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COMPETITIVE FOOD POLICY IMPLEMENTATION IN KENTUCKY SCHOOLS

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COMPETITIVE FOOD POLICY IMPLEMENTATION IN KENTUCKY SCHOOLS

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Nursing
at the University of Kentucky

By
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Lexington, Kentucky

Director: Dr. Ellen Hahn, Professor of Nursing

Lexington, Kentucky

2016

ABSTRACT OF DISSERTATION

COMPETITIVE FOOD POLICY IMPLEMENTATION IN KENTUCKY SCHOOLS

This study was designed to explore the literature on competitive food policy implementation (CFPI); examines demographic and school factors associated with CFPI; and explores the experiences of school leaders and staff in CFPI using a proposed theoretical framework to guide the research. Competitive foods are those sold in vending machines, a la carte settings, fundraisers, class parties and other venues which compete with foods offered through the national school lunch and breakfast programs. Competitive foods have traditionally been of low nutritional value and high energy density. CFPI may be effective in reducing student calorie intake and BMI. However, evaluation of competitive food policy effectiveness is difficult due to variability in policy implementation. A theoretical framework is needed to guide research on CFPI.

This research was a mixed methods study including a review of the literature, quantitative secondary analysis, and a qualitative content analysis of transcripts from semi-structured interviews with school personnel to understand their experience with CFPI. First, a systematic review of the research literature on CFPI was conducted. Demographic and school factors, policy features, and school and parent/community-level factors that impact CFPI were identified. Second, the association of multiple demographic and school factors with CFPI scores was examined. CFPI scale (overall) and sub-scales ("inside" and "outside" school) were developed and validated to evaluate CFPI effectiveness in Kentucky middle and high schools (N=640, grades 5-12). The scales were based on responses to 8 questions on competitive food practices from a 2011 School Tobacco and Wellness Policy biannual survey conducted by the University Of Kentucky College Of Nursing Tobacco Policy Research Program. Student BMI tracking and presence of a written wellness policy predicted higher scores on the overall CFPI scale (BMI OR=2.06, p=0.001; Wellness OR=1.74, p=0.02), inside subscale scores (BMI OR=2.46, p<0.0001; Wellness OR=1.58, p=0.05), and outside subscale scores (BMI OR=2.27, p=0.03; Wellness OR=1.54, p=0.0005). Greater county-level adult obesity rates predicted lower overall CFPI scores (OR=0.93, p=0.02). Private school status predicted lower scores on inside CFPI subscale scores (OR=0.47, p=0.004). Third, semi-structured interviews were conducted with 23 school personnel to explore CFPI. Interviews were recorded, transcribed and content analysis was conducted. Kentucky schools were stratified into four groups based on school level (middle or high) and CFPI scores (high

or low). Sixteen schools were randomly selected for each of the four groups. A total of eight schools, two from each group, agreed to participate. The interview guide was based on a proposed CFPI framework based on implementation science, educational and organizational theory research. Six key themes emerged: internal/external forces enabling CFPI; internal and external obstacles to CFPI; key organizational values; organization value of CFPI; methods that organizations use to communicate organizational values; and CFPI policies and procedures. Findings were discussed in the context of the proposed theoretical framework. Implications for policy, practice and future research are presented.

KEYWORDS: Competitive foods, wellness, schools, obesity, policy implementation

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April 21, 2016
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COMPETITIVE FOOD POLICY IMPLEMENTATION IN KENTUCKY SCHOOLS

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This dissertation is dedicated to my husband and daughter for the sacrifices they have made so that I could complete this achievement.

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CHAPTER ONE

Introduction to Dissertation

The prevalence of childhood obesity in the U.S. increased from 6.5% to 19.6% in children 6-11 years of age, and from 5% to 18.1% in those 12-19 years from the mid-1970s to 2007-2008 (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Schools have been an obvious target of strategies designed to stem the childhood obesity epidemic. One promising school-based strategy has been to control the availability of "competitive foods." Competitive foods are those purchased in school venues as alternatives or in addition to meals provided by National School Lunch Program (NSLP) and School Breakfast Program (SBP). Competitive foods are sold in vending machines, offered "a la carte" in the cafeteria, sold in school canteens, and offered in school-related venues such as sporting events, school celebrations and fundraisers. These foods have traditionally been unregulated, low nutritional value, energy dense foods (LNVED), such as chips, candies and sodas, which compete with healthier school breakfast and lunch foods.

One important piece of national legislation designed to prevent childhood obesity was the 2004 Child Nutrition and WIC Reauthorization Act that required all school districts to implement written school wellness policies (SWP) beginning in 2006-2007. However, efforts made in response to this legislation were inconsistent as the policy language was non-specific and there were no accountability measures in place. Further, the 2004 legislation did nothing to regulate competitive foods in schools. In 2010, the federal government re-visited renewal of this legislation renaming it the Healthy, Hunger-Free Kids Act of 2010 (HHFKA 2010). The 2010 legislation contained very specific requirements for all foods served in schools, including school breakfast, lunch and

competitive foods, based upon recommendations made by the Institute of Medicine in 2007. Provisions of the HHFKA 2010 have been implemented in phases under the direction of the United States Department of Agriculture (USDA). The competitive food standards were implemented during the 2014-2015 school year.

The purpose of this dissertation research was to: (1) conduct a systematic literature review related to competitive food policy implementation (CFPI); (2) examine demographic and school factors associated with CFPI by performing a secondary analysis of existing school survey data; and (3) explore the experiences of school administrators and staff related to CFPI by conducting interviews using qualitative methods. Based on the literature review and both study findings, a theoretical framework was proposed to guide CFPI research.

Competitive Food Provisions of HHFKA 2010

The HHFKA 2010 applies strict nutrition standards to all food and beverages available in schools and on school grounds during the school day (Congress, 2012). Briefly, in order for a food to meet the standards, it must fall into one of the following categories: a whole grain food (50% by weight), a fruit, vegetable, protein or dairy product, or a "combination food" with at least ¼ cup of fruit or vegetables. If the main ingredient for any of the former is water, the second ingredient must be one of the required nutrients. Snacks must have no more than 200 calories (kcal) and entrees must have no more than 350 kcal. No more than 35% of calories may come from fat with no more than 10% from saturated fat and 0% from trans-fats. Foods can have no more than 35% sugar by weight. Snack sodium must be < 230 mg and entrees must have < 480 mg of sodium. Beverages available at elementary and middle schools may not contain

caffeine; have required size limits and include only water, low fat plain or no fat plain or flavored milk, or 100% fruit or vegetable juices which may or may not be diluted with water. High schools may make available, in addition to the above, no and low calorie beverages. No and low calorie beverages may have no more than 5 kcal/8 ounce (oz.) or 10 kcal/20 oz. and no more than 40 kcal/8 oz. or 60 kcal/12 oz., respectively. Beverage sizes for no calorie beverages are limited to 20 oz. and to 12 oz. for low calorie drinks. Foods and beverages that do not meet these standards are prohibited everywhere on school campuses during the school day.

The law specifies that schools must identify a "local educational agent" responsible to see that these standards are met and that a public report be filed each year on compliance with the standards (Food and Nutrition Service January 3, 2014). This reporting is to be used to monitor compliance with the legislation at the state agency level and violators are required to submit a corrective action plan and receive technical assistance. In addition, those schools certified as compliant will receive an additional 6 cents per meal (breakfast and lunch) in funding. Those schools found non-compliant will forfeit this funding. In response to revenue concerns associated with fundraising restrictions expressed during the public comment period, the interim final rule leaves flexibility for state authorities to determine exceptions for "infrequent fundraising and special events such as parties and celebrations" provided that such activities do not compete with foods compliant with nutrition standards during the school day. If the state agency does not specify the limited exceptions, there are zero exceptions.

Chapter 2 – Systematic Literature Review on the Barriers and Facilitators of CFPI

Historically, the literature on SWP/CFPI has identified barriers and facilitators to CFPI in three major categories: (1) demographic and school factors; (2) strength of policy and (3) school and community/parent-level barriers and facilitators.

Demographic and school factors associated with better CFPI included higher proportion of students receiving free and reduced price lunch; later than 10:30 AM lunch times; greater percentage of non-Caucasian students and Pacific region location (Probart, McDonnell, Hartman, Weirich, & Bailey-Davis, 2006; Samuels et al., 2009; Taber, Chriqui, & Chaloupka, 2011; Turner, Chriqui, & Chaloupka, 2012). Results were mixed based on school and community size, locale and rurality. Findings included that town and rural schools had more exposure to sugar-sweetened soda and vending machine advertising (Adachi-Mejia et al., 2013); medium/town schools had fewer fund-raising restrictions (Turner et al., 2012); rural sites had lower a la carte sales (Nollen, Kimminau, & Nazir, 2011); small schools had better adherence to vending machine guidelines (Nollen et al., 2009); urban location was associated with increased a la carte food sales (Nollen et al., 2011) and greater area population density was associated with better competitive food policy adherence (Samuels et al., 2009). Greater policy strength and redundancy at the state, district and local levels was associated with improved implementation of competitive food guidelines in schools (Hood, Colabianchi, Terry-McElrath, O'Malley, & Johnston, 2013; Sandoval et al., 2012; Schwartz et al., 2012; Taber, Chriqui, & Chaloupka, 2012). Finally, school and community/parent factors also impacted CFPI. The most commonly cited school-level barriers to CFPI included food cost and revenue loss concerns-particularly when there were financial incentives tied to vending sales or other such arrangements including soda “pouring rights” (Probart et al.,

2006). Community and parent-centered barriers included parental concerns about student food choices and lack of parental knowledge about healthy food as well as student access to competitive foods in schools from surrounding restaurants and/or from parent delivery (Downs et al., 2012; Probart et al., 2006; Sanchez et al., 2014).

Chapter 3 – Secondary Analysis of Factors Impacting CFPI

Using data from the 2011 School Tobacco and Wellness Policy biannual survey conducted by the University of Kentucky (UK) College of Nursing Tobacco Policy Research Program (N = 640), we developed and validated a CFPI scale (overall) and subscales ("inside" and "outside" school) to examine the impact of the following factors on scale and sub-scale scores: eligibility for free/reduced lunch, percent Caucasian race, school size (enrollment), location (urban vs rural) and grade level (high school vs. non-high school), public vs. private school classification; percentage of obese adults in the county and rural vs. urban location. School factors measured were presence of written SWP, tracking student BMI data and the absence of soft drink pouring rights. Based upon the review of the literature, our hypotheses were: 1) higher competitive food policy implementation scores will be positively associated with demographic factors of higher eligibility for free and reduced lunch, lower percentage of white students, larger school enrollment, urban location, non-high school status, public school classification, and higher county-level obesity rate; and 2) higher competitive food policy implementation scores will be positively associated with school factors of existence of local school wellness policies, tracking student BMI data, and absence of soft drink pouring rights contracts. General equations estimation analysis showed student BMI tracking and presence of a written wellness policy predicted higher scores on the overall CFPI scale

(BMI OR=2.06, p=0.001); (Wellness OR=1.74, p=0.02), inside (BMI OR=2.46, p<0.0001); (Wellness OR=1.58, p=0.05) and outside subscales (BMI OR=2.27, p=0.03); (Wellness OR=1.54, p=0.0005). Greater county adult obesity percentage (OR=0.93, p=0.02) predicted lower overall CFPI scores. Private school status predicted lower scores (OR=0.47, p=0.004) on inside CFPI subscale scores. The findings emphasize the importance of having a strong school wellness policy as the driver of CFPI. Strong school wellness policies will contain provisions for competitive foods and outcome tracking strategies such as BMI measurement.

Chapter 4 – Interviews with School Administrators and Staff Using Qualitative Methods

Using results of the 2011 School Tobacco and Wellness Policy biannual survey conducted by the University of Kentucky (UK) College of Nursing Tobacco Policy Research Program, participating schools within 75 miles of Lexington, Kentucky were stratified into four groups based on school level (middle or high) and score (high or low) on the CFPI scale. Sixteen schools were randomly selected from each of four groups and invited to participate in the research study. A total of eight schools, two from each group, agreed to participate. Semi-structured interviews were conducted with participants from each school including at least one administrative and up to six staff representatives (N = 23). The interview guide was based on a proposed theoretical framework of CFPI based on implementation science (Klein & Sorra, 1996), educational theory (Arum, 2000) and institutional/organization theory research (Scott, 2014) (Figure 4.1). Data were coded using qualitative content analysis of transcripts. Six major themes were identified: (1) external and internal forces that enable CFPI; (2) internal and external obstacles to implementing CFPI; (3) key organizational values; (4) organizational priority of CFPI;

(5) methods used by organizations to communicate organizational priorities; and (6-7) implementation policies and procedures. For each theme, multiple subthemes emerged from the data. All data were analyzed and discussed in the context of the proposed theoretical framework. Half of the schools had either a school wellness policy, district wellness policy or both. Specificity of policy language, potential financial penalties, accountability mechanisms and district support/expectations for policy implementation were major external enabling forces for CFPI. Internal and external obstacles to CFPI included school personnel values conflicts with the means and the intent of SWPI/CFPI; dependence on fundraisers to fund school operations; soda pouring rights contracts and student/staff/parent complaints about food quality and quantity. Implementation strategies were developed to insure CFPI compliance at the district level. Managerial support for CFPI was passive, but permissive to district resources. The net result was compliant CFPI with as little disruption as possible to routine school operations. For CFPI in schools, this may be adequate given the multiple other organizational priorities with which schools must grapple. Only one school placed CFPI in their top three organizational priorities. Participants identified (1) doing the "right thing" for kids; (2) academic progress; (3) school safety and security; (4) compliance with regulations and (5) balancing needs with available resources as their key organizational priorities.

One of the greatest challenges in assessing the efficacy of public policy initiatives is accounting for highly variable policy implementation efforts. A theoretical framework is needed to guide the study of policy innovation and implementation effectiveness related to CFPI. This dissertation research furthers this goal by reviewing the literature on CFPI; examining demographic and school factors that impact CFPI; and exploring the

experiences of school personnel using a proposed theoretical framework to understand CFPI in schools.

CHAPTER TWO

Competitive Food Policy Implementation in Schools: A Review of the Literature

Abstract

Competitive food policies establish minimum required nutritional content of foods sold in school-associated venues outside of the federal school lunch or breakfast program including vending machines, school stores, a la carte offerings, concession stands, school parties/events and fundraisers. As of July 1, 2014, nutrition standards for competitive foods in schools were federally mandated. There is evidence that competitive food regulation in schools is an effective strategy to reduce low nutritional value and energy dense (LNVED) food and sugared beverage consumption. However, implementation of competitive food policy in schools has been highly variable. This review explores factors which influence variability in competitive food policy implementation. Three categories of factors were examined: school and demographic factors; policy strength and school and community/parent-level barriers and facilitators. Recommendations for future research are offered.

KEYWORDS: competitive food policy; school wellness policy; policy implementation; schools

Background

A comparison of the 1976-1980 and 2007-2008 National Health and Nutrition Examinations Surveys (NHANES) indicated the prevalence of obesity increased from 6.5% to 19.6% in children 6-11years of age, and from 5% to 18.1% in those 12-19 years (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Elementary and high schools have been an obvious target of strategies designed to stem the childhood obesity epidemic. One promising strategy has been to control the availability of "competitive foods". Competitive foods are foods purchased in school venues as alternatives or in addition to meals provided by National School Lunch Program (NSLP) and School Breakfast Program (SBP). Competitive foods are sold in vending machines, offered "a la carte" in the cafeteria, sold in school canteens, and offered in school-related venues such as sporting events, school celebrations and fundraisers. These foods have traditionally been unregulated, low nutritional value, energy dense foods (LNVED) such a chips, candies and sodas which compete with healthier school breakfast and lunch foods – the nutritional content of which has been monitored and improved for decades through federal policy.

There is evidence that implementation of competitive food policy in schools reduces excess energy intake (Briefel, Crepinsek, Cabili, Wilson, & Gleason, 2009; Fox, Gordon, Nogales, & Wilson, 2009; Kakarala, Keast, & Hoerr, 2010; Taber, Chriqui, & Chaloupka, 2012) and is significantly associated with lower student BMI (Coffield, Metos, Utz, & Waitzman, 2011; Fox et al., 2009; Mâsse, de Niet-Fitzgerald, Watts, Naylor, & Saewyc, 2014; Terry-McElrath, O'Malley, Delva, & Johnston, 2009). Thus, implementation of competitive food policies in schools may be an effective intervention to curb the obesity epidemic. This review of the research literature explores factors that

influence the variation in the adoption and implementation of competitive food policy in schools.

The NSLP was initiated in 1964. In 1966, the SBP was introduced. As of 2012, most public and some private schools served 51 million students through these government-subsidized programs (Hirschman & Chriqui, 2013). Of those students participating in the NSLP and SBP, 62% participated in the programs for 180 days per year, the majority of whom qualified for free or reduced meals. Since 1980, federal agencies have systematically monitored the nutritional content of these meals, and have issued continual updates to the regulations to improve the nutritional quality. Despite ongoing monitoring of government school meal programs, it was not until the passage of the 2004 Child Nutrition and WIC Reauthorization Act (WIC 2004) that all schools districts were required to implement local school wellness policies beginning in the 2006-2007 school year. However, this legislation did not regulate access to, or content of competitive foods.

The 2010 Healthy, Hunger-Free Kids Act (HHFKA 2010) (Chriqui et al., 2010) which reauthorized and strengthened the WIC 2004 legislation, provided the United States Department of Agriculture (USDA) with the authority to enforce competitive food standards (Chriqui et al., 2010). This legislation, now dubbed the “Smart Snacks in School Guidelines” applies strict nutrition standards to all food and beverages available in schools and on school grounds during the school day("The Healthy Snacks Resource System," 2014). Briefly, in order for a food to meet the standards, it must fall into one of the following categories: a whole grain food (50% by weight), a fruit, vegetable, protein or dairy product or a “combination food” with at least ¼ cup of fruit or vegetables. If the

main ingredient for any of the former is water, then the second ingredient must be one of the required nutrients. Snacks must have no more than 200 calories (kcal) and entrees must have no more than 350 kcal. No more than 35% of calories may come from fat with no more than 10% from saturated fat and 0% from trans-fats. Foods can have no more than 35% sugar by weight. Snack sodium must be < 230 mg and entrees must have < 480 mg of sodium. Beverages available at elementary and middle schools may not contain caffeine, have required size limits and include only water, low fat plain or no fat plain or flavored milk, or 100% fruit or vegetable juices which may or may not be diluted with water. High schools may make available, in addition to the above, no and low calorie beverages. No and low calorie beverages may have no more than 5 kcal/8 ounce (oz.) or 10 kcal/20 oz. and no more than 40 kcal/8 oz. or 60 kcal/12 oz., respectively. Beverage sizes for no calorie beverages are limited to 20 oz. and to 12 oz. for low calorie drinks. Foods and beverages that do not meet these standards are prohibited anywhere on school campuses during the school day. The law specifies that schools must identify a "local educational agent" responsible to see that these standards are met and that a public report be filed each year on compliance with the standards (Congress, 2012). This reporting is to be used to monitor compliance with the legislation at the state agency level and violators are required to submit a corrective action plan and receive technical assistance. In response to revenue concerns associated with fundraising restrictions expressed during the public comment period, the interim final rule leaves flexibility for state authorities to determine exceptions for "infrequent fundraising and special events such as parties and celebrations" provided that such activities do not compete with foods compliant with

nutrition standards during the school day. If the state agency does not specify the limited exceptions, then there will be zero exceptions.

Though the HHFKA was enacted in 2010, the specific final interim rule providing competitive food guidance was issued in June 2014 for implementation on July 1, 2014 for the 2014-2015 school year. The original proposed rule was published on February 8, 2013 and had a comment period through June 2013. The interim final rule with consideration of comments was published on June 28, 2013 and again available for public comment through October 28, 2013. The final version of the interim final rule was published on February 26, 2014, along with USDA technical assistance, and was open for public comment through April 28, 2014. Therefore, there has not yet been sufficient time under the final interim rule to accumulate data measuring the impact of this law on implementation of competitive food standards.

