EVALUATION OF SCHOOL WELLNESS POLICY IMPLEMENTATION IN HAWAI‘I’S PUBLIC SCHOOLS

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Abstract

Healthy children achieve more academically, miss fewer days of school, and are more likely to lead healthy lifestyles after high school graduation. Obesity is an increasing health problem among youth in the United States, and may also affect youth educational achievement outcomes. The Child Nutrition Reauthorization Act of 2004 mandated the development of school wellness policies by 2006, to be implemented by 2007 to improve dietary behaviors and increase physical activity in youth. Compliance with the creation of a policy was mandatory for school districts to continue receiving federal funds for school meals. Hawai‘i’s unique implementation of the policy entailed one policy for all public schools—the School Wellness Guidelines. Initial implementation of the school wellness guidelines in Hawai‘i was supported by various state and federal partners that offered specific interventions to assist schools in reaching the guidelines. Some of these interventions included professional development (PD) activities, changes in the school food services (SFS) program, implementation of recess before lunch (RBL), and school site individualized interventions. This dissertation study evaluated the impact of wellness policy implementation in Hawai‘i from 2007-2011, utilizing a descriptive study with a convergent mixed method design approach. Analysis of quantitative data provided from various programs was correlated with qualitative data from interviews with district administrators and individual school personnel.

Hawai‘i’s School Wellness Guidelines was compared with a national standard of school wellness policies, demonstrating strengths in some areas and weaknesses in others. Youth Risk Behavior Survey data showed significant change in consumption of more nutritious beverages after implementation of the school policies, although there was

an increase in screen time, or time watching television or other media. School level interventions showed no significant change in behavior referrals in schools that changed to RBL and difficulty with the implementation and compliance with a school food policy. System wide, school staff, including school food service workers, received additional trainings relating to wellness guidelines, and changes in the standardized school menu items increased nutritional value of school lunches. Results from interviews also provided other specific recommendations for future implementation channels and interventions for Hawai‘i’s unique wellness policy.

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List of Abbreviations

CDC: Centers for Disease Control and Prevention

Chapter 19: School Report of Behavioral Incidences

CNP: Child Nutrition Programs

DHS: Department of Human Services (Hawai‘i)

DOI: Diffusion of Innovations Theory

FFVP: Fresh Fruits and Vegetables Program

FNS: Food and Nutrition Services

HDOE: Hawai‘i Department of Education

HDOH: Hawai‘i Department of Health

HHI: Healthy Hawai‘i Initiative

KCC: Kapi‘olani Community College

NSLP: National School Lunch Program

OCISS: Office of Curriculum, Instruction and Student Support

PD: Professional development

PE: Physical education

RBL: Recess Before Lunch

RT: Resource teacher

SAWS: Safety and Wellness Survey

SBP: School Breakfast Program

SEM: Social Ecological Model

SFS: School food services

SMP: Special Milk Program

SNAP: Supplemental Nutrition and Assistance Program

UH: University of Hawai‘i

USDA: United States Department of Agriculture

WIC: Women, Infants and Children

YRBSS: Youth Risk Behavior Surveillance System

YRBS: Youth Risk Behavior Survey

Chapter 1: Introduction

Because of increased obesity rates and associated unhealthy behaviors increasing in children, public school districts across the nation were required to implement school wellness policies in 2007, to promote healthy eating and physical activity among youth. The purpose of this research study was to evaluate the implementation of the school wellness policies in Hawai‘i’s public schools from 2007 to 2010. The results of this research can suggest to other state and local education agencies possible statewide interventions to help them reach the goals set by their wellness policies. Locally, the results of the research can assist in guiding the future implementation of the wellness policies in Hawai‘i. Schools that are meet wellness policies promote healthy lifestyles for students and staff, which can help students achieve academically and lead healthier lives (CDC, 2010a; ASBE, 2005).

This introduction describes the significance of the problem, states the research questions, defines terms, discusses the theoretical construct, and presents an overview of the research methodology.

The Significance of the Problem

Obesity rates nationwide have reached epidemic proportions (Sherry et al., 2010). Childhood obesity rates in the United States have tripled during the past 20 years (CDC, 2010a). Obesity is correlated with many adverse effects on health for children and adults. *Healthy People 2020*, a national health promotion and disease prevention initiative, emphasizes the importance of establishing a school environment that supports a good diet and adequate physical activity to reduce obesity rates in children (United States Department of Health and Human Services [USDHHS], 2010).

With changes in educational focus during the past decade, the amount of time spent on subjects like health and physical education has decreased considerably. Only 3.8% of elementary schools, 7.9 % of middle and 2.1% of high schools in the United States provide students with daily physical education (Lee et al., 2007). Additionally, 22% of schools do not require any physical education classes (Lee et al., 2007). While formal health and physical education is important in helping people understand recommendations and how to change, it should be accompanied by changes in the whole school environment.

While children are at school, it is important to allow them the opportunity to engage in physical activity and eat healthy meals. Because children spend a large proportion of their day in school, experts recommend that they have at least 30 minutes of physical activity during the day (Story, Kaphingst, & French, 2006). However, the Youth Risk Behavior Survey (YRBS) in 2011 (CDC) found that fewer than 40% of adolescents participate in physical activity for 60 minutes or more a day. There has also been a decrease in student consumption of school lunches, which are prepared to meet daily nutritional requirements for children. Students have, in turn, increased consumption of snack or foods from school vending machines, which often do not contain adequate nutritional quality (Burgeson, Wechsler, Brener, Young &, Spain, 2001). A study of Hawai‘i schools (CDC, 2006) found that many schools did not meet standards in addressing nutrition and physical activity in the school setting.

To improve physical activity and nutrition in public schools, the Child Nutrition Reauthorization Act of 2004 required school districts that receive funds for nutrition services to develop school wellness policies targeting healthy eating and physical

activity. These policies were to be developed by 2006 and implemented by 2007. The school wellness policies aimed to encourage schools to implement multi-level changes, from educational offerings to choices of foods at school, to address physical activity and nutrition behaviors of students and staff.

In Hawai‘i, the Department of Education (HDOE) introduced a universal “School Wellness Guidelines” in 2007 (HDOE, 2009) to meet the national requirement for the implementation of school wellness policies (Appendix A). The goal was to implement the policies fully by the end of the 2010-2011 school year. Because of partnerships between the HDOE, the Hawaii Department of Health (HDOH) and the University of Hawai‘i at Manoa (UH), Hawai‘i schools received additional support for implementation of the wellness guidelines and for the required evaluation of progress toward meeting goals. Initiatives to support the implementation of the wellness guidelines included offering professional development for teachers and staff in health and physical education, making class schedule changes for students’ school day, improving school food services, offering mini grants for schools carrying out changes related to the wellness guidelines, and developing “wellness” model schools. In addition, the three state partner agencies encouraged schools in Hawai‘i to make progress toward meeting the guidelines by offering recognition and resource assistance for their attempts.

As the implementation of the wellness policies in Hawai‘i’s schools approached the target date for full compliance, measuring progress was important. This study evaluated the implementation of the statewide school wellness policies in Hawai‘i. Studies have evaluated the compatibility of school district level wellness policies with national recommendations, using standardized tools (Metos & Nanney, 2007). However,

in order to guide future policies or other interventions to address obesity in youth, more studies are necessary to focus on successful implementation strategies for the policies, and to evaluate the effects on student academic and health outcomes.

Research Questions

The following research questions were addressed in this mixed methods study:

1. In what ways and to what extent does the document entitled, *Hawai'i's School Wellness Guidelines* align with national recommendations?
2. During academic years 2007-08 through 2010-11, in what ways and to what extent were the HDOE schools assisted in the implementation of the school wellness guidelines?
3. What kinds of school level impacts occurred following the implementation of Hawai'i's school wellness guidelines?

Definition of Terms

The following terms were defined for the purposes of this study.

Obesity. Obesity is a "complex, multifactorial, chronic disease that develops from an interaction of genetic, biological, psychological, sociocultural and environmental factors" (Strauss, 2002, p. 175). Obesity is most often identified in populations, using the body mass index (BMI), which is the ratio of weight (kg) to height (m) squared (Stoddard, Kubik & Skay, 2008). Percentages relating height and weight to growth scales for children are often used when measuring obesity in children; however, BMI has been calculated and incorporated into growth charts for pediatric populations, allowing the longitudinal calculation of BMI throughout the lifetime (American Academy of Pediatrics, 2003; National Association of Pediatric Nurse Practitioners, 2006). Those

with a BMI greater than 25 (85-94%) are considered overweight, those with a BMI greater than 30 (95-99%) are considered obese, and those with a BMI greater than 40 (99%) are considered morbidly obese (Lobenstein & Jackson-Leach, 2007; National Institutes of Health, 2000). However, BMI should only be used as a guideline and does not measure bone, fat or muscle, which are important factors for consideration in the causes of the complications of obesity (Freedman et al., 2007).

Recommended physical activity for youth. Physical activity is defined as any bodily movement, usually in reference to movement of large muscles and closely associated with health outcomes (Sallis & Owen, 1999). For youth, the recommended physical activity is moderate activity for 60 or more minutes every day of the week (CDC, 2002). Moderate activity requires approximately three to six times as much energy as the resting state, and uses large muscle groups for activities such as brisk walking, swimming, cycling, or dancing.

School wellness policies. A local school wellness policy is the term used by the federal government in the Child Nutrition Reauthorization Act of 2004 (Public Law 108-265) to describe what school districts should do to promote health and wellness in the school setting. This applies directly to a school receiving funding as part of the National School Lunch Program.

School wellness guideline. The term "school wellness guideline" refers to the specific requirements chosen by the HDOE for Hawai'i's schools to guide schools toward meeting the national requirements of a local school wellness policy. See Appendix A.

Healthy Hawai'i Initiative (HHI). The Healthy Hawai'i Initiative is a part of the Hawai'i Department of Health, designated to "support healthy lifestyles by

implementing policies and programs to create sustainable changes in Hawai‘i’s communities, schools and workplaces” (HDOH, 2007). HHI partners with the HDOE to promote healthy lifestyles in the schools and has played a large role in the creation and implementation of the School Wellness Guidelines. The HHI is funded by the state’s tobacco settlement funds, which are perpetual funds from fiscal year revenues from large tobacco companies.

Theoretical Construct

The theoretical framework underlying the implementation of school wellness policies in Hawai‘i to address obesity through nutrition and physical activity, is the Social Ecological Model (SEM). The SEM describes the importance of addressing various levels of influence - individual, interpersonal, organizational, community and societal - in order to understand the factors and address the problem of obesity. However, to evaluate the implementation of school wellness policies, this study utilized Everrett Rogers’ diffusion of innovations (DOI) theory to describe the change process (Hubbard & Sandman, 2007). Rogers theory was selected because of its understanding of a social system as the basis for change, which coincides with the use of the SEM as a basis for the intervention.

A “diffusion” is the process by which change occurs within a social system (Rogers, 1995). Rogers’ theory can be used to define how an innovation or an idea is diffused throughout a social system over time. He describes four interacting factors that will cause change: innovation, communication channels, social systems and time (Rogers, 1995). The innovation is the idea, which can differ in the adoption rate in the social system depending on relative advantage, compatibility, complexity, trialability and

observability (Rogers, 1995). The outcome from the implementation of the innovation represents the impact that it will have in the social system. There are five steps leading to the change or adoption: knowledge, persuasion, decision, implementation and confirmation (Rogers, 1995).

The DOI model has been widely used in public health to analyze health promotion and disease prevention, and can be utilized to examine capacity building, public and private health sectors and collaboration with government (Haider & Creps, 2004). The model has been helpful in analyzing the process of change within organizations (Pearcey et al., 1996). When applied to this study, the innovation is the School Wellness Guidelines developed for Hawai‘i’s schools. The diffusion is the process and extent by which the guidelines have been implemented. The schools represent the social system where the innovation (wellness guidelines) will be diffused (implemented). In Roger’s process of change, this study primarily focuses on the evaluation of the implementation stage. School wellness guidelines implementation in Hawai‘i represents an authority type innovation-decision (Rogers, 1995), which was initiated by the federal government through public law. The implementation of the guidelines in Hawai‘i were further driven by the authority of selected individuals in the unified HDOE to implement a single policy for the state.

Rogers characterizes the different elements leading to the diffusion of an idea, which include characteristics of the innovation (idea), how the innovation is presented, the characteristics of those who will be adopting the change, and how it fits into the social system where it is presented (Rogers, 1995). These elements were used as a guide to evaluate the implementation of the wellness policies in Hawai‘i’s public schools.

Rogers also discusses the consequences of diffusion of an innovation—indirect versus direct, undesirable versus desirable and unanticipated versus anticipated—which provided further guidance in evaluating the outcomes of school wellness policy implementation.

Overview of Methodology

The evaluation of the school wellness guidelines utilized the DOI theory as a conceptual basis, and a convergent mixed methods design, organized around the three research questions. See Table 1, which provides the correlation between the research questions and the sources used to address them.

The first research question was addressed through a comparison of the HDOE's School Wellness Guidelines with the national recommendations for school wellness policies. The researcher utilized a standardized coding tool provided by Schwartz et al. (2009) to evaluate Hawai‘i's wellness guidelines as they corresponded to national recommendations.

The second question addressed how the HDOE administratively implemented the wellness policy in the schools. With information provided from HDOE system-wide the program administrators, the discussion of research question two described the resources, activities, and programs that were used to help schools meet the requirements of the wellness guidelines was created. Future and ongoing projects were also identified.

The third research question examined measurable (quantitative and qualitative) changes in the school setting resulting from the wellness guidelines implementation in

Table 1.

Summary of Research Conducted

Evaluation Category	Methodology	Tool or Data Set
Research Question 1: Comparison of Hawai‘i’s wellness policies to national standards	Document comparison and analysis	- School Wellness Policy Evaluation Tool (Schwartz et al., 2009)
Research Question 2: Description of Programs	Key informant interviews with program administrators	- Program Summary - Funding Sources - Resources Used
Research Question 3: Measurable outcomes from wellness policy implementation (including specific programs) 1. Statewide data 2. All programs 3. Professional development 4. School Food Services – menu changes 5. School Food Services – experiences of individuals who attended trainings and implemented changes 6. Recess Before Lunch 7. Experiences of individual schools	1. Statistical Analysis 2. Statistical analysis 3. Summaries of PD evaluations 4. Statistical analysis 5. Statistical analysis to identify schools for interviews with key informants in the SFS branch 6. Statistical analysis and comparison to existing data 7. Statistical analysis to identify schools for interviews with key informants at the school level	1. YRBS selected questions comparing 2007/2011 2. Number of people affected 3. Analysis of summaries of PD evaluations 4. Nutrient value before and after implementation 5. SFS training summaries, interview responses 6. Chapter 19 behavioral data before and after, correlate with existing data 7. SAWS data set, interview responses, attendance reports, standardized testing reports, Chapter 19 behavioral data

Hawai‘i’s schools. Discussion of research question three included an examination of the projects HDOE focused on to promote statewide implementation of the wellness guidelines during the past three years (2007-2010) was done to answer this question. The projects were: professional development (PD), school food service (SFS) programs including changes in school meals, and recess before lunch (RBL). The researcher summarized the types of trainings and the number of teachers and SFS members who engaged in related professional development trainings. Significant comments or qualitative data from surveys completed are included when applicable. Data obtained from the SFS branch comparing nutritional value change in school meals before and after program implementation, were triangulated with qualitative interview data to identify the effectiveness of the school food service component changes. In the RBL program, the number of misbehaviors (Chapter 19 data) for each school was compared before and after implementation. Data from Hawai‘i’s Youth Risk Behavior Survey (YRBS), which was completed by students in the state of Hawaii before implementation in 2007 and again in 2011, were analyzed for changes in responses, related to the intent of the wellness guidelines. YRBS questions included but were not limited to inquiries regarding the amount of physical activity undertaken recently, and choices to consume soda.

The remainder of research question three identified specific experiences and changes within schools that have shown progress in wellness guidelines implementation compared to schools that did not show progress. The responses to the annual Safety and Wellness Survey (SAWS) completed by Hawai‘i’s school principals since 2007 regarding their progress toward meeting the wellness guidelines were analyzed to determine which schools showed progress during the three years of implementation (Appendix B). Key

informants from selected schools that have shown significant progress or not shown progress toward meeting the guidelines participated in discussion about the implementation of the wellness guidelines at their school. Attendance and standardized testing data for these selected schools were analyzed before and after wellness policy implementation.

Chapter 2: Review of Literature

Childhood obesity is a growing problem in the United States today, which adversely affects the health of youth and their school success. Obesity can be prevented and treated, through healthy eating and increased physical activity (CDC, 2010a). The national requirement for the implementation of school wellness policies was intended to help address childhood obesity and related problems in the school environment (Child Nutrition and WIC Reauthorization Act, 2004).

This chapter reviews research related to the problems underlying the need for wellness policies in the school environment, and Hawai‘i’s efforts to implement its own School Wellness Policies, since 2007. This research review is organized into the following parts: (1) Obesity Among Children in the United States, (2) Interventions to Address Obesity, and (3) School Wellness Policies Addressing Obesity.

Obesity Among Children in the United States

In the United States the health problems associated with obesity in children have become a significant health care issue. Studies have shown that obesity in childhood correlates with health status in adulthood (ASPE, 2010; Gou, Roche, Chumies, Gardner, & Siervogel, 1994). The health care cost for obesity in children has been estimated at 127 million dollars a year, which corresponds to about 117 billion dollars in health care costs throughout adulthood (Finkelstein, Fiebelkorn, & Wang, 2003). Because the health behaviors that can prevent obesity often begin in childhood, it is important to teach children how to lead healthy lifestyles.

Unlike other chronic diseases, obesity, for the majority of the population, can be controlled with modification of lifestyle based on nutrition and physical activity

recommendations (Swinburn, Egger, & Raza, 1999). However, 75% of the US population does not meet recommended physical fitness levels and 45% does not participate in any physical activity (CDC, 2010a). In addition, large portion sizes for food and beverages, eating meals away from home, frequent snacking on energy-dense foods, and consuming beverages with added sugar are often hypothesized as contributing to inadequate nutritional intake exceeding daily requirements in children and teens (Institute of Medicine, 2005). Thus, it is important to prevent obesity in children by teaching them good eating habits and promoting physical activity.

Obesity rates in children. During the past 30 years, the number of Americans who are classified as being obese (CDC, 2008) has more than doubled, increasing dramatically from 15% to 35%. Based on the results from the National Health and Nutrition Examination Survey in 2007-2008, an estimated 17% of children are obese, which is an increase from 5% thirty years ago (CDC, 2010a). With the inclusion of those children at risk for being obese, the statistics for children show 32% of children as obese or at risk of obesity, which corresponds to about 25 million children (Ogden, Caroll, & Flegal, 2008). According to the CDC (2010a), 10% of children ages two to five, 15.3% of children ages six to 11 and 15.5% of children ages 12 to 19 are considered overweight in the United States.

In Hawai‘i, 28.5% of young children in kindergarten were found to be overweight, and 14.4% were considered obese, which is substantially higher than the national average (Pobutsky et al., 2006). Based on the CDC, 10-14% of high school students in Hawai‘i also were considered overweight (Kolodziejski et al., 2008), which was slightly lower that the national average. However, the health problems associated

with overweight and obese children are present throughout America and Hawai‘i and need to be addressed.

Adverse health and economic effects of obesity. Children who are obese are more likely to be obese in adulthood (ASPE, 2010; Biro & Wien, 2010). Obesity is the second leading attributive factor of death (behind tobacco) in the United States. Common complications of obesity include, but are not limited to type 2 diabetes, hypercholesterolemia, asthma, depression, hypertension, liver disease, early menarche, polycystic ovarian syndrome, skin infections, and slipped epiphyses (Schwartz et al., 2005; SEARCH, 2006; Parrot et al., 2012). For children, the immediate adverse consequence often is related to psychosocial needs (Fowler-Brown & Kahwati, 2004).

The total cost of obesity in the United States for approximately 3.1 billion people in the year 2000, was 117 billion dollars (Finkelstein, Fiebelkorn, & Wang, 2003). The related medical expenditures in Hawai‘i for approximately 1.3 million people were calculated at 290 million dollars (HDOH, 2007). In Hawai‘i, there also has been an increase in type 2 diabetes in children, related to obesity (Noy, Walter, Matsunaga, & Maddock, 2006). Therefore, it is important to prevent the problem of obesity when children are young.

Cause and risk factors of obesity. Obesity is caused by an imbalance of energy intake (nutrition) and energy expenditure (activity) (CDC, 2010a). Balancing the caloric intake of food with energy expenditure through physical activity is important in preventing obesity. For the majority of the population in the United States, this imbalance can be attributed to factors contributing to a sedentary lifestyle and eating unhealthy foods (high in fat and sugar), which result in a greater intake of calories

consumed compared to calories expended (Fowler-Brown & Kahwati, 2007). As mentioned previously 75% of the nation does not meet the daily requirements for physical activity (CDC, 2010a); similarly 64% of high school students do not meet the daily requirements for physical activity (CDC, 2005a). Seventy-nine percent of children age six to 11 and 28% of adolescents do not consume the recommended fruits and vegetables (foods that are nutrient dense and low in fat) daily (USDHHS, 2011). The replacement of healthy foods with higher caloric foods, coupled with the decrease in physical activity, plays a role in the increased incidence of obesity in today's youth.

However, for a smaller percent of the population, biologic factors like hypothyroidism, Down syndrome, Cushing's disease, eating disorders, Praeder Willi syndrome, or pharmaceutical treatments are correlated with obesity (Burns, Dunn, Brady, Starr & Blosser, 2004). Other studies have examined the possibility of a gene that increases the risk for obesity. Animal studies have repeatedly shown that a mutation in the leptin gene (also in humans) can be a cause for morbid obesity (Hong et al., 2010). A recent study has shown the association of genetic variations in the leptin gene with weight loss in humans; however, mutations have not been specifically identified as they have been with animals (Erez et al., 2010). Further research attempts to identify other biological and genetic links to obesity are currently underway; however, the influence of the environment and individual choices for nutrition and physical activity, continues to play the key role as a cause of obesity.

The risk for obesity is increased with race/ethnicity, culture, income level and location (Drewnowski, Rehm, & Solet, 2007; Haas et al., 2003). Obesity often is increased in certain ethnic groups, including Mexican American, African Americans,

American Indians and Native Hawaiians (Chai et al., 2003). There also is a possible genetic link to obesity for these ethnic groups, as found with the increased percentages of Native Hawaiians and other indigenous cultures when compared to other non-indigenous cultures (Furubayashi & Look, 2005). However, a recent study further investigating this disparity in obesity in these ethnic groups indicated that it might be due to socioeconomic status, culture and lifestyle (Brown, Fujioka, Wilson & Woodworth, 2009).

In a review of literature Fowler-Brown & Kahwatti (2004) showed that obesity repeatedly has been linked to low socioeconomic status (SES). Low SES is often associated with obesity because it can influence factors like neighborhood safety, resources available for education, types of foods offered at stores, ability to purchase healthy foods, and access to physical activity (Vieweg, Johnson, Lanier, Fernandez, & Pandurangi, 2007). The highest level of parental educational attainment, which is often associated with SES, was found by Goodman et al. (2003) to be inversely associated with children who are overweight. Additionally, for all groups, parental obesity in the family has been associated with childhood obesity (Fowler-Brown; CDC, 2010a).

Other specific risk factors for obesity include decreased time babies are breast fed, children's low self-esteem, maternal smoking during pregnancy, gestational diabetes, neighborhoods unsafe for outdoor activity, amount of sedentary activity (watching television, using the computer, video games) and chronic illness preventing physical activity (Barness, 2007; Burns et al., 2004; Jordan, Hersey, McDivitt, & Heitzler, 2006; Perman et al., 2008). Most of these factors are environmental, which in turn includes the physical environment as well as the influence of the culture.

This study will focus on the environment in Hawai‘i. Thus, it is important to examine research specific to Hawai‘i. The Behavioral Risk Factor Surveillance System (BRFSS) is a state-based survey of adults that assesses health risk behaviors, clinical preventive practices, and access to health care for chronic diseases and illnesses. In Hawai‘i, BRFSS data have shown that increased physical activity is related to increased income, male gender, and increased education (Kolodziejski et al., 2008). In all adults, healthy eating (more fruits and vegetables) has been associated with middle income females with more education (Kolodziejski et al., 2008). Thus, males could improve on eating habits and females could increase physical activity.

In the 2011 Youth Risk Behavior Survey, 86% of Hawai‘i’s high school students ate fewer than three fruits and vegetables per day, 17.5% drank soda at least once a day, 62.1% did not participate in the daily recommended physical activity, and 32.7% watched more than three hours of television per day (CDC, 2011). Similarly, for all youth, the results of the Hawai‘i Nutrition Education Needs Assessment (HNENA) demonstrated less time spent on physical activity by females compared to males (Kolodziejski et al., 2008). In this study, the Native Hawaiian youth population is at higher risk for becoming obese. Interestingly, Native Hawaiian and Pacific Islander youth were more likely to have increased rates of physical activity over other groups, despite the higher rates of obesity over other ethnic groups (Kolodziejski et al., 2008). This health disparity may suggest the need to emphasize healthy eating behaviors among Native Hawaiians by ensuring that healthy foods are accessible in the environment and educating about healthy eating behaviors. The school environment can represent a controlled environment to practice healthy behaviors where students can learn to eat healthy and engage in physical

activity both in school related settings and outside the school setting. School policies can widen the reach of interventions to prevent obesity to at risk groups.

Health and its effect on school achievement. Maximizing the health of students is essential to maximizing school achievement and promoting productive and healthy lifestyles. Studies support the fact that children who are healthier reach higher levels of achievement (Erhlich, 2008). This correlation may be due to various factors in the school environment, which may include but are not limited to attendance, behavior problems, and decreased complications of obesity.

Specifically, physical fitness has been linked to increased academic achievement in elementary school children (Eveland-Sayers et al., 2009). In the past decade, the emphasis on increasing instructional time has resulted in elimination of or decreased time spent on physical education. In various studies, when schools with decreased academic instructional time due to offering physical education instruction were compared to schools where there was no physical education or decreased physical activity the schools with decreased academic instruction did not appear to have an adverse effect on standardized test scores (Coe et al., 2006; Ahamed, 2007). Other studies comparing differing levels of physical activity among students have shown that when time is devoted to physical activity during the school day, academic performance especially in math, can equal or exceed that of students who do not get adequate amounts of physical activity (California Department of Education, 2002; Dwyer, Sallis, Blizzard, Lazarus, & Dean, 2001; Linder, 2002; Shephard, 1997; Tremblay, Inman, & Willms, 2000). In addition, adequate physical activity has been correlated with students' increased concentration, higher self-esteem and decreased behavioral problems, factors that can

indirectly help improve school achievement (Shepard, 1997). A more recent study found that physical activity alone was correlated with increased achievement for girls (Kwak et al., 2009). For boys, only the extent of physical fitness was significantly correlated (Kwak et al., 2009). Allowing students adequate time for physical activity in school may increase their achievement and meet the recommended daily levels of physical activity.

Despite the relationship between achievement and physical activity or physical education in schools, a survey of the nation's schools found that only 3.8% of elementary schools, 7.8% of middle schools and 2.1% of high schools have daily physical education (PE) as part of the school day (Lee, Burgeson, Fulton, & Spain, 2007). Budget concerns and the need to meet the standardized testing requirements have resulted in schools cutting back physical education programs and opportunities for physical activity. Many elementary schools in Hawai‘i do not have physical education teachers, although there are district level resource teachers available to provide guidance to classroom teachers to implement programs.

In a review of literature addressing nutrition at school, Taras (2005) found that a lack of sufficient sources of food adversely affect a student's ability to learn. Student academic performance was correlated with nutritional status (Taras, 2005). In the long term, insufficient nutrition in childhood was correlated with lower reading and math scores later in their education (Brown & Pollit, 1996). Eating breakfast was correlated positively with academic performance and cognitive functioning (Rampersaund, Pereira, Girard, & Adams, 2005; Taras, 2005). Schools with breakfast programs were found to have better attendance rates, decreased tardiness, improved behavior, and decreased hyperactivity (Brown, Beardsley, & Prothrow-Stith, 2008; Murphy et al., 1998). The

state of Hawai‘i participates in the National School Breakfast Program when there are 50% or more of students qualifying for free or reduced lunch based on family income. Therefore, nutrition and physical activity are important factors in promoting school achievement.

Interventions to Address Obesity

The development of healthy eating habits and achieving recommended physical activity during childhood have been shown to promote healthy behaviors throughout life (Kahn, Heath, Powell, Stone, & Brownson, 2001). *Healthy People 2020* addresses the prevention and treatment of obesity in 22 of its specific objectives related to nutrition and 15 related to physical activity (USDHHS, 2010). Guidelines to prevent childhood obesity involve eating a healthy diet according to recommendations from the Food and Drug Administration, and maintaining daily physical activity levels recommended by the CDC (2010a). A healthy diet involves balancing the consumption of foods with an adequate level of physical activity in order to maintain a healthy weight, and acquiring the recommended daily nutrients (CDC, 2010a). For children, interventions to reduce obesity and encourage healthy lifestyles should involve multi-level approaches through the medical care system, at home, at school and in the community (CDC, 2004; Sallis & Owen, 2002).

Social ecological model (SEM). The SEM was developed from Bronfenbrenner's ecological systems theory, which described influences on behavior as intercultural, community, organizational, interpersonal and individual influences (Sallis & Owen, 2002). The SEM's theoretical assumption is that health promotion occurs not only through individual interventions such as health education, but also through

"advocacy, organizational change, policy development, economic supports, environmental change and multi method strategies" (McElroy, Bibeau, Steckler, & Glanz, 1988). Influencing all five levels of the SEM is important in causing desired behavioral changes in a society.

The SEM has been used in the successful implementation of tobacco cessation programs, which has applications to obesity prevention programs (Corbett, 2001). However, the SEM is also important in addressing the obesity epidemic because of its multi-level approach at the individual, interpersonal, organizational, community and societal level (Egger & Swinburn, 1997; Robinson, 2008). Evidence-based approaches to obesity prevention involve a multi-factorial theoretical design to change health behaviors (Summerbell et al, 2005). Krebs & Jacobson (2003) support the need for multi-level interventions to address obesity, which can include limiting sedentary activities (e.g., television, computer, video games), promoting healthy eating and physical activity, and delivering changes through introducing initiatives and changing policy. This multilevel approach to promoting health behavior change is consistent with the theoretical concepts of the social ecological model.

Nationwide, a social ecological approach to obesity has been encouraged as a basis for interventions (OMHD, 2007; Joens-Marre et al., 2008). The recommendations found in a Healthy and Fit Nation by the Surgeon General in 2010 target obesity through individual decisions, the home environment, healthy childcare settings and schools, healthy workplaces, involvement with medical care practitioners and mobilization of communities (USHDDS, 2010 January 28). Such targets fall within the individual,

interpersonal, organizational, community and societal levels of the SEM model that must be addressed in order to bring about change.

In the state of Hawai‘i, the HDOH and the HHI team utilized the SEM as a basis for its physical activity and nutrition interventions throughout the state (Kolodziejski, Hirokawa, Benson, & Irvin, 2008). As shown in Figure 1 policy changes can influence all other levels of interventions. The Child Nutrition Reauthorization Act of 2004 represents a national policy requiring creation of local policies to cause change at the organizational level, with the school being the organization. Thus, the implementation of the school wellness guideline is an example of policy changes at the organizational level. In this study, the SEM model was used to understand the policy interventions relating to the problem of obesity, the DOI model was used to guide this study's evaluation of this policy change in the school as an organization. See Figure 1.

