Local Wellness Policy Strength and Perceived Implementation of School Nutrition Standards across Three States


Abstract

**Background:** Congress sought to address escalating rates of childhood obesity by mandating local wellness policies (LWP) (Child Nutrition and WIC Reauthorization Act of 2004). Previous research has examined LWP content and quality; however, data relative to LWP implementation is limited, and none has examined the relationship between LWP quality and implementation. The purpose of this study was to examine the influence of LWP strength on perceived implementation of LWP components.

**Methods:** Data collected from school districts in California, Iowa, and Pennsylvania included district LWPs and online surveys at the district ($n = 23$) and school levels ($n = 76$). LWPs were scored using a standardized coding tool. Binary and multinomial regression models were used to examine the predictive ability of covariates and independent factors on perceived implementation of reimbursable school meals and nutrition guidelines for competitive foods sold and offered.

**Results:** Overall LWP strength score did not predict perceived implementation of reimbursable school meals or nutrition guidelines for competitive foods. LWP component strength scores for reimbursable meals and nutrition guidelines did not consistently predict perceived implementation of those components. State and Urban-Centric Locale did predict perceived implementation of some LWP components, particularly nutrition guidelines for competitive foods sold and offered. State was a particularly influential factor in the implementation of LWPs in this study, likely due to differences in state policies and laws.

**Conclusions:** Overall LWP, reimbursable school meals, and nutrition guidelines for competitive foods strength scores do not predict perceived implementation of reimbursable school meals and nutrition guidelines for competitive foods.

Introduction

Local wellness policies (LWPs) were mandated by Congress to address escalating rates of childhood obesity. LWPs were to include: (1) goals for nutrition education, physical activity, and other school-based wellness activities; (2) nutrition guidelines for all foods available on the school campus during the school day; (3) assurance that guidelines for reimbursable school meals were not less restrictive than USDA regulations; (4) plan for measuring implementation; and (5) parents, students, school food authority, school board, school administrators, and public were involved in the development.

LWPs seek to address environmental factors in the school health environment that influence health behaviors, including school meals and nutrition guidelines for other foods available on school campuses. School meal programs must adhere to federal regulations to receive federal reimbursement; however, they may implement more stringent meal standards and/or policies than federal regulations. Schools doing so can be recognized by the HealthierUS School Challenge program; to date just 3098 schools nationwide have been recognized.

Nutrition guidelines for other foods available (competitive foods) are another required, but controversial, component of LWPs. Competitive foods include those sold in vending machines, school stores, or à la carte lines, as well as those offered in classrooms as part of academic programming or celebrations. These foods tend to be energy-dense, nutrient-poor options and have been increasing along with obesity rates in youth. Presently, federal regulations for the sale of competitive foods exist only for a few items; however, regulations are forthcoming as a result of the Healthy, Hunger-Free Kids Act of 2010. Over 70% of...
all states plus the District of Columbia have established nutrition guidelines for competitive foods.9

Previous studies have reported the majority (89%–99%) of LWPs included an assurance relative to school meal regulations.10–13 However, only 15% of policies in Connecticut and 17%–20% of students nationwide resided in districts where policies included language where school meal guidelines exceeded federal requirements.11,12 Conversely, LWPs appeared to be stronger relative to nutrition guidelines for competitive foods. In all, 60%–70% of students nationwide resided in districts where policies were strong; the strongest policies were in elementary schools, whereas the weakest were in high schools.13

Although the strength or quality of LWPs has been examined, data representing implementation of LWPs are more limited.14,15 One study has significant limitations given it was conducted with data collected prior to the LWP mandate using the School Health Policies and Programs Study data as a proxy for LWP implementation.14 The other study reports data from one state (Pennsylvania), where unique administrative guidance and an incentive program existed.15

Although the quality of LWP components has been explored, no studies have examined whether quality of LWP components influences implementation.16–20 The purpose of this study was to examine the influence of LWP strength on perceived implementation of reimbursable school meals and nutrition guidelines for competitive foods.

Methods and Procedures

Subjects

The Team Nutrition Local Wellness Demonstration Project (TNLWDP), funded by the USDA, involved researchers from USDA, National Food Service Management Institute, California, Iowa, and Pennsylvania. One aim of the project was to document change in the school environments of selected school districts. Each state established and implemented school district selection criteria. In total, 23 school districts participated in the project (Table 1).

California

Interested districts responded to a request for application process, with the eight highest scoring districts selected to participate. Selection criteria for the districts included district enrollment (≥300 students K through 12), Urban-Centric Locale, minority enrollment (%), free and reduced-price (FRP) school meal eligibility (%), and School Breakfast Program participation rate. Each district included one elementary, one middle, and one high school.

