

The Pennsylvania State University

The Graduate School

Department of Nutritional Sciences

**IMPLEMENTATION OF LOCAL WELLNESS POLICIES IN PENNSYLVANIA
SCHOOL DISTRICTS: STUDENT INVOLVEMENT AND PROCESS FACTORS
ASSOCIATED WITH POSITIVE CHANGES IN THE SCHOOL WELLNESS
ENVIRONMENT**

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Nutrition

by

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The dissertation of Lamis Hassan Jomaa was reviewed and approved* by the following:

Claudia Probart
Associate Professor of Nutrition
Dissertation Adviser
Chair of Committee

Terryl Hartman
Associate Professor of Nutrition

Katarzyna Kordas
Assistant Professor of Nutrition

Leif Jensen
Professor of Rural Sociology and Demography

Gordon Jensen
Professor of Nutrition
Head of the Department of Nutritional Sciences

*Signatures are on file in the Graduate School

ABSTRACT

Childhood obesity is an epidemic in the United States. Numerous health and nutrition policies at the national and state levels have been developed and adopted by various sectors to address this problem. Schools represent one of the primary settings targeted by federal and state policies to prevent and reverse childhood obesity. The Child Nutrition and WIC Reauthorization Act of 2004 is the most recent federal mandate that required schools sponsoring school meal programs across the country to develop local wellness policies (LWPs) in order to address this serious problem. The purpose of this study is to assess the progress of Pennsylvania public schools in implementing their local wellness policies, mainly the implementation of student involvement goals and changes in nutrition education, physical activity, and the competitive food environment after the establishment of wellness policies. A web-based survey was developed, pilot-tested, and administered to all Pennsylvania public school districts that developed LWPs at the beginning of the 2006/2007 school year. The 39-item survey included 9 components to assess process areas that were developed and followed by school districts to implement their LWPs and the progress of schools in implementing wellness policy goals.

Pennsylvania school districts met the main requirements of the wellness policy mandate; however schools varied in implementing their policy goals and in enforcing and measuring these policies. Pennsylvania school districts are involving students in wellness-related areas in a variety of ways. In our study, student involvement was associated with positive changes in nutrition education and physical activity opportunities. In addition, student involvement was associated with healthier foods and beverages sold and offered in competitive food venues. Two clusters of school districts in Pennsylvania were identified based on processes that schools have followed in implementing LWPs. Student involvement, receiving external funding, and measurement of LWP

implementation are among the processes identified in our study that distinguish between school districts in Pennsylvania. No demographic differences were observed between the two clusters. However, clusters differed on steps taken to plan the implementation of policy goals, the allocation of internal funds, and the existence of ongoing wellness committees and the frequency of their meetings. School districts that were more process-committed reported more positive changes in nutrition education, physical activity, and much healthier changes in competitive foods and beverages compared to less process-committed SDs. In conclusion, our findings highlight some of the main processes that distinguish school districts and can contribute to positive changes taking place in schools with the implementation of LWPs. These processes include involving students in the implementation of policy goals, mobilizing internal and external funds to support LWP-related activities, adopting an organized systematic approach in planning for the implementation of policy goals, and measuring school progress in implementation. Findings from our study have a number of implications for policy makers, nutrition professionals, researchers, and local school authorities involved in preventing childhood obesity through school nutrition and wellness policies. These implications may serve as good recommendations for future reauthorizations of the Child Nutrition Programs and the local wellness policy mandate.

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Chapter 1

Introduction

1.1 Background

In an attempt to address the problem of childhood obesity, the federal government passed the Child Nutrition and WIC Reauthorization Act of 2004 that mandated each Local Education Agency (LEA) participating in the school meal programs to develop a Local Wellness Policy (LWP) and to involve a number of stakeholders in the development process. Local Education Agencies (LEAs) include public school districts, private schools, charter schools, vocational technical schools, and residential schools. Research supports student involvement in nutrition programs and school-based interventions as this may increase buy-in for changes occurring in schools to promote healthful lifestyle behaviors. In Pennsylvania (PA) as in other states of the country, LEAs sponsoring school meal programs developed their own policies by the beginning of the 2006/2007 school year and are currently implementing their LWPs.

1.2 Statement of Problem

Prior to the establishment of LWPs, researchers expressed concerns over the weak enforcement of nutrition policies in schools, miscommunication about existing policies, and the lack of involvement of key stakeholders in the development of these policies.¹⁻³ Few studies

have been published, so far, to assess the progress of schools across the country in implementing their wellness policy goals. Even fewer studies explore whether different stakeholders and wellness committee members that helped develop the LWPs are involved in policy implementation and enforcement. A limited number of studies show mixed results on students' perceptions of school nutrition policies and their impact on their eating behaviors.⁴⁻⁶ To the best of our knowledge, our research group was the first to investigate student involvement-goals included in school policies and to identify policy and demographic characteristics of school districts that can help predict the inclusion of some of these student involvement-goals.^{7,8}

1.3 Specific Aims

The main purpose of the present study was to assess the progress of Pennsylvania public schools in implementing student involvement-goals and examine the perceived effectiveness of wellness policies on various areas of the school environment. This study was designed to fulfill the following objectives:

- identify the forms in which students are being engaged in school nutrition policies, programs, and meals;
- explore relationships between including student involvement goals in the local wellness policies and the implementation of these goals;
- assess whether information about the local wellness policy was disseminated to students within school districts and the modes of communication used;
- investigate relationships between implementation of student involvement-goals and the implementation of policy goals related to nutrition education, physical activity, and the nutritional quality of foods/beverages offered outside the school meal programs;

- classify processes carried out by school districts in implementing local wellness policies;
- report action steps taken by school districts in planning for the implementation of wellness policies; and
- investigate relationships between processes adopted by schools and implementation of policy goals.

Chapter 2

Literature Review

2.1 Childhood Obesity - Prevalence and Consequences

Childhood obesity is a serious public health problem in the US. In the past three decades, the prevalence of overweight has tripled reaching 18.8% and 17.4% for children 6-11 years and 12-19 years old respectively.⁹⁻¹¹ Results from the 2007 National Survey of Children's Health indicate that nearly one in three children ages 10-17 were overweight or obese in that same year.¹² Most recently, Ogden et al.¹³ assessed the prevalence of high body mass index in US children and adolescents using the NHANES 2007-2008 data. Researchers reported that among children and adolescents who are aged 2 -19 years, 12% were at or above the 97th percentile, 17% were at or above the 95th percentile, and 32% were at or above the 85th percentile.

Obesity threatens the health of today's children and adolescents and puts them at an increased risk of becoming obese adults.¹⁴⁻¹⁶ For the first time in this country's history, it is predicted that if the current high rates of obesity persist, children will likely have shorter life spans than their parents.¹⁷ Obesity is associated with a number of chronic diseases, such as cardiovascular diseases, hypertension, diabetes, and certain types of cancers. Researchers are observing strong correlations between obesity early in children's lives and a number of risk factors for chronic diseases. For instance, excess weight is a risk factor for impaired glucose tolerance, insulin resistance, and type 2 diabetes mellitus in the pediatric population.^{18, 19} Furthermore, pediatric obesity is associated with cardiovascular disease risk factors (e.g., elevated

systolic and diastolic blood pressures, insulin, and triglycerides levels) that predispose children to cardiovascular diseases early in life.^{20, 21} Most cross-sectional analyses and a few recent prospective studies lend strong support to the hypothesis that obesity is also a risk factor for respiratory problems, mainly asthma.^{22-24, 25} The combined effects of both asthma and excessive body weight decrease the quality of life of children.²⁶ Obese children and adolescents are also at increased risk for certain orthopedic and neurological conditions.^{27, 28} Obese children and adolescents not only suffer from adverse physical health consequences, but are also more susceptible to social stigmas and psychological problems compared to their average weight peers, all of which may affect their future growth and development to become healthy and productive adults.

2.2 Obesity Prevention in Schools

Schools are well positioned to address the problem of childhood obesity. Ninety-five percent of American youth aged 5 to 17 years spend 6 to 8 hours each day for most of the year in school. Over one-half of these children consume at least one meal per day from the school meals program; also, many consume foods and beverages sold or offered in schools, either à la carte, in vending machines, or in school stores.^{4, 29} In addition, schools present an optimal setting for children to acquire health-related knowledge, learn and practice healthy eating, and become physically active during and after school hours. Schools can promote healthy eating behaviors through integrating nutrition education within behaviorally and developmentally-appropriate classroom curricula. Furthermore, schools can provide children and adolescents with opportunities for being physically active during physical education classes, recess, afterschool programs, and intramurals.³⁰ It is within the school environment where social norms are observed, knowledge is acquired, and attitudes and behaviors are modeled and changed.⁴ The

length of time that children and adolescents spend at school, the variety of foods and beverages that they are offered or sold when there, and the learning opportunities schools can offer to model healthful eating and physical activity behaviors among children, all make schools unique settings to address the growing problem of childhood obesity.

As childhood obesity rates increased, numerous reports, studies, and policies across the nation addressed the role that schools can play in preventing, if not reversing, childhood obesity.³¹⁻³⁴ In 2005, the Institute of Medicine (IOM) developed a report promoting the need for a national action plan to reduce the alarming rates of childhood obesity.³⁵ The IOM considered schools the primary locations where positive health messages could be disseminated and modeled, and recommended that schools provide environments conducive to healthful eating and regular physical activity behaviors.^{35 (p 12-14)} In addition, the Institute rallied various stakeholders, such as families, communities, schools, industries, media, and governments, to become actively involved in the fight against obesity. This report provided stakeholders with specific goals and recommendations to promote healthy lifestyles among youth.^{35 (p1-19)}

2.3 Student Involvement and Empowerment

2.3.1 Student Involvement in School Changes

Historically, students have demonstrated strong capabilities to make school-related decisions and are key players in changes made at the classroom or school-level. However, youth participation in school changes and reforms were severely limited for years and their role have been focused primarily on social activities rather than more consequential school-related issues³⁶. In addition, student governments have rarely been engaged in identifying or solving school-

related problems.³⁷ Fortunately, the concept of student empowerment re-emerged in the past decade, especially within the field of education, to improve student outcomes and contribute to the success of school reforms.³⁸ With growing emphasis on closing the achievement gap and improving academic performances, student voice initiatives re-surfaced and youth-adult partnerships have been gaining significance.³⁹

Student voice can take different forms. Students can be asked to share their opinions and vocalize problems they perceive within the curriculum, school environment, or other school-relevant issues. Students can also collaborate with teachers and school administrators in brainstorming for solutions, and at times they may be given the lead on some of the changes that occur in their schools⁴⁰. Most of the recent initiatives focus on the benefits that schools can reap from student participation in decision making, mainly in school reforms. Collaborations between students and teachers lead to remarkable changes in the school curriculum, methods of instruction, and school policies.⁴¹ By empowering students to voice their opinions and involving them in school reform conversations, school administrators and teachers are learning how to enrich their knowledge and viewpoints with those of their students. They are also learning that students have unique perceptions of their school environments and can bring new ideas and challenges that teachers and administrators are unaware of or incapable of tackling.⁴² Thus, youth-adult partnerships are among the strong forms of student voice activities⁴³, as they allow for a synergy that “transcends what youth or adults alone can do” when facing school-related changes and challenges.^{39(p10)}

2.3.2 Role of Students in Obesity Prevention

The role that students can play in the development and implementation of school nutrition programs and policies targeting childhood obesity has not been fully explored. Students

and other members of the community should be involved in the school health and nutrition advisory committees.⁴⁴ Further, student input should be addressed if school environment policies are to influence positively the commitment, acceptance, and action of students. Schools are thus recognizing the unique contribution of youth to the success of any school policy or plan of action. The national nonprofit organization Action for Healthy Kids (AFHK) has been one of the strong promoters of student engagement in the fight against childhood obesity. The ‘Students Taking Charge’ is an example of a successful project developed by the Massachusetts AFHK team. The Massachusetts AFHK team greatly benefited from student innovative and active involvement in the project. The team provided pilot schools with mini-grants, engaged student councils and governments in drafting and reviewing school policy toolkits (School Health Index), and trained students how to voice their opinions and communicate with the school and state officials. The team also learned that student councils, especially in high schools, can be significant allies for the success of school policies and changes.⁴⁵ After this project was successfully implemented in Massachusetts, it was adopted by AFHK teams in Texas, Michigan, Iowa, Kansas, and other states. It has now become a national campaign that attracts high school students from across the nation to learn how to help make their schools conducive for healthy eating and active living.⁴⁶ The “Students Taking Charge” project provides evidence for the impact that active student participation can have on school environment changes. This project promotes the involvement of students in the development and implementation of the newly mandated local wellness policies that are developed by schools in order to help change the status quo away from students as passive beneficiaries to students as active participants. The Pennsylvania Advocates for Nutrition and Activity (PANA) is another organization that promoted student engagement in school environmental changes through launching the nrg-Powered by Choice campaign in 2007. It is a youth empowering health movement that rallied students to adopt healthy eating and physical activity behaviors to obtain energy balance.⁴⁷ Involving students in the development and

implementation of local school wellness policies to increase students' awareness and gain their support have been further promoted by the United States Department of Agriculture (USDA).⁴⁸ The USDA Team Nutrition in collaboration with the Center for Disease Control and Prevention (CDC) developed a helpful resource to be used by teachers and caregivers for empowering youth to make healthy lifestyle choices.⁴⁹ Despite the numerous resources available to schools for engaging students in school wellness policies and the campaigns that are gaining momentum in the past few years, only a handful of field reports have been published to document these efforts^{45, 50}, which often provide only anecdotal evidence.

2.3.3 Status of Student Involvement in Local Wellness Policies developed by Pennsylvania Schools

One of the requirements of the Child Nutrition and WIC Reauthorization Act of 2004 was the involvement of students, parents, representatives of the school food authority, the school board, school administrators, and the public in the development of local wellness policies. Through various state and local model policies, LEAs were encouraged to develop local wellness committees and/or school health advisory councils. The activities of these committees and councils would include developing the LWPs, follow-up on their implementation, as well as review, monitor, and evaluate their effectiveness in promoting healthy school environments. These committees and councils can provide valuable opportunities for various stakeholders to develop a common vision for their individual school environments and venues for continuous interaction among its members.

Prior to the development of local wellness policies, Probart and her colleagues⁵¹ conducted in-depth interviews with school food service directors from a representative sample of Pennsylvania high schools to identify key stakeholders involved in decisions related to the sale of

a la carte foods. Interestingly, students were identified among the four main stakeholder groups with the highest impact on à la carte sales and school revenues. Food service directors regarded students to have the power and saliency to influence the three other main stakeholders: school district administrators, the principals, and parents. In a follow-up study³, researchers found that student support and acceptance of local wellness policies was crucial for the successful implementation of wellness policies by school employees. Furthermore, school employees rated student involvement strategies among the top resources needed to implement effective school wellness policies.

After the local wellness policies were developed and submitted by Pennsylvania schools at the beginning of the 2006 school year, our research group⁷ assessed the role that students were given in the development and implementation of local wellness policies. Our study was the first, to the best of our knowledge, to explore factors that can help explain the inclusion of student involvement goals in local wellness policies. We explored the relationships between policy and demographic characteristics of Pennsylvania local education agencies and student involvement goals that were included in LWPs. Policy characteristics of schools included the comprehensiveness and strength of these policies; comprehensiveness was defined as total number of goals in a policy and strength was defined as number of neutral and strong policies compared to the Pennsylvania School Board Association policy template. Using logistic regression analysis models, we found that LEAs with comprehensive and strong policies were more likely to engage students in nutrition-related policies and activities regardless of the type of school (public or private), the size of school (enrollment), or the socioeconomic status of students enrolled in school.⁷ Findings from our previous study were promising, yet insufficient, to learn if schools in Pennsylvania are implementing student involvement goals and involving students in the implementation of the various areas of the LWP. Further studies were thus needed to examine if student involvement goals have been implemented, and explore possible associations

between student involvement in implementation of LWPs and changes in various component areas addressed in the LWPs.

2.4 Federal Local Wellness Policy Mandate

2.4.1 Local Wellness Policies and the Child Nutrition and WIC Reauthorization Act of 2004

In 2004, in an attempt to address the problem of childhood obesity in the US, the federal government passed The Child Nutrition, Women, Infant, and Children (WIC) Reauthorization Act in 2004.⁵² This law mandated that each Local Education Agency (LEA) sponsoring a school meal program must establish a school wellness policy for schools under the LEA by the start of the 2006-2007 academic year. LEAs are defined as educational agencies at the local level that exist primarily to operate schools or to contract for educational services. LEAs include public school districts, private schools, charter schools, vocational-technical schools and residential schools.

The mandate specified, at minimum, the following requirements to be included in the local wellness policies of schools:

- (1) Inclusion of *goals for nutrition education, physical activity, and other school based activities* designed to promote student wellness, as determined appropriate by the LEA;
- (2) Inclusion of *nutrition guidelines* selected by the LEA for all foods available on each school campus during the school day with the objectives of promoting student health and reducing childhood obesity;

- (3) Provision of assurance that guidelines for reimbursable school meals shall not be less restrictive than regulations and guidance issued by the Secretary of Agriculture. This mandate is pursuant to section 10 of the Child Nutrition Act (42 U.S.C 1779) and National School Lunch Act (42 U.S.C 1758, 1766), as those regulations and guidance apply to schools; and
- (4) Establishment of a plan for measuring implementation of the local wellness policy, including designation of one or more persons within a LEA or at each school to ensure that the school meets the local wellness policy; and
- (5) Involvement of parents, students, representatives of the school food authority, the school board, school administrators, and the public in the development of the school wellness policy.

2.4.2 Compliance of Schools with Local Wellness Policies

The law required that school districts have at least one goal within a number of specific areas including nutrition education, physical activity, and other-school based activities; however, it did not mandate specific goals in these areas. In the past few years, research groups from across the country were interested in the compliance of school districts with the mandates of the Child Nutrition Act when developing their local wellness policies. In 2008, the Action for Healthy Kids published the first study that assessed school wellness policies from a nation-wide convenience sample of school districts (n = 265).⁵³ Sixty-eight percent of the local wellness policies examined in this study met the minimum federal requirements; however, nearly all policy goals for nutrition education, physical activity, and other-school based activities lacked specifics to guide their implementation. Similarly, Probart et al.⁵⁴ found that the majority of school districts in Pennsylvania that sponsor school meal programs included the mandated requirements of the law within their local wellness policies. Nevertheless, most of the goals included in Pennsylvania's LWPs were fairly general and broad thus making it difficult for school personnel

to develop action plans and measure the implementation of these goals. In Utah, Metos and Nanney⁵⁵ reported that seventy-eight percent of school districts (n = 30) were found to be compliant with the federal guidelines and included nutrition and physical activity policy statements. However, Utah school districts seemed to include policy goals for areas that were either already in place or mandated by another agency, such as the Utah State Board of Education. Thus, researchers concluded that compliance with the minimum requirements of the Child Nutrition Reauthorization Act is insufficient to ensure that comprehensive or strong policies are being implemented in schools. In early 2006, Serrano et al.⁵⁶ conducted a study in Virginia that assessed what schools planned to include in their local wellness policies and found that most schools included goals for nutrition education, physical activity, and nutrition guidelines and at least one evaluation goal. Researchers also identified a number areas in which schools may need assistance and where nutrition educators and researchers can provide support. These areas included the involvement of students and parents in school wellness, advocating for additional funding to provide nutrition education to students, supporting evidence-based nutrition and physical activity education programs, and measuring goals through valid and reliable evaluation methods and instruments.