Individual interventions. When applied to obesity, interventions targeting individuals involve practices like goal setting and monitoring progress toward goals, which are often found through medical interventions. The advice of medical practitioners has played a significant role in individual decisions for weight management (Tan et al., 2006). Teams of medical professionals, including physicians, psychologists and nutritionists, have been shown to be more helpful than single practitioner in developing and directing effective interventions for addressing obesity (Damon, Dietrich, & Widhalm, 2005). Medical practitioners should screen all children for obesity and promote the prevention of obesity through diet and exercise. Problem behaviors and risk factors for obesity should be identified early, followed by goal setting with the family

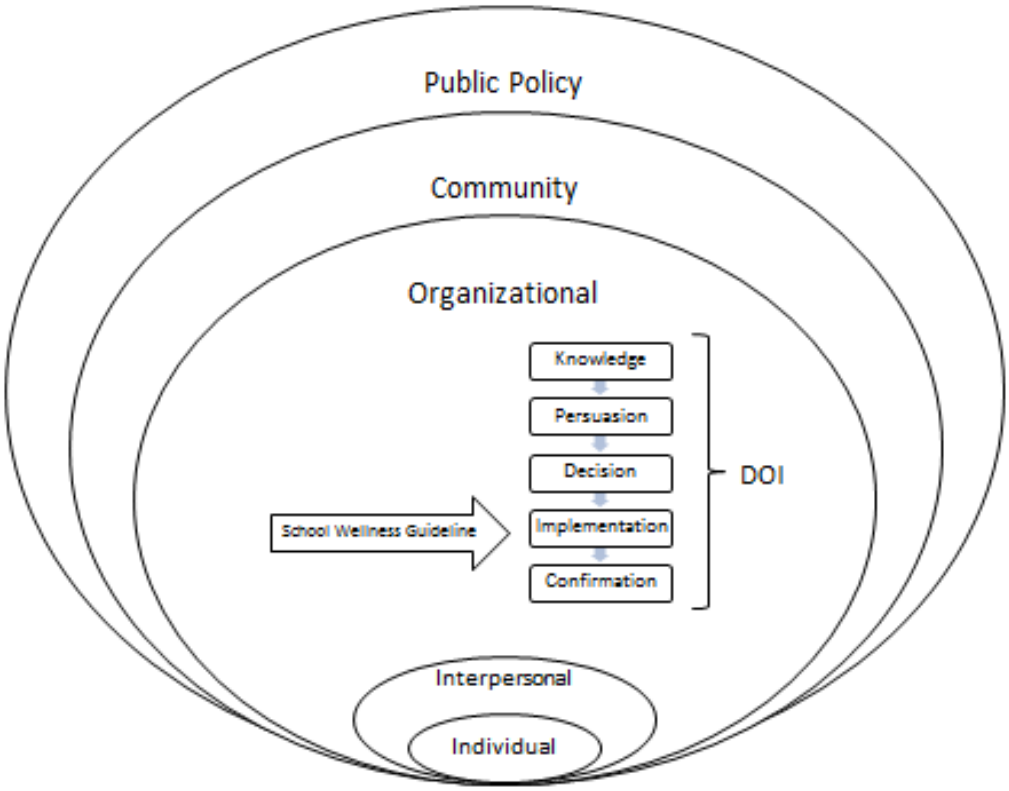


Figure 1. Framework for Evaluation of HDOE School Wellness Policies: Interaction between the SEM and DOI.

(Eldh, Ekman, & Ehnfors, 2006) and close monitoring (August et al., 2008).

The primary intervention for individual treatment of obesity in children is to encourage a healthy diet and increase physical activity. Through individualized goal setting, children should be measured on various parameters and receive positive reinforcement as they progress toward meeting nutrition and activity goals (Burns et al., 2004; Chock & Kerr, 2007; Wisotsky & Swencionis, 2003). Interventions can start at two years old if necessary, but for children who are still growing, the primary goal is to decrease the rate of weight gain (ADA, 2006). For older children and adolescents, gradual weight loss is preferred. Pharmacological treatment should be reserved for those with repeated treatment failures and other co-morbidities (August et al., 2008). Bariatric surgery in children should be restricted for special and severe cases of obesity that cannot be addressed by other means (Sugerman, 2003). Therefore, for most children, healthy lifestyle is the primary medical treatment for obesity.

Medical insurance companies have recognized the importance of decreasing obesity through lifestyle changes in all aspects of life in order to prevent future health care costs. Kaiser Permanente, a health maintenance organization, has various educational programs for children, their families and their communities (including schools and other groups), about health issues related to obesity, including: Educational Theater Program, Soil Born Farm Urban Agriculture Project, Explorit Science Center, FEED Coalition, California International Marathon's Youth Fitness Program and the Health Eating Active Living Program (Moore, McGowan, Donato, Kollipara, & Roubideaux, 2009). While the efficacy of each program is still being studied, the programs have involved millions of children nationwide. The programs are based on a

social-ecological approach to obesity extending beyond the individual visits to medical providers.

Interpersonal interventions. Although change in diet and physical activity are ultimately dependent on individual choice, interventions should attempt to cause change in various social contexts including small groups like family and friends, larger groups like schools and churches, and the community. At the interpersonal level, small groups, including family and friends can support individual change, through interventions like meal modifications and exercising together. Children may have healthy food choices and the opportunity to engage in physical activity; however, peer pressure and behavioral modeling in their social groups (including families) will influence their decision to participate (Hill & Lissau, 2002).

Family or home life plays a large role in most children's daily life, and plays an influential role in shaping children's eating and physical activity behaviors (Goran, 2006). Thus, families should be involved when attempting to change behaviors in children. Home life should model healthy lifestyle behaviors (Ludwig, 2007). Risk behaviors in children related to obesity are more likely to change with family goal setting and changes at home (Burns et al., 2004). Management plans and goals should be decided upon with the family unit, making sure that interventions are stepwise and gradual (Wisotsky & Swencionis, 2003). Interventions for families should take into account race, ethnicity, income and culture (Ramanathan & Crocker, 2009; Driskell et al., 2008; Katz, O Connell, Njike, Yeh, & Nawaz, 2007).

In developing a plan for change, various research studies are beginning to demonstrate which strategies that are most effective. Lob-Corzillus (2007) suggests a

correlation between less cooking at home and the consumption of more energy dense fast food. Young and Nestle (2002) have shown the importance of focusing on educating families about serving size and specific recommendations regarding types of foods to eat that are locally available. Encouraging families to counteract advertisements of high energy foods and drinks and to provide high quality foods in the home are important in making healthy nutritional choices (Lob-Corzilius, 2007). Effective recommendations for families to help children increase physical activity in daily routines, include decreasing screen time (television, computers, video games), participating in team sports and structured activities, and walking with pedometers as motivators to meet daily goals (Froberg & Anderson, 2005; Tudor-Locke & Bassett, 2004). The CDC (2010a) specifically recommends for children to limit screen time to two hours per day.

Often families do not have time to address and educate themselves about healthy eating and physical activity according to national recommendations. Therefore, the American Dietetic Association (ADA, 2006) recommends that pediatric prevention and treatment interventions targeting obesity should include a combination of family-based and school-based multi-component programs that include the promotion of physical activity, parent training and modeling, behavioral counseling, and nutrition education.

Community interventions. In a review of literature, the American Dietetic Association (2006) and the CDC (2002) found that individual and family interventions should be supported by community-based (societal) and environmental interventions to sustain and reinforce change to healthy behavior. The physical environment has a significant impact on the ability of individuals (families and groups) to meet recommendations for physical activity and nutrition. As an example, safe neighborhoods

have been shown to increase participation in outdoor physical activities (Harrell, Jessup & Green, 2006). Similarly, food choices are influenced by the accessibility of food sources like grocery stores, farmers markets or fast food restaurants. The availability of healthy food choices and the opportunity to engage in safe physical activity influence changes at the individual and family levels to promote healthy behaviors (CDC, 2007a). A community-wide approach to obesity will positively reinforce modeling of healthy lifestyles for children and support changes in behavior.

Various nationwide campaigns addressing obesity have been shown effective in increasing activity in youth and directing them toward healthier eating habits in multiple different environments. The nationwide Heart and Parks program, which provides resources and training for recreation centers and other community organizations, was effective in changing healthy eating decisions and increasing amount of time spent on physical activity (NHLBI, 2004). Similarly, the National Heart, Lung and Blood Institute has also launched the "We Can!" program for use with families, health care providers, and community organizations to improve food choices, increase physical activity, and reduce screen time (Moore, McGowan, Donato, Kollipara, & Roubideaux, 2009).

The social environment is also important at the community level because it involves social support for behavioral choices and provides clarity of expectations (Moos, 1980). Social organizations like churches or schools can reinforce change and promote healthy behaviors. Social marketing campaigns through the media and utilizing ecological approaches to change communities can also make it more acceptable to make healthy choices in relation to eating and exercise. Campaigns like the 1% (milk) or less campaign in Hawai‘i, and the "5 a day" campaign (now called Fruits and Veggies—More

Matters) in California have both been effective in population level changes toward healthy eating behaviors (Maddock et al., 2006; Reger-Nash et al., 2005; Wu, Forester, & Gregston, 1998). The nationwide "VERB It's What You Do" campaign which ran from 2002-2006 focused on increasing physical activity in teenagers through advertising, marketing and community partnerships. It was shown to have a dose dependent effect, where children who experienced more VERB messages also engaged in more physical activity (Wong et al., 2008).

A community-wide approach to obesity prevention within a school environment can positively reinforce modeling of healthy lifestyles for children and support changes in behavior. Societal changes through policy, like wellness policies or zoning laws, can cause environmental change to support healthy eating and physical activity. This study focused on evaluating changes brought out by policy development and the subsequent supports in order to address obesity in youth.

School interventions. Students spend a significant amount of their day in the school setting; thus, the school setting can provide an effective way to address the growing youth obesity epidemic (Nigg & Richards, 2006; Flynn et al., 2006). Successful interventions in the school setting are culturally appropriate and also involve families and communities (Wilson, 2009). A program called Pathways, developed for Native American children, demonstrated success when interventions focused on culturally appropriate delivery methods and involved the family and community in its development (Davis et al., 1999). Because Hawai‘i also has a significant Native Hawaiian population, which often parallels the concerns of Native American populations, it is important that similar steps are taken to assure that interventions in Hawai‘i are culturally appropriate.

Before interventions can be implemented, it is important to identify existing programs and initiatives in the schools and their effectiveness. The School Health Index (SHI) is an assessment tool, produced to help schools develop a Coordinated School Health Program (CSHP). A CSHP represents a model of eight interactive components—health education, physical education, health services, nutrition services, psychological and social services, school environment, health promotion for staff, and family and community involvement. Components are designed to promote and maintain health and wellness in youth (CDC, 2005). Using this model, the SHI identifies strengths and weaknesses of a school's current programs and policies and can assist schools in developing a plan to address student health, with the involvement of the school, parents, students and community (CDC, 2005). Because the SHI is based on the socio-ecologic approach, it emphasizes the promotion of student (and staff) health through the use of all available resources and changes throughout the school environment (Stokols, 1996).

Formal physical education and health education in the school setting also can help schools to promote healthy eating and exercise. The Physical Education Curriculum Analysis Tool (PECAT) and the Health Education Curriculum Analysis Tool (HECAT) can be used to evaluate the physical education and health education (related to nutrition) curricula available at school. The tools also can assist schools in identifying appropriate curriculum aligned with national health and physical education standards (CDC, 2006; CDC, 2007). These evaluation tools utilize various models and theories important in health and physical education, health promotion and behavior change in assessing the value of curricula.

Physical activity interventions at school. Because students spend a large part of their day at school, they should be given the opportunity to meet at least half of their daily physical activity requirements (30 minutes) at school (American Cancer Society, 2008). Students who have one or more 15-minute periods of recess (or short activity breaks) daily demonstrated better behavior in the classroom (Barros, Silver, & Stein, 2009). Decreased inactivity, including behaviors like sitting at a desk, using a computer, or watching television, has been associated with increased physical fitness (Sallis et al., 2002). When time was taken from subjects like math and reading to increase students' time spent on physical activity to 130 minutes, Ahamed et al. (2007) found that tests scores in reading and math remained the same. This study suggests that encouraging physical activity during the day will not be detrimental to academic success.

Increased time outdoors also has been associated with increased physical activity levels (Sallis et al., 2002). Having sufficient area (e.g., parks, pathways) for exercise has been shown to result in a 25% increase in physical activity (Matsuoka, Nett, Stromberg, & Maddock, 2005; CDC, 2002). Thus, school environments should provide environments for physical activity whenever possible. Ewing (2003) recommends that when feasible, walking or biking to school also should be encouraged if possible.

Having recess before lunch (RBL), an intervention piloted in Hawai‘i schools, also has been shown to decrease plate waste, increase access to recess equipment (and subsequent increased activity) and anecdotally decrease behavior referrals (Tanaka et al., 2005; Yelmokas, 2009). The RBL program suggests that schools allow students to engage in recess 20 minutes before lunch for students until the sixth grade. Subsequent studies have shown that recess before lunch is also associated with decreased loss of

instructional time, increased performance, decreased school nurse visits, increased time spent eating lunch and the consumption of a greater amount of high quality foods (White, 2003).

Various strategies can be implemented in the school environment to encourage increased physical activity. Formal physical education classes during school have been shown to increase physical activity in students, by providing the structured opportunity for safe and effective activities to promote physical activity and increase fitness (Kahn, Heath, Powell, Stone & Brownson, 2001). Analysis of data from the two year Early Childhood Longitudinal (n=9751) study found that physical education programs including one extra hour per week resulted in a significant decrease in BMI for girls (Datar & Sturm, 2004). A review of school policies for physical education, found that physical activity can be added to the school curriculum without detriment to academic achievement, and offers physical, emotional and social benefits (Story, Nanney, & Schwartz, 2009). In elementary schools today, due to decreased funding, there often are no physical education teachers. With the absence of licensed physical education teachers, it is important to provide regular education teachers with professional development opportunities to increase their knowledge in this area in physical education and related health areas (Kahn, Heath, Powell, Stone, & Brownson, 2001). Unfortunately, in Hawai‘i there is also is a lack of trained health and physical education specialists at the elementary level. If there were more specialists, they could provide assistance and resources to regular education teachers.

Nutrition interventions at school. School nutrition interventions have focused on teaching about nutrition through formal curricula and through changing food choices

offered for consumption. Foods offered on the school campus should meet the United States Department of Agriculture (USDA) guidelines. Participation in the National School Lunch Program (including breakfast), will offer students balanced meals for free or reduced prices while they are in the school environment. Removing vending machines or replacing them with healthy foods has been effective in changing students' eating behaviors at some schools (Harper, 2006; French & Stables, 2003). However, other studies have shown that for older students the removal of vending machines containing high sugar snacks did not cause significant consumption differences among students, possibly due to the lack of accompanying education to encourage students to avoid less healthier food choices outside of school (Whatley Blum et al., 2008). Other interventions in nutrition services such as removing sugar sweetened beverages, improving ala carte choices, reducing the offering of low nutrient, energy dense foods (e.g., french fries) have been shown to be important in improving nutritional habits at school (Briefel, Creninsek, Cabili, Wilson, & Gleason, 2009). Service learning projects where students prepare foods for themselves or other populations has been shown to increase knowledge about healthy eating and encourage positive behaviors outside the school (Rasberry, 2006).

Although nutrition education programs have been shown to increase nutritional knowledge and improve specific behaviors like increasing fruit and vegetable consumption (Gentile et al., 2009), reviews of interventions in schools note their apparent ineffectiveness in long term change of students' BMI status (Summerbell et al., 2005; Brown et al., 2009; Warren et al., 2003). In a large-scale longitudinal study including 1764 students in a quasi-randomized design, teaching of six nutritional units of study followed by extra time for physical activity resulted in no significant change in students'

BMI after four years (Plachta-Danielzik et al., 2007). The lack of sustainability of change in physical effects often has been attributed to the lack of application of nutritional knowledge and increased activity to other settings, and the narrow range of interventions (Carrell, 2007).

Successful nutrition interventions have focused on both curricular and environmental approaches to change. Programs like Farm to School that help children learn to grow their own foods and take into consideration a service learning component, have shown success in changing nutritional choices of students (Rimkas, Jones, & Ona, 2003). In addition, nationwide ecoliteracy guidelines for schools have suggested adding meal preparation, recycling, sustainability, cultural and agricultural values and inclusion of family into the wellness guidelines. The ecoliteracy guidelines coincide with Native Hawaiian cultural values and the natural resources available in Hawai‘i. Thus, various programs have been started in Hawai‘i, such as Kawaihao, Mao and Malakai, to teach students about how to grow and how to prepare healthy meals (Center for Ecoliteracy, 2005).

Programs that are multi-component in nature have been found to be more effective in preventing obesity in children at schools with a high proportion of children eligible for free and reduced priced lunches (Spiegel & Fould, 2006). In a study by Foster et al. (2008), a school nutrition policy accompanied by education, social marketing and parent outreach was shown to contribute to a 50% reduction in overweight students compared to non-targeted schools over a two-year period.

Combined nutrition and physical activity interventions. Although addressed separately above, nutrition and physical activity interventions can be effective when

addressed together. A nationwide program provided by the National Diabetes Education Program, "Move It!" for schools with American Indian and Alaskan Native students, found that its messages were more effective when it addressed physical activity and nutrition together and empowered youth to create their own strategies to increase awareness (Moore, McGowan, Donato, Kollipara, & Roubideaux, 2009).

In other countries, a Dutch study showed a reduction in BMI over eight months, as a result of education (biology), physical education, and food selection (health) (Singh et al., 2007). In Chile, a multi-component program, which added increased time for nutrition and physical activity, educational programs during school, changed the availability of foods at school, increased activities before and after school, and established parent involvement in teaching, was found to have a positive effect on adiposity indices (BMI, waist circumference, physical fitness testing, flexibility) (Kain et al., 2004). Thus, in order for school interventions to affect BMI and decrease the incidence of obesity, in addition to changing behaviors to increase physical activity and nutritional habits, school interventions should have multiple components.

Whenever possible, programs with multiple components also should be accompanied by community partnerships to promote sustainability and provide additional resources. A study by Perman et al. (2008) showed that a school-based prevention and intervention program conducted by a coalition of community agencies and organizations proved to be a promising and cost effective approach to addressing childhood obesity. This program involved activities after school, as well as cooperation with parents, local stores and medical practitioners (Perman et al., 2008). Similarly, educational programs at

school should subsequently be applied in the community setting, so that changes will continue even when school is not in session (Carrell et al., 2007).

After school interventions. Because of limited time to address prevention of obesity during the formal school day, after school programs have become another viable setting to offer interventions to increase physical activity and promote healthy nutrition habits. Various after school programs have been shown to increase activity level and increase knowledge about recommended nutrition habits (Nigg, 2006; Horowitz, Shiltz & Townsend, 2004; DeRenne et al., 2008; Sallis et al., 1997).

School Wellness Policies

Policy changes should encourage and support changes in communities, organizations, groups and individuals. Policy changes like tax breaks for healthy foods, support for programs that promote physical activity, and providing nutrition labels on fast foods, also have been suggested by researchers and practitioners as ways to address the obesity epidemic (Mendelson, 2007).

The CDC published recommendations for schools to change policies as support for an environment that addresses the obesity epidemic (CDC, 2010b). These recommendations include but are not limited to coordinating efforts across agencies, using local data in focusing efforts, supporting school health councils, and creating strong school wellness policies (CDC). The school wellness policies represent a national imitative utilizing public policy to change health behaviors through multiple interventions in the school setting. The Child Nutrition Reauthorization Act of 2004 mandated school wellness policies to be developed and implemented by 2006 in all school districts that utilize federally funded school nutrition programs. The HDOE School Food Services

receives 50% of their 78.2 million dollar budget (2008-2009) from the federal government. Thus, in Hawai‘i complying with the wellness policies was important for the state-wide school district.

Federal guidelines required the policies to target five areas, including: 1) creation of goals for nutrition education, physical activity and other school wellness programs, 2) nutrition guidelines for food available at schools, 3) assurance that school meals met the United States Department of Agriculture (USDA) guidelines, 4) a plan for monitoring the implementation of the policy and 5) involvement of parents, students, administrators and the public in the development of the policies (United State House of Representatives, 2004). In addition, the CDC further emphasizes the importance of staff development and certification, mandates for the length of time children spend each week in physical education, promotion of high quality nutrition and physical education, and encouragement of student participation in the USDA meals provided at school.

Nationwide, school districts have begun to comply with the requirement to establish school wellness policies. Coding systems have been developed to analyze and compare school district wellness policies (Schwartz et al., 2009; Moag-Stahlberg, Howley, & Lusri, 2008; Belansky et al., 2009). A preliminary study using the coding system developed by Schwartz et al. (2009) found that larger school districts and districts with more students eligible for free or reduced-price lunch had stronger written policies compared to other school districts (Storey, Nanney, & Schwartz, 2009). Another coding system developed for evaluation of best practices in school wellness policies, by the Action for Health Kids (AFHK), found that in 256 policies from districts of varying sizes (excluding Hawai‘i), 68% of policies followed recommend federal guidelines (Moag-

Stahlberg, Howley, & Lusri, 2008). The areas that were not addressed most often included evaluation and monitoring of implementation, assurances of qualified staff, and opportunities for staff development (Moag-Stahlberg, Howley, & Lusri, 2008). In a randomized study utilizing a different evaluation tool, many school policies were found to have weak wording, which potentially could result in minimal impact (Belansky et al., 2009).

Across the US, evaluation of the implementation of interventions to reach the wellness policies has just begun. A study of rural, low income schools in Colorado found that the most common barriers to implementing the wellness policies, included competing pressures facing school districts, lack of resources, lack of principal knowledge about the policy and lack of accountability mechanisms to ensure policy implementation (Marshall, 2009). In a small pilot school, evaluation of implementation of the wellness policies proposed components for a successful school nutrition program that included establishing staff buy-in so that they can serve as role models, utilizing recess before lunch, involving families and the community, taste testing different foods, having fruits and vegetables of the month, promoting physical activity in class time and after school, creating a school garden, limiting access to non-healthy foods, and having user-friendly information readily available describing nutrient value of the food readily available (McDermott, 2009). In Utah, districts with policies that were in compliance with national recommendations were servicing students who were most vulnerable to obesity (Metos & Nanney, 2007).

In California, a statewide survey of school board members, school leaders, wellness advocates and public health nutrition directors, showed 86% of school districts

addressing the policies, with over 90% of districts feeling they had the capability to implement and evaluate the policies, and also holding generally positive perceptions of the wellness policies (Ellis, 2008). While inadequate funding seems to be a common perceived barrier for implementation, the California study also identified other barriers, which included competing priorities, lack of support from parents and the community, and the need for tools and training (Ellis, 2008). The state of Hawai‘i has implemented a uniform guideline for the state and has supported the implementation with support through various interventions.

Implementation of school wellness policies in Hawai‘i. In compliance with the federal requirement for a school wellness policy, the Hawai‘i State Department of Education (HDOE) introduced school wellness guidelines for Hawai‘i public schools. With a start date of August 2007, a goal was set for all schools to meet the wellness guidelines by July 2011 (Healthy Hawai‘i Initiative, 2008). The state of Hawai‘i, unlike other states, has only one public school district for the whole state. Because of the uniform school administration for all Hawai‘i’s public schools, the HDOE implemented a standardized school wellness guideline to help schools meet the school wellness policy requirement. The guideline has not yet been evaluated to compare it with national recommendations for school wellness policies.

Some of Hawai‘i’s wellness guidelines related to physical education include requiring recess and physical education classes for all students. Nutrition-related interventions vary from nutrition curriculum to changes in school food services. Examples include teaching nutrition education for all students, an increasing in whole wheat items offered with prepared meals, a changing from white rice to brown rice,

offering zero trans fat in all foods served, including more fruits and vegetables in all meals, and establishing criteria for any type of food eaten or provided at school including snacks. (Appendix A.)

The HDOE has developed policies supporting the implementation of the wellness guidelines. The Wellness and Safety Policy (#1110-6) states that the HDOE has a "fundamental responsibility to provide a safe and healthy working and learning environment for all public school students, employees and persons under its jurisdiction" (para. 1). In addition, vending machines at schools selling items like soda were removed from HDOE schools during the 2007-2008 school year, in response to a statewide school policy to promote good nutrition. A formal state law was passed in 2009 to prevent further opposition toward this action (SB0228) taken by the board of education, due to its concern about other priorities like testing and funding arise (LRB, 2009).

Additionally, the state of Hawai‘i allotted funds from the national tobacco settlement through Act 304 to a program in the State Department of Health called the Healthy Hawai‘i Initiative (HHI). The HHI program uses the Social Ecological Model (SEM) to support a multi-factorial approach to generate changes in individual behaviors involving nutrition and exercise (Nigg et al., 2005; Sallis & Owen, 2002; Summerbell et al., 2005). To address these multiple factors, various approaches have been initiated throughout Hawai‘i, such as school/child care, workplace, health care providers and the community, policy changes (HDOH, 2007a).

One of the responsibilities of the HHI program was to partner with the HDOE to provide resources and assistance to help Hawai‘i's schools in reaching wellness goals. As part of this agreement, the University of Hawai‘i evaluates and monitors the ongoing

progress toward meeting the goals set by the wellness guidelines. Such an evaluation is a national requirement for the implementation of school wellness policies. This dissertation study evaluates the administrative implementation of the policies in the schools as well as supplementary areas of evaluation that the University of Hawai‘i has not yet addressed.

Research Summary

Childhood obesity is a growing problem among the youth of America. The rate of obesity in Hawai‘i’s youth for certain population is higher than the national average, in part because many of the children in Hawai‘i are predisposed to various risk factors. Obesity can be prevented and treated in most cases through increased physical activity and healthy eating habits. The school environment is a viable setting to address the problem of obesity and should involve multi-component approaches to do so. Interventions to address obesity need to involve all aspects of a child’s life: medical providers, home, school, and community. The federal government is seeking change for the better by requiring public schools receiving nutrition funds to create local school wellness policy standards and move toward reaching them. The state of Hawai‘i instituted School Wellness Guidelines in 2007, and has allotted funds and support through the Healthy Hawai‘i Initiative to provide schools with assistance to reach the guidelines. Evaluation research on the implementation of the school wellness policies across the United States is in the initial stages of evaluation, with plans to improve the implementation in the future. This dissertation evaluated the progress of Hawai‘i’s schools in meeting the requirements of the national school wellness policies, given the resources available.

Chapter 3: Methodology

This study utilized a mixed methods approach to evaluate the implementation of the School Wellness Guidelines in the state of Hawai‘i. Chapter 3 offers a discussion of the research questions, research paradigm, sample population, instrumentation, data collection, arrangements for the protection of human subjects, data analysis, assumptions and limitations. In order to connect research theory, research design and the elements of this study, I used theoretical substruction to create a conceptual model for investigation of the research questions (McQuiston & Campbell, 1997). See Figure 2. Table 1 provides an additional reference for the organization of the data and results based on the research questions.

The study was conducted in cooperation with the Hawai‘i State Department of Health, Healthy Hawai‘i Initiative (HHI) program, and the University of Hawai‘i, Public Health Department. Both entities have an agreement with the Hawai‘i State Department of Education to work with the schools to help them reach the national wellness poly recommendations. The HHI program is responsible for initiating and overseeing the implementation of school wellness programs focused on obesity, while the University of Hawai‘i is responsible for the evaluation of the programs. I worked closely with both entities and their resources, to complete this evaluation.

Research Questions

The following research questions were investigated:

1. In what ways and to what extent does the document entitled, *Hawai‘i’s School Wellness Guidelines* align with national recommendations?

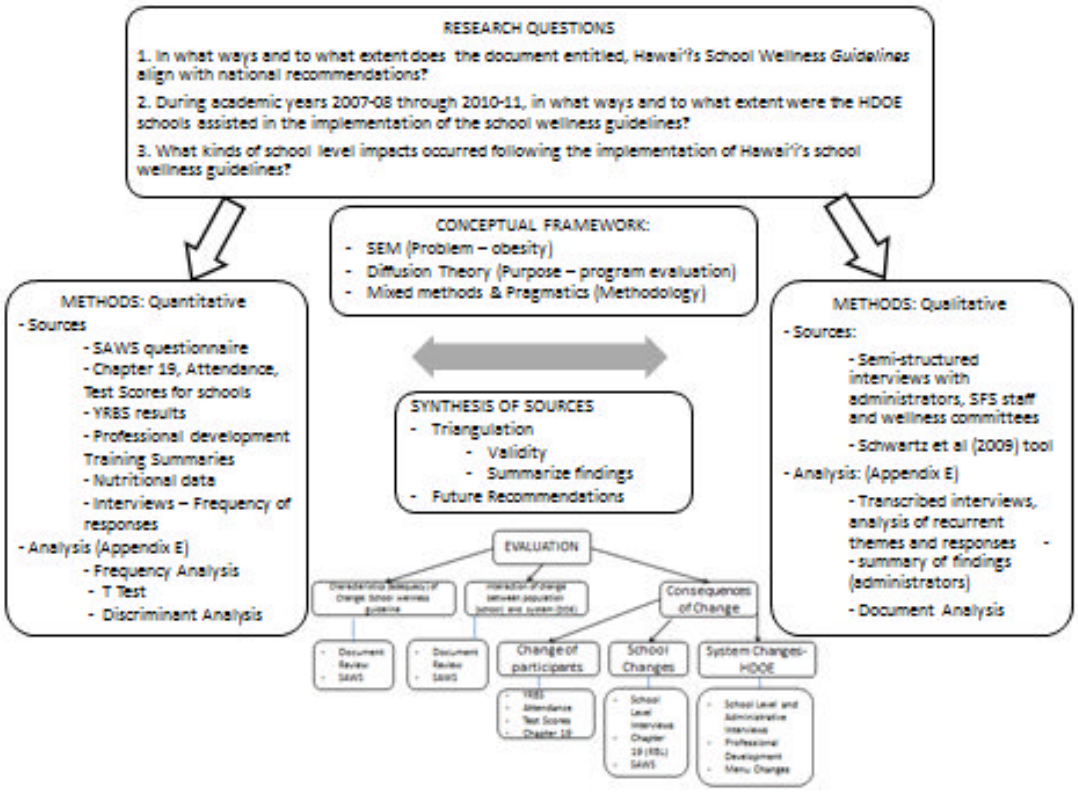


Figure 2. Theoretical substruction model connecting research methods and theory.

2. During academic years 2007-08 through 2010-11, in what ways and to what extent were the HDOE schools assisted in the implementation of the school wellness guidelines?
3. What kinds of school level impacts occurred following the implementation of Hawai‘i’s school wellness guidelines?

Research Paradigm

This evaluation involved a mixed methods approach involving quantitative and qualitative strategies to evaluate the implementation of the school wellness policies in Hawai‘i. This mixed methods approach represents a paradigm that blends other paradigms like positivism and constructivism (Johnson & Onwubuzie, 2004; Tashakkori & Teddlie, 2003a, Chapter 2). Johnson and Onwubuzie (2004) label the paradigm in mixed methods research as “pragmatics,” which is based on the premise that the truth is determined by experiences, and researchers should utilize whatever information – qualitative or quantitative - is necessary to develop and support understanding (Johnson & Onwubuzie, 2004). Others have argued that due to the incompatibility thesis, pragmatics does not represent a valid paradigm but instead a distinct methods approach to research (Sandelowski, 2000). While controversial, the proponents of pragmatic methodology argue that more research representing different world views is necessary. This paper will focus on mixed methods approaches as a valid methodology, utilizing both quantitative and qualitative data to promote greater understanding in the evaluation of the implementation of the School Wellness Guidelines.

As a methodology, researchers are finding that mixed methods research using both quantitative and qualitative data is increasingly relevant today, and utilizes both

quantitative and qualitative methods (Creswell & Clark, 2007). A mixed methods approach can be useful in studies like this one evaluating program effectiveness. While the quantitative approach may identify problems or strengths, qualitative data can better interpret those data in depth (Creswell & Clark, 2007). The mixed methods approach is particularly important in this study where there was a lack of baseline quantitative data, which was also obtained after the interventions were implemented. Thus, strengthening findings with qualitative data was important. In light of the fact that experts in mixed methods studies have noted that future directions for the field of mixed methods should better define procedures for sampling, mixing of data, analysis, and ways to define validity, the current study aimed to do so (Creswell & Clark, 2007).

