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The Role of Family and Community Involvement in the Development and Implementation of School Nutrition and Physical Activity Policy

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Abstract

BACKGROUND—Although there are several evidence-based recommendations directed at improving nutrition and physical activity standards in schools, these guidelines have not been uniformly adopted throughout the United States. Consequently, research is needed to identify facilitators promoting schools to implement these recommendations. Therefore, this study analyzed the 2008 School Health Profiles Principal Survey (Profiles) to explore the role of family and community involvement in school nutrition and physical activity standards.

METHODS—Survey data on nutrition and physical activity policies, as well as family and community involvement, were available for 28 states, representing 6732 secondary schools. One-factor analysis of variance (ANOVA), 2-sample t-tests, Pearson's chi-square tests, and multiple logistic and linear regression models were employed in this analysis.

RESULTS—Family and community involvement were associated with schools more frequently utilizing healthy eating strategies and offering students healthier food options. Further, involvement was associated with greater support for physical education staff and more intramural sports opportunities for students.

CONCLUSIONS—Though family and community involvement have the potential to have a positive influence on school nutrition and physical activity policies and practices, involvement remains low in schools. Increased efforts are needed to encourage collaboration among schools, families, and communities to ensure the highest health standards for all students.

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Human Subjects Approval Statement

The Institutional Review Board of the University of Minnesota exempted this study from review.

Keywords

adolescent obesity; family and community involvement; school nutrition policy; school physical activity policy

In the United States, childhood and adolescent obesity continues to be a major public health concern. Since 1980, the percentage of obese adolescents aged 12 to 19 has increased from 5% to nearly 21%.^{1,2} A number of comorbidities are associated with adolescent obesity including metabolic syndrome, type-2 diabetes, cardiovascular abnormalities, and psychosocial issues.³ Further, obesity in adolescence often tracks into adulthood,^{4,5} and thus, obese youth are at higher risk for a number of adult health problems including cardiovascular disease, stroke, diabetes, and certain types of cancer.⁶⁻⁸ Consequently, obesity prevention and intervention efforts are needed early in the life course and should persist through adolescence to reverse current trends.

The school environment has been identified as a promising avenue for implementing these efforts, as more than 95% of American youth aged 5 to 17 are currently enrolled in school.⁹ Children spend approximately one third of each weekday at school during which they consume up to 2 meals plus snacks per day and are provided with a variety of opportunities for physical activity.¹⁰ Therefore, school policies and practices targeting nutrition and physical activity, 2 of the major mitigating factors of obesity,³ are capable of meaningfully impacting students' health. In particular, secondary schools present promising opportunities for policy improvement, as they frequently have healthier food environments,¹¹⁻¹³ require less physical education (PE),¹⁴ and see their students making more personal health choices compared with elementary schools.¹³

Several national, state, and local recommendations directed at improving health standards in schools are currently available. Evidence-based recommendations include improving the nutritional content of foods offered to students,¹⁵⁻¹⁷ utilizing healthy eating strategies such as pricing healthy foods at lower costs and providing nutritional information to students and parents,¹⁸⁻²⁰ and restricting the marketing and promotion of less healthy food items on school grounds.^{21,22} Recommendations directed at increasing physical activity among students also have been established including PE requirements for all students,^{23,24} limiting PE exemptions,¹⁴ providing students with opportunities to participate in intramural sports,^{14,25-27} and hiring credentialed PE teachers equipped with adequate support and resources.^{14,28-30} Research has found these policies to be effective at positively influencing students' dietary behaviors and physical activity levels.³¹⁻³³ However, despite these findings, recommended policies and practices have not been uniformly adopted across the United States.³⁴⁻³⁷ Consequently, a critical next step in addressing childhood obesity through the school environment is to foster a better understanding of the factors facilitating schools to implement higher nutrition and physical activity standards.

Family and community involvement in school health councils, advisory boards, and other decision-making groups engaged in school policies is one factor potentially influencing nutrition and physical activity standards. Research indicates that family and community involvement in schools is associated with improvements in students' academic achievement,

higher attendance rates, and improved quality of school programs, as well as improved student behavior and school discipline.^{38–42} Further, there is some evidence of the benefits of parental and community involvement in school health initiatives, such as drug and alcohol use prevention and safe sex practices promotion.^{43–45} Accordingly, though there is currently little empirical evidence of the effects of family and community involvement on school nutrition and physical activity policies and practices specifically, it is reasonable to hypothesize that involvement is associated with higher school nutrition and physical activity standards.