Iowa

All districts in Iowa were invited to participate in the TNLWDP. Districts expressing interest were profiled according to geographic location, district enrollment, and previous participation in USDA programs [high (≥2 experiences) or low (≤2 experiences)]. These included Team Nutrition, Fresh Fruit and Vegetable Program, Expanded Food and Nutrition Education Program, and food stamp nutrition education. Each district included one elementary, one middle, and one high school.

Pennsylvania

School food service directors who previously completed a survey administered by Pennsylvania State University (funded by the Pennsylvania Department of Education) regarding the school meals program were eligible to participate in the project. Eligible districts were profiled according to metropolitan/nonmetropolitan status, district enrollment, FRP eligibility (%), and number of elementary schools. Districts of metropolitan and nonmetropolitan status with <3000 students, in the middle FRP tertile, and with at least two elementary schools were

<table>
<thead>
<tr>
<th>Table 1. Demographics of School Districts (N = 23)</th>
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<tr>
<td>School district</td>
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</tbody>
</table>

*Obtained from National Center for Education Statistics.26

FRP, Free and reduced price.
Recruited to participate in the project. Data were collected from two elementary schools, one middle school, and one high school from each district.

**Instruments and Procedures**

Each of the three states received Institutional Review Board approval from their respective universities for all data collection procedures and analyses. Data collection took place in fall 2007 (baseline) and spring 2009 (end point).

**LWP Scoring**

Upon enrollment into the project, LWPs, including any administrative guidance or regulations, were collected from each district (n = 23) and scored using a previously reported coding system, which scores each LWP component and total LWP on two dimensions—comprehensiveness and strength. For this study, strength scores for reimbursable school meals, nutrition guidelines for competitive foods, and overall LWP were determined. Strength scores indicated the degree to which the LWP components included specific and firm language. Table 2 displays the content items scored for the reimbursable school meals and nutrition guidelines for competitive foods components. Each item was scored with a 0, 1, or 2, which indicated whether there was no mention of the item topic, the topic was mentioned within a recommendation or with vague language (weak), or the topic was addressed in a specific and directive manner (strong), respectively. Component strength scores reflect the proportion of items coded as a 2; total strength score for the LWP was the average of the seven component scores within the LWP. Overall and component strength scores ranged from 0 (weak) to 100 (strong) and were categorized as high or low by distributing the data where a natural break in the scores occurred.

**School Surveys**

An online school survey modeled after the School Health Index was completed by personnel from each school (n = 76) at baseline and end point. Questions included perceived implementation of LWP components, including reimbursable school meals and nutrition guidelines for competitive foods sold (i.e., vending) and offered (i.e., classroom celebrations). Perceived implementation categories included fully implemented (4), partially implemented (3), planning for implementation (2), or not addressed in policy (0).

**Demographic Information**

Information on FRP eligibility was obtained from each state’s education bureau. Using online databases (i.e., National Center for Education Statistics), Urban-Centric Locale coding, school district enrollment, and minority enrollment data were gathered.

**Data Analysis**

Analysis of all data was conducted using the Statistical Package for Social Sciences for Windows (v. 18.0; Chicago, IL). Level of significance for all analyses was p < 0.05. General descriptive statistics included means, frequencies, and correlations. Independent factors used in modeling included state, Urban-Centric Locale, and school building level (elementary, middle, high).

Covariates used in analyses included FRP (%), minority enrollment (%), natural log of enrollment, overall LWP score, reimbursable school meals score, and nutrition guidelines for other competitive foods score. Implementation change scores were calculated by subtracting the baseline value from the end point value and categorized as negative, no change, or positive.

Regression models were used to examine the predictive ability of covariates and independent factors on perceived implementation of reimbursable school meals and nutrition guidelines for foods sold and offered. Some survey responses were collapsed to eliminate cells with limited responses to facilitate regression analyses. If more than one significant model was produced, the most significant model was reported with significant covariates and independent factors identified.

Binary regression models were used to predict perceived implementation of reimbursable school meals and nutrition guidelines for foods sold at baseline. Multinomial regression models were used to predict perceived implementation of nutrition guidelines for competitive foods offered at baseline as well as reimbursable school meals, nutrition guidelines for competitive foods sold, and nutrition guidelines for competitive foods offered at end point. Multinomial regression models were also used to predict policy component change scores (negative, zero, or positive).