The triangulation design convergence model was used in this study, which focused on obtaining separate results from quantitative and qualitative data collection and analysis, then comparing and contrasting the results in the final interpretation and conclusions (Creswell & Clark, 2007). The qualitative and quantitative data were assigned different weighting in drawing conclusions, depending on the type and quality of data obtained, and the applicability to the research questions (Creswell & Clark, 2007).

The investigation of research question one utilized a coding system and document analysis, to compare the local wellness policies to the national guidelines. Research question two involved a qualitative, descriptive approach to provide deeper understanding of the administrative implementation of the policies in Hawai‘i. Answering research question three utilized both quantitative and qualitative data to determine the extent of change and further describe successes and failures. Triangulation of quantitative and qualitative, accomplished by comparing themes from qualitative data

with similar conclusions from quantitative data, developed a more comprehensive perspective of the interventions and ensured the validity of data. See Figure 2. Conclusions from the triangulation of data were discussed utilizing the categories explained using the DOI model.

Sample Population

The overall sample population differed for each part of this evaluation study. However, inclusion criteria included any person attending and working in or with a Hawai‘i public school assisting in the implementation of the school wellness policies. There were approximately 1.28 million people living in the state of Hawai‘i, that included 178,649 students enrolled in the HDOE school district during the 2008-2009 school year (HDOE, 2011; Center on the Family, 2010). This number represents only 83.7% of the state’s students, with the remaining 16.3% attending private or independent schools (HDOE, 2011). Approximately 55% of the HDOE students have special needs (504 plan or Individualized Education Plan), and 33% are economically disadvantaged (HDOE, 2011). In the public schools (HDOE, 2011). There were 11,261 teachers and 93% were certified. There were 21,467 staff members in the schools (HDOE, 2011). Related to schools, the HDOE is one unified school system, which is divided into seven district offices with 15 complex areas, accounting for 286 schools. See Appendix C. The HDOE has a complex and centralized administrative structure. Administratively, under the superintendent, the HDOE is divided into five administrative offices and six school offices (HDOE, 2011a). The Office of Curriculum Instruction and Support Services (OCISS) represents one of the five administrative offices. See Appendix C.

In the public schools, the high school graduation rate is 79.3% (HDOE, 2011). Sixty-seven percent of students scored adequately on the state reading test and 49% scored adequately on the state math test in 2010 (HDOE, 2011). Of the 286 schools, only 51% made adequate yearly progress (AYP) toward meeting No Child Left Behind (NCLB) mandates (HDOE, 2011). Funding comes from the state general funds (81%), special funds (3%), federal funds (15%), and the remainder from trust funds. Because the HDOE is dependent on state and federal resources, implementation of the school wellness guidelines is important to continue to receive federal funding.

The School Food Services (SFS) branch assists 258 schools to feed over 100,000 students and school staff daily. The SFS is external to the individual school and falls under the superintendent in the office of school facilities and support services (HDOE, 2011a). See Appendix C. The branch works directly with the office of fiscal services for food procurement items. The branch is audited directly by the superintendent staff offices in the federal compliance and management office (HDOE, 2011a).

All schools in the HDOE participate in the National School Breakfast and Lunch Programs. Schools with 50% or more students qualifying for free and reduced lunch, participate in an afterschool snack program. Fifty-nine percent of students participate in the school lunch and 20% of students participate in the breakfast program. Fifty percent of the $78.2 million food service budget comes from federal funds.

There was no sample population for data generated in research question one, which involved a comparison of state and national guidelines. Research question two described the interventions that have been introduced throughout the state of Hawai‘i, from an administrative perspective, utilizing information provided by program

administrators, as the sample population. Administrators involved in all wellness related programs, as identified by the HHI team, were asked to participate. Seven individuals participated in the administrative interviews. Administrators worked in the HDOH HHI program and in different parts of the HDOE. However, additional nutritional data were provided for analysis from an individual with administrative capability, without a formal interview.

Research question three involved different population samples for each intervention studied. Data from the YRBS, which was not part of a specific intervention, were taken from results from a state survey funded by the CDC. Surveys that did not represent a response rate of more than 60% or had inappropriate documentation were not weighted as part of the sample. In 2011, sample sizes for states ranged from 1,147 to 13,201 (CDC, 2013a). Survey completion for the YRBS survey was voluntary and anonymous.

The sample population from the PD interventions involved the responses of those who chose to respond to the professional development evaluation surveys, which were provided to all those who attended trainings.

For the RBL intervention, anecdotally behavioral referrals were thought to decrease by school staff (Tanaka et al, 2005). Therefore, chapter 19 (number of behavioral incidents) data were compared before and after implementation in the 38 schools that identified implementing recess before lunch. These data included schools that implemented recess before lunch since the start of the school wellness guidelines; schools were identified from information reported on the SAWS survey.

For the SFS professional development interventions, staff members were selected for interviews based on their attendance at the trainings, and willingness to participate. Schools that attended the most workshops for school wellness policy interventions and menu changes were contacted first, to provide further qualitative feedback about the program implementation. Key informants who have witnessed the changes of the SFS program, including, if applicable, the cafeteria manager, a cafeteria worker, and a lunch monitor, were interviewed. The interview sample for the SFS program intentionally included three elementary schools (four individuals). Indirectly, information related to SFS professional development was also provided in the interview with two schools (one high school and one elementary school) during discussion of the progress toward reaching the wellness guidelines; therefore SFS interviews involved a total of six individuals. All of the schools utilized in the SFS data were found on the island of Oahu each in different complexes areas. Schools were found in urban and suburban areas; the sample did not include a school from a rural district. These schools served populations ranging from elementary through high school, and differed in the size of the school population receiving 50% free or reduced lunches.

For the school level interviews, the sample population consisted of public schools in Hawai‘i that completed the online SAWS questionnaire; only one questionnaire could be completed by each school. All public schools were provided with the survey and a timeline to respond, and 54% of public schools returning the initial survey in 2007-2008. Follow-up survey data completed in the 2009-2010 school year also are available representing a response rate of 90%. Based on a rating scale developed by HHI epidemiologists, each school was given a score based on their answers to the wellness

policy questions. The schools with the highest scores had reached between 67 to 68% of the wellness guidelines at their school. In the current study, four schools of the top six scoring schools that have showed significant progress in meeting the wellness guidelines were selected for further exploration. Selection of the four schools in the top six was by willingness of the school to participate. For each school, an administrator and at least one other staff member involved in the wellness policy implementation at the school were part of the sample. There were a total of 10 individuals participating in the interviews (two individuals were also in the SFS sample due to the nature of their response). These schools that were willing to participate were all located on the island of Oahu in different complex areas. The schools were found in urban and suburban areas.

In schools that scored low on the SAWS for meeting the wellness guideline (scoring 17-25% on the SAWS), only two schools were available for contact from the seven lowest scoring schools. The school administrators for two of the seven lowest scoring schools were interviewed to determine the barriers to implementation of the wellness policies at their school.

Instrumentation

Various instruments were used to collect data about interventions to address healthy eating and physical activity in the schools.

Coding tool for analysis of school wellness policies. A 96 item coding tool was developed by Schwartz et al. (2009) to evaluate the quality of wellness policies. The items evaluate the seven goal areas of the wellness policies: nutrition education, nutrition standards for school meals, nutrition standards for other food and beverages on campus, physical education, physical activity, communication about the policies, promotion of the

policies, and evaluation of the implementation. These seven areas were divided into subscales and examined for comprehensiveness and strength. The tool has been tested for internal (Cronbach's $\alpha = 0.6$ to 0.93) and interrater reliability for total comprehensiveness and strength (intraclass correlation coefficient 0.82), subscale scores (intraclass correlation coefficient 0.70), and individual items (intraclass correlation coefficient 0.72) (Schwartz et al., 2009). The comprehensiveness score refers to whether or not the policy addressed a topic recommended for inclusion by the USDA (Schwartz et al., 2009). The strength score reflects if the topic was addressed with clear and specific language (Schwartz et al., 2009). Well-written wellness policies have high scores in comprehensiveness and strength.

Youth Risk Behavior Survey (YRBS). The YRBS is one part of the Youth Risk Behavior Surveillance System (YRBSS) which was developed to assess health-risk behaviors associated with mortality, morbidity, and health problems among middle and high school youth biennially (CDC, 2010). YRBS data represent a two-stage, cluster sample design to produce a representative sample of students for grades 7-8 and 9-12 in Hawai‘i, and a multi-school sampling method (CDC, 2010). The six major categories of priority risk behaviors assessed include: behaviors contributing to unintentional injuries and violence, tobacco use, alcohol and other drug use, sexual behaviors, dietary behaviors and physical inactivity (CDC, 2010). Asthma and obesity are also surveyed. Similar questions from the 2007 and 2011 surveys related to obesity, unhealthy dietary behaviors and physical inactivity were used in this project. See Appendix D for list of questions and possible responses.

Reliability tests were conducted in 1992 and 2000 by the CDC showing that more than 75% of questions had substantial reliability (kappa = 61%-100%) and no statistically significant differences between prevalence estimates (CDC, 2010). The questions that were not reliable were deleted. There are no studies to address the validity of the YRBS data.

The YRBS survey has been conducted in odd numbered years in Hawai‘i since 1991. The questions are self-completed by students on a computer generated questionnaire. The majority of states require parental consent only to decline participation. Hawai‘i is one of four states nationwide requiring active permission – involving a signed consent before taking the survey – to participate in the survey, which may decrease the likelihood of reaching the diversity of the youth population.

Professional development evaluation (PDE). For trainings related to the wellness policy implementation, the standard tool for measuring the effectiveness of all professional development activities in the HDOE was used to obtain demographic information and evaluate teachers' perceptions of the effectiveness of the trainings and their perception of the applicability of knowledge to their classroom. The results of trainings were obtained from a database developed by the HHI evaluation team at the University of Hawai‘i.

Safety and Wellness Survey (SAWS). The SAWS is an online survey developed by a joint partnership between the HDOE and the HDOH to evaluate schools' progress toward meeting wellness guidelines. The SAWS directly addresses a school's progress toward the specific objectives of Hawai‘i's wellness guidelines (Appendix B). The survey has not been tested for reliability or validity, and was designed for evaluation

purposes only in Hawai‘i’s public schools as a national requirement of the implementation of school wellness policies. The lack of reliability and validity measures decreases the generalizability and accuracy of the tool. Administrators in the HDOE are expected to complete the SAWS upon request for their respective schools. Completion of the SAWS is a requirement for schools to qualify for additional support related to promoting health and wellness in the school setting.

Structured interview guides. Interview guides were used to provide structure and consistency during interviews, but allowing enough openness for participants to describe their experiences (Creswell, 2013). The number of questions varied based on interview type. See Appendix E. Interviews were conducted with SFS personnel, school level interviews and administrators. Overall, the interviews addressed the strengths and weaknesses of wellness policy interventions, and areas that need to be improved. Interviews conducted with participants in the SFS programs reviewed the trainings they received and identified if they had made suggested changes related to the wellness policy. Program administrator interviews focused on the goals and implementation of various programs. At the school level, interviews focused on correlation with responses on the SAWS and implementation of the wellness policies at the school level.

Data Collection

Research question one involved a document analysis of the School Wellness Guideline, which is available on the HDOE website. Despite awareness of other policies and practices in the HDOE, not referred to in this document, I utilized only the wellness policy document for the comparison to national recommendations.

For addressing research question two and part of question three I utilized the interview guide in Appendix E to guide the interview. Additional data were also provided from the HHI program and HDOE for summary and analysis. For all interviews, I was the primary data collector, responsible for assuring uniformity and proper procedure in data collection. I recognize that my own background knowledge and experiences can affect the outcome of the interviews therefore, adherence to the interview guide provided structure to decrease this effect. The HHI program and HDOE created the opportunities for data collection in each individual's school or work setting.

Interview guides were sent out to the potential participants before the interview to allow preparation of answers. Administrators of programs and schools had the choice of who to invite to assist in addressing the questions during the interview. Interviews were audio-recorded, and then transcribed into a word processing program for further analysis. For the three interviews done on the phone due to remote location or availability, I was able to transcribe the interview during the conversation. Two individuals also chose to answer the questions via email correspondence, and their answers were also transferred into a word processing program for further analysis.

The SAWS data sets from its initiation in 2007 through the 2009-2010 school year were partially provided by the HHI program for the schools identified as progressing or not progressing toward meeting the wellness guidelines. An interview of the administrator was important to determine the wellness policy changes that were initiated at the school. Other available staff members were asked to participate in a shorter interview regarding their knowledge of the wellness policies. Administrators of schools that were not meeting the majority of the wellness guidelines or had not progressed were

interviewed, with a focus on the barriers to implementation. For the schools identified in each group, attendance, chapter 19, and reading and math tests scores were collected from the HDOE website, before wellness policy changes (2007) and after implementation of the wellness policies (2011).

For research question three, data sets from Hawai‘i’s YRBS 2007 and 2011 were obtained from the CDC website (CDC, 2012a) for further analysis. Between 2007 and 2011 questions differed, so only the questions that were similar in 2007 and 2011 were compared in the analysis. The change in questions significantly decreased the number of comparable responses for middle school students.

Professional development session evaluation summaries and participation for teachers was obtained from the University of Hawai‘i, HHI evaluation team. Data was collected in the form of secondary reports from the raw data, obtained from the HHI tracking database. The reports summarized total numbers of trainings, total teachers (unique and repeated) changed, quantitative ratings of the effectiveness of the trainings, and qualitative comments from open ended questions. The structure of the database was changed between 2007-2011, resulting in different data reported in different categories. Most professional development activity rosters and evaluations, for SFS were not tracked by the HHI evaluation team. Whenever possible, this data was obtained from the HDOE SFS division. Nutritional information for menu changes was obtained from SFS personnel, administrator interviews, and from standardized school menus.

The chapter 19 data for RBL participating schools were obtained from the HDOE website (ARCH, 2012). Chapter 19 data describes the number and type of misbehaviors at the school. However, the type of misbehavior was not utilized in this study, only the

total number of misbehaviors. Schools participating in RBL were determined from the SAWS survey completed by schools in 2010.

Protection of Human Subjects

The study was approved by the University of Hawai‘i, Manoa Institutional Review Board (UHM IRB) before implementation and accepted by the HDOE for implementation. There was no perceived risk for those involved in this study. Participants completed signed informed consent before participating in interviews. (Appendix F). All data were kept confidential and participants were anonymous, unless they signed a HDOE waiver choosing to allow their comments to be published. School names were kept confidential unless administrators and the HDOE chose to allow identification of their school.

Data generated from interviews, with identifying individual information, were stored in locked electronic files, and a locked file for any tangible paperwork. In addition, data containing information related to specific schools, for example, number of trainings attended by SFS staff, ratings on the SAWS evaluation, were also kept in locked electronic files. Attendance sheets for SFS programs containing identifying information were used to generate a frequency analysis of schools attending trainings, which was immediately given back to the HDOE after identification of key schools. School names were not used in this dissertation, unless they were obtained from information available to the public. After data were collected from interviews, information was de-identified for the analysis process. All other information provided to me throughout this study did not contain identifying information.

Data Analysis

Both qualitative and quantitative methods were used to gather data from multiple sources. Data were analyzed separately by research question, then collectively to determine validity and present a more comprehensive evaluation of Hawaii's implementation of the school wellness policies. See Figure 2. The DOI model was used to guide the categorization of multiple sources in the final discussion.

Qualitative analysis. A content analysis was conducted to identify common recurrent themes for the qualitative interview data. Grounded theory was used to guide the qualitative analysis because the purpose was to explain the process of how people were experiencing a phenomenon (Corbin & Strauss, 2007; Creswell, 2013). The phenomenon was the implementation of school wellness guidelines. In this case, the qualitative research was conducted to investigate the process of how school personnel were implementing school wellness policies. Qualitative data from interviews and documents provided were analyzed using the constant comparative method (Miles & Huberman, 2002) to identify and analyze themes.

I independently performed the qualitative data analysis. I recognize that my own background and experiences can interfere with the collection and analysis of qualitative data. Thus, it is important to assess researcher credibility. My previous experience teaching health, science and physical education in the public schools, and time spent working as a health professional in the HDOE, provides credibility for my role as a researcher to investigate wellness policies in the school environment. This study

Table 2.

Comparison of interview categories to wellness guidelines.

	Wellness Guideline Item (Appendix A)	Related Discussion prompted from Interview Guide (Appendix E)	Interview Source	Interview Data Category*
1	Wellness committee requirements	- Review of school self-reported SAWS responses - Awareness of committee and roles - Effectiveness of committee	- School level interview - SFS interview (if applicable) - Administrative interviews	- Wellness committee composition - Barriers to implementation - School level initiatives implemented - Sustainability - Future directions
2	Nutrition guidelines for school meals	- Program intervention description - Implementation of changes in meals - Effectiveness of training	- SFS interview - Administrative interviews	- Barriers to implementation - SFS trainings - Compliance - Standardization - Student observations after implementation - Specific nutrient changes
3	Nutrition guidelines for snacks and beverages	- Review of school self-reported SAWS responses - School level changes observed - Staff and student "buy in"	- School level interview - SFS interview	-Barriers to implementation - Successes with implementation
4	Nutrition education	- Review of school self-reported SAWS responses - Program intervention description: goal, activity, resources, sustainability	- School level interview - SFS interview (if applicable) - Administrative interviews	- Description of program - Evaluation of program - Sustainability of program - Barriers to implementation - Success with implementation - Resources used
5	Physical education	- Review of school self-reported SAWS responses - Program intervention description: goal, activity, resources, sustainability	- School level interview - Administrative interviews	- Description of program - Evaluation of program - Sustainability of program - Resources used - Barriers to implementation - Success with implementation
6	Physical activity	- Review of school self-reported SAWS responses - School level changes - RBL implementation - Program intervention description: goal, activity, resources, sustainability	- School level interview - Administrative interviews (if applicable)	-Barriers to implementation - Successes with implementation - RBL observations - Resources used - Description of program - Sustainability of implementation
7	Professional development	- Effectiveness of trainings - Need for additional training or resources	- School level interview - SFS interview - Administrative interviews	- Feedback about trainings - Need for trainings - Observable changes

explored further concerns I had about the need to supplement formal education in the classroom with other changes, in order to change students' health behaviors.

Following transcription of interviews, I verified transcripts with subjects to increase reliability whenever possible. After transcription of interviews, I took notes while reading each transcript. I then reduced the data to focus on key areas of interest (Miles & Huberman, 2002). I grouped similar codes related to similar wellness guideline subjects together, resulting in themes (Creswell, 2013). See Table 2. Identified themes were then used with quantitative data to answer research questions.

The correlation of themes from multiple data sources as well as comparison with quantitative data through triangulation increased the external validity of the qualitative data (Creswell & Clark, 2007). After separate review of data from each type of interview – administrator, SFS and school level – data from all three sources were merged for a multi-source analysis to compare recurrent themes when they addressed similar topics.

Data was hand coded and analyzed, without the use of computer assisted qualitative data because of accessibility to the program and the manageable amount of data. In review of transcripts, I also noted comments that were not recurrent, which were important in identifying areas of interest for future study. When applicable, the qualitative data were quantified when repetitive themes were identified.

Quantitative analysis. All quantitative data were entered into Excel or SPSS for analysis. For data requiring comparative analysis, univariate descriptive statistics was calculated separately for each independent and dependent data set before continuing with analysis to check for normal distribution of data obtained. Other statistical assumptions including, linearity, homoscedasticity, singularity and multicollinearity were tested when

applicable. If data could be normalized to the population, then parametric t tests were utilized to determine relationships and significant group differences. A significance level of $p<.05$ was used for most of this study, except when there was a small sample size when a $p<.10$ was used.

Research questions. For research question one, the wellness policies were compared to national guidelines using the tool created by Schwartz et al. (2009). After document analysis using only the wellness guideline, my background knowledge of HDOE procedures, internet sources and findings during interviews, were additional sources used for discussion of related changes made but not included in the wellness guideline document.

Research question two utilized qualitative methods described previously. However, in this section, the emphasis on data analysis was summarizing and describing key programs. When applicable, comments were coded to similar categorical groups. Information provided in this section was also used in the final summative analysis.

Research question three involved the use of quantitative and qualitative methods. Qualitative methods were used in interviews related to SFS, review of PD reports from the HHI program, and school level implementation of the wellness policies. Quantitative methods were used for all other data sources.

Univariate descriptive statistics and frequency analysis were used to characterize responses to evaluations collected after PDE and SFS trainings when available, which evaluated training effectiveness. For the SFS menu changes, nutrients before and after program implementation were compared using simple descriptive statistics. Analysis of

reported nutrient changes in the menu were calculated based on procurement items provided during interviews or the USDA (2012) nutrient database if available.

Quantitative data from for the relevant questions from the YRBS were compared using the statistical tools on the CDC website (CDC, 2013), and reported in the results section. The data set was already coded and screened to make sure there were no missing data and to assess the validity of outliers in the data set. T-tests were used to compare responses between 2007 and 2011.

Schools utilizing RBL were identified from the 2010 SAWS survey. For the RBL program comparative statistics was used; the program implementation represents the independent variable, and behavioral data are the dependent variables. After univariate statistical analysis, the chapter 19 data for the schools that utilized RBL programs was compared before (2006-2007) and after project implementation (2010-2011), with a t test to determine significance of changes in the number of misbehaviors.

The HHI staff completed the analysis of the SAWS data set to provide a numerical scale comparing different schools, and provided data to the investigator for interviews of schools making progress and those not making progress. The data for the 2009-2010 school year were coded and screened to make sure there were no missing data and to assess the validity of outliers in the data set by the HHI staff. A description of how the data set was analyzed to categorize schools was not provided. Paired t tests were used to compare the attendance rates, test scores (math and reading) and behavioral referrals before (2006-2007) and after (2010-2011) the release and implementation of the School Wellness Guidelines in Hawai‘i to see if there were significant changes. The six highest scoring schools were compared with six of the seven lowest scoring schools;

relevant data for state testing from one of the lowest scoring schools could not be obtained due to confidentiality concerns because of the small sample size for the school. Thus, this school was excluded from the statistical analysis for the calculation of possible change in test scores. Bootstrapping was then used to generate a larger sample size due to the small sample size for comparison of data (Efron & Tibshirani, 1993). Discriminant analysis was then used to determine whether the changes in the four variables could classify the 12 schools into the two groups of highest and lowest scoring schools.

Qualitative data sources used for answering research question three included the SFS interviews, open-ended questions on the PD evaluations, and interviews with schools that scored highest and lowest on the SAWS analysis. Responses to qualitative, open ended questions on professional development evaluations were summarized in the secondary reports provided to the researcher. The constant comparative method was used to for the analysis of recurrent themes in qualitative data from interviews as described above.

After separate analysis of quantitative and qualitative data, data was triangulated. Multiple data sources were used to support the validity of findings by cross checking during triangulation. The themes in qualitative data were compared with quantitative data through the use of matrices (Creswell & Clark, 2007). The summary and themes identified in the qualitative data was compared with the quantitative data for support in the discussion. Additionally, qualitative data in this study were often used to support or refute findings in the quantitative data, and further explore relationships established through quantitative data (Creswell & Clark, 2007). Conclusions will be shared with the

HHI program and the DOE, to determine the success of the program and future directions.

Assumptions

The following assumptions were made for the purposes of this study:

1. SFS Program: For the change in nutritional value of meals, this calculation was based on the assumptions that students have not changed the amount of school lunches consumed after implementation of changes.
2. SAWS: This study assumed that school administrators who completed the SAWS had completed the survey based on what is actually happening at their respective schools. In addition, surveys were given out to all public schools in Hawai‘i, with a return rate of 90% in 2010. Although it may be true that schools that were not meeting the wellness guidelines comprised the remaining 10% of schools, this study will assume that the returned surveys provided a representative sample of the different schools in Hawai‘i. It is also assumed that the HDOH accurately created a tool to accurately compare wellness guideline implementation between schools, which was used in determination of schools progressing and not progressing toward full implementation.
3. Interviews: The study assumes that interviewees provided accurate information, which can be used to characterize the changes as a result of the wellness guideline implementation.

Limitations

There was a lack of baseline data available before implementation of the interventions, other than nutrient counts, YRBS, behavioral data, attendance and test

scores. Thus it was difficult to utilize available tools to demonstrate status of interventions at individual schools. Therefore, much of this study relied on qualitative data collected after implementation of the wellness policies. However, qualitative data analysis of interviews and in the document analysis did not include multiple researchers, thus decreasing inter-coder reliability. In addition, it would have been helpful to increase the accuracy of findings of qualitative data by member checking with all the participants, instead of only a selected few who were available at the time of data analysis (Patton, 2002).

Due to various factors affecting the school environment and the ability to utilize a controlled study, there is no causal relationship between wellness guideline implementation and YRBS, behavioral data, attendance, and standardized testing data although associations could be suggested.

The YRBS data represented all middle and high school students in the state of Hawai‘i; however, private schools were not required to implement a wellness policy. YRBS data were not an accurate measurement of specific changes collectively made in the public schools, thus, decreasing any strength in findings for the wellness policy interventions made between 2007 and 2011. In the analysis of recess before lunch changes, there were no data collected on other measures to show its effectiveness; for example, plate waste (amount of food thrown away by an individual when standard proportions are used for a sample), which has been used in other studies to demonstrate the benefit of the change, was not measured before the program initiation, thus making this form of data collection inadequate for this situation.

Because of the statewide focus on evaluation for this study, the study did not address all changes that may have occurred in each school environment as a result of wellness policy implementation.

It would also have been helpful to complete this study after SAWS data from the 2010-2011 school year were available, but given the research timeline this was not possible. Therefore, some data in this study utilized information after the intended compliance date in 2011 (i.e., test scores, trainings), while other data relied on information from 2010 (i.e., SAWS rating of schools). Interviews were done during the 2011 school year, at which time 100% compliance was not intended yet. This limits the applicability of this study to evaluate the complete implementation of the School Wellness Guideline.

Chapter 4: Results

The results section below is discussed based on the research questions.

Research Question One: School Wellness Guidelines Compliance

This dissertation study was conducted in part to compare the school wellness guidelines to the national school wellness policies. The School Wellness Policy Evaluation Tool (Schwartz et al., 2008) was created to reflect compliance with national policy recommendations. The evaluation tool comprised of 96 items divided into seven sections: nutrition education, standards for USDA child nutrition programs and school meals, nutrition standards for competitive and other foods and beverages, physical education, physical activity, communication and promotion, and evaluation. As detailed in Schwartz et al. (2008), the tool reviews each of the seven sections for its comprehensiveness (proportion of item topics that are mentioned) and strength (proportion of items that were addressed with specific and directive language). I rated the HDOE Wellness Guidelines on each of the 96 policy items provided by the tool. State law and school board policies (centralized for all schools in the state) were also utilized in evaluation of the guidelines if they superseded the authority of an item listed, as directed in the tool.

The HDOE distributed a School Wellness Guideline and a School Wellness Checklist as part of a Wellness Guideline Toolkit to all schools. Because both items were provided to schools for guidance, both were used in evaluation of the policy. State law and the state board of education policies were also used in the evaluation of the policy, as instructed by the evaluation tool (Schwartz et al., 2008). See Table 3. However, it is also

Table 3

Hawai'i School Wellness Guideline Comparison to National Recommendations

Section	Comprehensiveness (%)*	Strength (%)**
Nutrition Education	100	100
Standards for USDA Child Nutrition Programs and School Meals	62	62
Nutrition Standards for Competitive and Other Foods and Beverages	94	90
Physical Education	82	53
Physical Activity	70	40
Communication and Promotion	67	58
Evaluation	100	100
Overall	82	72

Notes: Comprehensiveness and strength score obtained from utilization of tool to evaluate wellness policy (Schwartz et al., 2009)
*Comprehensiveness: refers to whether or not the policy addressed a topic recommended for inclusion by the USDA (Schwartz et al., 2009).
**Strength: reflects if the topic was addressed with clear and specific language (Schwartz et al., 2009).

important to note that the HDOE implements a yearly SAWS evaluation, which was not used in this analysis of the wellness guidelines, because it was not a designated part of the toolkit, and was not readily available as a resource for schools. The SAWS is an annual survey whose completion is required by administrators at each school. It evaluates additional components that were not covered in the Hawai‘i Wellness Guidelines, but were recommended for inclusion in the evaluation of nationwide recommendations (Schwartz et al., 2008).

Overall, the HDOE school wellness guideline rated 82% for total comprehensiveness and 72% for total strength. The guideline scored highest in areas related to nutrition (education and nutritional standards). However, items related to the support of USDA school meals in the school environment scored lower. Physical activity and physical education categories scored lower than most nutrition related items. Although the overall evaluation plan is in place for the state of Hawai‘i was highly rated for its alignment with national policies, the communication and health promotion components were rated lower.

Nutrition education and nutrition standards. The HDOE policy received high scores in both comprehensiveness and strength for the categories of nutrition education, nutrition standards for competitive and other foods and beverages, and evaluation. In the section for Child Nutrition Programs and School Meals, the HDOE wellness policy did not address a summer food service program, access to hand washing before meals, qualifications for food service staff and the environment during school meal times.

The scheduling of school meals (i.e., recess before lunch) was not addressed in the policy, but promoted through the HHI, and was also a measure for evaluation in the

SAWS. The nutritional standards for foods and beverages addressed by the wellness policies did not address the use of food as a reward or punishment and limiting the serving size of food.

Physical education and physical activity. In consideration of physical education instruction, the guidelines were weak in not emphasizing the nationally recommended amount of time and frequency allotted for physical education, promoting inclusive play and addressing safe and adequate facilities for physical education. The comprehensiveness of the policy in this area did not require the participation in an annual health assessment, and did not address the amount of moderate to vigorous activity in physical education classes.

In the physical activity section, the HDOE policy was weak in the wording for addressing the provision of physical activity integrated throughout the school day and addressing the quality of physical activity. The Wellness Guidelines did not address physical activity for staff, the provision of intramurals at each school, the community use of school activities, and safe and active routes to school. However, the SAWS evaluation survey did evaluate the availability of physical activity opportunities for staff and the implementation of safe and active routes to school programs.

Communications and promotion. In the communication and promotion section, the HDOE policy addressed the need for a team, but did not require the participation of all groups (parents, and school food authority) as specified by the federal mandate. The Wellness Guideline did not address a staff wellness program, did not encourage staff as role models for healthy behaviors, did not specify who is responsible for wellness and health communication, and did not address a method to encourage input from

stakeholders (i.e., students and parents). As with physical activity, the SAWS evaluation survey did evaluate schools on their availability of a health promotion program for staff members.

Research Question Two: Description of Programs from Interviews with Program Administrators

The second research question in this study asked how HDOE schools were assisted in implementation of the wellness guidelines. Information summarized below was provided by program administrators during interviews describing the variety of interventions offered to schools in the HDOE to assist with implementation of the school wellness guidelines. Administrators in the HDOE (public schools) and the HHI program were asked to describe the programs they were involved in, the goals of the program, the targeted participants in the programs, the activities it involved, the funding sources if applicable, the outcomes of the program if measured and the future of the program. See Table 4. The overall program goals were to assist schools in addressing the wellness guidelines through environmental changes, system changes and policy changes, related to health, nutrition and physical education. In review of administrative interview responses, there were no contradicting information provided describing the programs, although personal opinions about sustainability and future directions may have differed.

Funding. Most funding for the administration supported interventions came from HDOE, HHI funds from the state tobacco settlement, and special federal funds from the United States Department of Agriculture (USDA). In Hawai‘i, part of the federal funding from the USDA for schools is managed through the Office of Hawai‘i Child Nutrition

Table 4

Programs related to implementation of school wellness guidelines.