The purpose of this study is to develop a clearer understanding of the potential impact of family and community involvement on specific nutrition and physical activity policies and practices in secondary schools across the United States. Findings from this analysis will augment current knowledge of school-based health policy, providing greater insight into effective strategies for promoting more robust school health standards geared toward mitigating current trends in adolescent obesity.

METHODS

Participants

This analysis used secondary data from the 2008 School Health Profiles Principal Survey (Profiles). Participating states were invited to share their school-identified 2008 policy data. Twenty-eight states (56%), representing 6732 secondary schools, agreed to share identified data. Seven states (14%) did not respond to multiple requests to participate; 8 states (16%) refused participation citing changes in leadership, concerns in sharing identified data sets, and inability to locate data; and 7 states (14%) sent de-identified data.⁴⁶ School-level characteristics including geographic location, percent minority enrollment, and percent free and reduced-price lunch eligibility were linked using the National Center for Education Statistics Public Elementary/Secondary School Universe Survey (NCES).⁴⁶ Once school characteristics were recorded, states were de-identified, and results were aggregated at the national level.

Survey Instrument

The Profiles survey was developed in 1996 by the Centers for Disease Control and Prevention in collaboration with state and local health agencies to monitor middle and high school health standards. The survey is conducted biennially to evaluate a number of school policies, though only data on nutrition policies, PE requirements, and family and community involvement were explored in this analysis. The Profiles survey consists of self-administered questionnaires completed by principals, and participation is confidential and voluntary. In 2008, states' school response rates ranged from 70% to 93%.⁴⁷

Procedure

Family and community involvement was assessed separately for nutrition and physical activity standards based on the following Profiles survey questions: (1) During the past 2 years, have students' families helped develop or implement policies and programs related to the following topics; (2) During the past 2 years, have community members helped develop

or implement policies and programs related to the following topics. Topics included physical activity and nutrition/healthy eating. Responses to these 2 questions were categorized into 4 levels: (1) neither family nor community involvement, (2) only community involvement, (3) only family involvement, and (4) both family and community involvement. Because of the smaller sample sizes in the “family only” and “community only” groups, as well as the need to narrow the scope of the discussion, differences between the “neither” and “both” involvement groups were the primary focus of the study.

The following provides a description of the nutrition and physical activity scales and individual survey items included in the analysis. Cronbach’s alpha values are provided, which capture the internal consistency of the survey items used in scale development. Cronbach’s alpha 0.70 is generally considered as acceptable in terms of reliability.^{48–50}

Availability of low nutrition energy dense (LNED) snacks and drinks scale—

Developed from responses to questions assessing the availability of the following 10 items in vending machines or school stores: (1) chocolate candy, (2) other kinds of candy, (3) salty snacks not low in fat, (4) cookies, crackers, cakes not low in fat, (5) ice cream or frozen yogurt not low in fat, (6) 2% or whole milk, (7) water ices or frozen slushes not containing juice, (8) soda pop or not 100% fruit juice drinks, (9) sports drinks, and (10) caffeinated foods or beverages (yes = 1, no = 0). This scale was only calculated for schools that indicated a vending machine/store was available to students. Cronbach’s alpha was 0.80.

Healthy eating strategies scale—Developed from responses to 5 questions assessing if the following strategies are utilized by schools: (1) pricing healthy snacks at lower costs; (2) collecting suggestions from students, families, and staff on nutritious food preferences; (3) providing information to students and families on nutrition and caloric content; (4) conducting taste tests to determine nutritious food preferences; (5) providing educational visits to the cafeteria (yes = 1, no = 0). Cronbach’s alpha was 0.61.

Prohibition of marketing of LNED snacks and drinks scale—Developed from responses to 4 questions assessing if schools ban advertising of fast food, candy, or soft drink brands in the following locations: (1) school buildings, (2) school grounds, (3) school modes of transportation, and (4) school publications (yes = 1, no = 0). Cronbach’s alpha was 0.89.

Additional nutrition policies/practices not included in scales—The following 5 survey items were analyzed individually to assess school-based nutrition policies further: (1) availability of vending machines or convenience stores (yes = 1, no = 0); (2) availability of fruits and/or vegetables in vending machines/stores (yes = 1, no = 0); (3) packaging/serving size restrictions on vending items (yes = 1, no = 0); (4) availability of fruits and/or vegetables at school celebrations or gatherings (almost always/always = 1, sometimes/rarely/never = 0); (5) distribution of merchandise promoting fast food, candy, or soft drink brands (yes = 1, no = 0).