However, the sale of competitive foods is not a new topic to schools. Recommendations regarding competitive food standards have been available from the Institute of Medicine (IOM) since 2007 (Medicine, 2007). Considered the "gold standard" for competitive foods, this publication detailed 13 standards for nutritional content of competitive foods almost identical to the Smart Snacks legislation for two levels of "healthy" foods called Tier 1 (similar to the elementary and middle school requirements in the current legislation) and Tier 2 foods (the additional beverages available to high school students in the current legislation). Recommendations included that: (1) only Tier 1 foods be available during the school day; (2) free, plain water be available throughout the day; (3) sports drink availability be limited to school athletes after activity of at least 1 hour duration; (4) food/drink not be used for either reward or

punishment for behavior or performance; (5) marketing of Tier 2 foods be minimized; (6) only Tier 1 foods be offered in after school events for elementary and middle schools, and only Tier 1 and 2 foods for high school after school events; (7) only Tier 1 foods be offered in fundraisers by any school during the school day and (8) in after school events, Tier 2 foods be available only in high schools, and in evening and community events with adults present.

Further, the intent to require all foods offered in schools to comply with nutritional standards was stated clearly in the original 2010 HHFKA with an accompanying USDA-mediated implementation timeline. Finally, although the federal legislative mandate has been available for only 2 years, the majority of states had already enacted state legislation governing competitive foods (Prevention, 2012). A nationwide study by the Centers for Disease Control and Prevention (CDC) found that 39 states had independently enacted some type of competitive food regulation prior to the 2012 federal mandate. Though variability in implementation could be expected, it is still reasonable to expect evidence of progress in implementation of competitive food regulation at the local district and school levels based on state legislation alone.

Three years after the publication of the IOM standards, Chriqui, Schnieder and Chaloupka (Chriqui et al., 2010) documented that competitive foods were still widely available in schools, with less than half of all state and district policies addressing one or more elements of the recommended competitive food standards. The nationwide study by the CDC (Prevention, 2012) presented a state by state policy analysis of competitive food and drink policy development and implementation. Eleven states had no competitive food laws at the state or board of education level. Thirty-nine states had some type of

competitive food regulation. The majority, 38 states, incorporated 50% or fewer of the IOM's recommendations into their competitive food policies. The median national "alignment score" (measured as the percent of the 13 IOM standards incorporated into state competitive food policy) for all schools was 25.6%. Despite extensive state legislation and issuance of national guidelines, there has been little uptake of competitive food regulation. Thus, though progress has been made in defining and mandating competitive food regulation, the adoption and implementation of these standards has been highly variable. The future question remains whether the most current federal mandate will improve adoption and implementation of competitive food standards in schools.

Methods

For the time period of 2006 to through 2014, Pub Med and Web of Science were searched using the following terms: implementation of school wellness policy and schools; competitive food policy; schools and competitive food policy; wellness policy and schools and implementation and competitive foods. These searches yielded 568, 69, 141, 45 and 28 articles, respectively. Titles from these 851 articles were reviewed for relevance to competitive food and/or wellness policy implementation and a total of 210 articles were retained for abstract review. The abstracts of all 210 articles were reviewed and the articles were retained if they: 1) specifically addressed competitive foods; and/or 2) evaluated school wellness policy or competitive food policy implementation outcomes (i.e. BMI reduction, calorie consumption); and/or 3) evaluated the policy implementation process (i.e. assessed effective implementation practices, facilitators or barriers to policy implementation or impact of any other intra- or extra-organizational factors on policy implementation). This reduced the total number of articles to 182. These 182 articles

were then reviewed in detail for specificity to competitive food policy efficacy and/or implementation. This detailed review yielded 31 articles of relevance. Bibliographies of these 31 articles were also reviewed and 4 sentinel articles appeared multiple times. These 4 additional articles were included in the review. A total of 35 articles were reviewed to describe factors which influence implementation of competitive food policy in schools.

Results

Three broad categories of factors were identified which impact implementation of competitive food policy in schools: (1) demographic and school factors; (2) strength of policy and (3) school and community/parent-level barriers and facilitators.

Demographic and School Factors and Implementation of Competitive Foods Policy

One consistent finding is that schools with higher free and reduced lunch percentage eligibility are more likely to adhere to competitive food and beverage standards. Pennsylvania food service directors (N = 228) were interviewed regarding their competitive food practices (Probart, McDonnell, Hartman, Weirich, & Bailey-Davis, 2006). Higher percentage of free or reduced price lunch and later lunch time (after 10:30 AM) were associated with lower a la carte sales. Similarly, percentage of free or reduced lunch participation predicted better adherence with competitive food and beverage standards one year after California's strict competitive food policy enactment (Senate Bills 12 and 965) in 2005 (Samuels et al., 2009). Investigators for another national study analyzed fundraising restrictions and found that schools that were majority white and with lower free-reduced price lunch eligibility (51% or less) were less likely to have fundraising restrictions in place (Turner, Chriqui, & Chaloupka, 2012). In contrast,

some investigators found lower free/reduced lunch participation predicted lower a la carte food sales in rural school districts, but not in urban/suburban schools. The impact of financial factors on a la carte food consumption in rural and urban/suburban Kansas school districts was examined (Nollen, Kimminau, & Nazir, 2011). Factors examined included per lunch cost, lunch price, percent free/reduced lunch participation, total student lunch participation and district financial support. In rural school districts, districts with <33% free/reduced lunch participation were more likely to have low a la carte food sales than those with >58% participation (OR=3, 95% CI=1.0-9.8, $p< 0.05$). In addition, for every ten cent increase in lunch price, rural districts were more likely to have low a la carte food sales (OR=1.2, 95% CI=1.1-1.4, $p< 0.007$). In urban schools, lower free/reduced lunch participation was independently associated with lower a la carte food sales. However, none of the financial factors predicted sales levels in the final regression model. The authors attribute these findings to well-documented lack of availability and purchasing of a la carte foods in rural settings in Kansas. The lack of urban findings may be attributable to the lower urban sample size (n=76 of 282) or the documented low level of urban schools in Kansas (21.1%) that can sustain independence from a la carte revenues.

Geographic disparities also exist with regard to competitive food policy adoption and implementation. Taber, et al. (Taber, Chriqui, & Chaloupka, 2011) studied geographic disparities in the adoption of both state and district general school wellness policy over a 2-year period. They calculated and compared policy adoption scale scores based on five school wellness policy domains including competitive foods. In 2006-2007, the lowest policy adoption scores were in the East and West North Central regions, while

the highest were in the Pacific region. However, in just one year, the mean competitive food policy strength score rose 11 points across all regions, the largest increase of any policy domain. This signaled the acceleration of adoption of competitive food policy components in 2007-2008. The greatest increase was in the East South Central region (+35.8 points on the competitive food scale score), with the largest increase in scores where obesity prevalence was more than 18%. The region with the lowest increase in competitive food scores in 2007-2008 was the West North Central region (+5.8). Regional differences were also examined for fundraising restrictions in a national sample of public schools. Southern schools (60.9%) were least likely to have nutritional restriction on fundraisers (L. R. Turner & F. J. Chaloupka, 2012).

School and community size also impact adherence to competitive food standards. Samuels et al. (Samuels et al., 2009) examined adherence to the state's competitive food standards in California. Schools located in towns with higher population density (large and mid-size cities of >250,000 and between 25,000 and 250,000 including urban fringe areas) predicted better adherence to beverage standards. A study examining fundraising restrictions found them less prevalent in town schools and in medium sized schools (451-621 students) based on the NCES classification of locale and school size (L. Turner & F. J. Chaloupka, 2012). Variability in vending machine contents by school size were examined in a small study of large (>350 students) and small (<350 students) rural Kansas high schools (Nollen et al., 2009). Smaller schools had fewer vending machines (median of 3 vs. 6.5), 2.3 fewer fat grams and 25 kcal less per item compared to larger schools. Likewise, total fat and total kcal purchased from all competitive food sources were significantly less (-15.4 grams and -306.8 kcal) in smaller than larger schools, as

were the fat and calorie content of a la carte foods. The same investigators examined the impact of demographic characteristics on a la carte food sales in a sample of rural and urban Kansas Public Schools (n=302) (Nollen et al., 2011). A la carte sales were classified, based on percent of foodservice revenue as low (0-13%), moderate (14-24%) or high (>24%). Demographic factors assessed included rurality, race, school enrollment and a la carte food nutritional quality. School enrollment was not independently associated with level of a la carte food sales in either rural or urban schools.

School rurality is also a factor which affects competitive food policy implementation. Nollen (Nollen et al., 2011) examined pairwise associations between rurality and a la carte food sales. Rural districts were 2.4 times more likely than urban/suburban districts to have low to moderate a la carte food sales (OR=2.4, 95% CI=1.2-4.8, $p< 0.01$). Of the 206 rural districts examined, 33% had low a la carte food sales and 67% had moderate to high sales. Of the 76 urban/suburban schools, 21.1% has low and 78.9% had high a la carte food sales. Other investigators examined food content and advertising associated with vending machines in 26 schools in New Hampshire and Vermont (Adachi-Mejia et al., 2013). Size and locale were based on the National Center for Education Statistics (NCES) urban-centric locale codes ("National Center for Education Statistics," 2015). Schools in town and rural locations vs. urban/suburban locations were more exposed to both sugar-sweetened beverages (SSB) and advertisements for them.

In summary, demographic and school factors are associated with implementation of competitive food policy. Schools with a higher proportion of students receiving free and reduced price lunch; later than 10:30 AM lunch times; greater percentage of non-

white students and schools located in the Pacific region are more likely to adhere to competitive food standards. Results were mixed based on school and community size, locale and rurality. One study reported that medium/town schools had fewer fund-raising restrictions supporting the theory that rural, small schools may be less compliant with competitive food standards. In contrast, two other studies demonstrated that rural sites had lower a la carte sales and small schools had better adherence to vending machine guidelines. Two other studies reported that urban location and greater area population density (area based on NCES designation) ("National Center for Education Statistics," 2015) were associated with increased a la carte food sales and better competitive food policy adherence respectively. Finally, a single study reported that there was no association at all between school enrollment size and a la carte food sales.

Strength of Policy and Implementation of Competitive Food Policy

A number of investigators examined various measures of strength of state, district or school-level wellness policy to explain variability in policy implementation. The University of Illinois at Chicago Center for Health Policy examined the relationship between the strength of state laws and nutrition and physical activity standards at the district level, including competitive food standards (Taber et al., 2012). Stronger state laws were associated with stronger district competitive food standards. In 2006-2007, elementary schools in states with weak laws had lower mean scores for competitive foods policy compared to those in states with strong laws, scoring 13.2 vs. 48.6, respectively. Furthermore, elementary schools with the highest scores in 2006-2007 had greater gains in mean school wellness scores one year later. Those states with weak vs. strong state laws scored 20.3 and 53.5, respectively, in 2007-2008.

Another study sought to examine the impact of state policy, district policy, or both on availability of competitive foods in elementary schools (Chriqui, Turner, Taber, & Chaloupka, 2013). When there were both state and district policies, competitive food standards were more likely to be implemented than when either one or no policy was in place. If a district policy restricted SSBs, the addition of a state policy did not further improve SSB restrictions. Overall, unhealthy foods were 11.2% less likely to be available if both state and district policies were in place. SSBs were 9.5% less likely to be available with a district policy alone.

Finally, Turner et al.(Turner et al., 2012) analyzed the impact of strength and redundancy of policies regulating nutritional content of food sold in fundraisers in a national sample of public schools. When there were state, district, and school policies present, there were fewer low nutritional value, energy dense foods (LNVED) including SSBs, gum and some candies sold in school fundraisers. However, even with these district, state and school wellness policies in place, only 55.8% of schools had a policy restricting these competitive foods at fundraisers.

In summary, greater policy strength and redundancy at local, district, and state levels improved implementation of school competitive food guidelines. However, even in the presence of stronger policies, implementation remained sub-optimal, particularly with regard to fundraising restrictions. Additional factors may influence competitive food policy implementation.

School and Community/Parent-Level Barriers and Facilitators to Implementation of Competitive Food Policy

While there is little research about barriers and facilitators specific to competitive food policy implementation, some common barriers have been identified. Lack of human and funding resources is a main barrier at the school level. A cross-sectional telephone survey of 357 schools in Alberta, CA identified lack of available resources as a key barrier to implementation of school wellness policy (including competitive food sales restrictions) (Downs et al., 2012). Resource concerns included loss of revenue to schools from competitive food sales; increased cost of healthful foods; increased rate of spoilage of healthy foods and lack of healthy food options available from vendors. Lack of resources was also a theme in a study evaluating the ability of federally reimbursed after-school snack programs to meet guidelines published by the IOM (Nanney & Glatt, 2011). Resource concerns included funding for the initiative; loss of revenue from selling popular snack foods; increased costs of healthier food; greater waste and spoilage of healthier food and increased costs from the purchase of individually packaged fruits and vegetables. Loss of revenue from financial incentives offered by vendors based on vending machine and soft drink sales (i.e. pouring rights) was identified as an obstacle to competitive food policy implementation specifically (Probart et al., 2006). Further, schools that received an incentive from food vendors reported more vending machines per student and less nutritious offerings in vending machines.

Another barrier to implementation of competitive food policy in schools is access to commercially-available "fast foods" by students through leaving campus at lunch or delivery by family members or friends. Probart and colleagues (Probart et al., 2006)

found that a policy prohibiting parents from bringing in outside food at lunch was associated with higher participation in the healthier school lunch program. Sanchez and colleagues also found that the presence of competitive fast foods close to campus, and parents bringing in fast and processed foods for lunch were barriers to competitive food restriction as well (Sanchez et al., 2014). Additional parent-level barriers to competitive food restriction included, but were not limited to, low socioeconomic status, parent resistance to change, lack of parental education about food guidelines, and unhealthy foods brought from home (Downs et al., 2012).

In summary, school-level barriers to competitive food policy implementation most commonly cited included food cost and revenue loss concerns-particularly when there were financial incentives tied to vending sales or other such arrangements such as soda "pouring rights". However, community/parent-centered barriers are also of concern. Parental concerns included limited student food choices and lack of parental knowledge about healthy food. Community factors included student access to competitive foods in schools from surrounding restaurants and/or from parent delivery to students.

Discussion

This systematic literature review showed that certain demographic and school factors were associated with implementation of competitive food policy. Schools with higher proportion of students receiving free and reduced price lunch; lunch times later than 10:30 AM; greater percentage of non-white students; and those schools located in the Pacific region location demonstrated better adherence to competitive food policy. Findings on locale, school/community size and school district rurality were mixed. The

literature reviewed provides evidence for both competitive food policy compliance in rural, small and town schools and in urban schools in dense population areas.

One might expect that communities with more resources would be more proactive in the implementation of health-promoting policies since both short and long term health status rises with community socio-economic status (Tamayo, Christian, & Rathmann, 2010). However, the consistent finding that greater free/reduced lunch participation is associated with greater competitive food policy compliance may suggest that personnel in schools serving socioeconomically disadvantaged children may take a broader interest in students' overall welfare, including their nutrition. Although parent resistance and lack of knowledge about healthy foods were cited as obstacles to CFPI, these obstacles to CFPI may not represent a significant obstacle to school personnel in poorer communities. It may be that in areas of greater poverty, parents may be less able to engage in school functions for a number of reasons such as work hours, lack of transportation, etc. These parents also may not feel empowered to approach school officials about wellness policies and practices. This possible lack of parent involvement in poorer communities may explain why schools may be more likely to implement CFPI than in communities where parents may be more empowered and able to object. Further, not offering competitive foods may be the default position in poorer schools because students lack the resources to purchase them. These factors may also explain the mixed findings in rural vs. urban schools. While there is often an association between poverty and rurality, there are also urban schools with a large number of socioeconomically disadvantaged students. Further research on rural and urban CFPI, controlling for socioeconomic variables, is warranted. The demographic studies reviewed here did not assess why these factors predicted better

policy implementation. Further research is needed to understand how demographic and school factors impact competitive food policy implementation and whether interventions can be targeted to improve policy outcomes. Follow up qualitative studies which seek comparative feedback from schools in economically advantaged and disadvantaged areas may lead to a more in-depth understanding of the findings of these demographic studies.

In addition to demographic and school factors, policy strength, specificity and redundancy at local, district, and/or state levels improved implementation of school competitive food guidelines and student nutrition. Increased strength and redundancy of policy at the state and district levels were found to reduce LNVED foods in both fundraisers and in schools, reduce SSB availability in schools and improve competitive food policy comprehensiveness scores. More evidence is needed to support the beneficial health effects of competitive food policy as effect sizes, though statistically significant, were small in the studies reviewed here. This is especially true in light of the important role that competitive food sales play in funding school activities. More research is needed to address whether these associations are the result of policy structure and enforcement or local implementation effectiveness and how these two factors interact. Exploring he role that financial considerations play in whether policies are implemented, no matter their strength, is also an opportunity for further research. By studying how all these factors interact, researchers and policy makers can better understand how to optimize the chance that strong policy will translate into effective programs.

School and community/parent-level barriers and facilitators to school wellness policy implementation can be applied to understanding competitive food policy implementation dynamics. School-level barriers were primarily related to lack of

resources including the increased costs of healthy foods, greater waste and higher cost of individually packaged foods. Food and drinks were also a revenue stream for schools that they could not afford to lose (i.e., income from competitive foods). Schools use a portion of vending machine sales; incentives for soda pouring rights; revenues from fundraisers and sports concession stand sales to fund a vast array of school activities including purchase of sports uniforms, travel for sports teams, bands and other organizations, and other special projects and equipment. Competitive foods are interwoven into the funding structure for schools and without alternatives for funding, this remains the key obstacle to competitive food policy implementation. However, Peterson (Peterson, 2011) reported that elimination of competitive foods improved financial performance of the school food services and school lunch sales More research is needed on the financial impact and cost-benefit of competitive food restriction and on alternative sources of funding across all school venues, not only on food service revenues.

Finally, since parents are the ultimate arbiters of their children's nutrition, it is key to understand their perceptions. Parent-level barriers identified include low socioeconomic status, poor educational levels–particularly with regard to nutrition-resistance to change, concerns regarding narrow food choice and facilitating a child's access to non-healthy food for lunch. Even with effective competitive food policies in place, skilled policy implementation and sufficient funding, failure to include parents as key stakeholders in this process can derail the best programs. Yet, there is limited research on this topic. Qualitative studies are needed to understand how best to engage parents in the policy process. Also, parent learning needs should be identified and

addressed. Finally, we need to understand how child nutrition policy impacts food and beverage consumption behavior when children return home from school. It is possible that restricting food choice in schools may result in students eating less at lunch. The parent may face irritable mood, "rebound" consumption and even increased food expense at home to compensate for the "unintended consequences" of food policy implementation. This may result in some of the resistant attitudes from parents toward restriction to only healthy foods at school – particularly in lower socioeconomic homes where school lunch has traditionally been relied upon to keep children satisfied until a busy parent arrives home from work.

Conclusions

This systematic review summarized findings of studies describing demographic and school factors, policy strength and school and community/parent-level barriers to the implementation of competitive food policies in schools. Research is needed to understand why schools in lower socioeconomic areas implement competitive food policy more effectively than those in wealthier areas. Clarity is needed on the most effective strategies to assist urban vs. rural locations in fuller implementation of competitive food standards. It is also important to continue to demonstrate the efficacy of competitive food policy implementation in improving student health outcomes in light of the role competitive foods play in funding school activities. Research is warranted to document the costs and benefits of competitive food policy implementation across all school venues. Research is also needed to explore alternative funding possibilities such as marketing of student artwork; selling holiday flowers or other non-food alternatives. Alternatively, research findings may tell a story compelling enough to use in lobbying for

additional dollars from traditional funding sources including state, district and federal support. The importance of including parent feedback into policy implementation development and implementation strategies cannot be overstated. Data are needed to understand parent concerns and to assess the impact of school nutritional policies on child behavior at home to insure that good intentions are not having negative unintended impact on the child's overall nutritional status. If that is the case, strategies to address these issues should be explored such as "to go healthy snack bags" for identified families, etc. and robust family education and support programs. Though all of the factors assessed in the literature contribute in some way to overall policy outcomes, what is not known at all is what factors are most important to "get right"; how the factors interact in real world settings; and if a theoretical framework could be advanced to bring order to the approach to improving school nutritional health policies and competitive food implementation specifically. Continuing efforts are needed to uncover insights into how to best support this important public health strategy to reduce childhood obesity. Competitive food policies remain a frequently overlooked component of school wellness policy. The hope is that the recently enacted "Smart Snacks in School" regulations will improve and expand implementation and adherence to competitive food nutrition guidelines. The question remains how best to optimize effective implementation of competitive food policy in the maximum number of schools to reach the most children.

