not just those children who qualify for free or reduced price meals (18 responses). Other advocacy strategies included providing nutrition education for parents at PTO meetings (11

responses), including an area on students' report cards to include an indicator of the child's food choices at school (8 responses), and facilitating frequent presentations by the Child Nutrition Director to parents at PTO meetings to help them understand their roles in helping their children develop healthful eating habits (38 responses). There were also recommendations to adequately fund and involve the Cooperative Extension Service in educating parents about children's nutritional needs and the role of the Child Nutrition Program in helping children meet their nutritional needs (4 responses).

Barrier: Limited Time and Space

Study participants were asked to recommend strategies to minimize or overcome the barrier of limited time and space for students to select or consume breakfast and/or lunch at school. Strategies requiring legislative action included the provision of a minimum of 30 minutes for students to select and consume their meal at school (21 responses) and the restoration of federal funds for purchasing equipment needed to serve students more efficiently and to minimize the amount of time spent waiting in the cafeteria lines (14 responses). The remaining strategies recommended by Child Nutrition Directors and Supervisors were described in previous sections of this chapter and are not repeated in this discussion. Participants' complete responses are shown in Appendix K.

Barrier: Too Little Nutrition Education in the Classroom to Influence Students' Food and Beverage Choices

Study participants recommended strategies to minimize or overcome the barrier of too little nutrition education in the classroom to influence students' food and beverage choices. Respondents' recommended strategies are described in Appendix L. Strategies requiring legislative action included the inclusion of nutrition education as part of the NCLB legislation (18 responses) and the restoration of federal funds to support the Nutrition Education and Training Program (15 responses). Strategies requiring policy adoption by the SBE included requiring nutrition education as a mandated component of the state's standard course of study (31 responses) and the availability of technology support to all NC public schools to allow students to access Mypyramid.com in order to use the site as a meal planning tool (3 responses). Strategies that would require policy adoption by the local BOE included a financial incentive to require teachers to devote at least 5 minutes each day to discuss nutrition concepts in their classrooms (8 responses) and the employment of Registered Dietitians within the LEAs to coordinate and provide nutrition education in grades K – 5 (3 responses).

Strategies requiring advocacy on behalf of the Child Nutrition Program were also reported. Strategies included the provision of incentives and resources to teachers to integrate nutrition education into the existing curriculum (15 responses), the provision of nutrition education to teachers to enable them to provide accurate information to students (8 responses), and providing information

to teachers and principals about the academic value of healthful school meals (14 responses).

Barrier: Students' Taste Preferences

Child Nutrition Directors and Supervisors recommended strategies for minimizing or overcoming the barrier of students' taste preferences. Participants' responses are shown in Appendix M. Strategies that would require legislative action included the enactment of laws that would prevent advertising or branding on school campuses (15 responses), the reinstatement of federal funds for the Nutrition Education and Training Program (12 responses), the reinstatement of federal funds for the purchase of equipment for school cafeterias (9 responses), the provision of more commodity foods that are appealing to children (5 responses), and expansion of the USDA Fresh Fruit and Vegetable Program to provide funds for more schools to participate (4 responses).

Strategies requiring policy adoption that address the barrier of students' taste preferences were also recommended. Strategies included the provision of special grants to districts to enable them to renovate their cafeterias to make the dining hall more inviting and appealing to students (12 responses), a ban on soft drinks in schools (7 responses), the development of policies to control the kinds of foods students may bring from home (12 responses), and the implementation of policies that limit the use of less healthful foods in class parties, school stores and fund-raising activities (12 responses).

Strategies requiring advocacy on behalf of the Child Nutrition Program were also recommended. The strategies included the development of a media

campaign targeted to parents to show the short and long-term consequences of children's poor diets (13 responses), the promotion of positive relationships with the media (8 responses), the provision of more assistance in menu development and nutrient analysis (2 responses), promoting the value of good nutrition to the local BOE as a means of reducing student absences, increasing attention spans and increasing test scores (6 responses) and the provision of consistent messages about healthy foods in the cafeteria, classroom, hallways, etc. until eating healthfully becomes the "cool" thing to do at school (2 responses).

CHAPTER V

Conclusions, Implications and Recommendations

The purpose of this research was to explore and describe the current school nutrition environment in North Carolina's public schools. The investigation examined perceptions of the state's Child Nutrition Directors and Supervisors about childhood overweight and the school environment. The study also assessed current practices in school meals programs to enhance the nutritional integrity of foods and beverages available to students. In addition, the study identified possible barriers that may limit the availability of healthful foods and beverages in school meals and described possible strategies to overcome the barriers.

Study participants included Child Nutrition Directors and Supervisors that administer the National School Lunch and School Breakfast Programs in the state. Nearly 90% of the Child Nutrition Directors and Supervisors participated in the study. Demographic data were obtained about the respondents and the LEAs in which they were employed. A descriptive analysis of the data was completed.

This chapter presents the conclusions and implications that are drawn from the findings of the study. General recommendations for consideration in the administration of Child Nutrition Programs are included and recommendations for future research are proposed in this chapter.

The following research questions guided this study:

1. What characteristics describe the school environment in general as related to the availability of foods and beverages to students?
2. What characteristics describe Child Nutrition Directors and Supervisors in North Carolina?
3. What perceptions do North Carolina's Child Nutrition Directors and Supervisors have about the school environment and childhood overweight?
4. What practices are being implemented in Child Nutrition programs to make more healthful foods and beverages available to students during the school day?
5. What barriers, if any, may limit the availability of healthful foods and beverages in school breakfast and lunch programs?
6. What, if any, possible strategies may exist to minimize and/or overcome the barriers to making more healthful foods and beverages available within the school breakfast and lunch program?

Conclusions and Implications

The following conclusions were derived based on the perceptions and self-reported service and preparation practices of Child Nutrition Directors and Supervisors. The subsequent implications reflect the congruence between the conclusion and the documentation in the current literature.

Conclusion 1: Child Nutrition Directors and Supervisors in North Carolina are keenly aware of the serious public health problems posed by the epidemic of childhood overweight and recognize that poor food and beverage choices and inadequate physical activity contribute to weight gain among children and adolescents. Over 96% of Child Nutrition Directors recognize that childhood overweight poses a serious public health concerns; 98% acknowledge that poor food and beverage choices promote weight gain and 99.5% acknowledge that physical inactivity promotes weight gain in children and adolescents. Child Nutrition Directors and Supervisors, like other child health advocates, recognize that childhood overweight has escalated to the point that the condition is the most prevalent nutritional problem facing children and adolescents and is now placing the health of the nation's youth at risk (Deitz and Klish, 2001; Institute of Medicine, 2005). This conclusion validates the findings of Price and Telljohann (1994) which suggested that 79% of Child Nutrition Directors recognize that normal weight was important to children's optimal health and development and 48% believed that Child Nutrition personnel should play a major role in preventing childhood overweight and obesity.

Conclusion 2: The majority of Child Nutrition Directors and Supervisors think Child Nutrition Programs should provide only healthful foods and beverage choices to children. Nearly all (99.1%) Child Nutrition Directors and Supervisors indicated that healthful food choices were available in their Child Nutrition Programs. Over 70% of Child Nutrition Directors and Supervisors in North Carolina think the Child Nutrition Programs should provide only healthful foods

and beverage choices to children. This finding is consistent with the findings of Price and Telljohann (1994) which suggested that 88% of Child Nutrition Directors believed it was their duty to plan and prepare nutritionally balanced meals for students.

Conclusion 3: Healthful food and beverage choices are available to students in North Carolina's school breakfast and lunch program; conducting nutrient analyses of school meals and A la Carte foods and beverages would enable LEAs to plan student-appealing meals that meet specific nutrition standards. The majority of the state's Child Nutrition Programs have implemented service and preparation practices that improve the nutritional integrity of school breakfast and lunch programs. Specific practices include an increase in fresh fruits and vegetables and whole grain products, a decrease in the availability of *A la Carte* foods and beverages that are high in fat and sugar, and an elimination of whole milk and fried foods. Preparation and service practices that improve the nutritional integrity of school meals have been implemented in elementary, middle and high schools in North Carolina. Fewer than half (41%) of Child Nutrition Programs conduct nutrient analyses of school meals and only 20% conduct nutrient analyses of *A la Carte* items. In the absence of data that document that school meals meet specific nutrient standards, school meals may continue to be criticized for serving only "junk foods" to students. For example, pizza is a known favorite food of children and adolescents. Pizza alone can be high in fat and calories. But a slice of pizza, served with a garden salad, a fresh fruit cup and skim milk can be a nutritious,

appealing meal for students. Without a nutrient analysis, however, it is impossible to determine the nutrient contribution of the meal.

Conclusion 4: Child Nutrition Programs in North Carolina are doing a better job of achieving nutritional integrity in elementary schools than in middle or high schools. This conclusion is consistent with the findings of USDA (2001) that indicate that elementary schools are achieving nutrition goals consistent with the Dietary Guidelines for Americans more rapidly than secondary schools.

