

Salud America!

The Robert Wood Johnson Foundation Research
Network to Prevent Obesity Among Latino Children



RESEARCH REVIEW
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Making a Healthy School Environment the Norm for Latino Kids

Abstract

Healthy school environments are paramount for the healthy development of Latino children, given the rising percentage of Latino students enrolled in public schools, the higher rates of obesity among Latino children than other racial/ethnic groups and that students consume up to half their daily calories at school. These health disparities warrant attention to all possible contributors to these elevated obesity rates, including access to unhealthy competitive foods in schools and higher rates of physical inactivity in the Latino youth population.

Access to unhealthy competitive foods and beverages in schools (those sold outside of federally regulated meal programs in vending machines and a la carte lines) has a disproportionately negative impact on the health of Latino students, and schools with

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a higher proportion of Latino students tend to have weaker policies regarding access to competitive foods in schools. In addition, Latino students engage in less physical activity both in and out of school compared to their peers. Increasing physical activity is a vital part of preventing overweight and obesity among Latino children in the United States, yet several factors decrease opportunities for physical activity in this population.

Implementing and enforcing stronger nutrition standards for competitive foods and beverages will help all students have access to healthier snacks at school, which may positively influence body mass index (BMI) trends for all populations, especially those at greatest risk of being overweight or obese. Access to and safety of physical activity sites in Latino communities, school policies, Latino parenting styles, and levels of acculturation all have been shown to make physical activity more difficult. Implementing programs that address these barriers may increase opportunities for physical activity among Latino children.

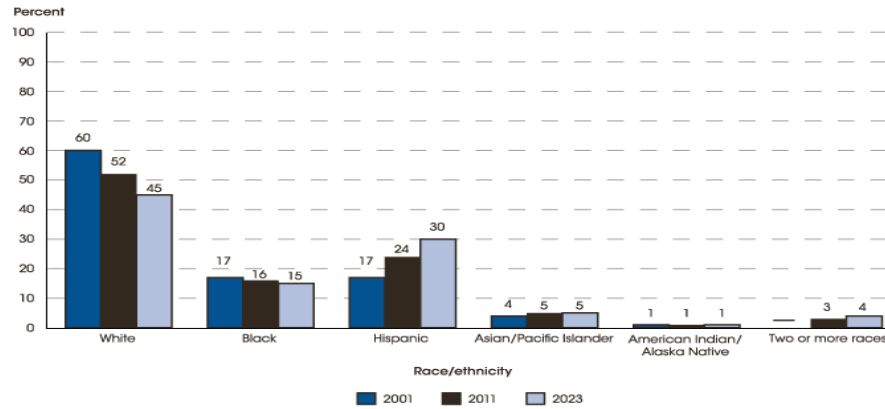
This review assesses current evidence on access to competitive foods in schools and its impact on childhood obesity among Latino students, and summarizes the current evidence on barriers to and supports for physical activity among Latino children.

Introduction

Obesity is a nationwide problem in the United States, and Latino children and adolescents are especially at risk. Nearly 40 percent of U.S. Latino youths ages 2-19 are overweight or obese, compared to 28.5 percent of non-Latino white youths, according to a recent estimate.¹ Among children ages 2-5, 29.8 percent of Latino children are overweight or obese; this compares to about 21 percent of non-Latino white children of the same age. The prevalence of obesity among Latino children and adolescents is of great concern given the multiple adverse physical and mental health issues related to obesity, including cardiovascular disease, asthma, type 2 diabetes, liver disease, sleep apnea, and psychological stress, among others.² As children who are obese are more likely to be obese as adults,² childhood represents an important developmental stage for preventing and/or reducing obesity.

From 2001 through 2011, the number of Latino students enrolled in U.S. public schools increased from 8.2 million students (17% of all students) to 11.8 million (24%).³ In contrast, the number of white students enrolled during this period decreased from 28.7 million students (60% of all students) to 25.6 million (52%). The percentage of Latino students enrolled in public schools is expected to continue to rise, reaching an estimated 30 percent in 2023 (Figure 1).

Figure 1. Percentage distribution of U.S. public school students enrolled in prekindergarten through 12th grade, by race/ethnicity: Selected years, fall 2001, fall 2011, and fall 2023



— Data not available.
 NOTE: Race categories exclude persons of Hispanic ethnicity. Prior to 2008, separate data on students of two or more races were not collected. Detail may not sum to totals because of rounding. Data for 2023 are projected.
 SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State Nonfiscal Survey of Public Elementary and Secondary Education," 2001–02 and 2011–12. See *Digest of Education Statistics 2013*, table 203.50.