**Results**

The majority of districts (≥74%) had FRP rates between 20.0% and 55.5%, minority enrollment between 2.5% and 45.5%, and district enrollments less than 10,000. The distribution of Urban-Centric Locales was fairly consistent between city (26.1%), suburb (26.1%), town (26.1%), and rural (21.7%) (Table 1).

The overall LWP mean strength score was 38.0, with a range of 20.1–57.3 (Table 3). Iowa’s overall LWP strength score was significantly lower than California (p < 0.05), and a similar trend existed with Pennsylvania (p < 0.10). The reimbursable school meals and nutrition guidelines for competitive foods mean strength scores were similar to the overall LWP score at 38.7 and 43.4, respectively. Almost half of the policies (41.9%) strongly stated nutrition standards for school meals beyond USDA minimum standards and the majority of policies (77.4%) included strong nutrition guidelines for competitive foods (Fig. 1, A and B, respectively). Iowa’s reimbursable school meal strength score was significantly higher than California (p < 0.05), and a similar trend existed with Pennsylvania (p < 0.10). Conversely, Iowa’s nutrition guidelines for competitive foods...
### Table 2. Strength Score Coding Items for Select LWP Components<sup>a</sup>

#### Reimbursable school meals
- Assures that guidelines for reimbursable school meals shall not be less restrictive than USDA school meal regulations (federal requirement)
- Addresses access to and/or promotion of the USDA School Breakfast Program
- Addresses access to and/or promotion of the Summer Food Service Program
- Addresses nutrition standards for school meals beyond USDA minimum standards
- Specifies use of low-fat versions of foods and/or low-fat methods for preparing foods
- Specifies strategies to increase participation in school meal programs
- Optimizes scheduling of meals to improve student nutrition
- Ensures adequate time to eat
- Addresses access to hand-washing before meals
- Requires nutrition qualifications of school food service staff
- Ensures training or professional development for food service staff
- Addresses school meal environment
- Nutrition information for school meals (e.g., calories, saturated fat, sugar) is available

#### Nutrition Guidelines for Competitive Foods
- Includes nutrition guidelines for all foods available on school campus during the school day (federal requirement)
- Regulates vending machines
- Regulates school stores
- Regulates food service à la carte
- Regulates food served at class parties and other school celebrations
- Regulates food from home for the whole class
- Regulates food sold before school
- Regulates food sold after school that is not part of a district-run after school program
- Regulates food sold at evening and community events on school grounds
- Regulates food sold for fundraising
- Addresses limiting sugar content of foods
- Addresses limiting fat content of foods
- Addresses limiting sodium content of foods
- Addresses limiting calorie content per serving size of foods
- Addresses limiting serving size of foods
- Addresses increasing “whole foods,” e.g., whole grains or fresh produce
- Addresses limiting the use of ingredients with questionable health effects in food or beverages (e.g., artificial sweeteners, processed or artificial foods, trans fats)
- Addresses food not being used as a reward and/or withheld as a punishment
- Nutrition information (e.g., calories, saturated fat, sugar) available for foods other than school meals
- Addresses limiting sugar content of beverages
- Addresses limiting fat content of drinks (other than milk)
- Addresses limiting calorie content per serving size of beverages
- Addresses limiting regular (sugar-sweetened) soda
- Addresses limiting beverages other than soda containing added caloric sweeteners such as sweetened teas, juice drinks, energy drinks, and sport drinks
- Addresses limiting sugar/calorie content of flavored milk
- Addresses limiting fat content of milk
- Addresses serving size limits for beverages
- Addresses limiting caffeine content of beverages (with the exception of trace amounts of naturally occurring caffeine substances)
- Addresses access to free drinking water

<sup>a</sup>Adapted from Schwartz et al. LWP, Local wellness policy.
Table 3. LWP Strength Scores* (N = 23)

<table>
<thead>
<tr>
<th>LWP strength scores</th>
<th>Mean strength score (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall LWP</td>
<td>38.0 (20.1–57.3)</td>
</tr>
<tr>
<td>California</td>
<td>41.4 (33.2–57.3)</td>
</tr>
<tr>
<td>Iowa</td>
<td>33.5 (20.1–49.0)*</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>39.0 (24.9–46.6)</td>
</tr>
<tr>
<td>Reimbursable school meals</td>
<td></td>
</tr>
<tr>
<td>California</td>
<td>38.7 (15.4–69.2)</td>
</tr>
<tr>
<td>Iowa</td>
<td>30.8 (15.4–69.2)</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>48.1 (15.4–61.5)*</td>
</tr>
<tr>
<td>Nutrition guidelines for other foods</td>
<td>37.4 (23.1–61.5)</td>
</tr>
</tbody>
</table>

*Strength scores obtained using coding tool developed by Schwartz and colleagues.21

Iowa significantly different from California (P < 0.05); trend with Pennsylvania (p < 0.10).