PE teacher training and support scale—Developed from the following 6 survey items assessing if PE staff are: (1) required to be certified, licensed, or endorsed by the state; (2)

provided with professional development during the past 2 years; (3) given goals, objectives, and expected outcomes; (4) given charts describing the annual scope and sequence of instruction for physical activity; (5) provided with plans for assessment; (6) provided with a written curriculum (yes = 1, no = 0). Cronbach's alpha was 0.74.

PE exemption scale—Developed from responses to 10 questions assessing if students are exempt from PE for any of the following reasons: (1) other classes, (2) school sports, (3) school activities, (4) community sports, (5) religious reasons, (6) long-term physical disability, (7) cognitive disability, (8) high physical fitness competency test score, (9) vocational training, and (10) community service (yes = 1, no = 0). Cronbach's alpha was 0.68.

Additional PE policies/practices not included in scales—The following 2 physical activity policy questions were assessed individually: (1) Is PE required for students in any grades 6 to 12? (yes = 1, no = 0); (2) Does the school offer opportunities for all students to participate in intramural sports and activities? (yes = 1, no = 0). Although individual PE grade requirements were available, these questions were not analyzed in regression models due to varying grade levels in participating schools.

Data Analysis

Analyses were conducted separately for nutrition and physical activity policies. Schools with missing data on family and community involvement in nutrition policy (N = 114, 1.7%) or physical activity policy (N = 133, 2.0%) were excluded from respective analyses. There were no significant differences in geographic location, percent minority enrollment, or percent free and reduced-price lunch enrollment between schools with missing involvement data and schools included in the analysis. Sample sizes vary slightly for each policy item due to variations in missing data. In instances where scales were assessed as the outcome of interest, schools were excluded from that particular analysis if they were missing data for any item used in the scale's development.

Statistical analyses were conducted using 1-factor analysis of variance (ANOVA) and 2-sample t-tests for policy scales and Pearson's chi-square tests for individual survey items. Criteria for determining meaningful between-group differences were based on the following 2012 Agency of Healthcare Research and Quality Report guidelines: (1) the difference is statistically significant at the $\alpha = 0.05$ level using the 2-tailed test; and (2) the relative between-group difference has an absolute value of at least 10%.⁵¹ Accounting for the magnitude of between-group differences was an important consideration in this analysis, as statistically significant results may be obtained due to the large sample size of the study that are not actually meaningful.³⁶

Multiple logistic and linear regression models were then used to adjust for schools' geographic location, percent minority enrollment, and percent free and reduced-price lunch enrollment, as these characteristics have been identified as independent predictors of school health policy.^{34,35} Categorizations of these variables are summarized in Table 1. Adjusted prevalence and adjusted prevalence differences were calculated from logistic regression models, and adjusted means and adjusted mean differences were calculated from linear

regression models. Schools with no outside involvement served as the reference level in these models. Statistical analyses were performed using Stata software version 12.1 (StataCorp, College Station, TX).

RESULTS

Table 1 provides level of family and community involvement in nutrition and physical activity policy stratified by school-level characteristics. Nutrition data were available for 6618 secondary schools, whereas physical activity data were available for 6599 secondary schools. Family and community involvement in school nutrition and physical activity policy varied significantly by geographic location, minority enrollment, and free and reduced-price lunch eligibility. However, a difference as great as 10% was only found when comparing the percentage of schools with both family and community involvement in nutrition policy between those with low minority enrollment (43%) and those with high minority enrollment (31%). Overall, schools had more involvement in nutrition policy than physical activity policy, as the percentage of schools with both family and community involvement in nutrition policy (38%) was substantially higher than physical activity policy (25%) across all school characteristics.

Table 2 presents the 2008 Profiles nutrition policy results for each level of family and community involvement. There were significant differences across involvement levels in terms of mean number of LNE food items offered in vending machines/stores ($p < .01$), availability of fruits and/or vegetables in vending machines/stores ($p < .01$) and at school celebrations ($p < .01$), packaging size restrictions on vending items ($p < .01$), and mean number of healthy eating strategies utilized by schools ($p < .01$). Schools with both family and community involvement had a lower mean number of unhealthy foods available, a higher prevalence of fruit and/or vegetable availability in vending machines and at school celebrations, a higher prevalence of package size restrictions, and a higher mean healthy eating strategies score with a higher prevalence for all five healthy eating strategy items compared with schools with no involvement. Differences as great as 10% were only found for 4 of the 5 healthy eating strategies, though other comparisons were close to meeting the 10% difference criteria. There were no significant differences in the availability of vending machines/stores ($p = .19$), distribution of fast food, candy, or soft drink merchandise ($p = .42$), or prohibition of marketing in school venues ($p = .32$) between schools with differing levels of family and community involvement.

