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School District Policies and Adolescents' Soda Consumption

Gabrielle F. Miller, Ph.D.[a,*], **Sarah Sliwa, Ph.D.**[a], **Nancy D. Brener, Ph.D.**[b], **Sohyun Park, Ph.D.**[c], and **Caitlin L. Merlo, M.P.H., R.D.**[a]

[a]Division of Population Health, National Center for Chronic Disease Prevention and Health Promotion, CDC, Atlanta, Georgia

[b]Division of Adolescent and School Health, National Center for HIV/Aids, Viral Hepatitis, STD, and TB Prevention, CDC, Atlanta, Georgia

[c]Division of Nutrition Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion, CDC, Atlanta, Georgia

Abstract

Purpose—Sugar-sweetened beverages (SSBs) are a significant source of calories and added sugars for youth ages 14–18 years in the United States. This study examined the relationship between district-level policies and practices and students' consumption of regular soda, one type of SSB, in 12 large urban school districts.

Methods—Data from the 2012 School Health Policies and Practices Study and 2013 Youth Risk Behavior Surveillance System were linked by district. The outcome variable was soda consumption and exposure variables were district policies. We used multivariable logistic regression analyses to calculate adjusted odds ratios (AORs) and 95% confidence intervals (CIs) after controlling for student characteristics and district free/reduced-price meal eligibility.

Results—About 18% of students reported consuming regular soda at least once per day. Most districts required high schools to have nutrition education, maintain closed campuses, and required/recommended that schools restrict promotional products and sale of beverages. Fewer districts required/recommended that schools offer healthful alternative beverages. Students in districts that restricted promotional products had lower odds of regular soda consumption (AOR = .84, 95% CI = .71–1.00), as did students in districts that restricted access to SSBs and offered healthful beverages when other beverages were available (AOR = .72, 95% CI = .54–.93, AOR = .76, 95% CI = .63–.91).

Conclusions—This study demonstrates that certain district-level policies are associated with student consumption of regular soda. These findings add to a growing consensus that policies and practices that influence the availability of healthier foods and beverages are needed across multiple settings.

[*]Address correspondence to: Gabrielle F. Miller, Ph.D., Division of Analysis, Research, and Practice Integration, National Center for Injury Prevention and Control, Centers for Disease Control and Prevention, 4770 Buford Highway, MS F-64, Atlanta, GA 30341. gferro@cdc.gov (G.F. Miller).

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Keywords

SSB; Nutrition education; District policies; SHPPS; YRBSS

The 2015 Dietary Guidelines for Americans recommend that Americans, including youth, limit their intake of added sugars [1]. Sugar-sweetened beverages (SSBs) are a significant source of both calories and added sugar intake for youth ages 14–18 years in the United States [2]. SSBs have been defined as "liquids that are sweetened with various forms of added sugars. These beverages include, but are not limited to, soda (regular, not sugar free), fruitades, sports drinks, energy drinks, sweetened waters, and coffee and tea beverages with added sugars" [1]. Frequent (e.g., daily) consumption of SSBs is related to adverse health consequences including but not limited to weight gain/obesity [3], cardiovascular health [4], dental caries [5], asthma [6], poor diet quality [7], and poor academic achievement [8] among children and adolescents. Additionally, daily SSB intake is significantly associated with insulin resistance in adolescents [9], and daily intake of regular soda is significantly associated with problem behaviors and victimization among US high school students [10].

Between 1999 and 2010, SSB intake declined both at home and away from home; nevertheless, calories from SSBs still comprise 10% of total energy intake for adolescents ages 12–19 and 44% of SSB calories are consumed away from home [11]. Several factors have been linked to SSB consumption among children and adolescents including marketing [12], sedentary behavior [13], and community [14], home [15], and school environments [16]. The Institute of Medicine highlighted the school environment as a priority setting for influencing the health behaviors of children and adolescents and for anchoring childhood obesity prevention efforts [16]. School policies adopted at state and district levels can play an important role in shaping students' access to SSBs during the school day [17,18]. Policies that help schools foster the development of preferences for healthier options by limiting the availability and promotion of less healthy options and by increasing the availability of healthier options may be effective at changing individual behavior [18]. Healthier beverages are those that meet strong nutrition standards [19], such as those recommended by the Institute of Medicine (e.g., plain water, low-fat or nonfat milk) [17].