Program	Goals	Activities	Finances	# involved	Evaluation
Model schools	Develop a model school in each complex, as an example to other schools.	Individualized health and/or physical education changes at each school.	HHI, HDOE-OCISS $8000 per year from 2010-2013	1 school per complex	Variable – In progress: Comparison before and after
PD for teachers: curriculum development	Curriculum support for PE, health, nutrition, and physical activity, individualized to the needs of the school and/or teacher.	See Table 6 - Training for use of curricula. - - Review curricula for appropriate classroom use. - Summer institute for teachers.	- HDOE – OCISS - CDC grant. - State legislature special programs - HHI - Cost to participant. - Community agencies	See Table 5.	Standard evaluation form and sign in sheets tracked by HHI and UH
Overall support for wellness guideline implement-tation	Support schools in wellness guideline implementation.	- Assist in forming committees and setting timelines. - Education of school staff and consulting on concerns. - Presentations about the wellness guidelines: - Complex area workshops. -Wellness toolkit on website for resource support.	HHI (through resource teachers and HDOH staff). Approximately $1000 allotted	All schools interested in receiving support. See Table 5.	SAWS

Note: See Appendix C for HDOE administrative structure.

Table 4. (Continued) *Programs related to implementation of school wellness guidelines.*

Program	Goals	Activities	Finances	# involved	Evaluation
Healthy Hawai‘i Schools challenge	Support individual schools in providing physical activity, nutrition, PE or environmental change related to wellness guidelines	Provide selected public and private schools with a maximum of $9750 to implement a program over two years.	HHI	17 schools initially, 14 at completion	Individual school level evaluation.
Elementary school nutrition program	Assess needs for nutrition education and implement a program to address needs in a community with high rates of obesity and diabetes	Assessment by UH. Selection of curricula (Health Smart). Training of teachers. PE curricula (SPARK) introduced to teachers. Implementation of curricula by teachers. Additional programs (cooking instruction by KCC, family night by students , cooking classes). Incorporation of health education into school plan.	- HHI ($51,000) to UH - UH (additional support after funding)	1 school, 700 students	- Assessment report - Evaluation by teachers of curricula. -Pending evaluation of events.
SNAP education partnership	Provide support to SNAP education programs that have similar goals to the wellness guidelines	Assistance with project at school focusing on nutrition through school gardening	- HHI - SNAP (federal funds)	~200 students directly affected	- Fruit and vegetable consumption report by student from food diary - Self efficacy reported by students.

Note: See Appendix C for HDOE administrative structure.

Table 4. (Continued) *Programs related to implementation of school wellness guidelines.*

Program	Goals	Activities	Finances	# involved	Evaluation
RBL	Implement recess before lunch at elementary and intermediate (if applicable) schools.	- Presentations for schools. - Handbook to guide schools to change to RBL. - Support from resource teachers.	HHI	See RBL section.	Focus group interviews
School food service changes and trainings	- Implement healthy changes in school menu choices. - Provide professional development for school food service staff.	- Provision of recipes to increase nutritional value of food items. - Trainings to implement changes in menu. - Evaluation of menu and changes in menu items.	- HHI - USDA (SNAP and OCHNP)	See Table 7	- Training evaluation when available. - Nutritional changes in menu.

Note: See Appendix C for HDOE administrative structure.

Programs (OHCNP), which includes the National School Lunch Program (NSLP), the School Breakfast Program (SBP), the Special Milk Program (SMP), and the Fresh Fruit and Vegetable Program (FFVP). The NSLP, SBP, and SMP all directly services schools through meals; the FFVP provides fresh fruits and vegetables to schools who apply and have at least 50% of students qualifying for free or reduced lunch. Hawai‘i also receives funding from the USDA through the Supplemental Nutrition Assistance Program (SNAP), which is managed by the Hawai‘i Department of Human Services. The Department of Human Services gives money to the Hawai‘i Department of Health and the University of Hawai‘i to develop and implement nutrition education programs. See Figure 3. In summary, some of the programs related to the wellness policies (discussed below) are also funded by the USDA, which are managed through the Office of Hawai‘i Child Nutrition Programs and the Department of Human Services.

Core team members for implementation. Interviews (n=4) identified that there was a core team responsible for assisting with wellness policy implementation at the school level which consisted selected individuals from the HHI and the HDOE. The wellness policies implementation was initiated by the Coordinated School Health Program (CSHP) through a grant, which was then turned over to the HHI program and HDOE Office of Curriculum, Instruction and Student Support (OCISS) for continued implementation. Therefore, a joint relationship between the HDOE and the HHI program in the Department of Health facilitated the implementation of curricula related programs. The HDEO OCISS is responsible for the selection, approval and implementation of curricula in Hawai‘i’s public schools. The HHI program had two full time positions to work with

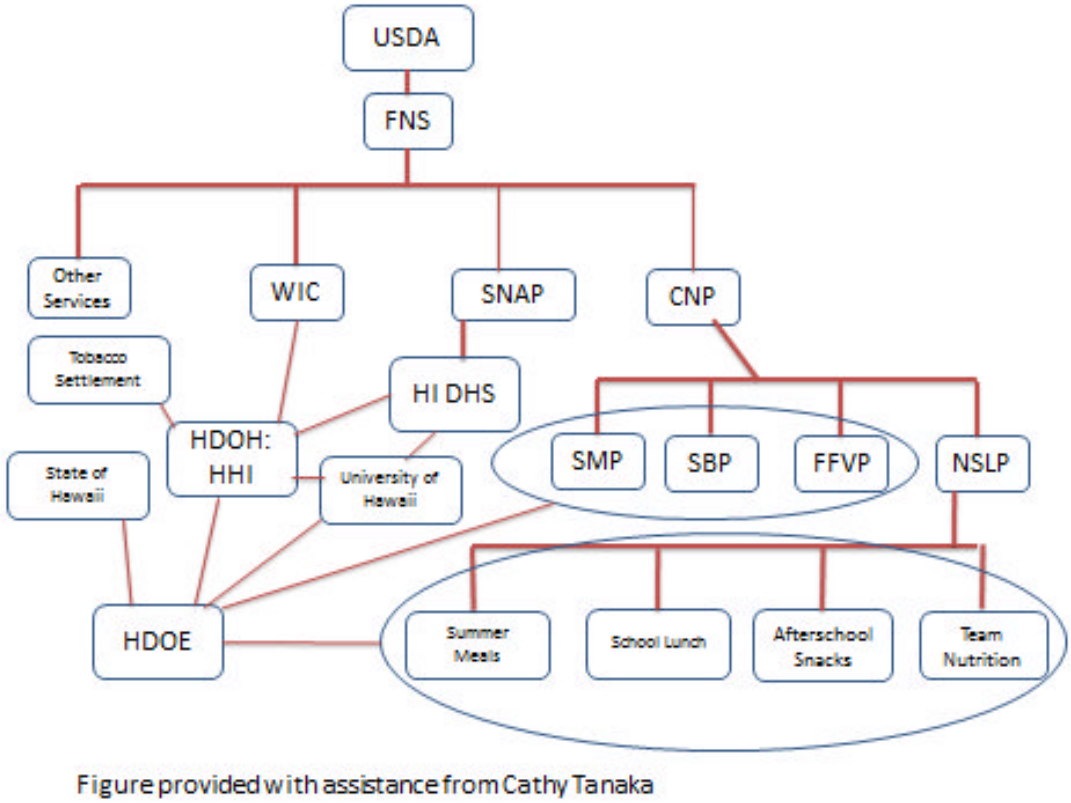


Figure 3. Summary of funding for health and physical education, wellness programs and school food services for the HDOE.

all Hawai‘i schools (public and private) to assist in program development and administrative implementation of the wellness policies. With the HHI program, the OCISS provided ongoing professional development, assisted in funding for curricula, and was involved in various programs described below. There is one person employed by the HDOE to evaluate and select appropriate curricula for schools. Two additional employees in the office are funded by the HHI program. In regards to the wellness policies, this office is imperative in the implementation of health and physical education curricula.

Under the direction of the HDOE OCISS and the HHI program, each district is assigned a resource teacher for health and PE education, except East Hawai‘i, to implement the programs at the school level. The resource teachers are employed by the HDOE OCISS, but are funded by the HHI program in the Department of Health. In interviews, resource teachers were identified as imperative (n=4) in carrying out many of the programs and projects related to the wellness policies. Data from interviews with resource teachers (n=2) corresponded with data provided from administrators (n=4). The resource teachers held trainings and provided resources to schools in the districts when the wellness policy was introduced. Although after introduction to the policies, a website was created to continually provide the information from the trainings as an additional resource. After implementation of the policy, the resource teachers and HHI program staff provided various professional development activities to HDOE staff, which will be discussed in the next section. The resource teachers have also assisted outside the classroom in the general school environment through promotion of the wellness policies at health fairs, with parent teacher organizations, and other school functions. They have

advocated for individual school policies and against allowing non-nutritious snacks for celebrations and fundraisers, although the decision to carry out the recommendations is left to the principal.

In addition the two HHI administrators also worked with the federal SNAP education committee to implement additional educational projects in the school and two SFS branch administrators to implement changes in the school menus and to develop SFS trainings. The UH HHI evaluation team assisted with evaluation of most interventions except those related to the changes in the school menus and most of the SFS trainings.

Healthy Hawai‘i Schools Challenge. The Healthy Hawai‘i Schools Challenge program was intended to develop promising practices in individual schools for related wellness changes that could be shared with other schools. Each school determined what interventions they thought would be beneficial for their school environment. However, the evaluation of the effectiveness of each project at the school was difficult because each school completed its own evaluation, which may not have included adequate evaluation methods. There were not enough resources to provide an evaluation team to every school that received funding from this program. Completed evaluations from the schools at the time of this study's data collection, were not available. This initiative was intended to lay the foundation for school participation in the Model School Program.

Selected school curricula intervention. In contrast to the Healthy Hawai‘i Schools Challenge which required individual schools to self-determine what kinds of interventions would be beneficial for their school, a program at a rural elementary utilized outside partnerships and collaboration with the resource teacher in order to assess the need for standardized curriculum in health and physical education. A partnership

with the UH allowed the assessment of school needs, the selection of appropriate programs (SPARK curriculum for PE and Health Smart curriculum for nutrition and health education) and the training of teachers to implement the programs. This intervention was also intended to lay the foundation for this school's participation in the Model Schools program.

Model schools program. In the 2011-2012 school year, seven schools in different districts were selected to participate as a "model schools" based on prior progress and interest in meeting wellness guidelines. The schools received $8000 each from the HHI to help their school meet the guidelines in an area designated for improvement. The district resource teachers guided the schools in implementation. The intent of the program was to then implement effective changes, allowing the school to be a model school for other schools in the district. This program is still in progress and evaluation is pending by the HHI evaluation team.

Recess before lunch (RBL). Also, with the help of the HDOE OCISS and resource teachers, schools were encouraged to participate in the RBL program as a wellness guideline intervention. Following a pilot study of RBL implementation in a HDOE school (Tanaka et al., 2005) that showed that there was an increase in food consumption and physical activity after the intervention, all HDOE elementary schools were encouraged to implement recess before lunch. A toolkit was created to help schools adjust their schedules to provide recess before lunch.

SNAP education programs. Support was also given by the HHI administrators to assist SNAP in areas that helped schools support the School Wellness Guidelines, through a memorandum of agreement. SNAP programs are intended to increase nutrition

education in schools with greater than 50% of students eligible for free and reduced lunch, therefore limiting joint assistance to schools that don't meet this requirement.

At Waimanalo Elementary and Intermediate school, the HHI administrators worked with SNAP education funds to assist financially and through staff support, to improve fruit and vegetable consumption and increase nutrition education through a special culturally focused class involving school gardening, classroom cooking and nutrition education. The project assessed needs at the school, implemented the garden intervention, and then evaluated the interventions. The UH HHI evaluation team conducted formal evaluation of this program and reported the school's significant increase in fruit and vegetable consumption after interventions as well as positive changes in attitudes and social norms of students (Buchthal, Tamai, Cornwell, & Heinrich; 2010). Qualitative results from this intervention also showed improvement in school and community relationships, student behavior and nutrition education throughout the school (Buchthal, Tamai, Cornwell, & Heinrich; 2010). However, the ability to sustain the program after funding ends is unknown at this time.

The HHI partnership with the SNAP also involved the pending implementation of an after school education program to be implemented through the existing after school programs offered at public schools.

Program sustainability and future directions. Interviews with administrators suggested that many of the programs would not be sustainable once funding runs out (n=5), although any systematic and policy changes made in the school will hopefully remain. The HDOE will still have one professional position in charge of curricula review for health and physical education. However, other positions are funded by HHI. Due to

constant turnover of teachers, administrators felt that it is important to continue professional development opportunities, which will be limited without funding (n=4). One administrator reasoned that with the lack of funding, sustainability will come from cultural change which values health and physical education in school, and writing new legislation to ensure inclusion in the schools.

The SAWS survey was used to evaluate effectiveness of many of the programs at the administrative level. The survey also served as a way to measure the implementation of the wellness polices at the school level, to ensure compliance with the national recommendations. However, comparison to show progress between years was difficult due to the varying response rate, which was 40% 2008, 54% in 2009, and 90% in 2010 school year. The 2011 data were not available for analysis at the time of data collection. Administrators (n=2) noted that there were technical problems with the survey in its implementation, and funding for analysis was limited.

Other suggestions by administrators and resource teachers to help maintain the wellness guidelines include: obtaining PE and health teachers for all schools (n=4), expanding inclusion of health teaching in regular education beyond washing hands and the food pyramid (n=1), and implementing a negative consequence for schools that do not meet the guidelines (n=1).

Research Question Three: Evaluation of School Level Interventions

The researcher conducted further evaluation of specific changes and interventions related to the wellness guidelines, including the recess before lunch (RBL) program, professional development, nutritional changes and overall related changes as evidenced by the YRBS data.

Recess before lunch (RBL). From the SAWS survey response (90% of 296 schools) after the 2009-2010 school year, there were 38 of 253 elementary and middle schools in the state of Hawai‘i that identified use of the schedule modification to having recess before lunch. One school that noted a change to RBL was a high school; most high schools do not have designated recess and lunch times. The response from this high school could not be validated, so was not included in further analysis. An elementary was excluded from the analysis of behavior referrals, because they had already implemented RBL before the wellness guidelines due to their participation in a pilot study in 2006. During the interviews one school answered “no” on the form, but had since initiated RBL for the 2010-2011 school year; this school was included in the analysis. The number of behavior referrals before schools initiated RBL (2006-2007 school year: 21,539) was compared with the number of behavior referrals in the 2010-2011 school year (21,607). There were 21,539 referrals in 2007 for 189,281 students and 21,607 referrals for 178,208 students in 2011. There was no significant difference in the number of behavior referrals: $t = -.556$, $df = 36$ and $p = .582$. However, qualitatively during interviews, one school wellness policy committee noted that they saw less food waste, increased milk consumption, and decreased behavioral referrals.

Professional development. There were two types of professional development in support of implementation of the school wellness guidelines. Professional development was provided for teachers/counselors, and for school food service workers.

Professional development for non-SFS staff. Professional development activities (not including SFS) mainly involved teachers, counselors and certified staff members. However, wellness guideline trainings were offered to all school staff. Some

activities, for example the annual physical education (PE) or health education conferences, were open to non-HDOE personnel, including community members and private school staff.

Between 2007-2008 and the 2010-2011 school year, there were 267 HHI evaluated professional development activities related to the wellness guidelines (nutrition and PE education). Because the accounting method for tracking these professional development activities changed in the 2010-2011 school year to exclude trainings not related to the wellness guidelines, trainings not related to wellness guidelines were removed from this number. Therefore, the trainings excluded from the count in 2007-2010 consisted of 19 trainings (nine secondary, five elementary, five all levels, one counselor), servicing 448 staff on the topics of sexual health, cyberbullying and violence. One training recorded focused on school staff and families (approximately 56 attended) involving multiple health topics, which did not directly involve professional development or wellness policy awareness. Often trainings included both nutrition and PE training with other topics; these trainings were included in the data. Before the 2009-2010 school year, resource teachers were not required to track individual trainings sessions with staff, so the number reported above may be lower than the true number of trainings conducted; from 2009-2011, there were 188 individual training sessions reported by the resource teachers (RT).

According to the HHI training tracker, there were 1561 unique teachers trained from 2007-2011 in standards based nutrition education, and 2187 unique teachers trained from 2007-2011 in standards based PE. In the 2010-2011 school year, nutrition or physical education trainings were classified into five levels of training: 101, 201, 301,

overview and other trainings. The levels 101, 201 and 301 indicate an initial training on a topic (101), followed by subsequent trainings (201 and 301). See Table 5. This differentiation in trainings did not occur in previous years.

Physical education and nutrition education trainings were provided in different formats. See Table 6. A summary of open ended, qualitative comments was provided in reports from the UH HHI evaluation team training database. However, due to the large number of possible comments for the vast number of trainings the comments were reviewed for the number of negative comments. The number of negative qualitative comments related to each the actual training activity (not including specific location related accommodations) if they occurred never represented more than two comments per training.

Yearly, there were state conferences with various selections throughout the day for session topics. Sometimes health and physical education topics were combined, and in other years they were not. The summary report provided did not specify comments related to specific sessions during the conferences. There were district workshops (15 districts), usually conducted by the district resource teacher and community partners when applicable. There were also professional development level three (PDE3) courses, usually consisting of a four-day workshop, and requiring teachers to produce a portfolio at the end of the class. Professional learning communities (PLC) in each district were also convened and led by resource teachers with the help of community partners, to discuss specific topics related to nutrition and physical activity, depending on interest. Other training sessions focused on specific health and education curriculum, and

Table 5

2010-2011 Summary of PD trainings for teachers in nutrition and physical education.

Training Type	Nutrition Education	Physical Education
overview	9	3
overview/101	0	4
101	9	123
201	27	28
201/301	0	1
301	7	37
Other	1	9
Total # Training	46	205
Total Personnel Trained	239	469

Source: HHI Training Tracker

Table 6.

Professional development activities for nutrition and physical activity for non-SFS staff, sponsored by HHI 2007-2011.

Activity	# events	# Unique Partic-ipants	Type Participants	Activity Details	Primary Funding
- Professional learning communities (PLC), - District workshops - Curriculum training - Health & PE leadership	- 52 (12 secondary, 25 elementary, 15 elementary/ secondary) - Focus: 6 health only, 2 health/ wellness, 27 pe only, 2 pe/ wellness,15 health and pe	1605	- PLC: all school staff interested. - Other trainings: Teacher, counselors, Administrators	- PE/Health standards - wellness policies - model schools - PE curriculum: “socci”, “geomotion”, “dynabands”, jumprope, SPARK, “trikes”, land paddling, “quickstart tennis”, Fitnessgram, Fit for Life, pe toolkit, movement education - Health curriculum: not specified in objectives	HHI and HDOE through RT
PDE3 courses	4 sessions	119 (missing 1 site)	Teachers	Wellness polices, health and PE standards, classroom management, stress, fitnessgram, sexuality	HHI and HDOE through RT
Individual trainings	188	188 (not unique)	Teachers	Fitness gram, PE curriculum, motion schools, motion, trike curriculum, scales, field day, jump rope, pedometers.	HHI and HDOE through RT
Summer institute	Unknown	unknown	teachers	Partner with UH to offer health and physical education classes for credit to teachers	HHI and UH

Note: Data obtained from UH evaluation team’s HHI Training Tracker through event and yearly reports.

Table 6. (Continued) *Professional development activities for nutrition and physical activity for non-SFS staff, sponsored by HHI 2007-2011.*

Activity	# events	# Unique Partic-ipants	Type Participants	Activity Details	Primary Funding
State health or PE conference	9 events (4 health only focus, 2 pe only focus, 3 health/pe focus)	1309	Teachers, counselors, community members	Multiple opportunities for health and PE	HHI and HDOE
Wellness Trainings	>7 (exact unknown)	566	All school staff	Introduce wellness guidelines. Discuss model schools.	HHI and HDOE through RT
Other: RT Training	1	6	RT and HHI staff	SHI, wellness policies, curriculum	HHI and HDOE
Other : Elementary School Nutrition and PE Curriculum Program	2 trainings, 1 school	39	Teachers	Individualized School Assessment, Health Smart and SPARK curriculum	HHI and HDOE

Note: Data obtained from UH evaluation team's HHI Training Tracker through event and yearly reports.

the use of standards (leadership trainings). There may be missing data from smaller trainings (district or individual) in the years prior to 2010-2011, because this analysis was based on evaluation data that were available. In addition, according to the HHI Training Tracker reports, in the 2010-2011 school year there were an additional 255 training events held across the state related to health and PE topics (including one-on-one trainings). There were 726 participants; however, formal evaluations were not completed for these trainings and tracked by the HHI evaluation team.

In addition, although not directly related to the wellness policies, from 2000-2009, there were summer institutes for teachers, which provided subsidized classes in health and PE for university credit and as a professional development activity. Some of the funding for these institutes was provided by the HHI program. During this time there were over 40 classes held in partnership with the HHI program, which provided supplemental education to over 500 teachers. The exact data from these events could not be found with the resources available for use. Many of these classes covered topics relevant to the school wellness guidelines, but were not necessarily associated with the implementation of the school wellness guidelines.

Professional development for SFS staff. Limited funds were available in the HDOE budget for professional development for school food service workers. The only previous professional development offered by the HDOE, per union guidelines, was a recordkeeping class for those who wanted to become cafeteria managers. Cafeteria managers all noted that they made attempts to train their staff each school year before the students arrived, but the extent and content of training differed among schools. However, the HHI program provided various trainings and programs for school food service

workers to prepare them to make changes in the preparation of meals and to help them provide brief nutritional interventions with students. Whenever available, reports summarizing evaluations for the trainings were reviewed. For several trainings the UH HHI evaluation team did provide assistance in evaluation, so reports were available in formats similar to the PD for non-SFS staff. Original evaluation forms were not available.

HHI funding provided an opportunity for all school food service workers to receive professional development training. "Institute Day" trainings were held for all school food service workers on Oahu and each neighbor island district in 2008 to increase their knowledge of nutrition, health and wellness, and the impact on the student's lives through nutrition. However, with the state mandated furloughs and changes in funding, the Institute Day provided by the HHI program during the evaluation period were also discontinued.

In the summer of 2009, HHI partnered with Kapi'olani Community College (KCC) culinary school to present workshops on culinary math and culinary nutrition to school food service workers. The classes were designed to increase participants' knowledge of basic nutrition and math skills, and to help participants gain the basic knowledge they need to pass the recordkeeping class. Overall, all cafeteria workers who attended the summer sessions and completed the evaluation forms, felt that the trainings held on Oahu and Maui, were useful and they learned skills that they would be able to use in their job. The future goal of culinary math and nutrition programs in partnership with KCC is to create and/or modify recipes. From interviews with food service workers who were working when the workshops were offered, the SFS workers noted that the

workshops needed to be available to more staff, since workshops filled within a few days of the announcement (n=3).

In contrast to the limited space in the KCC workshops, the whole wheat workshops utilized a "train the trainer" method, thereby inviting all staff who were able to attend. The focus of the whole wheat program was to improve school lunches by increasing the whole wheat content in the meals. Standardized recipes using at least 51% whole wheat in preparation were created and then introduced to schools. The whole wheat change affected recipes for rice, bread products (rolls, biscuits, pizza crust), cookies and noodles. Schools were then mandated to utilize 51% whole wheat in all products involving wheat flour. Although a requirement for use of 51% whole wheat in ingredients existed, the HDOE did not mandate the use of standardized recipes at each school, which allows for different tastes, nutritional content and preparation methods for similar items. Therefore, some schools (n=2) felt that standardizing a recipe was helpful when requiring the change of 51% wheat. In an interview with one cafeteria manager who had culinary experience, the manager had already modified the whole wheat recipe, within the requirements, to make it more appealing for his school. In contrast, another cafeteria manager was confused and felt that they may not have received the right recipes, but is trying to comply by adding at least 50% whole wheat flour anytime flour is required, without making the other changes that were in the standardized recipe. All cafeteria managers (n=4) also noticed a decline in consumption of 51% whole wheat cookies and brownies, although most felt that the consumption of the other products did not change significantly (bread and biscuits).

All cafeteria managers in HDOE schools that had 50% or more students qualifying for free or reduced lunch, were offered additional training and associated training materials (posters) to teach their student monitors (who rotate through the cafeteria) about nutrition, during their time assisting in the cafeteria. Schools that participated in this program were given a free digital scale for their cafeteria. The effectiveness of this program was not measured quantitatively. The total number of students that received the brief educational intervention was reported to the program administrators, but the data was not available during data collection for this study. A cafeteria manager who did participate in this program felt that it was effective and said that he/she continues to try to educate all students who come in to assist and encourages all students eating in the cafeteria to try and eat fruits and vegetables. See Table 7.

Due to the positive comments from evaluations of the programs that were provided for the school food service workers and the need to improve the nutritional value of meals, funding through the HDOE was obtained to continue professional development activities for school food service workers after the HHI's direct funding ends. An administrator in the SFS division of the HDOE noted that planned professional development may include online training, which the participant believed is now becoming a more reliable source of education. In interviews with SFS workers from a school that does not receive additional support because the school does not have a student population with 50% qualifying for free and reduced lunch, the workers felt that they do not get enough support from the HDOE and local programs. They were not able to offer the same nutritional services that were offered at schools that do receive support.

Table 7.

Professional development for school food services (SFS) staff.

Activity	Participants (who and how many)	Activity Details	Funding	Evaluation comments (when applicable)
Recordkeeping 2008	Chefs, cafeteria managers, bakers, other. 19 participants	Requirement for managers	HHI, HDOE	No evaluation forms available. Attendance sheets only.
Recordkeeping 2009	Chefs, cafeteria managers, bakers, other. 16 participants, 16 schools.	Requirement for managers	HHI, HDOE	No evaluation forms available. Attendance sheets only.
Culinary nutrition I	Chefs, cafeteria managers, bakers, other. Oahu: 27 participants, 18 schools. Maui: 18 participants.	Discuss major nutrients and USDA guidelines for nutrition.	HHI, SNAP	- All participants strongly agreed in usefulness for the job and felt confident in using the skills. - Would like to know more about creating new recipes. (n=2) [data from UH HHI training tracker reports]
Culinary nutrition II	Chefs, cafeteria managers, bakers, other. 7 participants, 4 schools. Maui: 18 participants.	Continue from culinary nutrition I	HHI, SNAP	- All participants strongly agreed in usefulness for the job and felt confident in using the skills. [data from UH HHI training tracker reports]

Table 7. (Continued). *Professional development for school food services (SFS) staff.*

Activity	Participants (who and how many)	Activity Details	Funding	Evaluation comments (when applicable)
Culinary math I	Chefs, cafeteria managers, bakers, other. Oahu: 25 participants, 15 schools. Maui: 14 participants.	Basic math skills, measuring, unit conversion, yield and recipe conversion.	HHI, SNAP	-All participants strongly agreed in usefulness for the job and felt confident in using the skills. - Some participants wanted to spend less time reviewing math concepts. (n=2) [data from UH HHI training tracker reports]
Culinary math II	Chefs, cafeteria managers, bakers, other. Oahu: 15 participants, 8 schools. Maui: 14 participants.	Continue from culinary math I	HHI, SNAP	All participants strongly agreed in usefulness for the job and felt confident in using the skills. [data from UH HHI training tracker reports]
Whole wheat recipe development	14 participants, 2 supervisors.	Train trainers for the baker's training.	USDA Team Nutrition Program, HHI	- Learned how to work with whole wheat (n=1). - Desire for more classes (n=4).
Baker's training	Chefs, cafeteria managers, bakers, other. 136 participants, 76 schools.	Prepare recipes using whole grain products (muffins, rolls, cinnamon bread, French bread, cookies, pizza crust).	HHI ($5140)	No evaluation forms available. Attendance sheets only.

Table 7. (Continued). *Professional development for school food services (SFS) staff.*

Activity	Participants (who and how many)	Activity Details	Funding	Evaluation comments (when applicable)
Student monitors and nutrition education	Cafeteria managers (exact number unknown)	Provide digital scale for schools that participate	HHI, SNAP	No evaluation data available
Institute day – Multiple training sessions 2008 (5 sites)	All food service employees. 685 participants on 4 islands	Nutritional value of food items, standardized recipes, wellness policies, increasing student wellbeing	HHI	- 95% desire standardized recipes. - More training on recipes and ways to increase student participation in school meals. - Qualitative (most frequent): learned about "Living health" [data summarized from UH HHI training tracker reports]

However, all school food service workers interviewed were interested in attending more professional development workshops if they were offered.

There were other school food service programs in which changes were pending but not implemented at the time of the data collection. One of the programs will have experienced commercial chefs to go to individual schools and implement individualized changes for school level preparation of food based on what supplies are available at each school.

Nutrition changes in school meals. Joint participation between the HHI and the USDA funded the National School Lunch Program and allowed the creation of Team Nutrition. The focus of Team Nutrition was to improve the nutritional value of school lunches in HDOE. School lunches are designed to provide 1/3 of the recommended daily nutrients in the lunch meal and ¼ in the for breakfast meal provided. The minimum requirements for lunch in grades kindergarten through third include 1.5 ounces of meat daily, eight servings of grains per week, ½ cup of two different fruits or vegetables daily, and eight ounces of milk as a beverage. Grades four through 12 receive two ounces of meat daily, eight servings per week of grain, ¾ cup of at least two different vegetables per day (one serving) and eight ounces of fluid milk.

At the administrative level, the school food services supervisor made changes in the HDOE contracts, which provided the ingredients to the schools, to increase the nutritional value of meals beyond the minimum requirements. Also, a nutritionist was contracted to work with HHI utilizing USDA support to create "Team Nutrition," which reviewed HDOE menus and made suggestions for change. The goal was to bring HDOE school lunches to a level of nutrition that allows them to compete in the nationwide

Healthier United States Schools Challenge. In addition, changes were made based on the results of a random audit of school lunches in Hawai‘i’s schools which suggested there was too much salt content in the school lunches.

The USDA monitors the nutrient value of school lunches regularly for calorie count, protein, iron, calcium, vitamin A, vitamin C, fat, sodium, fiber and cholesterol. Regulation of sugar content is recommended in the wellness policy. Since 2007 procurement changes included a change from iceburg lettuce to romaine lettuce, elimination of trans fat from all food products, elimination of strawberry and orange drinks from the menu, elimination of fruits served in heavy syrup, a requirement for whole wheat flour in chicken patties/nuggets, protein items that are no more than 30% fat and 10 % saturated fat, 100% juice in fruit juices, a change from brown rice from 100% white rice, and a change to skim chocolate milk and 1% white milk. See Table 8 for associated nutritional changes, if determination was possible based on procured items. Data in Table 8 focused on nutritional changes greater than 25% (decrease or increase) in nutrients monitored by the USDA in school lunches: total calories, protein, fat, fiber, sugar, calcium, iron, sodium, vitamin c, vitamin A, cholesterol (USDA, 2012). The exact procurement item used when available was matched with the actual food label instead of a common USDA value for the specified food item.

Trans-fat is found in natural animal fats and artificially from partially hydrogenated vegetable oils that increase shelf stability; elimination of artificial trans-fat from the menu can help to prevent heart attacks and coronary heart disease (USDA & USDHHS, 2010). The elimination of fruit and soda options in the school lunch decreased high sugar content in the school lunches. In addition schools were required to eliminate

Table 8.

Changes made from the 2006-2007 school year through the 2010-2011 school year in nutritional value per serving for school lunch based on HDOE standardized menu.