In 2009, Chriqui and her colleagues⁵⁷ published findings from the most comprehensive national review of wellness policies done to date. They assessed more than 600 local wellness policies developed by a nationally representative sample of school districts and that were in place at the beginning of 2006/2007 and 2007/2008 school years. They reported the strength of wellness policies and their reach to students, and assessed areas that were mandated by the law including nutrition education, physical activity, nutrition guidelines for school meals and competitive foods, as well as the implementation and evaluation of the these policies by school districts. They found that at the beginning of the 2007/2008 school year, most students nationwide were enrolled in a district with a wellness policy. However, the quality of wellness

policies varied among schools, and many policies were underdeveloped and lacked sufficient plans for implementation and monitoring. To strengthen the school wellness policies, Chriqui and her colleagues recommended that the implementation and evaluation of these policies should become a high priority for decision-makers at all levels. In addition, the provision of adequate funding to support wellness policy implementation in schools was another key issue that requires the attention of federal legislators and policy makers.

According to all these studies that were published in the last 4 years, the large majority of schools sponsoring school meal programs have met the general requirements of the LWP mandate and included goals on nutrition education, physical activity, and nutritional quality of foods and beverages available during the school day. However, nearly all studies that assess school wellness policies across and within states found that the most common policy goals were general and did not include specific action plans needed to implement and evaluate the progress. Neither did these policies identify explicit anticipated outcomes and measurable goals to document the changes that are happening in schools and their impact on the dietary choices, intakes, and weight status of children.

2.4.3 Implementation and Evaluation of Local Wellness Policies

Four school years have passed since districts from across the nation participating in the federal meal programs were required to develop and implement local wellness policies in order to address the problem of childhood obesity. However, only few studies were published so far reporting on the progress that schools have made in implementing their policy goals, and if schools are meeting the federal law requirements related to the implementation, measurement, and evaluation of their wellness policies.

According to the Child Nutrition and WIC Reauthorization Act of 2004, school districts were required to establish a plan for measuring implementation of the LWP. However schools were not required to develop plans for implementing each of their wellness policy goals. Few federal and state agencies urged schools to develop implementation plans for their wellness policies and provided schools with templates to develop plans for specific LWP components such as nutrition education and physical activity.^{58, 59} Developing and adopting sound policies are only the first steps and do not guarantee the implementation of these policies. Successful implementation requires good planning and strong management, consistent enforcement and communication, as well as continuous communication to gain the support of various school and community stakeholders.⁶⁰ In addition to developing action plans and procedures, schools were encouraged to establish realistic time frames for implementing their policy goals, whether having them all be implemented at once or using a phased-in approach.⁶¹

2.5 Competitive Food Policies in Schools and Changes to the Nutrition Guidelines after Local Wellness Policies

Competitive foods are all foods and beverages that are sold or offered to students at school and that fall outside of the USDA's school meal programs - breakfast, lunch, and after-school programs. Foods sold in vending machines, a la carte lines, school stores, and for fundraisers are considered competitive foods. Research has shown that competitive foods are widely available for purchase at all grade levels in US public schools, particularly in secondary schools, and many of these foods fall under the unhealthy food category.^{62, 63} According to data from the third School Nutrition Dietary Assessment Survey (SNDA III) collected during the 2004-2005 school year, more than 40% of public school students consumed at least one

competitive food item during the school day. In addition, all high schools, nearly all middle schools (97 percent), and most elementary schools (80 percent) had some competitive food source available to students. A la carte offerings sold in the cafeteria were the most common source of competitive foods for elementary students, whereas vending machines, school stores, and snack bars were more common source for middle and high school students.⁶³

Research indicates that the types of competitive foods available at schools influence students' dietary choices. In certain studies, students had better diets, relative to Dietary guidelines for Americans, when unhealthy competitive foods were not sold at schools (unhealthy foods were defined as low-nutrient energy-dense foods and beverages).⁶⁴ In other studies, researchers found that the availability of healthy options in schools is insufficient to increase their consumption, if unhealthy competitive foods are still available within schools.^{65, 66} According to Story and Larson⁶⁷, few studies investigated the relationship between availability of competitive foods in schools and changes in weight status of students, all of which were cross-sectional and reported increased risk of obesity among schools in which unhealthy competitive foods are available.

Foods and beverages provided through the USDA school meal programs must meet the federal nutrition standards; whereas competitive foods that are widely available in schools are largely exempt from similar nutrition standards. Prior to the Child Nutrition and WIC Reauthorization Act of 2004, 31 states had no state competitive food policies other than the USDA regulations.⁶⁸ However, in the past seven years, several school districts and numerous states adopted policies to regulate competitive foods and beverages in schools.^{69, 70} These policies were set to improve the school food environment, help students make healthier dietary choices, and ultimately reduce their risk for obesity. In 2007, the IOM and CDC conducted a joint study to review the sale, content, and consumption of foods at school, including competitive foods. The findings of this study were published in a 2007 report that included three main recommendations:

1) federally-reimbursable school nutrition programs should be the main source of nutrition at school, 2) the availability of competitive foods in schools should be limited, and 3) if competitive foods are available, they should consist of nutritious fruits, vegetables, whole grains, and nonfat or low-fat milk and dairy products, consistent with the 2005 Dietary Guidelines for Americans (DGA). These recommendations were intended to augment the LWP mandate and ensure that schools are setting nutritional standards for all foods offered or sold in their schools as required by the Child Nutrition and WIC Reauthorization Act of 2004.

According to a report released by the Trust for America's Health and the Robert Wood Johnson Foundation (RWJF) in 2009, Pennsylvania was one of the 27 states to have nutritional standards for competitive foods and limited access to competitive foods.⁶⁹ Two years prior to this report, the Pennsylvania Department of Education (PDE) developed voluntary nutrition standards for all foods and beverages offered on school campuses. The PDE provided financial incentives to all schools in Pennsylvania that adopted these standards and implemented them in various competitive venues within their schools.⁷¹

Probart et al. conducted a statewide assessment of local wellness policies in Pennsylvania and reported that nearly all school districts sponsoring school meal programs met the federal wellness policy mandate and its requirement to include nutrition guidelines for all foods available on the school campus during the school day within their LWPs.⁵⁴ More recently, same research group examined the response of Pennsylvania school districts to the federal mandate and found improvements to the nutritional quality of foods sold in competitive venues, mainly through la carte menus and vending machines.⁷² Probart and her colleagues suggested that incentives and consequences for adoption of strict nutrient standards should be considered by state and federal legislators as strategies to ensure that schools are improving the nutritional quality of foods and beverages offered and sold to students during the school day.⁷²

Chapter 3

Methodology

3.1 Demographic Data of School Districts

Data on the geographic location of each SD, also known as *locale*, was available through the National Center for Education Statistics (NCES) database for school year 2005-2006.⁷³ Using the NCES locale categories, each SD was assigned to one of the following: 1) Principal city (Large City and Midsize city), Suburban (Urban fringe of large city, urban fringe of midsize city, and large town), and Rural (rural areas and small towns). Cities and towns were defined based on location and population size and are described in details on the NCES website.⁷³ Enrollment and percentage of free and reduced price meals (F/R rate) of SDs for 2006/2007 and 2007/2008 school years were publicly available through the Pennsylvania Department of Education website and its online resources.⁷⁴

3.2 Local Wellness Policy Data

At the beginning of the academic year 2006, all Local Education Agencies (LEAs) participating in a federal meals program were required to submit a LWP to the Pennsylvania Department of Education (PDE) for review of compliance. PDE and the Pennsylvania School Boards Association (PSBA) developed a LWP template and encouraged PA LEAs to use it when developing their own wellness policies.⁷⁵ LEAs could use the PSBA template goals, modify them,

use other templates, or develop their own. Copies of the LWP that were submitted to PDE were then sent to our research group for abstraction and analysis. The process of data abstraction and coding of LWPs and student involvement-goals was described in details elsewhere.⁷ For the purpose of the current study and to compare original policy data with implementation data, we included in our analysis SDs that developed LWPs and submitted them to the Pennsylvania Department of Education (PDE) in 2006 and completed the Pennsylvania Implementation Checklist (PIC) in the 2008/2009 school year (n = 368).

3.3 Policy Implementation Checklist (PIC) /Survey Data

3.3.1 Survey Development and Pilot Testing

The present study is part of a larger study conducted by our research group, which included the development and evaluation of a 39-item online tool/survey to measure the implementation of LWPs and its various components (see Appendix A). The tool was designed to measure the progress of schools in implementing required and recommended implementation steps, and to examine the perceptions of respondents in terms of the impact of LWP implementation on changes in the school environments.

The survey was assessed for validity and clarity by a panel of experts in the area of LWP implementation, including school foodservice directors, university researchers, and state department of education officials. The survey was determined to be valid, and was then pilot-tested by fifty superintendents/chief administrative officers (CAOs) who were randomly selected from among all LEAs in Pennsylvania. Standard, recommended survey methodology was used.⁷⁶ Pre-notification letters which included web-links to the survey were mailed along with \$20 for

participation requesting completion of the survey by the superintendent/CAO or another individual familiar with LWP implementation. Three e-mail reminders were sent to non-respondents. Thirty-four surveys were returned (response rate: 68%) and the Cronbach alpha reliability coefficient was 0.62. Based on results from the pilot test, minor changes were made to the survey. Changes included expanding the response categories for the student involvement question and eliminating a question on changes that occurred in school schedules (class and bus schedules) after the LWP was established.

3.3.2 Survey Administration

The data for the larger study was collected between November 2008 and January 2009 using web-based surveys sent by the Penn State Survey Research Center. The web survey was designed using Perseus SurveySolutions[®] software. The invitation for the web-based survey was sent to 924 school districts/private schools' superintendent/administrative officers, all of whom sponsor the National School Lunch Program, out of which 638 completed surveys were collected (response rate:69%). The survey methodology was identical to pilot-testing excluding monetary incentives. Recruitment messages were sent under the signature of Pennsylvania's State Director of Child Nutrition Programs, strongly encouraging participation and promising an individualized feedback report to document LWP implementation progress.

3.3.3 Survey Sample and Components

The sample of our present study includes surveys received from 368 out of 499 public school districts in Pennsylvania that sponsor school meal programs, and are thus required to develop LWPs (response rate: 73.7%). The online survey tool, known as the Policy

Implementation Checklist (PIC), assessed several components that measure the process of implementation (planning for implementation; measurement and reporting, external funding allocated for LWP-activities, communication, and student involvement) and content areas of LWPs (nutrition education, physical activity, and competitive foods and beverages).

The survey included a number of questions to assess steps taken by school districts to plan for the implementation of their LWPs, the existence of wellness committees in each school district, and whether internal funds and resources were allocated for the implementation of the LWPs. Five scales were developed to measure *process components* measured assessed by the survey, as listed below:

1- Funding scale: measures *external* funding available to the school district to support the implementation of activities related to its LWP - question #26. The score ranges from (1) to (4), with score (1) indicating no external funding, score (2) indicating funding less than \$1,000, score (3) indicating funding between \$1,000 and \$4,999, and score (5) for funding that is greater or equal to \$5000.

We used question #27 on the PIC to explore whether there were *internal resources or funds* allocated to support the LWP implementation. Respondents were asked to pick one of three following options (1) Yes, (2) No, and (3) Don't Know when answering the following question: "Has any internal funding or local resources been designated to support your Local Wellness Policy implementation?" This question was not included as part of the funding scale, because it did not include a specific range of funds allocated for LWP-related activities.

2&3- Communication scales:

This scale was developed based on SD responses to question #28

- The ‘stakeholders’ communication scale assesses to whom information about the LWP has been communicated, and scale ranges from 0 to 7, with 0 indicating that LWP was not communicated to anyone of the 7 listed stakeholder groups
- The ‘modes’ communication scale, indicates modes of communication used to share information about the LWP with different stakeholders. The scale ranges from 0 to 6 with 0 indicating that SD did not use any mode of communication and 6 indicating the use of the 6 modes of communication listed on the PIC.

4- Measurement and Reporting scale: evaluates plans and other activities taking place in school districts to measure and report LWP implementation and includes questions # 34 through question # 38.

Table 3-1: Measurement and reporting of the implementation of Local Wellness Policy (LWP) goals

Questions	Yes	No	In Process/In Progress	Don't know
Question #34: Is there a written plan for measuring implementation?	✓	✓	✓	✓
Question #35: Is there a timeline for reporting on implementation of your Local Wellness Policy to the school board or other administrative body?	✓	✓	✓	✓
Question #36: Has measurement of implementation of your Local Wellness Policy begun?	✓	✓	---	✓
Question #37: Have any written or oral reports been presented to the school board or Superintendent or other administrative body	✓	✓	✓	✓

describing the progress of your Local Wellness Policy implementation?				
Question #38: Is there a plan for review and possible revision of your Local Wellness Policy?	✓	✓	---	✓

Each individual question was coded as ‘1’ for yes and ‘0’ for no. Responses to the five questions were summed and a score was assigned for each school district on the measurement and reporting scale. The scale ranged from ‘0’ to ‘5’ with ‘0’ given to SDs that answered ‘no’ to the 5 questions listed above and indicating that SDs did not make any effort, in terms of measuring or reporting on the implementation of their LWPs. The score ‘5’ was given to SDs that had a total of 5 ‘Yes’ responses on all 5 questions, thus indicating highest level of measurement and reporting. The ‘in process/in progress’ responses on questions # 34, #35, and #37 were re-coded as ‘0’ when calculating the scale scores, and the “don’t know” responses were re-coded as missing data.

5- Student Involvement Scale: assesses the active involvement of students in LWP implementation beyond policy development. This scale was calculated based on responses to question #8 from the PIC in which a total of 8 areas or forms of student involvement were listed (see table 3-2).

Question # 8 on the PIC/survey was designed to parallel the forms of student involvement suggested by the Pennsylvania School Boards Association (PSBA) template and promoted by the Pennsylvania Department of Education. As reported previously, most SDs in Pennsylvania used the PSBA template when developing their LWPs.⁵⁴ Thus, eight specific areas of involvement were listed on the survey for respondents to check all that applied for their SDs. Six of these areas of involvement were matched with student involvement-goals found on the PSBA template (a),

(b), (c), (e), (f), and (g) and two assessed other forms of student involvement that were included in some of the LWPs and may be currently implemented (d) and (h).

Table 3-2: Student involvement-goals on the Policy Implementation Checklist (PIC)

Student Involvement Goals*
a) Students encouraged to act as positive role models of healthy behaviors
b) Students involved in school meals menu selections
c) Students represented on an on-going wellness committee
d) Students serve on school meal advisory board
e) Students are provided with nutritional content of school meals
f) Student input regarding other health/wellness/nutrition/physical activity issues is assessed
g) Students involved in annual reviews and reporting about LWP implementation
h) Student lead campaigns related to wellness

*Each of the questions had two response categories (1 = selected, 0 = not selected).

These data were treated in two ways: 1) responses to each of the following forms of student involvement [(a) to (h)] were explored separately in this study, 2) a student involvement scale that ranges from 0 – 8 goals was calculated by summing the individual responses. Correlations between the implementation of student involvement goals (individual goals or scale) and various components of PIC (process and content areas) were then explored.

3.3.3.1 Steps taken to implement Local Wellness Policies

Seven questions were included in the PIC to assess steps taken by school districts when planning the implementation of their LWPs. For each of the questions listed in Table 3-3, responses were coded to identify if action steps were completed or not (Yes or No responses), and in questions #1, #6, and #7 we investigated whether steps were taken for all or for some of the

goals (Yes, for some goals and Yes, for all goals). In question #4, SDs could report if an action step was taken and is “in process” to be completely implemented. For all questions that SDs responded with a “don’t know” answer we coded these responses as missing data.

Table 3-3: Action steps taken by school districts to plan the implementation of LWP Goals

Implementation Steps	Yes	Yes, for some goals	Yes, for all goals	In process	No	Don't know
Question #1: Developed written implementation plans	---	✓	✓	---	✓	✓
Question #2: Identified person with ultimate responsibility	✓	---	---	---	✓	✓
Question #4: Incorporated policy into strategic plan	✓	---	---	✓	✓	✓
Question #5: Prioritized Policy Goals for implementation	✓	---	---	---	✓	✓
Question #6: Developed timelines for implementation	---	✓	✓	---	✓	✓
Question #7: Identified consequences for violation of your LWP	---	✓	✓	---	✓	✓
Question #10: Identified dedicated wellness coordinator	✓	---	---	---	✓	✓

✓ (check) Response options for each question

--- (blank) Response options that are not applicable for question

Two questions were included in the PIC to explore whether a school district has a functioning wellness committee and how often did this committee meet in the school year prior to the PIC administration.

Table 3-4: Wellness committee-related Questions on the PIC

<p>Q #24: Is there a functioning wellness committee in your school/district?</p> <ol style="list-style-type: none"> 1) Yes 2) No 3) Don't Know
<p>Q# 25: How often did the committee meet last school year?</p> <ol style="list-style-type: none"> 1) No meetings were held 2) 1-2 times 3) 3-4 times 4) More than 4 times

For question #24, we recoded responses to two categories: Yes as (1) and No as (0), whereas the “don’t know” and missing responses were considered as missing data and were excluded from the analysis. A total of seven cases (school districts) had missing data on this question. For question #25, four categories were created for each of the four responses and missing responses (total of five school districts) were re-coded as system-missing and were excluded from the analysis.

3.3.3.2 Content components

The content components explored in our study include reported changes in nutrition education (NE) and physical activity, as well as perceived changes in the quality of competitive foods and beverages. We used questions # 29, #30, and #31 to measure reported changes in NE. Respondents from schools were asked to select one of the answer options indicated below. The “don’t know” responses were re-coded as missing data and were excluded from the analysis.

Table 3-5: Reported changes in nutrition education after the establishment of LWPs

Reported Changes in Nutrition Education (NE)	Yes	No	Occurring prior to the LWP	Don't know
Question #29: Are students receiving more minutes of NE?	✓	✓	---	✓
Question #30: Are students receiving higher quality* NE now that they were prior to the establishment of your LWP?	✓	✓	✓	✓
Question #31: Is NE being integrated into a variety of subject areas (math, language arts, etc.)?	✓	✓	✓	✓

*Higher quality was explained as behaviorally oriented, age-appropriate, interactive, etc.