To date, research has consistently shown that students in states with more restrictive policies around competitive foods and beverages (i.e., foods and beverages available outside the school meal programs) have lower access to SSBs in school, including regular soda [20]. However, the association between students' access to SSBs in school and consumption of SSBs is less clear. A systematic review focused on written policies identified four studies that examined the relationship between policies addressing competitive foods and beverages in schools and student beverage consumption and found inconsistent results: two studies showed a decline in SSB consumption, one study had results that were insignificant, and the overall review reported "mixed outcomes" [21]. A recent study reported that state policies banning soda was strongly associated with lower soda availability in schools [20]. The authors did not find an association between these policies and consumption overall across the entire student body; rather, the authors reported lower soda consumption solely among African-American students [20].

The relationship between school policies and SSB consumption is particularly relevant to adolescents, who consume more SSBs and consume a greater percent of their calories from SSBs than do younger children [2]. Yet policies and guidance around the sale of SSBs have been [22], and continue to be, less restrictive at the high school level compared to middle schools and especially elementary schools, as seen in expert recommendations, and policies across the federal [23], state [24], and district levels [25].

The purpose of this cross-sectional study was to examine the association between district-level nutrition policies and practices on soda consumption among US high school students using a linked data set from the 2012 School Health Policies and Practices Study (SHPPS) and the 2013 Youth Risk Behavior Surveillance System (YRBSS) at the district level for 12 large urban school districts. By focusing on high school students and a variety of school policies such as bans on promotion and availability, this study aims to address a noted research gap [26]. This analysis may help researchers, practitioners, and policy makers identify opportunities to strengthen district-level wellness policies and anticipate the potential influence of these policies on youth soda consumption.

Methods

Sample and survey administration

District-level data—Data on district-level policies were obtained from the 2012 SHPPS. SHPPS is a cross-sectional study conducted periodically by the Centers for Disease Control and Prevention (CDC) at the state, district, school, and classroom levels. To select a nationally representative sample of public school districts, primary sampling units (PSUs) were constructed by grouping contiguous school districts. These PSUs were then sampled with equal probability without replacement. In addition to these sampled PSUs, certainty PSUs, which were school districts funded by the CDC at the time of the study, were added to the sample. These certainty PSUs were selected with a probability of 1.0 before the other PSUs were sampled. This cross-sectional analysis used 2012 data from the 12 certainty districts (Districts included Charlotte-Mecklenburg, Chicago, Houston, Los Angeles, Memphis, Miami-Dade County, Milwaukee, New York City, Palm Beach County, San Diego, San Francisco, and Seattle.) that also had representative student-level data from the 2013 YRBSS as described in the following section.

SHPPS collected data through standardized questionnaires. During recruitment, the superintendent or other district-level contact designated a respondent for each questionnaire. All designated respondents had primary responsibility for or were the most knowledgeable about the particular component of school health. For this study, data were drawn from three questionnaires: Nutrition Services, Health Education, and Healthy and Safe School Environment. The questionnaires were administered through Web-based surveys or mail questionnaires. SHPPS was reviewed by an institutional review board at CDC and was determined to be exempt. More detailed descriptions of the methods used in SHPPS 2012 have been published previously [27].

Student-level data—Student-level data were obtained from Youth Risk Behavior Surveys conducted in 2013 among representative samples of high school students in large

urban school districts funded by CDC in that survey year. These surveys, a component of the YRBSS, are conducted biennially by local education agencies, with technical assistance from CDC, to monitor the prevalence of priority health risk behaviors among high school students. In each participating district, a two-stage sample design was used to produce a representative sample of students in grades nine through 12 who attended public high schools in that district.

Student participation in the survey was anonymous and voluntary, and local parental permission procedures were followed. Students completed the self-administered paper-and-pencil questionnaire during a regular class period and recorded their responses directly on a computer-scannable questionnaire booklet or answer sheet. In 2013, across the 12 districts included in this analysis, school response rates ranged from 89% to 100%, student response rates ranged from 71% to 90%, and overall response rates ranged from 71% to 90%. Student sample sizes ranged from 1,308 to 9,439. Institutional review board reviews for the district Youth Risk Behavior Surveys are handled by the individual districts. More detailed descriptions of YRBSS methods have been published previously [28].

Variables

The outcome of interest, student consumption of regular (non-diet) soda, was derived from a single question on the Youth Risk Behavior Survey (YRBS): “During the past 7 days, how many times did you drink a can, bottle, or glass of soda or pop, such as Coke, Pepsi, or Sprite? (Do not count diet soda or diet pop.)” Response options included, “I did not drink soda or pop during the past 7 days”, “1–3 times during the past 7 days”, “4–6 times during the past 7 days”, “1 time per day”, “2 times per day”, “3 times per day”, and “4 or more times per day”. For this analysis, a dichotomous response category was created: <1 versus ≥1 time/day to identify frequent regular soda consumers (i.e., daily intake of regular soda) [8,10].