Table 3 presents the 2008 Profiles physical activity results for each level of family and community involvement. Significant differences across involvement levels were found in the proportion of schools requiring PE in any grades 6 to 12 ($p = .03$), though there were no significant differences in individual grade requirements. Additionally, each component of the PE teacher credentials and support scale differed significantly across involvement levels ($p < .01$), with schools involving both families and communities scoring highest on the scale (5.5 ± 1.1). Further, many types of PE exemptions significantly varied across involvement levels, and the overall exemption scale differed significantly by level of involvement ($p < .01$). Finally, the proportion of schools offering intramural activities to students significantly differed by involvement level ($p < .01$), with schools involving both families and

communities providing intramural opportunities more frequently (70.0%) than schools with no involvement (60.6%). Only the plans for assessment component of the PE teacher support scale had a between-group difference as great as 10% when comparing schools with both family and community involvement to schools with no outside involvement, though other comparisons were substantial.

Table 4 provides results from the multivariate regression models analyzing the association between family and community involvement and school nutrition policies. After controlling for school-level characteristics, involvement remained unassociated with the availability of vending machines/stores in schools ($p = .55$). After adjustment, involvement remained significantly associated with the number of LNED food items available in vending machines/stores ($p < .01$), availability of fruits and/or vegetables in vending machines/stores ($p < .01$), and vending item size restrictions ($p < .01$). Schools with both family and community involvement in nutrition policy offered fewer LNED food items on average, were more likely to offer fruits and/or vegetables in vending machines/stores, and were more likely to limit the packaging size of vending items compared with schools with no outside involvement. Involvement level was also associated with the availability of fruits and/or vegetables at school celebrations after adjustment ($p < .01$), with a significantly higher adjusted prevalence of fruit and/or vegetable offerings at gatherings among schools with both family and community involvement (38.1%) compared with schools with no outside involvement (28.5%). Further, family and community involvement was associated with the healthy eating strategies scale after adjustment, with a significantly higher mean number of healthy eating strategies utilized by schools with both family and community involvement (2.0 ± 0.03) compared with schools with no outside involvement (1.0 ± 0.02). There was no association between involvement level and distribution of fast food/candy/soft drink merchandise ($p = .25$) or prohibition of marketing in school venues ($p = .12$) after adjustment.

Table 5 presents results from the multivariate regression models analyzing the association between family and community involvement and school physical activity policies. After adjusting for school characteristics, the association between involvement level and PE requirements for any grades 6 to 12 was no longer statistically significant ($p = .31$). The association between involvement level and the PE teacher credentials and support scale remained significant after adjustment ($p < .01$), with schools involving both families and communities having a significantly higher mean support scale score (5.5 ± 0.03) compared with schools with no outside involvement (5.0 ± 0.02). Additionally, there was a significant association between involvement level and the PE exemption scale after adjustment ($p < .01$), with schools involving both families and communities allowing a significantly higher mean number of PE exemptions (2.5 ± 0.1) compared with schools with no outside involvement (2.3 ± 0.03). Finally, level of involvement was associated with intramural sports opportunities for students after adjustment ($p < .01$), with a significantly higher adjusted prevalence of intramural sports opportunities among schools involving both families and communities (70.6%) compared with schools with no outside involvement (60.1%).

DISCUSSION

Results from this analysis demonstrate the potential for family and community involvement to positively impact school nutrition and physical activity standards. Although level of involvement in nutrition policy was not significantly associated with the presence of vending machines/stores in schools, it was associated with the types of foods offered in these venues. Schools with both family and community involvement in nutrition policy were significantly more likely to offer fewer LNE food options, offer fruits and/or vegetables, and limit packaging sizes of vending items. Additionally, schools with family and community involvement were significantly more likely to offer fruits and/or vegetables at celebrations and to utilize a greater number of healthy eating strategies compared with schools with no outside involvement, further associating family and community involvement with healthier food options for students. Involvement was not associated with either the distribution of fast food/candy/soft drink merchandise, which had a low prevalence across all levels of involvement, or the prohibition of marketing in school venues.

Family and community involvement in physical activity policies and programs was not associated with PE grade requirements. However, involvement was associated with the PE teacher credentialing and support scale, with schools involving both families and communities scoring highest on the scale. Interestingly, schools with both family and community involvement allowed more PE exemptions than schools with no outside involvement, pointing to the need for further education on the importance of PE, as well as the need for the development of more PE classes tailored to meet the specific religious, social, and physical needs of all students. Finally, schools with both family and community involvement were significantly more likely to offer intramural sports opportunities to students compared with schools with no outside involvement, again demonstrating the importance of family and community involvement in school health policy.