Conclusion 5: Foods and beverages available to students as A la Carte items are higher in fat, sugar or calories than foods and beverages served as part of the reimbursable meals. Two-thirds of Child Nutrition Directors and Supervisors report that foods and beverages available as *A la Carte* items are less nutritious than the foods and beverages available as part of the reimbursable meal. While the federal government has established nutrition standards for reimbursable school meals served through the National School Lunch and School Breakfast Programs, there are no federal, state or local standards for foods and beverages sold *A la Carte* (US GAO, 2003). The shift in providing children with greater access to less healthful foods available as *A la Carte* items has the potential to erode the positive influences of school meals (USDA, 2001).

Conclusion 6: Competitive foods are available in approximately one-fourth of elementary schools, half of middle schools and three-fourths of high schools. The availability of competitive foods on school campuses has been shown to undermine the nutritional integrity of the school breakfast and lunch programs

and discourage participation (USDA, 2001). Competitive foods are relatively low in nutrient density and high in fat, added sugar and calories. When children replace school meals with less nutritious foods, they are at risk for inadequate nutrient intake and excess caloric intake (USDA, 2001).

Conclusion 7: Foods sold in competition with Child Nutrition Programs in North Carolina may contribute to childhood overweight. Over 80% of Child Nutrition Directors and Supervisors indicated competitive foods are widely available on North Carolina's public school campuses. According to the USDA (2001), competitive foods are relatively low in nutrient density and high in fat, added sugar and calories. As previously stated, when children replace school meals with less nutritious foods, they are at risk for inadequate nutrient intake and excess caloric intake which may result in weight gain. When competitive foods are purchased in addition to the school meal, there is the risk of over-consumption that may also contribute to overweight and obesity (USDA, 2001).

Conclusion 8: Fund-raising activities involving the sale of foods and beverages that compete with Child Nutrition Program are being conducted in nearly half of elementary schools, two-thirds of middle schools and three-fourths of high schools in North Carolina. Foods and beverages sold as classroom or school fund-raisers are often high in calories, fat and sugar (Kubik, et al., 2005). When foods and beverages are used as fund-raisers on school campuses, students have more opportunities to eat and drink at school which may promote the consumption of more foods and beverages high in calories and low in nutrients and may contribute to childhood weight gain.

Conclusion 9: Vending machines that dispense soft drinks and other confections (before the last student is served lunch) are operational in nearly half of all high schools in North Carolina. According to the Center for Science in the Public Interest (2005), three-fourths of the drinks and 85% of the snack foods served in vending machines on school campuses are of poor nutritional value. The American Academy of Pediatrics (2004) suggests that each 12-oz sugared soft drink consumed daily has been associated with a 0.18-point increase in a child's BMI and a 60% increase in risk of obesity. Increased availability of soft drinks and snack foods through vending machines on school campus creates the potential for over consumption of calories and subsequently plays a key role in childhood overweight.

Conclusion 10: The Child Nutrition Program in North Carolina is an integral part of the Coordinated School Health Model. In over 90% of LEAs, Child Nutrition personnel are actively involved in the School Health Advisory Council (SHAC) as mandated by the State Board of Education. The role of Child Nutrition Services within the Coordinated School Health Model is to provide students with access to a variety of nutritious and appealing meals that accommodate the health and nutrition needs of all students and achieve high standards that promote optimal nutrition integrity in school meals.

Conclusion 11: The majority Child Nutrition Directors and Supervisors in North Carolina are prepared academically and experientially to manage the Child Nutrition Programs. According to the Center for Disease Control and Prevention's School Health Policies and Programs Study (2000), only 40% of

Child Nutrition Directors have an undergraduate degree. In North Carolina, the majority of Child Nutrition Directors (82.8%) of have earned a Bachelors Degree and 25.8% have earned a Masters Degree. In addition, 62.1% of Child Nutrition Supervisors have earned a Bachelors Degree and 15% have earned a Masters Degree. Experientially, 78% of Child Nutrition Directors have been employed in Child Nutrition Program for more then ten years; 38% have been employed in the programs for more than 20 years.

Conclusion 12: The majority of local Boards of Education in North Carolina have not adopted policies that address the availability of foods and beverages on school campuses. The National Association of State Boards of Education (NASBE) has also recommended that local Boards of Education adopt policies to encourage healthy eating (NASBE, 2002). Nutrition policies for schools can shape students' consumption of more healthful foods. According to Neumark-Sztainer, French, Hannan, Story and Fulkerson (2005), local Boards of Education policies that decrease access to foods and beverages that are low in nutrients and high in fats and sugars are associated with less frequent purchases of these items among students in secondary schools.

Conclusion13: Lack of support from Local School Administrators and Boards of Education are barriers to making more healthful food and beverage choices available to students. Over 40% of Child Nutrition Directors are not permitted to report directly to the local BOE about the Child Nutrition Program. While 80% of Child Nutrition Directors have the authority to influence LEA policies related to the availability of healthful foods and beverages on school

campuses, 20% do not have the authority to influence food and beverage-related decision-making.

Conclusion 14: School finances are the leading barrier that limits the availability of more healthful foods and beverages in the school breakfast and lunch programs. This conclusion is consistent with the findings of the US Government Accounting Office (2003) which suggests that increased financial demands have begun to shape the school nutrition environment. With increasing financial pressures and limited resources, schools often put nutrition at the bottom of the priority list and fail to support school breakfast and lunch programs financially. Over 80% of Child Nutrition Directors and Supervisors agreed that the Child Nutrition Program would not sell less nutritious foods if they were not financially dependent upon those items to generate revenues. Over 75% of Child Nutrition Directors and Supervisors agreed that indirect costs assessed to the Child Nutrition Program limits the program's capacity to offer more nutritious foods, such as fresh fruits, fresh vegetables and whole grain food choices to students. Nearly 70% of all Child Nutrition Programs are assessed indirect costs by the LEA. Only one-third of Child Nutrition Programs receive state revenue matching funds to offset the costs of food, equipment, labor and other expenditures associated with the administration and operation of the Child Nutrition Program.

Conclusion 15: Student taste preferences may limit the availability of healthful foods and beverages in school breakfast and lunch programs. This conclusion is consistent with similar studies of students' taste preferences.

According to Kubik (2003) students' food preferences often drive food choices available in schools and school meals often reflect students' preferences for fast foods, sweetened beverages and salty snacks. While healthful foods and beverages are available in school meals, over half of the state's Child Nutrition Directors and Supervisors indicate that students do not choose them. Foods and beverages that are lower in fat, sugar and calories are not typically appealing to most students, and therefore, are not selected as often as foods and beverages that are higher in calories, fat and sugar.

Conclusion 16: Lack of support from teachers is a barrier to the availability of more healthful foods and beverages choices to students during the instructional day. Over 80% of Child Nutrition Directors and Supervisors agree that lack of support from teachers is a barrier to making more healthful foods and beverages available in Child Nutrition Programs. Fewer than half of Child Nutrition Directors and Supervisors perceive that teachers view the school breakfast program as a valuable part of the instructional day and only 60% of Child Nutrition Directors and Supervisors perceive that teachers view the school lunch program as a valuable part of the instructional day. Only 46% of Child Nutrition Directors and Supervisors perceive that teachers have a positive influence on student's eating habits.

Conclusion 17: There is too little nutrition education in the classroom to adequately prepare students to make healthful food and beverage choices. Over 70% of Child Nutrition Directors and Supervisors indicate there is too little nutrition education to influence students' food and beverage choices. The

primary goal of nutrition education is to influence students' eating behaviors. Building nutrition knowledge and skills helps children make healthy eating and physical activity choices. In the absence of sound nutrition education, students often lack the knowledge and skills needed to make optimal food choices.

Conclusion 18: Numerous strategies exist to overcome the barriers that limit the availability of healthful foods and beverages in school meals programs. The most effective strategies to minimize or overcome the barriers identified by Child Nutrition Directors and Supervisors will require legislative action at the federal and/or state levels or the adoption of policies that would provide adequate funds to the Child Nutrition Program to purchase, prepare and serve healthful foods and beverages to students who consume breakfast and lunch in North Carolina's public schools.

Recommendations for Current Practice in the Administration of Child Nutrition Programs in North Carolina

This study provided information that may be useful to Child Nutrition Directors and Supervisors and other school administrators in the current operation of Child Nutrition Programs in North Carolina. Clearly, Child Nutrition Directors and Supervisors are making strides to improve the nutritional integrity of school meals. The data provides evidence that Child Nutrition Programs are important vehicles for increasing the availability of fresh fruits and vegetables and whole grain products to students during the school day. The evidence also suggests there are ongoing efforts to eliminate high fat foods like whole milk, fried foods and high-fat entrees and desserts; the evidence also supports efforts

to reduce the availability of foods and beverages high in sugar. However, few stakeholders are aware of the significance of these efforts. School administrators, local board members, principals, teachers, parents, students and the media should be informed of these changes that are occurring in the local Child Nutrition Programs. It is imperative that Child Nutrition Directors and/or Supervisors share this positive information with key stakeholder groups in order to keep them informed of the progress the programs are making and to invite their support for continuous improvements that promote the health and well-being of students. Child Nutrition Directors should seek opportunities to communicate with local BOE members on a regular basis. At least semi-annually, they should provide a public presentation to BOE members and parents to keep them informed of the program and its changing needs and priorities. Efforts should also be made to gain the support, involvement and understanding of local BOE members and parents regarding the Child Nutrition Program and the relationship between healthy, well-nourished students and high academic performance.