✓ (check) Response options for each question

--- (blank) Response options that are not applicable for question

To assess reported changes in opportunities given for students to be physically active, we used questions #32 and #33. Respondents from schools were asked to select one of the answer options indicated below (table 3-6). The “don’t know” responses were re-coded as missing data and were thus excluded from the analysis.

Table 3-6: Reported changes in physical activity opportunities after the establishment of LWPs

Reported Changes in Physical Activity	Yes, in all schools	Yes, in some schools	No	Don't know
Question # 32: Do students have more physical activity now than they did prior to the establishment of your LWP?	✓	✓	✓	✓
Question #33: Are there more opportunities for	✓	✓	✓	✓

students to be physically active in classrooms (outside of Physical Education) now than there was prior to the establishment of your LWP?				
---	--	--	--	--

✓ (check) Response options for each question

--- (blank) Response options that are not applicable for question

Several questions were included in the PIC (questions # 12 – 19) to assess the food environment and nutrition guidelines in SDs after the LWP was established. We used question #15 on the PIC to explore perceived changes in the foods and beverages offered in different school venues after the LWP was established. Respondents could select one of six options listed below to describe the changes that have been made to the foods and beverages offered in six different school venues: 1) a la carte, 2) vending machines, 3) student stores, 4) fundraisers, 5) concession stands, and 6) classroom parties.

- 1) These items are now much healthier
- 2) These items are now somewhat healthier
- 3) These items have always been healthy, so little change has occurred
- 4) These items are primarily not healthy
- 5) No foods and/or beverages offered in this area
- 6) Don't know

If SD responded that 'items are now much healthier' within a venue of food/beverage, the variable was coded as (1) indicating that change occurred after LWP was established, and if SD responded as 'items are now somewhat healthier', 'always been healthy, so little changes has

occurred', 'items are primarily not healthy', and/or 'no foods and/or beverages offered in the area', the variable was coded as (0) to indicate that there was no change between situation prior and after the establishment of the LWP. If SDs selected the "don't know" option when answering each question related to changes in the foods and beverages offered in different school venues, the responses were coded as missing data.

3.4 Data Analysis

All survey responses were entered into one database after merging with the demographic data of 2006/2007 and 2007/2008 school year as well the LWP data. All data was analyzed using SPSS software (version 18.0 Chicago, IL). Chi-square analysis was conducted to assess numerous associations: 1) inclusion of student involvement goals in LWPs and implementation of student involvement-goals as reported on the Policy Implementation Checklist, 2) communication with students about the LWP and implementation of student involvement goals, and 3) processes adopted by schools when implementing LWPs and reported changes in content areas of the LWP. Analysis of variance (ANOVA) was used to measure the relationship between student involvement scale and reported changes in nutrition education, physical activity, and nutritional quality of competitive foods and beverages offered to students. K-means cluster analysis^{77, 78} was conducted to identify relatively homogeneous groups of school districts based from our entire sample of school districts based on five process scales: 1) external funding, 2) measurement and reporting, 3) 'stakeholders' communication scale, 4) 'modes' communication scale, and 5) student involvement. We identified two clusters of schools of comparable sub- sample sizes ($n_1 = 182$ and $n_2 = 165$) and saved cluster membership as a new variable. The cluster membership variable was used in running further chi-square analyses to explore differences between clusters with respect to demographic characteristics and reported changes in nutrition education, physical

activity, and perceived changes in nutritional quality of competitive foods. The use of clusters of school districts helped minimize within-group variation and increased between-group variation when exploring differences between clusters in implementing wellness policy goals. Significance value was set at $P \leq 0.05$.

Chapter 4

RESULTS

4.1 Demographic Characteristics of School Districts

A total of 499 public school districts that sponsor school meals programs exist in Pennsylvania. Our study includes SDs that developed local wellness policies (LWPs) and submitted them to the Pennsylvania Department of Education (PDE) at the beginning of 2006/2007 school year and that responded to our Policy Implementation Checklist in 2007/2008 school year. Thus, a total of 386 school districts were included in our analysis (response rate = 73.7%). Demographic data for PIC respondents and non-respondents were available for the school year 2005/2006. We did not observe significant differences between PIC respondents ($n = 368$) and non-respondents ($n = 130$) with respect to the size of school district, percentage of students eligible for free or reduced price meals, or geographic location (rural, urban, suburban); see table 4-1.

Table 4-1: Demographic characteristics of Pennsylvania school districts (Policy Implementation Checklist respondents and non-respondents) ($n = 499$)

Demographic Variables	Respondents $n = 368$	Non-respondents $n = 130$	<i>P</i> for significance
mean \pm SD			
Size of school district			
Enrollment 2005/2006 [†]	3,498 \pm 10,251	3, 205 \pm 3,292	ns

Socioeconomic status of students			
%F/R 2006/2007	30.7 ± 16.2	30.0 ± 17.7	ns
	n (%)		ns
Locale			
Urban	11 (3%)	6 (5%)	
Suburban	169 (46%)	73 (56%)	
Rural	51 (51%)	51(39%)	

† Log transformed (natural logarithm) to achieve normal distribution

* not significant (ns) ; $P > 0.01$

In our study, we ran analysis on PIC respondents and excluded non-respondents. On average, 3,490 and 3,461 students were enrolled in Pennsylvania SDs in the 2006 /2007 and 2007-2008 school years, respectively. In both 2006/2007 and 2007/2008 school years, the average percent of students eligible for free and reduced price meals (%F/R) was similar (31.3% and 31.9% respectively). The %F/R was used as an indicator of the socioeconomic status of school districts. Approximately half of SDs included in our study are located in rural areas ($n = 188$), and slightly less than half in suburban areas ($n = 169$) of Pennsylvania. Only three percent of SDs ($n = 11$) are in urban areas and principal cities. (Table 4-2)

Table 4-2: Demographic characteristics of Pennsylvania SDs reporting on the implementation of LWPs ($n = 368$)

	n	Mean (SD)	Min – Max
Size of School District			
Enrollment 2006 – 2007	366	3,490 (9,977)	248 – 186,946
Enrollment 2007-2008	367	3,461 (9,629)	246 – 180,221
Socioeconomic Status of SDs			
% Students eligible for Free & Reduced Price Meals (%F/R) 2006-2007	366	31.3 (16.0)	1- 86

% Students eligible for Free & Reduced Price Meals (%F/R) 2007-2008	367	31.9(16.0)	1 – 86
	n	Percentage	
Locale			
City / Urban	11	3%	
Suburban	169	45.9%	
Rural	188	51.1%	

4.2 Respondents to the Policy Implementation Checklist from Pennsylvania SDs

The majority of SDs reported that food service directors were involved in providing information to complete the survey/PIC (81%, n = 297). Fifty five percent of SDs (n = 204) reported that superintendents and chief administrative officers were involved in completing the PIC and slightly less than half of SDs indicated that principals were also involved in providing information (n = 177). In addition, slightly less than 40% of SDs (n = 144) reported that nurses, health and physical education teachers provided information to complete the PIC. Less than one-third of SDs reported that curriculum coordinators (n = 117) and business managers (n = 98) were involved in the process. Furthermore, less than 20% of SDs reported that information was provided by family and consumer science teachers (n = 65), other teachers (n = 49), food service staff (n = 63), parents (n = 52), and students (n = 41) when completing the PIC. Other stakeholders who were involved in answering questions on the PIC included assistant superintendents, athletic directors and trainers, councilors, and directors of various facilities and services at schools. (Table 4-3)

Table 4-3: Stakeholders involved in providing information to complete the Policy Implementation Checklist (PIC) on LWP Implementation (n = 368)

Stakeholders	Frequency (n)	Percentage (%)
Food service director	297	80.7%
Superintendent / Chief Administrative Officer	204	55.4%
Principals	177	48.1%
Health/Physical Education Teacher	141	38.3%
School Nurse	141	38.3%
Curriculum Coordinator	117	31.8%
Business Manager	98	26.6%
Family and Consumer Science Teacher	65	17.7%
Food service staff	63	17.1%
Parents	52	14.1%
Other teacher	49	13.3%
Students	41	11.1%
Others	99	26.9%

4.3 Part I: Student Involvement Goals

4.3.1 Implementation of Student Involvement Goals as assessed through the Policy Implementation Checklist

As stated in the methods section, there were eight specific areas for students to be involved in the implementation of their districts' LWPs and that were listed on the PIC/survey. Six of these areas of involvement were matched with student involvement-goals included on the PSBA template and found in school districts' (SD) policies and two additional areas of involvement were not on the PSBA template but were included in the PIC.

Slightly less than sixty percent of SDs who responded to the PIC survey reported that students are being encouraged to act as positive role models of healthful behaviors (n = 213), and approximately 55% of SDs reported that students are represented on on-going wellness committees (n = 202) and involved in menu selections (n = 203). Slightly less than half of SDs stated that students are serving on school meal advisory boards, whereas 45% reported students are provided with nutritional content of school meals (n = 165, 45%). More than a third of SDs reported students' needs regarding health, nutrition, and wellness issues were assessed (n = 141, 38%). Less than 20% of SDs (n =141) reported that students are involved in annual reviews of LWPs and even fewer SDs (n = 51) indicated that students are leading wellness-related campaigns (see Table 4-4).

Table 4-4: Frequency of student involvement-goals included in LWPs and reported to be implemented on the PIC by Pennsylvania school districts

Student Involvement Goals	Included in the policy (n = 368)	Reported Implementation on the PIC (n = 368)
	n (%)	
Students encouraged to act as positive role models of healthy behaviors	200 (54.3%)	213 (57.9%)
Students involved in school meals menu selections	170 (46.2%)	203 (55.2%)
Students represented on an on-going wellness committee	335 (91%)	202 (54.9%)
Students serve on school meal advisory board	---	181 (49.2%)
Students are provided with nutritional content of school meals	245 (66.6%)	165 (44.8%)
Student input regarding other health/wellness/nutrition/physical activity issues is assessed	183 (49.7%)	141 (38.3%)
Students involved in annual reviews and reporting about LWP implementation	242 (65.8%)	59 (16%)
Student lead campaigns related to wellness	---	51 (13.9%)

4.3.2 Associations between Inclusion of Student Involvement Goals on LWPs and Implementation of Student Involvement Goals

We observed little association between the inclusion of student involvement-goals on the LWPs and the implementation of these goals as reported on the PIC, with one exception. More than two-thirds of SDs (n = 114) that stated in their LWPs students will be involved in school meals menu planning reported on the PIC that this goal was implemented. Only 45% of SDs that did not include this goal on their LWP implemented it (n = 89); Chi-square value = 17. 2, P<0.001, see table 4-5.

The majority of SDs reported students were not involved in annual reviews regardless of whether the goal was included in LWP or not (n = 309, 84%). In addition, about 40% of SDs reported that students' inputs on various wellness, nutrition and physical activity-issues were being assessed, whereas two-thirds did not report this goal to be implemented regardless of whether the goal was included in the original policy or not (n = 227, 61.7%). On the other hand, the majority of SDs reported that students are being encouraged to act as positive role models of healthful behaviors in their PICs, whether SDs included this goal in their original policy or did not. However, none of these relationships reached statistical significance (table 4-5).

Table 4-5: Student involvement-goals included in LWPs (submitted in 2006) and reported to be implemented on the PIC (2008-2009) (n = 368)

LWP (Original Policy)	Implementation Checklist		Chi-square P-value (X^2)
	Yes n (%)	No n (%)	
Student on Wellness Committee			
Yes	188 (56.1%)	147 (43.9%)	1.76
No	14 (42.4%)	19 (57.6%)	
Student involved in annual reviews			
Yes	43 (17.8%)	199 (82.8%)	1.23
No	16 (12.7%)	110 (87.3%)	
Students' input is assessed			
Yes	72 (39.3%)	111 (60.7%)	0.10
No	69 (37.3%)	116 (62.7%)	
Students receive nutritional content of school meals			
Yes	117 (47.8%)	128 (52.2%)	2.18
No	48 (39%)	75 (61%)	
Students involved in menu planning			
Yes	114 (67.1%)	56 (32.1%)	17.19***
No	89(44.9%)	109 (55.1%)	
Students encouraged to be positive role models			
Yes	111(55.5%)	89(44.5%)	0.82
No	102(60.7%)	66(39.3%)	

* P < 0.10, ** P ≤ 0.05, *** P ≤ 0.001

4.3.3 Associations between Implementation of Student Involvement Goals and Communication about the LWP

The majority of SDs shared information about the LWP with a number of stakeholders, namely students, parents, teachers/faculty, school administrators, and school food service staff, new employees, and the community at large.

Approximately 50% of PIC respondents reported using school website, school newspaper or newsletter, and mail or handouts as modes to communicate information about the LWP to students. Almost 30% of SDs informed students about the LWP through presentations at meetings and almost 22% used local newspapers. Least mode of communication used by SDs to communicate information about the LWP with students was emails (3.5%, n = 13), table 4-6.

Some of the modes of communication identified by SDs included annual health fairs, after-school fitness and wellness programs, as well as school morning announcements and shows. Few schools organized thematic days and activities such as ‘Go for the Greens’, ‘Jump a Thon’, ‘Walk to School’, and ‘Great Apple Crunch’ promoted by the “nrgBalance” health promotion campaign.⁴⁷

Table 4-6: Modes of communication used by Pennsylvania school districts to inform students about the LWPs (n = 368)

Communicated with students	Frequency (N)	Percentage (%)
Modes of Communication:		
Website	202	54.9%
School newspaper or newsletter	185	50.3%
Mailings/handouts	177	48.1%
Presentation at meeting	116	31.5%
Local newspaper	79	21.5%
Other	45	12.2%
Email	13	3.5%
Don't Know	8	2.2%

Significant associations were observed between communication with students about LWPs and the implementation of two student involvement goals: 1) students act as positive role models of healthful behaviors ($X^2 = 7.01$, $P = 0.008$), and 2) students serve on school advisory boards for school meals program ($X^2 = 4.01$, $P = 0.045$). A higher percentage of SDs that used ≥ 1 mean of communication reported that students are being encouraged to be role models of healthful behaviors compared to SDs that did not use any means of communication. Similarly, a higher percentage of SDs that used ≥ 1 mean of communication indicated that students served on on school meal program advisory boards compared to SDs that did not report using any mean of communication.

A similar trend was observed for two other areas of student involvement (students serving on on-going wellness committees and students leading wellness-related campaigns). However, the association between communication with students and these two student involvement questions on the PIC only approached significance (table 4-7).

Table 4-7: Associations between implementation of student involvement-goals and communication with students about LWPs (n = 368)

Implementation of Student Involvement-Goals	Communication with students about LWP		X^2	P-value
	≥ 1 mean of communication n (%)	No means of communication n (%)		
Student on Wellness Committee			3.62	0.057*
Yes	191(56.5%)	11 (36.7%)		
No	147 (43.5%)	19 (63.3%)		
Student involved in annual reviews about LWP				
Yes	58(17.2%)	1 (3.3%)		
No	280 (82.8%)	29 (96.7%)		
Students' input on wellness issues is assessed			2.45	0.118
Yes	134 (39.6%)	7 (23.3%)		
No	204 (60.4%)	23 (76.7%)		
Students receive nutritional content of school meals			2.29	0.13
Yes	156 (46.2%)	9 (30%)		
No	182 (53.8%)	21 (70%)		
Students involved in menu planning			2.41	0.121
Yes	191 (56.5%)	12 (40%)		
No	147 (43.5%)	18 (60%)		
Students encouraged to be positive role models			7.01	0.008**
Yes	203 (60.1%)	10 (33.3%)		
No	135 (39.9%)	20 (66.7%)		
Students serve on school meals advisory boards			4.01	0.045**
Yes	172 (50.9%)	9 (30%)		
No	166 (49.1%)	21 (70%)		
Students lead wellness-related campaigns			3.1	0.078*
Yes	89 (26.3%)	3 (10%)		
No	249 (73.7%)	27 (90%)		

* trend for significance if $P < 0.1$, ** P is significant if ≤ 0.05

4.3.4 Relationships between Implementation of Student Involvement Goals and Reported Changes in Nutrition Education (NE) and Physical Activity Opportunities after the establishment of LWPs

Half of Pennsylvania SDs included in our study reported that students were receiving more minutes of nutrition education now than they were prior to the establishment of their LWP (table 4-7). Less than one-third of SDs reported no change in the time allocated for nutrition education after LWPs were established, and the 20% of SDs did not know whether change occurred in this area. Approximately 60% of SDs included in our analysis reported that students are receiving higher quality nutrition education now than they were prior to the establishment of their LWPs. Higher quality was defined for respondents as interactive, developmentally and age-appropriate nutrition education lesson plans. Slightly less than 30% of SDs (n = 101) reported that there was no change in the quality of nutrition education, most of which reported that the quality of nutrition education was already high prior to the LWP (n = 78).

In addition, more than one-third of SDs included in our analysis reported that nutrition education is being integrated into a variety of subject areas and that this was occurring prior to the establishment of the LWPs. Approximately 17% of SDs reported that this was a new activity after the LWP, and 23% SDs reported that the integration of nutrition education into other subject areas is not taking place in their schools. Surprisingly, one-quarter of SDs either did not respond to this question or did not know whether this activity was occurring in their schools (Table 4-8).

Table 4-8: Reported opportunities of nutrition education provided to students after the establishment of LWPs in Pennsylvania SDs (n = 368)

Nutrition Education (NE) Area	n(%)
Are students receiving more minutes of nutrition education now? (Q# 29)	
Yes	185 (50.3%)
No	111 (30.2%)
Don't Know/No response	72 (19.6%)
Total	368
Are students receiving higher quality nutrition education now? (Q# 30)	
Yes	214 (58.2%)
No, b/c it was high quality prior to establishment of the LWP	78 (21.2%)
No	23 (6.3%)
Don't Know/No response	53 (14.4%)
Is nutrition education being integrated into a variety of subject areas (math, language arts, etc.)? (Q# 31)	
Yes, but this was occurring prior to the establishment of the LWP	127 (34.5%)
Yes, and this is a new activity	61 (16.6%)
No	86 (23.4%)
Don't Know/No response	94 (25.5%)

More than 60% of Pennsylvania SDs included in our analysis reported that students have more opportunities for physical activity now than they did prior to the establishment of their LWP. Slightly less than 40% of SDs reported that these opportunities are offered in some of their schools (n = 140) and approximately one-quarter of SDs reported that opportunities are increased in all their schools.