CHAPTER THREE

Demographic and School Factors Associated With Competitive Food Policy Implementation

Abstract

Competitive food regulation in schools is an effective strategy to reduce student calorie consumption and body mass index. However, competitive food policy implementation (CFPI) remains variable. The association between multiple demographic and school factors and variability in CFPI in schools was examined. Factors assessed included location, enrollment, grade level, percent non-white students, eligibility for percent free/reduced price lunch, school type, having a school wellness policy, food vendor incentives, student BMI tracking, and county-level adult obesity rates. A CFPI scale (overall) and sub-scales ("inside" and "outside" school) were developed to evaluate CFPI in Kentucky public and private middle and high schools (N=640). Generalized estimating equation analysis showed student BMI tracking and presence of a written wellness policy predicted higher scores on the overall CFPI scale (BMI OR=2.06, p=0.001); (Wellness OR=1.74, p=0.02), inside (BMI OR=2.46, p<0.0001); (Wellness OR=1.58, p=0.05) and outside subscales (BMI OR=2.27, p=0.03); (Wellness OR=1.54, p=0.0005). Greater county adult obesity percentage (OR=0.93, p=0.02) predicted lower overall CFPI scores. Private school status predicted lower scores (OR=0.47, p=0.004) on inside CFPI subscale scores. Having a written wellness policy and tracking student BMI are strong predictors of better CFPI and should be encouraged to be a part of every school wellness initiative.

KEYWORDS: competitive food policy; schools; demographic factors; BMI measurement; school wellness policy

Introduction

The 2010 Healthy, Hunger-Free Kids Act (HHFKA 2010) (Congress, 2012) was broad national legislation intended to support healthy childhood nutrition and hunger prevention in the United States. One element of the legislation, referred to as the "Smart Snacks in Schools" rule ("The Healthy Snacks Resource System," 2014) required that all foods meet strict nutritional guidelines including those served through the National School Lunch Program (NSLP), School Breakfast Program (SBP) and competitive foods. Competitive foods are foods sold in school snack bars, a la carte settings, vending machines, school related concessions, school meetings/celebrations and school fundraisers which have traditionally "competed" with foods offered through the NSLP and SBP. Historically, these foods often included low nutritional value, energy dense foods (LNVED) which include sugar-sweetened beverages (SSBs), gum and some candies. There has been national guidance on competitive food nutritional content available since at least 2007 when the Institute of Medicine (IOM) (Institute of Medicine, 2007) published "the gold standard" for competitive food policy which is the template for the current "Smart Snacks in Schools" regulations. These 13 IOM recommendations are presented in Table 3.1. However, historically, there has been inconsistent adherence to these recommendations in states with and without competitive food legislation (Prevention, 2012). The goal of the most current national legislation was to remove these foods from school venues and offer healthier alternatives.

Background

The United States Department of Agriculture (National School Lunch Program and School Breakfast Program: Nutrition Standards for All Foods Sold in School as

Required by the Healthy, Hunger-Free Kids Act of 2010, Interim Final Rule, 2013) has been leading the phased implementation of the HHFKA since 2010. The initial rule specifying the standards governing competitive food regulation was published in February 2013. Allowing for public comment, the final interim rule was published in June 2013 with an implementation date of July 1, 2014 for the 2014-2015 school year. Although the implementation date of the federal rule has been recent, many states have had competitive foods laws in place for some time. In 2012, the Centers for Disease Control and Prevention (CDC) published a state by state analysis of competitive food policy which found that only 11 states had no competitive food laws (Prevention, 2012).

Kentucky adopted an administrative regulation specifying minimum nutritional standards (Legislature, 2005) prohibiting competitive foods in schools for implementation during the 2006-2007 school year. Kentucky is also one of 10 states requiring that the State Board of Education promulgate regulations, with no parental opt out, that student BMI be recorded on the "preventative healthcare exam form" for each year in kindergarten through 5th grade and once in middle and high school (Legislature, 2012).

The CDC analysis (Prevention, 2012) evaluated state competitive food policies enacted prior to 2010. Only 25.6% of schools on average in the U.S. were aligned with the IOM recommendations. Kentucky's policy complied partially with six of the IOM's 13 recommendations and completely with only one of them, and the state received an overall alignment score across all grade levels of 30.2% compared to a national state median of 25.6% (range 0-70.5%). Since Kentucky schools have had sufficient time and guidance to implement competitive food standards, the purpose of this study was to

examine demographic and school factors associated with competitive food policy implementation in a sample of Kentucky schools. The secondary goal was to describe the prevalence of competitive food policy in Kentucky schools.

There is evidence that restricting competitive foods is an effective strategy in reducing student calorie consumption and BMI. In the 2004-2005 school year, 40% of school children consumed one or more competitive food items as part of their school lunch, contributing 159 kcal/day (Fox, Gordon, Nogales, & Wilson, 2009). Those who did not consume school lunch ingested even more competitive foods, providing 201 kcal/day. Total intake among children in schools serving competitive foods with and without a la carte offerings has been examined. Mean calorie intake among students in schools serving competitive foods was 106 kcal/per day more than in schools not serving competitive foods (Kakarala, Keast, & Hoerr, 2010). California students in schools with strong competitive food policies consumed both a lower proportion of their total calories at school (21% vs. 28%) and consumed 157.8 fewer calories per day compared to student samples from states without strong competitive food policies (D. R. Taber, Chriqui, J.F., Chaloupka, F.J., 2012). Using the 2005 School Nutrition Dietary Assessment III (SNDA) national dataset, Fox et al. (Fox et al., 2009) demonstrated that zBMI in middle school children was significantly higher when there were vending machines selling competitive foods in the vicinity of the cafeteria (Beta=0.21, $p< .05$). University of Michigan researchers analyzed the impact of multiple factors on student intake and BMI. They found a positive association between “full-sugared” foods available a la carte and in vending machines and student BMI (OR=1.15, $p < .05$) (Y. M. Terry-McElrath, O'Malley, Delva, & Johnston, 2009).

Since regulation of competitive foods in schools can improve student nutrition and reduce obesity, it is unknown why there is not more uniform implementation of these policies. Investigators have examined school and demographic factors to understand why some schools are more successful than others in the adoption and implementation of competitive food policy. These findings are summarized below.

Demographic Factors

Free and reduced lunch eligibility. Higher percentage of eligibility for free and reduced lunch (a marker of child poverty) is consistently linked to better adherence to competitive food and beverage standards. Pennsylvania food service directors (N = 228) were interviewed regarding their competitive food practices (Probart, McDonnell, Hartman, Weirich, & Bailey-Davis, 2006). Higher percentage of free or reduced price lunch was associated with lower a la carte sales. Similarly, higher percentage of free or reduced lunch participation predicted better adherence with competitive food and beverage standards one year after California's enactment of strict competitive food policy in 2005 (Samuels et al., 2009). Investigators in another national study analyzed fundraising restrictions and found that schools that had lower eligibility for free-reduced price lunch (51% or less) were less likely to have fundraising restrictions in place (Turner, Chriqui, & Chaloupka, 2012). Given the link between student eligibility for free and/or reduced lunch and adherence to competitive food policy, we examined this factor at the school level in the study reported here.

Racial distribution of students. There have been mixed findings on the impact of race on CFPI efforts. In the Turner et al. study (Turner et al., 2012), schools that were majority Caucasian were less likely to have fundraising restrictions in place. In a study of

implementation of competitive food legislation in California, Samuels, et al. (Samuels et al., 2009) found that as percent non-Caucasian student population increased, adherence to both food and beverage policy increased ($r=0.629$, $p<0.0001$ and $r=0.335$, $p=0.03$ respectively). In contrast, investigators examined the risk for students, grades 6-8, to skip lunch and buy vending machine foods on two or more of the previous five days in a sample of Florida schools (Park, Sappenfield, Huang, Sherry, & Bensyl, 2010). While availability of vending machines posed the greatest risk of purchasing vending machine foods (OR=3.5, 95% CI=2.2-5.7), being non-Hispanic black (OR=2.4, 95% CI= 1.8-3.2) or Hispanic (OR=2.2, 95% CI= 1.6-2.9) at least doubled the risk of consuming vending machine food rather than school lunch. In the study reported here, percentage of Caucasian students at the school level is examined.

School size and location. School size and location also impact adherence to competitive food standards. Investigators examined food content in vending machines and size and locale in 26 New Hampshire and Vermont schools (Adachi-Mejia et al., 2013) using the National Center for Education Statistics (NCES) urban-centric locale codes: city – large, midsize and small; suburb – large, midsize small; town – fringe, distant, remote, rural and rural – fringe, distant, remote. Schools in towns and rural vs. urban locations (including city and suburb categories) were more exposed to sugar-sweetened beverages. Similarly, Samuels et al. (Samuels et al., 2009) examined adherence to the California competitive food standards and found that schools located in towns with higher population density (large and mid-size cities of >250,000 and between 25,000 and 250,000 including urban fringe areas) predicted better adherence to beverage standards. In another study, fundraising restrictions were less prevalent in town schools

(ordinal variable included rural, town, suburban and urban categories) and in medium sized schools (between 451 and 621 students) based on the NCES classification of locale and school size. (Turner et al., 2012). This study also examined the impact of strength of policies on nutritional restrictions on fundraisers in a national sample of public schools. Those least likely to have a policy to guide nutritional restrictions for fundraisers included schools located in the south, town schools, and medium size schools. In contrast, variability in vending machine contents by school size were examined in a small study (n=13) of large (>350 students) and small (<350 students) rural Kansas high schools (Nollen et al., 2009). Smaller schools had fewer vending machines than larger schools (median of 3 vs. 6.5); 2.3 fewer fat grams per item, and 25 kcal less per item compared to larger schools. Likewise, total fat and total kcal purchased from all competitive food sources were significantly less (-15.4 grams and -306.8 kcal) in smaller than larger schools as were the fat and calorie content of a la carte foods. Nollen's group also examined the association of rurality with low and high a la carte sales in a sample of Kansas Public Schools (n=302) (Nollen, Kimminau, & Nazir, 2011). A la carte sales were classified, based on percent of foodservice revenue, as low (0-13%), moderate (14-24%) or high (>24%). Rural districts were 2.4 times more likely than urban/suburban districts to have low to moderate a la carte sales (OR=2.4, 95% CI, 1.2-4.8; $p<0.01$). For the study reported here, we use NCES school enrollment and the same binary Beale Code classification as Turner et al. (Turner et al., 2012) to examine the association of school size and location on CFPI.

School grade level. There is consistent evidence that elementary schools adopt and adhere to competitive food policy better than middle and high schools. In a sample of

287 schools with 2314 students, grades 1-12, consumption of sugar sweetened beverages tripled as the strength of competitive food policy fell dramatically from elementary to high school (Briefel, Crepinsek, Cabili, Wilson, & Gleason, 2009). Many schools receive financial incentives from food and drink vendors to exclusively offer their products in schools. These contractual arrangements are known as "pouring rights". The percent of schools with no soft drink pouring rights fell from 43.1% to 16.3% from elementary to high school ($p=0.02$) (Briefel et al., 2009). The percentage of schools without a store or snack bar fell from 93.7% in elementary to 43.6% in high school ($p<0.001$). Similarly, schools not selling sweet or salty foods for fundraisers dropped from 47.2% in elementary to 21.9% high school ($p=0.006$). Schools with no a la carte offerings fell from 23.6% to 5.1% ($p<0.001$), and schools without vending machines fell from 75.6% in elementary to 1.6% in high school ($p<0.001$). In the study reported here, each school was classified as high school vs. non-high school and the impact of school grade level on competitive food policy implementation was examined.

School type (private vs. public). Investigators have also examined how competitive food environments compare between public and private schools in a large national sample of elementary schools from 2006 to 2010 (L. Turner & F. J. Chaloupka, 2012). Based on survey data, they generated a score ranging from 0-100 (100 = best nutritional value) which considered school foods, competitive foods and other food-related practices. Public schools scored 50.1 and 53.5 in 2006 and 2010, respectively, compared to 37.2 and 42.2 for private schools. Public schools scored higher than private schools in both 2006 and 2010 ($p<0.0001$). In addition, the increase in scores between 2006 and 2010 was greater in public schools than in private schools ($p<0.0001$). In the

study reported here, school type was identified for each Kentucky school based on NCES data.

County-level adult obesity percentage. University of Chicago investigators examined disparities in the adoption of both state and district general school wellness policy, including competitive food policy, over a 2-year period between 2006 and 2008 (D. R. Taber, Chriqui, & Chaloupka, 2011). A policy strength score was assigned in each of five policy domains, including competitive foods. Competitive foods had the lowest initial policy strength scores in all regions (16.8, range 16.8-34.8). However, between 2006 and 2008, the mean competitive food policy strength score experienced the largest increase of any policy domain, with the largest proportion of this increase from areas with obesity prevalence more than 18%. Thus, community adult obesity prevalence may be associated with better competitive food policy implementation. In the study reported here, we will examine if county-level adult obesity rates are associated with CFPI.

School Factors

School wellness policy. A 2009 study analyzing the impact of federal legislation on local school wellness policy implementation reported that the federal legislation was key to improving adoption of school wellness policy components, including guidelines pertaining to competitive foods (Longley & Sneed, 2009). Prior to the federal legislation, only 37.4% of school wellness components were in place. After the federal legislation, 72.4% of the wellness policy components were in place. Turner et al. (Turner et al., 2012) demonstrated that strength and redundancy of wellness policy at the state and district level more than doubles the odds ratio that elementary school policies would include nutrition guidelines, not only for fundraisers in general, but also for restriction of candy

and sodas during fundraisers. In contrast, other investigators have demonstrated that across 23 school districts, 76 schools and 3 states, school level policy strength scores did not predict perceived implementation of reimbursable meal guidelines or nutrition guidelines for competitive foods (Wall, Litchfield, Carriquiry, McDonnell, & Woodward-Lopez, 2012). Strong federal, state and district policies may predict the presence of written, strong school wellness policies but they may not predict how well schools implement those policies. In the study reported here, we examine if having a school-specific, written wellness policy is associated with CFPI.

Tracking student BMI. In conjunction with the adoption and implementation of school wellness policy, some schools measure and track student BMI. The state of Arkansas pioneered mandatory tracking and reporting of student BMI when they implemented the 2003 Arkansas Legislative Act 1220 (Justus, Ryan, Rockenbach, Katterapalli, & Card-Higginson, 2007). BMI measurement was the first phase of a multi-phase approach which successfully stabilized the childhood obesity rates in the state of Arkansas within four years (Raczynski, Thompson, Phillips, Ryan, & Cleveland, 2009). However, there is some controversy regarding the best measure of overweight and obesity in children and adolescents. "Gold standard" measurements of BMI such as dual x-ray absorptiometry (DXA) (Wohlfahrt-Veje et al., 2014) are not practical for use in the field, so more convenient measures include BMI, height and weight, Z-BMI, skin-fold thickness and waist to hip circumference. Multiple studies have confirmed that BMI is strongly correlated with DXA (Blüher et al., 2013; Boeke et al., 2013; Wohlfahrt-Veje et al., 2014). In the study reported here, we examine whether the self-reported practice of measuring student BMI predicts greater CFPI.

Soft drink pouring rights. Turner et al. (L. Turner & F. J. Chaloupka, 2012) found that schools receiving a portion of sales from vending machines were less likely to have competitive food policies. Similarly, one study found that school profits from vending machines and commercial incentives were significantly associated with increased low nutritional value, energy dense food (LNVED) availability and decreased fruit and vegetable availability (Yvonne M. Terry-McElrath, Hood, Colabianchi, O'Malley, & Johnston, 2014). In the study reported here, we examine the relationship between administrator-reported participation in soft drink pouring rights and CFPI.

The hypotheses for this study were: 1) higher competitive food policy implementation scores will be positively associated with demographic factors of higher eligibility for free and reduced lunch, lower percentage of white students, larger school enrollment, urban location, non-high school status, public school classification, and higher county-level obesity rate; and 2) higher competitive food policy implementation scores will be positively associated with school factors of existence of local school wellness policies, tracking student BMI data, and absence of soft drink pouring rights contracts.

Methods

Design and Sampling

A secondary analysis of data from the 2011 School Tobacco and Wellness Policy biannual survey conducted by the University of Kentucky (UK) College of Nursing Tobacco Policy Research Program was completed. Data were collected on implementation of school nutrition and physical activity policies via telephone survey with school administrators. Local health department tobacco coordinators were trained to

conduct the telephone survey, document responses, and send to UK for analysis. All public and private schools were invited to participate in the voluntary survey. There were 640 respondents from schools (middle and high schools) nested within 116 Kentucky counties. Based on the total number of schools (N = 1565 public and 301 private schools) and counties (N = 120) in Kentucky, the survey collected data from 97% of counties and 34% of all schools.

Measures

There were 8 items on the survey which assessed whether a school had a policy restricting unhealthy competitive foods in certain locations, at events, or under specific conditions. A scale and subscales were developed from these survey items that measured overall CFPI score and two subscale scores: "inside" school CFPI (4 items; e.g., vending machines) and "outside" school CFPI (4 items; e.g., fundraisers) (Table 3.2).

The 8-item scale had acceptable internal consistency with a Cronbach's alpha coefficient of 0.79. Inter-item correlations were all r=0.30 or above. In addition, Bartlett's test of Sphericity was significant ($p<.001$) and the Kaiser-Meyer-Olkin value was 0.755 supporting the factorability of the correlation matrix. Principal component analysis showed that two components explained 58.1% of the variance, with Component 1 contributing 41.8% and Component 2 contributing 16.3%. The Eigenvalues for Components 1 and 2 were 3.34 and 1.30, respectively, with all other components having values less than 1. The scree plot also confirmed that two components were appropriate. Principal component analysis showed no double loading on the vending machines, classroom party foods, reward for good behavior and reward for academic performance (inside school subscale elements). There was moderate double loading on the outside

school elements of school-related meeting foods, after school event food, concessions and fundraisers. Oblimin rotation, however, clearly showed two subscales: competitive food policy related to inside (Component 1, with four items) and outside (Component 2, with four items) school activities. There was no double loading on either component. An item was considered to load on a component if the loading was at least 0.45. Loading values on the inside school component were all above 0.7 except for vending which was 0.457. Even though the vending item loaded lower than the other items, it was retained because of its central importance in competitive food regulation. Items in the outside school component all loaded above 0.671. Reliability analysis for each subscale yielded Cronbach's alpha for the inside and outside subscales of 0.78 and 0.71, respectively.

The CFPI scale and subscale scores were calculated for each school. Median, mean scores, mode and score distributions were evaluated across all schools to assess an appropriate approach to converting scale and subscale scores to binary variables. Mean scale scores were low for overall, inside, and outside Competitive Food School Policy scores (2.71 +/- 2.17 SD, range 0-8; 2.06 +/- 1.46 SD, range 0-4 and 0.663 +/- 1.08, range 0-4, respectively). Median scores were 2, 2 and 0, respectively. The mode was 1, 1 and 0, respectively (Figure 3.1 and Table 3.3). The distribution of the data was bi-modal for inside subscale scores and sharply skewed to the right for both overall competitive food scale scores and outside subscale scores.