ITEM CHANGE	NUTRITIONAL CHANGE OF SELECT NUTRIENT VALUES (1 SERVING)
Iceburg to Romaine lettuce (1/4 cup serving change)	Increase fiber 71%, calcium 59%, iron 140% and vitamin c 193%. Decrease sodium by 48%
2% white milk to 1% milk (1/2 pint)	Decrease total fat by 50%, iron by 40, vitamin c by 100% and cholesterol by 40%.
1% chocolate milk to skim (1/2 pint)	Decrease fat by 33%, fiber by 33%, sugar by 58% and cholesterol by 60%. Increase Vitamin C by 220%
No butter with rolls (5 g serving)	Changes in calories, fat, sodium and cholesterol. (Decrease 36 calories, 4 grams fat, 101 mg sodium, 11mg cholesterol.)
0% whole wheat to 51% whole wheat for bread recipe (1 ounce serving) *not exact recipe*	Increase fiber by 133%. Sugar content not available.
Mozarella cheese from whole to skim milk (topping on pizza) (1.5 ounce)	Decrease fat 28%. Increase calcium 55% and vitamin A 29%.
Macaroni with omega 3 fortification and enriched versus no fortification (1/4 cup).	Exact brand change unknown. Decrease calories by 55%, protein by 32%, fat by 84%, calcium by 45% and iron by 38%. Increase fiber 970%. Feature of enrichment (not compared elsewhere): Increase thiamin by 280%, riboflavin by 193%, B6 by 50% and folate by 700%.
Pepperoni change from regular to low fat and low sodium (0.25 ounces)	Decrease calories 27%, fat by 25% and sodium by 51%.
White rice to Brown rice (3/4 cup)	Increase fat by 317%, fiber by 550%, calcium by 275%. Decrease iron by 62%.
Fruit packed in heavy syrup to packed in its own juice (ie. Peaches ¼ cup)	Decrease in calories by 43%, fat by 69%, sugar by 48% and sodium by 44%. Increase protein 33%, calcium by 87%.

the butter serving with rolls and eliminate butter and salt in preparation with vegetables, use at least 51% whole wheat flour in flour based products, and use more spices instead of salt in preparation of meals. A cafeteria manager at one school, with professional culinary experience was happy about the change to use more spices, and easily made the changes. However, other cafeteria managers without experience did not know how to make changes without assistance (n=2), but would gladly accept assistance to do so. The interviews with cafeteria managers also suggested that they have not all made the changes in butter and salt usage in preparation of vegetables (n=2). Determination of the exact value of nutritional changes in prepared items is difficult because recipes differ between schools.

In interviews with school food service staff, school cafeteria managers noticed a decrease in consumption of milk since the changes in milk on the menu (n=2). Initially, one cafeteria manager noticed a decrease in consumption of fruits with the change to fresh fruits versus canned fruits in heavy syrup, but then he found that students adjusted and began to eat selected fresh fruits in similar consumption amounts to previous levels. Another cafeteria manager, from a district where there median family income was higher, noted that rice consumption decreased especially in the older elementary students with the change to 50% brown rice.

In a review of the standardized menus from the 2006-2007 to the 2010-2011 school year, there was an increase of four fruit and vegetable servings (half cup per preserving) per month after the nutritional changes were made. Schools were also encouraged to use as many fresh fruits and vegetables as possible, and to include at least one green leafy vegetable in every salad served. A separate program, not directly related

to the wellness guidelines implementation originated from the Office of Hawai‘i Child Nutrition Programs (OHCNP) which is a state managed federally funded program that assists schools who had more than 50% of students receiving free and reduced lunch. Interviews with school identified that all schools interviewed (n=9) were aware of the existence of this program assisting schools in obtaining more fresh fruits and vegetables for the school lunches; three schools participated in the program already and two more schools were approved to participate in the next school year.

Standardized menus are required in HDOE elementary schools. High schools are allowed to substitute lunches for other items, which, with the exception of salads, are not always as nutrient balanced as the school lunches (i.e., saimin – a noodle dish in high salt soup base). At a secondary school, the cafeteria manager noted that the salads are very popular with students and staff and meet the USDA guidelines for school lunches with this offering. Some HDOE schools have changed to an “offer” versus “serve” approach to reduce waste from meals. With this change to student decision making, cafeteria managers noted that education with the students is very important to ensure that students select the items that provide quality nutrients to them (n=4). The elementary school cafeteria manager interviewed who does offer this option for the students educated students before the change and also encouraged the staff to educate the students to make healthy nutritious selections while they are being served.

With the implementation of the wellness policies, portion size is also more strictly regulated in the schools. Students now have to pay at cost for additional portions. The HDOE also made an attempt to remove all vending machines from school sites during the

implementation of the wellness policies, however, during site visits the researcher noted vending machines on school grounds.

While some of the changes in the menus can easily be measured due to the change in purchasing of products that are supplied to all the schools, ensuring changes that involve preparation of food is difficult in the HDOE. The recipes used in preparation of foods differ at each school and vary in taste with the prior experience of the cafeteria manager and food preparers. In interviews, cafeteria managers who did not have professional culinary experience prior to obtaining their position felt they were less confident in their ability to create or modify recipes within their budget, when compared to managers who had prior culinary experience (n=4).

Another common theme in interviews with cafeteria managers and school food service staff was the understanding that they must prepare foods that the students will eat (n=5). Although they may offer a nutritionally balanced meal, they reported that if the meal is too different from what students are used to, students may not eat the meal. Thus, this change would not be beneficial to the students' nutritional intake. Cafeteria managers indicated that they must balance the menus taking into consideration what their student population will likely eat and the need to prepare meals with high nutritional value (n=3). A cafeteria manager in a secondary school regularly surveys students to get their response on what they liked from the menu and their concerns in order to tailor the menu toward something that was nutritious but would be desirable to students. This manager noted that the students consistently felt some of the foods on the menu were too salty.

All the elementary cafeteria managers interviewed from schools that had 50% of students on free and reduced lunch and from schools with a higher mean family income (not qualifying for special funding), stated the opinion that students in schools where there was 50% students with free and reduced lunch were more likely to eat the lunch with the nutritional changes compared to schools with higher family income. A cafeteria manager also independently stated that parents with higher family income would simply buy their children a lunch that they desired after school. In this school, the cafeteria manager was concerned that the changes to healthier options that students did not want to eat but would get from home, were causing students to not purchase the school lunch. The cafeteria manager thought that this would eventually eliminate the school lunch program at schools that did not receive federal funding.

For those students who bring lunch from home, there were differing views depending on the school, regarding the nutrient content of what was sent by parents. At all the schools, cafeteria managers monitored what children ate in the cafeteria, and would offer students a nutritious school lunch if they did not have one. One school had a policy requiring the cafeteria to provide a lunch to a student if they did not have one, or if their lunch was deemed "non-nutritious."

In summary, there were system wide changes made to the school menus that should have been implemented at the school level. However, there are many variables contributing to the actual changes being made in the menu and the students' actual consumption of foods with these changes.

YRBS data. A comparison of dietary behaviors and physical activity for student responses in 2007 compared to 2011 was completed on the CDC website (CDC, 2012a). Questions that were not on both surveys were eliminated from the analysis.

In high school students (grades 10-12) students were more likely to drink a high sugar beverage (i.e. soda), one, two or three times a day in 2007, compared to 2011 (p = .01, .00, .01 respectively). See Table 9. Students were also more likely to have eaten a fruit or have drunk a 100% fruit juice within the past day in 2011 compared to 2007 (p = 0). Although not directly related to the wellness policies, high school students were also more likely in 2007 to take a laxative or similar medicine to prevent from gaining weight. For physical activity responses in high school students, students were more likely to use the computer for three hours a day in 2011 when compared to 2007. See Table 10. Thus, nutritional responses showed improvement, but activity declined. Other questions compared were not significant.

Middle school students also completed the YRBS questionnaire. There were no significant changes in the responses to dietary related questions between 2007 and 2011. The number of dietary questions asked in 2011 was significantly lower than the number asked in 2011, thereby, decreasing the number of questions that could be compared. As to, to physical activity, students were more likely to attend physical education classes in 2011 than in 2007 (p=0). Similar to the high school students, middle school students in 2011 also tended to have three or more hours of screen time, when compared to 2007 (p=0). In addition, these students were less likely to do physical activity for at least 60 minutes per day every day of the week (p=.04). See Table 11.

Table 9.

Comparison of significant 2007-2011 Hawai'i high school responses to YRBS questions pertaining to dietary behaviors (CDC, 2012a).

Question	2007	2011	p-value	2007 More Likely Than 2011	2011 More Likely Than 2007
Drank a can, bottle, or glass of soda or pop one or more times per day (not counting diet soda or diet pop, during the 7 days before the survey)	22.6 (19.5–26.1) 1,158	17.5 (15.6–19.6) 4,169	0.01	True	
Drank a can, bottle, or glass of soda or pop two or more times per day (not counting diet soda or diet pop, during the 7 days before the survey)	17.3 (14.7–20.1) 1,158	11.1 (9.8–12.7) 4,169	0.00	True	
Drank a can, bottle, or glass of soda or pop three or more times per day (not counting diet soda or diet pop, during the 7 days before the survey)	9.2 (7.3–11.4) 1,158	6.0 (4.9–7.4) 4,169	0.01	True	
Ate fruit or drank 100% fruit juices less than one time per day (during the 7 days before the survey)	50.9 (47.8–53.9) 1,151	45.1 (42.6–47.6) 4,147	0.00	True	
Vomited or took laxatives to lose weight or to keep from gaining weight (during the 30 days before the survey)	7.9 (6.1–10.0) 1,161	5.5 (4.6–6.6) 4,159	0.03	True	

Notes: † Percentage, confidence interval, cell size.

Table 10.

Comparison of significant 2007-2011 Hawai'i high school responses to YRBS questions pertaining to physical activity (CDC, 2012a).

	2007	2011	p-value	2007 More Likely Than 2011	2011 More Likely Than 2007
Used computers 3 or more hours per day (played video or computer games or used a computer for something that was not school work on an average school day)	31.1 (27.6–34.9) 1,154	36.6 (34.8–38.4) 4,087	0.01		True

Notes: † Percentage, confidence interval, cell size. '—' = Data not available. ~ = P-value not available

Table 11.

Comparison of significant 2007-2011 Hawai'i middle school responses to YRBS questions pertaining to physical activity (CDC, 2012a).

Question	2007	2011	p-value	2007 More Likely Than 2011	2011 More Likely Than 2007
Did not attend physical education classes in an average week (when they were in school)	48.1 (40.6–55.7) 1,187	34.4 (30.9–38.1) 4,880	0.00	True	
Used computers 3 or more hours per day (played video or computer games or used a computer for something that was not school work on an average school day)	25.2 (21.6–29.2) 1,199	37.5 (34.3–40.9) 4,792	0.00		True
Physically active at least 60 minutes per day on less than 7 days (doing any physical activity that increased their heart rate and made them breathe hard some of the time during the 7 days before the survey)	80.3 (74.9–84.8) 1,186	75.0 (73.2–76.7) 4,840	0.04	True	

Notes: † Percentage, confidence interval, cell size.

No correlation with wellness guideline interventions can be made with the YRBS data, but it provides additional insight to student behavior during this time period.

SAWS evaluation. The average score on the SAWS in the 2009-2010 school year was 61% (HDOE, 2012). Statewide 73% of schools had a wellness committee, 61% met required minutes for health education, 35% made required minutes for PE, and 93% provided students with a minimum of 20 minutes of recess per day (HDOE, 2012). Based on the response to the SAWS survey (90% response rate) in the 2009-2010 school year, school principals and other representatives (if possible) were interviewed to further elaborate on their responses and identify barriers to implementation.

In general, the responses on the survey corresponded to what was going on at the school based on the review of school reported SAWS data during the interviews. The scale used by the Hawai‘i DOH to identify schools through the SAWS that were meeting the guidelines, versus schools that were not meeting the guidelines, appeared to correspond well to responses in interviews from schools that met the guidelines versus those that did not meet the wellness guidelines. In interviews, schools not progressing toward the wellness policy (n=2) identified that they had not formed wellness committees and addressed various items in the wellness guideline, whereas schools progressing toward meeting the guidelines held interviews for this study with the wellness committee and indicated numerous interventions that they made to comply.

School level experiences and changes. Based on the SAWS results in 2010, two groups of schools were identified based on the numerical scale created by the HDOH: those progressing well toward meeting the guidelines and those not progressing well. For the two groups of schools, chapter 19 (total number of behavior referrals), attendance

rates, math scores and reading scores, were analyzed for significant changes, and the ability to classify changes based on the group. From the 2006-2007 school year to the 2010-2011 school year, descriptive statistics suggested that there was a significant decrease in Chapter 19 behavior scores and academic increases in math and reading scores for both groups, so a paired t-test was performed on a bootstrapped sample, due to small sample size. The paired t-test on the bootstrapped sample showed significant increases in math (p=.059) and reading (p=.089) scores for schools progressing toward the guidelines, and significant increases in math (p=.036) scores for schools not progressing toward the guidelines. See Table 12.

To identify whether the changes in attendance, behavior referrals, math and reading scores could help classify the schools into groups, a discriminant analysis was performed. Despite a small sample size of six per group there was still more than the four predictors; thus, the analysis was performed. Increases in math scores, decreases in attendance rates and decreases in chapter 19 data allowed classification of 66.7% of schools into the two categories, which is greater than that expected by chance alone (50%). See Table 13. If reading is included in the model, the suggested classification drops to 58%, so reading was not included. The standardized canonical discriminant function coefficients suggest that the schools progressing toward the guidelines had relatively more decrease in behavior referrals (1.620) and increase in attendance (1.435) when compared with schools not progressing toward the guidelines. In contrast, the schools not progressing toward the guidelines had more increase in their math scores (-.409) when compared to those that were progressing. See Table 13.

Table 12.

Paired t-test for schools progressing or not progressing toward meeting guidelines.

Without bootstrapping

		Paired Differences				t	df	Sig
				95% Confidence Interval of the difference				
		Mean	Std. error mean	Lower	Upper			
Progressing Schools	Attendance 2007-2011	-2.03333	-2.32575	-8.01186	3.942520	-.874	5	.422
Progressing Schools	Chapter 19 2007-2011	50.6667	36.33517	-42.73586	144.06919	1.394	5	.222
Progressing Schools	Reading scores 2007-2011	-9.40000	3.10752	-17.38813	-1.41187	-3.025	5	.029
Progressing Schools	Math Scores 2007-2011	-13.5967	3.49163	-22.57219	-4.62115	-3.894	5	.011
Not Progressing Schools	Attendance 2007-2011	-1.40000	1.39068	-4.97487	2.17487	-1.007	5	.360
Not Progressing Schools	Chapter 19 2007-2011	77.16667	60.84813	-79.24842	233.58175	1.268	5	.261
Not Progressing Schools	Reading scores 2007-2011	-7.86667	4.04192	-18.25675	2.52342	-1.946	5	.109
Not Progressing Schools	Math Scores 2007-2011	-15.08833	3.49864	-24.08187	-6.09480	-4.313	5	.008

With Bootsrapping

			Bootstrap				
						95% Confidence Interval of the difference	
		Mean	Bias	Std Error	Sig (2-tailed)	Lower	Upper
Progressing Schools	Attendance 2007-2011	-2.03333	-.03330*	2.14522*	.458*	-6.80803*	.70000*
Progressing Schools	Chapter 19 2007-2011	50.6667	.34411**	33.72738**	.372**	5.05869**	125.03701**
Progressing Schools	Reading scores 2007-2011	-9.40000	-.05654^	2.95335^	.089^	-14.56066^	-2.91176^
Progressing Schools	Math Scores 2007-2011	-13.5967	-.05871^	3.26080^	.059^	-19.72500^	-7.28091^
Not Progressing Schools	Attendance 2007-2011	-1.40000	-.03741^^	1.32635^^	.437^^	-4.40000^^	.87747^^
Not Progressing Schools	Chapter 19 2007-2011	77.16667	1.60442`	56.77031`	.331`	-11.19126`	205.6000`
Not Progressing Schools	Reading scores 2007-2011	-7.86667	.11078`	3.71681`	.130`	-14.97733`	-.40000`
Not Progressing Schools	Math Scores 2007-2011	-15.08833	-.02764`	3.25012`	.036`	-20.75890`	-8.42000`

Note: unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

* Based on 986 samples, **Based on 990 samples, ^Based on 995 samples, ^^Based on 987 samples, ` Based on 997 sample

Table 13.

Discriminant analysis if schools progressing or not progressing towards wellness guidelines.

		Group	Predicted Group Membership		Total
			Progressing	Not Progressing	
Original	Count	Progressing	4	2	6
		Not progressing	2	5	6
	%	Progressing	66.7	33.3	100
		Not Progressing	33.3	66.7	100

Standardized Canonical Discriminant Function Coefficients

	Function
	1
Change in Math Scores	-.409
Change in Chapter 19 (behavioral) Referrals	1.620
Change in Attendance	1.435

In most areas, schools progressing toward meeting the wellness guidelines had various items that they had changed in their school, when compared to schools not progressing. See Table 14. The schools interviewed because they were doing well in making progress toward meeting the wellness guidelines all completed the School Health Index (SHI) survey for their school, to identify the strengths and weakness of their school. One school did an in-depth analysis of the school resources using the SHI and produced a corresponding report of their findings. All schools had a focus area to work on to help them meet the wellness guidelines. These schools had wellness committees to carry out the evaluation utilizing the SHI. All the committees consisted of at least an administrator, the cafeteria manager, and the health aide or health professional. The secondary school interviewed included students and parents on their wellness committee.

Two of the schools had a representative attend the district workshops introducing the policies and taking the message back to their respective sites; two other schools heavily relied on the online resources, specifically the "checklist" online for direction in reaching the wellness guidelines. Schools progressing toward meeting the wellness guidelines relayed important information about the policies to the staff in the beginning of the school year and discussed school specific policies usually including fundraising and what kinds of foods could be introduced into the school environment. Although schools recognized the importance of training new staff, most administrators felt that they could adequately continue wellness guideline principles and training for their staff (n=3). Both the schools identified as not progressing well, felt that it was difficult to form another committee to accomplish these tasks, so they used an existing committee to address concerns. They also felt that the "checklist" was lengthy and too

Table 14.

Comparison of responses to items mentioned by schools during the interviews.

Item	Schools Progressing (n=4)	Schools Not Progressing (n=2)
Has school wellness committee	100%	50%
Has reviewed the SHI	100%	0
Does recess before lunch	(n=3) * 33%	0
Required minutes of PE	100%	50%
Does NOT restrict recess	100%	0
Enforces a school food policy	25%**	0
No vending machines	100%	100%
Has a school garden	25%	0
Required time for health education	100%	50
Required minutes for recess	100%	0
Had a health fair	75%	0
Supplements recess to increase activity level	100%	50%
Regular parent education about wellness	100%	0

*Note: *RBL is intended for implementation at elementary level. One school indicated in 2009-2010 that they had not done RBL, but changed for the 2010-2011 school year.*

***Schools that reported they did have a school policy did not enforce it, the school that answered on the SAWS that they didn't have a school policy, had and made attempts to enforce a policy.*

difficult to carry out.

In the elementary schools the introduction of snacks and other foods into the school environment was the focus for many changes. Based on the SAWS report, statewide only one percent of schools were compliant with the snack and food policy (HDOE, 2012). An afternoon snack monitored for nutrient quality is provided for schools with 50% of students qualifying for free and reduced lunch. These schools also qualified for a federally sponsored fresh fruit and vegetable program, allowing the school to provide a nutritious snack for the students. The two schools with difficulty progressing toward the wellness guidelines utilized this program, and noted that they would probably not be able to provide nutritious snacks in the school without the program. A cafeteria manager in a school without a policy for what is brought for snack felt that one way to address the snacks that are brought into the school environment would be to allow all schools (whether or not they have the 50% qualifying for free and reduced lunch status) to offer afternoon snacks that were nutritious.

Administrators felt that when they made it a school policy not to provide unhealthy snacks as rewards, the staff at their schools was compliant (n=3). Schools that were not progressing toward meeting the guidelines did not have a school policy in place for what could be provided by school staff to students, did not discuss this state guideline with the staff, and were unsure whether the school staff was following the state guideline (n=2). One school used some of its fundraising money to provide nutritious snacks to students at certain times during the year, especially during testing times. Another school provided non-food items to teachers to give out at events like Halloween and Easter.

The DOE mandated changes in what foods could be sold at the school through the wellness policies. Schools all noted that the contents of the vending machines (if they still existed) were now compliant with the wellness guidelines criteria (n=4). Sodas were not sold on campus at any school. The change in soda was the most difficult for the secondary schools and resulted in a re-appropriation of funds, because of the opposition from the students and the decreased profits for the school obtained from the vending machines with the changes.

Schools progressing toward meeting the guidelines felt that fundraising changes and rewards for students were the easiest for schools to control during the school day, based on the guidelines (n=3). However, fundraisers occurring outside the school day were difficult to control for at the secondary level (i.e., sports events), especially where outside vendors were utilized. Because of the wellness guidelines, a local company selling fundraising items changed their recipe to meet the wellness guidelines so that they could continue to work with the schools. Another school changed their fundraiser to a "walk-a-thon" requiring students to be sponsored for the amount that they walked. Schools administrators also found it easier to regulate items sold during the school day, versus regulating what students bring into the school. At schools progressing toward following the wellness guidelines, the teachers were compliant with the introduction of snacks at school, and the elementary schools all changed to non-food items for student rewards. Both schools that were not progressing identified that it was difficult to regulate what parent groups and teachers introduced into the school environment, but recognized it as an area that they could reasonably work on in the future.

Regulation of what students bring into the school from home was a larger barrier for all schools. A common theme at all schools from different staff member (principal, teachers, cafeteria workers) was that they could not control what parents sent with students individually for lunch or snack. Both elementary and secondary schools that had stores selling unhealthy foods near the campus (n=2), felt that if the stores changed what they sold to the students (and advertised), this would help promote students to bring healthier snacks into the school environment. Additionally, one school noted that unhealthy foods in the nearby stores were cheaper than healthy foods, so they understood why parents on a limited budget were inclined to buy these foods. With the change in beverage offerings at the secondary level to water and 100% fruit juice, one school noted there was an increase of unhealthy items bought just outside the school and brought onto the campus. The elementary schools (n=3) had policies for what parents could send to schools for parties and school functions. One school had a contest with students in the beginning of each year to determine who could bring the healthiest snack, with prizes. However, views from school staff about enforcement of the school policies differed, with schools finding it most difficult to restrict parents from bringing in snacks for celebrations. One elementary school attempted enforcement by confiscating identified unhealthy snacks (i.e., candy bars) and then returning them to the students as they left school. However, the other schools interviewed did not do this. A smaller school felt that the size of their school and the “buy in" from their staff allowed them to have fairly good control of snacks brought to school.

Because of the concern about compliance with student’s families, schools tried to focus on educating the families and community. One school’s wellness committee

attempted to hold “coffee hours” to teach students and parents so that they learn what kinds of foods are good to eat and how to prepare nutritious meals, and to encourage exercise. However, they found that turnout was low, especially with those who are of lower socioeconomic status, because they parents were often working. Another school sent monthly newsletters to parents, highlighting health tips each month, which included recipes, ideas for exercise, etc. One school created a website with related resources. All schools, even those not meeting the wellness guidelines, tried to send some form of health or physical activity information home with students to their parents. The elementary schools that were progressing toward the wellness guidelines all held annual health fairs, utilizing health related community support and sponsors to educate families and the community. One school was able to provide all healthy foods at the fair, through a joint grant and partnership with the farmer’s market. Three schools progressing toward meeting the wellness guidelines, sponsored regular parent and family nights throughout the year, for which they changed all foods provided to healthy foods and included wellness education in their discussions with parents. In a school that was not progressing toward meeting the guidelines, there was concern that the “school was being forced to implement social policies (including some of the guidelines in the wellness policies) that parents should address at home.”

All schools that were progressing well toward meeting the guidelines ensured that their teachers included some type of health education into the curriculum based on standards. The elementary schools did not have a health education teacher or funding for a teacher; none of the schools had a special health education curriculum for school use. One school had an initiative to teach students what types of foods were healthy at the

grocery store. The schools having difficulty in progression toward meeting the guidelines noted that it was up to teachers to introduce health education, and the effort was not coordinated school wide. Schools tried different approaches to providing supplemental health education. Another school worked with health professionals to create an intervention for children who were identified as being obese. This program received funding from private donors and involved nutrition education and instruction in meal preparation.

One school had the cafeteria manager providing brief nutrition education related to lunch choices in all the classrooms throughout the year. However, this school would have liked to have a trained nutrition teacher to do this task if possible. When possible, all schools involved the cafeteria manager, school food service workers or the lunchtime supervisors, to provide brief educational interventions about nutrition to the children. In some schools, lunches were prepared by another school and brought daily, so the school staff supervising lunch took it upon themselves to try to educate students during this time with brief interventions while students were eating. One cafeteria had a digital screen where they placed health messages and encouraged students to make healthy choices when eating. The information provided by administrators and wellness committee members, coincided with information provided in interviews with cafeteria managers in separate interviews.

Depending on the resources at the school campus, having a garden was difficult for some schools; vandalism of the garden was a problem at two of the school sites. All schools that were progressing well toward meeting the wellness guidelines had plans on how to have a school garden in the future (n=4). One school supported teachers to

incorporate healthy cooking into the curriculum through the integration of reading and math lessons with a few lessons from the garden.

Funding physical education was difficult in the elementary schools. Funding was not often available for physical education teachers so schools had to be creative in identifying ways to fund a teacher. One school used proceeds from its annual fair to fund a part time teacher, and another school partnered with the University of Hawai‘i to provide opportunities for student teachers while allowing students to have formal physical education classes. Another school without a formal PE teacher or class ensured that students were allotted physical activity time during the required instructional time for PE. Although they tried to make the number of recommended hours of physical education, one school was concerned about how to fit the health and physical education requirements into the curriculum with so many other requirements for improvement in other areas.

Schools also addressed physical activity by encouraging vigorous activity. All schools (whether progressing or not progressing toward meeting the guidelines) noted that their students engaged in what they believed to be vigorous activity during recess and lunch. Two schools identified the use of intramural sports during recess and lunch. One school scheduled their PE teacher to take groups of students during recess to participate in organized sports, which they found to helpful in decreasing behavioral referrals during recess. Two schools made sure they had equipment that would encourage vigorous activity, which included: hula hoops, “dance dance revolution,” balls, jump ropes. One school supported a community effort to participate in “safe routes to school” a program encouraging students to walk to school with supervision. Two schools requested

suggestions for ways to increase physical activity during recess with students. A secondary school progressing toward meeting wellness guidelines, maintained a recess time allowing for physical activity versus time to walk to the next class, which is different from the trend in high school schedules. This allowed students time to partake in activities like volleyball and other sports.

Most of the schools (n=3) progressing toward meeting the wellness guidelines also did not restrict recess as punishment, while schools that were not progressing (n=2) noted that they allowed teachers to withhold recess from students for behavioral or instructional concerns. The schools that did not restrict recess noted that they felt it was difficult to find a way to hold students accountable for behaviors without decreasing the time spent at recess or instruction (yet schools were required to not exclude students from instructional minutes per NCLB for disciplinary actions).

None of the schools had ongoing programs for the teachers and staff to increase physical activity, although several wellness committees discussed possible future interventions. One school held a 5K run to include participation with teachers, students and their families on the weekend. Two other schools welcomed community partners into the school to hold sessions focusing on physical activity (i.e., zumba) outside of school hours; usually a fee was charged for participation, except when it occurred during a school fair.

An additional barrier mentioned by schools to meeting the guidelines, included the need to meet so many other guidelines in the school environment (n=3). Additional trainings for staff (teachers) regarding the wellness policies, with the exception of

guidance for specific health education curricula and school food service workers, were not requested by any of the schools interviewed.

Chapter 5: Conclusions and Recommendations

Changing school policies at the state or district level can represent a cost-effective way to bring about change in the school environment related to wellness education and behaviors. The mandatory implementation of School Wellness Policies for schools receiving USDA funding provided a mechanism to change school policies and promote nutrition and physical activity in the school environment. As described in the SEM model (see Figure 1), policy changes can have significant effects upon all levels of society when addressing a concern like obesity. The national policy required by federal law requiring local implementation of a wellness policy directly influenced the school or school districts as an organization, to make changes which are intended to improve nutrition and physical activity behaviors in the individuals and groups that fall within this organization.

The State of Hawai‘i’s implementation of one school wellness guideline for all public schools, to meet the requirements of the federal mandate, was evaluated in this dissertation. The following research questions were addressed:

1. In what ways and to what extent does the document entitled, *Hawai‘i’s School Wellness Guidelines* align with national recommendations?
2. During academic years 2007-08 through 2010-11, in what ways and to what extent were the HDOE schools assisted in the implementation of the school wellness guidelines?
3. What kinds of school level impacts occurred following the implementation of Hawai‘i’s school wellness guidelines?

Roger's (1995) DOI model will be used to guide the discussion of results from the varying data sources. Rogers describes (See Figure 1) five steps leading to the change (innovation – wellness guidelines): knowledge, persuasion, the decision to change, implementation and confirmation. Factors that influence the adoption of the innovation include: relative advantage, compatibility, complexity, trialability and observability.

A large campaign was provided to schools by the HHI and HDOE to educate and present knowledge about the upcoming change to those in the school environment. In interviews, all the schools felt they received adequate training about the existence of the guidelines. Schools that were progressing toward the change utilized the checklist provided in order to meet the requirements. The persuasion to change was the improvement in health of those in the school environment, and the threat of decreased funding due to the federal requirement. Schools were rewarded for compliance with additional funding and further supports to change, providing them a relative advantage. However, one interviewee noted the actual lack of negative consequences on schools who did not comply decreasing the likelihood that a decision to change would be made. Numerous interventions were available to support implementation, which was the focus of this evaluation in research questions two and three. The confirmation that change (implementation of the wellness guidelines) took place was intended to be measured by the SAWS survey. The SAWS, the self-reported evaluation survey of schools to identify their progress toward meeting wellness goals (as well as other health concerns) correlated well with what schools were actually doing to meet wellness guidelines, during school site interviews. However, this dissertation proposed to further evaluate the implementation and confirm change.

In the evaluation of the adoption of an innovation (school wellness guideline) into a social system (HDOE), the DOI model discusses the importance of examining: the adequacy of the proposed change (wellness guideline), the characteristics of the population and system undergoing the change, and the consequences of the change (Rogers, 1995). Figure 4 displays the connection between available data sources and the evaluation of the implementation of the school wellness guidelines in the HDOE. The consequences of implementation may be indirect or direct, desirable or undesirable and anticipated or unanticipated. In the discussion below, future recommendations based on the evaluation are also suggested.

Adequacy of Program (School Wellness Guideline)

First, the change – the School Wellness Guidelines – was evaluated for the adequacy of the program in addressing goals and objectives (Rogers, 1995). The HDOE developed school wellness guidelines to address all the requirements of the federal law (PL-108-265, Section 204). Research question one compared the HDOE School Wellness Guideline with a tool interpreting federal law best practice recommendations (Schwartz et al., 2008) for wellness policy creation, which demonstrates the adequacy of the guidelines in addressing the necessary elements. Overall, Hawai‘i did well in many areas.