The exposure variables were five questions (i.e., require nutrition education, maintain closed campuses, restrict promotional products, restrict sale of beverages, and offer healthful alternatives) from SHPPS regarding district-level policies (Table 1). Response options for questions on the restriction of promotional products, the restriction of sale of beverages, and offering healthful alternatives questions were “required,” “recommended,” or “neither.” Based on the data distribution (Table 1), we dichotomized response options as required/recommended versus neither for the logistic regression model. For the nutrition education and closed campus questions, response options were yes or no.

Covariates from the YRBS included grade (9th, 10th, 11th, and 12th), sex, race/ethnicity (non-Hispanic [NH] white, NH black, Hispanic, NH Asian, and NH other), and weight status (underweight, normal weight, overweight, and obese) [29]. Weight status was defined using self-reported height and weight to calculate body mass index (BMI) percentile which was categorized by <5% underweight, ≥5% to <85% normal weight, ≥85% to <95% overweight, and ≥95% obese. Physical activity was defined as participation in at least 60 minutes of physical activity per day and was treated as a binary variable (yes or no). Two variables were used to identify sedentary behaviors: time spent watching television and time spent playing video or computer games or using computers for something that was not

school work. Each variable was treated as binary (<3 vs. ≥3 hours/day) [30]. In addition, information on the percent of students eligible to receive free or reduced-price lunch in the district was available by linking SHPPS to an extant data source from Market Data Retrieval [31]. The percentage of students who were eligible to receive free or reduced-price lunch was included in the model as a categorical variable; it was divided into tertiles based on our data distribution.

Statistical analysis

The SHPPS files for 2012 were merged with the YRBS files from 2013. The study had a total of 12 district data points. There were 27,786 unique student observations in this sample. Students who did not answer the soda consumption, sex, or grade question were excluded from the study, leaving an analytic sample of 25,241 students. Chi-square analyses were used to compare characteristics of those students who consume soda more than once per day and those who did not. The regression model included information on student-level characteristics and district-level characteristics. The student-level characteristics were derived from YRBS and included sex, grade, physical activity, TV time, computer and video game time, weight status, and race/ethnicity. District-level characteristics included each of the five policies derived from SHPPS, plus the percentage of students in the district eligible to receive free or reduced-price lunch. For the regression model the sample size was reduced to 23,196 students due to additional missing data on exposure variables and/or other covariates. Stata version 13 (College Station, TX: Stata Corp LP) was used to conduct all statistical analysis. The complex survey design and sampling weights used in the YRBSS were accounted for in all analyses.

Results

Table 1 provides summary statistics for the district policies. Across these 12 districts, most had adopted policies stating that high schools will teach about nutrition and dietary behavior and maintain closed campuses. While few of the districts required that schools restrict the distribution of promotional products and restrict the times SSBs can be sold, the majority recommended that schools implement such practices. In contrast, most districts neither required nor recommended that schools make healthful beverages available to students when other beverages are offered or sold. On average, districts had 3.77 policies out of 5 in place (data not shown). In addition, across the 12 districts, the percentage of students eligible to receive free or reduced-price lunch ranged from 39% to 77%, with an average of 64% (data not shown).

Characteristics of this study population can be found in Table 2, as well as the prevalence of regular soda consumption by characteristics of students. Overall, 18.4% of students drank regular soda at least once per day. In addition, 40.3% of students played video or computer games three or more hours per day while 39.5% participated in at least 60 minutes of physical activity per day. Almost two-thirds of the students were classified as normal weight, according to their body mass index percentile. Soda consumption significantly varied by all characteristics except participating in at least 60 minutes of physical activity per day.

Table 3 reports the adjusted odds ratios (AORs) for the logistic regression. Among districts with a policy that high schools offer healthful alternative beverages when other beverages are available, the odds of a student consuming regular soda one or more times per day were 25% lower than in districts without this requirement. Additionally, in districts that required or recommended that schools restrict promotional products, the odds of a student consuming regular soda one or more times per day were 16% lower than in districts that did not require or recommend this restriction. Students in districts that restricted the time when SSBs could be purchased had 28% lower odds of consuming soda than students in districts that did not require or recommend this restriction. District policies related to closed campuses or nutrition education were not significantly associated with students' regular soda consumption.