Other school-based personnel should also be informed about and involved in the Child Nutrition Program's efforts to improve the nutritional integrity of school meals. Principals and teachers are perceived as barriers in implementing much-needed changes in the school meals programs, yet these individuals are in key positions to help students understand the need for healthier school meals. Efforts should also be made to inform school-based personnel about the importance of Child Nutrition Programs in helping all students achieve their academic best.

A state-wide social marketing campaign would enable the 115 Child Nutrition Directors in the state to work collaboratively to share a clear, consistent message about more healthful school meals for students. A message that is as simple as “children have to be well-nourished in order to learn AND they have to learn how to be well-nourished” can resonate the importance of investing in healthful school meals and the relationship between good nutrition and good grades.

In order to more precisely document the nutritional changes in the Child Nutrition Program, Child Nutrition Directors and Supervisors must begin to conduct nutrient analyses of menus and to begin planning menus more creatively. Students’ taste preferences for certain foods does not have to be a barrier to changes in the school meals programs if some of their preferred foods are included in a menu plan that includes other more nutritious foods. Using nutrient analysis as a menu planning tool would enable the program to continue to satisfy students, teaching them that all foods, if selected with good health and good taste in mind, can be part of a healthful diet. Conducting nutrient analyses regularly would also provide the data needed to convince skeptics about the kinds of food and beverage choices available to students during the school day.

School administrators should revisit the role of the school meals program as part of the academic day. Nearly 50% of the children in North Carolina’s public schools qualify for free and reduced price meals. For a majority of children, meals consumed at school are an important part of the students’ overall diets. For these children and many others who may not be eligible for free or

reduced price meals, foods served at school are among the most nutritious foods available. Therefore, school administrators should insist on a high quality school meals program, a pleasant, non-threatening environment in which meals and snacks may be consumed and adequate time for students to eat the meal or snack. All too many school cafeterias have become “feeding frenzies” as students rush to get something to eat so they will not be hungry for afternoon classes. Acknowledging students’ needs for sound nutrition and socialization around food would make the dining experience more appealing to students and teachers. A relaxed meal environment may also minimize the “necessity” of having to “grab foods from a vending machine” in order to get something to eat and get back to class on time.

Members of the NC General Assembly and decision-makers at the North Carolina Department of Public Instruction, and the State Board of Education should be informed of the primary barrier that is preventing Child Nutrition Programs from providing more healthful foods and beverages to students. The primary barrier identified in this study was school finances – the requirement for Child Nutrition Programs to be revenue producing. In the absence of adequate funding for educational purposes, LEAs have begun to depend upon the revenues generated from the sale of foods and beverages to students. Yet the sale of some foods (high calorie, low nutrient foods) has been documented to be a factor in the development of unhealthy food choices and subsequently childhood overweight. School districts cannot balance their budgets on the bellies of children without paying a huge price in the future. Chronic health

conditions that result from the development of poor eating habits during the school-age years will cost the state financially in lost productivity and increased health care costs. Can the General Assembly afford not to financially support the Child Nutrition Program in its efforts to provide nutritious, appealing meals to students knowing the cost of not doing so could create a insurmountable financial burden for the state in years to come?

Next to the family unit, schools are positioned to help students learn, practice and ultimately develop lifelong healthful eating habits. An optimal school nutrition environment should be the goal of every school administrator, BOE member, parent, principal, teacher and tax payer. As LEAs in North Carolina develop, adopt and implement the federally-mandated local wellness policies in preparation for the June 30, 2006 deadline, students' health and well being, as reflected in an optimal school nutrition environment should be the foundation of those policies. The wellness policies can be the catalyst for change within the school district as these policies can provide the authority to ensure adequate nutrition education in the classroom, reasonable nutrition standards for all foods and beverages on campus, limitations on competitive foods during the school day (including foods used as fund-raisers and offered as rewards) and the elimination of any food or beverage that has a questionable impact on students' health. This researcher challenges every School Superintendent and local BOE member in North Carolina to develop these policies based on the needs of students and not the desire for revenues.

Recommendations for Future Research

The current investigation provided a foundation for further research concerning the school nutrition environment in North Carolina's public schools. The following recommendations are presented based on the findings, conclusions and implications of this study. This study identified and described several conditions that exist in the school nutrition environment. Future research efforts should attempt to quantify data concerning these conditions. Specifically, future research should measure the actual availability of healthful foods and beverages in school meals by obtaining menus and obtaining the nutrient analyses of the reimbursable menu items and nutrient analyses of items available as *A la Carte* foods and beverages. Future research should also attempt to measure the inter-relatedness of various factors that currently exist in LEAs that have been identified through this investigation. If answered, the following questions would enable administrators and policy-makers to modify the school environment in a manner that would more effectively and efficiently support nutrition integrity in school meals:

1. Do the qualifications of Child Nutrition Directors and/or Supervisors influence the availability of healthful foods and beverages in school meals?

2. Do various demographic factors within the LEA (size of LEA, geographic region of LEA, percentage of students that qualify for free and/or reduced price meals, average daily participation) influence the availability of healthful foods and beverages in school meals?

3. When students choose foods and/or beverages sold in competition with school meals for breakfast and/or lunch, what is the caloric and nutrient content of these foods as opposed to the foods available in the school breakfast or lunch program?

4. What is the financial loss to the Child Nutrition Program's operating budget when students choose foods sold in competition with school meals (from vending machines, school stores, fund-raisers)? Does the revenue loss impact the operating budget in a manner that limits the ability to purchase healthful foods and beverages for school meals?

5. What is the financial gain to school districts from pouring rights contracts? How can this amount of revenue be replaced by another source of revenue that does not adversely affect the current and future health of students?

Future research is also needed to address the barriers that limit the availability of healthful foods and beverages in school meals that were validated as a result of this inquiry. The most immediate research need would be to quantify the projected costs associated with achieving nutrition integrity in school meals. The adverse effects of indirect cost assessments to the school meals programs should also be quantified. Perhaps the most urgent research priority as a result of this study would be an investigation of the cost of action versus the cost of inaction; the question of finances must be answered before sustainable changes in the school nutrition environment may be changed. In order to make informed, responsible decisions, policy-makers must know the financial costs of making only healthful foods and beverages available in school meals; policy-makers also need quantitative projections about the direct and indirect costs to the state's economy and health care system should the school nutrition environment go unchanged.

Other barriers should be addressed through further qualitative research. Focus groups with principals, teachers, parents and students would identify issues that need further exploration in order to reverse the level of support from these key stake-holder groups. Ideally, focus groups would also yield further

strategies for involving these groups as partners in achieving nutritional integrity on school campuses.

Future research should also explore the viability of the strategies that were recommended to minimize and/or overcome the barriers that limit the availability of healthful foods and beverages in school meals. Many of the recommended strategies appear to have merit, but the costs (human, financial, political, and/or programmatic) of implementation need to be quantified.

Finally, future research should measure the effect of local wellness policies that are required to be adopted by local Boards of Education by June 30, 2006 on the availability of healthful foods and beverages on school campuses. The research should measure changes in the total school environment associated with the adoption of the policies and it should measure how effectively the local policies were implemented, monitored and evaluated within the district.

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Appendices

Appendix A

Dear Child Nutrition Director or Supervisor:

Public concern about the increase in childhood overweight and obesity in North Carolina is growing. Clearly, poor diet and too little physical activity can lead to health-related problems that may begin during the school-age years and continue into adulthood. Many child and adolescent health experts have suggested that schools can play an important role in combating problems associated with poor nutrition and inactive lifestyles.

As various groups convene throughout the state to identify strategies for preventing childhood overweight and obesity, the role of Child Nutrition programs is usually a topic for discussion. Unfortunately there is little state-wide data about these programs that may be used to promote informed decision-making. For this reason, I am conducting a study as part of my dissertation research at North Carolina State University that will establish baseline data for North Carolina's Child Nutrition programs. Specifically, the purpose of this study is to identify the factors that influence the availability of healthful food choices in school meals.

Please complete the enclosed questionnaire. It should take no more than twenty minutes of your time. Your responses will remain confidential. Any data reported as a result of this study will reflect state-wide trends, not individual school districts. By completing and returning the questionnaire, you are consenting to participate in this in this stud. is entirely voluntary, and you are free to decline without penalty. Additionally, should question make you uncomfortable, you are free to skip it. While you are not required to participate in this study, I would greatly appreciate your assistance.

Please return the completed questionnaire by July 15, 2005, using the postage paid return envelope. If your questionnaire is completed and postmarked by July 15, you will be eligible for a drawing to receive one of five $200.00 gift purchases for educational materials from the National Food Service Management Institute. Upon receipt of your completed questionnaire, the code on your questionnaire will be entered into a random drawing. If your code is drawn, you will be notified the week of July 18, 2005. Please note that the code on your questionnaire will be used only to identify you by name should your code be drawn for the gift purchase and to determine which questionnaires are returned so a follow-up letter may be sent to all non-respondents. Neither your code nor your name will be linked to your responses to the questionnaire.

Thank you in advance for your assistance.

Sincerely,

Lynn Hoggard, Doctoral Student
North Carolina State University

Appendix B
Questionnaire

Section One: For each of the following statements, circle the number that best describes your opinion.