Iowa significantly different from California and Pennsylvania (p < 0.05).

LWP, Local wellness program.

Figure 1. Strength of LWP statements relative to school meals and competitive foods available. (A) Addresses nutrition standards for school meals beyond USDA minimum standards. (B) Includes nutrition guidelines for competitive foods available. Strength scores were determined using the coding tool developed by Schwartz and colleagues.21

For all foods available on each school campus during the school day with the objective of promoting student health and reducing childhood obesity. (White) Not mentioned; (gray) weak; (black) strong.

Figure 2. (A) Perceived implementation of nutrition guidelines for foods sold by state at baseline. (B) Perceived implementation of nutrition guidelines for foods offered by Urban-Centric locale at baseline. (C) Perceived implementation of reimbursable school meals at baseline.
foods strength score was significantly lower than both California and Pennsylvania ($p < 0.05$).

Regression models suggest perceived implementation of reimbursable school meals and nutrition guidelines for competitive foods sold and offered were most frequently associated with state, Urban-Centric Locale, and LWP component score. State was predictive of perceived implementation of nutrition guidelines for competitive foods sold at baseline (Fig. 2A). In California and Pennsylvania, over 70% of schools perceived full implementation. Conversely, Iowa perceived the lowest implementation, with just 33.3% of schools indicating full implementation. State also predicted change score for implementation of nutrition guidelines for competitive foods offered. Although schools in all three states reported less implementation than at baseline, just 4.3% of schools in California reported a negative change score, compared to 23.1% in Pennsylvania and 29.2% in Iowa ($p < 0.05$; data not shown).

At baseline, Urban-Centric Locale predicted perceived implementation of nutrition guidelines for competitive foods offered; the majority of suburbs (52.3%) and towns (50.0%) indicated full implementation in contrast to just 23.5% of rural areas and 5.6% of cities (Fig. 2B).

The reimbursable school meal strength score predicted perceived reimbursable school meal implementation at baseline; however, this was an inverse relationship. Higher reimbursable school meal strength score predicted less implementation of this policy component (Fig. 2C). Interestingly, all 15 schools with the lowest strength scores for reimbursable school meals perceived full implementation at baseline.

Overall, LWP strength score was not a significant predictor of perceived implementation of reimbursable school meals or nutrition guidelines for competitive foods. Furthermore, LWP component strength scores were not always the strongest predictors of perceived implementation of LWP components.

Discussion

A significant limitation of this study was the limited sample size (23 districts representing 76 school buildings among three states) and short time frame (18 months). The small sample size and lack of randomized nationwide sample limited statistical power and interpretation of all analyses. In addition, districts selected to participate in the study were recruited and identified in different manners among the three states. In fact, districts from California and Iowa are likely to be biased because they were those districts that expressed interest in participating in the project. Finally, data reflecting LWP implementation were self-report with inherent limitations.

A strength of this study was the use of a previously reported comprehensive coding system. This coding system was developed to facilitate comparative analysis of school district wellness policies in single or multi-state studies. The tool exhibited intraclass correlation coefficient of 0.70–0.82 for LWP total strength and component scores suggesting a good level of interrater reliability. The Cronbach alpha values for the LWP component strength scores used in this study were 0.79 for reimbursable school meals and 0.93 for nutrition guidelines for competitive foods, suggesting good internal consistency.

The overall LWP mean strength score reported in this study is very similar to previous studies. Data from this study (mean 38.0; range 20.1–57.3) represented 23 districts from three states (California, Iowa, Pennsylvania). Chriqui and colleagues examined a nationwide sample of 593 LWPs and reported a mean strength score of 33 in the 2008–2009 school year. Results reported by Schwartz and colleagues (mean 36; range 50–64) represented 60 districts from four states (Connecticut, Minnesota, Pennsylvania, and Washington). In that study, Pennsylvania LWPs were significantly stronger in most domains, which was attributed to the wellness policy template developed by the Pennsylvania Department of Education and the state school board association. In the present study, the overall LWP mean strength score of California LWPs was higher than both Iowa and Pennsylvania.