It is evident from this analysis that family and community involvement has the potential to positively influence school nutrition and physical activity standards. However, a large proportion of participating schools reported no family or community involvement, with 46% of schools indicating no involvement in nutrition policy and 60% of schools indicating no involvement in physical activity policy. These findings are consistent with previous research that has shown limited family and community involvement in school health policy throughout the nation.³⁸ Consequently, it is clear that greater promotion of family and community involvement is needed in secondary schools to more effectively utilize the school environment in obesity prevention and intervention efforts. Further, it is apparent from these results that additional factors beyond family and community involvement are needed to ensure rigorous health standards, as even schools with both family and community involvement did not uniformly adopt recommended policies and practices. Therefore, in addition to family and community involvement, further avenues to promoting more robust school health standards must be explored.

Limitations

There were several limitations to this analysis. First, because the data set is cross-sectional, temporal relationships between involvement level and school health standards cannot be

established. Second, because only 56% of states agreed to share identified data for this analysis, results may not be generalizable to all secondary schools throughout the United States. However, nonresponse bias was assessed using publicly available state-level data from nonparticipating states, and policy implementation was found to be similar for participating and nonparticipating states.⁴⁶ Third, many variables in this analysis had some level of missing data, though this is likely a minor limitation as the percentage of missing data was small and there were no observed differences in school-level characteristics.

A potentially more substantial limitation is the fact that the survey did not determine level of family and community involvement for each specific survey item assessed, and thus, level of involvement in specific types of policies could not be determined, nor could the amount of involvement within schools be quantified beyond the 4 levels. It is possible that responses to the general involvement questions do not accurately represent involvement in each individual policy. Therefore, a critical next step in this area of research is to describe the role of families and communities in developing specific policies related to nutrition and physical activity, as the impact of involvement may vary by policy type.

A final limitation is that the survey did not clearly define “family” and “community,” leaving it to participants to interpret these concepts for themselves. Therefore, this analysis would be strengthened by clearer definitions of “family involvement” and “community involvement.” Despite these limitations, this analysis contributes to a better understanding of the role of family and community involvement in school nutrition and physical activity standards and presents future directions for this area of research.

Conclusions

This study provides valuable insight into strategies for addressing childhood obesity through the school environment, as results demonstrate the potential role of families and communities in positively influencing school nutrition and physical activity policy development and implementation. Findings from this analysis point to the need for more active participation from families and community members in developing school policies and practices, as results suggest that school officials need outside support in establishing higher health standards for students. Further, whereas it is evident that family and community involvement is associated with more rigorous school nutrition and physical activity policies and practices, it is likely not enough to ensure schools meet recommended guidelines. Therefore, opportunities exist for families, communities, and school leaders to improve upon current childhood obesity prevention and intervention efforts, as it is evident that a collaborative approach is necessary if current trends are to be reversed.

IMPLICATIONS FOR SCHOOL HEALTH

This analysis demonstrates that school nutrition and physical activity standards can be strengthened through collaboration among families, communities, and school officials. Therefore, schools should be encouraged to provide opportunities for parents, family members, and communities to participate in forums, meetings, and open discussions addressing school health policy. More specifically, to maximize resources and expertise, schools should draw upon school boards, Parent Teacher Associations, advisory councils,

local health departments, health and recreation organizations, and other parent and community groups when crafting school policies and wellness plans. Inviting nutrition and physical activity experts to this collaborative decision-making process will not only strengthen school health policy, but will provide parents and educators with a deeper knowledge of how to create a healthier environment for adolescents. Therefore, secondary schools need to ensure that families are provided with opportunities to stay actively involved in and informed about the health environments of their children as they progress through adolescence.

Because these findings point to the significant role of families and community members in potentially influencing the health environment of children, it is critical that adults take a more active role in ensuring adequate nutrition and physical activity standards for youth not only in schools, but in home and community settings as well. In particular, parents likely serve as the strongest advocates for ensuring a healthy environment for their children and continue to significantly impact their children's health behaviors during young adulthood.^{13,52,53} Therefore, parents must persist in playing a central role in ensuring their adolescents are active and healthy and should not rely solely on schools to enforce health guidelines. Although this study suggests that the school environment is a promising setting for implementing obesity prevention and intervention efforts, it is evident that a school, family, and community partnership is needed to ensure the highest nutritional and physical activity standards for all students.