Because many U.S. students, including Latino children and adolescents, consume up to half their daily calories at school,⁴ foods and beverages available in schools have the potential to influence students’ diets and weight. Competitive foods, sold through à la carte lines in the cafeteria, vending machines, school stores, snack bars, and other venues,^{5,6} are often high in fat, calories, sugar and/or salt, and offer little nutritional value.⁴

Key findings from a 2012 health impact assessment (HIA) indicated that a national competitive foods policy may support a healthy weight and reduced risk of overweight or obesity among Latino students. Based on a review of available evidence, the authors concluded that implementation of strong nutrition standards would benefit vulnerable populations, including Latino students, who are often more likely to have weight-related health issues.⁴

As required by the Healthy, Hunger-Free Kids Act of 2010, the U.S. Department of Agriculture updated nutrition standards for the National School Lunch Program and School Breakfast Program at the beginning of the 2012-13 school year. In January 2013, USDA proposed updated nutrition standards for competitive foods and beverages—the first in more than 30 years.⁷ All schools participating in the federal school meal programs were required to implement updated competitive food nutrition standards (often referred to as the Smart Snacks in School program) beginning in the 2014-2015 school year.

In January 2015, the USDA proposed a rule (based on the Dietary Guidelines for Americans and recommendations from the Institute of Medicine and mandated by the Healthy, Hunger-Free Kids Act) to improve nutrition standards for meals provided through its Child and Adult Care Food Program (CACFP).⁸ The proposal introduces science-based nutrition standards for meals dispensed through the program, which provides meals for child, adolescent, and adult attendees of daycare centers, Head

In 2015, the USDA proposed guidelines to improve nutrition standards for meals provided to Head Start centers and after-school programs through the Child and Adult Care Food Program (CACFP).

Start programs, emergency shelters, and after-school programs throughout the United States. When finalized, the proposed rule would mark the first significant change to the CACFP since 1968.^{8,9}

Physical activity is also an important factor in obesity prevention, and has been found to provide other benefits associated with physical and cognitive growth and development, including improved overall health and academic performance.^{10–15} According to current guidelines from the United States Department of Health and Human Services, children should participate in at least 60 minutes of moderate-intensity physical activity per day.¹⁶ Studies suggest that Latino children are less likely to meet the recommendations for daily physical activity and are more likely to engage in sedentary behaviors than White children.^{17–19} Current literature suggests that many factors may be associated with lower levels of physical activity among Latino children, and addressing these factors may lead to higher levels of physical activity.¹¹

This review assesses current evidence (2008-present) on access to competitive foods in schools and its impact on childhood obesity among Latino students and summarizes the current evidence on barriers to and supports for physical activity among Latino children, as well as potential strategies for increasing their physical activity levels during school.

Methodology

This comprehensive research review summarizes scientific literature (as well as the gray literature) regarding the influence of access to competitive foods in daycare centers, preschools, and K-12 schools on nutrition, overweight, and obesity among Latino children and adolescents ages 2-19; and identifies literature relevant to increasing physical activity among Latino children (defined as individuals younger than 18) in school and school-based before- or after-school programs.

Keyword searches were conducted in PubMed and Google Scholar. Databases were searched with key terms such as: “competitive food AND Latino childhood obesity,” “competitive food in school AND obesity AND Hispanic,” “competitive food AND childhood obesity,” “competitive food in school AND BMI, overweight preschool AND Hispanic,” “competitive food in school AND access,” “child care AND obesity and Hispanic,” “child care AND food policy AND Hispanic,” “USDA ‘smart snacks in school’ AND Hispanic,” “preschool AND food policy AND Hispanic,” “school sports AND Hispanic,” “school physical activity AND Hispanic,” “school recess AND Hispanic,” “health policy AND schools AND Hispanic,” and “local wellness policy AND Hispanic;” we also searched combinations of the following keywords and Medical Subject Headings (MeSH) terms: community, neighborhood, physical activity, youth, Latino, “Hispanic Americans”[MeSH], “Mexican Americans”[MeSH], “Child”[MeSH], “Adolescent”[MeSH], “Overweight”[MeSH], “Obesity”[MeSH], “Pediatric Obesity”[MeSH], “Obesity, Morbid”[MeSH], “Motor Activity”[MeSH], “Play and Playthings”[MeSH], “Recreation”[MeSH],

“Schools”[MeSH], “Community-Based Participatory Research”[MeSH], “Community Networks”[MeSH], “Community Health Planning”[MeSH], “Policy”[MeSH], “Public Policy”[MeSH], “Policy Making”[MeSH], “Health Policy”[MeSH].