However, the school wellness guidelines were not specific enough in areas like communication, where recommendations were to specify a desired communication method with parents and students. The lack of a specified communication method to a subgroup that is supposed to take part in the change will decrease the knowledge needed for the population to make the decision to change. Schools having difficulty reaching the

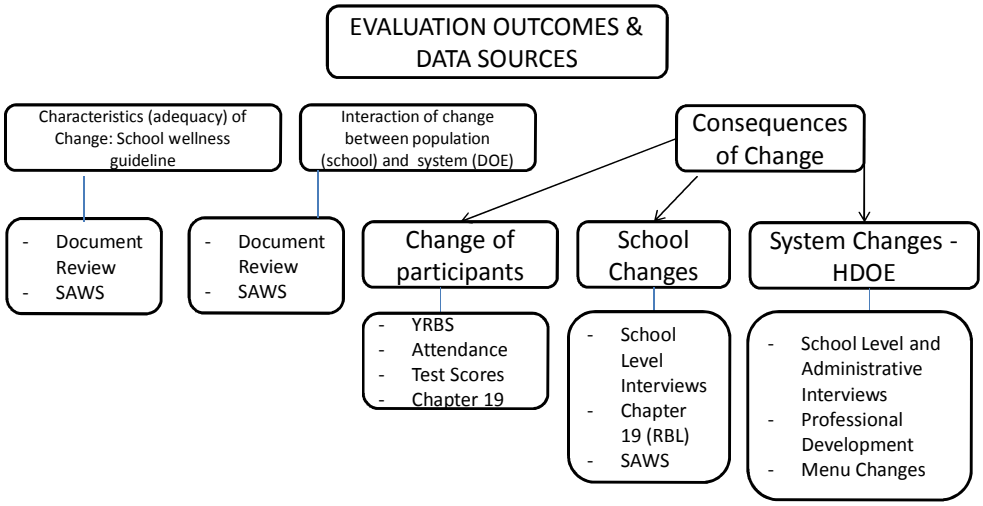


Figure 4. Association of data sources with evaluation categories.

wellness guidelines indirectly recognized this inadequacy of the policy in involving the parents, by using the lack of parental influence as reason for not making changes at school. However, schools that were progressing toward meeting guidelines saw this concern, and tried to educate the parents to change the student behaviors through newsletters, fairs, and parent nights.

Because the district is so large, in consideration of differences in local practices from diverse communities, the authors of the tool note the difficulty in having one policy for a large diverse area (Schwartz et al., 2008). While the intention not to specifically address communication may be warranted, this suggests the difficulty in having a unified policy.

Although not directly noted in the Hawai‘i school wellness guidelines, there were often changes made statewide by other means (other than state law or direct procedural and policy changes), which coincided with what should have been included in the wellness guidelines. For example, school food service menu changes occurred to promote best practices statewide but were not addressed directly by any policy. Not stating the changes in the guideline, although they were occurring, can decrease the likelihood that the changes are made if people are not knowledgeable about the intention. Thus, the unified administrative structure of the HDOE provided benefits for complying with federal recommendations (PL-108-265, Section 204) in the schools, but did not help in strengthening the HDOE's written policy.

The SAWS also evaluated schools in items that were not incorporated into the school wellness guideline (i.e., recess before lunch, staff wellness promotion). Thus, the HDOE was evaluating itself on nationally recommended wellness policy items that were not addressed in the wellness guidelines. It may be beneficial to revise the HDOE school wellness guidelines to increase its strength and comprehensiveness as indicated by the evaluation tool (Schwartz et al., 2008), since the changes are already mandated by other means. This will increase the HDOE's compliance with the federal mandate upon review of the policy, and therefore increase the adequacy of the policy.

To consolidate wellness recommendation goals and objectives, it may be beneficial to identify the additional wellness requirements mandated by the HDOE, but not currently part of the wellness guidelines, in the comprehensive toolkit provided to schools. In the toolkit, schools were guided toward implementation through a checklist, trainings, and other online resources. Based on interview comments, there can be

confusion with multiple documents relating to the wellness policies, thus increasing complexity and decreasing likelihood of compliance. However, the "checklist" provided helpful guidance for administrators of schools identified as progressing well toward meeting the guidelines.

Interaction of the Change Between the Population and System

The characteristics of the population and system undergoing the change (school wellness guidelines) can influence the outcomes of implementation. For the purposes of this discussion, the individual schools represented the population, and the HDOE represented the system. Research question two and three identified numerous programs initiated system wide for schools to help them reach the requirements of the school wellness guidelines, and contributed to this part of the discussion.

As the HDOE initiated school wellness guidelines per USDA requirements in the 2007-2008 school year, the HDOE was supported during implementation through various partnerships with other state and federally funded programs. The complexity of this relationship and different requirements for different programs may have caused confusion to schools that may have been willing to utilize the programs. The partnerships led to numerous interventions presented to assist schools in meeting the guidelines. However, schools were also encouraged to implement changes in their own ways, resulting in differences in implementation at each school.

Because of the diversity in the HDOE system, and the use of one unified policy, it was important in implementation that the individual needs of schools be addressed within the constraints of the larger system. In many of the specific interventions - the Healthy Hawaii Schools Challenge and the Model Schools - the goals were to identify practices

that could be used in other similar situations. The Healthier Hawaii Schools Challenge allowed schools to increase trialability of interventions within the smaller school environment. Although there should have been more focus on the evaluation of these programs, for the purposes of implementing these specific practices elsewhere, it will be important to share successes and concerns with implementation to other schools. This increases observability of wellness guideline interventions between schools, and can increase the likelihood of compliance and affect outcomes.

Schools are faced with multiple requirements to fulfill within a fixed budget and fixed amount of time. Some of the changes suggested by the school wellness guidelines and the SAWS evaluation may not have been perceived as compatible with current school procedures, resulting in a barrier to implementing change.

As an example, in the school wellness guidelines, schools were not allowed to restrict recess for younger students. Recess encourages the students to engage in what most staff believe is increased physical activity, which is important in addressing obesity and decreasing behavior referrals (Barros, Silver & Stein, 2009), possibly allowing more time to be spent on academic achievement. During interviews, all elementary schools observed that students engaged in physical activity when given the opportunity to have recess; however, schools found it difficult to discipline students in other ways due to other requirements for time spent on defined educational hours. More measurable evidence supporting not restricting recess as an advantage over other behavioral options is needed, and guidance provided to schools for situations that present with conflicting choices from external policies.

The requirement in the policies for a certain number of educational hours spent on nutrition and physical education also placed conflicting requirements on some schools, especially those that were not meeting adequate yearly progress. School administrators had to find alternative ways to meet the requirement, like offering physical education classes during recess or nutrition education during lunch, and implementing integrative nutrition programs, which may or may not have been the intention of the guideline.

The HDOE, which represents a diverse group of all public schools in Hawai‘i, implemented a single school wellness guideline for all schools. Due to the uniform nature of the guideline, system wide changes were possible. While, the implementation of the guidelines was intended to allow schools the independence to make individual changes, other requirements made it difficult to comply with changes when there were conflicting policies.

Consequences of Implementation of School Wellness Guideline

This dissertation also attempted to look at changes occurring in HDOE schools as a result of interventions that would assist schools in continuing to implement the Hawai‘i school wellness guidelines. Changes took place at various levels: students, practices in the schools and system wide changes.

Changes with students.

None of the changes specific to student outcomes evaluated in this study demonstrated causal relationships, but awareness of the change in variables can suggest future outcome measurements. YRBS data suggested that students made some changes to consume less unhealthy beverages and increase physical activity while also increasing screen time. However, there are numerous other factors that influenced these data in the

school setting, but the findings suggest a possible influencing factor on nutritional and physical activity behaviors. We would hope to see less screen time, but with societal advances in technology during this time period, this effect can be explained.

In comparing the subgroup of the top schools progressing toward meeting the guidelines based on the SAWS, with the lowest score schools in progression, there were no significant changes in the attendance and behavior referrals between groups during this time period. However, there was a significant increase in test scores for math in the schools not progressing toward meeting the wellness guidelines. The significant change in tests scores may not be representative of all schools due to the small sample size, and it does not account for other interventions to raise test scores during this time period, which could not be controlled for between schools. It would have been preferable to compare schools that had other similar changes or to have a controlled study design. However, this analysis of data was done retrospectively and changes were already made without control groups.

Changes in the Schools. Various changes were identified in the school environment as a result of school wellness guideline implementation.

RBL. One practice in schools targeted in the school wellness guideline was RBL. Previously, anecdotal data and observations suggesting that there may be decreased behavioral referrals associated with RBL (Tanaka et al., 2005; Bark, Stenberg, Sutherland, & Hayes, 2010), but it was not studied directly. In this study, the RBL intervention did not show a significant change in the total number of behavior referrals. However, as in the previous studies, qualitative observations by school staff suggest that it may have an effect on lunchtime referrals (Tanaka et al, 2005). In the current study,

the number of referrals may have been unduly influenced by other changes in the school environment. To better assess the impact of RBL, perhaps it would have been beneficial to track behavioral referrals during the lunch hour before and after schools changed to RBL. Demonstrating a decrease in behavioral referrals can increase the relative advantage for schools to change to this practice.

Also, it appeared school staff were confused about what it meant to change to RBL; schools needed more guidance (and/or trainings), if this is a target intervention that the HDOE wants to address. The HHI program produced a handbook for RBL implementation, which informed schools about the advantages to changing to RBL and decreased the complexity with implementation. However, the information could have been more readily available with the wellness toolkit to increase the likelihood that schools would make the change. Also, to increase implementation of RBL in schools, a research study developed a "RBL Best Practice Checklist" which may be useful in the HDOE to assist stakeholders to effectively implement RBL (Rainville, Lofton, & Carr, 2009).

Health and physical education. Many schools tried different ways to get health topics and physical education incorporated into the school day. Elementary schools all expressed a desire to have a health and PE teacher if one was not available; having one teacher at each school who could teach both health education and physical education may be beneficial for schools. This person could also play an important role in other wellness guidelines at the school.

If there is no funding for a health education teacher, as some comments by schools suggest, it may be beneficial for schools to have a standardized health education

curriculum that they can utilize across all grades. In interviews, schools that were progressing toward meeting the guidelines tried to standardize their approach to health education independently through various means. Implementing a new curriculum like this may be effective with a train the trainer approach, so it can be used at multiple schools. The curriculum intervention at the rural elementary school attempted to introduce a standardized curriculum into an elementary setting. However, more data are needed on the effectiveness of this curriculum for this school because evaluation was only available on the effectiveness of the trainings provided. It may also be beneficial to implement standardization of physical education for the same reason if there are no designated funds for a physical education teacher, at each school site. Implementing these options would require continued professional development for existing classroom teachers who will have to integrate these practices into their classrooms.

Because a year round garden is possible in many schools in Hawai‘i due to the weather and resources, it may also be beneficial to incorporate a school garden into a standardized health education plan, as evidenced by increased fruit and vegetable consumption from the pilot program in one Hawai‘i school (Buchthal, Tamai, Cornwell, & Heinrich, 2010) and other similar interventions across the nation (McAleese & Rankin, 2007). Other schools that have attempted gardens found that community support is also important for various reasons, which correlate with the findings in the pilot program.

Food and beverages in the school environment. Findings in this study have shown that foods and beverages introduced into the school setting outside of regulated school meals have been difficult for school personnel to control. Statewide school policies disallowing certain foods and beverages in school may be one of the only ways

to control this. One study found that 30 states had such a policy, with compliance rates of 67-80% (Wootan, Henry, Roberts & Johnson, 2007); in Hawai‘i, the compliance with this policy in the 2009-2010 school year was only one percent (HSDOE, 2011). A review of current research on school policies to promote healthy eating is further supported by the findings in this evaluation, in that competitive foods (foods sold outside of the federally reimbursed school meals) are widely available in secondary schools (Story, Nanney & Schwartz, 2009). Furthermore, the availability of these types of foods is related to the high intake of total calories from soft drinks and fat, and the lower intake of fruits and vegetables (Story, Nanney & Schwartz, 2009). In one school district, a policy change requiring healthier beverages sold in the school showed compliance by the school, but did not change self-reported behaviors in student consumption of these types of drinks or students' BMI (Jensen et al., 2012). Similar changes were recommended in the Hawai‘i school wellness guidelines for items provided to students during the school day. It may be helpful if the school wellness guidelines in Hawai‘i as with other policies also addressed the items that students can bring into the school environment.

Influencing snacks and in some cases lunches in the school environment was a problem for all schools. However, the schools with staff "buy in" and the regulation of a school snack policy were most successful in promoting healthier snacks. Schools progressing toward meeting this guideline had administrators who set additional school level policies in accordance with the guidelines, made an effort to educate the staff, and attempted to enforce polices, minimally with their staff. School administrators and the school wellness committee members felt that their policies were effective in changing behaviors at the school. However, further studies are needed at the school site to see if

policy changes were being carried out in practice and to see if changes affected student consumption of snack items. Regulating what is sold in the school setting or at school sponsored events, and regulating what is provided by school staff to students, was a priority for administrators in schools progressing toward meeting the guidelines. Other schools could utilize these school regulations as examples. Similar to having a policy on other items brought into the school environment (e.g., cell phones, weapons) specific school or district-wide policies should be set to prevent students and parents from introducing unhealthy foods.

System-wide changes.

Because the HDOE is a unified district and a single school wellness guideline was required, system wide changes were also observed as a result of implementation of programs offered or implemented in all schools.

SFS changes. Due to regulation by a centralized SFS department within the HDOE, changes in SFS should theoretically cause system wide changes in nutrition services. As observed by participants in this study, school lunches can provide better nutrition than many lunches brought from home. A study comparing two mid-west metropolitan schools, school lunches versus bagged home lunches showed that children eating school lunches had higher intakes of protein, vitamin A, D and K, and calcium, and lower intakes of fats, carbohydrates, vitamin E and sugar (Hur, Burgess-Champou, & Reicks, 2011). Thus, the minimum required nutrition values were higher in those eating school lunches. A recent School Nutrition and Dietary Analysis (SNDA III) of schools surveyed showed that most schools nationwide meet the standards for protein, vitamins and minerals; however, sodium and fat intake are high and fiber intake is low (Crepinsek,

Gordon, McKinney, Condon, 2009). In interviews with school food service administrators regarding the Team Nutrition program evaluation by a nutritionist, Hawai‘i’s school lunches, before additional changes were made in the menu, were found to have high sodium intake and low fiber intake. Thus, changes were implemented to address this concern. With the suggested changes in the composition of the standardized school menus, school lunches in the HDOE have increased in nutritional value. Schools in the HDOE should receive further support, as to encourage the consumption of school lunches, and parents should be educated on how to prepare nutrition meals for their children.

Although SFS changes should have caused system wide changes, variations continue to occur at school sites at implementation. Statewide menus and recommendations of how to comply with standards exist; however, school interviews revealed that all schools are not necessarily making the changes recommended, and many schools implement their own menus which may differ from the standardized menus. Without having mandatory inspections or use of standardized recipes and standardized preparation procedures for the items on the menus, changes in the procurement contracts present the best method at this time to effect changes in the school menu, because all schools must utilize these designated contractors to obtain the food products. Some changes were made in this manner. Now funding is being spent to help train individual schools, based on the resources they have, but perhaps schools should all be provided with similar resources (recipes and supplies) so changes can be implemented throughout the state without need for individualized assessment at each school. Standardization of recipes and supplies to all schools will also allow trainings and supplies to be offered to

schools that do not receive extra funding and support because they do not have 50% of their students qualifying for free and reduced lunch.

As many SFS noted, it is beneficial to utilize locally grown products and individualize a school's menu based on what students are familiar with and what they are likely to eat. Yet the state and national crisis in obesity demands that schools acknowledge it is also important to still maintain a nutritional standard. Thus, efforts should also be made to provide standardized nutritionally reviewed menu options for schools to select from, representing a variety of local cultures and preferences. SFS cafeteria managers may be the best individuals to work with to develop and select menu items that they feel the students will consume.

Cafeteria managers noted the difficulty in providing nutritional lunches versus providing something that the student will consume. The managers all verbalized that they don't want to choose the unhealthy option when given choices, but are concerned that the students get something versus nothing. Since the difficulty has much to do with families' nutrition and community preferences in foods, schools should work with parents and the community to familiarize students with the importance of consuming healthier options. Many schools utilized the time that students spent in the cafeteria to educate them about nutrition and physical activity in the primary and secondary grades. More standardized guidance to help schools provide these brief interventions and maximize learning in this part of the school environment may be beneficial, especially since it is directed at a time when students are making choices about what they will eat.

Professional development. Ongoing professional development for SFS workers, beyond required annual safety training, is also important to help SFS workers educate

students, clear up misconceptions about the foods that the HDOE is providing to the students, and to help them utilize methods allowing them to prepare more healthy and nutritious meals, including standardization of practices. Education about and promotion of the nutritional value of the school lunch with school staff and parents can be beneficial to clarify misconceptions about the content of foods in the school lunch and to promote more consumption of the lunches. Educating the food service workers so they can educate the students in the cafeteria can also be beneficial, especially in light of the fact that all cafeteria workers interviewed were eager to participate in such a task.

With the focus on health and wellness through the wellness guidelines, and the goals of the HHI program, numerous professional development activities have been offered to classroom teachers and health/physical education teachers throughout the HDOE system. Use of resource teachers across the state appeared to be a beneficial method to update staff, implement new curricular ideas across the state and provide specific guidance for each school site. Professional development trainings recorded for non SFS usually focused on improving health and physical education based on statewide standards. Also, trainings administered on smaller scale (not statewide conference or special funding projects) sponsored by resource teachers appeared to focus more on physical education than nutrition education according to a comparison of training objectives and participant responses.

Prior to the 2010-2011 school year, the data presented in this study may not include the scope of trainings that took place in the schools due to inconsistencies in tracking of professional development activities. Problems with tracking may explain some of this discrepancy or there may be a need for more PE training versus nutrition. In

general, all trainings with available evaluations completed showed that participants increased their knowledge from professional development activities and would like to have more training sessions. However, a comprehensive needs assessment (including teachers who may not have attended existing workshops) to determine what types of professional development were needed in these areas may be beneficial to direct future trainings. Due to recent budget cuts and furloughs in Hawai‘i, trainings have been more difficult to provide to staff.

Research Question Summary

There were three research questions evaluated in this dissertation. Research question one was addressed by comparing the Hawai‘i school wellness guidelines to the national recommendations utilizing a standardized tool (Schwartz et al, 2009). The Hawai‘i’ school wellness guidelines scored high in comprehensiveness and strength compared to other policies nationwide. The strengths were in the HDOE’s plan for nutrition education, physical education, standards for competitive foods in the school, and in its evaluation plan. The guideline needed to further address communication and health promotion, and ensure that the guideline encompassed the changes in the USDA nutrition programs and school meals that were being made locally. Based on the SEM theory, policy development should result in actual changes at various levels. However, in a three state study of wellness policies by Wall et al. (2012), the strength and comprehensiveness of wellness polices do not predict perceived implementation of nutrition related areas. Thus, it is important to evaluate the implementation and outcomes of a given wellness policy, which was done in research question two and three.

The centralized structure of the HDOE system allowed for the implementation of various standardized programs to assist in wellness policy implementation. Research question two specifically addressed the administrative support provided to schools to implement the school wellness guidelines. Numerous interventions were implemented in order to help schools meet the guidelines, with the goal of increasing physical activity and improving nutritional practices. Support for schools to understand the law was provided through repeated trainings, and confirmed as adequately provided in school level interviews. Numerous opportunities for professional development were provided for teachers as well as SFS staff. To enable schools to tailor their interventions locally a mini-grant program offered financial support to carry out interventions that could be applied elsewhere. Other schools elected to participate as model schools for nutrition and physical activity interventions. Some schools had the opportunity to participate in a trial of standardized curricula and implementation of a culturally appropriate garden based curricula. Despite the large system, schools and individuals could receive additional support in the implementation of the guidelines through district resource teachers. There were also district wide changes made to the school menus, with subsequent training for SFS staff to support the changes. Despite a lack of resources and budget to support the wellness guideline implementation, the HDOE was assisted by other partners in the HDOH, UH, and other federally funded programs to create and implement various interventions.

Research question three then addressed the school level impacts that may have occurred as a result of the implementation of the wellness guidelines by the HDOE and its supporting partners. As evidenced by the SAWS evaluation tool, some schools were

progressing toward meeting the guidelines utilizing available resources, while other schools were not. Interviews with schools progressing showed that they had developed committees and were trying to identify ways to provide adequate health and physical education for their students, ensure adequate physical activity during the school day, educate parents, and involve the community in addressing the wellness guidelines. Interviews with schools not progressing toward implementation described concerns about other conflicting school demands and the lack of support in the home and community environment to implement the policies. All schools had difficulty with implementing the food and snack policy, especially with older students. Interviews also identified that intended menu changes were not often implemented adequately, and more standardization and training was desired by SFS personnel. Based on these findings recommendations for continued implementation of the school wellness guidelines are suggested.

Recommendations

Because of the threatened loss of funding for the federal school lunch program, it was important for HDOE schools to implement the school wellness guidelines within a set time frame. Compliance was expected by the end of the 2011 school year; however, this study demonstrated that full compliance by all schools was unlikely by this date, due to various barriers in the school and community setting.

In order to meet the recommendations of the federal law, the HDOE should re-examine the current policy, and revise it to comprehensively address all recommendations with a new implementation plan. A revised guideline should also include a provision to meet physical education requirements, focus more on parent and

community involvement, and address school staff wellness so they can be role models for the students. Although not required in the national recommendations but suggested in a recent study (Wall et al, 2012), in order to cause measurable changes in behavior, stronger policy recommendations need to be made regarding all foods consumed during the school day to include foods brought into the school environment by students.

In regards to policy interpretation at the administrative level, the HDOE should lend more support and guidance to school administrators to assist in compliance with required minutes of health and physical education and requirements for physical activity during the school day, due to conflicting priorities in the school environment. Other policies may have to be reviewed or separate policies created to address discrepancies that occur in requirements.

Various interventions were implemented that may have resulted in more measurable changes (i.e., attendance, test scores, behavioral referrals, changes in nutrition or physical activity behaviors) in the school environment. However, due to a lack of an effective evaluation plan before the interventions, it was difficult to measure outcomes. It would have been beneficial to have more thorough evaluations planned and implemented for each program. Future interventions should have a solid evaluation plan in place before implementation, in order to assess the effectiveness and applicability of the intervention to other schools and/or states. In addition, with frequent staff turnover and a lack of stable funding all interventions should also have a plan for sustainability in the school environment without external support.

While sustainability is important at the school level, it is inevitable that due to staff turnover continued professional development is needed for school personnel. The

administrative implementation of professional development opportunities with the assistance of resource teachers appeared to be effective based on the number of teachers trained and positive comments. However, interviews at school sites and with administrators demonstrated the need for more professional development activities for SFS workers whose practices can have a large impact of what students eat during the school day. Therefore, more interventions and funding should be directed at professional development for SFS workers, with consideration of more standardized practices in meal preparation between schools.

School interviews demonstrated the need to address students' family and community life in order to support changes made by the school wellness guidelines and to assist in full implementation of the guidelines. Involvement of more community partners to support the wellness guidelines, especially located around the schools, is needed. Administrative interventions in the HDOE targeting these concerns are needed.

Future comparison studies should also address the implementation of policies and interventions in private schools in Hawai‘i that do receive funding from the USDA. Additionally, for the private schools that do not receive USDA funding, it would be interesting to see if they have attempted to make similar changes in their school based on a desire to improve health and wellness in the school setting.

Appendix A: State of Hawai‘i Wellness Guidelines and Checklist

(Implements Board of Education Policy 1110-6)

The Department of Education (DOE) recognizes that there are links among nutrition education, the food served in schools, and the amount of physical activity. Student wellness is affected by all of these. The DOE also recognizes that when students' wellness needs are met they attain higher achievement levels. To enable the development of life-long healthy habits, each of Hawai‘i's public schools shall implement these Wellness Guidelines over a four-year period (SY 2007-08 through SY 2010-11).

The Wellness Guidelines are based upon the following principles:

- Healthy students are better able to learn;
- Eating habits and active lifestyles that are developed in childhood will affect health throughout life;
- All children deserve nutritious and safely prepared food;
- Standards based Health Education, including a focus on skills and knowledge relating to nutrition;
- Standards based Physical Education as well as daily physical activity.

Assessment and evaluation will be an integral part of ensuring the adoption and implementation of these Wellness Guidelines.

Each school will have a designated school committee or council that regularly addresses school health issues. This committee shall be responsible for ensuring that the Hawai‘i Wellness Guidelines are implemented at the school.

The purpose of the committee will be to improve and maintain the school health environment to promote the level of healthy students with an emphasis on lifelong physical activity, nutrition, and being tobacco free.

The committee can be an existing body (i.e., School Community Council, Safety Committee, Quality School Support/Comprehensive Student Support Services Committee) or a newly formed group.

The committee shall include representatives from the school administration, staff/faculty, students and community.

The committee shall utilize the School Health Index and other sources of data to identify priority areas and to monitor improvements in those areas on an annual basis. Priority areas should be included in the school's Academic and Financial Plan.

The committee shall ensure that the school provide families with information about community physical activity resources and is encouraged to work closely with

community organizations and programs that help schools implement these Wellness Guidelines.

NUTRITION STANDARDS

Food/beverage providers must promote positive nutritional logos and trademarks on school grounds.

Nutrition information for products offered in snack bars, ala carte, vending, etc. is readily available near the point of purchase.

Nutrition Guidelines for Food and Beverage Items

All food and beverages sold or served to students at school or at school sponsored functions must comply with the current USDA Dietary Guidelines. Exceptions can be made for food and beverage items provided at one-time privately catered school sponsored events such as Prom or Winter Ball. Fund-raising events are not exempt.

The following items are not provided to students anywhere at school or at school-sponsored functions:

- Food of minimal nutritional value as defined by U.S. Department of Agriculture (USDA) regulations.
- All food and beverage items listing sugar, in any form, as the first ingredient, such as candy.
- Food containing artificial trans fat.

MEALS

All reimbursable meals shall fulfill Federal nutrient standards as required by the USDA Child Nutrition Program regulations.

All meals sold or served to students at school or at school sponsored functions must comply with the current USDA Dietary Guidelines.

Meals should feature fresh and minimally processed fruits and vegetables from local sources to the greatest extent possible.

SNACKS

After-school snacks served as part of the National School Lunch Program or the Child and Adult Care Food Program must meet USDA meal pattern requirements.

All snack items sold or served to students anywhere at school or at school sponsored functions, including items sold in ala carte lines and fundraisers, or provided in classrooms must meet the Institute of Medicine (IOM) standards **per serving** based on

the nutrition facts label or U.S. Food and Drug Administration-established serving size reference amount:

- Calories ≤ 200 calories
- Total Fat ≤ 8 grams
    - With the exceptions of nuts and seeds.
- Saturated Fat ≤ 2 grams
- Trans Fat ZERO
- Sodium ≤ 200 mg
- Sugar ≤ 8 grams
- Dietary Fiber ≥ 2 grams
    - Snacks with < 2 grams of dietary fiber are currently acceptable.

BEVERAGES

All beverages sold or served to students at school or at school sponsored functions must comply with the current IOM guidelines.

Beverages for <u>all students</u> include:

- Water without flavoring, additives, or carbonation
- Low-fat and nonfat milk:
    - Lactose-free and soy beverages are included
    - Flavored milk with no more than 22 g of total sugar per 8 oz. portion
- 100% fruit juice
- Caffeine-free, with the exception of trace amounts of naturally occurring caffeine substances

Beverages for <u>secondary level students after school</u> may include:

- Non-caffeinated, non-fortified beverages with less than 5 calories per portion as packaged (with or without non-nutritive sweeteners, carbonation, or flavoring).
- Sports drinks for student athletes participating in sport programs involving vigorous activity of more than one hour's duration.

NUTRITION & HEALTH EDUCATION

All required health education classes include a focus on knowledge and skills that support healthy eating and are aligned with the Hawai‘i Content and Performance Standards for Health Education. Nutrition education is integrated into other areas of the curriculum such as math, science, language arts, and social studies. Standards-based health and nutrition education information are taught by or done in collaboration with a teacher.

Instructional periods incorporating quality standards-based health education totals of a minimum of:

- 45 minutes per week for grades K-3,
- 55 minutes per week for grades 4-5, 107 minutes per week for elementary grade 6, and
- 200 minutes per week for secondary grades 6-12.

Standards-based health and nutrition education curricula information involve sharing information with families and the broader community (i.e., area sports leagues, youth groups & school clubs) to positively impact students and the health of the community. In recognition of the existing health disparities prevalent among Hawai‘i’s children, nutrition education includes multiple options for achieving optimum nutrition and health, and includes practical, multi-ethnic approaches that reach across all economic strata.

- Schools will promote the importance of students starting the day with a healthy breakfast, including the School Breakfast Program.
- Schools will promote the importance of students eating a nutritious lunch & healthy snacks, including participation in the National School Lunch Program and After School Snack Program (if applicable).

PHYSICAL ACTIVITY AND PHYSICAL EDUCATION

A systemic approach to physical activity develops and reinforces a physically active lifestyle. Teachers play a large role in increasing physical activity for students. Teachers must attend physical education workshops and conferences for professional development.

All required physical education classes shall be aligned with the Hawai‘i Content and Performance Standards for Physical Education. Physical education is an integral part of the total education of every child kindergarten through grade 12. Quality physical education programs facilitate the development of physically active lifestyles and are needed to increase the physical competence, health-related fitness, personal responsibility, and enjoyment of physical activity for all students so that they can be physically active for a lifetime.

- Instructional periods providing developmentally appropriate programs total a minimum of:
    - 45 minutes per week grades K-3,
    - 55 minutes per week for grades 4-5, 107 minutes per week for elementary grade 6, and
    - 200 minutes per week for secondary grades 6-12.
- Physical education courses provide an environment where students can learn, practice, and are assessed on developmentally appropriate motor skills, social skills, and knowledge acquisition.
- Policies ensure that state-certified physical education instructors teach all physical education classes and have a student/teacher ratio similar to other classes.
- Each secondary school’s physical education department provides continuing support to students and their families to help them participate in physical activity outside of physical education class.

- All students will have at least 20 minutes a day of supervised recess, during which schools must encourage moderate to vigorous physical activity.
- Students do not have periods of two or more hours of inactivity.
    - The only exception is during school-wide testing.
- Schools do not use physical activity as punishment.
- Schools do not withhold opportunities for physical activity as punishment.

PROFESSIONAL DEVELOPMENT

School faculty and staff, including School Food Services Staff, will be provided professional development in Hawai‘i’s Wellness Guidelines, health and nutrition education, physical education and Coordinated School Health summits.

State of Hawai‘i Wellness Guidelines Implementation Checklist

(Implements Board of Education Policy 1110-6)
To enable the development of life-long healthy habits, each of Hawai‘i’s public schools shall implement these Wellness Guidelines by the end of SY 2010-11.

Committee Designation
CD1: The school has a designated committee or council that will regularly address school health issues.
CD2: The committee annually completes the School Health Index and utilizes the results and other data sources to identify priority areas and to monitor improvements in those areas.
CD3: Identified priority areas submitted in the Safety and Wellness Survey (SAWS).
CD4: Actions to address priority areas are reflected in the school Academic and Financial Plan.

Nutrition
NS1: All reimbursable meals and snacks meet Federal nutrient standards as required by the U.S. Department of Agriculture Child Nutrition Program regulations.
NS2: All foods and beverages sold at school or school sponsored events (vending, concession stands, a la carte, fundraisers, student stores, and school parties) comply with the current USDA Dietary Guidelines.
NS3: Nutrition information for products offered in snack bars, a la carte, vending, etc. is readily available near the point of purchase.
NS4: Food and beverage providers promote positive nutritional messages on school property.
NS5: Meals feature fresh and minimally processed fruits and vegetables from local sources to the greatest extent possible.

Nutrition Education and Health Education
NH1: All required health education classes include a focus on knowledge and skills that support healthy eating and are aligned with the Hawai‘i Content and Performance Standards for Health Education.
NH2: The school promotes the importance of students starting the day with a healthy breakfast, including participation in the School Breakfast Program.
NH3: The school promotes the importance of students eating a nutritious lunch & healthy snacks, including participation in the National School Lunch Program and After School Snack Program (If applicable).
NH4: All required health education classes have instructional periods totaling a minimum of 45 minutes per week for grades K-3, 55 minutes per week for grades 4-5, 107 minutes for elementary grade 6, and 200 minutes per week for secondary grades 6-12.
NH5: Nutrition education is integrated into other areas of the curriculum such as math, science, language arts, and social studies.