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Table 1

The 2008 School Health Profiles Principal Survey: Level of Family and Community Involvement in Nutrition and Physical Activity Policy by School-level Characteristics

School Characteristics	N	Family and Community Involvement in Nutrition Policy N (%)				p-Value [*]	Family and Community Involvement in Physical Activity Policy N (%)				p-Value [*]
		Neither	Community Only	Family Only	Both		Neither	Community Only	Family Only	Both	
Location											
City	1208	548 (45%)	182 (15%)	97 (8%)	381 (32%)	<.01	671 (56%)	170 (14%)	86 (7%)	275 (23%)	<.01
Suburb	1441	706 (49%)	139 (10%)	100 (7%)	496 (34%)		886 (62%)	127 (9%)	86 (6%)	339 (24%)	
Town/rural	3969	1779 (45%)	347 (9%)	226 (6%)	1617 (41%)		2402 (61%)	296 (7%)	197 (5%)	1064 (27%)	
Minority enrollment [‡]											
Low(<5%)	1162	499 (43%)	90 (8%)	72 (6%)	501 (43%)	<.01	706 (61%)	77 (7%)	60 (5%)	318 (27%)	<.01
Medium(5% to <50%)	3740	1704 (46%)	350 (9%)	230 (6%)	1456 (39%)		2264 (61%)	303 (8%)	212 (6%)	948 (25%)	
High (50%)	1684	815 (48%)	225 (13%)	118 (7%)	526 (31%)		970 (58%)	211 (13%)	95 (6%)	403 (24%)	
Free/reduced-price lunch [‡]											
Low(<20%)	1508	663 (44%)	128 (8%)	125 (8%)	592 (39%)	<.01	931 (62%)	115 (8%)	93 (6%)	369 (24%)	<.01
Medium(20% to <60%)	3447	1571 (46%)	344 (10%)	185 (5%)	1,347 (39%)		2063 (60%)	291 (8%)	177 (5%)	905 (26%)	
High (60%)	1362	634 (47%)	171 (13%)	94 (7%)	463 (34%)		766 (56%)	158 (12%)	80 (6%)	352 (26%)	
Total	6618	3033 (46%)	668 (10%)	423 (6%)	2494 (38%)		3959 (60%)	593 (9%)	369 (6%)	1678 (25%)	

^{*} Tested using Pearson's chi-square statistic.

[‡] A total of 32 schools missing data on % minority enrollment.

[‡] A total of 301 schools missing data on % free and reduced-price lunch enrollment.

Table 2

The 2008 School Health Profiles Principal Survey: Nutrition Policies by Level of Family and Community Involvement

Nutrition Policy/Practice *	N	% With Nutrition Policy by Level of Family and Community Involvement				p-Value [†]
		Neither	Community Only	Family Only	Both	
Vending machine/store	6295	72.5	74.3	71.6	74.9	.19
If school has a vending machine:	4629					
Number of low nutrient energy dense items (mean± SD)		4.6± 2.8 ^a	4.4± 2.9 ^{ab}	4.1± 2.8 ^b	4.3± 2.8 ^b	<.01
Fruits and/or vegetables available		40.3 ^a	44.1 ^{ab}	51.1 ^b	47.9 ^b	<.01
Packaging/serving size restrictions		59.9 ^a	68.4 ^b	67.9 ^b	69.5 ^b	<.01
Fruits/vegetables available at celebrations	6419	29.4 ^a	33.5 ^b	36.7 ^b	37.5 ^b	<.01
Healthy eating strategies scale (mean± SD)	6466	1.0± 1.1 ^a	1.4± 1.2 ^b	1.6± 1.4 ^c	1.9± 1.3 ^d	<.01
Price healthy snacks at lower costs		7.1 ^a	8.4 ^a	13.5 ^b	14.6 ^b	<.01
Collect healthy suggestions		31.2 ^a	45.1 ^b	53.8 ^c	65.4 ^d	<.01
Provide nutrition information		35.5 ^a	50.2 ^b	46.9 ^b	63.1 ^c	<.01
Conduct taste tests of healthy foods		12.8 ^a	18.7 ^b	21.5 ^{bc}	25.2 ^c	<.01
Provide educational visits to cafeteria		11.1 ^a	15.5 ^b	23.0 ^c	26.2 ^c	<.01
Distribute fast food/candy/soft drink merchandise	6465	2.8	1.7	2.4	2.5	.42
Prohibit marketing scale (mean± SD)	6530	2.6± 1.7	2.7± 1.6	2.7± 1.7	2.6± 1.6	.32
School building		66.1	67.9	67.9	66.6	.75
School grounds		57.6	60.4	59.8	57.7	.49
School bus		72.1	75.2	72.7	74.4	.18
School publications		61.6	65.7	65.1	63.4	.15

* For a given policy item, involvement levels that do not share a common letter are significantly different (p < .05).