Slightly less than 60% of SDs reported that there were more opportunities for students to be physically active in classrooms (outside of PE classes) now than there were prior to the

establishment of their LWPs. Most of these SDs reported that physical activity opportunities in classrooms increased for students in all their schools. (Table 4-9)

Table 4-9: Reported opportunities for physical activity provided to students after the establishment of LWPs in Pennsylvania school districts (n = 368)

Physical Activity Area	n (%)
Do students have more opportunities for physical activity now? (Q #32)	
Yes, in some schools	140 (38%)
Yes, in all schools	89 (24.2%)
No	106 (28.8%)
Don't Know/ no response	33 (9%)
Are there more opportunities for students to be physically active in classrooms (outside of PE) now? (Q # 33)	
Yes, in some schools	157 (42.7%)
Yes, in all schools	51 (13.9%)
No	111 (30.2%)
Don't Know/no response	49 (13.3%)

SDs that reported their students are receiving more minutes of NE after establishment of the LWPs had higher scores on the student involvement scale than those who did not report changes in time allocated for NE ($F = 14.4, P < 0.001$). The reported quality of NE provided was also correlated with student involvement. SDs reporting that students were receiving higher quality NE after establishment of LWPs had the highest student involvement score followed by SDs that reported no change in quality of NE because it was high prior to the establishment of LWPs, and least by SDs that did not report any changes in NE quality ($F = 7.46, P = 0.001$). Reported integration of NE into a variety of subject areas was also correlated with student involvement. SDs that reported NE to be integrated into a variety of subject areas, as a new activity, had highest score on student involvement scale followed by SDs that reported this to be

taking place prior to establishment of LWP, and least by SDs that did not report changes in this area after establishment of LWPs ($F = 6.9, P = 0.001$). (Table 4-9)

Similarly, SDs that reported students have more opportunities for physical activity after the LWP was established in all their schools had highest scores on student involvement scale followed by SDs that reported increased physical activity opportunities in some of their schools, with lowest score seen in SDs that did not report changes in physical activity opportunities ($F = 6.75, P = 0.001$). In addition, SDs that reported more opportunities for physical activity outside of physical education classes for students in all their schools after LWP was established had highest score on student involvement scale, followed by SDS with increased physical activity opportunities in some of their schools with lowest scores seen in SDs that had no changes after LWP was established ($F = 6.63, P = 0.02$). (Table 4-10)

Table 4-10: Relationships between implementation of student involvement-goals and reported changes in nutrition education and physical activity opportunities after the establishment of LWPs in Pennsylvania school districts ($n = 368$)

PIC Component Areas	Student Involvement Scale n (Mean score)	F – value (ANOVA)
Nutrition Education		
Are students receiving more minutes of nutrition education now? Yes (n = 185) No (n = 111) Don't know/no response (n = 72)	3.94 3.05	14.36***
Are students receiving higher quality nutrition education now? Yes (n = 214) No, because it was high quality prior to LWP (n = 78) No (n = 23) Don't know/no response (n = 53)	3.86 3.29 2.39	7.46***

Is nutrition education being integrated into a variety of subject areas (math, language arts, etc.)?		
Yes, new activity (n = 61)	4.31	6.90***
Yes, but this was occurring prior to LWP (n = 127)	3.73	
No (n = 86)	3.10	
Don't know/no response (n = 94)		
Physical Activity		
Do students have more opportunities for physical activity now?		
Yes, in all schools (n = 89)	4.19	6.75***
Yes, in some schools (n = 140)	3.31	
No (n = 106)	3.30	
Don't know/no response (n = 33)		
Are there more opportunities for students to be physically active in classrooms (outside of PE) now?		
Yes, in all schools (n = 51)		6.63**
Yes, in some schools (n = 157)	4.37	
No (n = 111)	3.56	
Don't know/no response (n = 49)	3.17	

* P < 0.10, ** P ≤ 0.05, *** P ≤ 0.001

4.3.5 Changes in the School Food Environment after the Establishment of LWPs and Relationships between Student Involvement and Perceived Changes in the Competitive Foods and Beverages

We explored changes in the food environment, and the nutrition guidelines of foods and beverages that are offered in Pennsylvania SDs. The majority of SDs reported that foods and beverages offered through *a la carte venues* at their schools had been assessed for compliance with the LWP nutrition guidelines (n = 334, 91%) and less than five percent of SDs reported that assessment was in progress to meet these guidelines. Slightly more than three-quarters of SDs

indicated that foods and beverages offered through the *vending machines* had been assessed for compliance with their LWP nutrition guidelines, approximately eight percent were still working towards assessing compliance with these guidelines, and only four percent had not assessed compliance. Two-third of SDs included in our analysis reported that foods offered through *classroom parties* had been assessed for compliance with the LWP nutrition guidelines, 23% were still in progress, and approximately seven percent had not assessed compliance with those guidelines. One-third of SDs reported that foods and beverages offered through *student stores* were assessed for compliance with the LWP nutrition guidelines, 23% of SDs were still in progress, and only five percent of SDs had assessed compliance with these guidelines. In addition, slightly less than half of SDs reported that foods and beverages were not offered through student stores. When asked if foods and beverages offered through *fundraisers* in schools were assessed for compliance with the LWP nutrition guidelines, slightly less than half of SDs reported compliance was assessed, 24% of SDs were still in progress, and 20% of SDs did not assess foods and beverages sold or offered in schools for compliance with nutrition guidelines of their LWPs. Less than five percent of SDs reported that foods and beverages were not offered as fundraisers in their schools. For foods and beverages offered at *concession stands*, more than half of SDs did not assess competitive foods and beverages for compliance with the LWP nutrition guidelines, approximately 15% of SDs had progress (n =56) whereas 15% of SDs (n = 55) did not perform any assessment. Only two percent of SDs reported that foods and beverages are not offered at concession stands. (Table 4-11)

Table 4-11: Assessment of competitive foods and beverages offered at Pennsylvania school districts for compliance with the nutrition guidelines on LWPs (Q #12); n = 368

Food Venue	Yes	No	In Progress	No foods/ beverages offered in this area	Don't know/no response
A la Carte	334 (90.8%)	4(1.1%)	15(4.1%)	6(1.6%)	9(2.4%)
Vending Machines	283 (76.9%)	15 (4.1%)	28 (7.6%)	31 (8.4%)	11(3%)
Classroom parties	243(66%)	25(6.8%)	84(22.8%)	1(0.3%)	15(4.1%)
Student stores	122 (33.2%)	19(5.2%)	28(7.6%)	179(48.6%)	20(5.5%)
Fundraisers	173(47%)	72(19.6%)	87(23.6%)	12(3.3%)	24(6.6%)
Concession stands	55(14.9%)	203(55.2%)	56(15.2%)	8(2.2%)	46(12.5%)

When asked which stakeholders were informed about the acceptable snacks for classroom parties after the LWP was established, approximately 70% of SDs reported that parents (n = 251) and teachers (n = 269) were informed, and 65% of SDs informed their administrators. Forty percent of SDs reported that students were informed of which snacks are acceptable in classroom parties. Other stakeholders that were informed about acceptable snacks in classrooms were nurses, health aides, cafeteria managers, food service employees, and booster groups among others, table4-12).

Table 4-12: Stakeholders informed of acceptable snacks for classroom parties after the establishment of LWPs as reported on the PIC (Q # 14); n = 368

Responses	n (%)
Teachers	269 (73.1%)
Parents	251(68.2%)
Students	144(39.1%)
Administrators	239(64.9%)
Other	51(13.9%)
No one	38(10.3%)
Don't know/no response	18(4.9%)

Approximately 60% of SDs included in our analysis (n = 214) reported that foods and beverages offered through the a la carte menus at their schools are now much healthier than what was offered prior to the establishment of their LWPs. More than one-quarter of SDs found that these items are now somewhat healthier (n = 106) and the remaining 13% of SDs indicated that these items have always been healthy so little change has occurred (n = 32), were primarily not healthy (n = 2), or no foods and/or beverages were offered through a la carte menus (n = 4), table 4-12. Less than half of SDs (n = 173) found that foods and beverages offered through vending machines are now much healthier than they were prior to the LWP, and 31% observed these items to be somewhat healthier (n = 113). Only 11% of SDs (n = 39) had no foods or beverages offered through vending machines in their schools, and less than five percent evaluated foods and beverages sold through vending machines as always healthy with no change occurring after the LWP was established.

In terms of changes to the foods and beverages offered through classroom parties, approximately half of SDs (n = 178) found items somewhat healthier than those offered prior to the LWP, 39% of SDs (n = 143) evaluated items as much healthier, and only four SDs reported that foods and beverages offered in classroom parties were always healthy so little change occurred after the LWP. One school district did not offer foods through classroom parties.

When asked if foods and beverages are offered in student stores and whether changes were made to the items after the LWP was established, more than one-half of the SDs (n = 204) reported foods and beverages were not offered in their student stores, 13% found that these items were much healthier after the LWP (n = 47) and 17% found them as somewhat healthier items (n = 62). Less than five percent of SDs found foods and beverages offered in student stores as primarily not healthy (n = 10).

For foods and beverages offered through fundraisers, 45% of SDs (n = 166) reported that these items are now somewhat healthier after the LWP was established, 16% (n = 60) reported that items are much healthier, and a slightly lower percentage reported that foods and beverages offered through fundraisers remain to be primarily not healthy (n = 58). Only five percent of SDs (n = 18) reported that foods and beverages are not offered as fundraisers and less than one percent of SDs (n = 4) reported that foods and beverages sold as fundraisers were always healthy, even prior to the LWP.

When asked about changes to the foods and beverages offered at concession stands after the LWP was established, slightly less one-third of SDs reported that items are primarily not healthy (n = 114), and approximately one-quarter of SDs reported that foods and beverages are now somewhat healthier. Only four percent of SDs (n = 14) reported that foods and beverages offered at concessions stands are now much healthier than prior to the establishment of the LWP and even fewer are the SDs that do not offer foods and beverages at concession stands (n = 10). A relatively high percentage of SDs did not know whether foods and beverages are offered at concession stands or left this question unanswered (n = 135). (Table 4-13)

Table 4-13: Perceived changes in the nutritional quality of competitive foods and beverages offered at Pennsylvania school districts as a result of the LWP (Q#15), n = 368

Food Venue	Now Much Healthier	Now Somewhat Healthier	Always been healthy; little change	Primarily not healthy	No foods/ beverages offered	Don't know/no response
	n(%)					
A la Carte	214(58.2%)	106(28.8%)	32(8.7%)	2(0.5%)	4(1.1%)	10(2.7%)
Vending	173(47%)	113(30.7%)	17(4.6%)	12(3.3%)	39(10.6%)	14(3.8%)
Classroom parties	143(38.9%)	178(48.4%)	4(1.1%)	10(2.7%)	1(0.5%)	31(8.4%)
Student stores	47(12.8%)	62(16.8%)	4(1.1%)	10(2.7%)	204(55.4%)	41(11.1%)
Fundraisers	60(16.3%)	166(45.1%)	4(1.1%)	58(15.8%)	18(4.9%)	61(16.6%)
Concession stands	15(4.1%)	88(23.9%)	5(1.4%)	114(31%)	10(2.7%)	135(36.7%)

When asked if fundraisers still occur in schools, 56% of SDs reported that fundraisers do sometimes occur (n = 206) whereas 42% of SDs (n = 153) reported that fundraisers are never held at their schools. Only five SDs reported that fundraisers often do occur in their schools. Sixty percent of SDs (n = 219) reported that the approval of a building administrator is required for selling foods as fundraisers during the school day and 30% of SDs reported that food is not used as fundraisers. Less than five percent of SDs (n = 17) reported that foods are sold as fundraisers during the school day without being approved by a building administrator. Table 4-14

Table 4-14: The occurrence of fundraisers in schools and approval of these fundraisers by school administration as reported on the PIC (Q #16 & Q #17); n = 368

Fundraisers	n (%)
Do food fundraisers occur during the school day? (Q # 16)	
Sometimes	206 (56%)
Often	5(1.4%)
Never	153(41.6%)

No response	4 (1.1%)
Are foods sold as fundraisers during the school day required to be approved by a building administrator? (Q #17)	
Yes	219 (59.5%)
No	17(4.6%)
Not applicable as food is not used as fundraisers	112 (30.4%)
Don't know/ no response	20 (5.5%)

4.3.6 Relationships between Implementation of Student Involvement Goals and Perceived Changes in the Food Environment after Establishment of the LWPs

We observed significant associations between student involvement scale and reported changes in foods and beverages offered at schools. SDs that reported change in the foods and beverages offered on la carte, in fundraisers, concession stands, and classroom parties after establishment of their LWPs (i.e. much healthier items offered or sold in these venues) had higher scores on the student involvement scale ($P < 0.021$). As explained earlier, the student involvement scale measures the number of student involvement goals that are reported to be implemented by each SD included in our analysis. However, we did not observe significant associations between student involvement scale and changes in foods and beverages offered through vending machines and student stores. Table 4-15

Table 4-15: Relationships between implementation of student involvement-goals and perceptions of changes in nutritional quality of foods and beverages offered in Pennsylvania school districts as a result of the establishment of LWPs (n = 368)

Venue for foods and beverages offered in the SD	Student Involvement Scale n (mean ± SD)	F-value (ANOVA)
A la carte Much Healthier (n = 214) No Change (n = 144)	3.74 ± 1.91 3.11 ± 2.02	8.85**
Vending Machines Much Healthier (n = 173) No Change (n = 181)	3.65 ± 1.96 3.33 ± 2.01	2.31
Student Stores Much Healthier (n = 47) No Change (n = 280)	3.87 ± 1.86 3.45 ± 2.00	1.86
Fundraisers Much Healthier (n = 60) No Change (n = 247)	4.38 ± 2.02 3.41 ± 1.93	12.12***
Concession Stands Much Healthier (n = 15) No Change (n = 218)	4.73 ± 1.83 3.52 ± 1.97	5.37**
Classroom Parties Much Healthier (n = 143) No Change (n = 194)	3.92 ± 2.07 3.28 ± 1.82	8.99**

* P < 0.10, ** P ≤ 0.05, *** P ≤ 0.001

4.4 Part II

Factors Associated with Implementation of Nutrition Education Goals, Physical Activity Goals, and Nutrition Guidelines for Competitive Foods

4.4.1 Cluster Analysis and Processes Differentiating between School Districts

When running cluster analysis on our sample (n = 368 SDs in Pennsylvania), we identified two clusters of SDs based on process components. The processes were measured in the form of scales, namely funding, communication, assessment, and student involvement (explained in the methods section). We observed that cluster 2 (n = 165 SDs) had higher scores on student involvement scale, assessment scale, and funding scale compared to cluster 1 (n = 182 SDs). Clusters 1 and 2 did not differ on either communication scale (to whom the LWP was communicated and how the information about the LWP was communicated) Table 4-16.

Table 4-16: Cluster groupings of school districts in Pennsylvania differentiated by ‘Processes’ followed to implement LWPs (n = 347)

Scales	Cluster 1 <i>(Less Process-Committed)</i> n = 182	Cluster 2 <i>(Process-Committed)</i> n = 165
Student Involvement (0 - 8)	2.09	5.04
Communication ‘Stakeholders’ (0 - 7)	6.54	6.79
Communication ‘Modes’ (0 -7)	3.41	4.87
External Funding (1-4)	1.73	2.50
Measurement and Reporting Scale (0 - 5)	1.72	3.32

After identifying two clusters of SDs based on ‘process components’ of the PIC, we explored whether there were significant differences between SDs in each cluster with respect to demographic variables, including size of the SD (enrollment data), the socioeconomic status of students [% student eligible for free and reduced price school meals (%F/R)], and the locale of SDs (rural, urban, suburban). As presented in table 4-17, we did not find significant differences between SDs in cluster 1 and cluster 2 in terms of enrollment and SES of schools (%F/R) for both 2006/2007 and 2008/2009 school years. Similarly, SDs in both clusters I and II were mostly located in suburban and rural areas (table 4-16) with no differences noticed between clusters.

Table 4-17: Demographic characteristics of clusters of Pennsylvania school districts (n = 347)

Demographic Variables	Cluster I n = 182	Cluster II n = 165	P for significance
	n (mean ± SD)		
Size of school district			
Enrollment 2006/2007†	181 (3,090 ± 2,702)	164 (3,993 ± 14,620)	Ns
Enrollment 2007/2008†	181 (3,080 ± 2,748)	165 (3,938 ± 14,055)	ns
Socioeconomic status of students			
%F/R 2006/2007	181 (31.3 ± 16.9)	164 (31.0 ± 15.3)	ns
%F/R 2007/2008	181 (31.9 ± 16.7)	165 (31.6 ± 15.5)	ns
	n (%)		ns
Locale			
Urban	6 (3.3%)	5 (3.0%)	
Suburban	85(46.7%)	73 (44.2%)	
Rural	91 (50%)	87 (52.7%)	

† Log transformed (natural logarithm) to achieve normal distribution

* not significant (ns) ; P > 0.01

4.4.2 Steps Taken by Pennsylvania School Districts in Planning the Implementation of Local Wellness Policies

When exploring steps taken by SDs to plan the implementation of LWPs, we observed statistically significant differences between the two clusters of SDs (Table 4-18).

- Almost half of SDs in cluster II (process-committed) reported that written implementation or action plans were developed for all their goals, 43% reported having action plans for some of their goals, and less than 10% reported that there were no action plans developed for any of the goals on their LWP. On the other hand, less than one-third of SDs in cluster I reported that action plans were developed for all their goals, almost 45% reported action plans for some of their goals, and almost one-quarter of SDs reported that action plans were not developed for any of their LWP goals ($X^2 = 20.8$, $P < 0.001$).
- In terms of prioritizing policy goals for implementation, 82% of SDs in cluster II reported that policy goals were prioritized and less than 20% of SDs reported that goals were not prioritized. However, 62% of SDs in cluster I reported that goals were prioritized and slightly less than 40% of SDs reported that goals were not prioritized ($X^2 = 15.9$, $P < 0.001$).
- Differences were also observed between SDs in cluster I and II when asked if timelines have been developed for implementing their LWP goals. Slightly less than 45% of SDs in cluster 2 reported timelines were developed for all their LWP goals whereas 22% of SDs in cluster I reported that timelines were developed for all their goals. A comparable percentage of SDs in both clusters reported setting timelines for implementing some of their LWP goals. However, slightly less than one-quarter of SDs in cluster I reported that timelines were not developed to any of their goals compared to only 4% of SDs in cluster II ($X^2 = 35.2$, $P < 0.001$).

- Although the majority of SDs in both clusters I (n = 148, 87%) and cluster II (n = 109, 69%) reported that consequences for violation of LWP goals have not been identified, a higher percentage of SDs in cluster II (31%) reported that consequences have been identified for violation of some or all of the LWP goals compared to SDs in cluster I (13%) [$X^2 = 14.7$, $P < 0.001$].
- A greater percentage of SDs in cluster II (39%, n = 64) reported that a dedicated wellness coordinator was identified compared to SDs in cluster I (19%, n = 33) [$X^2 = 16.7$, $P < 0.001$].