5 = Strongly Agree
4 = Agree
3 = Unsure/No Opinion
2 = Disagree
1 = Strongly Disagree

1.	Childhood overweight is a serious public health problem in NC.	**5**	**4**	**3**	**2**	**1**
2.	Poor food choices may promote weight gain in children and adolescents.	**5**	**4**	**3**	**2**	**1**
3.	Physical inactivity may promote weight gain in children and adolescents.	**5**	**4**	**3**	**2**	**1**
4.	Some foods available as part of the school breakfast program in my LEA may contribute to childhood overweight.	**5**	**4**	**3**	**2**	**1**
5.	Some foods available as part of the school lunch program in my LEA may contribute to childhood overweight.	**5**	**4**	**3**	**2**	**1**
6	In my LEA, the majority of foods sold as a la carte items are higher in fat, sugar or calories than foods served as part of the reimbursable meal.	**5**	**4**	**3**	**2**	**1**
7	Foods sold in school-operated vending machines, school stores and as school fund raisers in my LEA may contribute to childhood overweight.	**5**	**4**	**3**	**2**	**1**
8	The Child Nutrition Program in my LEA would NOT sell less nutritious a la carte foods and beverages if they were not financially dependent upon these items to generate revenues.	**5**	**4**	**3**	**2**	**1**

Section One (continued)

5 = Strongly Agree
4 = Agree
3 = Unsure/No Opinion
2 = Disagree
1 = Strongly Disagree

9	Foods that are lower in fat, sugar and calories are not appealing to most students in my LEA.	**5**	**4**	**3**	**2**	**1**
10.	School administrators view school breakfast as a valuable part of the instructional day in my LEA.	**5**	**4**	**3**	**2**	**1**
11.	School administrators view school lunch as a valuable part of the instructional day in my LEA.	**5**	**4**	**3**	**2**	**1**
12.	Teachers view school breakfast as a valuable part of the instructional day in my LEA.	**5**	**4**	**3**	**2**	**1**
13.	Teachers view school lunch as a valuable part of the instructional day in my LEA.	**5**	**4**	**3**	**2**	**1**
14.	Child Nutrition Programs should provide only healthful food and beverage choices for children.	**5**	**4**	**3**	**2**	**1**
15.	Children receive adequate nutrition education in the classroom to prepare them to make healthful food choices in the cafeteria.	**5**	**4**	**3**	**2**	**1**
16.	Cafeteria employees serve as positive role models to children in making healthful food choices.	**5**	**4**	**3**	**2**	**1**
17.	Healthful food choices are available to children in my LEA's Child Nutrition program.	**5**	**4**	**3**	**2**	**1**

18.	Healthful food choices are available to children in my LEA's Child Nutrition program, but children do not choose them.	**5**	**4**	**3**	**2**	**1**
19.	Students have adequate time to eat breakfast at school.	**5**	**4**	**3**	**2**	**1**
20.	Students have adequate time to eat lunch at school.	**5**	**4**	**3**	**2**	**1**
21.	Parents are among the greatest influences on children's eating habits.	**5**	**4**	**3**	**2**	**1**
22.	Teachers positively influence students eating habits.	**5**	**4**	**3**	**2**	**1**
23.	Children like the taste of healthful foods such as fruits, vegetables and whole grains.	**5**	**4**	**3**	**2**	**1**
24.	Indirect costs assessed to Child Nutrition Programs limit the CN Director's ability to offer more nutritious foods such as fresh fruits, fresh vegetables and whole grain food choices to students.	**5**	**4**	**3**	**2**	**1**

Section 2: Please check the response that best describes the current practices in your LEA's Child Nutrition program to improve the nutritional content of foods and beverages served in the reimbursable meal and as a la carte items.

1, Is your LEA's Child Nutrition program implementing the Winner's Circle Program? ___ yes ___ no ____ not sure

If yes, which grade level(s)? (check all that apply)
___ pre-K – 5
___ 6-8
___ 9 – 12

2. Is your LEA's Child Nutrition program involved in USDA's Team Nutrition Initiative? ___ yes ___ no _____ not sure

If yes, which grade level(s)? (check all that apply)
___ pre-K – 5
___ 6-8
___ 9 – 12

3. Is your LEA's Child Nutrition program involved in any other nutrition programs or initiatives to improve the nutritional content of school meals?

___ yes ___ no _____ not sure

If yes, please list the name of the program or initiative_____

NOTE: If your LEA is involved in other nutrition programs or initiatives to improve the nutritional content of school meals, please list them on the back side of this page.

4. Several practices for improving the nutritional content of school meals are shown in **bold print**. For each of the following practices, please indicate whether or not the practice has been implemented in your LEA's Child Nutrition program by checking "yes" or "no". If the practice has been implemented, please indicate if it has been implemented at breakfast and/or lunch, and at what grade level(s). Check all responses that apply.

a. **Increased fresh fruits** ___ yes ___ no

___ breakfast ___ lunch ___ pre-K – 5
___ breakfast ___ lunch ___ 6-8
___ breakfast ___ lunch ___ 9 – 12

b. **Increased fresh vegetables** ___ yes __ no

___ breakfast ___ lunch ___ pre-K – 5
___ breakfast ___ lunch ___ 6-8
___ breakfast ___ lunch ___ 9 – 12

c. **Increased whole grain breads** ___ yes __ no

___ breakfast ___ lunch ___ pre-K – 5
___ breakfast ___ lunch ___ 6-8
___ breakfast ___ lunch ___ 9 – 12

d. **Eliminated fried foods** ___ yes __ no

___ breakfast ___ lunch ___ pre-K – 5
___ breakfast ___ lunch ___ 6-8
___ breakfast ___ lunch ___ 9 – 12

e. **Reduced the number of desserts available to students** __ yes __ no

___ breakfast ___ lunch ___ pre-K – 5
___ breakfast ___ lunch ___ 6-8
___ breakfast ___ lunch ___ 9 – 12

f. **Eliminated whole milk** ___ yes __ no

___ breakfast ___ lunch ___ pre-K – 5
___ breakfast ___ lunch ___ 6-8
___ breakfast ___ lunch ___ 9 – 12

g. **Reduced the availability of high fat foods served a la carte** __ yes __ no

___ breakfast ___ lunch ___ pre-K – 5
___ breakfast ___ lunch ___ 6-8
___ breakfast ___ lunch ___ 9 – 12

h. **Reduced the availability of a la carte foods that are high in sugar**
__ yes __ no

___ breakfast ___ lunch ___ pre-K – 5
___ breakfast ___ lunch ___ 6-8
___ breakfast ___ lunch ___ 9 – 12

i. **Reduced the availability of a la carte beverages high in sugar**
___ yes ___no

___ breakfast ___ lunch ___ pre-K – 5
___ breakfast ___ lunch ___ 6-8
___ breakfast ___ lunch ___ 9 – 12

Section 3: Several barriers have been identified which may prevent school districts from making more healthful foods available to students in school breakfast, lunch and snack programs.

Step 1: For each of the following barriers, indicate whether you agree, disagree or are unsure that it presents a barrier to making healthful food choices available to students. Place an "X" on the line that best describes your opinion.

Step 2: After indicating your agreement or disagreement, rank each barrier in order from the most important barrier (1) to the least important barrier (10). Under the **Rank** column, place a "1" beside the most important barrier and a "10" beside the least important barrier. Continue the ranking by assigning the numbers 2 – 9 to the other barriers.

Barrier	**Do you agree, disagree or are you unsure?**			**Rank**
School Finances (Child Nutrition Program must produce revenues)	___Agree	___Disagree	___Unsure	____
Lack of support from Superintendent and/or School Board	___Agree	___Disagree	___Unsure	____
Lack of support from Principals	___Agree	___Disagree	___Unsure	____
Lack of support from Teachers	___Agree	___Disagree	___Unsure	____
Lack of support from Parents	___Agree	___Disagree	___Unsure	____
Nutrition is not valued as part of the instructional day	___Agree	___Disagree	___Unsure	____
Limited time/space for students to eat school meals in a relaxed atmosphere	___Agree	___Disagree	___Unsure	____
Student taste preferences are for high fat, high sugar, high calorie foods	___Agree	___Disagree	___Unsure	____
Too little nutrition education in the classroom to influence children's eating habits	___Agree	___Disagree	___Unsure	____

Conflicting messages (nutrition concepts taught in classroom while vending machines with less healthful foods are readily accessible outside classroom)	___Agree ___Disagree ___Unsure ____

Section 4: In the previous section, you ranked the barriers which may prevent Child Nutrition programs from making more healthful foods available to students in school breakfast, lunch and snack programs. For the **top 3 barriers** you identified (your #1, #2 and #3 ranked barriers), please list possible strategies that could be implemented in order to minimize or overcome the barriers. Please categorize the strategies according to whether they fall under federal (Congressional or USDA), state (NC Department of Public Instruction or State Board of Education), or local (local school board or LEA Administrator) policies or practices.

Barrier # 1 _____ (write in name of barrier ranked #1)

List possible strategies to overcome Barrier #1.