† Categorical variables tested using Pearson's chi-square statistic; continuous variables tested using 1-way ANOVA F-test statistic and 2-sample t-test statistic.

The 2008 School Health Profiles Principal Survey: Physical Activity Policies by Level of Family and Community Involvement

Table 3

Physical Activity Policy/Practice*	N	% With Physical Activity Policy by Level of Family and Community Involvement				p-Value [†]
		Neither	Community Only	Family Only	Both	
PE required any grades 6–12	6504	92.9 ^a	90.9 ^a	93.2 ^{ab}	94.4 ^b	.03
Grade 6	2918	95.9	98.5	95.5	96.3	.20
Grade 7	3765	95.0	96.1	97.3	95.7	.35
Grade 8	3735	92.6	93.5	94.6	93.0	.68
Grade 9	3096	92.3	91.3	93.9	93.6	.50
Grade 10	2958	71.6	77.0	75.0	75.1	.13
Grade 11	2830	43.7	46.8	46.6	49.0	.11
Grade 12	2818	40.3	44.2	46.3	45.3	.08
Grade 11 or 12	2814	44.5	47.2	47.6	49.2	.19
PE teacher support scale (mean± SD)	6315	5.0± 1.4 ^a	5.3± 1.2 ^b	5.3± 1.2 ^b	5.5± 1.1 ^c	<.01
Credentials		93.5 ^a	92.0 ^a	94.8 ^{ab}	96.3 ^b	<.01
Professional development		83.1 ^a	87.7 ^b	89.7 ^b	92.9 ^c	<.01
Goals/objectives		92.9 ^a	97.7 ^b	96.0 ^b	97.3 ^b	<.01
Annual charts		73.3 ^a	82.7 ^b	78.7 ^b	82.8 ^b	<.01
Plans for assessment		78.1 ^a	86.1 ^b	86.5 ^b	88.3 ^b	<.01
Written curriculum		81.3 ^a	85.9 ^b	88.2 ^{bc}	90.0 ^c	<.01
PE exemption scale (mean± SD)	5699	2.3± 1.8 ^a	2.6± 1.8 ^b	2.3± 1.9 ^{ac}	2.5± 1.9 ^{bc}	<.01
Other classes		22.7 ^a	27.7 ^b	18.2 ^a	21.2 ^a	.01
School sports		17.7 ^a	19.5 ^{ab}	21.7 ^{ab}	22.1 ^b	<.01
School activities		19.3 ^a	26.9 ^b	22.6 ^{ab}	21.4 ^a	<.01
Community sports		6.2	9.0	8.3	6.9	.07
Religious reasons		39.0 ^a	45.8 ^b	42.7 ^{ab}	45.0 ^b	<.01
Physical disability		81.9 ^a	85.7 ^b	78.0 ^a	81.4 ^a	.04
Cognitive disability		33.6 ^a	36.5 ^{ac}	28.0 ^b	36.5 ^c	.02
High fitness score		2.8	3.0	2.2	3.8	.21
Vocational training		4.2	4.1	5.4	5.7	.12
Community service		2.3	2.6	3.2	3.4	.16

% With Physical Activity Policy by Level of Family and Community Involvement						
	N	Neither	Community Only	Family Only	Both	p-Value [†]
Physical Activity Policy/Practice [*]						
Offer intramural sports/activities	6158	60.6 ^a	68.9 ^b	71.4 ^b	70.0 ^b	<.01

PE, physical education.

* For a given policy item, involvement levels that do not share a common letter are significantly different ($p < .05$).

[†] Categorical variables tested using Pearson's chi-square statistic; continuous variables tested using 1-way ANOVA F-test statistic and 2-sample t-test statistic.

Table 4

The 2008 School Health Profiles Principal Survey: Nutrition Policy Regression Models Adjusted for Schools' Geographic Region, Percent Minority Enrollment, and Percent Free and Reduced-price Lunch Eligibility by Level of Family and Community Involvement