Table 4-18: Differences between school districts in Pennsylvania based on steps taken to implement LWPs (n = 347)

Implementation Steps	Cluster I n = 182	Cluster II n= 165	Chi-square
Developed written implementation plans (Q#1)			20.8***
Yes, for all goals	55 (30.9%)	80 (49.4%)	
Yes, for some goals	80 (44.9%)	69 (42.6%)	
No	43 (24.2%)	13 (8%)	
Missing data	4	3	
Identified person with ultimate responsibility (Q#2)			1.2
Yes	161 (93.1%)	158 (96.3%)	
No	12 (6.9%)	6 (3.7%)	
Missing data	9	1	
Incorporated policy into strategic plan (Q#4)			4.6
Yes	88 (56.1%)	102 (66.2%)	

In process	20 (12.7%)	20 (13%)	
No	49 (31.2%)	32 (20.8%)	
Missing	25	11	
Prioritized Policy Goals (Q#5)			15.9***
Yes	105 (61.8%)	133 (82.1%)	
No	65 (38.2%)	29 (17.9%)	
Missing	12	3	
Developed timelines for implementation (Q#6)			35.2***
Yes, for all goals	38 (21.5%)	71 (43%)	
Yes, for some goals	97 (54.8%)	87 (52.7%)	
No	42 (23.7%)	7 (4.2%)	
Missing	5	0	
Identified consequences for violation of your LWP (Q#7)			14.7***
Yes, for some or all goals	22 (12.9%)	49 (31%)	
No	148 (87.1%)	109 (69%)	
Missing	12	7	
Identified dedicated wellness coordinator (Q#10)			16.7***
Yes	33 (18.6%)	64 (39.3%)	
No	144 (81.4%)	99(60.7%)	
Missing	5	2	

* P < 0.10, ** P ≤ 0.05, *** P ≤ 0.001

4.4.3 Existence and Functionality of Local Wellness Committees

The majority of SDs in our sample reported that they have a functioning wellness committee (91%, n = 35). When asked about the frequency of the meetings that the wellness committee held in the past school year, 42% of SDs (n = 154) reported meeting 1-2 times, 23% of SDs (n = 85) reported that their committees met 3-4 times, and 21% of SDs (n = 77) reported more than 4 meetings in the past school year. Only 13% of SDs reported that their wellness committees did not hold any meetings. See table 4-19

Table 4-19: Status of LWP committees in Pennsylvania school districts and the frequency of committee meetings one year prior to the PIC administration (n = 368)

School District Wellness Committee	n (%)
A functioning wellness committee exists in your school/district	
Yes	335 (91%)
No	26 (7.1%)
No response/Don't Know	7 (1.9%)
Frequency of wellness committee meetings last school year	
No meetings were held	47 (12.8%)
1-2 times	154 (41.8%)
3-4 times	85 (23.1%)
> 4 times	77 (20.9%)
No response/don't know	5 (1.4%)

We explored whether there were differences between clusters I and II of SDs and the presence of a functioning wellness committee and frequency of committee meetings one year prior to the PIC administration. We did observe differences between responses of SDs in clusters I and II that were statistically significant (table 4-20).

- Although the majority of SDs reported that they have a functioning wellness committee in their school districts, significantly more SDs in cluster II reported that they have a

functioning wellness committee compared to SDs in cluster I (Chi-square = 10.7, P = 0.001).

- Approximately 30% of SDs in cluster II reported that their wellness committees met > 4 times in the past school year compared to less than 15% of SDs in cluster I that reported a similar frequency in wellness committee meetings. In addition, 19% of SDs in cluster I reported that their wellness committees did not meet at all in the past school year compared to only 6% of SDs in cluster II reporting that no meetings were held (Chi-square = 19, P < 0.001)

Table 4-20: Differences between clusters of school districts with respect to the existence of a functioning wellness committee and the frequency of the meetings held by the committee one year prior to the PIC administration (n = 347)

School District Wellness committee	Cluster I n = 182	Cluster II n= 165	chi-square
A functioning wellness committee exists in your school/district			10.65***
Yes	160 (88.4%)	159 (97.5%)	
No	21 (11.6%)	4 (2.5%)	
Missing	1	2	
Frequency of wellness committee meetings last school year			19.13***
No meetings were held	34 (18.7%)	10 (6.1%)	
1-2 times	78 (42.9%)	67 (40.6%)	
3-4 times	43 (23.6%)	40 (24.2%)	
>4 times	27 (14.8%)	48 (29.1%)	
Missing	0	0	

* P < 0.10, ** P ≤ 0.05, *** P ≤ 0.001

4.4.4 Allocation of Internal Funds and local resources to support LWP implementation

Slightly more than one-half of SDs in our sample (n = 189) reported that internal funds or resources were not allocated for the implementation of LWP or its activities. The remaining 42% of SDs (n = 189) reported that internal funds were allocated and 6% of SDs (n = 23) did not know whether internal funds were allocated for LWP implementation and selected the “don’t know” option or left the answer blank. Table 4-21

Table 4-21: Allocation of internal funds and local resources by school districts in Pennsylvania to Support the implementation of their LWPs (n = 368)

Internal funds and local resources were allocated for LWP implementation	n (%)
Yes	156 (42.4%)
No	189 (51.4%)
Missing	23 (6.3%)

Slightly less than 70% of SDs in cluster I reported that internal funds were not allocated for the implementation of LWPs, whereas more than 60% of SDs in cluster II reported that internal funds were allocated in their schools to support the implementation of their LWPs (chi-square value = 31.24, P < 0.001); see table 4-22.

Table 4-22: Differences between clusters of school districts with respect to allocation of internal funds and resources to implement their LWPs (n = 347)

	Cluster I n = 182	Cluster II n= 165	chi-square
Internal funds allocated for LWP-related activities			31.24***
Yes	55 (30.9%)	99 (61.1%)	
No	123 (69.1%)	63 (38.9%)	
Missing	4	3	

* P < 0.10, ** P ≤ 0.05, *** P ≤ 0.001

4.4.5 Implementation of Wellness Policy Goals in Pennsylvania School Districts

4.4.5.1 Reported Changes in Nutrition Education (NE) after the establishment of LWPs

Differences between SDs were observed when exploring reported changes in NE after the establishment of LWPs (table 4-23).

- A higher % of SDs in cluster II (73%, n = 106) reported that more minutes of NE were provided after the LWPs were established compared to SDs in cluster I (49%, n = 68) [$X^2 = 15.96, P < 0.001$].
- A higher percentage of SDs in cluster II (78%, n = 122) than in cluster I (56%, n = 81) reported that their students are receiving higher quality NE after the establishment of LWPs. Twenty two percent of SDs in cluster II reported that there were no changes in the quality of NE, most of which had high quality of NE prior to the establishment of LWPs (20%, n = 31) whereas 44% of SDs in cluster I reported no changes in the quality of NE (31% of SDs reported that quality of NE was already high prior to establishment of LWPs and 13% reported no changes) [$X^2 = 20.2, P < 0.001$].
- When asked if nutrition education is being integrated into a variety of subject areas, a higher percentage of SDs in cluster II (30%, n = 42) than SDs in cluster I (15%, n = 19) reported that this occurred after the LWP were established. A comparable percentage of SDs in cluster I (n = 55, 43.3%) and in cluster II (n = 65, 47.1%) reported that the integration of NE into other academic subjects was occurring in their schools even prior to establishing the LWPs. However, a higher % of SDs in cluster I reported that nutrition integration is not being integrated into other curricular subjects (42%, n = 53) compared to SDs in cluster II (22.5%, n = 31) [$X^2 = 14.84, P = 0.001$].

Thus a higher percentage of SDs in cluster II than in cluster I reported that students are receiving more minutes of nutrition education, are receiving higher quality of nutrition education and are integrating nutrition into a variety of subject areas after establishing their LWPs.

Table 4-22: Differences between school districts based on changes in nutrition education after the establishment of LWPs (n = 347)

Nutrition Education Content Area	Cluster I n = 182	Cluster II n = 165	Chi-square (χ^2)
	n (%)	n (%)	
Are students receiving more minutes of nutrition education now? (Q# 29)			15.96***
Yes	68 (49.3%)	106 (73.1%)	
No	70 (50.7%)	39 (26.9%)	
Missing	44	20	
Are students receiving higher quality nutrition education now? (Q# 30)			20.20***
Yes	81 (55.9%)	122 (77.7%)	
No, higher quality prior to LWP	45 (31.0%)	31 (19.7%)	
No	19 (13.1%)	4 (2.5%)	
Missing	37	8	
Is nutrition education being integrated into a variety of subject areas (math, language arts, etc.)? (Q# 31)			14.84***
Yes, occurring prior to LWP	55 (43.3%)	65 (47.1%)	
Yes, new activity	19 (15%)	42 (30.4%)	
No	53 (41.7%)	31 (22.5%)	
Missing	55	27	

* P < 0.10, ** P ≤ 0.05, *** P ≤ 0.001

4.4.5.2 Reported Changes in Physical Activity Opportunities after Establishment of LWPs

The two clusters of school districts in Pennsylvania differed with respect to changes reported in opportunities given for students to be physically active after the establishment of LWPs (table 4-24).

- A higher % of SDs in cluster II (35%) than in cluster I (18.5%) reported an increase in opportunities given for students in all their schools to be physically active after the LWP was established. On the other hand, a higher % of SDs in cluster I than SDs in cluster II reported that physical activity opportunities for students did not increase after the LWP was established (35% vs 28%) and physical activity opportunities increased for students in some but not all of their schools (46% vs 37%).
- Approximately 40% of SDs in cluster I reported no change in physical activity opportunities in classrooms outside of PE after the LWP was established and half of SDs in the same cluster reported an increase in physical activity opportunities in classrooms within some but not all of their schools. Only 7% of SDs in cluster I reported that opportunities for physical activity in classrooms were increased in all their schools. On the other hand, one-quarter of SDs in cluster II reported an increase in classroom physical activity opportunities in all their schools, and slightly less than half of SDs in same cluster reported an increase in all their schools, and less than 30% of SDs reported no change after the LWP was established.

Thus, a higher % of SDs in cluster II than SDs in cluster I reported that students have more physical activity opportunities after establishment of the LWPs in all their schools. In addition, a higher % of SDs in cluster II than SDs in cluster I reported that opportunities for students to be physically active in classrooms increased after the LWPs increased in all their schools.

Table 4-24: Differences between school districts based on changes in physical activity opportunities after the establishment of LWPs (n = 347)

Physical Activity Content Area	Cluster I n = 182	Cluster II n = 165	Chi-square (X^2)
	n (%)	n (%)	
Do students have more opportunities for physical activity now? (Q #32)			
Yes, in some schools	75 (46.3%)	59 (36.9%)	11.17**
Yes, in all schools	30 (18.5%)	56 (35%)	
No	57 (35.2%)	45 (28.1%)	
Missing	20	5	
Are there more opportunities for students to be physically active in classrooms (outside of PE) now? (Q # 33)			
Yes, in some schools	76 (50%)	75 (48.4%)	19.8***
Yes, in all schools	11 (7.2%)	38 (24.5%)	
No	65 (42.8%)	42 (27.1%)	
Missing	30	10	

* $P < 0.10$, ** $P \leq 0.05$, *** $P \leq 0.001$

4.4.5.3 Perceived Changes in Competitive Foods Sold and Offered to Students after the Establishment of LWPs

Two-thirds of SDs in cluster II reported changes in the foods and beverages offered through *a la carte* items after the LWP was established. In addition, SDs in cluster II were more likely to report changes in foods and beverages offered and/or sold as *la carte* items compared to SDs in cluster I ($X^2 = 4.36$, $P = 0.037$). The majority of SDs in clusters I and II did not report changes after LWP was established in terms of foods and beverages offered as *fundraisers and in concession stands*, however SDs in cluster II were still more likely than SDs in cluster I to report positive changes in the offerings of foods and beverages after the LWP was established. In addition, SDs in cluster I were more likely than SDs in cluster II to report no change in the foods and beverages offered through *classroom parties*. We did not observe significant differences

between SDs from both clusters in terms of changes in foods and beverages sold in the *vending machines* after LWP was established. (Table 4-25)

Table 4-25: Differences between school districts based on perceived changes in the foods and beverages offered and/or sold in schools after the establishment of LWPs (n = 347)

Change in Foods and Beverages in various venues after LWP	Cluster I n = 182	Cluster II n = 165	Chi-square (X^2)
	n (%)	n (%)	
A la carte			4.36**
Much Healthier	98(55.1%)	110 (66.7%)	
No Change	80 (44.9%)	55 (33.3%)	
Vending Machines			0.026
Much Healthier	87 (49.2%)	82 (50.6%)	
No Change	90 (50.8%)	80 (49.4%)	
Student Stores			0.651
Much Healthier	20 (12.5%)	25 (16.3%)	
No Change	140 (87.5%)	128 (83.7%)	
Fundraisers			11.286***
Much Healthier	16 (11%)	40 (27%)	
No Change	130 (89%)	108 (73%)	
Concession Stands			6.86**
Much Healthier	2 (1.8%)	13 (11.2%)	
No Change	111 (98.2%)	103 (88.8%)	
Classroom parties			5.83**
Much Healthier	57 (35.2%)	79 (49.1%)	
No Change	105 (64.8%)	82 (50.9%)	

* P < 0.10, ** P ≤ 0.05, *** P ≤ 0.001

Chapter 5

DISCUSSION

5.1 The Child Nutrition and WIC Reauthorization Act of 2004 and Implementation of LWPs in Pennsylvania School Districts

Schools are unique settings for children and youth to consume healthy and nutritious meals, be physically active, adopt healthful behaviors, and learn how to lead healthy lifestyles. In recognition of the role that schools can play in reducing soaring rates of childhood obesity, the Congress passed the Child Nutrition and WIC Reauthorization Act of 2004 mandating that all Local Education Agencies, including public and private schools, that participate in the federal school meals program (School Breakfast Program or the National School Lunch Program) to develop local wellness policies (LWPs) by the beginning of the 2006/2007 school year. More than three years have passed since schools throughout the country started implementing their wellness policies; however few reports have been published so far evaluating the progress of schools. The Child Nutrition Programs and the LWP mandate are scheduled for reauthorization as part of the Child Nutrition and WIC Act later this year. Thus, our study comes at a crucial time to evaluate the progress that public schools have made so far in terms of implementing their wellness policy goals, assess specific components of the policies, and identify areas where schools may require assistance to implement and evaluate their policies.

Pennsylvania (PA) represented a unique setting to conduct the current study because it has one of the highest numbers of National School Lunch Program (NSLP) sponsors in the country and a wide variation in enrollment and socioeconomic status of students within its school districts. Our study was conducted in collaboration with the Pennsylvania Department of Education (PDE) that developed different strategies and approaches to assist schools in meeting the 2004 federal mandate and implementing their policies. Together with the Pennsylvania School Board Association (PSBA), PDE developed a LWP template for schools to use when developing their policies in 2006. The PDE reviewed all policies submitted by schools and approved those that met or exceeded the minimum requirements of the LWP mandate. In addition, PDE developed voluntary nutrition standards for all foods and beverages offered on school campuses, and provided financial incentives to all schools in Pennsylvania that adopted these standards and implemented in all identified competitive venues and areas⁷¹.

5.2 Part I: Student Involvement in Local Wellness Policies

5.2.1 Status of School Districts in Implementing Student Involvement Goals

In Pennsylvania, our research group assessed the components of the LWP through developing a checklist [Policy Implementation Checklist (PIC)] that was validated, pilot-tested and administered to all schools in the state that have previously developed LWPs and submitted them to PDE in 2006. One of the areas that the PIC explored was the implementation of student involvement goals and the various areas in which students have been involved in with respect to their districts' LWPs. To our knowledge, our research group was the first to explore the participation of students in the development of the LWPs and to identify some of the predictors

for including student involvement goals on the LWPs.⁷ In the present study, we were interested in assessing the number and percent of school districts that reported implementing each of the student involvement goals. In addition, we wanted to explore whether the inclusion of student involvement goals on LWPs is related to the implementation of these goals.

Although the concept of student voice and empowerment is still a nascent idea in the nutrition literature, specifically school nutrition programs and policies, efforts are being made by a number of national and state organizations to highlight the role of students in their schools. Resources and campaigns are also being developed to empower youth and help them plan, implement, and evaluate nutrition and physical activity-related projects.^{47, 49} SDs reported a variety of forms of student involvement that vary in the degree of responsibility and leadership given to students, from encouraging students to be role models of healthful behaviors to allowing them to lead campaigns that promote health and wellness. The student involvement goal that was reported most frequently in Pennsylvania's SDs was the encouragement of students to be positive role models of healthful behaviors. Peer influence has been shown to be effective in the prevention of unhealthful behaviors, such as smoking and alcohol consumption^{79, 80}. In addition, applying peer education in the modeling of healthful behaviors including eating and physical activity have been reported to be effective among youth.^{81, 82} Thus, it is promising to observe an increase in the number and percentage of SDs reporting that this goal is being implemented even among SDs that did not include it on their LWPs. More SDs in Pennsylvania reported that students are involved in the selection of items on their school meals menus than the number and % of SDs who included this goal on their wellness policies. Involving students in menu selection was the only goal where we observed a significant association between having the goal on the policy and the reported implementation of the goal.

The active role that students should play in their school meals programs through serving on nutrition advisory councils have long been promoted by the School Nutrition Association.⁸³

According to the CDC's 'Guidelines for School Health Programs to Promote Lifelong Healthy Eating', having students serve on the school nutrition advisory committee or the nutrition subcommittee of the school health advisory council can help develop and publicize the presence of a coordinated school nutrition policy.⁴⁴ In this study, half of the SDs reported that students were serving on school meals advisory boards. In addition, more than two-thirds of SDs reported that students will be provided with the nutritional content of school meals as one of their LWP goals. However, only 44% of SDs reported that this goal has been implemented. Schools might have found the involvement of student representatives in the selection of their school meal menus and on their school meal advisory boards to be less cost and resource-demanding than sharing nutritional information with the student body. Schools might have already been involving students on the school nutrition advisory councils, which has been promoted for years by the School Nutrition Association.⁸³ Schools may also require assistance developing interesting facts about the school meals beyond providing nutritional information, and preparing material that is readable and accessible by students at all grade levels.

According to the Child Nutrition and WIC Reauthorization Act of 2004, schools were required to involve a number of stakeholders, including students, in the development of their local wellness policies. However, the federal requirement did not require an ongoing wellness committee; neither did the new mandate specify the forms or areas that students should be involved in when implementing their wellness policies. The large majority of SDs in our sample reported that they have a functioning wellness committee (91%, n = 335). Interestingly, the same number of SDs included within their LWPs a goal about involving students on on-going wellness committees. However, only 55% of SDs reported that students are actually serving on on-going wellness committees. Thus, schools that stated earlier on their policies that students will be actively involved in the on-going meetings and functions of the wellness committees are not fully

implementing this goal and may not be taking students' opinions into account in the implementation of the LWPs.