Based on the medians for these variables, overall CFPI scale scores were ranked as high if they scored greater than 2 and low if they scored 2 or less. The inside subscale scores were ranked as high if greater than 1 and low if 1 or less. The outside subscale scores were high if they scored more than zero and low if they were zero.

Independent variables, their definitions, level (county vs. individual), data sources, statewide Kentucky data and mean values for the study sample are shown in Table 3.4. We measured demographic factors of eligibility for free/reduced lunch, percent Caucasian race, school size (enrollment), location (urban vs rural) and grade level (high school vs. non-high school), public vs. private school classification and the percentage of obese adults in the county. To determine rural vs. urban location, we used Beale codes ("Rural Urban Codes," 2013) which is a typical way of distinguishing urban/rural areas Those with scores of 3 or less corresponded to urban areas and scores of 4 or more were categorized as rural (Agriculture, 2013b). If a school contained grades 9-12, it was considered high school regardless of the lowest grade level in the school. School factors measured were existence of a written local school wellness policy, tracking student BMI data and the absence of soft drink pouring rights.

Data analysis

The distributions and relevant descriptive statistics for each study variable were analyzed and are found in Figure 3.1 and Table 3.4, respectively. The unit of analysis was the county. Both school and county-level factors were used as potential predictors in the models. Schools were nested within counties. Thus, responses could not be treated as independent of each other. Because of this nested structure, generalized estimating equation (GEE) modeling was used to assess factor associations with binary scale and subscale score outcomes. GEE produces output which is interpreted like logistic regression. Odds ratios for each independent variable are reported in Tables 3.5, 3.6 and 3.7. All statistical analyses were performed using SAS 9.4.

Results

Of the 640 schools in our sample, 574 responded to all of the questions composing the total CFPI scale. There were 600 respondents to the four questions composing the inside scale and 600 respondents to the outside scale items. On the total CFPI scales, 48% scored high on the total CFPI scale; 54% scored high on the inside school scale and 40% scored high on the outside food scale. In comparison to national demographic data (Table 3.4), our sample had some striking differences including a much greater percentage of Caucasian race, more rural representation, much larger high school enrollments and fewer elementary and private schools represented.

Tables 3.5, 3.6 and 3.7 present the results of the GEE analysis. Higher scores on the overall CFPI Scale were associated with student BMI tracking (OR=2.06, p=0.001) and having a wellness policy (OR=1.74, p=0.02) while county adult obesity percentage (OR=0.93, p=0.02) was associated with lower overall scores. Tracking student BMI (OR=2.46, p<0.0001) and having a wellness policy (OR=1.58, p=0.05) were associated with higher inside competitive food policy subscale scores while private school status predicted lower scores (OR=0.47, p=0.004). Tracking student BMI (OR=2.27, p=0.03) and wellness policy presence (OR=1.54, p=0.0005) were associated with higher outside school competitive food policy implementation scores.

Discussion

Kentucky schools are early in their adoption of CFPI despite strong federal and state school wellness policies. Our study findings partially supported our hypotheses that higher overall CFPI scale scores would be positively associated with demographic and school factors.

Demographic factors associated with CFPI were school type and county-level obesity rates. Public schools were more likely than private schools to have higher overall CFPI. Private schools were less than half as likely as public schools to implement inside competitive food policies. This finding was in keeping with our hypothesis and in keeping with the literature (L. Turner & F. J. Chaloupka, 2012). More research is needed on school type and CFPI. Affluent tuition-based private schools serve students with higher socioeconomic status. Since changing the schools' food environment can be controversial (Raczynski et al., 2009), these private school administrators may opt not to disrupt their customers. Alternatively, there are many private schools that are not well-funded or large enough to have full service cafeterias, sports programs and other centers where competitive food restrictions would apply. Many meet in churches or buildings that lack the facilities to prepare foods, so they rely on vending machines or other alternative means to feed their students lunch. Ultimately, the most likely reason for this finding is that government policies do not apply to private schools. Thus, any effort to implement competitive food policy would be voluntary.

Our hypothesis that higher county obesity rates would be associated with better competitive policy implementation was not supported. This is in contrast to the literature (D. R. Taber et al., 2011). The finding that county-level adult obesity rates were negatively associated with overall CFPI in Kentucky schools is of interest for future research. Since obese parents are more likely to have obese children (Keane, Layte, Harrington, Kearney, & Perry, 2012), it follows that communities with a higher proportion of obese adults are likely to have higher rates of childhood obesity. When school personnel are aware that their community has an obesity problem, this may

increase their support for more comprehensive competitive food policy to protect their students (Lanier, Wagstaff, DeMill, Friedrichs, & Metos, 2011). However, it is possible that parents who struggle with obesity in adulthood may be resistant to childhood prevention efforts because they may have accepted obesity as a norm or these efforts may provoke unwanted changes in their own lifestyles.

Also in contrast to our hypotheses, none of the following variables were associated with overall, inside or outside competitive food policy scale/subscale scores in schools: greater eligibility for reduced and free lunch, lower percentage of white students, larger school enrollment, urban location and non-high school status.

The failure of these demographic variables to reach significance may be related to the lack of variability in the selected demographic factors studied. (Table 3.3). Specifically, our sample, like the state of Kentucky, is a predominantly Caucasian ("National Center for Education Statistics," 2015) and rural (Agriculture, 2013a). Further, schools designated as high schools have larger enrollments and non-high schools have smaller enrollments compared to national estimates ("National Center for Education Statistics," 2015). Breiffel et al. (Briefel et al., 2009) showed that as grade level increases, competitive food policy implementation decreases. In our predominantly rural sample, if a school had grades 9-12, it was treated as a high school. However, in smaller towns high schools are typically combined with middle school and/or elementary students, perhaps, contributing to the larger high school enrollments in the study reported here. It is possible that high schools serving non-high school students gear their competitive food policies toward the youngest of their populations. This could dilute the differences between high school and non-high school competitive food practices and

explain why larger school enrollment and non-high school status were not significant in our models. Finally, greater reduced/free lunch eligibility percentage did not predict better compliance with competitive food policy as hypothesized. Since our CFPI overall scale and outside subscale scores were skewed to the right with little variability, this may explain the lack of significant findings for some of the demographic factors.

The lack of variability may also be a factor in failure to find an association between the school factor of soft drink pouring rights and CFPI. In our sample, 75% of the schools in the state have soft drink pouring rights contracts.

Findings support that two school factors drive a comprehensive approach to competitive food regulation: (1) having a written, local school wellness policy and (2) tracking student BMI data. Overall competitive food policy implementation scores as well as inside and outside school subscale scores were positively associated with these two school factors. Tracking student BMI is often driven by strong and specific local school wellness policy, district policy or both as was illustrated in the Arkansas study (Justus et al., 2007; Raczynski et al., 2009). Our study is the first to show the association between BMI tracking and CFPI – an important component of strong and comprehensive school wellness policies (D. R. Taber, Chriqui, Perna, Powell, & Chaloupka, 2012). Tracking student BMI may be a proxy for a school's commitment to student health promotion since it takes considerable resources and commitment to accomplish (Justus et al., 2007). Enabling schools to track BMI is an important challenge for policy practitioners and researchers. In Arkansas, BMI measurement was done in partnership with University research personnel (Justus et al., 2007). States could partner similarly with those interested in research on childhood obesity prevention. Establishment of

statewide coalitions of childhood obesity prevention advocates would be an excellent first step. Another option for measuring BMI is through partnering with state departments of health. For instance, in Kentucky, schools partner with the health department for the provision of school nurses and, as such, these nurses could be charged with measuring and recording BMI annually. Effective, automated electronic options for capturing BMI should also be explored since lack of resources is often cited as a reason for not tracking student BMI.

The outside school CFPI scores in our sample revealed that implementation of outside school competitive food policies is weak. (Table 3.3; Figure 3.1). Based on the findings, Kentucky schools are more willing to implement competitive food policies inside school than in outside school venues. Although no studies were identified that examined differences in inside vs. outside school CFPI, there is a similar concept of spanning organizational boundaries to boost innovation in the business literature (Anderson, Kragh, & Lettl, 2013). These authors describe the challenges of working with external agents to broaden creativity vs. the simpler task of working within their own organizational boundaries. Viewing competitive food policy implementation as an innovation, implementation of inside school policy components involve fewer stakeholders, little negotiation, are not complex, can be adopted with ease, and compliance is easily monitored. School administration and staff may see such practices as a decision in their purview with little impact on outside parties, making implementation more likely. Implementation of outside school competitive food policy components involves reaching beyond the school administration-controlled environment. Consensus on outside CFPI may be more complex as parents and the community may be

more involved in these outside school environments such a concession stands at sporting events, community fundraisers and after-school events. The schools may not see themselves as the sole decision-makers in implementing these outside school policies. There are also more financial implications tied to outside school policy components. Fundraisers and concession stands are often significant sources of revenue for schools. To change fundraisers from candy and cookie dough to flowers and fruit and/or to re-vamp the menu at the concession stand for all sports events may imply financial risk. It also requires time that school personnel do not have to analyze the possible impact on school finances should healthier alternatives not be as popular in the community. There are few studies analyzing the financial impact of eliminating competitive foods. However, as early as 2003, prior to any federal regulation, the Centers for Science in the Public Interest published multiples case studies from across the U.S. where schools voluntarily limited competitive foods and experienced greater profitability (Interest, 2003). For instance, a Minneapolis school increased the number of vending machines in school from 4 to 16. However, only one contained sodas and a second contained sports drinks. The others contained water or 100% juice. The healthy vending beverages were priced lower than the non-healthy options. The school saw water become the best-selling vending item, a reduction in soda sales and an additional profit from vending machines of $4000/year over prior year. It is key to continue to confirm these findings in meaningful and practical ways to school administrators. Without overcoming these real and perceived financial obstacles, schools may not readily embrace outside school competitive food restrictions as was illustrated in our findings.

Strengths of this study include a large sample size and representative distribution across Kentucky counties. The study's limitations include secondary analysis of self-reported data by school leaders with no independent, on-site verification which may introduce reporting bias. In addition, conversion of scale and subscale scores to binary variables (high or low scoring) is a limitation over the use of continuous data. Finally, the original data source was based on participant self-report with no verification of participant feedback. Given the difficulties associated with self-reported data, the scale may or may not have accurately reflected CFPI in participating schools. The measure of CFPI may have also contributed to the lack of associations found between most demographic and school factors of CFPI found in the literature.

Childhood obesity prevention advocates need to encourage local schools to start by implementing the simpler inside competitive food policy components such as placing only healthy foods in vending machines and eliminating sugared sodas. A longer term goal is to reduce obstacles to the implementation of outside policy components such as participating in only healthy food fundraising and converting sports concession stands to selling only healthy foods. Research is needed on the profitability of healthy vs. unhealthy fundraising food options and these data need to be shared with school leaders. In addition, the financial impact of fundraising on school activities needs to be analyzed and alternative funding options pursued, including advocating with local, state and national political leaders for more adequate school funding. If fundraising is a must, development of healthier alternatives is key. Research on parent/family and community preferences in healthy fundraising alternatives would help provide school leaders with the confidence to make changes to their food fundraising selections.

In summary, having a written, local school wellness policy and tracking student BMI were important school factors in driving successful CFPI. The presence of school pouring rights was not significantly associated with CFPI. Demographic factors associated with poorer CFPI were high county adult obesity rates and private school status. No other demographic factors were significantly associated with CFPI including location, enrollment, grade level, percent non-white students or eligibility for percent free/reduced price lunch. Kentucky schools scored higher on total and inside school CFPI scales than on outside school CFPI scales. Childhood obesity prevention advocates and school health personnel need to focus on providing support for schools to implement competitive food standards inside their schools first, followed by implementation of competitive food standards in outside school functions.

Conclusion

The association between a number of demographic and school factors and CFPI were examined in this study. Demographic factors included location, enrollment, grade level, percent non-white students, and percent eligibility for free/reduced price lunch and school type. School factors included having a school wellness policy, school pouring rights and tracking student BMI. A scale was developed to measure CFPI. Principal component analysis demonstrated that our total CFPI scales contained two components: inside school CFPI and outside school CFPI. Subscales to measure inside and outside CFPI were developed based on these components. GEE was used to assess the relationships between these factors and CFPI scale and subscale scores. Schools that have a school wellness policy in place and track student BMI data were strongly associated with better CFPI scale and subscale scores. County adult obesity percentage

was associated with poorer inside CFPI. Private school status was associated with poorer overall CFPI. No other demographic or school factors were significantly associated with CFPI. A greater percentage of schools scored higher on overall and inside school scales than on the outside school scale indicating that outside school CFPI may be more challenging. BMI measurement and tracking may be an outgrowth of strong school wellness policies which, in turn, contain competitive food restrictions. Our study is the first to show the strong association between BMI measurement and CFPI. It is key for schools to develop competitive food policies which are customized to their setting while insuring that they specifically address competitive foods in all venues. Having a written wellness policy and tracking student BMI are strong predictors of better CFPI and need to be encouraged as a part of every school wellness initiative.

Table 3.1 IOM Nutrition Standards

Standards for Nutritive Food Components

Standard 1: Snacks, foods, and beverages must have no more than 35% of calories from fat, less than 10% from saturated fat and no trans-fats.

Standard 2: Snacks, foods, and beverages provide no more than 35 percent of calories from total sugars unless they are fruit or vegetable juices or unflavored low-fat milk or yogurt.

Standard 3: Snack items are 200 calories or less per serving and á la carte entrée items do not exceed calorie limits on comparable NSLP items.

Standard 4: Snack items meet a sodium content limit of 200 mg or less per serving or 480 mg or less per entrée portion as served for á la carte.

Standards for Nonnutritive Food Components

Standard 5: Beverages containing nonnutritive sweeteners are only allowed in high schools after the end of the school day.

Standard 6: Foods and beverages are caffeine free.

Standards for the School Day

Standard 7: Foods and beverages offered during the school day meet NSLP standards.

Standard 8: Water is available throughout the school day at no cost to students.

Standard 9: Sports drinks are not available in schools unless provided by the school to athletes participating in vigorous sports.

Standard 10: Foods and beverages are not used as rewards or discipline for academic performance or behavior.

Standard 11: Minimize marketing of Tier 2* foods and beverages in the high schools.

Standards for the After-School Setting

Standard 12: Snack items that meet NSLP standards are allowed after school for student activities for elementary and middle schools. Both NLSP and Tier 2 snacks are allowed after school for high school.

Standard 13: Only foods and drinks meeting NSLP standards may be sold for in-school fundraisers for elementary, middle, and high schools. Tier 2 foods and drinks are allowed for high schools after school. For evening activities that include adults, only foods meeting NSLP standards or Tier 2 food and drinks are encouraged.

IOM 13 standards for nutrition in schools (Institutes of Medicine, 2007)

Tier 2 foods include any foods that meet NSLP standards PLUS additional snack foods that are NOT fruits, vegetables, combination or low fat milk products that meet NSLP calorie and nutrient standards (i.e. low salt baked potato chips, animal crackers) as well beverages that are sugar and caffeine-free, not vitamin fortified and have less than 5 calories per serving (i.e. diet soda and sports drinks)

Table 3.2 Competitive Food Policy Items by Subscale

Competitive Food Policy Implementation Scale Questions	
Does your school or district have a policy that prohibits or restricts junk food:	Subscale identity
INSIDE SCHOOL	
1. in vending machines	inside
2. at student/classroom parties	inside
3. as rewards for good behavior	inside
4. as rewards for academic performance	inside
OUTSIDE SCHOOL	
1. at staff meetings	outside
2. at after school events	outside
3. at concession stands	outside
4. at fundraisers	outside

Table 3.3 Competitive Food School Policy Scale and Subscale Score Descriptive Statistics

Variable	Mean	Median	Mode	Standard Deviation	Range	*n*
Overall score	2.71	2.0	1.0	2.17	0-8	574
Inside score	2.06	2.0	1.0	1.46	0-4	600
Outside score	0.66	0	0	1.08	0-4	599

Table 3.4 Independent Variable Characteristics

Variable	Description	Level	Source	Study sample	KY state	U.S.
Demographic Factors						
Reduced and free lunch	Percentage of students eligible for free or reduced lunch	School	NECS	56.4% +/- 15.9 Range 17-98%	55%	51%
Percent Caucasian	Percentage of student population that is white	School	NECS	88.5% +/- 13.0	83%	51%
Enrollment (size)	Number of children enrolled	School	NECS	Mean = 1042 for high schools; Mean = 374 for non-high schools	Mean = 398 for elementary schools; Mean = 550 for middle schools; Mean = 637 for high schools	Mean = 471 for elementary schoolsMean = 639 for high school
Urban vs. rural (location)	Beale code for urban (coded 1-3 =0) vs. rural (coded 4-9=1)	County	USDA +	Urban =23.4%; Rural = 76.6%	Urban = 29.2%; Rural = 70.8%	Urban = 80.7%; Rural=19.3%
High school vs. non-high school	Non-high school = 0; High School = 1	School	NECS	98 elementary schools (55%); 79 high schools (45%)	995 elementary schools-64% 441 secondary schools -28% All schools -1565	67086 elementary (68%) 24,544 high schools (25%)
Public vs. private school	Public (0) vs. Private school (1)	School	UK database and NCES	15.3% private; 84.7% public	17.2% private; 82.8% public	23.5% private; 76.5% public
Percent of obese adults	Percentage of obese adults	County	Annie E. Casey Kids Count database; CDC 2013	31.4% +/- 4.9 Range 19-52	31%	32.6%
School Factors						
Required measurement of BMI	School tracks individual student BMI	School	UK database and publication **	228 negative responses (36%); 399 positive responses (64%)	Data not available	42.6% elementary schools; 43.2% middle schools and 40.4% high schools
Wellness policy	School has local wellness policy	School	UK database; CDC 2010 School Health Policies and Practices Study	33.3% yes; 66.7% no	Data not available	38.4% yes; 61.6% no
Pouring rights	School has soda pouring rights contract	School	UK database	75.2% have pouring rights	Data not available	83% have pouring rights *

(L. R. Turner & F. J. Chaloupka, 2012) [+]; (Agriculture, 2013b)**; (Nihiser et al., 2007)

Table 3.5 Findings of Multi-Level GEE Analysis

Predictors of Total Competitive Food Scale Score

Independent variable	Odds ratio	Standard Error	95% Confidence Limits		p-value
School Factors					
Wellness Policy	1.74	0.43	1.08	2.82	0.02*
BMI tracking	2.07	0.46	1.34	3.19	<0.01*
Pouring rights	1.00	0.29	0.57	1.75	0.99
Demographic Factors					
Reduced/Free Lunch	0.99	<0.01	0.98	1.00	0.22
Percent white	0.99	<0.01	0.98	1.00	0.15
Enrollment	0.99	0.03	0.94	1.05	0.82
Location (urban vs. rural)	1.11	0.29	0.66	1.86	0.69
High school vs. non-high school	1.14	0.22	0.78	1.66	0.49
Public vs. Private	0.52	0.15	0.29	0.92	0.03
Percent Obese Adults	0.93	0.03	0.87	0.99	0.03*

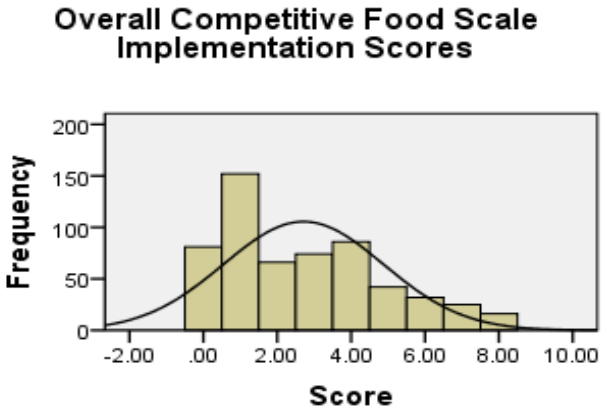
Table 3.6 Predictors of Inside Competitive Food Scale Score