In terms of student characteristics, the odds of males consuming regular soda daily were 25% higher than females. The odds of consuming regular soda daily was higher for those students in 9th grade than those in 10th, 11th, or 12th grade. In addition, the odds of consuming regular soda daily were higher for black and Hispanic students compared to white students (AOR = 1.45 confidence interval = 1.25–1.69; AOR = 1.33 confidence interval = 1.14–1.52). On the other hand, the odds of Asian students consuming regular soda daily were 33% lower than white students. Students who participated in sedentary behaviors had higher odds of consuming regular soda daily than their peers who did not engage in these activities. Specifically, the odds of students who watched three or more hours of TV consuming regular soda one or more times per day were 89% higher than those who did not engage in this behavior. Students who played computer or video games three or more hours a day had 43% higher odds of consuming regular soda daily compared to students who did not participate in these activities.

Discussion

This study demonstrates that policies that decrease the exposure to SSBs and unhealthy marketing in school (e.g., promotional bans) were associated with lower odds of daily regular soda consumption. Schools are an important setting for providing students with access to nutritious foods and beverages and for building demand and preferences for these options [16,17]. Nevertheless, schools are just one environment where children and adolescents spend time. Physical and social environments (e.g., home and community settings [32], family, and friends), parenting styles, media influences including marketing, and individual characteristics all influence what adolescents eat and drink [16]. Consistent with this framework, our findings suggest that certain district policies and practices, individual demographic factors, and sedentary behaviors are all significantly associated with regular soda consumption. The findings on demographic characteristics, that males and African-Americans have higher odds of consuming regular soda daily, are consistent with previous studies addressing SSBs [33,34]. Stratified analyses by demographic subgroups would provide additional insights about the relationships between policies and consumption and present a future research direction.

Compared to the district-level policies, in the present study, individual behavior such as screen time (time spent watching TV and time spent playing computer and video games) had

stronger associations with higher regular soda consumption. Previous research has consistently shown positive associations between TV viewing time and consumption of soda and other SSBs in children and adolescents [13,34]. This study adds to the literature and aids in demonstrating a strong association between computer and video game time and soda consumption [8]. Although policies may be in place at the district level to impact the availability and promotion of SSBs at the school level, it is important to have strategies that also influence adolescents in the time they spend out of school.

Contrary to expectations, this study did not find that district requirements or recommendations that schools offer healthier beverages when other beverages are offered were associated with lower regular soda consumption among students. A recent study that assessed the impact of increasing water availability in school lunchroom found similar results, where an increase in availability did not result in a statistically significant decrease in reported numbers of SSBs [35]. Similarly, there was no difference in the odds of daily soda consumption between students in districts where nutrition education was and was not required.

These findings further support the notion that other factors including, taste, economics, convenience, health, and variety and not knowledge alone guide food and beverage selections in various settings [36].

Making healthier options more available at school is likely insufficient to decrease students' consumption of regular soda possibly due to consumption outside the school. The implementation of the Smart Snacks in School nutrition standards, as part of the Healthy Hunger-Free Kids Act, will increase the availability of healthier beverages in school nationwide, including but not limited to the availability of free drinking water during school meals [37]. The implementation of these standards will further restrict the sales of less healthy drinks. With the exception of flavored milk, SSBs cannot be sold in elementary and middle schools, and sales in high schools will be limited to no and low calorie options during the school day [23]. Over time, students may react to the ban by increasing SSB consumption in nonschool settings or by bringing soda or other SSBs to school, in which case the policy could have the unintended effect of increasing students' overall SSB consumption. However, following the implementation of a statewide ban on soft drinks in Connecticut schools, researchers did not find evidence of increased home soda purchases in households with school-aged children (ages 6–18 years) [38]. As more policies are put into place, it will be important to monitor the impact of these changes on consumption of regular soda and other SSBs through longitudinal studies. Additionally, future research should explore the impact of the number of policies in school districts on students' SSB intake.

Findings from this study suggest that policies that restrict the promotion of less healthful foods and beverages through the distribution of products (e.g., book covers) are associated with lower consumption of soda. This is one strategy to reduce exposure to marketing of less healthful foods and beverages. Fewer than one-fourth of districts nationwide have policies that address restricting the marketing of unhealthful items on school grounds [39]. However, proposed requirements for local school wellness policies would require school districts to include language in the district wellness policy that prohibits the marketing and promotion

of foods and beverages that do not meet or exceed the Smart Snacks in School nutrition standards [37]. Our findings suggest that such provisions may help decrease regular soda consumption among high school students.