Two-thirds of Pennsylvania SDs reported that there is a plan for reviewing and possibly revising their LWPs; however measurement and reporting of LWP implementation has been found by our research group to be a weak area overall.⁷² In this study, we found that less than 20 % of Pennsylvania SDs reported students are being involved in annual reviews. It is not clear whether SDs that did not report the involvement of students in annual policy reviews are facing difficulties in reviewing and revising these policies in general or if they are excluding students from this process for other reasons. Future studies will need to investigate the barriers that schools face in measuring the implementation of wellness policy goals. These studies can also explore strategies followed by schools where students are active participants in policy reviews, and the impact of student involvement on buy-in and acceptance to wellness policies and subsequent school changes.

One-half of SDs in our sample included the goal about assessing students' inputs on various nutrition, health, and wellness issues in their LWPs; however a lower percentage of SDs (38%, n = 141) reported that this goal is being implemented. SDs that are not implementing this goal might be unaware of the importance of collecting students' feedback on changes occurring in their school environment and the various components of the LWP. Other SDs might be aware of the importance of assessing students' inputs on various school issues, including wellness, yet might require assistance in developing and using simple and effective strategies to collect students' inputs through short surveys, questionnaires, and/or conducting focus groups through classroom or student club meetings. This is one of the areas in which the local wellness committees may require further training to develop interactive methods for collecting students' feedbacks. Templates for surveys, questionnaires, and focus group sessions can be developed by

researchers, nutrition, and education professionals at various local, state, and federal agencies and non-governmental organizations that work closely with schools.

The least reported goal to be implemented by SDs was having students organize and lead wellness-related campaigns, and this might be explained by numerous possible reasons. Since this goal was not included on the PSBA template for use in the development of LWPs, schools might have been unaware of the leadership role that students can play in wellness issues and thus did not include this goal on their LWPs. Some schools might have discouraged students from leading school or community wellness-related campaigns in fear that this might distract students and adversely affect their academic performance. Furthermore, allowing students to take the lead on health and wellness-related campaigns can be challenging for schools with rigid power hierarchies where decisions tend to be adult-centered and the approach taken for decision-making is less participatory and rather follows a top-down management approach. Thus, schools may want control over wellness-related activities, or administrators may feel students are not fully qualified to organize these functions. Consequently, students might be regarded as mere beneficiaries of the changes happening in schools and not observed as active participants that can help implement the LWP and promote its main objectives. According to the education literature, student governments have been the common forums for students to voice their opinions on school wide issues. However, the role of the student governments dwindled over the years and their involvement in school matters has been limited to social activities and fundraising events rather than substantial school-related issues.^{36, 37} Dana Mitra states that student voice can take different shapes and forms, such as a pyramid, with students sharing their opinions and voicing their concerns about specific school-related issues as the base of the pyramid. When students collaborate with adults in the school, including teachers and administrators, their level of involvement rises up the pyramid reaching the peak when students take the lead on making school changes with adults and peers.⁴⁰ Schools can benefit from numerous success stories and

campaigns from across the nation in which students are not only participating but also taking charge of wellness campaigns in their schools and communities. The Action for Healthy Kids 'Students Taking Charge' ⁴⁶ is one successful example of a project that started in few pilot schools in Massachusetts and expanded to become a national movement advocating students to become aware and involved in their school wellness issues. Student leaders in any school district in the country can access this website and learn how to become involved in their school wellness policies and decisions. They can gain knowledge of the health school-issues, learn how to assess their school environment, and then take the lead on putting their school wellness policies into action and rally for needed changes.

In our study, we did not find significant associations between having student involvement-goals on LWPs and the implementation of these goals, except for one goal (involving students in menu planning). Schools might have been unaware of the potential difficulties in implementing wellness policy goals in various areas, including student involvement, at the time LWPs were established. Other schools might have been influenced by the increase in student health promotion campaigns that have been gaining publicity and momentum at the state and local level in the past few years leading to the implementation of student involvement-goals that were not part of their original LWPs. Furthermore, schools that involved students in selected school venues may have benefited from students' input and support leading to the implementation of more student involvement-goals not included in their wellness policies in 2006.

The majority of Pennsylvania SDs included in our analysis reported that information about the LWPs was shared with various stakeholders, namely school administrators (94.3%), the school food service staff (93.8%), faculty/staff (92.7%), parents (93.2%), students (91.8%), new employees (82.6%), and members of the community (85.3%). The most common forms of communication used by SDs to inform students about their LWPs were websites and school

newspapers/newsletters followed by mailings/handouts, presentations during meetings, and local newspapers. The least selected venue for communication with students about the LWPs was sending them emails. Other venues used to share information about the different components of the LWP were annual health fairs, after-school fitness and wellness programs, as well as school morning announcements and shows. In addition, few schools organized health and wellness campaigns with thematic days and activities such as ‘Go for the Greens’, ‘Jump a Thon’, and ‘Great Apple Crunch’ promoted by the Pennsylvania Advocates for Nutrition and Activity (PANA), now known as nrgBlanace.^{47, 84}

When exploring whether there were significant associations between communication with students about the LWP and the implementation of these goals, we observed that SDs that used at least one mean of communication were more likely to report that students are being encouraged to act as positive role models of healthful behaviors ($P = 0.08$) and more likely to report that students are serving on school meal advisory boards ($P = 0.045$) compared to SDs that did not use any modes of communication to share information about the LWP with their students. In addition, SDs that used one or more means of communication with students to share information about their LWPs were more likely to involve students on ongoing wellness committees and more likely to report that students are organizing wellness-related campaigns compared to SDs that did not use any modes of communication, however, these two associations only approached significance ($P \leq 0.078$).

The positive association between communicating with students about the LWP and student involvement in wellness-related issues highlights the importance of sharing information with students to get them involved in policies related to their health and wellbeing. The associations are significant or approached significance for areas of involvement where students are given a lead role in either presenting other students’ opinions, such as serving on on-going wellness committees and school meal advisory boards, or taking higher levels of responsibility,

which include role modeling of healthful eating and physical activity behaviors to organizing and taking the lead on wellness-related campaigns. By communicating with students about the LWP, schools can indirectly teach students how to share information with their peers through serving on committees and sharing agendas of meetings and how to make decisions on the behalf of the remaining student body. Thus, when students become well-trained, they then become role models of healthful behaviors and leaders of wellness-related projects. Furthermore, communication with students teaches civic involvement and responsibility, and it empowers students to be agents of change, solving or helping to solve their own issues, as well as develop leadership skills.

5.2.2 Student Involvement and Reported Changes in Nutrition Education and Physical Activity Opportunities after the LWP

In a previous study⁵⁴, our research group assessed the nutrition education goals that were included in the LWPs of Pennsylvania SDs (n = 499) at the beginning of the 2006/2007 school year. We found that two-thirds of Pennsylvania SDs included a goal within their LWPs to develop age-appropriate nutrition lesson plans and activities, but less than 40% of SDs stated in their policies that the nutrition curriculum will be behavior-focused. In addition, 59% of SDs stated that nutrition education shall be integrated into other subjects in order to complement but not replace academic standards based on nutrition education. In the present study, one-half of Pennsylvania SDs included in the analysis (n = 185) reported that students are receiving more minutes of nutrition education after LWPs were established. In addition, slightly less than 60% of SDs (n = 214) reported that students are receiving higher quality nutrition education compared to what they received prior to establishing and implementing district wellness policies. A higher quality of nutrition education was defined as planning nutrition lessons that are age-appropriate, behaviorally-oriented, and interactive with

students. Even further, 17% of SDs reported that nutrition education is being integrated into a variety of subject areas, such as math, language, and arts as a new activity after the LWP was established, whereas 35% reported that this was occurring prior to the LWP.

School districts in Pennsylvania met the minimum requirements of the federal law to include at least one goal about nutrition education within their LWPs and reported implementing nutrition education policy goals. Our findings suggest that the implementation of nutrition education goals varied among school districts. Some districts appeared to benefit from including specific nutrition education goals on their LWPs, whereas other districts were already in the process of increasing the quality of nutrition education and integrating it into other subject areas even prior to the establishment of LWPs. This may be attributed to the fact that public schools were required to meet the curricular requirements for nutrition education as part of a comprehensive health education program established by the Pennsylvania State Board of Education Curriculum Regulations, the Academic Standards for Health, Safety, and Physical Education⁸⁵, and the Family and Consumer Sciences⁸⁶.

One of the requirements of the 2004 legislation is the inclusion of at least one goal related to physical activity to promote students' health and wellbeing. The federal mandate highlighted the importance of physical activity outside of physical education classes. The Pennsylvania School Board Association (PSBA) wellness policy template that was used by most public schools included a variety of goals that promote opportunities for physical activity through recess time, classroom breaks, and before- and after-school programs. Although the majority of SDs in Pennsylvania used this template when developing their policies, the most common physical activity goals in the policy, as with other components of the LWP, were general and difficult to measure.⁵⁴ In the present study, 62% of SDs reported having more physical activity opportunities for students in their schools after establishing LWPs. However, slightly less than one-quarter of SDs reported that these opportunities are provided to students in all their schools and even fewer

(15% of SDs) reported that opportunities for physical activity in classrooms outside of PE classes are given to students in all their schools. Thus, LWPs increased the physical activity opportunities given to students only marginally. Belansky et al.⁸⁷ found that neither physical activity opportunities nor policies supporting students' participation in physical education and recess playtime changed after LWPs were established in 45 rural elementary schools in Colorado. Researchers coded wellness policies of these schools and found that the goals were weakened by using words that were not specific, such as using "may" or "should" instead of "require", "must", or "mandate" when stating their goals and action plans. The weak goals can explain the minimal impact of these policies on physical activity opportunities given to elementary students. However, in another study conducted in Texas public elementary schools, Kelder et al.⁸⁸ found more promising effect of state-mandated requirements on opportunities given for students to be physically active. Researchers conducted structured interviews with principals from a statewide sample of public elementary schools (n = 171) to explore if they were aware of the Texas Senate Bill 19. The bill required schools to provide students with opportunities for being physically active in addition to implementing a coordinated school health program by the beginning of the 2007 school year. According to principals' reports, elementary students received more minutes of physical activity (through classroom, physical education, and recess) than the amount required by the state mandate, and 50% of the physical education class time was spent in moderate and vigorous physical activity.

Few studies have been published so far that assess the impact of LWPs on the opportunities given for students to be physically active. Thus more studies and state-evaluations will be needed in the future to identify the impact of LWPs on various areas including physical activity. In addition, difficulties that schools face when providing students with more physical activity opportunities will need to be identified. Among these barriers are the lack of resources devoted for LWPs and accountability mechanisms to ensure that wellness policy goals are

implemented.⁸⁷ In addition, schools that are not meeting the adequate yearly progress of the No Child Left Behind Law are sometimes forced to cut back on physical education in order to allocate more time for academic subjects.⁸⁹ In addition, schools are reluctant to provide students with physical activity opportunities during class that would take away from time allocated for math, sciences, and other subject areas. However, research has shown that physical education and physical activity are positively associated with academic performance and success through influencing the concentration, memory, and behavior of students in the classroom.⁹⁰⁻⁹² Furthermore, adding physical activity to the school curriculum by taking time from other subject areas was shown not to adversely affect students' academic achievement. Taking time from physical education programs to add to curricular subjects on the other hand did not lead to anticipated improvements in the grades of students on these subjects.⁹⁰ As a result, it is necessary for the upcoming federal reauthorization to mandate specific physical activity-related requirements that schools should meet in order to ensure that students across the country are provided with the recommended daily amount of physical activity.

After exploring changes in the nutrition education and opportunities given for students to be physically active during the school day after LWPs were established, we were interested in exploring relationship between the implementation of student involvement goals and changes in these two areas. We did observe significant associations between student involvement and positive changes in nutrition education and opportunities for physical activity in Pennsylvania SDs. SDs with higher scores on the student involvement scale reported an increase in time allocated for nutrition education and in the quality of nutrition education offered to students after their LWPs were established compared to SDs with lower scores on the student involvement scale. In addition, SDs with higher student involvement scores reported that nutrition education is being integrated into a variety of subject areas after the LWPs were established more than SDs with lower scores. Similarly, SDs with higher scores on the student involvement scale reported

an increase in the opportunities given for students to be physically active, including classrooms other than PE classes.

The positive associations between implementation of student involvement goals and reported changes in nutrition education and physical activity opportunities may indicate that schools that involve stakeholders, including students, in making changes at the curricular and policy levels are those that are benefiting the most from the LWP and are thus reporting positive changes in both nutrition education and physical activity areas. Our study was focused on exploring student involvement, thus we cannot conclude if the involvement of other stakeholders, such as parents, teachers, and other members of the community, may also show similar significant associations with changes in nutrition education and physical activity opportunities in schools. The federal law mandated that parents, teachers, administrators, and representatives from the food service authority, along with community members to be involved in the development of the LWP committee. Research that investigates the role that various stakeholders are currently playing on the ongoing wellness committees is still minimal, however it would provide insights of how responsibilities of specific LWP component areas are being assigned and implemented.

5.2.3 Perceived Changes in Competitive Foods and Beverages after the LWP

Competitive foods are foods and beverages that are sold or offered to students at school and that fall outside of the USDA's school meal programs including breakfast, lunch, and after-school programs. Research has shown that competitive foods are widely available for purchase at all grade levels in US public schools, particularly in secondary schools, and many of these foods fall under the unhealthy food category.^{62, 63} The ubiquitous availability of these unhealthy food options in schools was also shown to adversely affect students' dietary intakes, their weight status, and may contribute to their risk of obesity.⁶⁷ In order to promote healthy eating by students

and reverse childhood obesity, the 2004 federal law required school meal program sponsors to develop wellness policies and include nutritional guidelines for all foods and beverages offered during the school day and on the school campus, including competitive foods. In 2005, the Pennsylvania Department of Education developed voluntary nutrition guidelines for competitive foods in Pennsylvania, and in 2007 it provided additional funding for schools that adopted these guidelines as part of the Pennsylvania's School Nutrition Incentive Program⁷¹

In the present study, we explored the food environment and the nutrition guidelines that are being implemented in Pennsylvania SDs after the LWPs were established. We also explored if perceived changes in competitive foods and beverages were associated with the implementation of student involvement goals.

The majority of Pennsylvania SDs included in our study reported that foods and beverages offered through **a la carte items** at their schools have been assessed for compliance with nutrition guidelines included in their LWPs, and approximately 60% of SDs reported that food/beverage offerings are now much healthier than those offered through the same venue prior to the establishment of LWPs. Less than 30% of SDs reported that foods and beverages offered through a la carte venues are now somewhat healthier than those offered prior to the LWP and 4 SDs reported that foods or beverages are no longer offered in their schools as la carte items. These findings are promising when compared to those observed in Pennsylvania prior to the 2004 federal mandate and the establishment of state voluntary nutrition guidelines for competitive foods. In 2005, Probart and colleagues⁹³ reported that less than 46% of the top-selling a la carte items identified by food service directors in Pennsylvania public high schools (n = 227) were considered nutritious. The remaining 54% of items sold were high in energy density (sugar and fat-content) and included french-fried potatoes, carbonated beverages, chocolate candy, etc. In 2006, McDonnell et al.¹ reported that only few school nutrition policies related to nutritional standards for competitive foods, including a la carte foods, existed and were enforced in

Pennsylvania high schools. In the same study, less than 40% of principals and 15% of school food service directors (FSDs) who responded to a survey about school competitive food policies reported that policies exist and are enforced for nutritional standards of a la carte food items. On the other hand, more than 90% of Pennsylvania SDs in our study reported that foods and beverages offered through a la carte venues have been assessed for compliance with nutrition standards included on their LWPs and slightly less than two-thirds of SDs have made somewhat or much healthier changes to a la carte items offered in their schools. Using a nationally representative sample of school districts, Chriqui et al.⁵⁷ examined LWPs that were in place at the beginning of the 2007/2008 school year and reported that more than three-quarters of students nationwide were enrolled in a district that had a policy suggesting restricting or completely banning the sale of a la carte foods and beverages high in fat, sugar, and calories during meal times. Researchers reported that SDs had stronger restrictions on sales of competitive foods, including a la carte items, in elementary schools more than middle and high schools. In our study, perceived changes in the nutritional quality of foods and beverages offered through competitive venues, including la carte items, were reported by school personnel at the district level. Based on these findings and those reported earlier in Pennsylvania high schools, further research is required to explore if the enforcement of new competitive food nutritional guidelines and standards for a la carte items is taking place at all school levels (elementary, middle, or high school).

Slightly more than three-quarters of Pennsylvania SDs included in our study reported that foods and beverages offered through **vending machines** at Pennsylvania SDs were assessed for compliance with the LWP nutrition guidelines and a greater percentage of SDs reported that foods and beverages in vending machines are now much or somewhat healthier than those offered prior to the establishment of their LWPs. In addition, 11% of SDs reported that foods and beverages are no longer sold in vending machines within their schools after the LWP was established. In 2004, only 10% of FSDs (total n = 228) and 19% of principals (total n = 79)

reported that policies related to setting standards for nutritional quality of foods offered to high school students through vending machines were being enforced. In addition, 43% of food service directors and 27% of principals reported that neither a policy nor a recommendation existed for nutritional standards of foods sold in vending machines.¹ Findings from our present study indicate that the inclusion of nutrition guidelines as part of the LWPs lead to positive changes in the foods and beverages offered through vending machines by substituting food of minimal nutritional value with healthier options as well as banning of food and beverage sales through vending machines. These findings are similar to those reported in a nationally representative sample of SDs with more than 78% of students found to be enrolled in a district that had some form of policy restriction on vending machine sales, as part of the LWPs developed after the 2004 federal law. As with a la carte items, researchers found stronger policy restrictions on the foods and beverages offered through vending machines at elementary schools than in middle and high schools.⁵⁷ Findings from both studies highlight the importance of investigating whether policy requirements and nutritional guidelines for foods and beverages sold through vending machines vary by grade level in Pennsylvania SDs.

National data from the 2004-2005 school year showed that competitive foods of low nutritional value, such as candies and cookies, were commonly offered to elementary students through **classroom parties** or as rewards⁹⁴. At the beginning of the 2007/2008 school year, Chriqui and colleagues⁵⁷ also reported that 65% of elementary-school students from a nationally representative sample of public school districts were enrolled in a district with a policy that had some form of restriction on the availability of competitive foods for classroom parties. A study conducted by McDonnell and colleagues¹ prior to the development and implementation of LWPs by schools in Pennsylvania showed that more than one-half of principals and food service directors reported the lack of policies or recommendations for nutritional quality of food offered to high school students at **school parties**. School parties were taking place across various school

levels, and were not limited to classroom parties. In the same study, slightly less than 30% of respondents reported that policies for school parties do not apply to high school students, and less than 5% of respondents reported that policies exist and are either enforced or not always enforced.¹ In our study, two-thirds of Pennsylvania SDs reported that foods and beverages offered through classroom parties have been assessed for compliance with the LWP nutritional guidelines for competitive foods and approximately 90% of SDs reported that foods and beverages offered through classroom parties are now somewhat or much healthier than those offered prior to developing and implementing the LWPs. Thus, SDs in Pennsylvania reported great progress after setting nutritional standards for foods and beverages offered at classroom parties in their LWPs and made changes through substituting unhealthy options with healthier ones. However, since classroom parties occur mostly in elementary schools, it is not clear whether similar positive changes were made to foods and beverages offered to middle and high school students through school parties. In addition, when asked which stakeholders were informed about the acceptable snacks for classroom parties after the LWP was established, approximately 70% of SDs in our study reported that parents and teachers were informed, 65% reported informing administrators, and 40% of SDs reported informing students about acceptable snacks for school parties. Previous studies reported differences in perception among school personnel (food service directors and principals in same schools) on whether school nutrition policies exist and are enforced through various competitive food venues.^{1, 4} Thus, lack of communication about school nutrition policies, and an unclear identification of who is responsible for enforcing these policies, including standards for foods offered in classroom and school parties, may increase the risk of violations of school nutrition policies going unnoticed, and underreported.

