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Original article

District Policies and Practices Vary in Their Association With Adolescents' Consumption of Milk and 100% Fruit Juice

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A B S T R A C T

Purpose: Researchers previously examined the relationship between school beverage policies and sugar-sweetened beverage (SSB) consumption. This study addressed a research gap by examining cross-sectional associations between district-level policies and practices and U.S. high school students' consumption of milk and 100% fruit juice.

Methods: Data from the 2012 School Health Policies and Practices Study and 2013 Youth Risk Behavior Surveillance System were linked for 12 large urban school districts. Outcome variables were daily milk consumption (≥1 glass/day) and 100% fruit juice consumption (≥1 time/day). Exposure variables were five district policies (i.e., restrict SSB sales, maintain closed campuses, offer/sell healthful alternatives, restrict promotional products, and require nutrition education). Logistic regression models estimated the odds of consuming milk or 100% fruit juice daily, conditional on the policies and adjusting for sex, race/ethnicity, grade level, weight status, and district free/reduced-price lunch eligibility (n = 23,173).

Results: Students in districts that required/recommended restricting the times of SSB sales had 55% higher (adjusted odds ratio [AOR], 1.55; 95% confidence interval [CI], 1.28–1.87) odds of consuming ≥1 glass/day of milk than students in districts without this policy. Closed campus policies were associated with lower odds of consuming milk (AOR, .72; 95% CI, .63–.82) and higher odds of consuming juice (AOR, 1.27; 95% CI, 1.07–1.50). Policies requiring/recommending that districts offer/sell healthful alternatives were associated with lower odds of consuming 100% fruit juice daily.

Conclusions: Results suggest that restricting SSB sales may support adolescents' milk consumption. Future studies should assess whether the implementation of federal standards that further restrict SSB sales in school leads to increased milk consumption.

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IMPLICATIONS AND CONTRIBUTION

By considering the relationship between district policies and practices and students' consumption of SSB alternatives, milk and 100% juice, this study contributes new information. Restrictions on SSB sales were associated with greater milk consumption. Such polices have the potential to enhance students' diet quality by influencing beverage selection and consumption.

Schools are an important setting for influencing children's eating behaviors through policy and environmental approaches [1–3]. The school nutrition environment is inclusive of foods and beverages sold and served throughout the school day and messages about foods and beverages communicated through marketing and nutrition education [3]. The Healthy Hunger Free Kids Act (HHFKA) mandates nutrition standards for school meals

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Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily reflect the official position of the Centers for Disease Control and Prevention.

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(i.e., National School Lunch and School Breakfast Programs) and competitive foods (i.e., foods sold during the school day, on the school campus, outside school meals programs) [4,5]. The implementation of these standards (beginning in school year 2012–2013 for school lunch, 2013–2014 for school breakfast, and 2014–2015 for competitive foods) is expected to further restrict the sale of sugar-sweetened beverages (SSBs) in school settings [4,5]. The potential impact is broad: children spend many of their waking hours in school, and over 30 million students participate in the National School Lunch program each day [6]. Data from states and districts with policies that address the availability and sales of SSBs can yield relevant insights in advance of published evaluations of HHFKA.

Research describing the relationship between state- and district-level beverage policies and student-level beverage consumption has primarily evaluated the extent to which these policies contribute to lower SSB availability and consumption [7–9]. Studies have consistently found lower school-based access to SSBs in states and districts with policies that restricted the sales of such beverages [7]. This shift in availability may contribute to greater consumption of other beverages sold in schools. For example, significant increases in middle school students' milk consumption were documented following the introduction of the Texas State Nutrition Policy [10]. Alternately, students may react to restrictions on a palatable choice, such as SSBs, by consuming more of the "forbidden" item in other settings [11,12]. In this scenario, one would not expect to see greater consumption of milk or 100% fruit juice when SSBs are restricted. Researchers did not find evidence of such compensation following the implementation of nutrition standards that allowed only water and 100% fruit juice to be sold as competitive beverages in three middle schools in Connecticut [13]. In fact, after the beverage restrictions went into place, students' in-school consumption of restricted beverages declined and, in contrast to the students in comparison schools, at-home SSB consumption did not increase [13].