This study is the first to link two surveillance systems, SHPPS and YRBS, which identify district-level policies and student-level characteristics from the same districts. This unique methodology enables us to determine the association between student behavior and district-level policies and practices by combining two data sources into one data set. In addition, the ability to include student-level characteristics aids in the ability to determine the relationship between district-level policies individually on student regular soda consumption behavior.

However, this study has several limitations. First, the policies that we examined were from 12 large urban school districts, and the implications and findings may not be transferrable to smaller districts or districts that are not similar in socioeconomic status characteristics to the ones included here. Similarly, this study only examined policies and student consumption at the high school level. It is unknown how these results might differ in elementary school and middle school settings, where these policies tend to be more restrictive [27]. Second, SHPPS relies on respondents' knowledge and perception of district policies rather than a review of the policies themselves; although a validity study conducted during a previous SHPPS cycle indicated an overall high level of data quality [40]. Third, we were unable to analyze some questions as a categorical variable that distinguished between stronger ("require") and weaker ("recommend") policy language due to the small sample of districts and related lack of power. Future research using a larger sample of districts could examine differences between policy strength (required vs. recommended) and students' behaviors. At the student level, only data on frequency of regular soda intake were available, so we could not address the consumption of other SSBs such as fruit drinks, sports drinks, and energy drinks. The YRBS question captures regular soda intake throughout the day, which prevents researchers from determining the settings where regular soda is being consumed. This limitation makes it difficult to assess how policies that influence access to soda during the school day are associated with in-school beverage consumption. Additionally, this is a cross-sectional study and causality between district policies and student-level characteristics cannot be implied. Future studies could examine the time and location of SSB consumption to determine how school policies are associated with in-school consumption. Finally, the number of policies present in the school environment may affect consumption of soda and other SSBs, future research could explore the impact of the number of policies on risky behavior.

In conclusion, findings from this study showed that some district-level policies have the potential to impact student consumption of regular soda. However, other factors such as TV viewing and video game/computer use may play a role as well. Because of the fact that regular soda intake has been associated with adverse health outcomes, students' consumption is of interest to public health practitioners and educators alike. These health conditions have the potential to impact academic outcomes. These findings add to a growing consensus that policies and practices around marketing of foods and beverages are needed in schools [16].

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IMPLICATIONS AND CONTRIBUTION

This study links the School Health Policies and Practices Study and Youth Risk Behavior Surveillance System. The resulting data set demonstrates that certain school district policies are significantly associated with the student consumption of regular soda.

Table 1

Variable names, question wording, and number and percentage of districts with each response option—12 large urban school districts, School Health Policies and Practices Study, 2012

Variable name	Question	No. of districts (%)
Nutrition education	Has your district adopted a policy stating that high schools will teach about nutrition and dietary behavior?	
	Yes	10 (83.3)
	No	2 (16.7)
Closed campus	Has your district adopted a policy stating that high schools will maintain closed campuses, meaning that students are not allowed to leave school during the school day, including during lunchtime?	
	Yes	8 (66.7)
	No	4 (33.3)
Restrict sale of beverages	Does your district require or recommend that schools restrict the times during the day that soda pop, sports drinks, or fruit drinks that are not 100% juice can be sold in any venue?	
	Require	1 (8.3)
	Recommend	9 (75.0)
	Neither	2 (16.7)
Restrict promotional products	Does your district require or recommend that schools restrict the distribution of products promoting candy, fast food restaurants, or soft drinks to students, for example t-shirts, hats, or book covers?	
	Require	1 (8.3)
	Recommend	7 (58.3)
	Neither	4 (33.3)
Offer healthful alternatives	Does your district require or recommend that schools make healthful beverages such as plain water or low-fat milk available to students whenever other beverages are offered or sold, for example at student parties or in school stores?	
	Require	1 (8.3)
	Recommend	3 (25.0)
	Neither	8 (66.7)

Table 2

Characteristics of high school students and associations between characteristics and regular soda consumption — 12 large urban school districts, Youth Risk Behavior Surveillance System, 2013[a]