In a study conducted earlier by Probart and colleagues⁹³ to examine the types of competitive foods available in public high schools in Pennsylvania, 41% of food service directors

reported that **school stores** exist in high schools and many sell food and are located in or areas immediately adjacent to the school cafeterias. In addition, slightly less than one-half of respondents reported that student governments operate these school stores and candies, cookies, and chips were the predominant foods sold in school stores that sell food. The same group assessed the existence and enforcement of competitive nutrition policies in Pennsylvania high schools, including student stores. Less than 10% of respondents (food service directors and principals) reported that standards for nutritional quality of foods sold through student stores exist in their public high schools and are either being enforced or not always enforced. Less than one-third of respondents reported that neither a policy nor a recommendation for nutritional quality of foods sold through student stores existed and slightly more than one-half of respondents reported that these policies did not apply because foods are not sold in their student stores.¹ After the LWP was established, one-third of Pennsylvania SDs in our study reported that foods and beverages offered through student stores have been assessed for compliance with LWP nutrition guidelines. Furthermore, approximately 30% of SDs reported that changes have been made for foods offered through this venue to be much or somewhat healthier than what was offered prior to the LWP. More than one-half of SDs reported that foods and beverages were no longer offered or sold in student stores after their LWPs were established. Our findings highlight the positive changes made to the foods offered through student stores in Pennsylvania SDs after the LWP nutrition guidelines for competitive foods were developed and enforced. At the beginning of the 2007/2008 school year, Chiqui and colleagues⁵⁷ reported that more than 70% of elementary, middle, and high students were enrolled in districts (recruited from a nationally representative sample) that had policies of varying strengths that either banned school stores, competitive food sales in these stores, or required them to select food options that comply with the nutrition standards limiting fat, calorie, and sugar content. Researchers observed greater increases in the strength of policies that banned or imposed limits on the nutritional value of competitive foods

sold at middle and high school levels when compared to those reported by same grade levels in the 2006/2007 school year. However, the strongest policies restricting foods in school stores were predominantly in elementary schools. These findings once again highlight the importance of collecting data in Pennsylvania SDs at the school-level to learn whether healthier changes to the foods sold in school stores are taking place in all or some of the schools and if disparities exist between different school-levels when enforcing these nutrition policies. Identifying which stakeholders have the lead roles in selecting food items for each of the competitive food venues is necessary to ensure that information about those policies and guidelines is actually being enforced and met. In the case of school stores, student governments and clubs may be currently in charge of selecting and selling foods and beverages in school stores. Thus, communication with student governments and clubs about the LWP and the competitive food nutrition guidelines are necessary to ensure that non-food items or healthier food alternatives are being sold in schools while gaining the buy-in and support of student leaders that can become advocates of wellness and role models for healthful behaviors.

Food sales are commonly used by student clubs as **fundraisers**. One-half of food service directors who were surveyed from a random sample of high schools in Pennsylvania prior to the establishment of LWPs reported that fundraisers through club sales occurred less than once a month in their high schools, whereas 16% reported that club sales occur at least once a week.⁹³ After the LWP was established, 42% of SDs in our study reported that food fundraisers do not occur during the school day, 56% of SDs reported that food fundraisers do occur sometimes during the school day, and only 5 SDs reported that food fundraisers often occur during the school day. Thus, we observed that food fundraisers are occurring less often during the school day now than they were prior to the development and implementation of LWPs and in many SDs food fundraisers have been entirely banned. In addition, 60% of SDs reported that foods sold

during the school require approval from building administrators whereas 30% of SDs reported that this is not happening because food is not used as fundraisers.

Prior to the Child Nutrition Reauthorization Act of 2004 and the LWP federal mandate, less than 10% of principals and food service directors surveyed from Pennsylvania high schools reported that policies for the nutritional quality of foods sold in schools through clubs existed and were being enforced.¹ Fundraisers sold in Pennsylvania high schools included nutritious options, such as fruits, vegetables, and 100% fruit or vegetable juices, as well as less nutritious foods including chocolate candy, pizza, chips, and baked goods.⁹³ Our results show that approximately two-thirds of Pennsylvania SDs have made positive changes to the foods offered as fundraisers through selling healthier items. However, 16% of SDs reported that foods offered in fundraisers are still primarily not healthy after the LWP was established.

Concession stands have been a tradition in many schools and are commonly used as fundraisers for school sports and student athletic teams. Concession stands operate during after-school hours and include the selling of food of minimal nutritional values that are high in fat, sugar, and calories. In our study, more than one-half of SDs reported that assessment for compliance with LWP nutrition guidelines did not take place and 30% of SDs reported that these foods are still primarily not healthy after the wellness policy was established. Changes made by SDs to the foods and beverages sold in concession stands were found to be minimal. Concession stands operate after-school hours, and are thus exempt from the 2004 federal mandate that requires only foods and beverages sold during the school day to be in compliance with the nutrition guidelines set by schools. Thus, nutrition standards for foods offered before and after-school hours need to be addressed by state and federal policies to ensure that consistent nutrition messages are delivered to students and their families.

In conclusion, Pennsylvania SDs reported improvements in foods and beverages sold or offered through various competitive venues, mostly in those offered a la carte in school meal programs and sold in vending machines. However, the enforcement of nutrition standards for all foods and beverages offered or sold in schools has not been fully achieved in Pennsylvania school districts.

5.2.4 Student Involvement and Perceived Changes in Competitive Foods and Beverages after the LWP

We observed significant associations between student involvement and perceptions of changes in the quality of competitive foods and beverages offered and sold in a number of school venues. SDs that had higher scores on the student involvement scale reported much healthier changes in the foods and beverages offered through a la carte, fundraisers, concession stands, and classroom parties after the establishment of their LWPs. According to school personnel responses on the Policy Implementation Checklist, students are involved in school nutrition programs and policies in a variety of forms. School districts that involve students in school meal-related decisions appear to also involve students in the selection of competitive food item, such as a la carte items, that are offered at the time school meals are served.

Our findings show SDs that reported higher implementation of student involvement goals (higher student involvement score), also reported much healthier changes in the quality of foods and beverages sold through fundraisers and concession stands. This association might be explained by the fact that student governments and clubs organize many of the food fundraisers that occur during the school day and the concession stands during athletic events in order to raise money for their activities and functions. Thus, as students become more aware of the objectives of the LWPs in their schools and become more involved in implementing its goals, they are more

likely to buy-in the changes imposed by adults in the school environment. They are also more likely to contribute, if not even, lead changes in the food environment that influences their dietary habits, as well as those of their peers.

In addition, we observed that SDs that reported higher implementation of student involvement goals also reported much healthier changes in the foods and beverages offered through classroom parties. The positive association between implementation of student involvement goals and the offering of healthier foods in classroom parties may be attributed, in part, to an active involvement by the student body and their representatives in selecting what foods to be offered. In addition, 39% of SDs provided students with a list of acceptable snacks for classroom parties. Students may have shared the acceptable snack list with their parents and their peers, thus limiting the offering of less healthful food options during classroom celebrations.

In conclusion, our findings are promising, as they highlight the progress that school districts have made in Pennsylvania so far with respect to the nutritional quality of foods and beverages offered and/or sold in their schools. In addition, we observed positive and significant associations between the implementation of student involvement goals and reported changes in nutrition education, opportunities for students to be physically active during the school day, and competitive foods and beverages offered in schools. Although promising, the positive relationships between student involvement and perceived changes in various content areas are based on associations and do not determine causality. Student involvement in nutrition and wellness policies may explain, in part, reported changes in the school wellness environment. However, a number of other factors and processes adopted by schools may explain if not contribute directly to these positive changes. Student involvement may merely serve as a good marker for proactive schools that are adopting various strategies and processes when implementing their local wellness policies. Thus, to further explore what contributes to changes that have been reported in schools after wellness policies were established, in Part II of this study,

we assessed the demographic characteristics of school districts, as well as the processes, resources, and action steps reported by schools when implementing their policy goals.

5.3 Part II: Factors Associated with Implementation of Nutrition Education Goals, Physical Activity Goals, and Nutrition Guidelines for Competitive Foods

According to the Child Nutrition and WIC Reauthorization Act of 2004, school districts were required to establish and then implement local wellness policies (LWPs) for their schools in order to address the problem of childhood obesity. The law required that each school district should establish a plan for measuring implementation of their LWP and should designate one or more persons within a school district or at each school to ensure that the school meets the goals included in the LWP.⁵² In addition to the federal requirements, other specific action steps were recommended for successful implementation of the LWPs. Recommended steps included developing written implementation plans, prioritizing policy goals, setting timelines for implementing these goals, naming dedicated wellness coordinators, and identifying consequences for violation of LWPs.^{60, 61}

The school wellness policies went into effect at the beginning of the 2006/2007 school year, and since then thousands of schools across the country developed and have been implementing their policies. In Pennsylvania, our research group reported earlier that the majority of school districts developed policies that met the LWP mandate requirements; however the school districts' most common policy goals were worded in vague and general language.⁵⁴ These findings raised questions on whether schools will be able to implement their general policy goals and the extent to which school personnel serving on local wellness committees and school health councils will need assistance to develop action plans and measure the implementation of their policies. In order to assess the status of Pennsylvania SDs in implementing their policy goals and other required and recommended steps to plan and measure implementation, our research group

developed, pilot-tested, and then administered a Policy Implementation Checklist to all school districts that developed LWPs in 2006.

5.3.1 Meeting Requirements of the LWP mandate Related to Implementation and Measurement of LWPs

As reported recently by our research group ⁷², the large majority of SDs who responded to the PIC (92%, n = 337) reported that a person with ultimate responsibility for implementing the LWPs has been identified. However only slightly more than one-half of SDs reported that they started measuring implementation of their LWP goals (n = 198) and 55% of SDs (n = 202) reported meeting the requirement for developing written plans for measuring implementation or making progress towards writing these plans. We observed that SDs in Pennsylvania are still struggling in meeting the requirements of the federal mandate related to measuring the implementation of their LWPs. Since the Child Nutrition programs are scheduled for reauthorization later this year, nutrition professionals and policy makers have a unique opportunity to recommend that the new mandate requires school districts to identify specific goals and develop measurable outcomes and plans.

5.3.2 Meeting Recommended Steps for Implementing LWPs and Measuring the Progress of Schools in Implementation

In the same study ⁷², we assessed the frequency of SDs from Pennsylvania that were included in our analysis and that are meeting some of the recommended steps in planning for the implementation of the wellness policies. The majority of SDs (81%) reported that they developed written implementation or action plans for some or all of their policy goals, prioritized their goals (67%), and developed timelines for implementing some or all of their policy goals (83%).

However, fewer SDs (50%) reported that they incorporated their LWPs into the districts' strategic plans (54%), and even fewer were SDs that developed consequences for violation of their LWP goals (19.5%).

Using cluster analysis, we identified two groups SDs from the entire sample of Pennsylvania school districts that differed by the processes followed in implementing wellness policy goals. Five scales were developed to assess the processes: 1) external funding, 2 & 3) communication (information about the LWP was shared with which stakeholders and through which venues), 4) measurement and reporting of the LWP implementation and 5) implementation of student involvement-goals. We observed that school districts in cluster II had on average higher scores on all 5 of the process scales compared to SDs in cluster I, particularly on the implementation of student involvement-goals, the amount of external funding received by schools to support implementation of policy goals, and the measurement and reporting of implementation. Thus, SDs in cluster II appeared to be more process-committed or oriented than SDs in cluster I. We then explored whether the two clusters of SDs varied with respect to their demographic characteristics. Using t-tests and chi-square analysis, we did not find significant differences between the two clusters of school districts in terms of the location (urban/suburban/rural areas of the state), size (student enrollment), or socioeconomic status of students enrolled in these districts (% students eligible for free and reduced price meals) for both 2006/2007 and 2007/2008 school years ($P < 0.1$).

5.3.3 Planning the Implementation of LWPs, the Functionality of Local Wellness Committees, and Allocation of Internal Funds: Differences between Two Clusters of School Districts in Pennsylvania

We observed that more school districts in cluster II than those in cluster I reported that they identified dedicated wellness coordinators, prioritized policy goals, and developed written implementation plans and timelines for implementing all their goals ($P \leq 0.001$). Although only few SDs of the entire sample reported that consequences for violating policy goals were established, we observed that more school districts in cluster II than in cluster I reported that consequences were identified ($P < 0.001$). Our findings suggest that school districts that were more process-committed (cluster II) were also more proactive in planning how to implement their policy goals through setting specific action plans, priorities, timelines, and consequences for violation of these policies.

The majority of school districts in Pennsylvania that were included in our study (91%) reported that a functioning wellness committee existed in their school. These findings are promising since the federal law did not include a specific requirement for schools to maintain a wellness committee after the LWP was established at the beginning of the 2006/2007 school year. Nonetheless, 42% of SDs reported that their committees met at least 1-2 times in the past year prior to the PIC administration, 23% of SDs reported that their committees met 3-4 times, and 21% of SDs reported that the committees met more than 4 times. We found that a higher number and percentage of school districts in cluster II reported having a functioning wellness committee and reported meeting more than 4 times in the past school year than school districts in cluster I. Thus, more process-committed school districts that reported implementing student involvement goals, receiving external funds, and measuring and reporting the implementation of their policy goals were more likely to be the schools with functioning wellness committees that meet more frequently than schools that are less process-committed.

School districts in cluster II reported receiving on average more external funding to support the implementation of or activities related to the LWP than school districts in cluster I (see table 4-17). In addition, a higher percentage of school districts in cluster II reported allocating internal funds and resources to implement LWP-related activities than school districts in cluster I (61% VS 31%, $P < 0.001$). Thus, school districts in cluster II reported the availability of more external and internal funds to support the LWP-activities than school districts in cluster I. The availability of funds to support the wellness policy may contribute to the explanation of some of the differences we observed so far between Pennsylvania SDs.

5.3.4 Reporting Changes in the Nutrition Education and Opportunities for Physical Activity after the Establishment of Local Wellness Policies: Differences between Two Clusters of School Districts in Pennsylvania

In our study, we observed that a higher percentage of SDs in cluster II than SDs in cluster I reported that students are receiving more minutes of nutrition education (73% VS 49%, $P < 0.001$) and receiving higher quality nutrition education (78% VS 56%) after the LWP was established ($P < 0.001$). In addition, a higher percentage of SDs in cluster II reported integrating nutrition education into a variety of subject areas, including math, sciences, and language arts, after the LWP was established than SDs in cluster I (30% VS 15%, $P < 0.001$).

In terms of opportunities given for students to be physically active, we found that differences between clusters I and II were statistically significant ($P \leq 0.05$). A greater percentage of SDs in cluster II than in cluster I (35% VS 19%) reported that more physical activity opportunities are provided to students in all their schools. We also found a significant difference between clusters I and II in terms of the increase in classroom physical activity opportunities for students after the LWP was established ($P < 0.001$). A higher percentage of SDs in cluster II than

cluster I (25% VS 7%) reported that there are more classroom physical activity opportunities, outside of PE classes, for students in all their schools.

Based on our findings, SDs in cluster II that appear to be more process-committed than SDs in cluster I reported taking more steps to plan for the implementation of their LWPs, had more internal funds to support the implementation of wellness policy goals, and had more active wellness committees that met more frequently than SDs in cluster I. These differences between the two clusters of SDs may contribute to the explanation of differences in reported changes in nutrition education and in physical activity opportunities provided to students.

5.3.5 Reporting Changes in Competitive Foods and Beverages Sold and Offered to Students: Differences between Two Clusters of School Districts in Pennsylvania

Similar to what we observed with reported changes in nutrition education and physical activity opportunities, we observed significant differences between clusters I & II of Pennsylvania SDs with respect to perceived changes in the competitive foods and beverages offered and sold to students after the LWP was established ($P \leq 0.05$). A higher percentage of SDs in cluster II than in cluster I reported much healthier changes in the nutritional quality of foods and beverages offered through a la carte, fundraisers, concession stands, and classroom parties after the LWP was established. A number of differences that exist between SDs in clusters I and II with respect to communicating, planning, funding, measuring and reporting the implementation of LWPs may all contribute to the perceived positive changes in the quality of foods and beverages offered through competitive venues. Thus, schools that have taken various steps to implement their wellness policies, applied for external funds, and mobilized internal school resources might be more likely to observe much healthier changes in their school food environment.

We noticed that the perceived changes in the foods and beverages offered through vending machines and student stores were not statistically significant between the two clusters of school districts. Schools in both clusters may still be facing difficulties in this area, since healthier foods and beverages tend to have higher costs and shorter shelf-lives than less healthful items. Another explanation to the lack of difference between schools may be attributed to the variety of school personnel who may be in charge of the foods and beverages sold through vending machines. In addition, schools may still be bound to long-term contracts with food companies that provide less healthful food options yet provide constant financial incentives.

Chapter 6

CONCLUSIONS AND IMPLICATIONS

Pennsylvania SDs are involving students in wellness-related areas in a variety of ways, most often by encouraging positive role models, involving students in school meals-related decisions, and serving on wellness committees. Fewer districts reported implementing student-led campaigns. Our research group found little association between having student involvement goals on the policy and the implementation of these goals. In addition, we found that communication with students about the policy and its goals was related to some areas of student involvement. Student involvement was associated with positive changes in nutrition education and physical activity opportunities. In addition, student involvement was associated with healthier competitive foods.

In our study, we identified two clusters of SDs that differed with respect to student involvement, funding, and measurement of LWP implementation. No demographic differences were observed between the two clusters. However, clusters differed on the existence of wellness committees, frequency of wellness committee meetings, and the allocation of internal funds. In addition, the two clusters of SDs were distinct in terms of developing implementation plans, prioritizing policy goals, developing timelines, identifying consequences for violation, and identifying wellness coordinators. Furthermore, SDs that had higher student involvement, funding, and measurement of policy goals (more process-committed) reported more positive changes in nutrition education, physical activity, and perceived nutritional quality of competitive foods compared to less process-committed SDs. Our findings highlight some of the main

processes that distinguish school districts and can contribute to positive changes taking place in schools with the implementation of LWPs. These processes include the involvement of students in the implementation of policy goals, availability and mobilization of funding, and measurement and evaluation of LWP implementation. Findings from our study have a number of implications for policy makers, researchers, and local school authorities and personnel involved in preventing childhood obesity through school nutrition and wellness policies.