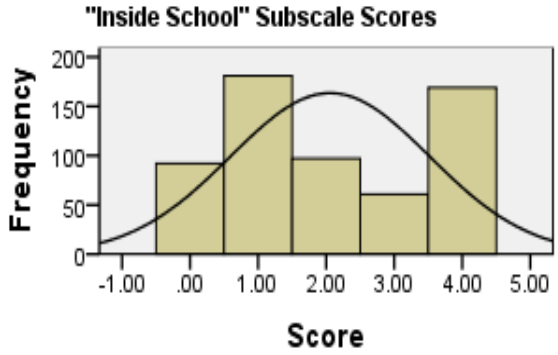
Independent variable	Odds Ratio	Standard Error	95% Confidence Limits		p-value
School Factors					
Wellness policy	1.58	0.36	1.00	2.48	0.05*
BMI tracking	2.47	0.55	1.60	3.82	<0.01*
Pouring rights	1.12	0.30	0.66	1.88	0.68
Demographic Factors					
Reduced/Free lunch	0.99	0.01	0.98	1.00	0.09
Percent white	0.99	0.01	0.98	1.01	0.59
Enrollment	1.00	0.03	0.95	1.06	0.91
Location (urban vs. rural)	1.14	0.33	0.65	2.00	0.64
High school vs. non-high school	0.99	0.18	0.69	1.42	0.96
Public vs. Private	0.47	0.12	0.29	0.79	<0.01*
Percent Obese Adults	1.00	0.01	0.98	1.01	0.13

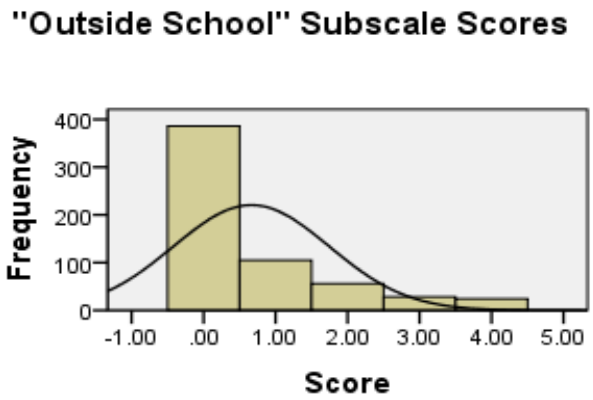
Table 3.7 Predictors of Outside Competitive Food Scale Score

Independent variable	Odds Ratio	Standard Error	95% Confidence Limits		p-value
School Factors					
Wellness policy	2.28	0.54	1.43	3.61	<0.01*
BMI tracking	1.55	0.31	1.05	2.29	0.03*
Pouring rights	1.34	0.41	0.73	2.44	0.34
Demographic Factors					
Reduced/free lunch	0.99	0.01	0.98	1.01	0.48
Percent white	0.99	0.01	0.98	1.00	0.12
Enrollment (size)	1.03	0.03	0.98	1.08	0.28
Location (urban vs. rural)	1.32	0.31	0.84	2.08	0.23
High school vs. non-high school	1.01	0.18	0.72	1.42	0.96
Public vs. Private	0.63	0.19	0.34	1.14	0.12
Percent Obese Adults	0.99	0.03	0.94	1.05	0.89

Figure 3.1 Scale and Subscale Score Distributions







CHAPTER FOUR

Experiences of School Administrators and Staff Implementing Competitive Food Policy in Kentucky Schools

Abstract

Competitive foods in schools are a significant source of excess calories for children. Competitive foods are those available in vending machines, a la carte settings, fundraisers, classroom parties, after school events and other venues which compete with the national school lunch and breakfast foods. Restricting competitive foods in schools is associated with a reduction in BMI and less consumption of calories and fats. The Healthy, Hunger-Free Kids Act of 2010 (HHFKA 2010) was the first federal legislation to mandate competitive food policy. However, implementation of competitive food policy in schools has been highly variable. The aim of this study was to understand the experience of school administrators and staff in competitive food policy implementation (CFPI) using a proposed theoretical framework (Figure 4.1). The study design was a qualitative content analysis of semi-structured interview content from participants. Twenty-three school personnel from a stratified, random sample of 8 Kentucky middle and high schools participated in the study. Verbatim transcripts of semi-structured face-to-face interviews and focus groups were analyzed for themes using qualitative techniques. Six themes emerged: (1) internal/external forces facilitating CFPI; (2) internal and external obstacles to CFPI; (3) key organizational values; (4) organizational value of CFPI; (5) methods the organization employs to communicate priorities; and (6) CFPI policies and procedures. Using the proposed theoretical framework, the innovation described was CFPI. The specificity of federal policy language and the expectations and support of school district personnel were important external forces enabling CFPI. The most important obstacles to CFPI were lack of resources creating a dependence on fundraisers and a serious conflict between school personnel's values and the tenants of CFPI. CFPI was driven primarily through school districts. Managerial support for CFPI was passive, but permissive to the district's implementation efforts which seem to be sufficient. Both school administrators and staff were extremely skeptical about CFPI's usefulness and effectiveness based on past policy experiences. There was considerable conflict between their personal and organizational values and CFPI innovations. The end result was that schools were compliant with the specific competitive food policy provisions articulated in the federal legislation including restrictions on vending machines, a la carte foods, outside foods and fundraisers during the school day. They were not compliant with less specific policy recommendations including content of fundraisers and serving only approved foods at after school events. These findings emphasize the importance of policy language specificity, incorporation of penalties for noncompliance, inclusion of accountability mechanisms, and equipping district and school personnel with sufficient resources and training to enable CFPI. School health practitioners can advocate for the inclusion of these elements in future school wellness policy development.

KEYWORDS: competitive food policy; school wellness policy; implementation; qualitative review; Healthy, Hunger-Free Kids Act of 2010

Introduction

For more than a decade, national legislation has been enacted to require school wellness policies (SWP) in the fight against the childhood obesity epidemic in the United States (Congress, 2004, 2012). The 2010 Healthy, Hunger-Free Kids Act (HHFKA 2010), which reauthorized and strengthened the 2004 Child Nutrition and WIC Reauthorization (WIC 2004) legislation, provided the United States Department of Agriculture (USDA) with the authority to enforce competitive food standards in schools (Chriqui et al., 2010). This legislation applies strict nutrition standards to all food and beverages available in schools and on school grounds during the school day. Competitive food policy implementation (CFPI) in schools is a promising strategy to reduce student intake of low nutritional value, energy dense foods (Fox, Gordon, Nogales, & Wilson, 2009; Kakarala, Keast, & Hoerr, 2010; D. R. Taber, Chriqui, J.F., Chaloupka, F.J., 2012; Terry-McElrath, O'Malley, Delva, & Johnston, 2009). However, multiple studies demonstrate that having a school wellness policy (SWP) in place does not guarantee effective implementation of the policy at the local level (Metos & Murtaugh, 2011).

There are many reasons why SWP implementation is inconsistent. The 2004 federal regulations required that schools establish a wellness policy without specifying the precise content required. The result was that most states or school districts issued a "model" policy which schools adopted, but implementation beyond the adoption of a written policy was uncommon. There were also no incentives or disincentives for compliance. Further, there was little funding to equip schools to implement SWP and there were no mechanisms for assessing compliance with the policies. HHFKA 2010 addressed these policy shortcomings by including a 6 cent per meal incentive (including breakfast and lunch) for schools that demonstrate compliance. However, there is a formal

process for third-party certification of each school's compliance. Non-compliant schools are subject to losing the 6 cent incentive and may be cited by the state and subject to administrative review (Congress, 2012).

Many studies have examined the impact of the strength, specificity and comprehensiveness of policy language and policy redundancy on school wellness policy implementation (SWPI) effectiveness (Longley & Sneed, 2009; D. R. Taber, Chriqui, & Chaloupka, 2011) and on CFPI effectiveness (Chriqui, Turner, Taber, & Chaloupka, 2013; Turner, Chriqui, & Chaloupka, 2013). Other studies have examined the impact of specific demographic and school factors on the success of CFPI (Adachi-Mejia et al., 2013; Nollen et al., 2009; Nollen, Kimminau, & Nazir, 2011; Park, Sappenfield, Huang, Sherry, & Bensyl, 2010; Probart, McDonnell, Hartman, Weirich, & Bailey-Davis, 2006) and SWPI (Briefel, Crepinsek, Cabili, Wilson, & Gleason, 2009; Samuels et al., 2009; Terry-McElrath et al., 2009; Turner & Chaloupka, 2012; Wall, Litchfield, Carriquiry, McDonnell, & Woodward-Lopez, 2012). Finally, a number of studies have used survey or interview methods to understand school personnel's experiences, perceptions, and barriers and facilitators in implementing school wellness policies.

Barriers to implementing competitive food policies include lack of resources such as loss of school revenue from competitive food sales; lack of availability of healthy food options from vendors (Downs et al., 2012); lack of funding for health initiatives; loss of revenue from selling popular snack foods; increased costs and greater waste/spoilage with healthier food; increased costs of individually packaged fruits and vegetables (Nanney & Glatt, 2013); and loss of revenue from financial incentives offered by vendors (i.e. pouring rights) (Probart et al., 2006). Additional barriers include allowing outside

foods into the school or student access to nearby commercial outlets (Sanchez et al., 2014), and community/parental barriers such as low socioeconomic status, parent resistance to change, lack of parental education about food guidelines, and unhealthy foods brought from home (Downs et al., 2012; Quintanilha et al., 2013).

Despite the wealth of information found in the literature, few studies have systematically examined how external factors (i.e. federal mandates, required policy language) interact with intra-organizational factors to impact SWPI effectiveness. For example, none were identified that examined these factors in CFPI. In addition, there were no studies identified that used theoretical models or conceptual frameworks to guide research on either CFPI or SWPI. Theory-driven research is needed to understand how best to promote and support these policy initiatives in schools. Since there are no specific theoretical models to guide CFPI process inquiry, a theoretical framework was adapted using education theory (Arum, 2000), institutional and organizational theory (Scott, 2014), and implementation science literature (Klein & Sorra, 1996).

The aim of the current study is to explore the experiences of school leaders and staff in CFPI using a proposed theoretical framework.

Background

The adapted theoretical framework is shown in Figure 4.1. The model is comprised of two major components that determine CFPI effectiveness: external forces impinging on CFPI (Arum, 2000; Scott, 2014) and the internal CFPI implementation process (Klein & Sorra, 1996). Moving from left to right in Figure 1, there are two types of external forces which influence CFPI in schools. Arum, et al. (Arum, 2000), a noted scholar on educational institutions, identified these two forces as local/ecological

community and institutional/professional sources. Local/ecological forces are factors such as parental pressure, advocacy group activities, local customs or traditions, etc. Institutional/professional sources include national and state regulatory forces (e.g., HHFKA 2010 regulations or state board of education curriculum requirements) and professional/peer recommendations (e.g., professional school administrator organizations which promote best practice). These two types of external forces can be further understood in the context of W. Richard Scott's work. Scott (Scott, 2014), a noted scholar on institutions and organizational theory, describes three pillars of organizations: normative, regulatory and cultural/cognitive. Normative forces are the understood values, expectations, norms and roles based on experiences with the organization. Regulatory forces are formal laws or rules. Cultural-cognitive forces are unspoken understandings about the institution's common framework of meaning. They are transmitted culturally but translated to behaviors cognitively. Early organizational theorists saw regulatory forces as the key driver of organizational behavior. Later, social scientists proposed that normative elements were most important in driving institutional behaviors. Most recently, neo-institutionalists have emphasized cultural-cognitive elements as dominant in driving organizational behavior. Scott asserts that all three types of forces influence organizational development, behavior and stability and should be examined when predicting institutional performance. Scott's input is incorporated into the proposed CFPI model as additional subcategories of forces arising from local/ecological and institutional/professional sources.

The middle section of the model (see Figure 4.1) describes the organization's internal innovation implementation process and is based on the work of Klein and Sorra

(Klein & Sorra, 1996). An "innovation" is any product or practice used in an organization for the first time to benefit the organization. If the "targeted members" of the organization become increasingly skillful, consistent, and committed to the innovation, implementation is considered effective (see far right side of the Figure 4.1). If the innovation benefits the organization, the innovation is considered effective (see far right side of Figure 4.1). The organization may be effective at implementing an innovation, but may not benefit from the innovation. Conversely, the organization may not benefit from the innovation if there is inadequate implementation of the innovation.

Shown in the center of the internal organizational implementation process in the CFPI model (see Figure 4.1), are the two most important mediators of innovation implementation effectiveness: implementation climate and innovation/values fit. Implementation climate is determined by managerial support, resource availability and implementation policies and procedures. A positive implementation climate is promoted by managerial support to remove obstacles, provide incentives/disincentives, and equip people with skills. Resource availability includes funding and human resources. Implementation policies and procedures are the activities an organization undertakes to support implementation of the policy. The robustness of implementation policies and procedures is predominantly mediated by resource availability.

Innovation/values fit is the congruence between the innovation and the key values of the collective organizational members. Innovation/values fit is determined by both the prevailing target group values and internalized corporate values. Managerial support contributes to values/innovation fit, but does not determine it. The stronger the implementation climate and innovation/values fit, the greater the odds of implementation

effectiveness. The proposed adapted theoretical framework guides the research reported here.

Methods

Design

This study was a qualitative content analysis of transcripts from semi-structured interviews with school personnel to understand their experience with CFPI. The study was approved by the University of Kentucky Investigational Review Board.

Sample

A sample of Kentucky schools was obtained from the 2011 School Tobacco and Wellness Policy biannual telephone survey with school personnel in Kentucky middle and high schools conducted by the University of Kentucky (UK) College of Nursing Tobacco Policy Research Program. There were 640 respondents from middle and high schools, 5th-12th grades nested within 116 Kentucky counties. Based on the total number of schools (N = 1565 public and 301 private schools) and counties (N = 120) in Kentucky, the survey collected data from 97% of counties and 34% of all schools.

For the study reported here, participating schools within 75 miles of Lexington, Kentucky were stratified into four groups based on school level (middle or high) and CFPI scale score (high or low) (see Chapter 3). Sixteen schools were randomly selected from each of four groups and invited to participate in the research study. Starting at the top of each group list, principals were contacted up to three times by phone and three times by e-mail to invite them to participate in the study. This procedure was followed until two principals from each group agreed to participate. Personnel from a total of eight schools, two from each group, agreed to participate. The goal was to interview a key

administrative representative and up to six school staff members per school who were involved or knowledgeable about SWPI/CFPI. All interviews and focus groups were conducted face-to-face at the schools. Each school's administrative participant was interviewed individually first. Then the staff identified by the administrative participant were contacted to enlist participation in the same manner. Where possible, school staff were interviewed in focus group format. However, to accommodate school staff schedules, 8 staff members were interviewed individually. There were a total of three focus groups and 16 individual interviews conducted. A total of 23 people participated in the study: seven principals, one assistant principal, and 15 school staff members.

Measures

The interview guide for the study was based on the proposed CFPI theoretical framework. The interview questions and their associated theoretical construct elements are listed in Table 4.2. The interview guide comprised eight key concepts and one sample characteristic (status of each school's wellness policy) including: (1) internal and external enabling forces for CFPI; (2) internal and external obstacles to CFPI; (3) key organizational values; (4) organizational value of CFPI; (5) methods by which the organization communicates its priorities; (6) CFPI policies and procedures; (7) fundraisers and; (8) restriction of outside foods brought into school. In order to understand the organizational context of CFPI, broad probes relating to SWPI were asked first and then more narrow probes about CFPI followed. Similar questions and probes were used in the interviews with both the administrators and staff. Each interview ranged from 45 minutes to 1 hour.

Procedures

Eight questions from the 2011 School Tobacco and Wellness Policy survey were used to design a CFPI scale, with higher scores indicating better CFPI (see Chapter 3). Strata were created using CFPI scale score (high or low) and school level (middle or high). From four groups of randomly selected schools, participants were recruited via email and telephone. Participants who agreed to participate received a letter which introduced and described the study prior to the interviews. Semi-structured interviews were conducted with participants from each school including at least one administrative and up to six staff representatives (N = 23). In-person written informed consent was obtained prior to the interview.

If the administrator identified only one staff member, interviews were conducted individually. When multiple staff contacts were identified, if possible, a focus group format was used. There were instances in which multiple staff from the same school were individually interviewed to accommodate scheduling. All interviews and focus groups were audio recorded and transcribed verbatim. Interviews and focus groups were the sole source of data. No documents or written policies were inspected to verify interview findings. Once transcribed, audio recordings were deleted immediately and transcripts were stored in a locked cabinet.

Data Analysis

A total of seven individual and three focus group interviews were analyzed for themes and sub-themes. Each interview was identified by a study number, role of the participant, and school level to reduce investigator bias based on school identity or location. The eight concepts and one sample characteristic question (status of each

school's formal wellness policy) contained in the interview guide guided initial coding. Transcripts were coded using an Excel spreadsheet; each category of data was organized on a separate spreadsheet to look for sub-themes within the eight categories. During the coding process, two of the categories were redundant. "Fundraisers" and "outside food policy" were collapsed under the category of "implementation policies and procedures." Each of the remaining categories of data was then coded based on emergent data themes.

A codebook was constructed based on this data array. A researcher with experience in qualitative analysis was then trained to use the codebook, and they coded 20% of randomly selected interviews (two administrators and two staff) to assess interrater agreement. Cohen's kappa and interrater agreement were calculated using SPSS 21.0 (Cohen's kappa = 0.542, 56.1% agreement).

Results

Demographic Characteristics of the Sample

Table 4.1 presents demographic characteristics of school participants. Six public schools (three middle and three high schools) and two private schools participated in the study. One private school housed pre-school through 8th grade (middle school) and the other housed pre-school through 12th grade (high school). Four of the schools were from metropolitan areas. The remaining schools were non-metro or rural. Schools administrators were comprised of six principals and two assistant principals. School staff were comprised of five physical education (PE) teachers, four nurses (one district-level), a district director of pupil personnel, an assistant principal, a family resource center counselor, a chef, a middle school program director and a practical living teacher. School sizes ranged from 135 to 1064. The percent of free/reduced lunch ranged from 37-69%.

There were six major themes derived from the interview and focus group data and each category had multiple subthemes (number of subthemes listed in parentheses): (a) internal and external forces impacting schools (12); (b) obstacles to SWP/CFPI (7); (c) key organizational values (8); (d) organization priority of school wellness initiatives (4); (e) methods organizations use to communicate its priorities (4); and (f) CFPI policies and procedures (16).

Description of School Wellness Policy Sample Characteristics

Of the eight schools, only two had formal, local school wellness policies. One of the high school principals described their school wellness policy as "describing the things we can't do" (e.g., cannot allow competitive foods to be sold in vending machines, etc.). He added, "If it is a law or regulation, we do it." The other high school had an intentional wellness program driven by a school committee which tracked individual students who had missed more than 10% of school days. This school had strong nurse leadership in their Comprehensive School Wellness Program initiatives historically. Every school in this district had a written wellness policy inclusive of competitive food policy as did the entire district and there were active wellness committees at both the local and district levels. An additional 4 schools were covered by district-level wellness policies that addressed competitive foods. Only one of the participants reported having food standards for classroom parties/meetings. None had food standards in place for after-school events or external fundraisers (i.e. school-related concession stands).

Neither private school had formal school wellness or competitive food policies or committees. The school leaders and staff from one private school expressed that they approached wellness in an "integrated manner." The other private school had made a

strategic decision to prohibit all outside food in support of being an allergen-free school. The restriction of outside foods was consistent with their recent conversion to a professional chef-led school food program where all meals and snacks were fresh, "from scratch" and locally sourced. The tuition paid by parents covered the cost of meals and snacks at this school.

In summary, schools fit into one of five categories: no school wellness policy; in process of developing a school wellness policy; local school policy only, district policy only or both district and school wellness policies. The two private schools did not have any competitive food policies in place. Both had "practices" they felt were consistent with an integrated approach to wellness. In the public schools, two of the six (one high school and one middle school) were "working on developing a general school wellness policy that would contain competitive food regulations", so they were without any formal school wellness policies at the time of the interviews. Both had received direction from the district to develop a competitive food policy, and both had district committees which were working on a policy. The last four public schools had formal wellness policies in place which addressed competitive foods. Two of the four schools followed a district level policy and participated in a district level committees. The final two schools had formal wellness policies at both the school and district levels.