Article titles and abstracts were examined, and relevant articles were retrieved, including those that were contradictory. Additional articles were identified through searches of the references of the initial set of publications found through keyword searches, and additional sources of evidence include reports from governmental agencies and other relevant stakeholders and peer-reviewed, published studies and review articles. The literature identified for this review is comprised primarily of survey-based research (interviews and questionnaires) and non-comparative studies. To be included, the studies must have stated in the study abstract and/or methods that ethnicity was considered in the analysis or must have included a high proportion (greater than 30%) of Latino students in the study population. Search limits were confined to the English language.

Key Research Results

- Latino students have greater access to certain types of competitive food venues than students of other ethnicities.
- Latino students are more likely than non-Latino White students to purchase and consume unhealthy competitive foods and beverages in schools.
- Unhealthy food venues near schools are highly prevalent in the Latino community, the availability of which is associated with high rates of childhood obesity.
- Schools with a higher proportion of Latino students tend to have weaker policies regarding access to competitive foods in schools, and may be less likely to implement nutritional guidelines for competitive foods.
- Policies that reduce access to competitive foods in schools are likely to reduce Latino students’ consumption of unhealthy foods and drinks during the school day, potentially lowering their intake of empty calories. However, such policies do not necessarily improve students’ overall nutrient intake.
- Strong policies for competitive foods in schools have the potential to improve the BMI status among Latino students.
- Latino children have few options for physical activity during the school day. Increasing opportunities for physical activity at school by implementing structured programs that engage children in physical activity may increase overall activity levels and improve obesity-related outcomes among Latino children, though currently, school compliance with physical activity policies is low.
- Latino students engage in less physical activity during school hours and are less likely to participate in team sports or after school activities at school than their peers.
- Schools with larger minority populations, including Latino students, are often located near heavily-trafficked roads, leading to an increase in motor vehicle transportation to and from school.

Studies Supporting Key Research Results

Latino students have greater access to unhealthy competitive food venues than students of other ethnicities.

Two national studies suggest ethnic disparities regarding access to specific types of competitive food venues. The first study, using data collected in spring 2005 as part of the third School Nutrition and Dietary Assessment (SNDA III), included a nationally representative sample of 395 U.S. public schools and found that Latino high-school students had greater access to brand-name fast foods in schools than their black or White peers.²⁰ This same study found no differences in access to healthy foods based on student ethnicity or socioeconomic status.

The second study, an updated report of the National Secondary School Survey, a comprehensive study including a nationally representative sample of more than 700 public schools, found that in 2010, Latino middle-school students had significantly greater access to school stores or snack bars/carts than White or black students.⁵ These two studies support other data showing that Latino students have greater access to certain competitive food venues, such as à la carte lunch items, and as a result, less access to healthier options.⁴

Latino students are more likely to purchase and consume unhealthy competitive foods and beverages in schools when available.

Two cross-sectional studies showed that Latino students were at least twice as likely as non-Hispanic White students to purchase from a vending machine selling sugar-sweetened beverages (SSBs) and snacks, when available.^{21,22} While the link between vending machine use among middle-school students and increased SSB consumption had previously been established,²³ these studies contribute to the body of evidence that unrestricted access to vending machines may influence purchasing behaviors and dietary practices of Latino students.

According to Thompson et al.²², the majority of non-Latino Whites did not purchase a food or drink from a vending machine, while the majority of students of other races or ethnicities reported purchasing from a vending machine on one or more days during the week. These results are based on cross-sectional, nationally representative, population-level YouthStyles 2005 survey data (collected July-August 2005) that included 869 public school children and adolescents who had access to a school vending machine, of which 20.5 percent were grouped as “Hispanic or other” ethnicity. Specifically, compared to non-Latino Whites, participants who were “Hispanic or other” were twice as likely to purchase sodas or other snack food such as chips, chocolate bars, or cookies from a vending machine 1 or more days per week. Respondents who reported frequent vending machine purchases were also more likely to have unrestricted access to vending machines and to report additional unhealthy dietary practices, such as consuming soda on a regular basis and purchasing pizza or fried food from the cafeteria 1 or more days per week.²²