Federal Level **(Congress or USDA)**	**State Level** **(NC General Assembly, NC DPI or SBE)**	**Local Level** **(Local School Board, Commissioners or LEA Administrators)**

Barrier # 2 _____ (write in name of barrier ranked #2)

List possible strategies to overcome Barrier #2.

Federal Level **(Congress or USDA)**	**State Level** **(NC General Assembly, NC DPI or SBE)**	**Local Level** **(Local School Board, Commissioners or LEA Administrators)**

Barrier # 3 _____ (write in name of barrier ranked #3)

List possible strategies to overcome Barrier #3.

Federal Level **(Congress or USDA)**	**State Level** **(NC General Assembly, NC DPI or SBE)**	**Local Level** **(Local School Board, Commissioners or LEA Administrators)**

Section 5: Please place an X beside the response that best describes you.

1. Age:

___ 22 – 30
___ 31 – 40
___ 41 – 50
___ 51 - 60
___ 61 - 70
___ greater than 70

2. Job Title:

___ Child Nutrition Executive Director
___ Child Nutrition Director
___ Child Nutrition Supervisor
___ Other, please list _____

3. Years in Your Current Position:

___ less than 2 years
___ 2 – 5 years
___ 5 – 10 years
___ 11 – 15 years
___ 16 – 20 years
___ more than 20 years

4. Total Years Employed in Child Nutrition:

___ less than 2 years
___ 2 – 5 years
___ 5 – 10 years
___ 11 – 15 years
___ 16 – 20 years
___ more than 20 years

5. Have you earned any of the following credentials? (Check all that apply)

___ School Food and Nutrition Specialist (SFNS)
___ Registered Dietitian (RD)
___ Certified Nutrition Specialist (CNS)
___ Licensed Dietitian/Nutritionist (LDN)
___ Other, please list _____

6. Indicate the highest degree you have earned:
___ High School Diploma
___ Bachelors Degree
___ Masters Degree
___ Doctoral Degree
___ Other, please list _____

7. If you have earned a Bachelor's Degree or greater, please indicate the area(s) of study:
___ Home Economics/Family and Consumer Sciences
___ Nutrition
___ Institutional Management
___ Business/Accounting
___ Other, please list _____

Section 6: Please respond to each item below as it best describes your LEA

1. What is the size of your LEA?
   ___ fewer than 2,500 students
   ___ 2,501 – 5,000 students
   ___ 5,001 – 10,000 students
   ___ 10,001 – 15,000 students
   ___ 15,001 – 20,000 students
   ___ 21,000 – 25,000 students
   ___ 25,001 – 30,000 students
   ___ more than 30,000 students

2. Number of pre-K – 5 schools ___

3. Number of schools grades 6 – 8 ___

4. Number of schools grades 9 – 12 ___

5. Number of Child Nutrition Directors (including Executive Directors) ___

6. Number of Child Nutrition Supervisors ___

7. Percent of students that qualify for free meals _____

8. Percent of students that qualify for reduced price meals ____

9. Average daily participation (as a percentage) in School Breakfast Program ____

10. Average daily participation (as a percentage) in School Lunch Program ____

11. Number of after school snack programs in the school district ___

12. Are competitive foods available to students during the school day?

elementary schools	___ yes	___ no	___ not sure
middle schools	___ yes	___ no	___ not sure
high schools	___ yes	___ no	___ not sure

13. Are fund-raising activities conducted during the school day that compete with the Child Nutrition Programs?

elementary schools	___ yes	___ no	___ not sure
middle schools	___ yes	___ no	___ not sure
high schools	___ yes	___ no	___ not sure

14. Are other activities (club meetings, make-up tests, intra-mural activities, etc.) scheduled during the designated lunch period that may prevent students from eating school lunch?

elementary schools	___ yes	___ no	___ not sure
middle schools	___ yes	___ no	___ not sure
high schools	___ yes	___ no	___ not sure

15. Do soft drink machines operate before the last child is served lunch?

elementary schools	___ yes	___ no	___ not sure
middle schools	___ yes	___ no	___ not sure
high schools	___ yes	___ no	___ not sure

16. Is the district's Child Nutrition Program operated by a Food Management Company? ___ yes ___ no

17. Please list the top 10 a la carte sale items by grade:

A la carte sales in Pre-K – 5th grade	A la carte sales in 6th – 8th grades	A la carte sales in 9th – 12th grades
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.
6.	6.	6.
7.	7.	7.
8.	8.	8.
9.	9.	9.
10.	10.	10.

18. Type(s) of Menu Planning used in your LEA's Child Nutrition Program:
___ Traditional
___ Enhanced Traditional
___ Nutrient Standard Menu Planning
___ Enhanced Nutrient Standard Menu Planning
___ Other, please list _____

19. Has your local School Board adopted policies on foods available in schools? __ yes __ no

If policies have been adopted, please list the general areas they address.
_____
_____
_____
_____

20. Are you or a member of the Child Nutrition Staff a member of the district's School Health Advisory Council? ___ yes __ no

21. What is the approximate amount of time (in minutes) students have to eat school breakfast in your LEA?

_____minutes to eat school breakfast in pre-k – 5
_____minutes to eat school breakfast in grades 6 – 8
_____minutes to eat school breakfast in grades 9 - 12

22. What is the approximate amount of time (in minutes) students have to eat lunch in your LEA?

_____minutes to eat lunch in pre-k – 5
_____minutes to eat lunch in grades 6 – 8
_____minutes to eat lunch in grades 9 - 12

23. Does the Child Nutrition Program in your LEA pay indirect cost to the school district? ___ yes ___ no

If yes, what amount was paid for the 2004 – 2005 school year?
_____

24. Does the Child Nutrition Program receive its allocation of State Revenue Matching Funds (formerly called "Supervisor Funds")? ___ yes ___ no

If yes, what amount of funds does the program receive? _____

25. What is the approximate dollar amount of a la carte sales in the Child Nutrition Program annually? _____

Approximately what percentage of the total Child Nutrition Program operating budget does this amount of a la carte sales represent?
_____

26. Does the LEA have a "pouring rights contract"? ___ yes ___ no

27. Does the Child Nutrition Program in your LEA manage or negotiate the district's contract for all vended food items, including beverages and snacks? ___ yes ___ no

28. Does your Child Nutrition Program conduct computer-assisted nutrient analyses of school meals? ___ yes ___ no

29. Does your Child Nutrition Program conduct computer-assisted nutrient analyses of a la carte food items? ___ yes ___ no

30. Do you or someone from your Child Nutrition Program provide regular reports about the Child Nutrition Program to your LEA's School Board?
___ yes ___ no

31. In your opinion, do you have the authority to influence school policies and/or practices concerning healthful school meals? ___ yes ___ no

Appendix C

A la Carte **foods and beverages available in Child Nutrition Programs**

Grades Pre-K through 5

Item	Frequency
Ice Cream	56
Cookies	52
Baked Snack Chips	50
Water	46
Fruit Juice and Fruit Ices (100%)	41
Milk	38
Fruit (cereal) Bars	32
Fruit Drinks (10% - 50%)	30
Snack Crackers	27
Fresh Fruits or Vegetables	23
Entrée items available as part of reimbursable meal	20
Pizza	19
Yogurt	16
Snack Cakes	14
Fruit Leathers	14
Chicken Nuggets	13
Graham Crackers	13
French Fries	11
Marshmallow Crunch Bars	11
Sports Drinks	11
Pretzels	10
Specialty Sandwiches	8
School Baked Rolls	7
Cheese Sticks	5
Pudding	5
Regular Shack Chips	4
Popcorn	4
Dill Pickle	4
Sherbet	3
Baked French Fries	3
Reduced Fat Hot Dog with Bun	3
Nuts/Seeds	3
Garden Salad	2
Honey Bun	2
Nachos	2
Tacos	1
Muffin	1

***A la Carte* foods and beverages available in Child Nutrition Programs**

Grades 6 – 8

Item	Frequency
Cookies	62
Water	44
Ice Cream	43
Fruit Drinks (10% - 50%)	41
Pizza	39
French Fries	34
Fruit Juice (100%)	33
Baked Snack Chips	29
Regular Snack Chips	29
Sports Drinks	28
---	---
Specialty Sandwiches	26
Fruit Juice (100%)	24
Entrée items served as part of the reimbursable meal	23
Snack Cakes	22
Chicken Nuggets	19
Snack Crackers	11
Milk	11
Fruit Cereal Bars	10
Fresh Fruit	10
Marshmallow Crunch Bars	9
Pretzels	8
Iced Tea	6
Popcorn	6
Cheese Strips	4
Fruit Leathers	5
Nuts/Seeds	4
Fruit Smoothies	4
Yogurt	4
Garden Salad	3
Baked French Fries	3
Nacho Cheese Cups	3
Honey Bun	2
Dill Pickles	2
Muffins	2
Breakfast Biscuits	2
Pudding	1
School Baked Rolls	1

***A la Carte* foods and beverages available in Child Nutrition Programs**

Grades 9 – 12

Item	**Frequency**
Specialty Sandwiches	59
Pizza	56
Cookies	56
Water	50
French Fries	46
Fruit Drinks (10% - 50%)	45
Regular Snack Chips	35
Ice Cream	33
Sports Drinks	31
Iced Tea	24