Another relevant question is whether policies that restrict the sales of SSBs are associated with greater consumption of other beverages sold in schools, such as milk or 100% fruit juice. These beverages can be included as part of a school breakfast or lunch that meets the HHFKA standards and, for these reasons, are likely to become more salient choices as SSBs become less available. Describing the relationship between policies and practices that address beverage sales and students' consumption of milk and juice contributes to a more complete picture of how these policy and environmental factors can influence dietary intake.

The physical environment, which influences access to food, and the messaging environment, which influences demand for food, are among determinants of eating behaviors [2,14].

Accordingly, policies that impact students' access to food and beverages and their exposure to advertising may influence beverage intake. Previous research has shown that students in schools with closed campus policies consumed food from fast food restaurants and convenience stores less frequently than students who could leave campus at lunchtime [15]. Furthermore, some research has shown that fast food consumption is inversely associated with dairy consumption among adolescents [16]. By closing campuses, districts may help reduce students' access to less healthy foods and beverages and may contribute to greater consumption of beverages sold in schools, including milk and 100% juice. Policies that limit advertising of soft drinks and fast food restaurants or provide opportunities for students to learn about nutrition may increase demand for and consumption of milk and 100% fruit juice [8]. A focus on these beverages is relevant given their presence in school settings and potential impact on diet quality.

In children's diets, milk is a major source of calcium and vitamins A and D [17], which are underconsumed nutrients [18]. The 2015–2020 Dietary Guidelines for Americans note that a healthy diet can include fruit juice when consumed within recommended amounts [18]. The American Academy of Pediatrics committee on nutrition recommends that adolescents consume no more than 12 ounces of 100% fruit juice a day [19]. Average juice consumption falls within these limits [18]; however, greater consumption of 100% fruit juice is a possible unintended consequence of restricted access to SSBs if students seeking a sweet beverage drink more juice. Consumption in excess of American Academy of Pediatrics recommendations would be cause for concern as 100% fruit juice offers no benefits over whole fruit and contains no dietary fiber, another shortfall nutrient [19,20].

This cross-sectional study describes the relationship between district-level policies and practices related to the availability, sale, and promotion of soft drinks and the consumption of milk and 100% juice among U.S. high school students in large urban school districts. We hypothesize that these policies and practices will be positively associated with the consumption of milk and 100% juice.

Methods

Sample and survey administration

Data on district-level policies were obtained from the 2012 School Health Policies and Practices Study (SHPPS). SHPPS is a nationally representative cross-sectional study conducted periodically by the Centers for Disease Control and Prevention (CDC) among a representative sample of public school districts in the United States. In addition to the national sample, school districts funded by the CDC at the time of the study also were included in the sample with certainty, resulting in data from each of these districts. This cross-sectional study analyzed 2012 SHPPS data from the 12 CDC-funded districts that also had district-representative student-level data in the 2013 Youth Risk Behavior Surveillance System (YRBSS), as described later.

SHPPS collected data through standardized questionnaires that were administered through Web-based surveys or self-administered paper copies. During recruitment, the superintendent or other district-level contact designated a respondent for each questionnaire that had primary responsibility for or was 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. An institutional review board at CDC reviewed SHPPS and determined it to be exempt. More detailed descriptions of the methods used in SHPPS 2012 are published elsewhere [21].

Student-level data were obtained from Youth Risk Behavior Surveys (YRBSs) conducted in 2013 among representative samples of high school students in large urban school districts funded by CDC that survey year. In each participating district, a two-stage sample design was used to produce a representative sample of students in grades 9 through 12 who attended public high schools in that district.

Student participation in the survey was anonymous and voluntary, and local institutional review board procedures