Internal and External Enabling Forces for CFPI

Specific school leaders or champions were most frequently cited as important forces in driving CFPI efforts. These leaders included school principals, assistant principals, school nurses, family resource center staff, and faculty. One participant identified the district superintendent as a specific champion of school wellness efforts:

> "Our superintendent really gets the non-academic things that drive student success. [He/she] started this and modeled it after a program in (City), (State). The leader of that program came to Kentucky to speak and we modeled it after hers."

Another school staff member said the principal was the program champion:

> "I think right now it is John Smith (pseudonym). John was in the army for 25 years and is "big time" into working out and stuff. John stays on me saying, "Make your programs have plenty of rigor". We've implemented running for 10 minutes before gym starts and push-ups and sit-ups…John can be persuasive and sometimes overly eager, but John has been here for a while so we know how to take John. John believes in doing the right thing and keeping your body healthy."

School district support and direction was important in pushing CFPI forward. In all of the public schools, district resources were identified as responsible for educating principals and other personnel on the food standards, doing menu planning, food purchasing and insuring compliance with the standards. School-based decision making councils or boards or other managing committees were also influential forces at the majority of schools as was the availability of monetary or human resources.

Participants from private schools said that parent and student feedback was an important force in school food practices in the interest of promoting high "customer satisfaction". This was not mentioned by the public schools.

State and federal regulations were the strongest drivers of CFPI. Since the HHFKA 2010 explicitly mandates NSLP and breakfast program food standards, content of a la carte food, vending machine regulations and in-school fundraiser restrictions (Congress, 2012), these were uniformly addressed in each public school. Participants from private schools were not subject to federal nutrition standards/regulations, so these regulations were not discussed.

Other less frequently identified internal and external influences on CFPI included performance on the school's annual quality improvement plan, monitoring of performance data, and learning from professional associations, peers and competitors. Others said that spontaneous as well as desired organizational changes had provided the "window of opportunity" to push CFPI. One participant cited direct political pressure from school board and district leaders when the media highlighted Kentucky's high rates of childhood obesity:

> "You know media. When it says we're number 48 in the nation because of obesity, the administrators and commissioners, they all get in a ball of motion trying to fix things…so I would say media and administrators are important."

In summary, the most important internal and external forces enabling SWPI/CFPI were the federal regulations, presence of a program "champion," district support for the initiative, support by a governing board or committee and availability of adequate resources. Since private schools were not subject to the regulations, the most important force driving their decisions was ensuring parent and student (customer) satisfaction.

Internal and External Obstacles to CFPI

Complaints from parents, students and staff about school food was the most frequently cited obstacle to CFPI. A number of participants were concerned that the food portions were inadequate for athletes who frequently stayed late for practice. Participants said athletes would "load up on junk food" after school when there was access to free outside foods and/or vending machines.

> "The portions are not a lot and it is really backfiring all the way around because the kids go get something after school because they are still

> hungry, and those that can just bring food from home and they are eating worse than they ever have before."

Another obstacle was that participants perceived HHFKA 2010 as failing to address the core issues related to obesity.

> "I think we need to make good choices instead of changing things like the lunch and they (the students) are left wondering why. I think we have missed the boat on that one. We need to equip them to make better choices long term. They should not just say "no salt". They should discuss seasoning alternatives. I wish the whole federal lunch program had more teaching. Instead they just change up the lunch and the kids don't understand. They complain and don't eat it and then they eat junk food when they get home."

Another important obstacle was lack of human and monetary resources. Participants cited the need for fundraising to support key school operations, particularly extra-curricular activities. This was the case in all public schools and in one of the private schools. The other private school relies solely tuition and has no need for fundraisers. Concession stands, manned by teacher, parent and/or booster club member volunteers, were a routine way to raise money in schools. Participants uniformly stated that converting concessions to healthier options would have a large negative impact on concession stand revenues. Participants stated that fundraising restrictions would have a disproportionate negative impact on schools in poorer counties as those parents could not directly fund extracurricular activity expenses.

A clear values conflict was articulated as an obstacle to providing healthy food, activity and competitive food practices in school relative to other school priorities, especially in poorer communities. The following comments capture this sense of misplaced priorities:

> "We are trying to do all we can to help these kids in a community with high unemployment, not a lot of business, very rural, parents have to go to work out of town. If we have hamburgers left over (from our a la carte food sales), the lunch ladies give them away to the kids that need them. It may not be the legal thing to do, but it is the right thing."

> "Nutrition, exercise and BMI take a back seat to bigger concerns like poverty, chronic absenteeism and hunger in a county with 70% free and reduced lunch. Our county family resource centers sent 7000 backpacks filled with food (donated by the churches) home with students last year on Fridays so they don't go hungry over the weekend and the federal government is limiting portion sizes. We try to fill them (the backpacks) with healthy food, but you want to fill them up too, so it is a fine line."

> "Kona Ice is a good example. It's sugar water, but Kona Ice was able to work it out (their potassium content) so that it met the requirements – so we still do Kona Ice – even though it is sugar water – very expensive sugar water…People have been doing these kinds of fundraisers since schools began. Fundraisers are not the reason our kids are obese….Now are there some things we need to do a whole lot better at? Yes. Is it terrible to make kids run laps because they didn't turn in their homework and have them make that negative association with exercise? Yes, that is not a wise decision. Do I think the cookie dough that the soccer team sells once a year that I can keep in my freezer is a bad thing? I really don't because I can buy it at Walmart and I would rather the kids have the money than Walmart."

Another key obstacle to CFPI was school pouring rights. Schools and/or districts may agree to serve only one vendor's soft drinks where permitted and receive a rebate from the vendor based on sales. This is known as soft drink "pouring rights". All public schools and/or districts had these arrangements with either Coke or Pepsi. Though participants did not identify pouring rights as an obstacle, these contracts are a barrier to implementation of outside school competitive food policy elements because they are part of the larger problem of school dependence on fundraisers including sales of unhealthy foods at after-hours school-related events. Dependence on fundraising is a well-documented obstacles to SWPI/CFPI (Turner, Chriqui, & Chaloupka, 2012).

Another obstacle to CFPI was that school employees did not believe that CFPI policies are effective. They felt obesity prevention efforts were not effective so far; similar policies had not been monitored or enforced; and they voiced a sense of futility in "having students for 7 hours per day with the other 17 spent elsewhere". Three principals were generally wary of any regulations that might "tie their hands" needlessly. Finally, outside foods brought in lunches from home was identified by multiple participants as an obstacle to CFPI.

In summary, important obstacles to CFPI were school personnel's' values conflicts with the means and the intent of SWPI/CFPI; dependence on fundraisers to support school operations; soda pouring rights contracts; and student/staff/parent complaints about food quality and quantity.

Key Organizational Values

Participants were asked for their three most important organizational values. Five key values were identified: (1) doing what is good/right for students; (2) academic success; (3) student safety; (4) compliance with regulations; and (5) availability of adequate funding and human resources. "Doing what is right/good for the kids" was the most often mentioned organizational value. Two participants shared their thoughts.

> "Our number one priority is the student. If we keep the student out front in all decisions, that is what we need to do. It has to be the student that drives it. It can't be because it is good for the adults. It has to be the students."

> "First, does it benefit our kids broadly or academically? If not, we don't need to do it….The kids have to feel that we are doing what is good for them. If we are convinced that it is something we should do, we will find a way to get the funds."

Academic progress (e.g. test scores) was also identified as either the first or second key value, followed by student and staff safety. The two private schools listed parental and student satisfaction as a top priority; whereas none of the public schools reported this. Complying with regulations was listed as key value by two schools, though never as a top priority. Resource-related values included availability of funding and teachers' acceptance and volunteerism. Only one school mentioned teacher acceptance of an initiative as a key value.

In summary, there were five major values identified by participants including (in order of frequency cited): doing "the right thing" for students; academic success; student safety; compliance with regulations; and availability of resources.

Organizational Priority of CFPI

Participants were asked what priority SWPI/CFPI held in their organizations. Personnel from the private schools said that physical wellness could not be separated from other aspects of the student (including academic achievement) and, by virtue of this, had high priority. While one school had a robust chef-driven healthy food program and placed great emphasis on student physical activity because of the value they place on excellence in everything, the other private school was catering lunch for students through local Chinese, Mexican and Italian restaurants because of cost limitations. Thus, it was unclear whether SWPI efforts were a clear outgrowth from this integrated approach in the private schools.

Few public school principals identified wellness in the organization's top three or top five priorities (n=1) A participant stated that "it was not at the top of my list," but other participants from that school felt it was in the organization's top three priorities.

Yet another participant stated it was "not in the top five" and additional participants from that school agreed that it was "probably in the top ten, perhaps seven or eight". A final participant stated "it is not in my top ten" and other participants from that school agreed saying:

> "We are here to educate kids-bottom line. Our butts are on the line every day with the state department so allot of that has to do with testing. Our school is a top ten middle school in the state. Priorities are reading, writing and 'rithmetic…the basics…the things that will make kids successful. If kids are at school, they will learn."

Another school administrator was equally direct.

> "Wellness is not in the top 10 priorities here. If they didn't require it, we probably wouldn't have a policy. Anybody who tells you it is, they are probably not telling the truth. Our first priority is that our kids be successful and in academics, that is measured by test scores and that is the bottom line."

In summary, among the public schools, one participant placed SWPI/CFPI in the school's top three organizational priorities. In this school, wellness initiatives had been linked to a robust effort to reduce chronic absenteeism. There was another school in which staff participants thought wellness was in the top three priorities, but the administrative participant did not agree. Two schools placed SWP/CFPI in their top five and the three remaining schools placed it somewhere below the top five. Private schools were unable to differentiate physical wellness initiatives from other types of wellness (i.e. academic, psychological, etc.) as they see the student as an integrated whole.

Methods Organizations Use to Communicate Priorities

Participants were asked to identify what methods school leaders typically use to communicate that an initiative is a priority in their organizations. Often, the question was

phrased, “How does your organization communicate that you are serious about an initiative? How do employees know that a program is here to stay?” There were four main subthemes that emerged: 1) constant communication; 2) follow up by the principal; 3) seeing operational changes happen; and 4) assigning priority based on who is communicating about the initiative.

One principal described his communication efforts.

> “I am out of the office and in classrooms all the time and I have an open door policy so I have a good handle on what is going on out there. I am very visible. I will talk to teachers and students. I have a teacher leader group that represents the faculty and their views. I appoint them and I pay them. I meet with them once per month and I want their honest feedback –main thing is that they are not “yes people”. Then I will go to the site-based decision-making council (SBDMC) members one by one. By the time something makes it to a faculty meeting, everybody pretty much knows what to expect. No surprises.”

One principal described his follow up with employees in this way.

> “Well, I’m sure you have heard, “If you want it done, you’ve got to inspect it.” If I say I’m going to do this and I never come looking for it, they are not going to believe I’m serious.” Then, like the ACT prep program we implemented, I’ll go to the classroom and say “show me how you are using this.” Then there are things that we HAVE to implement. I’ll say, “Guys, we have to implement this. I’m not going to come look for it, but if somebody else does, I have told you to do it. I have done my job.”

Other participants expressed that they knew an initiative was a priority when they saw changes occur consistent with the initiative (i.e. physical plant changes; training required for the initiative or establishing a district committee to direct efforts).

Finally, some participants felt the best indicator that an initiative was a priority was seeing administration championing the initiative. Two participants expressed

confidence in their principals specifically citing their leaders' histories of "consistently following through on all the things they said they would do".

In summary, there were four key ways that people in the organization know that an initiative is an organizational priority: (1) frequent communication about the initiative; (2) follow-up by the principal (or others) to check on the progress of the initiative; (3) seeing the organization change structures to accommodate the initiative; and (4) observing administration "doing what they say they are going to do".

SWPI/CFPI Policies and Procedures

There were 16 SWPI/CFPI subthemes that supported SWP/CFPI policies and procedures. The most frequently identified CFPI policy or procedure was vending machine restrictions. All public school administrative participants reported compliance with the HHFKA 2010 restrictions on vending machines. Though not in conflict with HHFKA 2010 provisions, interestingly, most of these participants acknowledged that there was a vending machine with sugared sodas in the faculty lounge or in an area otherwise unavailable to students. One private school had no restrictions on vending machines unless a parent requested it.

A second identified CFPI theme related to policies and procedures was school district involvement or support. Districts provided expert resources, participated in policy development/update, local and district wellness committees, and all had identified someone to stay current and compliant with HHFKA 2010 standards. This person was responsible for menu planning, food purchasing, education, and monitoring compliance with the standards. Private schools do not have a district counterpart so this resource was not applicable to them.

Seeking feedback from parents, students and faculty was also a frequent strategy identified to promote CFPI policies and procedures. This was particularly true of private schools. One private school had a board made up of only parents or former parents to provide feedback on every major decision. They also had a student council that provided a forum for student feedback. The second private school also had a student council provide feedback and there was a specific forum for them to provide feedback on dietary practices. Both private schools had open door, immediate access policies for parents with concerns. One private school participant talked of the importance of telling parents of any significant events before they hear about it from the students.

> "We try to be proactive and think of things before they (the parents) do. If something goes wrong here, we are the first ones to tell the parents…Over the years, there have been times when I wasn't as proactive and got "bit in the butt" so to speak. So from that point on, I have made it my business to tell my teachers, if something goes wrong, YOU be the one to communicate it to the parents – not the kid in the car on the way home."

Private schools' focus was on customer satisfaction first and foremost. One of the private school principals said it this way.

> "We charge a pretty strong tuition for what we do and if we are not excellent at what we do, we are going to be in big trouble... We just cannot have mediocrity anywhere and adequacy just doesn't do. We need to be excellent…It's just that we serve a niche and if we are going to do the job we do, you better have great customer service, excellent classroom teaching and excellent, healthy food that is made from scratch. That just permeates everything we do – just a dedication to excellence."

Though public schools were much less proactive in seeking feedback, in some cases, they also had formal customer feedback forums. Public school participants cited the SBDMC as a common way to seek parent and teacher feedback. One administrative

participant appointed several teachers to serve on a committee and they were paid extra to provide feedback. Most public schools also had some type of student council structure, but none cited that as a major mechanism for seeking student feedback about SWPI/CFPI.

Another CFPI policy was restricting in-school fundraising. All public schools had uniformly implemented this policy. Few schools (n=1) placed restrictions on the content of fundraisers or required approval of any fundraiser by the Board or the principal. Even though the volume of fundraisers was high, all public schools were knowledgeable about and had adopted the requirement that fundraising items could not be sold or delivered during school hours, consistent with the HHFKA 2010 standards. A private school participant noted that they were moving toward auctions rather than food fundraising in order to receive a greater portion of the proceeds. However, in the current year they had sponsored a cookie dough fundraiser. Another private school did not engage in fundraisers.

Another CPFI policy relates to a la carte foods. Few schools in our sample still offered traditional a la carte items (hamburgers and hot dogs) in the cafeteria despite that fact that HHFKA 2010 requires a la carte foods to meet food standards as a part of their competitive food provisions. Some schools offered a la carte purchase of additional school lunch items which were compliant with food standards in an effort to increase food volume. Whereas the former would be a violation of the HHFKA 2010 regulation, the latter would not be a violation as the a la carte foods met food standards. Both private schools offered healthy snacks during the day in addition to their meal arrangements, neither of which are subject to government regulations.

Restricting foods from the outside was another CFPI procedure identified by school personnel. The vast majority of schools restricted outside foods other than home-packed lunch. Generally, this was not a written policy, but an "unspoken rule". There was a school which had a formal policy that if unhealthy items were sent to school from home in a child's lunch, it had to be concealed in a thermos or other wrapping. Another high school participant handled the outside food problem diplomatically by requiring parents bringing in food to stay and eat with their teenager. Knowing that teens prefer the company of their peers at lunch rather than parents, he noted "that takes care of that!" Participants shared that the motive for outside food restrictions was to prevent disciplinary problems. Restriction of outside foods is not expressly required by HHFKA 2010. However, if outside foods are offered for general consumption by the school during the school day (e.g., pizza parties), they must meet food standards.

Another CFPI policy or procedure related to serving foods at parties. At least three schools had eliminated parties and/or sugary foods at parties and celebrations/recognition. One school provided healthy snacks for those celebrations. Most schools reported they no longer had time for "lots of parties". HHFKA 2010 does not address parties/celebrations, but requires that foods served anywhere in schools during the school day meet food standards. The policy also "recommends" that foods served at "after school events where adults are present" be limited to approved foods.

The remaining policies and procedures applied more broadly to general school wellness policy implementation than to CFPI. These included involving the teachers and staff in any school wellness program; partnering with community agencies to provide services; ensuring compliance with the state curriculum standards for physical and health

education; using non-food recognition and rewards to incentivize students' behavior/performance; offering broad extracurricular sports programs; designating a lead person or committee to champion the program; offering staff wellness activities such as water challenges, health screenings, etc.; BMI tracking; use of data to track or plan operational improvements in health; and using a variety of marketing and promotional strategies to promote health-related programs and policies.

In summary, the most frequently used policies and procedures for SWPI/CFPI identified by school personnel were vending machine restrictions, in-house fundraising restrictions, a la carte food restrictions, restrictions on outside food, and district support for implementation. Seeking student/staff and parent feedback was a dominant theme expressed by personnel from private schools, but also was mentioned by some public school personnel. All but one of the schools had identified an internal lead person to drive SWPI/CFPI. Other less frequent themes related to SWP policies and procedures included involvement of teachers, partnering with community agencies, recognition and reward, staff health challenges/offerings, school-based athletics, BMI and/or other data tracking and marketing and promotion of the program.

Discussion

The theoretical framework shown in Figure 1 guides the summary and discussion of the results. Findings will be presented based on the order in which they appear in the model from left to right (Figure 4.1). First, external and internal forces that enabled CFPI are discussed followed by internal and external obstacles to CFPI, implementation climate and innovation values fit as they relate to implementation effectiveness.

External and Internal Forces Enabling CFPI

Participants identified the following as the most important external forces enabling CFPI: state and federal regulations, school district support or direction, and availability of human and funding resources (i.e., external resources provided by federal and state agencies). Less frequently noted external forces were learning from professional associations, peers and competitors; parent or student and faculty feedback; and political pressure on district and board members brought about by media coverage of Kentucky's childhood obesity epidemic.

Compliance with regulations was identified by school participants as a key organizational priority. The specificity of HHFKA 2010 legislation, the incorporation of financial incentives and/or penalties and a formal process for third-party certification of compliance were all important factors viewed by school personnel as strengthening the positive impact of CFPI. Consistent with prior research, there is a link between policy strength and specificity and better implementation of the policy provisions (Chriqui et al., 2013; Longley & Sneed, 2009; D. R. Taber, Chriqui, & Chaloupka, 2012; Wall et al., 2012).

School district support and adequate human resources and funding were also important enabling external forces impacting CFPI. Every public school participant looked to their district office for training, menu planning, food purchasing and compliance monitoring associated with HHFKA 2010. Notably, this was enabled through the very specific provision in the HHFKA 2010 allocating a total of $47 million for each of two years (2012 and 2013) in order to provide resources and technical assistance to schools implementing HHFKA 2010 requirements (Congress, 2012). This

is in addition to the six cent per meal reimbursement to compliant schools which is projected to be an additional half billion dollars provided to schools annually by 2017. Because of these federally allocated resources, school districts were able to designate a HHFKA 2010 leader and provide training and support to comply with the specific provisions of the law. Allocating sufficient human and monetary resources is vital to effective policy implementation (Downs et al., 2012; Gugglberger, 2011; Louise C Mâsse, 2013; Quintanilha et al., 2013).

Less frequently cited were internal enabling forces (i.e. local/ecological forces) impacting CFPI. Participants identified internal enabling forces such as school-based decision making councils (SBDMC)/managing committees or board direction; performance on annual quality improvement plans; use of data trends to guide internal processes; and spontaneous organizational change creating a window of opportunity for organizational change (i.e., change in personnel).