6.1 Leadership and Designated Responsibility

Leadership at the local level was recognized to be necessary for policy implementation and enforcement. Only few districts in Pennsylvania identified a dedicated wellness coordinator, however, school districts that identified a wellness coordinator reported taking action steps to plan the implementation of their policy goals, and reported more positive changes in various areas of the LWP. Thus, findings from our study highlight the importance of having a dedicated wellness coordinator with a formalized role to follow up on the implementation of a district's local wellness policy. A wellness coordinator would be held responsible for scheduling frequent committee meetings, following-up closely on the progress of schools in implementing policy goals, as well as documenting and reporting measurable outcomes to the school board and community. However, schools may need technical training and additional funding in order to hire wellness coordinators to oversee the implementation of their policies. Thus, the scheduled reauthorization of the Child Nutrition Programs is a unique opportunity to reinforce the importance of local leadership, to mandate that schools hire wellness coordinator responsible for the implementation of local wellness policies, and to address strategies that should be developed including funding, if needed, to support a wellness coordinator position.

6.2 Wellness Committees and Student Involvement

According to the Child Nutrition and WIC Reauthorization Act of 2004 a number of stakeholders were required to be involved in the development of school wellness policies. In a previous study, we found that all public school districts in Pennsylvania that sponsor school meal programs met this requirement.⁵⁴ Furthermore, the majority of Pennsylvania school districts included in the present study (91%) reported having a functioning wellness committee to implement their wellness policy goals. Districts with wellness committees that met frequently during a school year were found to be more process-committed and followed a systematic approach when planning the implementation of their policies. In addition, districts with functioning wellness committees that met frequently also reported higher quality and time allocated for nutrition education, more physical activity opportunities, and healthier foods sold or offered in competitive food venues within schools. Thus, the future reauthorization act, expected in 2010, should require that wellness committees remain active in schools after the development of the wellness policies. These wellness committees should be required to follow-up on the implementation, evaluation, and possible revisions of local wellness policies.

As with wellness committees that developed the LWPs, ongoing wellness committees should also consist of a host of stakeholders from the school and local community, and should include representatives from the student body. Research supports student involvement in nutrition programs and school-based interventions that promote healthy lifestyle behaviors as this can increase buy-in for changes occurring in schools. In our study, the involvement of students in the implementation of local wellness policies was found to be associated with positive changes in various areas, including nutrition education, physical activity, and healthier competitive foods in schools. The impact of involving students in the implementation of wellness policies on changes in their knowledge, behavior, or attitudes has not been explored yet. Future research can address

these questions, and investigate potential barriers deterring schools from engaging students in school nutrition policies and changes. Other studies can explore success stories from schools that empowered students to participate in wellness-related policies, decisions, and practices.

In addition, schools may require technical assistance in motivating students to become participants in the fight against childhood obesity. Researchers, nutrition and education professionals working in various governmental and non-governmental agencies can help schools by through developing resources that can be readily used by schools. For example, templates for surveys and questionnaires can be designed to assess students' feedback on issues related to nutrition, physical activity, and wellness within their schools. Conducting state, regional, and national workshops and creating forums for students to share ideas and learn how to positively influence change in nutrition programs and policies within their schools can be another strategy. Schools can be provided with educational material to train their student leaders and representatives to be peer-mentors and model healthful behaviors in school and within the community. Schools may also require innovative strategies to help student clubs and governments raise funds for their activities and functions through selling non-food items or foods of high nutritional quality that meet the nutrition standards recommended by the Institute of Medicine and other optional or mandatory standards set by local states.

6.3 Organized Systematic Approach in Implementing LWPs

Our findings highlight the importance of adopting an organized systematic approach in implementing policies. School districts that planned for the implementation of their LWPs through prioritizing goals, setting timelines, and identifying consequences for violation of policy goals seemed to do better on a number of outcomes. Schools that were more process-committed and planned for the implementation of their LWPs tended to have more positive changes in

nutrition education, physical activity, and healthier competitive foods. These steps have been recommended by a number of federal and state agencies and should be considered in future reauthorizations of the wellness policy mandate. Future studies that assess how schools across the nation are performing in terms of the implementation of LWPs are also needed. These studies will need to explore what strategies and mechanisms are schools adopting to implement and enforce their wellness policies. Findings from these studies can guide policy makers in the legislation of future local wellness policy mandates and in requiring that schools adopt specific action steps when implementing their wellness policies. Nutrition and health professionals can help school authorities meet these requirements, set specific action plans and goals, and identify measurable outcomes to follow up on their progress in providing students with environments conducive for healthful eating and active living.

6.3 Allocation of Funds

In our study, Pennsylvania SDs that received more external funding and mobilized internal resources to support the implementation of local wellness policies were the schools that had greater positive changes in nutrition education, physical activity, and healthier competitive foods. Thus, funding was one of the factors that may have contributed to the successful implementation of nutrition, physical activity, and competitive food-related areas of the LWP. Since the LWP was an unfunded mandate, schools had to secure funding to pay for additional costs entailed from implementing their policy goals and compensating for potential losses in revenues from limiting or banning the sales of competitive foods. Future reauthorizations of the federal mandate will need to address the issue of funding as it is considered one of the main

barriers that schools continue to face when implementing strong and comprehensive wellness policies while making revenues to sustain their functions.

6.5 Strengths and Limitations of this Study

Pennsylvania represented a unique model for studying the implementation and enforcement of the 2004 mandate. To the best of our knowledge, our study is the first to examine student involvement in the implementation of local wellness policies of public school districts. It is also the first to explore correlations between student involvement and reported changes in various areas of the LWP, including nutrition education, physical activity, and perceived changes in the food environment. Our research group developed a valid and reliable survey (Policy Implementation Checklist) that was pilot-tested prior to being administered to all superintendents of public school districts in Pennsylvania to assess the progress of schools in implementing their LWPs. We also had a high response rate (74%) that may be attributed in part to the recruitment messages that were sent to school districts under the signature of Pennsylvania's State Director of Child Nutrition Programs. In addition, the use of a concise survey limited time burden that may have otherwise competed with the school personnel's time and reduced our survey's response rate. Implications from our research are timely and can help strengthen the LWP mandate and the Child Nutrition Programs scheduled for reauthorization later this.

As with any other study, ours has limitations. Responses to the Policy Implementation Checklist were collected at the district level and do not distinguish between changes occurring at various school levels. Differences may exist between elementary, middle, and high schools with respect to changes that occurred in nutrition education, physical activity, and the food environment after the LWP was established. Thus, future studies are needed to assess the progress

of LWP implementation at the district, school, and building-levels. Data collected from the PIC was self-reported by school personnel and other stakeholders involved in the implementation of local wellness policies. This is another limitation of our study and our findings, as data may be subject to respondents' bias. To test for the accuracy of information provided by respondents and further investigate the progress of schools in implementing their wellness policy goals, future studies and evaluation surveys should be coupled with school visits, interviews, and focus groups. On-site observations of school wellness-related activities and the quantification of changes occurring in schools are instrumental data collection methods to assess changes occurring in the school environment after wellness policies were established. The quantification of changes occurring in schools may include documenting time spent by students per grade and school-level in learning about nutrition and being physically active throughout the school day. A third limitation of this study is the lack of specific questions to measure the proportion of foods and beverages sold or offered in schools that have become much or somewhat healthier after the LWP was established. Survey respondents varied in terms of their job titles and responsibilities among schools; thus the perception of 'healthier' changes may have differed between school personnel depending on their job positions or their understanding of the nutritional values of items sold or offered in schools. Changes in each of the competitive food venues can thus be further explored and quantified to assess the percentage of food items that have become much or somewhat nutritionally healthier than those offered prior to the LWP implementation and identify food venues in which change has been minimal. Furthermore, the use of a checklist with 39 questions may have reduced time burden on respondents yet limited our ability as researchers to explore all action steps and changes that occurred in schools after the LWP implementation. Changes that may have occurred in the areas of physical education and in other-school based activities are worth exploring in future studies. The policy implementation checklist and similar evaluation surveys can be expanded to include more specific questions for each of the content areas, mainly

nutrition education and physical activity. Time spent per week by students at each grade and school-level in learning about nutrition through structured nutrition and health education classes or by integrating nutrition education into other subject areas and class curricula can be assessed. In addition, questions and on-site observations and documentation of time spent by students being engaged in moderate to vigorous physical activity within a school day are worth exploring.

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APPENDIX

Local Wellness Policy Implementation Checklist

Thank you for taking the time to complete this Local Wellness Policy Implementation Checklist. Because Local Wellness Policies cross multiple areas within school districts and schools, it is anticipated that multiple individuals will need to provide information to accurately and thoroughly complete this checklist. Please keep track of the individuals who contributed to the responses because, at the end of the checklist, you will be asked to indicate, by job title, who was involved. We suggest that only one person enter the responses, in the web survey, at one time period. All responses must be made using the web form. Please refer to the email message with contains the web address. If you have misplaced the email with the web address, please email websurvey@survey.psu.edu.

Planning Implementation

1. Have written Implementation or Action plans been developed for your Local Wellness Policy?
 - No
 - Yes, for some goals
 - Yes, for all goals
 - Don't know

2. Has a person with ultimate responsibility for your Local Wellness Policy implementation been identified?
 - Yes
 - No
 - Don't know

3. Related to responsibility for your Local Wellness Policy implementation, have responsible individuals been assigned at the...

- District/Diocese/Central Administration office level
- School level
- Both district and school level
- Neither
- Don't know

4. Is your Local Wellness Policy part of your school district's strategic plan?

- Yes
- No
- In process
- Don't know

5. Have policy goals been prioritized for implementation?

- Yes
- No
- Don't know

6. Have timelines been developed for your Local Wellness Policy implementation?

- No
- Yes, for some goals
- Yes, for all goals
- Don't know

7. Have consequences been identified for violation of your Local Wellness Policy goals?

- No
- Yes, for some goals
- Yes, for all goals
- Don't know

8. How have students been actively involved in your Local Wellness Policy implementation beyond policy development? (Please check all that apply.)

- Represented on on-going wellness committee
- Student advisory group for school meals program
- Students are involved in school meals menu selections
- Student input regarding other health/wellness/nutrition/physical activity issues is assessed
- Students are involved in annual reviews and reporting about Local Wellness Policy implementation
- Students are provided with nutritional content of school meals
- Students are encouraged to act as role models of healthy behaviors
- Student-led campaigns related to wellness
- Other: Please describe: _____
- Students have not been actively involved in the Local Wellness Policy implementation.
- Don't know

9. Have you partnered with any community agencies/organizations to support implementation of your Local Wellness Policy? (Please check all that apply.)

- YMCA/YWCA
- Other local fitness center
- PANA
- Local hospital
- Penn State Cooperative Extension
- American Cancer Society
- American Heart Association
- STEPS program
- Other: Please describe: _____
- We have not partnered with community agencies/organizations
- Don't know

10. Do you have an identified, dedicated wellness coordinator (formalized in job description) for your district?

- Yes
- No
- Don't know

11. Some school districts have included goals in their policies to represent practices already in place. Others have included new goals. Which statement best describes your situation?

- Our district included only new goals and practices into the Local Wellness Policy.
- Our district included only already existing goals and practices into the Local Wellness Policy.
- Our district included a combination of new and existing goals and practices.
- Don't know

Nutrition Guidelines

12. Have foods and beverages offered in the following areas been assessed for compliance with your Local Wellness Policy?

	Yes	No	In Progress	No foods and/or beverages offered in this area	Don't know
A la carte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vending machines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student stores	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fundraisers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Concession stands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Classroom parties	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Has any research been done to identify new foods and beverages that meet the nutrition guidelines established in your Local Wellness Policy?

- Yes
- No
- In progress
- Don't know

14. Has a list of acceptable snacks for classroom parties been developed and distributed to...(Please check all that apply.)

- Teachers
- Parents
- Students
- Administrators
- Other _____
- No one
- Don't know

15. Please describe the changes that have been made to the foods/beverages offered through the following venues compared to the situation prior to establishment of your Local Wellness Policy

	These items are now much healthier.	These items are now somewhat healthier.	These items have always been healthy, so little change has occurred.	These items are primarily not healthy.	No foods and/or beverages offered in this area.	Don't know
A la carte	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vending machines	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Student stores	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fundraisers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Concession stands	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Classroom parties	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Do food fundraisers occur during the school day?

- Sometimes
- Often
- Never

17. Are foods sold as fundraisers during the school day required to be approved by a building administrator?

- Yes
- No
- Not applicable (no food fundraisers)
- Don't know

18. Are foods of any kind used as rewards or punishment in classrooms or other school functions? (for example, a pizza party for high grades.)

- Sometimes
- Often
- Never
- Don't know

19. Has information been communicated to teachers regarding the use of foods as reward?

- Yes
- No
- Don't know

Professional Development

20. Has professional development/training been done for or materials distributed to school foodservice staff related to your Local Wellness Policy areas?

- Yes
- No
- Don't know

21. Has professional development/training been done for or materials distributed to teachers who provide nutrition education related to your Local Wellness Policy areas?

- Yes
- No
- Don't know

22. Has professional development/training been done for or materials distributed to Health/PE faculty related to your Local Wellness Policy areas?

- Yes
- No
- Don't know

23. Has professional development/training related to your Local Wellness Policy been done for or materials distributed to those teachers who do not traditionally teach nutrition or Physical Education?

- Yes
- No
- Don't know

Wellness Committee

24. Is there a functioning wellness committee in your school/district?

- Yes
- No
- Don't know

Nutrition Education

29. Are students receiving more minutes of nutrition education now than they were prior to the establishment of your Local Wellness Policy?

- Yes
- No
- Don't know

30. Are students receiving higher quality nutrition education now than they were prior to the establishment of your Local Wellness Policy? (Higher quality might mean more behaviorally oriented, age-appropriate, interactive, etc.)

- Yes
- No, because it was high quality prior to establishment of the Local Wellness Policy.
- No
- Don't know

31. Is nutrition education being integrated into a variety of subject areas (e.g. math, language arts, etc.)?

- Yes, but this was occurring prior to the establishment of the Local Wellness Policy.
- Yes and this is a new activity.
- No
- Don't know

Physical Activity

32. Do students have more opportunities for physical activity now than they did prior to the establishment of your Local Wellness Policy?

- No
- Yes, in some schools
- Yes, in all schools
- Don't know

33. Are there more opportunities for students to be physically active in classrooms (outside of Physical Education) now than there was prior to the establishment of your Local Wellness Policy?

- No
- Yes, in some schools
- Yes, in all schools
- Don't know

Measurement and Reporting

34. Is there a written plan for measuring implementation of your Local Wellness Policy?

- Yes
- No
- In process
- Don't know

35. Is there a timeline for reporting on implementation of your Local Wellness Policy to the school board or other administrative body?

- Yes
- No
- In process
- Don't know

36. Has measurement of implementation of your Local Wellness Policy begun?

- Yes
- No
- Don't know

37. Have any written or oral reports been presented to the school board or Superintendent or other administrative body describing the progress of your Local Wellness Policy implementation?

- Yes
- No
- In progress
- Don't know

38. Is there a plan for review and possible revision of your Local Wellness Policy?

- Yes
- No
- Don't know

Please indicate who was involved in providing information to complete this checklist (please check all that apply.)

- Business manager
- Curriculum Coordinator
- Family and Consumer Science teacher(s)
- Foodservice director
- Foodservice staff
- Health/Physical Education teacher(s)
- Parent(s)
- Principal(s)
- School nurse(s)
- Student(s)
- Superintendent/Chief Administrative Officer
- Other teacher(s)
- Other: Please specify _____

PERSONAL INFORMATION

- Top 1% graduate from both Penn State (PhD & Masters) and AUB (BSc)
- Fluent English and Arabic; Moderate French
- Skilled in Microsoft Office XP (Word, Excel, PowerPoint), SPSS & Minitab softwares, NUT IV & NUT Pro.

EDUCATION**Ph.D. Nutritional Sciences (GPA 3.98)** 2009 – 2010Penn State University, University Park, Pennsylvania, USA (*Advisor: Dr. Claudia Probart*)*Dissertation: Implementation of Local Wellness Policies in Pennsylvania School Districts: Student Involvement and Process Factors Associated with Positive Changes in School Environment*
(Nutrition Education, Special Topics in International Nutrition, Qualitative & Quantitative Analysis of Nutrition Policies)**M.S. Nutritional Sciences (GPA 3.96)** 2006 - 2008Penn State University, University Park, Pennsylvania, USA (*Advisor: Dr. Claudia Probart*)*Thesis: Student Involvement in Local Wellness Policies of Schools in Pennsylvania*
(Community Nutrition, School Nutrition Literature Reviews, Policy Abstraction & Coding)**Dietetic Intern, Lebanese Registered Dietitian** 2004 - 2005

American University of Beirut Medical Center, Beirut, Lebanon

B.S. Nutrition and Dietetics (with “High Distinction”) 2001 – 2004

American University of Beirut, Beirut, Lebanon

AWARDS AND SCHOLARSHIPS11 academic, research & outreach awards, including the prestigious **Fulbright scholarship****PUBLICATIONS AND PRESENTATIONS**

Authored & co-authored 4 manuscripts; developed 10 abstracts and poster presentations

PROFESSIONAL EXPERIENCE**Graduate Research and Teaching Assistant** 2006 - 2010Department of Nutritional Sciences, Penn State, USA (*Primary Investigator: Dr C. Probart*)

- Developed school online training modules & performed various school nutrition analyses
- Assisted in teaching 3 undergraduate courses & presented on various topics as guest speaker
- Managed educational field trips for International Program in Nutrition - Rome, Italy

Research Assistant 2005 – 2006American University of Beirut Medical Center, Lebanon (*Primary Investigator: Dr G. El-Hajj-Fuleihan*)

- Recruited & analyzed 60 subjects for a clinical study conducted with Children’s Cancer Center
- Analyzed data and developed abstracts/posters, and co-authored a peer-reviewed publication

Field Coordinator 2004Arab Resource Collective, Beirut, Lebanon (*Project director: Ms. J. Zabaneh-Melky*)

- Assisted in training-of-trainees workshops & coordinated daily nutrition lessons and activities

Technical Assistant 2001 - 2004Nutrition & Dietetics, AUB, Lebanon (*Supervisor: Dr. N. Hwalla*)

- Assisted in preparing nutrition course materials and recruited study participants

ADDITIONAL INFORMATION:

- Active member in 6 professional associations & NGOs
- Student leader on numerous committees & associations