The current study found 41.9% of the LWPs had strong nutrition standards for reimbursable school meals (beyond USDA requirements). This may be higher than previous findings by Chriqui and colleagues, where 20% of elementary and 17% of middle and high school students nationwide resided in districts having LWPs with strong nutrition standards for reimbursable school meals. The difference between reporting percent of districts with strong policies and percent of students residing in districts with strong policies makes comparative interpretation difficult. The reimbursable school meal strength score was a significant predictor of perceived school meal implementation, but surprisingly this relationship was negative. All 15 schools with the lowest strength scores for reimbursable school meals perceived full implementation at baseline. There are two plausible explanations for this finding. First, it would be unusual for a district not to report full implementation, because adherence to the federal regulations is required to obtain reimbursement. In fact, studies by the School Nutrition Association have reported high implementation of reimbursable school meals LWP component (92%). Second, implementation of stronger policy components where a higher bar has been set is likely more challenging and less likely to be fully implemented.

Results of this study also suggest a large proportion of districts included strong statements relative to nutrition guidelines for competitive foods, which appears to be similar to the findings of Chriqui and colleagues. This study reported 77.4% of the policies contained strong statements, whereas the previous study reported students residing in districts with strong nutrition guidelines for other foods was 70%, 67%, and 60% in elementary
schools, middle schools, and high schools, respectively. Once again, the difference in how the data were reported makes comparative interpretation challenging. At the time of this study, California had state law and Pennsylvania had an incentive program in place to restrict the types of foods sold in competitive food venues, but Iowa had neither. These state policies likely explain why Iowa LWPs scored significantly lower on nutrition guidelines for competitive foods and reported the least implementation of nutrition guidelines for competitive foods sold. The School Nutrition Association\(^\text{16,20}\) has reported high levels of implementation for nutrition guidelines for competitive foods among à la carte items (72%), but implementation was only 33% for other competitive foods such as fundraising, class parties and school stores.

Interestingly, all three states had schools reporting a negative change score relative to perceived implementation of nutrition guidelines for competitive foods offered. It is possible that the complexity of implementing and enforcing these nutrition guidelines was not originally recognized by school districts, thus less implementation was reported at end point. California had the least number of schools reporting negative change relative to implementation of nutrition guidelines for competitive foods offered. It is possible that the presence of state legislation for competitive foods sold carried over to those offered. Because state was a significant predictor of perceived implementation of nutrition guidelines for foods sold, state served as a proxy for state law and was controlled in regression models.

A strong LWP relative to nutrition guidelines for competitive foods according to the scoring tool\(^\text{21}\) may not have encompassed the complexity of the competitive foods environment present in schools,\(^\text{11}\) but rather a policy that met the minimum requirements of the federal mandate. Policies may have addressed some, but not all, of the competitive foods and venues on the school campus or they may have only applied to certain times of the day. Furthermore, although not required by the mandate, many LWPs incorporate some but not all of the 2007 Institute of Medicine competitive food guidelines.\(^\text{23}\) It is not surprising that nutrition standards for competitive foods tend to be much stronger in elementary schools than high schools.\(^\text{11}\)

Urban-Centric Locale was significant in predicting perceived implementation of nutrition guidelines for foods offered at baseline, suggesting implementation of nutrition guidelines may be more challenging in areas of lower socioeconomic status and higher rates of FRP. Cities and rural areas reported the least implementation of goals for foods offered. This appears to contrast previous reports noting stronger LWP policy components among schools with the highest levels of FRP; however, it should be noted that this study reported perceived implementation while the previous studies reported policy strength.\(^\text{18,24}\)

Conclusion

In summary, overall LWP and component strength scores did not consistently predict perceived implementation of LWP reimbursable school meals or nutrition guidelines for competitive foods offered or sold in school settings. These findings are similar to a recent report by Kubik and colleagues,\(^\text{25}\) where school district nutrition policies were not associated with less “junk” food in vending machines and school stores. That study suggests neither state policy nor district policy influence the availability of junk food in high schools; however, state policies did influence junk food availability in elementary and middle schools. Conversely, these results contrast those of Schwartz and colleagues,\(^\text{24}\) who reported higher LWP strength scores were predictive of implementation among schools in Connecticut.

Collectively, results of this study and those reported previously suggest LWP scores, which indicate comprehensiveness or strength of a LWP, may not result in greater perceived or actual implementation. This is an important finding to consider when examining influence of LWPs on the school health environment.

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Author Disclosure Statement

The authors declare no conflict of interest.

References


Address correspondence to:
Ruth Litchfield, Ph.D., R.D., L.D.
Associate Professor/State Nutrition Extension Specialist
Iowa State University
1104 HNSB
Ames, IA 50011

E-mail: litch@iastate.edu