SY of Completion

Physical Activity and Physical Education
PA1: All required physical education classes are aligned with the Hawai‘i Content and Performance Standards for Physical Education.
PA2: Secondary school’s Physical Education department provides support

for participation in physical activity outside of physical education class.
PA3: All students have at least 20 minutes a day of supervised recess, during which students are encouraged to participate in moderate to vigorous physical activity.
PA4: All required physical education classes have instructional periods totaling a minimum of 45 minutes per week for grades K-3, 55 minutes per week for grades 4-5, 107 minutes per week for elementary grade 6, and 200 minutes per week for secondary grades 6-12.
PA5: The school ensures that state-certified physical education instructors teach all physical education classes and have a student/teacher ratio similar to other classes.*
PA6: The school provides information to families to help them incorporate physical activity into students' lives.
PA7: The school discourages extended periods (i.e., periods of two or more hours) of inactivity.
PA8: When mandatory school-wide testing makes it necessary for students to be inactive for extended periods of time, schools will give students periodic breaks to stand and be moderately active unless the testing protocol specifies otherwise.*
PA9: The school does not use or withhold physical activity as punishment.

Professional Development

PD1: All applicable role groups including the School Food Service staff are given the opportunity to receive professional development in Hawai'i's Wellness Guidelines, health, nutrition, and physical education, and healthy school meals

Appendix B: Safety and Wellness Survey (SAWS)

Please type the name of your school for verification purposes. _____

1. Was a designated school committee or council in place to address school health issues?
    a. Yes
    b. No
2. Was the School Health Index completed by your Wellness Committee this year?
    a. Yes
    b. No
3. Which priority areas from the School Health Index did your school focus on this year? (Check all that apply) *
    a. health and safety polices and environment
    b. health education
    c. physical education and other physical activity programs
    d. nutrition services
    e. health services
    f. counseling, psychological and social services
    g. health promotion for staff
    h. Family and community involvement
    i. none.
4. Were priority areas reflected in your school's Academic and Financial Plan?
    a. yes
    b. no
5. Did all food and beverages sold or provided to students comply with the Wellness Guidelines? (This includes the student store, vending machines, fundraisers, athletic concessions, food science class, clubs, school parties, and school events) *
    a. yes
    b. no
6. Did your meal program feature fresh and minimally processed fruits and vegetables from local sources to the greatest extent possible? *
    a. yes
    b. no
7. Did all required health education classes include the HCPS topic area for nutrition? *
    a. yes
    b. no
8. Which of the following did your school promote? (Check all that apply) *
    a. The importance of students eating a nutritious breakfast
    b. Participation in the School Breakfast Program
    c. The importance of students eating a nutritious lunch
    d. Participation in the National School Lunch Program
    e. all of the above
    f. none of the above
    g. specify your own value (indicate)
9. In which grades did your school require health education? (Check all that apply) *
    K, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

10. Which grades received the recommended instructional minutes of standards-based health education per week? (Check all that apply) *

K (45 min), 1 (45 min), 2 (45 min), 3 (45 min), 4 (55 min), 5 (55 min), 6 elementary (107 min), 6 secondary (200 min), 7 (200 min), 8 (200 min), 9 (200 min), 10 (200 min), 11 (200 min), 12 (200 min)

11. Was nutrition education integrated into other curricula areas such as math, science, language arts, social studies, etc.? *

a. yes
b. no

12. Were all required PE classes aligned with the HCPS for PE? *

a. yes
b. no

13. Were all required PE classes aligned with the HCPS for PE? *

a. yes
b. no

14. Did your school provide support for participation in physical activity outside of PE? *

a. yes
b. no

15. Did all students have at least 20 minutes a day of supervised recess, during which they were encouraged to participate in moderate to vigorous physical activity? *

a. yes
b. no

16. In which grades did your school require PE? (Check all that apply) *

K, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

17. Which grades received the recommended instructional minutes of standards-based PE per week? (Check all that apply) *

K (45 min), 1 (45 min), 2 (45 min), 3 (45 min), 4 (55 min), 5 (55 min), 6 elementary (107 min), 6 secondary (200 min), 7 (200 min), 8 (200 min), 9 (200 min), 10 (200 min), 11 (200 min), 12 (200 min), All, None

18. Did PE classes have a student/teacher ratio similar to other classes? *

a. yes
b. no

19. Did the school provide information to families to help them incorporate physical activity into students' lives? *

a. yes
b. no

20. Does the school use or withhold physical activity as punishment? *

a. yes
b. no

21. Did school faculty and/or staff receive information about the Wellness Guidelines this year? *

a. yes
b. no

22. Which of the following screenings did your school provide to students? (Check all that apply) *

a. head lice
b. hearing
c. vision
d. oral health
e. height and weight or body mass index
f. scoliosis
g. none of the above

23. Which of the following were addressed through your school counseling or intervention services? (Check all that apply) *

a. abuse or neglect
b. immunization
c. bullying/harassment
d. conflict mediation
e. sexual violence
f. LGBTQ (or sexual orientation) discrimination/harassment
g. hiv/std
h. drug/alcohol/tobacco abuse
i. depression or suicide

24. Did your school require that all students update their Form 14 (Student Health Card) this year? *

a. yes
b. no

25. How many students required health or nursing services (e.g. medication, 504 modification plans, case management or SPED/IDEA)? *

26. Which active lifestyle opportunities were offered to students outside of school hours? (Check all that apply) *

a. before or after school physical activity programs
b. extramurals
c. parks and recreation programs
d. ymca/ywca programs
e. referrals to existing community programs
f. none of the above
g. specify your own

27. Was food used as a reward for students? *

a. yes
b. no

28. Was recess withheld for disciplinary reasons? *

a. yes
b. no

29. Did any students at your school have a "Recess Before Lunch" schedule? (i.e. students have recess immediately before eating lunch) *

a. yes
b. no

30. Does your school have a garden used for nutrition education with students? (e.g., container, raised bed, hydroponic, or farm) *

a. yes

b. no

31. How were health education standards addressed? (Check all that apply) *
    a. integrated into other standards
    b. dedicated health education class time
    c. augmented with before or after school programs
    d. specify your own value
32. Who taught health education classes? (Check all that apply) *
    a. licensed general education teacher
    b. licensed health education teacher
    c. licensed physical education teacher
    d. other teacher
    e. write your own value
33. Which of the following were barriers for providing health education? (Check all that apply) *
    a. lack of instructional time
    b. lack of qualified staff
    c. lack of adequate health education resources (e.g., demonstration models, DVDs)
    d. lack of professional development
    e. lack of interest by staff
    f. write your own value
34. Which of the following were facilitators for providing health education? (Check all that apply) *
    a. District health/physical education resource teacher
    b. highly qualified staff
    c. wellness guidelines
    d. health education and professional development
    e. adequate health education resources (e.g., demonstration models, DVDs)
    f. state resources
    g. federal resources
    h. community resources
    i. funding from the pta
    j, none of the above
35. How were PE standards addressed? (Check all that apply) *
    a. integrated into other standards
    b. dedicated health education class time
    c. augmented with before or after school programs
    d. specify your own value
36. Who taught PE classes? (Check all that apply) *
    a. licensed general education teacher
    b. licensed health education teacher
    c. licensed physical education teacher
    d. other teacher
    e. write your own value
37. Which of the following were facilitators for providing PE? (Check all that apply) *
    a. District health/physical education resource teacher

b. highly qualified staff
c. wellness guideline
d. health education and professional development
e. adequate health education resources (e.g., demonstration models, DVDs)
f. state resources
g. federal resources
h. community resources
i. funding from the pta
j, none of the above

38. Does your school have a health promotion program for staff? *
a. yes
b. no

39. Was there a designated area where school staff could find information on health screening, intervention programs and activities (e.g., fitness, weight management, tobacco cessation, substance abuse counseling.)? *
a. yes
b. no

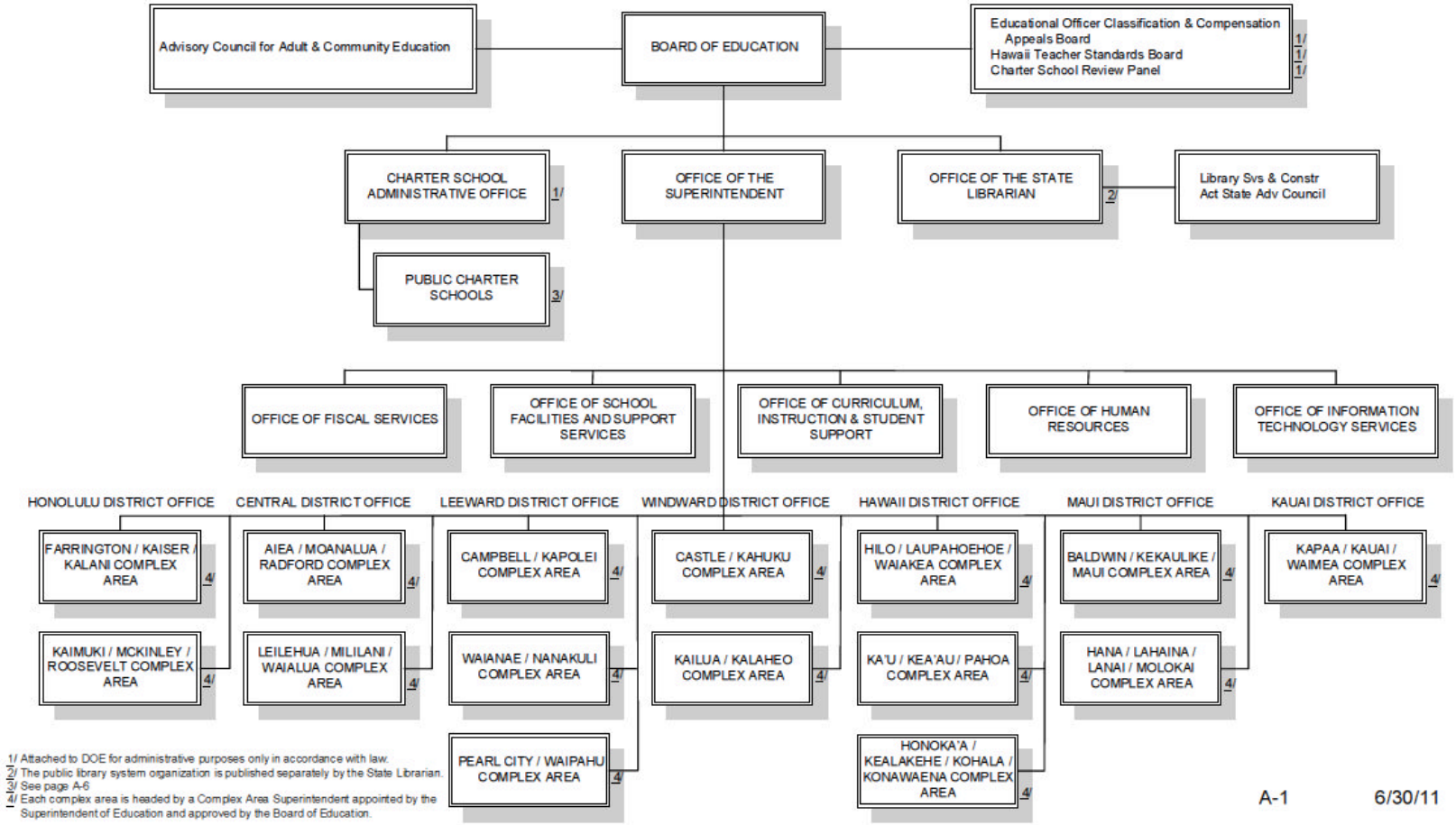
40. Did your school allow staff to utilize school facilities for physical activity (e.g., gym, weight room, swimming pool)? *
a. yes
b. no
c. n/a

41. How often were your facilities utilized after school hours and on weekends by the community? *
a. 1-2 times per week
b. 3-5 times per week
c. 6-7 days per week
d.n/a

42. Does your school have a "Safe Routes to School" program? *
a. yes
b. no

43. Please use this space to record any comments or questions.

Appendix C: HDOE Administrative Structure (Diagram from HDOE (2011a)



Appendix D: Similar YRBS Questions in Years 2007 and 2011

The following questions used for comparison between survey years 2007 and 2011 were obtained from the CDC (2012a). Questions included in 2007 that were not included in the 2011 survey were not listed below.

Middle School Questions

The next 5 questions ask about body weight.

38. How do you describe your weight?
A. Very underweight
B. Slightly underweight
C. About the right weight
D. Slightly overweight
E. Very overweight

39. Which of the following are you trying to do about your weight?
A. Lose weight
B. Gain weight
C. Stay the same weight
D. I am not trying to do anything about my weight

40. Have you ever gone without eating for 24 hours or more (also called fasting) to lose weight or to keep from gaining weight?
A. Yes
B. No

41. Have you ever taken any diet pills, powders, or liquids without a doctor's advice to lose weight or to keep from gaining weight? (Do not include meal replacement products such as Slim Fast.)
A. Yes
B. No

42. Have you ever vomited or taken laxatives to lose weight or to keep from gaining weight?
A. Yes
B. No

The next 5 questions ask about physical activity.

43. During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time.)

A. 0 days
B. 1 day
C. 2 days
D. 3 days
E. 4 days
F. 5 days
G. 6 days
H. 7 days

44. On an average school day, how many hours do you watch TV?
A. I do not watch TV on an average school day
B. Less than 1 hour per day
C. 1 hour per day
D. 2 hours per day
E. 3 hours per day
F. 4 hours per day
G. 5 or more hours per day

45. On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work? (Include activities such as Xbox, PlayStation, Nintendo DS, iPod touch, Facebook, and the Internet.)
A. I do not play video or computer games or use a computer for something that is not school work
B. Less than 1 hour per day
C. 1 hour per day
D. 2 hours per day
E. 3 hours per day
F. 4 hours per day
G. 5 or more hours per day

46. In an average week when you are in school, on how many days do you go to physical education (PE) classes?
A. 0 days
B. 1 day
C. 2 days
D. 3 days
E. 4 days
F. 5 days

47. During the past 12 months, on how many sports teams did you play? (Count any teams run by your school or community groups.)
A. 0 teams
B. 1 team
C. 2 teams
D. 3 or more teams

High School Questions

The next 5 questions ask about body weight.

67. How do you describe your weight?
A. Very underweight
B. Slightly underweight
C. About the right weight
D. Slightly overweight
E. Very overweight

69. During the past 30 days, did you go without eating for 24 hours or more (also called fasting) to lose weight or to keep from gaining weight?
A. Yes
B. No

70. During the past 30 days, did you take any diet pills, powders, or liquids without a doctor's advice to lose weight or to keep from gaining weight? (Do not include meal replacement products such as Slim Fast.)
A. Yes
B. No

71. During the past 30 days, did you vomit or take laxatives to lose weight or to keep from gaining weight?
A. Yes
B. No

The next 7 questions ask about food you ate or drank during the past 7 days. Think about all the meals and snacks you had from the time you got up until you went to bed. Be sure to include food you ate at home, at school, at restaurants, or anywhere else.

72. During the past 7 days, how many times did you drink 100% fruit juices such as orange juice, apple juice, or grape juice? (Do not count punch, Kool-Aid, sports drinks, or other fruit-flavored drinks.)
A. I did not drink 100% fruit juice during the past 7 days
B. 1 to 3 times during the past 7 days
C. 4 to 6 times during the past 7 days
D. 1 time per day
E. 2 times per day
F. 3 times per day
G. 4 or more times per day

73. During the past 7 days, how many times did you eat fruit? (Do not count fruit juice.)
A. I did not eat fruit during the past 7 days
B. 1 to 3 times during the past 7 days

C. 4 to 6 times during the past 7 days
D. 1 time per day
E. 2 times per day
F. 3 times per day
G. 4 or more times per day

74. During the past 7 days, how many times did you eat green salad?
A. I did not eat green salad during the past 7 days
B. 1 to 3 times during the past 7 days
C. 4 to 6 times during the past 7 days
D. 1 time per day
E. 2 times per day
F. 3 times per day
G. 4 or more times per day

75. During the past 7 days, how many times did you eat potatoes? (Do not count french fries, fried potatoes, or potato chips.)
A. I did not eat potatoes during the past 7 days
B. 1 to 3 times during the past 7 days
C. 4 to 6 times during the past 7 days
D. 1 time per day
E. 2 times per day
F. 3 times per day
G. 4 or more times per day

76. During the past 7 days, how many times did you eat carrots?
A. I did not eat carrots during the past 7 days
B. 1 to 3 times during the past 7 days
C. 4 to 6 times during the past 7 days
D. 1 time per day
E. 2 times per day
F. 3 times per day
G. 4 or more times per day

77. During the past 7 days, how many times did you eat other vegetables? (Do not count green salad, potatoes, or carrots.)
A. I did not eat other vegetables during the past 7 days
B. 1 to 3 times during the past 7 days
C. 4 to 6 times during the past 7 days
D. 1 time per day
E. 2 times per day
F. 3 times per day
G. 4 or more times per day

78. During the past 7 days, how many times did you drink a can, bottle, or glass of soda or pop, such as Coke, Pepsi, or Sprite? (Do not count diet soda or diet pop.)

A. I did not drink soda or pop during the past 7 days
B. 1 to 3 times during the past 7 days
C. 4 to 6 times during the past 7 days
D. 1 time per day
E. 2 times per day
F. 3 times per day
G. 4 or more times per day

The next 5 questions ask about physical activity.

79. During the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time.)
A. 0 days
B. 1 day
C. 2 days
D. 3 days
E. 4 days
F. 5 days
G. 6 days
H. 7 days

80. On an average school day, how many hours do you watch TV?
A. I do not watch TV on an average school day
B. Less than 1 hour per day
C. 1 hour per day
D. 2 hours per day
E. 3 hours per day
F. 4 hours per day
G. 5 or more hours per day

81. On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work? (Include activities such as Xbox, PlayStation, Nintendo DS, iPod touch, Facebook, and the Internet.)
A. I do not play video or computer games or use a computer for something that is not school work
B. Less than 1 hour per day
C. 1 hour per day
D. 2 hours per day
E. 3 hours per day
F. 4 hours per day
G. 5 or more hours per day

82. In an average week when you are in school, on how many days do you go to physical education (PE) classes?
A. 0 days

B. 1 day
C. 2 days
D. 3 days
E. 4 days
F. 5 days

83. During the past 12 months, on how many sports teams did you play? (Count any teams run by your school or community groups.)
A. 0 teams
B. 1 team
C. 2 teams
D. 3 or more teams

Appendix E: Interview Guides

For all those participating in interviews, first complete the following steps:

- Read through IRB consent document and have participant sign if not signed already.
- Will you allow us to tape your interview? (Not required to proceed. If yes, names will not be used for the remainder of the interview. Start tape.)
- Will you allow us to use direct quotes from your answers to evaluate the interventions that have taken place at your school? (Not required to proceed.)
- Please state your position and location of work (i.e. teacher, student, staff member, cafeteria worker, playground supervisor, educational assistant).

Interview guide for program administrators

- What program have you assisted in implementing?
- What are the goals of this program?
- What activities are associated with this program?
- How was this program introduced to the schools?
- What resources are necessary to carry out this program?
- What financial resources were necessary to initiate this program (if possible)?
- What is done to support schools that choose to implement this program?
- How do schools become involved? Are there requirements for participation? If so, what are they?
- How many schools are involved now? Which schools are involved (if possible)?
- What measures have been taken to evaluate success or failure of this program?
- What do you think needs to be improved on? What went well with implementation?
- What efforts have been made for sustainability related to the changes in this program?

- Any other comments?

Brief interview guide for follow up to SFS program implementation

- Are you aware that changes have been made to the school lunch menus? What changes have you noticed?
- What role have you played (if any) in the implementation of the changes in the school lunch menus? How did this change affect your job?
- Did you receive any training on the changes? If yes, was the training helpful in guiding you to implement them at your school? How can the training be improved?
- Are there any changes in student eating behaviors as a result of these changes? If yes, what are the changes that you have observed? (prompt with: choices of foods by students, amount they eat/waste)
- Do you have any suggestions that would help in implementing this change?

Interview guide for overall wellness policy implementation

For Administrators:

- Review the SAWS data submitted by the school for accuracy in responses.
- What activities has your school done to meet the wellness policies?
- What resources did you utilize to implement the policies? Supplemental? Community? Anything else?
- How did you encourage staff and student "buy in"?
- What barriers or challenges did you have in implementing the policies?
- Did you feel that you received enough support to implement the policies??
- What future plans (if any) do you have to continue implementing the policy?
- How do you plan to sustain the changes that you have made?

- Do you have any other comments regarding the wellness policies and/or their implementation?

For Non Administrators:

- Are you aware of the School Wellness Policies?

- If Yes: What do you know about them? After answering provide with summary of guidelines.

- If No: Provide interviewee with summary of guidelines. Briefly read through guidelines if necessary.

- Are you aware of the changes and interventions that your school has tried to make in order to meet the wellness guidelines?

- If Yes: Which changes have you heard about or taken part in? For each intervention that participant was aware of, ask:

1. Did you feel this was effective? Why or Why not?

2. What other changes do you think would have been helpful?

3. What role if any, did you play in implementing the wellness policies?

- If No: Explain to interviewee some of the programs that are going on at their school.

- Are you aware that there is a school wellness committee?

- If Yes: Please explain what you think the wellness committee does at the school.

1. Do you feel they are effective?

2. What else do you think they can do to help the school meet the wellness guidelines?

- If No: Explain the role of the wellness committee per publication from the DOE (Appendix A).

- Are there any other interventions that you think the school should be doing to address physical activity and the importance of nutrition to students and staff?
- Any additional comments?
    - (For teachers only) Did you participate in the implementation of any new health and physical education curriculum? Do you feel that it worked well? Did you receive any PDE related to the wellness policies? Was this helpful in guiding you for implementation of the policies in the school setting?

Appendix F: Consent form for participation in interviews

Participants were asked to sign this form. The form may be read to those who are unable to read, before signing. If an interpreter was available, the contents of this form was interpreted for the participant.

UNIVERSITY OF HAWAI'I
Department of Education
Consent To Act As A Research Participant

This study involves an interview of individuals, about the implementation of the school wellness policies in Hawai'i. This research project is performed as partial fulfillment of the requirement for the University of Hawai'i, Manoa, doctoral program in education, and for potential submission to relevant published journals.

There are no foreseeable risks with this research.

I agree to participate in this research project and I understand the following that:

1. The time required for the interview will be approximately 15-30 minutes
2. The nature of my participation may involve a taped phone or in person conversation about myself in addition to my account of the topic being researched.
3. I may be contacted after the interview for verification of data.
4. All data are confidential unless a secondary release is signed.
5. My participation is entirely voluntary and I understand that I may withdraw at any time without jeopardy to my role as student or as employee
6. It will be necessary for me to be contacted at an additional time to clarify information discussed during the taped interview.
7. If I should have any questions about the research please feel to contact, Janelle Jinbo at (808) 291-5126 or Dr. Beth Pateman at (808) 956-5359.

_____

Signature of Participant/Legal Guardian Date

_____

Signature of Researcher Date

Janelle Jinbo

References

Accountability Resource Center of Hawai‘i (ARCH). *School Status and Improvement Reports*. State of Hawai‘i, Department of Education. Systems Accountability Office. Retrieved from http://arch.k12.hi.us/ on July 15, 2012.

Ahamed, Y., MacDonald, H., Reed, K., Naylor, P.J., Liu-Ambrose, T., & McKay, H. (2007). School based physical activity does not compromise children's academic performance. *Medicine and Science in Sports and Exercise*, 39, 371-376.

American Academy of Pediatrics. (2003). Prevention of Pediatric Overweight and Obesity. *Pediatrics*, 112 (2), 424-430.

American Cancer Society, American Diabetes Association, and American Heart Association. (2008). *Physical Education in Schools-Both Quantity and Quality are Important*. Retrieved from http://www.everydaychoices.org/082008/PE%20in%20Schools%20Statement%20ACS%20ADA%20AHA%205.27.08%20_final_.pdf

American Dietetic Association (ADA). (2006). Position of the American Dietetic Association: individual, family, school and community based interventions for pediatric overweight. *Journal of American Dietetic Association*, 106 (6), 925-945.

Assistant Secretary for Planning and Evaluation (ASPE). (2010). *Childhood Obesity.* Retrieved on August 30, 2010 from http://aspe.hhs.gov/health/reports/child_obesity/.

August, G.P., Caprio, S., Fennoy, I., Freemark, M., Kaufman, F.R., Lustig, R.H., Silverstein, J.H., Speiser, P.W., Styne, D.M., & Montori, V.M. (2008). Prevention and treatment of pediatric obesity: an Endocrine Society clinical practice

guideline based on expert opinion. *Journal of Clinical Endocrinology Metabolism*, 93(12):4576-99.

Bark, K., Stenberg, M., Sutherland, S., Hayes, D. (2010). Scheduling recess before lunch: Exploring the benefits and challenges in Montana schools. *Journal of Child Nutrition and Management*, 32 (2), Retrieved from http://www.schoolnutrition.org/Content.aspx?id=14762

Barness, L.A. (2007). Obesity in children. *Fetal Pediatric Pathology*, 26 (2), pp. 75-85.

Barros, R., Silver, E., & Stein, R. (2009). School Recess and Group Classroom Behavior. *Pediatrics*, 123 (2), 432-436.

Belansky, E., Cutforth, N., Delong, E., Ross, C., Scarbro, S., Gilbert, L., Beatty, B., & Briefel, R.R., Crepinsek, M.K., Cabili, C., Wilson, A., & Gleason, P.M. (2009). School food environments and practices affect dietary behaviors of US public school children. *Journal of American Dietetic Association*, 109 (2 Suppl), S91-107.

Beets, M.W.,= & Pitetti, K.H. (2006). Criterion-referenced reliability and equivalency between the PACER and 1 mile run/walk for high school students. *Journal of Physical Activity and Health*, 3 (Suppl 2), S21-S33.

Biro, F.M. & Wien, M. (2010). Childhood obesity and adult morbidities. *American Journal of Clinical Nutrition*. 91 (5), 1499S-1505S.

Briefel, R.R., Crepinsek, M.K., Cabili, C., Wilson, A., & Gleason, P.M. (2009). Improving Child Nutrition Policy: Insights from National USDA Study of School Food Environments. *Journal of American Dietetic Association*, 109 (2S), pp S91-S107.

Brown, L., Beardslee, W., & Prothrow-Stith, D. (2008). *Impact of School's Breakfast on Children's Learning*. Retrieved on September 2, 2010 from http://www.sodexofoundation.org/hunger_us/Images/Impact%20of%20School%20Breakfast%20Study_tcm150-212606.pdf

Brown, L. & Pollitt, E. (1996). Malnutrition, poverty and intellectual development. *Scientific American*, 274 (2), 38-43.

Brown, W.V., Fujioka, K., Wilson, P.W., &Woodworth, K.A. (2009). Obesity: Why be concerned? *American Journal of medicine*, 122 (4 Suppl 1): S4-11.

Buchthal, V., Tamai, T., Cornwell, E., & Heinrich, K. (2010). Waimanalo Elementary/Intermediate School (WEIS) Garden-to-Classroom Project. *Journal of Nutrition Education and Behavior*, 42(4), S132.

Burgeson, C.R., Wechsler, H., Brener, N.D., Young, J.C., & Spain, C.G. (2001). Physical education and activity: results from the School Health Policies and Programs Study. *Journal of School Health*, 71 (7), 279-293.

Burns, C.E., Dunn, A.M., Brady, M.A., Starr, N.B., and Blosser, C. (2004). *Pediatric Primary Care: A Handbook for Nurse Practitioners* (3rd Ed.). Philadelphia: Elsevier.

California Department of Education. (2002). *State Study Proves Physically Fit Kids Perform Better Academically*," Sacramento, CA

Carrell, A.L., Clark, R.R., Peterson, S. Eickhoff, J., & Allen, D.B. (2007). School based fitness changes are lost during the summer vacation. *Archives of Pediatric Adolescent Medicine*, 161 (6), 611-614.

Centers for Disease Control (CDC). (2002). *Creating or Improving Access to Places for*

Physical Activity is Strongly Recommended to Increase Physical Activity. Retrieved March 6, 2008 from http://www.thecommunityguide.org/pa/default.htm.

Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Adolescent and School Health, Health Resources and Services Administration, Maternal Child Health Bureau, Office of Adolescent Health, National Adolescent Health Information Center, University of California, San Francisco. (2004). *Executive Summary – Improving the Health of Adolescents and young Adults: A guide for States and Communities*. Atlanta, GA.

Centers for Disease Control and Prevention (CDC). (2005). *School Health Index: A Self-Assessment and Planning Guide*. Elementary school version. Atlanta, Georgia.

Centers for Disease Control and Prevention (CDC). (2005a). Surveillance Summary, *MMWR*, 55 (SS-5), 1-108.

Centers for Disease Control and Prevention (CDC). (2006). *CDC: Physical Education: Curriculum Analysis Tool*, Atlanta, GA. Retrieved from http://www.cdc.gov/healthyyouth/PECAT/.

Centers for Disease Control and Prevention (CDC), School Health Policy and Programs Study (SHPPS). (2006). *State Report Card: Hawai'i*. Retrieved from http://www.cdc.gov/HealthyYouth/shpps/2006/report-cards/Hawai'i/RC_Hawai'i_SHPPS2006.pdf

Centers for Disease Control and Prevention (CDC). (2007). *Health Curriculum Analysis Tool*, Retrieved from http://www.cdc.gov/HealthyYouth/HECAT/index.htm

Centers for Disease Control and Prevention (CDC). (2007a). *Contributing Factors.* Retrieved from http://www.cdc.gov/nccdphp/dnpa/obesity/childhood/contributing_factors.htm

Centers for Disease Control and Prevention (CDC). (2008). *Behavioral Risk Factor Surveillance System.* Retrieved from http://apps.nccd.cdc.gov/brfss/display.asp?cat=OB&yr=2008&qkey=4409&state=UB.

Centers for Disease Control and Prevention (CDC). (2010a March 31). *Childhood Overweight and Obesity.* Retrieved September 28, 2010 from http://www.cdc.gov/obesity/childhood/index.html

Centers for Disease Control and Prevention (CDC). (2010b October 20). *School Based Obesity Prevention Strategies for State Policymakers*. Retrieved from http://www.cdc.gov/obesity/recommendations.html

Centers for Disease Control and Prevention (CDC). (2011). Youth Risk Behavior Surveillance – Hawaii. Retrieved from http://apps.nccd.cdc.gov/youthonline/App/Results.aspx?TT=A&OUT=0&SID=HS&QID=QQ&LID=XX&YID=2011&LID2=&YID2=&COL=S&ROW1=&ROW2=&HT=QQ&LCT=&FS=&FR=1&FG=1&FSL=&FRL=&FGL=&PV=&TST=False&C1=&C2=&QP=G&DP=1&VA=CI&CS=Y&SYID=&EYID=&SC=DEFAULT&SO=ASC

Centers for Disease Control and Prevention (CDC). (2012). Youth Risk Behavior Surveillance System. *MMWR,* 61 (4), 1-166.

Centers for Disease Control and Prevention (CDC). (2012a). *Youth Risk Behavior*

Surveillance System. Retrieved from http://www.cdc.gov/HealthyYouth/yrbs/brief.htm

Centers for Disease Control and Prevention (CDC). (2013). *1991-2011 High School Youth Risk Behavior Survey Data.* Retrieved from http://apps.nccd.cdc.gov/youthonline.

Centers for Disease Control and Prevention (CDC). (2013a). Methodology of the Youth Risk Behavior Surveillance System – 2013. *MMWR,* 62 (1), 1-18.

Center for Ecoliteracy. (2005). *Model Wellness Policy Guide*. Retrieved from www.ecoliteracy.org.