Entrée items served as part of the reimbursable meal	21
Chicken Nuggets	21
Snack Cakes	19
Fruit Juice (100%)	18
Baked Snack Chips	17
Milk	14
Fruit Cereal Bars	13
Fresh Fruit	7
Garden Salad	5
Baked French Fries	5
Nachos with Cheese	5
Fruit Smoothies	5
Marshmallow Crunch Bars	5
Fresh Vegetables	5
School Baked Rolls	4
Nuts/Seeds	3
Popcorn	3
Yogurt	3
Pretzels	3
Hot Dogs with Bun	3
Breakfast Biscuits	3
Fried Chicken	2
Cheese Sticks	2
Muffins	2
Burrito	1
Milk Shakes	1
Shrimp Poppers	1

Appendix D

Strategies to Minimize and/or Overcome the Barrier of School Finances

Recommended Strategies to be implemented at the **federal level** to address the barrier of school finances

Recommended Strategies requiring Legislative Action	N
Universal Free Lunch and Breakfast for all students	181
Increase the federal rate of reimbursement to adequately cover all costs associated with producing a healthy, appealing school breakfast or lunch	168
Eliminate the reduced price meal category	163
Congress should adopt more stringent competitive foods regulations than those currently in the law	145
Reinstate federal funding for food service equipment	121
Expand programs like the Fresh Fruit and Vegetable to allow more schools to participate	58
Recommended Strategies requiring Regulation, Ordinance or Policy Adoption	
Revise the meal patterns to reflect the dietary guidelines	11
Eliminate the sur charge on produce available from the Department of Defense	8
Recommended Strategies requiring Law/Policy Enforcement	
Enforce regulations that state matching funds must be used in the Child Nutrition program and not for any other purpose	87
Recommended Strategies requiring Advocacy	
Sponsor a national initiative to get the food industry involved in preparing nutritious, appealing foods for children at affordable prices	64
Provide healthier selections of commodity foods (less fat and sodium)	14
Investigate the amount of federal dollars allocated to feed children that are going to pay for other things within the LEA through the assessment of extremely high indirect costs to the Child Nutrition Program	107

Recommended strategies to be implemented at the **state level** to address the barrier of school finances

Recommended Strategies requiring Legislative Action	N
Eliminate indirect costs to Child Nutrition Program	177
General Assembly should provide per meal financial support for the Child Nutrition Program	154
General Assembly to provide state funds for state-mandated pay raises (as they do for all other school personnel and state employees) and benefits for Child Nutrition Personnel instead of requiring the Child Nutrition Program to generate additional revenues through food and beverage sales to students to provide the mandated pay raise	121
Provide adequate funding for education so school administrators don't have to have "food sales" to support schools within the district	61
Expand the State Kindergarten Breakfast Program to include all Kindergarten students in the state, not just a portion of them	34
Prohibit indirect cost assessment until the CN Program has a 3 month operating balance	33
Supplemental funding to support the cost of gradually implementing nutrition standards in the CN Program	28
NCDPI's CN Services Section to develop realistic nutrition standards for all foods on school campus and State Board of Education to mandate and monitor the standards; establish consequences for failure to meet nutrition standards (ensure that consequences are assessed to offending group, not to Child Nutrition Program)	21
Help fund and promote a state expansion of the Fresh Fruit and Vegetable Program; would be beneficial to both schools and farmers	18
State legislature should provide funds for training for Child Nutrition Personnel	14
Provide financial support for districts with low rates of students eligible for free/reduced price meals	12
Recommended Strategies requiring Enforcement of Current Regulations or Policies	
Require NCDPI to use state revenue matching funds as the federal regulations require instead of allowing Superintendents to use the funds for other purposes	118
Enforce current State Board of Education Policy on competitive foods to require all revenues from the sale of foods and beverages before the last child is served lunch for the day to accrue to the Child Nutrition Program	93
Recommended Strategies requiring Advocacy	
Implement state-wide purchasing group to help CN Programs save money	57
Develop and test standardized recipes that are acceptable to students in NC	11
Make more "farm-to-school produce" available to Child Nutrition Programs	9
Reward schools that strictly adhere to competitive foods rules	7
Develop a state-wide media plan to show positive aspects of Child Nutrition Program	6

Recommended strategies to be implemented at the **local level** to address the barrier of school finances

Recommended Strategies requiring Regulation, Ordinance or Policy Adoption	N
Eliminate requirement for Child Nutrition Programs to pay indirect cost to the school district	179
County Commissions should fund revenues that are currently generated from competitive foods (vending) and remove vending machines; put political pressure on commissioners and school boards to release administrators from sacrificing student health and well-being in order to generate revenues for education	61
Include Child Nutrition Program renovations or equipment in bond or other monies used for remodeling projects or new school projects; provide capital outlay funds for equipment purchases	56
Child Nutrition Program should not have to pay worker's compensation; the district covers this expense for all other personnel and should do the same for Child Nutrition Personnel	44
Restrict fund-raisers to non-food activities	38
Provide adequate time for meal service; with too little time, students are going to head to the vending machines where they get a lot of calories that can be consumed very quickly	36
Provide financial support for Child Nutrition Program just as support is provided for other educational programs within the district	25
Ban vending machines until after school	15
Provide local funds to subsidize districts that have at least 85% of students eligible for free or reduced price meals so all meals may be at no cost to students	9
Recommended Strategies requiring Enforcement of Current Regulations or Policies	
Local board should require Child Nutrition revenue match funds to be used as law requires	136
Comply with requirement to develop and implement local wellness policy	7
Recommended Strategies requiring Advocacy	
Support participation in local Child Nutrition Program; speak favorably about school meals; be an advocate, not an adversary	42
Implement nutrition standards gradually, not recklessly	28
Educate school administrators and staff about the Child Nutrition Program including how it operates and how it supports students	24
Be open to meal price increases when needed to keep the program financially sound	17

Appendix E

Strategies to Minimize and/or Overcome the Barrier of Lack of Support of School Administrators and Local Boards of Education (BOE)

Recommended strategies to be implemented at the **federal level** to address the barrier of **lack** of support from School Administrators and local Boards of Education

Recommended Strategies requiring Legislative Action	N
Develop a national nutrition policy that would eliminate all competitive foods to be available to students during the school day	152
Fund any mandated nutrition standards; healthy foods will cost more until there is an adequate supply of them; healthy foods will also increase labor costs	124
Hold LEA financially accountable for violations of competitive food policy instead of Child Nutrition Program	86

Recommended strategies to be implemented at the **state level** to address the barrier of lack of support from School Administrators and local Boards of Education

Recommended Strategies requiring Legislative Action	N
NC General Assembly should provide a per meal financial supplement for the Child Nutrition Program	124
Recommended Strategies requiring Regulation, Ordinance or Policy Adoption	
Develop standards for all foods on school campus, not just those that are part of the Child Nutrition Program	103
NC General Assembly should pass legislation to ban soft drinks and other vending sales that compete with the Child Nutrition Program	89
Include Child Nutrition personnel in ABC incentives; Child Nutrition personnel work hard to support student achievement by providing healthy school meals	86
Allocate state construction funds to renovate old school cafeterias to make them appealing (and safe) for students	81
Develop state-wide nutrition standards and provide a strong presence in the LEAs to ensure school administrators are complying with federal and state guidelines	63
Recommended Strategies requiring Enforcement of Current Regulations or Policies	
Revise the annual Child Nutrition Program Agreement to directly address responsibilities of Superintendent and local Board of Education to support Child Nutrition (i.e. adhere with federal/state regulations; schedule adequate meal time; actively promote the CN Program)	114
Recommended Strategies requiring Advocacy	
Help Superintendents develop a positive attitude about Child Nutrition; many treat Child Nutrition as a “necessary evil” and treat CN personnel as second class citizens	44
Require CN Programs to make at least 1 report to their local board of education each year; many Superintendents will not allow the CN Director to speak directly with members of the School Board	27

Recommended strategies to be implemented at the **local level** to address the barrier of lack of support from School Administrators and local Boards of Education

Recommended Strategies requiring Regulation, Ordinances or Policies	N
School Board should provide sufficient funds needed to operate school without reliance on profits from school meals	115
School Board should financially support the CN program to enable it to serve more healthful meals	102
Nutrition standards should be required for everyone on the school campus (teacher's lounge, athletic functions, fund raisers, PTO meetings, School Board Meetings, etc)	93
Use School Health Advisory Councils to make policy recommendations on healthy foods and physical activity	55
Recommended Strategies requiring Advocacy	
Superintendents need to focus on the needs of the "whole" student; academics are important but so is health; unhealthy students don't do their best academically	78
Educate administrators about the relationship between poor nutrition and poor academic performance; poor nutrition equals poor EOG scores	72
Board members should visit schools more often and should eat meals in the school cafeteria	18

Appendix F

Strategies to Minimize and/or Overcome the Barrier of Conflicting Message to Students

Recommended strategies to be implemented at the **federal level** to address the barrier of conflicting messages