Nutrition Policy/Practice*	Value	N	Nutrition Policy by Level of Family and Community Involvement				p-Value [†]
			Neither	Community Only	Family Only	Both	
Vending machine/store	Adjusted prevalence	6003	73.0	75.2	72.0	73.9	.55
	Adjusted prevalence difference (95%CI)			(2.3 [-1.5, 6.0])	(-1.0 [-5.8, 3.8])	(1.0 [-1.5, 3.4])	
Number of low nutrient energy dense items	Adjusted mean± SE	4413	4.7± 0.1 ^a	4.5± 0.1 ^{ab}	4.1± 0.2 ^b	4.3± 0.1 ^b	<.01
	Adjusted mean difference (95%CI)			(-0.1 [-0.4, 0.1])	(-0.5 [-0.9, -0.2])	(-0.4 [-0.6, -0.2])	
Fruits and/or vegetables available	Adjusted prevalence	4413	40.5 ^a	42.9 ^{ac}	50.3 ^{bc}	48.3 ^b	<.01
	Adjusted prevalence difference (95%CI)			(2.4 [-2.5, 7.4])	(9.8 [3.5, 16.1])	(7.8 [4.6, 11.0])	
Packaging/serving size restrictions	Adjusted prevalence	4413	58.8 ^a	66.5 ^b	65.8 ^b	69.5 ^b	<.01
	Adjusted prevalence difference (95%CI)			(7.7 [2.9, 12.6])	(7.0 [0.9, 13.1])	(10.7 [7.7, 13.8])	
Fruits/vegetables at celebrations	Adjusted prevalence	6134	28.5 ^a	31.9 ^{ab}	35.3 ^{bc}	38.1 ^c	<.01
	Adjusted prevalence difference (95%CI)			(3.4 [-0.6, 7.4])	(6.8 [1.8, 11.7])	(9.6 [7.0, 12.2])	
Healthy eating strategies scale	Adjusted mean± SE	6169	1.0± 0.02 ^a	1.4± 0.05 ^b	1.6± 0.1 ^c	2.0± 0.03 ^d	<.01
	Adjusted mean difference (95%CI)			(0.4 [0.3, 0.5])	(0.6 [0.5, 0.7])	(1.0 [0.9, 1.0])	
Distribute fast food/candy/soft drink merchandise	Adjusted prevalence	6168	2.9	1.6	2.3	2.5	.25
	Adjusted prevalence difference (95%CI)			(-1.4 [-2.5, -0.2])	(-0.6 [-2.2, 1.0])	(-0.4 [-1.3, 0.5])	
Prohibit marketing scale	Adjusted mean± SE	6232	2.5± 0.03	2.6± 0.1	2.6± 0.1	2.7± 0.03	.12
	Adjusted mean difference (95%CI)			(0.1 [-0.1, 0.2])	(0.1 [-0.1, 0.2])	(0.1 [0.02, 0.2])	

CI, confidence interval.

* For a given policy item, involvement levels that do not share a common letter are significantly different ($p < .05$).

[†] Categorical variables tested using Wald chi-square statistic; continuous variables tested using ANOVA F-test statistic.

The 2008 School Health Profiles Principal Survey: Physical Activity Policy Regression Models Adjusted for Schools' Geographic Region, Percent Minority Enrollment, and Percent Free and Reduced-Price Lunch Eligibility by Level of Family and Community Involvement

Table 5

Physical Activity Policy/Practice*	Value	Physical Activity Policy by Level of Family and Community Involvement					p-Value [†]
		N	Neither	Community Only	Family Only	Both	
PE required any grades 6–12	Adjusted prevalence	6206	93.1	92.1	93.0	94.2	.31
	Adjusted prevalence difference (95%CI)			(-1.0 [-3.3, 1.3])	(-0.2 [-2.9, 2.6])	(1.0 [-0.4, 2.5])	
PE teacher support scale	Adjusted mean± SE	6035	5.0± 0.02 ^a	5.3± 0.1 ^b	5.3± 0.1 ^b	5.5± 0.03 ^c	<.01
	Adjusted mean difference (95%CI)			(0.2 [0.1, 0.3])	(0.2 [0.1, 0.4])	(0.5 [0.4, 0.5])	
PE exemption scale	Adjusted mean± SE	5450	2.3± 0.03 ^a	2.6± 0.1 ^b	2.3± 0.1 ^{ac}	2.5± 0.1 ^{bc}	<.01
	Adjusted mean difference (95%CI)			(0.3 [0.1, 0.4])	(0.0 [-0.2, 0.2])	(0.2 [0.1, 0.3])	
Intramural sports/activities	Adjusted prevalence	5876	60.1 ^a	66.4 ^b	69.5 ^b	70.6 ^b	<.01
	Adjusted prevalence difference (95%CI)			(6.3 [2.0, 10.7])	(9.4 [4.2, 14.7])	(10.5 [7.7, 13.2])	

CI, confidence interval.

* For a given policy item, involvement levels that do not share a common letter are significantly different ($p < .05$).

[†] Categorical variables tested using Wald chi-square statistic; continuous variables tested using ANOVA F-test statistic.