Characteristic	Overall respondents (%)[b]	By regular soda consumption		
		≥1 time/day (%)[c]	<1 time/day (%)[c]	*p* value[d]
Observations	25,241 (100)	4,472 (18.4)	20,679 (81.6)	
Sex (n = 25,241)				<.001
Female	13,315 (50.0)	2,184 (20.0)	11,131 (80.0)	
Male	11,926 (50.0)	2,288 (16.7)	9,638 (83.3)	
Grade (n = 25,241)				<.01
9	6,659 (27.8)	1,316 (20.5)	5,343 (79.5)	
10	6,527 (26.4)	1,173 (17.9)	5,354 (82.1)	
11	6,179 (23.1)	1,006 (17.6)	5,173 (82.4)	
12	5,876 (22.7)	997 (17.1)	4,899 (82.9)	
Race/ethnicity (n = 25,241)				<.001
White, non-Hispanic	4,060 (14.4)	531 (14.3)	3,529 (85.7)	
Black, non-Hispanic	6,139 (26.8)	1,426 (22.2)	4,713 (77.8)	
Hispanic	9,791 (46.8)	1,878 (19.1)	7,913 (80.8)	
Asian, non-Hispanic	2,980 (9.1)	238 (9.5)	2,742 (90.5)	
Other, non-Hispanic	1,551 (2.9)	259 (18.6)	1,292 (81.4)	
Weight status (n = 25,241)				<.01
Underweight	853 (3.3)	166 (19.3)	687 (80.7)	
Normal weight	15,958 (62.3)	2,698 (17.8)	13,260 (82.2)	
Overweight	3,544 (14.4)	680 (18.2)	2,914 (81.8)	
Obese	4,886 (20.0)	978 (20.2)	3,908 (79.8)	
Participate in at least 60 minutes of physical activity per day (n = 24,373)				.12
Yes	9,379 (39.5)	2,590 (19.0)	7,691 (81.0)	
No	14,994 (60.6)	1,688 (17.8)	12,404 (82.2)	
Watch 3 or more hours of TV per day (n = 24,308)				<.001
Yes	7,750 (33.2)	2,250 (26.3)	5,735 (73.7)	
No	16,558 (66.8)	2,015 (14.3)	14,308 (85.7)	
Use computers 3 or more hours per day (n = 24,187)				<.001
Yes	9,615 (40.3)	2,140 (22.5)	7,512 (77.5)	
No	14,572 (59.7)	2,103 (15.4)	12,432 (84.6)	

[a] Unweighted sample sizes and weighted percentages are presented. Weighted percentages may not total 100 due to rounding.

[b] Column percentages are presented.

[c] Row percentages are presented.

[d] Chi-square tests were used for each variable to examine differences across categories.

Table 3

Adjusted odds ratios of district-level policies and student characteristics on daily regular soda consumption among high school students—12 large urban school districts, 2013

Characteristic	AOR (95% CI)[a]
Nutrition education	
Yes	1.11 (.93–1.33)
No	Referent
Closed campus	
Yes	1.23 (1.02–1.48)
No	Referent
Offer healthful alternatives	
Recommend/require	.76 (.63–.91)
Neither	Referent
Restrict promotional products	
Recommend/require	.84 (.71–1.00)
Neither	Referent
Restrict sale of beverages	
Recommend/require	.72 (.56–.93)
Neither	Referent
Percent of students eligible to receive free and reduced-price lunch	
1st tertile	Referent
2nd tertile	1.14 (.94–1.40)
3rd tertile	.85 (.72–1.00)
Sex	
Female	Referent
Male	1.25 (1.16–1.35)
Grade	
9	Referent
10	.88 (.77–1.00)
11	.87 (.74–1.02)
12	.85 (.74–.98)
Race/ethnicity	
White, non-Hispanic	Referent
Black, non-Hispanic	1.46 (1.23–1.72)
Hispanic	1.31 (1.13–1.53)
Asian, non-Hispanic	.67 (.52–.88)
Other, non-Hispanic	1.31 (.99–1.72)
Weight status	
Underweight	1.26 (1.00–1.58)
Normal weight	Referent
Overweight	.98 (.85–1.12)
Obese	1.04 (.93–1.17)

Characteristic	AOR (95% CI)[a]
Participate in at least 60 minutes of physical activity per day	
Yes	1.06 (.94–1.19)
No	Referent
Watch 3 or more hours of TV per day	
Yes	1.89 (1.70–2.09)
No	Referent
Use computers 3 or more hours per day	
Yes	1.43 (1.29–1.59)
No	Referent
Observations	23,196

AOR = adjusted odds ratio; CI = confidence interval.

[a]The logistic regression model included all five policy variables, district-level participation in free and reduced-price lunch, and student-level characteristics.