Recommended Strategies requiring Legislative Action	N
Federal regulations should be enforced to ensure schools serve the healthiest meals possible to students	136
Nutrition education should be included as part of No Child Left Behind Legislation and should be adequately funded	124
Universal free meals to all children to eliminate the stigma associated with the program; all children would be given opportunity to choose healthy foods, not just some children	113
Federal regulations should prevent “marketing” by product name to students	75
Recommended Strategies requiring Regulation, Ordinance or Policy Adoption	
Child Nutrition Programs should not be held financially accountable for competitive foods violations; require principals to be accountable by assessing fines for competitive foods violations to the individual school	62
Recommended Strategies requiring Enforcement of Current Laws or Policies	
Penalize state agencies if they fail to enforce competitive foods regulations	15
Recommended Strategies requiring Advocacy	
Child Nutrition Programs should not be allowed to be the scapegoat for childhood overweight	62

Recommended strategies to be implemented at **the state level** to address the barrier of conflicting messages

Recommended Strategies requiring Legislative Action	N
Fund more nutrition pilots at no financial risk to the CN program; over time, it may become clear that healthy choices are affordable as long as they don't have to be sold beside less healthy foods	45
Cease the passage of unfunded mandates like the "elimination of trans fats in school meals"	12
Recommended Strategies requiring Regulation, Ordinance or Policy Adoption	
Fine schools or LEAs for violations of the competitive foods regulations not the Child Nutrition Program	107
Develop reasonable nutrition standards that teach "moderation not elimination"	92
State Board of Education should require nutrition education to be taught regularly and consistently in public school classrooms; teachers should be trained in basic nutrition and in the importance of serving as role models for students	88
Mandate nutrition standards for all foods available on school campuses; support LEAs financially so as not to have to sell unhealthy foods to children in order to secure needed funds for educational purposes	41
Recommended Strategies requiring Enforcement of Current Laws and Policies	
State Board of Education should allow CN Section to enforce federal regulations	114
Recommended Strategies requiring Advocacy	
State-wide media campaign for healthy meals in schools	62

Recommended strategies to be implemented at the **local level** to address the barrier of conflicting messages

Recommended Strategies	N
Actively support the SBP and NSLP by understanding the program and cooperating with the Child Nutrition Program by obeying existing federal and state laws and state board policies governing the programs	74
Establish, monitor and enforce local board policies that make children's health as important as their academic achievements	67
Have local boards address the question of which will cost more…making foods at school healthy or paying escalating health care costs for students and adults as a result of their poor eating habits that increase their risks of developing chronic diseases	51
Pouring rights contracts with vending companies should not be allowed; they undermine the efforts of the Child Nutrition Program	44
Adopt strict policies on school vending to prevent competition with Child Nutrition program; Eliminate competitive food sales and promote the health and well-being of wellness of staff and students	38
Educate parents, principals, teachers, students, community and media about healthy eating and physical activity; have everyone speaking the same message	23
Require busses to be scheduled so as to allow all students adequate time to eat breakfast at school	17

Appendix G

Strategies to Minimize and/or Overcome the Barrier of Lack of Support from Principals

Recommended strategies to be implemented at **the federal level** to address the barrier of lack of support from Principals

Recommended Strategies requiring Legislative Action	N
Assess financial penalties for competitive foods to the school/district instead of to the CNP	113
Require healthy meals available to students are part of NCLB to ensure that principals give it some priority	62
Develop national regulations that prohibit the sale of any food or beverage from any source other than Child Nutrition during the school day	19
Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	
Mandate only healthy food choices for all foods on school campuses	78
Recommended Strategies requiring Enforcement of Current Laws and/or Policies	
Require stronger enforcement of rules governing the sale of competitive foods during breakfast and lunch	128
Recommended Strategies requiring Advocacy	
Provide incentives for schools/principals that make only healthy food and beverage choices available to students	24

Recommended strategies to be implemented at the **state level** to address the barrier of lack of support from Principals

Recommended Strategies requiring Legislative Action	N
Hold principals financially accountable when they blatantly violate federal and state laws and State Board Policies concerning the Child Nutrition Program	51
Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	
Fund all school-based programs that have become dependant upon the sale of items from vending machines	104
Principals should be required to sign a page of the Child Nutrition Program Annual Agreement indicating they will abide with all the rules/regulations of the program	49
Require the Child Nutrition Program to oversee all vended operations as a means of discouraging competitive food sales	78
Enact State legislation or SBE policy requiring supervision of students at meal times in high schools	18
Recommended Strategies requiring Enforcement of Current Laws and/or Policies	
State Board of Education should support CN section in Raleigh when they try to enforce competitive foods regulations	127
Give more legal authority to the local Child Nutrition Program to enforce federal and state regulations; Superintendents and principals don't seem to care that they are violating federal regulations as long as they get the revenues they need	37
Recommended Strategies requiring Advocacy	
Educate principals about the relationship between healthful meals and academic achievement	92

Recommended strategies to be implemented at the **local level** to address the barrier of lack of support from Principals

Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	N
Implement local policies to prevent the sale of competitive foods and include strong penalties when violations occur	72
Implement a local ban on “pouring rights contracts” that encourage students to consume more and more soft drinks in order for the school to benefit financially	61
Implement a local ban on exclusive vending contracts between principals and vendors; all procurements and contracts for food and beverages should be initiated in the central office and monitored by the finance officer; there is not accountability for the funds when anyone in the district may enter into exclusive contracts with vendors	54
Require the Child Nutrition Program to oversee all vended operations as a means of discouraging competitive food sales	42
Adopt local policy to restrict school fund-raising to non-food items	40
Adopt policies stating that food cannot be used as a disciplinary action; cannot take away supplemental sales items (cafeteria should be a happy, positive environment)	28
Develop stricter rules for students when they are caught stealing food	5
Recommended Strategies requiring Advocacy	
Principals should “set the pace” at their schools; they should eat healthy meals and get plenty of physical activity; they should say “NO” to soft drinks and other non-nutritive foods on the school campus during the school day	47
Develop a financial incentive for teachers to sit/eat with students in the cafeteria; this would be a great time to promote good nutrition and positive eating habits	13

Appendix H

Strategies to Minimize and/or Overcome the Barrier that Good Nutrition and School Meals are Not Valued as Part of the Instructional Day

Recommended strategies to be implemented at the **federal level** to address the barrier nutrition and school meals are not valued as part of the instructional day

Recommended Strategies requiring Legislative Action	N
Include nutrition education as a component of No Child Left Behind Legislation	54
Mandate meal times based on the age of the child to ensure adequate time for meal selection and consumption	33
Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	
Require nutrition education to be part of the state-adopted curriculum in order to qualify for reimbursement for school meals	37

Recommended strategies to be implemented at the **state level** to address the barrier that good nutrition and school meals are not valued as part of the instructional day

Recommended Strategies requiring Legislative Action	N
Mandate meal times based on the age of the child	52
Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	
Enact legislation or State Board of Education policies to support and enforce nutrition education and structured physical activity	72
Require teachers to teach nutrition as part of the curriculum; emphasize that school breakfast and lunch are parts of the instructional day	64
Develop a state adopted nutrition curriculum for grades Pre-K – 5	55
Recommended Strategies requiring Enforcement of Current Laws and/or Policies	
Strengthen the State Board Policy on Competitive Foods to maintain the financial integrity of the Child Nutrition Program	67
Recommended Strategies requiring Advocacy	
Develop PSA videos that may be played on monitors in school cafeterias promoting the appeal of eating school meals	6

Recommended strategies to be implemented at the **local level** to address the barrier that good nutrition and school meals are not valued as part of the instructional day

Recommended Strategies requiring Regulation, Ordinance or Policy Adoption	N
Mandate that principals support participation in NSLP and SBP; set a minimum participation level and let that be a part of the principal's evaluation	31
Recommended Strategies requiring Regulation, Ordinance or Policy Adoption	
Eliminate all foods and beverages sold or made available to students that compete with and undermine the Child Nutrition Program	29
Extend nutrition standards to adults on campus; students do what they see adults do, not necessarily what they are told to do	8
Recommended Strategies requiring Enforcement of Current Laws and/or Policies	
Enforce existing State Board of Education policies about a healthy school environment	61
Recommended Strategies requiring Advocacy	
Use financial incentives to encourage the Superintendent to actively support the availability of healthy foods in school cafeterias	26
Educate local board members about the value of nutrition and physical activity in helping students achieve academic success	18
Support breakfast program as actively as lunch program	10

Appendix I

Strategies to Minimize and/or Overcome the Barrier of Lack of Support from Teachers

Recommended strategies to be implemented at the **federal level** to address the barrier of lack of support from Teachers

Recommended Strategies requiring Legislative Action	N
Mandate nutrition education and physical activity as part of No Child Left Behind legislation	61
Recommended Strategies requiring Advocacy	
Sponsor national initiative to educate teachers about the research-based link between adequate nutrition and academic performance, reduced student behavioral problems and reduced student absences	28

Recommended strategies to be implemented at the **state level** to address the barrier of lack of support from Teachers

Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	N
Mandate nutrition education in the state-adopted curriculum and include nutrition concepts on end-of-grade tests	72
Allow for teacher renewal credits to be given for teachers who participate in nutrition education and physical activity-related staff development	50
Recommended Strategies requiring Enforcement of Current Laws and/or Policies	
Enforce competitive foods regulations and ensure that teachers are not allowed sell soft drinks and candy to students	28
Recommended Strategies requiring Advocacy	
Train teachers to serve as mentors and role models to students in the development of healthy eating habits	69
Provide training to teachers on creative strategies for integrating nutrition education and physical activity into the state adopted curriculum	37
Educate teachers about the Child Nutrition program; encourage them to develop an attitude of tolerance and acceptance towards the Child Nutrition Program and its personnel	12