Center on the Family. (2010). *Data Center*. Retrieved from http://uhfamily.Hawai‘i.edu/Cof_Data/datacenter.asp.

Chai, D., Kaluhiokalani, N., Little, J., Hetzler, R., Zhang, S., Mikami, J., & Ho, K. (2003). Childhood Overweight Problem in a Selected School District in Hawai‘i. *American Journal of Human Biology*, 15: 164-177.

Chock, G. & Kerr, N. (2007). *Hawai‘i Pediatric Weight Management Toolkit*. Honolulu, HI: Author.

Coe, D.P., Pivarnik, J.M., Womack, C.J., Reeves, M.J., & Malina, R.M. (2006). Effect of physical education and activity levels on academic achievement in children. *Medicine and Science in Sports and Exercise*, 38, 1515-1519.

Corbett K.K. (2001). Susceptibility of youth to tobacco: a social ecological framework for prevention, *Respiratory Physiology* 128: 103-118.

Corbin, J. & Strauss, A. (2007). *Basics of qualitative research: Techniques and procedures for developing grounded theory (*3rd ed.). Thousand oaks, CA: Sage.

Crepinsek, M.K., Gordon, A.R., McKinney, P.M., Condon, E.M., & Wilson, A. Meals offered and served in US public schools: do they meet nutrient standards? *Journal of American Dietetic Association*, 109 (2 suppl): S31-S43.

Creswell, J. & Clark, V. (2007). *Designing and Conducting Mixed Methods Research*. Thousand Oaks, CA: Sage Publications.

Creswell, J. (2013). *Qualitative Inquiry and Research Design*. Thousand Oaks, CA: Sage publications.

Damon, S., Dietrich, S., & Widhalm, K. (2005). PRESTO – Prevention Study of Obesity: A project to prevent obesity during childhood and adolescence. *Acta Pediatrica*, 94 (Suppl 448): 47-48.

Datar, A. & Sturm, R. (2004). Physical Education in elementary school and body mass index: Evidence from the early childhood longitudinal study. *American Journal of Public Health*, 94, 9-14.

Davis, S., Going, S., Helitzer, D., Teufel, N., Snyder, P., Gittelsohn, J., Metcalfe, L., Arviso, V., Evans, M., Smyth, M., Brice, R., & Altaha, J. (1999). Pathways: A culturally appropriate obesity prevention program for American Indian School Children. *American Journal of Children Nutrition*, 69 (suppl), 796S-802S.

DeRenne, C., Maeda, J.K., Chai, D.X., Ho, K., Kaluhiokalani, N., & Braun, K. (2008). Afterschool physical activity program to reduce obesity-related cancer risk: a feasibility study. *Journal of Cancer Education*, 23 (4): 230-4.

Dowda, M. C., Sallis, J. F., McKenzie, T. L., Rosengard, P. R. & Kohl, H. W. (2005).

Evaluating the sustainability of SPARK physical education: A case study of translating research into practice. Research Quarterly for Exercise and Sport, 76, 11-19.

Drewnowski, A., Rehm., C., & Solet, D. (2007). Disparities in obesity rates: Analysis by zip code area. *Social Science Medicine*, 65 (12), 2458-2463.

Driskell, M.M., Dyment, S., Mauriello, L., Castle, P., & Sherman, K. (2008). Relationship among multiple behaviors for childhood and adolescent obesity prevention. *Preventive Medicine*, 46 (3), 209-215.

Dwyer, T., Sallis, J. F., Blizzard, L., Lazarus, R., & Dean, K. (2001). Relation of Academic Performance to Physical Activity and Fitness in Children. *Pediatric Exercise Science*, 13, 225-238

Efron, B. and Tibshirani, R. J. (1993). *An Introduction to the bootstrap*. New York: Chapman and Hall.

Egger, G., Swinburn, B. (1997). An ecological approach to the obesity pandemic. *BMJ*. 315 (7106), 477-480.

Ehrlich, G. (2008). Health = Performance. *American School Board Journal, 195*(10), 42-44.

Eldh, A.C., Ekman, I., Ehnfors, M. (2006). Conditions for patient participation and non-participation in health care. *Nursing Ethics*, 13 (5), 503-514.

Ellis, K. (2008). *School wellness policy development, implementation and evaluation*. Retrieved from www.csba.org.

Eres, G., Tirosh, A., Rudich, A., Meiner, V., Schwarzfuchs, D., Sharon, N., Shpitzen, S., Bluher, M., Stumvoll, M., Thiery, J., Fiedler, G.M., Friedlander, Y., Leiterstdorf,

E., & Shai, I. (2011). Phenotypic and genetic variation in leptin as determinants of weight regain. *International Journal of Obesity*, 35(6), 785-92.

Eveland-Sayers, B.M., Farley, R.S., Fuller, D.K., Morgan, D.W., & Caputo, J.L. (2009). Physical fitness and academic achievement in elementary school children. *Journal Physical Activity and Health*, 6 (1), 99-104.

Ewing, R., Schmid, T., Killingsworth, R., Ziot, A., & Raudenbush, S. (2003). Relationship between urban sprawl and physical activity, obesity, and morbidity. *American Journal of Health Promotion*, 18 (1), 47-57.

Finkelstein, E.A., Fiebelkorn, I.C., & Wang, G. (2003). National medical spending attributable to overweight and obesity: How much, and who's paying? *Health Affairs*, W3, 219-226.

Flynn, M.A., McNeil, D.A., Maloff, B., Mutasingwa, D., Wu, M., Ford, C., & Tough, S.C. (2006). Reducing obesity and related chronic disease risk in children and youth: a synthesis of evidence with best practice recommendations. *Obesity Research*, Suppl 1: 1-5.

Foster, G., Sherman, S., Borradaiele, K., Grundy, K., Vander Veur, S., Nachmani, J., Karpyn, Al, Kumanyika, S., & Shults, J. (2008). A Policy Based School Intervention to Prevent Overweight and Obesity. *Pediatrics*, 121 (4), 794-802.

Fowler-Brown, A. & Kahwati, L.C. (2004). Prevention and treatment of overweight children and adolescents. *American Family Physician,* 69 (11), 2591-8.

Freedman, D.S., Wang, J., Ogden, C.L., Thornton, J.C., Mei, Z., Pierson, R.N., Dietz, W.H., & Horlick, M. (2007). The prediction of body fatness by BMI and skinfold

thickness among children and adolescents. *Annals Human Biology*, 34 (2), 183-194.

French, S. & Stables, G. (2003). Environmental interventions to promote vegetable and fruit consumption among youth in schools settings. *Preventive Medicine, 37*, 593–610.

Froberg, K. & Andersen, L. (2005). Mini review: physical activity and fitness and its relations to cardiovascular disease risk factors in children. *International Journal of Obesity*, 29 (Suppl 2), S34-S39.

Furubayashi, J.K. & Look, M. (2005). Type 2 diabetes in native Hawaiians and Pacific Islanders in Hawai‘i. *Pacific Health Dialogue* 12 (2), 103-110.

Gentile, D.A., Walk, G., Eisenmann, J.C., Reimer, R.A., Walsh, D.A., Russell, D.W., Callahan, R., Walsh, M., Strickland, S., & Fritz, K. (2009). Evaluation of a multiple ecological level child obesity prevention program: Switch what you Do, View and Chew. *BMC Med*, 7, 49-56.

Goodman, E., Adler, N.E., Daniels, S.R., Morrison, J.A., Slap, G.B., & Dolan, L.M. (2003). Impact of objective and subjective social status on obesity in a biracial cohort of Adolescents. *Obesity Research*, 11 (8), 1018-1026.

Goran, M. (2006). Parents as agents of change in childhood obesity: From research to practice. *International Journal of Pediatric Obesity*, 1 (2), 66-76.

Gou, S. S., Roche, A. F., Chumlea, W. C., Gardner, J. D., & Siervogel, R. M. (1994). The predictive value of childhood body mass index values for overweight at age 35y. *American Journal of Clinical Nutrition, 59*, 810–819.

Haas, J. S., Lee, L. B., Kaplan, C. P., Sonneborn, D., Phillips, K.A., & Liang, S. Y.

(2003). The association of race, socioeconomic status, and health insurance status with the prevalence of overweight among children and adolescents. *American Journal of Public Health, 93*(12), 2105–2110.

Haider, M. & Kreps, G. (2004). Forty of diffusion of innovations: Utility and value in public health. *Journal of Health Communication*, 9, 3-11.

Harper, M. (2006). Childhood obesity: Strategies for prevention. *Family & Community Health*, 29 (4), 288-298.

Hawai‘i State Department of Health (HDOH). (2007a). *Hawai‘i physical activity and nutrition plan 2007-2012.* Honolulu, HI: Author.

Hawai‘i State Department of Health (HDOH). (2007b). *About the Healthy Hawai‘i Initiative.* Retrieved from http://www.healthyHawai‘i.com/about_hhi/about_start_living_healthy/about_the_healthyHawai‘i_initiative.htm

Hawai‘i State Department of Education (HDOE) (2009). *Department of Education School Wellness Guidelines.* Retrieved from http://doe.k12.hi.us/foodservice/toolkit/index.htm.

Hawai‘i State Department of Education (HDOE). (2009a). *2009 Superintendents annual report.* Honolulu, Hawai‘i: Systems Accountability Office. Retrieved on June 17, 2010 from http://arch.k12.hi.us/PDFs/state/superintendent_report/2009/2009SuptRptFinal20100222.pdf.

Hawai‘i State Department of Education (HDOE) (2011). *Superintendent’s Annual Report 2010*. Honolulu, Hawai‘i: Retrieved from

http://arch.k12.hi.us/state/superintendent_report/sar2010.html.

Hawai‘i State Department of Education (HDOE) (2011a). *Plan of Organization*. Honolulu, Hawai‘i: Retrieved from http://doe.k12.hi.us/about/orgcharts/2011%20DOE%20Plan%20of%20Organization%206-30-11.pdf

Healthy Hawai‘i Initiative. (2008). *Report to the 25th Legislature State of Hawai‘i 2009.* Retrieved from http://docs.google.com/viewer?a=v&q=cache:qXRsc2jrR5QJ:gen.doh.Hawai‘i.gov/sites/LegRpt/20091/leg001.pdf+saws+school+survey+hhi&hl=en&gl=us&pid=bl&srcid=ADGEEShb8m_cgRrmVh-RHQBhlMQw3BGq1VlYBcGBliGd65s120HzXbkJdibGR_EVvF3bDeMwz4MhJIQuSrq_8rzKNIuSGv-yJVMZ8ygaXzWd_1V0HSWQmoaNBlhtTlFb4txb2fQPuIYj&sig=AHIEtbTF6IvVIHAQuL9rAKFNzoIYC2aBZg.

Hill, A., & Lissau, I. (2002). Psychosocial factors. In W. Burniat, T.J. Cole, I., Lissau, & M.E. Elizabeth (Eds.). *Child and adolescent obesity: Causes, consequences, prevention and management.* Cambridge, NY: Cambridge University Press.

Hong, C.J., Tsai, P.J., Cheng, C.Y., Chou, C.K., Jheng, H.F., Chuang, Y.C., Yang, C.N., Lin, Y.T., Hsu, C.W., Cheng, I.H., Chen, S. Y., Tsai, S.J., LIou, Y.J., & Tsai, Y.S. (2010). ENO Mutagenesis Identifies Mice with Morbid Obesity and Severe Hyperinsulinemia caused by a Novel Mutation in Leptin. *PLoS One*, 9:5 (12), e15333.

Horowitz, M., Shitlz, M.K., & Townsend, M.S. (2004). Eatfit: A goal oriented

intervention that challenges adolescents to improve their eating and fitness choices. A Theory-drive behaviorally focused, nutrition and fitness intervention for adolescents. *Journal Nutrition Education and Behavior*, 36, 43-44.

Hubbard, W. & Sandman, L. (2007). Using Diffusion of Innovations Concepts for Improved Program Evaluation. *Journal of Extension*, 45 (5), Retrieved from http://www.joe.org/joe/2007october/a1.php

Hur, I., Burgess-Champoux, T., & Reicks, M. (2011). Higher Quality Intake from School Lunch Meals Compared with Bagged Lunches. *ICAN: Infant, Child and Adolescent Nutrition,* 3 (2), 70-75.

Institute of Medicine. (2005). *Preventing Childhood Obesity-Health in the Balance*. The National Academies Press, Washington, DC.

Jensen, C., Sato, A., McMurtry, M., Hart, C., & Jelalian, E. (2012). School Nutrition Policy: An Evaluation of the Rhode Island Healthier Beverages Policy in School. *ICAN: Infant, Child and Adolescent Nutrition*, 4 (5), 276-282.

Joens-Marre, R.R., Welk, G.J., Calabro, M.A., Russell, D.W., Nicklay, E., & Hensley, L.D. (2008). Rural urban differences in physical activity, physical fitness and overweight prevalence of children. *Journal of Rural Health*, 24 (1), 49-54.

Johnson, R.B. & Onwuegbuzie, A. (2004). Mixed Method Research: A Research Paradigm Whose Time Has Come. *Educational Researcher*, 33 (7), pp. 14-26.

Jordan, A.B., Hersey, J.C., McDivitt, J.A., & Heitzler, C.D. (2006). Reducing Children's Television Viewing Time: A Qualitative Study of Parents and Their Children. *Pediatrics,* 118 (5), 1303-1310.

Kahn, E., Heath, G., Powell, K., Stone, E., & Brownson, R. (2001). *Increasing* Physical

Activity: A Report on Recommendations of the Task Force on Community Preventive Services. *MMWR*, 50 (RR18), 1-16.

Kahn, E., B., Ramsey, L.T., Brownson, R.C., Heath, G.W., Howzc, E.H., & Powell, K.E. (2002). The effectiveness of interventions to increase physical activity: A systematic review. *American Journal of Preventive Medicine*, 22 (4S), 73-107.

Kain, J., Uauy, R., Vio, F., Cerda, R., & Leyton, B. (2004). School based obesity prevention in Chilean primary school children: methodology and evaluation of a controlled study. *International Journal of Obesity*, 28, 483-493.

Katz, D.L., O Connell, M., Njike, V.Y., Yeh, M.C., & Nawaz, H. (2007). Strategies for the prevention and control of obesity in the school setting: systematic review and meta-analysis. *International Journal of Obesity*, 31 (7), 1068-1073.

Kolodziejski, B., Hirokawa, R., Benson, K., & Irvin, L. (2008). *Hawai'i Physical Activity and Nutrition Surveillance Report 2008*. Hawai'i State Department of Health.

Krebs, N.F. & Jacobson, M.S. (2003). Prevention of pediatric overweight and obesity. *Pediatrics*, 112 (2), 424-430.

Kwak, K. Kremers, S.P. Bergman, P., Ruiz, J.R., Rizzo, N.S., & Sjostrom, M. (2009). Associations between physical activity, fitness and academic achievement. *Journal of Pediatrics*, 155 (6), 914-918.

Lee, S., Burgeson, C., Fulton, J., & Spain, C. (2007). Physical education and physical activity: Results from the school health policies and programs study 2006. *Journal of school health*, 77, 435-463.

Legislative Reference Bureau (LRB). (2009). *Crossover Bills which have passed the*

third reading in the Hawai'i State Legislature regular session 2009, Honolulu HI. Retrieved from http://Hawai'i.gov/lrb/legis09/crsovr09.pdf.

Linder, K. J. (2002). The physical activity participation--Academic performance relationship revisited: Perceived and actual performance and the effect of banding (Academic Tracking). *Pediatric Exercise Science*, 14, 155-170

Lob-Corzillus, T. (2007). Overweight and obesity in childhood: A special challenge for public health. *International Journal of Hygiene and Environmental Health*, 210, 585-589.

Lobenstein, T. & Jackson-Leach, R. (2007). Child overweight and obesity in the USA: Prevalence rates according to IOTF definitions. *International Journal of Pediatric Obesity*, 2 (1), 62-64.

Ludwig, D.S. (2007). Childhood obesity: The shape of things to come. *New England Journal of Medicine*, 357 (23), 2325-2327.

Maddock, J., Maglione, C., Barnett, J., Cabot, C., Jackson, S., & Reger-Nash, B. (2006). Statewide implementation of the 1% or less campaign. *Health Education Behavior*, 20(10), 1-11.

Marshall, J. (2009). Early impact of the federally mandated local wellness policy on physical activity in rural, low-income elementary schools in Colorado. *Journal of Public Health Policy*, 30, S141-S160.

Matsuoka, C., Nett, Bl, Stromberg, H., & Maddock J. (2005). Improving access to physical activity: Revitalizing the old Kona Airport walking/jogging path. *Californian Journal of Health Promotion*, 3 (4), 28-35.

McAleese, J. & Rankin, L. (2007). Garden-based nutrition education affects fruit and

vegetable consumption in sixth-grade adolescents. *Journal of the American Dietetic Association*, 107 (4), 662-665.

McDermott, A. (2009). *Evaluation of school wellness policies in South San Luis Obispo County.* San Luis Obispo, California: Cal Poly State University, Kinesiology Department.

McElroy, K.R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly,* 15, 351-377.

McQuiston, C. & Campbell, J. (1997). Theoretical substruction: A Guide for Theory Testing Research. *Nursing Science Quarterly*, 10 (3), 117-123.

Metos, J. & Nanney, M. (2007). The strength of school wellness policies: One state's experience. *Journal of School Health*, 77 (7), 367-372.

Mendelson, R. (2007). Think tank of school-aged children: nutrition and physical activity to prevent the rise in obesity. *Applied Physiological Nutrition and Metabolism*, 32 (495-499).

Miles, M. & Huberman, M. (2002). *The Qualitative Researcher's Companion*. Sage Publications: London.

Moag-Stahlberg, A., Howley, M.A., & Lusri, L. (2008). A national snapshot of local school wellness policies. *Journal of School Health*, 78 (10), 562-568.

Moore, K., McGowan, M., Donato, K., Kollipara, S., & Roubideaux, Y. (2009). Community resources for promoting youth nutrition and physical activity. *American Journal of Health Education*, 40 (5), 298-303.

Murphy, J.M., Pagano, M.E., Nachmani, J., Sperling, P., Kane, S., & Kleinman, R.E.

(1998). *The relationship of school breakfast to psychosocial and academic functioning.* Archives of Pediatrics and Adolescent Medicine*, 152, 899-906.*

National Association of Pediatric Nurse Practitioners (NAPNAP). (2006). Identifying and preventing overweight in childhood, clinical practice guideline. *Journal of Pediatric Health Care*, 20 (2), S3-S63.

National Heart Lung and Blood Institute (NHLBI). (2004). *Heart N Parks – Report of 2004.* Retrieved on May 20, 2009 from http://www.nhlbi.nih.gov/health/prof/heart/obesity/hrt_n_pk/2004_report.pdf

National Institutes of Health (NIH). (2000). *The practical guide: Identification, evaluation, and treatment of overweight and obesity in adults.* Retrieved on March 21, 2008 from http://www.nhlbi.nih.gov/guidelines/obesity/prctgd_b.pdf.

Nigg, C., Maddock, J., Yamauchi, Pressler, V., Wood, B., & Jackson, S. (2005). The Healthy Hawai‘i Initiative: A social ecological approach promoting healthy communities, Am. J. Health Promotion, 19 (4): 310-313, 2005.

Nigg, C. & Richards, K. (2006). Physical activity in youth. *Hawai‘i Medical Journal*, 65 (5), 148-149.

Noy, L., Walter, M., Matsunaga, D.S., & Maddock, J.E. (2006). Pediatric obesity: are we under-diagnosing? Assessing pediatric obesity at an urban community health clinic. *Hawai‘i Medical Journal*, 65 (4), 102-4.

Office of Minority Health and Health Disparities (OMHD). (2007). *Eliminating racial and health disparities*. Retrieved from http://www.cdc.gov/omhd/About/disparities.htm.

Ogden, C., Carroll, M., & Flegal, K. (2008). High body mass index for age among US

children and adolescents, 2003-2006. *JAMA*. 299 (20), 2401-2405.

Parrott, J., Rutledge, C., Zimbro, K., & Shepherd, L. (2012). The predictive relationship of pediatric body mass indexes and comorbid diagnoses. *ICAN: Infant, Child, and & Adolescent Nutrition*, 4 (5), 283-288.

Pearcey, P. & Draper, P. (1996). Using the diffusion of innovation model to influence practice: a case study. *Journal of Advanced Nursing*, 223, 714-721.

Perman, J.A., Young, T.L., Stines, E., Hamon, J., Turner, L.M., & Rowe, M.G. (2008). A community driven obesity prevention and intervention in an elementary school. *Journal of the Kentucky Medical Association*, 106 (3), 104-108.

Plachta-Danielzik, S., Pust, S., Asbeck, I., Czerwinski-Mast, M., Langnase, K., Fischer, C., Bosy-Westphal, A., Kriwy, P., & Muller, M.J. (2007). Four year follow up of school based intervention on overweight children: the KOPS study. *Obesity*, 15 (12), 3159-69.

Pobutsky, A.M., Hirokawa, R., Zou, L., Huang, T., Rosen, L., & Wood, B. (2006). Overweight and at-risk for overweight among Hawai‘i public school students entering kindergarten, 2002-2003. *Hawai‘i Medical Journal*, 65 (10), 283-287.

Rainville, A., Lofton, K., & Carr, D. (2009). Recess before lunch in elementary schools: Development of a best practice checklist. *Journal of Child Nutrition & Management*, 33 (2), Retrieved from http://schoolnutrition.org

Ramanthan, S. & Crocker, P. (2009). The Influence of family and culture on physical activity among female adolescents from the Indian Diaspora. *Qualitative Health Research*, 19 (4), 492-503.

Rampersaund, G.C., Pereira, M.A., Girard, B.L., Adams, J., & Metzi, J. D. (2005).

Breakfast habits, nutritional status, body weight and academic performance in children and adolescents. *Journal of American Dietetic Association*, 105(5), 743-760.

Rasberry, C.N. (2006). Teaching nutrition concepts through service learning. *Journal of Nutrition Education Behavior,* 38 (1), 59-60.

Reger-Nash, B., Bauman, A., Booth-Butterfield, S., Cooper, L., Smith, H., Chey, T., & Simon, K. (2005). Wheeling walks: Evaluation of a media based community intervention. *Family and Community Health*. 28 (1), 64-78.

Rimkas, L., Jones, P., & Ona, F. (2004). *The San Francisco Farm to School report: results from the 2003 feasibility study.* Retrieved from http://www.farmtoschool.org/files/publications_90.pdf

Robinson, T. (2008). Applying the social-ecologic model to improving fruit and vegetable intake among low income African American. *Journal of Community Health*, 33 (6), 395-406.

Rogers, E.M. (1995). *Diffusion of Innovations* (4th ed). New York: Free press.

Sallis, J. F., McKenzie, T. L., Alcaraz, J. E., Kolody, B., Faucette, N., & Hovell, M. F. (1997). The effects of a 2-year physical education program (SPARK) on physical activity and fitness in elementary school students. American Journal of Public Health, 87, 1328-1334.

Sallis, J. F., McKenzie, T.L., Kolody, B., Lewis, M., Marshall, S., & Rosengard, P. (1999). Effects of health related physical education on academic achievement; project SPARK. *Research Quarterly for Exercise and Sport*, 70 (2), 127-134.

Sallis, J.F. & Owen, N. (1999). *Physical activity and behavioral medicine.* Thousand

Oaks, California: Sage Publications.

Sallis, J.F. & Owen, N. (2002). Ecological models of health behavior. pp. 462-484. In K. Glanz, B.K. Rimer, and F.M. Lewis (Eds.), *Health Behavior and Health Education: Theory, Research, and Practice, third edition.* San Francisco: Jossey-Bass

Sallis, J.F., McKenzie, T.L., Conway, T.L., Elder, J.P., Prochaska, J.J., Brown, M., Zive, M.M., Marshall, S.J., & Alcaraz, J.E. (2003). Environmental interventions for eating and physical activity: A randomized controlled trial in middle schools. *American Journal of Preventive Medicine*, 24 (209-217).

Sandelowski, M. (2000). Combining qualitative and quantitative sampling, data collection, and analysis techniques in mixed-method studies. *Research in Nursing and Health*, 23, 246-255.

Schwartz, M., Bell, L., Bingham, P., Chung, E., & Friedman, D. (2005). *The five minute pediatric consult*. Baltimore MD: Lippincott.

Schwartz, M., Lund, A., Grow, M., McDonnell, E., Probart, C., Samuelson, A., & Little, L. (2009). A comprehensive coding system to measure the quality of school wellness policies. *Journal of the American Dietetic Association*, 109, 1256-1262.

SEARCH for Diabetes in Youth Study Group. (2006). The burden of diabetes mellitus among US youth: Prevalence estimates from the SEARCH for diabetes in youth study. *Pediatrics*, 118, pp. 1510-1518.

Senate Bill 2507-108th Congress: Child Nutrition and WIC Reauthorization Act of 2004. (2004). In *GovTrack.us (database of federal legislation).* Retrieved October 21, 2010 from http://www.govtrack.us/congress/bill.xpd?bill=s108-2507.

Shephard R.J. (1997). Curricular physical activity and academic performance. Pediatric Exercise Science, 1997;9:113-125

Sherry, B., Blanck, H.M., Galuska, D.A., Pan, L., Dietaz, H.W., & Balluz, L. (2010, August 3). Vital signs: State-specific obesity prevalence among adults – United States, 2009. *Morbidity and Mortality Weekly Reviews*. Retrieved from http://www.cdc.gov/mmwr/Pdf/wk/mm5930803.pdf.

Singh, A.S., Chin A paw, M.J., Brug, J., & Van Mechelen, W. (2007). Short term effects of school based weight gain prevention among adolescents. *Archives of Pediatric Adolescent Medicine*, 161 (6), 565-71.

Spiegel, S. & Foulk, D. (2006). Reducing overweight through a multidisciplinary school based intervention. *Obesity Research*, 14 (1), 88-96.

Stoddard, S.A., Kubik, M.Y., & Skay, C. (2008). Is school based height and weight screening of elementary students private and reliable? *Journal of School Nursing*, 24 (1), 43-8.

Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion*, 10 (4), 282-98.

Story, M., Kaphingst, K., & French, S. (2006). The role of schools in obesity prevention. *Future of Children*, 16 (1), 109-142.

Story, M., Nanney, M. & Schwartz, M. (2009). Schools and obesity prevention: creating school environments and polices to promote healthy eating and physical activity. *Milbank Quarterly*, 87 (1), 71-100.

Strauss, R.S. (2002). Childhood obesity. *Pediatric Clinics of North America*. 49 (1), 175-201.

Sugerman, H.J. (2003). Bariatric surgery for severely obese adolescents. *Journal Gastrointestinal Surgery*, 7 (1), 102-107.

Summerbell, C.D., Waters, E., Edmunds, L.D., Kelly, S., Brown, T., & Campbell, K.J. (2005). Interventions for preventing obesity in children. *Cochrane Database Systematic Review*, CD001971.

Swinburn, B., Egger, G., & Raza, F. (1999). Dissecting obesogenic environments: The development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Preventive Medicine*, 29, 563-570.

Tan, D., Zwar, N.A., Dennis, S.M., & Vagholkar, S. (2006). Weight management in general practice: what do patients want? *Medical Journal of Australia*, 185 (2), 73-75.

Tanaka, C., Richards, K., Takeuchi, L., Otani, M., & Maddock, J. (2005). Modifying the Recess Before Lunch Program: A pilot study in Kaneohe Elementary School. *Californian Journal of Health Promotion,* 3 (4), 1-7.

Taras H. (2005). Nutrition and student performance at school. *Journal of School Health* 75(6):199–213.

Tashakkori, A. & Teddlie, C. (Eds.). (2003). *Handbook of mixed methods in social and behavioral research*. Thousand Oaks, CA: Sage.

Tremblay, M. S., Inman, J. W., & Willms, J. D. (2000). The relationship between physical activity, self-esteem, and academic achievement in 12-year-old children. *Pediatric Exercise Science*, 12, 312-324.

Tudor-Locke, C. & Bassett, D.R. (2004). How many steps/day are enough? Preliminary pedometer indices for public health. *Sports Medicine* 34 (1), 1-8.

United States Department of Agriculture (USDA) and U.S. Department of Health and Human Services (USDHHS). (2010). *Dietary guidelines for Americans, 7th Edition*. Washington, DC: U.S. Government Printing Office, December 2010.

United States Department of Agriculture (USDA). (2012, July 20). *USDA National Nutrient Database for standard reference*. Retrieved from http://ndb.nal.usda.gov/.

United States Department of Health and Human Services (USDHHS). (2010, January 28). *The Surgeon General's vision for a healthy and fit nation.* Retrieved from http://www.surgeongeneral.gov/library/obesityvision/obesityvision_factsheet.html

United States Department of Health and Human Services (USDHHS). (2010b). *Healthy People 2020 Objectives*. Washington, DC: U.S. Government Printing Office.

United States Department of Health and Human Services (USDHHS). (2011). *Childhood Obesity*, Retrieved from http://aspe.hhs.gov/health/reports/child_obesity/

United States House of Representatives. (2004). *Child Nutrition and WIC Reauthorization Act of 2004.* Public Law 108-4981.

Vieweg, V.R., Johnston, C.H., Lanier, J.O., Fernandez, A., & Pandurangi, A.K. (2007). Correlation between high risk obesity groups and low socioeconomic status in school children. *Southern Medical Journal*, 100 (1), 8-13.

Wall, R., Litchfield, R., Carriquiry, A., McDonnell, E., & Woodward-Lopez, G. (2012). Local wellness policy strength and perceived implementation of school nutrition standards across three states. *Childhood Obesity*, 8 (4), 331-338.

Warren, J.M., Henry, C.J., Lightowler, H.J., Bradshaw, S.M., & Perwaiz, S. (2003). Evaluation of a pilot school program aimed at the prevention of obesity in

children. *Health Promotion International*, 18 (4), 287-296.

Whatley-Blum, J., Kaley, L., Wigand, D., Jenkins, P., Davee, A., & Beaudoin, C. (2008). Reduced availability of sugar-sweetened beverages and diet soda has limited impact on beverage consumption patterns in Maine high school youth. *Journal of Nutrition Education and Behavior*, 40 (6), 341-347.

White, P. (2003). Reverse order. *School Food Service and Nutrition*, 57 (7), 36-42.

Wilson, D.K. (2009). New perspectives on health disparities and obesity interventions in youth. *Journal of Pediatric Psychology*, 34 (3), 231-44.

Wisotsky, W. & Swencionis, C. (2003). Cognitive-behavioral approaches in the management of obesity. *Adolescent Medicine*, 14 91, 37-48.

Wong, F., Greenwell, M., Gates, S., & Berkowitz, J. (2008). It's What you do! reflections on the VERB campaign. *American Journal of Preventive Medicine*, 34 (6), S183-187.

Wootan, M.G., Henry, H., Roberts, D., & Johanson, J. (2007). *State school foods report card* 2007. Washington, DC: Center for Science in the Public Interest.

Wu, S., Forester, S., & Gregson, J. (1998). Ten years into the California 5 a day Campaign: Lessons on large scale social marketing for healthy eating. *Journal of the American Dietetic Association*, 98 (9), Supplement 1, A31.

Yelmokas, A. (2009). *Evaluation of school wellness policies in North San Luis Obispo County,* Retrieved from http://www.google.com/url?sa=t&source=web&cd=1&ved=0CBUQFjAA&url=http%3A%2F%2Fdigitalcommons.calpoly.edu%2Fcgi%2Fviewcontent.cgi%3Fartic

le%3D1057%26context%3Dkine_fac&ei=xJmCTZX0Coe4sQPH4cyIAg&usg=AFQjCNEzAKxLbmAPAo_LMVahOGL6iVHf-w

Young, L.R. & Nestle, M. (2002). The contributions of expanding portion sizes to the US obesity epidemic. *American Journal of Public Health*, 92 (2), 246-249.