Internal and External Obstacles to CFPI

Just as sufficient human resources and funding were important enabling forces for CFPI, the lack of resources for other school functions necessitating fundraising was an obstacle to CFPI, particularly fundraising activities taking place outside of the school day. School personnel in our study reported dependence on local funding from fundraisers, donations and faculty or community volunteers to support routine operations. Similarly, Longley et al. (Longley & Sneed, 2009) reported in a large national study that lack of resources necessitating fundraisers was a primary barrier to SWPI. Even in schools with strong state and district fundraising regulations, Turner et al. (Turner et al., 2012) found that only 55% of schools had fundraising restrictions in place. The literature

reinforces the role fundraising plays as an obstacle to CFPI in schools. A dominant related theme in our study was the school's dependence on sports concession fundraisers to support important extracurricular activities. No literature was identified examining the role of sports concession fundraising on SWPI/CFPI or on student health outcomes. Research on the impact of concession stand fundraising and other unhealthy fundraisers on school finances is a definitive gap in understanding fundraising as an obstacle to CFPI.

The general lack of adequate resources as an obstacle to SWPI is a theme in prior literature. Belansky et al. (Belansky et al., 2009) examined SWP regulations in Colorado schools before and after the passage of WIC 2004 legislation. Although the state distributed a template policy to school districts for their use, few other resources were provided to schools by either the state or national legislation for wellness policy implementation. Schools adopted the required language, but because the source legislation was broadly worded and there was little implementation or program funding, school policies largely complied "on paper," with few schools implementing the policy elements. Participants viewed SWPI as an "unfunded mandate" and they lacked the physical education teachers to adequately provide support for implementation.

A relative resource shortage in the face of competing priorities was also an important obstacle to CFPI in the study reported here. Similarly, Belansky et al. reported that SWPI was not a priority because No Child Left Behind legislation was a competing priority at the time (Belansky et al., 2009). Other studies have emphasized the impact that competing priorities in the face of finite resources have on SWPI/CFPI (Chriqui et al., 2010; Chriqui et al., 2013; Hirschman & Chriqui, 2013). Schools, overburdened with

competing priorities, may not comply with school wellness initiatives, particularly if the legislation has non-specific language and/or lacks incentives and/or penalties and specific accountability processes. Even in the study reported here, while HHFKA 2010 had strong features of effective school wellness legislation, participants reported compliance with only the policy provisions that were very specific and enabled by district resources. There was little to no attention to "softer" recommendations of the legislation such as improving fundraiser content or serving only healthy foods during after-hours school-related functions where adults are present. Additional internal obstacles to CFPI are discussed below under implementation climate and innovation/values fit.

Implementation Climate

One of the most important determinants of implementation effectiveness is implementation climate (Klein & Sorra, 1996). A positive implementation climate is promoted by managerial support and strong implementation policies and procedures which are largely determined by adequate available resources. The impact of external and internal resource availability has been discussed. Next, managerial support and implementation policies and procedures are summarized and discussed.

Managerial support involves three features: 1) removing obstacles; 2) providing incentives and disincentives; and 3) equipping people with the skills needed to consistently practice an innovation (Klein & Sorra, 1996). To what degree did managerial support for CFPI involve removal of obstacles in this study? There were no apparent efforts made to remove key obstacles. All of the following obstacles remained in place post-implementation of the HHFKA 2010 competitive food provisions including: complaints by parents, students and staff about the quality and quantity of food served in

school; use of fundraisers/concession stand revenue to support most extracurricular activities; participation in pouring rights; and students bringing unhealthy foods from home.

Managerial support may have also helped to improve school personnel attitudes toward the regulations, another identified obstacle to CFPI. However, participants did not report managerial intervention targeting improved staff acceptance of CFPI. Many participants, including school administrators, perceived the regulations as too restrictive; ineffective based on historical experiences with similar policy efforts; and lacking policy implementation monitoring and accountability processes. These obstacles to SWPI/CFPI are consistent with previous research findings (Louise C Mâsse, 2013; Sanchez et al., 2014; Sirinya Phulkerd, 2016). School personnel attitudes toward CFPI are also discussed under innovation/values fit, but in short, many participants had grave reservations about the entire concept of obesity prevention practices in schools. Data from only two of the eight administrative participants indicated CFPI was positive. School administrators expressed resignation to the process of implementing initiatives with which they may not agree. For these leaders, managerial support in the case of CFPI consisted largely of "getting out of the way" of district compliance mechanisms and minimizing the impact of CFPI on current school operations. In the study reported here, there was little evidence of active managerial support to remove obstacles in support of CFPI.

The second aspect of managerial support, providing incentives and disincentives, was rarely mentioned by school personnel in the current study. Only one school included a nutrition-related goal in their annual quality improvement plan, and this did not address

competitive foods. However, multiple public school participants emphasized avoidance of possible loss of federal funding for non-compliance with HHFKA 2010 as an important motivator. Schools were strongly encouraged to follow these standards by the district office. There is little research on use of incentives and disincentives related to CFPI. One review of the literature examined state level incentives and penalties for schools in relation to implementing SWPs (Gourdet, Chriqui, Piekarz, Dang, & Chaloupka, 2014). Eighteen states had codified incentives, contract provisions or monetary penalties as part of SWP. However, the study did not examine the impact of these incentives/disincentives on policy implementation effectiveness. Kentucky is one of the states that mandates penalties for non-compliance. Graduated offenses ranging from a fine of no less than 1 week's competitive food sales revenue, to a fine of 1 month's revenue from sales, culminating in a 6-month ban of competitive food sales is specified (Commission, 2012). Interestingly, none of the participants were aware of these penalties. No other literature on SWPI/CFPI could be identified on incentives/disincentives. Research is needed to evaluate the use and effectiveness of penalties and/or incentives in CFPI. Research is also needed to design and test effective incentives and/or disincentives which encourage competitive food policy compliance.

The previous discussion refers to external incentives provided to school districts and schools for compliance with federal policy, external regulatory and institutional forces. However, when the theoretical framework refers to internal incentives or disincentives, it is denoting the rewards or penalties offered by school leaders to school personnel to support CFPI efforts. In the study reported here, there were no rewards/penalties offered at the school level by school administrators. CFPI was

approached as a “have to” and school staff had little input. The closest thing to an incentive offered by school administrators was providing faculty with their own unrestricted vending machine. Otherwise, there was passive acceptance on behalf of the principal and staff to the changes mandated by the competitive food policy provisions.

Finally, the third determinant of managerial support, equipping people with skills, was primarily accomplished through district efforts. District expert resources, principals, and school food service directors were equipped with skills for CFPI. Staff were not aware of the detailed competitive food standards unless they were directly involved. Processes were put in place by the principal and district personnel in cooperation with school lunch leaders to assure school compliance with HHFKA 2010 without disrupting other school operations. No literature was identified that describes this passive approach to CFPI and its impact on implementation effectiveness. Since HHFKA 2010 provides for third party certification and public reporting of compliance, it would be possible to obtain these data and evaluate the effectiveness of these implementation efforts in achieving policy compliance. Furthermore, the use of a theoretical framework such as the one presented here may enable researchers to differentiate this passive implementation approach from others to examine CFPI effectiveness.

The final determinant of implementation climate is implementation policies and procedures. The most important policies and procedures supporting CFPI in this study were vending machine content or access restrictions; district training, execution and monitoring of CFPI compliance; in-school fundraising restrictions; discontinuation/modification of a la carte food offerings; and restriction of outside foods. In addition, the majority of public schools had written district and/or local wellness

policies in place as part of program implementation. Schools did not extend CFPI to fundraiser content, concession stand offerings, faculty meetings or other outside school functions. Some schools eliminated sugary food from parties/celebrations and most did not use food as a reward. The practices of restricting vending machines, in-school fundraising, a la carte and outside foods are consistent with those competitive food practices identified in the literature as well as in the provisions of the HHFKA 2010 (Congress, 2012; Turner & Chaloupka, 2012). The CFPI implementation policies and procedures reported in this study were consistent with those identified in the literature as effective.

In summary, implementation climate was characterized by passive managerial support but adequate implementation policies and procedures. Although managers made few attempts to remove obstacles or provide internal incentives for staff support of CFPI, school administrators adopted a "non-obstruction" approach to the implementation of a SWPI mandate that they may or may not support. Future research using reported school-level compliance data may be helpful to understand whether this approach to implementation is sufficient. External funding through HHFKA 2010 provided the resources to enable effective implementation policies and procedures. In addition, implementation of these competitive food policies and procedures were facilitated by district resources/infrastructure. Only the people directly involved in the school food processes were equipped with skills through district support to facilitate CFPI while minimizing the impact of CFPI on routine school operations. The choice to limit the disturbance of other staff not directly involved with CFPI may have been a deliberate CFPI support strategy by management to lessen staff resistance to the initiatives.

Innovation/Values Fit

Innovation/values fit was poor in this study based on participant feedback. Innovation/values fit is the degree to which an innovation is congruent with the prevailing values of an organization (Klein & Sorra, 1996). In interviews with participants, there were three main questions designed to assess congruence of CFPI with school personnel's key organizational values (see Table 4.2). One of these questions asked how the organization communicated their priorities. Participants identified four main ways that their organizations communicated their priorities: (1) active and frequent communication about a priority initiative to all stakeholders; (2) frequent inspection of an initiative's progress; (3) observing changes in the organizational environment to accommodate the initiative; and (4) communication about the initiative from people known for "getting things done." Of these four organizational communication strategies, only the third was identified as relating to CFPI at the school level. Few school-based organizational communication strategies were employed indicating that CFPI was an organizational priority. However, the district provided support for CFPI by communicating and training key staff and providing follow up processes to ensure compliance. The district frequently inspected progress toward CFPI progress, indicating that the organization viewed CFPI as a priority.

The second and third interview questions in this study were designed to understand how CFPI fit into participants' organizational priorities. The top five organizational values identified, in order of frequency, were: (1) doing what is good (the "right thing") for students; (2) achieving academic success; (3) student safety; (4) compliance with regulations; and (5) availability of adequate funding and human

resources for an initiative. Only three of the 23 participants considered CFPI congruent with these organizational values. Only one principal placed school wellness "in their top three" priorities. Most believed that resources being used for obesity prevention initiatives would be better spent on more pressing priorities for students such as access to mental and physical healthcare or better and more food in their home settings Furthermore, they expressed doubt that these initiatives would be effective in achieving their intent. Many pointed to negative, unintended consequences already observed as a result of policy implementation (e.g., more students bringing unhealthy foods from home). CFPI was not consistent with the most important values of these organizations.

The general finding that SWPI/CFPI was not among schools' top organizationalpriorities is consistent with the literature. School administrators and staff believe that promoting student academic success is their primary aim (J. Clarke, 2013). In addition, there is intense competition in the school environment for time and resources (Belansky et al., 2009; Chriqui et al., 2010; Chriqui et al., 2013; Hirschman & Chriqui, 2013). By the time other key priorities, including academics and school safety, have claimed those resources, there is little left for other initiatives such as CFPI.

Finally, there is ample evidence that school personnel are conflicted about their role in obesity prevention efforts. School personnel and parents believe that a child's nutrition is more a parental responsibility than the school's role (Louise C Mâsse, 2013). Some see school efforts as intrusive on parents. Many doubt that without full parent support and involvement, such initiatives will not be effective because there are so many opportunities to reverse school nutrition efforts in the home environment (Downs et al., 2012; Quintanilha et al., 2013). Still others believe the time and resources invested in

obesity prevention efforts in schools would be better spent on more pressing problems (Louise C Mâsse, 2013). The importance of this innovation/values conflict cannot be overstated in the context of CFPI.

Implementation Effectiveness

There are two major determinants of implementation effectiveness: implementation climate and innovation values fit. Over time, school personnel may adjust the innovation/values fit of a specific innovation based on their positive or negative experiences with the innovation's effectiveness. This feedback loop is described in the theoretical framework. Future research to identify additional possible feedback loops is warranted. It is possible that a school's experience with implementation effectiveness may inform changes in resource availability, managerial support strategies, and implementation policies and procedures. Strong policy features and provision of district resources to support CFPI countered the intra-organizational weaknesses in implementation climate and innovation/values fit. Future research on the nature of the association between implementation climate and innovations/values fit is needed to inform CFPI effectiveness.

Implementation climate is determined by managerial support and implementation policies and procedures which are largely a result of adequate resources. Managerial support at the school-level was characterized as passive, but permissive. The CFPI was managed largely by district resources and infrastructure supported by resources allocated by HHFKA 2010 implementation funding. Thus, resources at the district level supported the implementation climate. The most frequently cited implementation policies and procedures were restricting vending machines, a la carte foods, in-school fundraising, and

outside foods. The policy language for these four provisions is very specific. The specificity of the policy language was an important force in key implementation policies and procedures. In addition, the HHFKA 2010 provision of penalties and third-party compliance certification to merit financial incentives was also critical in promoting CFPI.

Innovation/values fit was poor for CFPI according to the majority of school staff and administrators interviewed in this study. Participants felt that there were more important issues in play that needed to be addressed to improve student outcomes (educational and overall) and doubted the efficacy of the policy to make an impact based on historical experience. The poor innovation/values fit may have influenced the choice of school administrators to limit CFPI implementation training and communication to only those directly involved. "Walling off" the majority of school staff from the time and energy needed to implement CFPI could be seen as managerial support for CFPI designed to limit staff resistance arising from poor innovation/values fit. While school administrators allowed implementation of CFPI, they also engaged in activities designed to shield staff from the impact of these policies (e.g., providing a vending machine containing unhealthy foods in an area inaccessible to students). These managerial behaviors may have been intended to reduce anticipated staff resistance to CFPI in a situation where the principal had no choice.

Implications for Future Research

Opportunities for future research include further development and testing the proposed theoretical model. The next step in developing and testing the model for CFPI research is to create operational definitions and develop and test scales to measure each construct in the framework using the findings from the current study. It may be useful to

explore other established theoretical constructs that could assist in operationalizing the various CFPI framework constructs. For instance, a scale to quantify innovation/values fit may include measures of self-efficacy (Bandura, 1977). Operationalizing the theoretical framework constructs would allow for hypothesis testing related to CFPI effectiveness. Understanding each construct's contribution to CFPI in the theoretical model will support the examination of the organizational factors and strategies most strongly associated with CFPI effectiveness scores. Understanding the contribution of each construct to CFPI can inform more effective policy structure, choice of the most appropriate local policy support strategies, and attempts to more closely align resources and policy initiatives to promote better innovation/values fit.

Research is also needed on the financial impact of fundraisers on CFPI and student health outcomes, especially in disparate populations (e.g., schools in low socioeconomic communities). Is there an association between fundraisers, including concession stands, and student health outcomes? Competitive food regulation can be effective in reducing student intake of calories and unhealthy foods (Briefel et al., 2009; Fox et al., 2009; Kakarala et al., 2010; D. R. Taber, Chriqui, Perna, Powell, & Chaloupka, 2012), but the differential effects of various CFPI elements have not been examined. These data are needed to support advocacy efforts for adequate school funding, a common obstacle to strong CFPI as shown in the current study.

In addition, research is needed to describe how the HHFKA 2010 food standards ("The Healthy Snacks Resource System," 2014) impact the percentage of students that bring lunch to school, the content of those lunches, and after school student consumption of vending machine foods. This would advance understanding of any possible

"unintended consequences" associated with the HHFKA 2010 food standards. There is also an opportunity to develop and test innovative interventions to improve the quality of lunches brought from home such as parent training programs or take-home menu guides.

No research could be identified on "compliant implementation" as seen in this research vs. other modes of implementation. While passive, but permissive managerial support seems intuitively sub-optimal, it may be an effective response to support CFPI. This is especially true given the multiple priorities that schools must balance. It may even be that such a response is optimal in the context of overall school priorities. Understanding these dynamics represents another opportunity for organizational innovation implementation research.

One of the major obstacles to CFPI identified in this study was the dependence on fundraising to support school operations. Schools perceive fundraising as an indispensable part of financing critical school offerings such as extracurricular student activities. The true financial impact of fundraisers on schools and extra-curricular activities has not been thoroughly examined in the literature. In addition, the disparate impact of restriction of fundraising on schools in lower socioeconomic areas needs to be understood. Future research findings on fundraising could be used to advocate for different funding sources with both legislators and fundraising vendors. There also remains the question if allowing fundraisers impacts student health outcomes. Further, the differential effects of the various competitive food policy elements have not been examined.

Strengths of this study are stratified random sampling to select the schools; use of wellness policy data to identify the stratum (e.g., high and low scoring schools); and a

proposed theoretical model grounded in multiple disciplines to guide the study. Study limitations include lack of incentives for participation in the study, making recruitment difficult. Although asking the administrative representative was the most expedient method to recruit staff knowledgeable about CFPI, this snowball sampling method may have introduced selection bias. Principals may not have referred the researcher to staff who may have had opposing views to their own. Some staff interviews were done individually while others were done in focus groups to accommodate participants' schedules. Data collected from focus groups vs. individual interviews may have been influenced by the interview format as participants may have been more candid when not in a group. In addition, the interview questions had to be somewhat broad in order to provide the larger organizational context for CFPI. Some of the concepts were difficult to formulate within the narrow scope of a question addressing only CFPI. As such, the researcher inferred how the broader SWP elements would apply to CFPI in some cases, resulting in potential error in coding. Data were self-report. No documents or written policies were inspected to verify what was reported by school personnel. The study could have benefitted from additional interrater reliability testing. Data validation using reliability assessment was limited to interrater coding comparison with a trained qualitative researcher. An additional limitation is that the Cohen's kappa was somewhat low (kappa=0.542; 56.1% agreement). Serial training, rather than a single training session as well as codebook clarification would have improved the interrater reliability agreement.

Conclusion

Semi-structured interviews were conducted with 23 school administrators and staff from eight Kentucky middle and high schools using qualitative methods. Interview transcripts was coded into seven major themes: importance of formal policy, internal and external CFPI enabling forces; internal and external obstacles to implementation; key organizational values; organizational priority of CFPI; methods that an organization uses to communicate organizational priorities and CFPI policies and procedures. Those findings were presented in detail and discussed using a proposed theoretical framework to guide CFPI research.

The specificity of HHFKA 2010 policy language, financial incentives and penalties, accountability processes, and the implementation expectations and support of school district resources were important external forces that enabled CFPI. Lack of resources necessitating school reliance on fundraising, competing organizational priorities, and skeptical staff and administrative attitudes toward CFPI were major obstacles to CFPI. The CFPI initiative including policies and procedures was driven and managed by district resources. School administrators understood that they had no choice but to implement certain competitive food policies and procedures due to federal regulations. Perhaps due to a sub-optimal innovation/values fit among school staff, school administrators adopted a passive, yet permissive approach to CFPI that complied with district-recommended specific provisions of HHFKA 2010, while minimizing the impact of CFPI on their staff. This resulted in compliant organizational implementation related only to the specific policy provisions (i.e., restricting vending machines, in-school fundraising, a la carte foods, and outside foods). Policy "recommendations" that were not deemed mandates were not implemented (i.e., restricting external fundraising such as

pouring rights and concession stand sales and foods served at school-related functions outside the school day). Since HHFKA 2010 provides for ongoing third-party certification of school compliance, the data will soon be available to assess whether this approach resulted in effective CFPI. Research is needed to determine if policy compliance equates to implementation effectiveness and ultimately, if CFPI, as implemented, is an effective policy intervention to improve student outcomes and reduce childhood obesity.