Recommended strategies to be implemented at **the local level** to address the barrier of lack of support from Teachers

Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	N
Require staff development for teachers in areas of nutrition and physical activity	51
Reward teachers who include nutrition education and physical activities as part of their ongoing classroom activities (at all grade levels)	46
Reward teachers who serve as positive nutrition and physical activity role models to students	41
Develop local policies to prevent teachers from selling foods to students for any purpose	29
Recommended Strategies requiring Advocacy	
Educate teachers on relationship between healthy eating and academic performance	58
Meet with NCAE members to garner support for teachers to show support for educating students about nutrition	8

Appendix J

Strategies to Minimize and/or Overcome the Barrier of Lack of Support from Parents

Recommended strategies to be implemented at the **federal level** to address the barrier of lack of support from Parents

Recommended Strategies requiring Advocacy	N
Social marketing campaign targeting parents as the child's "first teacher" with the message that good eating habits are established at home and reinforced at school	34
Develop national media campaign to educate parents about "today's" Child Nutrition Program and to get parents involved in their children's school nutrition environment	25
Develop educational materials that may be provided to parents to show the benefits of school meals to all children to help overcome the bias that many parents seem to have that the Child Nutrition Program is not just for poor children	18

Recommended strategies to be implemented at the **state level** to address the barrier of lack of support from Parents

Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	N
Develop State Board Policy on foods brought into school from home	18
Recommended Strategies requiring Advocacy	
Social marketing campaign targeting parents as the child's "first teacher" with the message that good eating habits are established at home and reinforced at school	14
Provide nutrition education to parents at PTO meetings (or develop the resources for local personnel to educate parents at local PTO events)	11
Include an area on students' report cards to include some indicator of the child's food choices to let parents know what their children are eating for breakfast and/or lunch	8
Provide adequate funding to the Extension Service so Extension Agents can help educate the public about childhood nutrition issues	4

Recommended strategies to be implemented at the **local level** to address the barrier of lack of support from Parents

Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	N
Implement local Board policy on foods brought into school from home and fast food restaurants	41
Recommended Strategies requiring Advocacy	
Establish frequent presentations by the Child Nutrition Director to all PTOs to involve parents and help them understand their role in helping students develop healthy eating habits	38
Inform parents that they may not should not join their child for lunch in the cafeteria and bring a bag lunch from a fast-food restaurant for the child and the parent as it sends the wrong message to students	21
Arrange a collaborative partnership between local Extension Service and Child Nutrition Program to enable Extension Agents to educate parents about child nutrition issues while Child Nutrition Program begins to make gradual changes in the foods available to students	4

Appendix K

Strategies to Minimize and/or Overcome the Barrier of Limited Time and Space for School Meals

Recommended strategies to be implemented at the **federal level** to address the barrier of limited time/space

Recommended Strategies requiring Legislative Action	N
Legislate a minimum of 30 minutes for students to have a meal period to adequately and healthfully consume their meals; make this part of No Child Left Behind Legislation	21
Restore Food Service Equipment funds to purchase food service equipment needed to prepare healthful school meals	14

Recommended strategies to be implemented at the **state level** to address the barrier of limited time/space

Recommended Strategies requiring Regulation, Ordinance or Policy Adoption	N
Set standards for minimum meal times; children cannot make good food choices in the time allocated for breakfast or lunch	8
Lengthen the school day; there is not enough time to get everything required into the school day schedule	2

Recommended strategies to be implemented at the **local level** to address the barrier of limited time/space

Recommended Strategies requiring Regulation, Ordinance or Policy Adoption	N
Local BOE should develop policies to govern schedules to provide adequate time to eat the meal, thus increasing participation in the Child Nutrition Program	6
Schedule busses to arrive on time so students may eat breakfast at school	5
Provide funds to make old cafeterias more aesthetically appealing to children so they will want to eat in the school cafeteria in a pleasant, relaxing environment	5
Require school administrators and members of Local BOEs to visit schools during meal times more often in order to become aware of inadequate meal period schedules especially in over-crowded schools	4
Local Boards of Education should establish minimum meal times; children cannot make good food choices in the time allocated for breakfast or lunch. Principals should be required to consider adequate meal time in planning school schedules	3
Do a better job of projecting student growth in order to design and build schools that are adequate to meet space needs	1
Lengthen the school day; there is not enough time to get everything required into the schedule	1

Appendix L

Strategies to Minimize and/or Overcome the Barrier of too Little Nutrition Education in the Classroom to Influence Students' Food and Beverage Choices

Recommended strategies to be implemented at the **federal level** to address the barrier of too little nutrition education in the classroom

Recommended Strategies requiring Legislative Action	N
Nutrition education should be made a part of No Child Left Behind Legislation	18
Restore funding for the Nutrition Education and Training Program to support nutrition education in the classroom and cafeteria	15

Recommended strategies to be implemented at the **state level** to address the barrier of too little nutrition education in the classroom

Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	N
Require nutrition education as part of the state-adopted curriculum ("Test it" – if it is not tested, it is not taught in North Carolina)	31
Provide technology support to all NC schools so students can access "Mypyramid.com" and use it as a daily planning tool	3
Recommended Strategies requiring Advocacy	
Provide incentives and resources to teachers to integrate nutrition education throughout the existing curriculum	15
Provide funding for lesson plans and materials to integrate nutrition education into all areas of the curriculum	12
Provide nutrition education to teachers so they will not misinform students	8

Recommended strategies to be implemented at the **local level** to address the barrier of too little nutrition education in the classroom

Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	N
Establish local BOE policies to require nutrition education to be taught in the classroom	17
Require teachers to spend 5 minutes daily discussing nutrition concepts in their classrooms and provide teachers a free meal or meal token (paid from local funds) for teaching nutrition	8
Employ RDs within the district to coordinate and provide nutrition education in grades K- 5	3
Recommended Strategies requiring Advocacy	
Educate teachers and principals about the academic value of healthy school meals	14
Educate parents, community and media about Child Nutrition through newsletters, newspapers; reach out to parents and community to get them involved and supportive of the Child Nutrition Program	13
Principals and teachers should serve as role models to students	10

Appendix M

Strategies to minimize or overcome the barrier of Student's Taste Preferences

Recommended strategies to be implemented at the **federal level** to address the barrier of student taste preferences

Recommended Strategies requiring Legislative Action	N
Establish regulations that prevent advertising and branding on school campuses	15
Provide funds for equipment/food carts in dining room and commons areas so students may select a variety of meal options in a small amount of time; no waiting in line for school meals	9
Reinstate Nutrition Education and Training funds for student taste tests and accompanying nutrition education in the classroom and cafeteria	7
Provide more commodities that are appealing to children	5
Regulate advertising of "junk" food to small children	5
Expand Fresh Fruit and Vegetable Program to provide funds to more schools; this is a great program to change student's food preferences	4
Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	
Provide special grants to low-wealth school districts to enable them to renovate their cafeterias and make the dining hall more inviting/appealing to children, provide adequate equipment to prepare and serve more healthful foods and other program enhancements	12

Recommended strategies to be implemented at the **state level** to address the barrier of student taste preferences

Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	N
Ban soft drinks in schools; we know they are not good for children, but school administrators don't want to part with the money they bring in; something is wrong with that message	7
Recommended Strategies requiring Enforcement of Current Laws and/or Policies	
Enforce competitive food rules with a financial penalty to the district if not followed; kids will choose what is available to them	16
Recommended Strategies requiring Advocacy	
Develop a media campaign targeted to parents to show them the short and long term consequences of their children's poor diets	13
Promote positive relationships with the media to generate more positive press for Child Nutrition Programs so children will be proud, not embarrassed, to eat school meals	8
Continue to secure funding and grants for local education agencies to implement innovative nutrition programs	3
Provide more assistance in menu development and nutrient analysis	2

Recommended strategies to be implemented at the **local level** to address the barrier of student taste preferences

Recommended Strategies requiring Regulation, Ordinance and/or Policy Adoption	
Establish local policies on the kinds of foods students may bring from home and restrict soft drinks and candy as part of the child's bag lunch	12
Establish local policies to reduce the availability of unhealthy foods outside the cafeteria (i.e. class parties, school stores, fund raisers)	12
Require nutrition education in K-5 classroom	4
Prohibit sales of food-related fund raisers with the exception of fresh fruits	3
Require nutrition education to be taught in both the classroom and cafeteria	3
Form Nutrition Advisory Councils to involve students in menu planning and food selection	2
Recommended Strategies requiring Enforcement of Current Laws and/or Policies	
Local School Board should support not challenge the enforcement of USDA regulations on competitive food sales	10
Recommended Strategies requiring Advocacy	
Promote the value of good nutrition to the local board as it relates to preventing student absences, heightened attention spans and ultimately an increase in test scores	6
Provide consistent messages about healthy foods in the cafeteria, classroom, hallway, etc. until healthy foods become the "cool" way to eat	2
Market healthy food choices through Winner's Circle and other nutrition promotion programs	2
Provide opportunities for students to test new food products that are healthy	2