Table 4.1 Demographic Characteristics of Study Participants

School grades	School type	School location	Percentage Free/reduced price lunch (1)	School size (2)	Administrative interviewee	Staff interviewee
1. Pre-school-8th (middle)	private	Metro	n/a	518	Principal	Administrator, Chef, School nurse
2. Pre-school-12th (high school)	private	Nonmetro	n/a	135	Principal	Asst. principal
3. High school 9-12th	public	Metro	41	1128	Principal	2 physical education teachers
4. Middle school 5-8th	public	Nonmetro	57	507	Principal	Physical education teacher, school nurse, Practical living teacher
5. High school 9-12th	public	Non-metro	69	686	Principal	School nurse
6. Middle school 6-8th	public	Metro	56	562	Principal	Physical education teacher
7. High school 9-12th	public	Non-metro	62	1057	Assistant principal	Director of pupil personnel (district), Family resource center counselor, district nurse
8. Middle school 6-8th	public	Metro	37	1064	Assistant principal	Physical education teacher

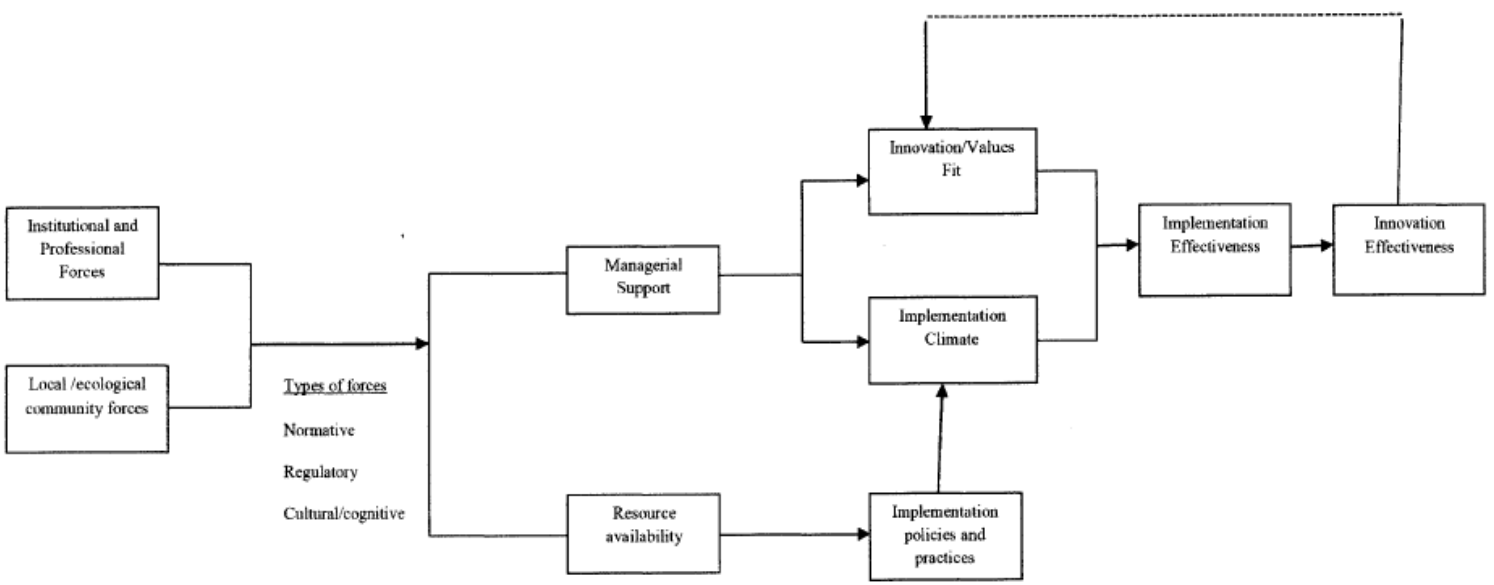
(Agriculture, 2013); ("National Center for Education Statistics," 2015)

Table 4.2 Matrix of Interview Question Concepts Mapped to Qualitative Themes

Interview Question	Do you have a formal school wellness policy?	What external and internal forces drive initiatives forward here?	What are key internal and external factors that block initiatives?	What are your top three most important organizational values?	What priority does SWPI/CFPI occupy?	On a scale of 1-5 (5 the best), what would your school score on SWPI/CFPI?	What specific strategies have been used to implement SWPI/CFPI?	What methods does your organization use to communicate its priorities?
Qualitative Theme								
Importance of formal wellness policy	X			X	X		X	
Enabling external/ internal forces	X	X	X	X	X	X	X	
Internal/external obstacles to SWPI CFPI		X	X	X	X	X	X	
Organizational priority of SWPI/CFPI	X			X	X	X		X
Methods organization uses to communicate the organizational priorities				X	X		X	X
Implementation policies and procedures	X					X	X	X

Figure 4.1 Proposed Theoretical Framework for Competitive Food Policy Implementation

Figure 1. Proposed Model of Competitive Policy Implementation in Schools



CHAPTER FIVE

Dissertation Conclusion

There are 34% of adults in the U.S. who are overweight and an additional 34% who are obese (S. J. Olshansky, 2005). This trend extends to U.S. children; one-third of children and adolescents are overweight or obese (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). To stem the growth in childhood obesity, schools have been a target for obesity prevention efforts. One such effort is implementation of competitive food policy to improve the nutritional quality of foods and beverages offered in schools in addition to those foods offered in the national school lunch and breakfast programs. Competitive foods are those foods served in classrooms, a la carte settings, vending machines, school parties, after school events and fundraisers that "compete" with the healthy foods offered by the NSLP and SBP. Traditionally, competitive foods have been low nutritional values and high energy density or "junk food".

Implementation of competitive food policy in schools reduces excess energy intake (Briefel, Crepinsek, Cabili, Wilson, & Gleason, 2009; Fox, Gordon, Nogales, & Wilson, 2009; Kakarala, Keast, & Hoerr, 2010; D. R. Taber, Chriqui, J.F., Chaloupka, F.J., 2012) and is significantly associated with lower student BMI (Coffield, Metos, Utz, & Waitzman, 2011; Fox et al., 2009; Mâsse, de Niet-Fitzgerald, Watts, Naylor, & Saewyc, 2014; Terry-McElrath, O'Malley, Delva, & Johnston, 2009). The federal legislation, Healthy, Hunger-Free Kids Act of 2010 (Congress, 2012) (HHFKA 2010), required competitive foods to meet the same strict standards that apply to national school lunch and breakfast foods beginning in the 2014-2015 school year. HHFKA 2010 also provided penalties to schools for failure to comply and requires regular third-party

certification of school compliance. This dissertation research sought to examine the implementation of these competitive food mandates in Kentucky schools.

The study aims were to (1) explore the literature on competitive food policy implementation (CFPI); (2) examine the demographic and school factors associated with CFPI using secondary analysis of existing school wellness policy data; and (3) explore the experiences of school administrators and staff implementing competitive food policy in Kentucky schools.

In Chapter 2, the literature on CFPI was reviewed to explore which factors influence variability in competitive food policy implementation. Three categories of factors were examined: school and demographic variables; policy strength/comprehensiveness; and school and parent/community-level barriers and facilitators.

Demographic factors associated with greater implementation of competitive food policy included a higher proportion of students receiving free and reduced price lunch; later than 10:30 AM lunch times; greater percentage of non-white students and Pacific region location (Probart, McDonnell, Hartman, Weirich, & Bailey-Davis, 2006; Samuels et al., 2009; D. R. Taber, Chriqui, & Chaloupka, 2011; Turner, Chriqui, & Chaloupka, 2012). Results were mixed for school and community size, locale and rurality (Adachi-Mejia et al., 2013; Nollen et al., 2009; Nollen, Kimminau, & Nazir, 2011; Turner et al., 2012).

A number of investigators examined various measures of strength of state, district or school-level wellness policy to explain variability in policy implementation (Hood, Colabianchi, Terry-McElrath, O'Malley, & Johnston, 2013; Sandoval et al., 2012;

Schwartz et al., 2012; D. R. Taber, Chriqui, & Chaloupka, 2012). Greater policy strength and redundancy at local, district, and state levels improved implementation of school competitive food guidelines.

Finally, school and community-level factors that influenced competitive food policy implementation included food cost and revenue loss concerns-particularly when there are financial incentives tied to vending sales or other such arrangements such as soda "pouring rights" (Probart et al., 2006). Community/parent level barriers included concerns about student food choices and lack of parental knowledge about healthy food as well as student access to competitive foods in schools from surrounding restaurants and/or from parent delivery to students (Downs et al., 2012; Probart et al., 2006; Sanchez et al., 2014).

In Chapter 3, the association between demographic and school factors and CFPI was examined. The study was a secondary analysis of data from the 2011 School Tobacco and Wellness Policy biannual survey conducted by the University of Kentucky (UK) College of Nursing Tobacco Policy Research Program. There were 640 respondents (middle and high schools) nested within 116 Kentucky counties. Based on the total number of schools (N = 1565 public and 301 private schools) and counties (N = 120) in Kentucky, the survey collected data from 97% of counties and 34% of all schools.

CFPI implementation effectiveness was measured using an author-developed CFPI scale and subscales created from 8 competitive food-related survey questions. The 8-item CFPI scale and subscales measured two domains; 'inside' school (4 items; e.g., vending machines) and 'outside' school (4 items; e.g., fundraisers). The scale elements are shown in Table 3.2.

Generalized equation estimation analysis showed student BMI tracking and presence of a written wellness policy predicted higher scores on the overall CFPI scale (BMI OR=2.06, p=0.001; Wellness OR=1.74, p=0.02), on the inside school subscale (BMI OR=2.46, p<0.0001; Wellness OR=1.58, p=0.05) and outside school subscale (BMI OR=2.27, p=0.03; Wellness OR=1.54, p = 0.0005). Greater county adult obesity rates (OR=0.93, p=0.02) predicted lower overall CFPI scores. Private school status predicted lower scores (OR=0.47, p=0.004) on inside CFPI subscale scores. Better CFPI implementation was associated with having a written wellness policy and BMI tracking while county-level adult obesity rates and private school status predicted less effective implementation of competitive food policy in schools.

Finally, the third study aim was to explore the experiences of school leaders and staff in CFPI. Using results of the 2011 School Tobacco and Wellness Policy biannual survey conducted by the University of Kentucky (UK) College of Nursing Tobacco Policy Research Program, participating schools within 75 miles of Lexington, Kentucky were stratified into four groups based on school level (middle or high) and score (high or low) on the competitive food implementation scale. Sixteen schools were randomly selected from each of four groups and invited to participate in the research study. School personnel from a total of eight schools, two from each group, agreed to participate. Semi-structured interviews were conducted with participants from each school including one administrator and at least one staff representative (N = 23). The interview guide was based on a proposed theoretical framework of CFPI developed by the author using implementation science (Klein & Sorra, 1996), educational theory (Arum, 2000), and institutional/organization research (Scott, 2014). The data were analyzed using qualitative

content analysis of interview transcripts. Six major themes were identified: (1) external and internal forces that impact CFPI; (2) obstacles to implementing CFPI; (3) key organizational values; (4) organizational priority of CFPI; (5) methods which organizations use to communicate their organizational priorities; and (6) implementation policies and procedures. For each theme, multiple subthemes emerged from the data. All data were summarized, and discussed using the proposed theoretical framework (Figure 4.1). Specificity of policy language, potential financial penalties, accountability measures and district support/expectations for policy implementation were major external enabling forces for CFPI. The most important obstacles to CFPI were lack of resources creating a dependence on fundraisers and a serious conflict between school personnel's values and the tenants of CFPI. CFPI was driven primarily through school districts. Managerial support for CFPI was passive, but permissive to the district's implementation efforts which seemed to be sufficient. Both school administrators and staff were extremely skeptical about CFPI's usefulness and effectiveness based on past policy experiences. There was considerable conflict between their personal and organizational values and CFPI innovations. The end result was that schools were compliant with the specific competitive food policy provisions articulated in the federal legislation including restrictions on vending machines, a la carte foods, outside foods and fundraisers during the school day. They were not compliant with less specific policy recommendations including content of fundraisers and serving only approved foods at after school events. These findings emphasize the importance of policy language specificity, incorporation of penalties for noncompliance, inclusion of accountability mechanisms, and equipping district and school personnel with sufficient resources and training to enable CFPI.

School health practitioners can advocate for the inclusion of these elements in future school wellness policy development.

Implications for Future Research

Opportunities for future research include further development and testing the proposed theoretical model. The next step in developing and testing the model for CFPI research is to create operational definitions and develop and test scales to measure each construct in the framework using the findings from the current study. This would allow for hypothesis testing related to CFPI effectiveness. Understanding each construct's contribution to CFPI in the theoretical model will support the examination of the organizational factors and strategies most strongly associated with CFPI effectiveness scores. Understanding the contribution of each construct to CFPI can inform more effective policy structure, choice of the most appropriate local policy support strategies, and attempts to more closely align resources and policy initiatives to promote better innovation/values fit.

Research is also needed on the financial impact of fundraisers on CFPI and student health outcomes, especially in disparate populations (e.g., schools in low socioeconomic communities). Competitive food regulation can be effective in reducing student intake of calories and unhealthy foods (Briefel et al., 2009; Fox et al., 2009; Kakarala et al., 2010; D. R. Taber, Chriqui, Perna, Powell, & Chaloupka, 2012), but the differential effects of various CFPI elements (i.e. fundraising restrictions vs. vending machine vs. a la carte restrictions) have not been examined. These data are needed to support advocacy efforts for adequate school funding, a common obstacle to strong CFPI as shown in the current study.

In addition, research is needed to describe how the HHFKA 2010 food standards ("The Healthy Snacks Resource System," 2014) impact the percentage of students that bring lunch to school, the content of those lunches, and after school student consumption of vending machine foods. This would advance understanding of any possible "unintended consequences" associated with the HHFKA 2010 food standards. There is also an opportunity to develop and test innovative interventions to improve the quality of lunches brought from home.

No research could be identified on "compliant implementation" as seen in this research vs. other modes of implementation. While passive, but permissive managerial support seems intuitively sub-optimal, it may be an effective response to support CFPI. This is especially true given the multiple priorities that schools must balance. It may even be that such a response is optimal in the context of overall school priorities. Understanding these dynamics represents another opportunity for organizational innovation implementation research.

One of the major obstacles to CFPI identified in this study was the dependence on fundraising to support school operations. Schools perceive fundraising as an indispensable part of financing critical school offerings such as extracurricular student activities. The true financial impact of fundraisers on schools and extra-curricular activities has not been thoroughly examined in the literature. In addition, the disparate impact of restriction of fundraising on schools in lower socioeconomic areas needs to be understood. Future research findings on fundraising could be used to advocate for different funding sources with both legislators and fundraising vendors. There also remains the question if allowing fundraisers impacts student health outcomes. Further,

the differential effects of the various competitive food policy elements have not been examined.

Implications for Policy Development

This research reiterated the importance of specificity of policy language in competitive food policy implementation. HHFKA 2010 policy provisions that were very specific were implemented including vending machine restrictions, a la carte food restrictions and in-house fundraiser restrictions. Other broader recommendations were not implemented because they were non-specific. For example, the recommendation to only serve approved foods in after school events where adults are present was ignored as were recommendations for healthier external fundraising. Health advocates and policymakers need to continue to employ both of these strategies in policy development and deployment.

It is also critical that states enact strong policies that ensure adequate school funding to support implementation of competitive food and school wellness policies. The HHFKA 2010 final rule authorized up to 47 million dollars to states for each of two years to assist in the implementation of updated meal/food patterns, including training, technical assistance and conducting performance-based certifications necessary to merit the additional 6 cent per meal funding (Food and Nutrition Service January 3, 2014). This assistance allowed school districts to set up implementation training and compliance infrastructures to support schools in implementation of competitive food provisions as well as all other provisions of the HHFKA 2010. Based on our findings, district resources were the engine that supported CFPI in our sample of Kentucky schools (see Chapter 4). Thus, policy provisions which provide robust resources that equip school

personnel with skills, an important aspect of managerial support, is key. Finally, HHFKA 2010 provided for systems of accountability to assess compliance with the law; specifically state-level third party certification of compliance (Food and Nutrition Service January 3, 2014). Based on our study findings (see Chapter 4), having a specific system of accountability was key to encouraging compliance. Compliance tracking will provide policymakers and school personnel with data to evaluate competitive food policy implementation effectiveness. However, compliance tracking alone will not supply information about policy effectiveness. In order to evaluate policy effectiveness, the routine collection of relevant student health outcomes data is needed. This research (Chapter 3) demonstrated that a strong wellness policy and BMI tracking were associated with better CFPI. Policymakers, practitioners and school employees need to understand the important and unmatched role that schools can play in collecting and reporting student health outcome data. Policymakers need to know whether the policies put forward are having the intended effect to understand the cost/benefit analysis of their work. Practitioners need to understand the importance of collecting BMI data in directing improvements or re-direction of the efforts to prevent obesity-related chronic illness onset in children. School personnel and administrators need to understand student health outcomes so that they can more fully embrace those school-based practices which are truly effective and omit those that are not, given the multiple competing priorities they face on a daily basis. Thus policy advocates need to encourage mandatory, school-based outcomes tracking and support fiscal provisions in school-related health policies that enable this tracking. Finally, policies which apply to vendors serving the schools need also to be considered. It would relieve some of the school organizational burden if

the onus were placed on vendors to meet the standards dictated by the HHFKA 2010 legislation in order to do business with school systems. Such policies could apply broadly to food vendors of all types including suppliers of not only school lunch and breakfast foods, but also to fundraising and vending machines companies.

Implications for School Health Practice

Considerable resources are devoted to school health policy initiatives like CFPI in the hope that it will improve childhood obesity problem. However, particularly in the case of CFPI, there are no mechanisms in place to adequately measure student health outcomes. Only by systematically capturing these outcomes over time will we understand the effectiveness of school policy-based initiatives. Findings from the current study reiterate the importance of BMI tracking to improve CFPI, yet only one school tracked BMI and some school personnel felt to do so was an intrusion on the parents' role. School administrators and health providers must recognize the importance of collecting BMI and other appropriate health outcomes data to promote the health of our next generation. The school setting provides an unmatched opportunity to collect health outcomes data for the population of children at risk for obesity (Justus, Ryan, Rockenbach, Katterapalli, & Card-Higginson, 2007; Raczynski, Thompson, Phillips, Ryan, & Cleveland, 2009). School health practitioners can lead the way by capturing relevant student health outcomes data to develop policy-driven processes designed to improve the health and lives of the next generation.

Finally, given that CFPI is not a high priority for school personnel, public health and school practitioners must reinforce with school leaders the link between health and learning outcomes. One strategy may be to link school health initiatives to school goals

that may be more highly valued. This concept was evident in the data shared from by one of the participants in the qualitative study (Chapter 4). They described that schools are funded each year in Kentucky based on prior year attendance and all schools have a designated person charged with improving attendance. This particular school established a committee charged with following up individually with students missing 10% or more days per year to address attendance obstacles. By linking health policy initiatives with attendance improvement initiatives and thus, school funding, school wellness policy initiatives moved into their top three organizational priorities. It is incumbent upon school health practitioners, as student health advocates, to find such opportunities to demonstrate the value that school wellness policy implementation can bring to the organization.

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Vita

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Education

Institution	Degree	Date Conferred	Field of Study
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Professional Experience

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2015-2016	University of Louisville Department of Neurology Louisville, KY	Director, Clinical Product Development
2004-2014	Central Baptist Hospital Lexington, KY	Director, Neuroscience Center
2000-2003	Medtronic, Inc. Memphis, TN	Group Director Physician and Provider Services
1996-2000	Baptist Memorial Healthcare Corporation Memphis, TN	Hospital CEO
1986-1996	Charter Medical Corporation Evansville, IN	Hospital CEO

Honors and Awards:

- Worked as a graduate assistant while working toward Ph.D. in physiology and biophysics. Assisted in research as well as taught medical student physiology laboratories. 4.00 GPA. Finished first in class of 150 medical and graduate students in physiology, pharmacology, biochemistry and histology
- Graduated first in baccalaureate nursing program with a 4.00 GPA
- Invited to be on the National Stroke Association Acute Care Board beginning Fall, 2007
- Awarded Most Outstanding Junior Student in junior year of undergraduate nursing program

- Selected as a delegate to AACN legislative conference by UK College of Nursing faculty, Spring, 2012
- PhD GPA 3.91

Publications:

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