A cross-sectional analysis by Park et al. was based on the 2003 Florida Youth Physical Activity and Nutrition Survey that included a statewide representative sample of 4,322 students from 73 Florida public middle schools, of which 21 percent were Latino. This study found that, compared to non-Latino White students, when vending machines were available, Latino students were 2.2 times more likely to buy snacks or beverages from vending machines 2 or more days during the previous 5 days instead of buying lunch. The most commonly purchased vending machine items were chips, pretzels/crackers, candy bars, soda, and sport drinks. This likelihood was even higher among Latino students who reported smoking cigarettes 1 or more days in the past 30 days. The primary factor influencing purchasing behavior was the presence of beverage vending machines on school property—students attending schools with beverage vending machines were 3.5 times more likely to buy snacks and beverages for lunch. Additionally, among Latino students who purchased lunch from vending machines, 72 percent reported buying both less-healthy snack and beverage options.²¹

Two other studies support and extend these findings relating increased competitive food purchasing to poor dietary behaviors observed among Latino students. According to a cross-sectional study including a nationally representative sample of 287 public schools and 2,314 children and adolescents (22% Latino) in grades 1-12 from SNDA III, Latino high school students consumed 47 calories more during the school day from low-nutrient, energy-dense foods than their non-Latino White peers, independent of household income. Authors indicate that reducing access to unhealthy competitive foods could specifically help Latino youth groups at high risk of obesity.²⁴

Additionally, a state-level study including a majority-Latino (60%) population of 5,365 seventh- and ninth-graders at 19 schools in multiethnic, low-income California communities found that students consumed more unhealthy foods at school and also purchased and consumed unhealthy competitive food items if available, independent of whether they participated in the school lunch program. The authors concluded that, in general, students consider it important to be able to purchase healthy foods, such as fresh fruits and vegetables, at school, but do not perceive their school food environment to be healthy and consume more unhealthy foods at school.²⁵

Unhealthy food venues near schools are highly prevalent in the Latino community, the availability of which is associated with high rates of childhood obesity.

Studies have previously demonstrated that the availability of unhealthy food venues near schools is associated with higher rates of childhood overweight.^{26,27} In an analysis of 100,000 students who participated in the California Healthy Kids Survey, researchers found that when school proximity to fast-food restaurants increased, so did both Latino and black students' BMI. The study results also indicated an association between BMI and the proximity of fast-food outlets to schools among Latino students attending lower-income schools, regardless of whether the schools

Students attending schools with beverage vending machines were 3.5 times more likely to buy snacks for lunch...Among Latino students, 72% reported buying less healthy snack & beverage products.

were urban or nonurban. To illustrate the significance of these results, the authors compared the effects of the distance between schools and fast-food outlets on BMI to the effects of exercise on BMI, and found that, for Latino students, the presence of a fast-food restaurant one mile nearer to school may negate the positive effects of as many as three days of exercise per week.²⁸

For instance, a national study including all (31,622) U.S. public middle and high schools found that Latino students were more likely to attend schools whose surrounding food environments included convenience stores, fast-food restaurants, snack stores or liquor stores. The authors concluded that this easy access to snacks, sodas, and fast food in the immediate vicinity of a school could negate positive school food policies, especially among students who can leave campus.²⁹

In exploring the competitive food environment in proximity to schools attended by Latino students, Tester and colleagues (2010) found mobile food vendors to be highly prevalent in the predominantly Latino community of Oakland, Calif. An average of five vendors were within a quarter-mile walk of each of the six schools on any given observation period. Over half of the transactions were performed by children only, and the majority of these purchases were at ice cream trucks or paleteros (ice cream pushcart vendors).³⁰

A qualitative case study of students at a diverse California middle school identified several factors that influence students' unhealthy food choices. The selected school belonged to a district with a strong competitive food policy that banned the sale of sodas and junk food in schools, though the school was located in close proximity to fast food restaurants and convenience stores. In the study, the middle school held a "Detox Month," during which teachers and administrators encouraged students to replace junk food with more healthful options, such as water, fruits, and vegetables. Latino, black, and Asian-American students responded to questions before, during, and after Detox Month, allowing the researchers insight into why students make certain food choices. Many of the students complained about the school lunch and skipped it altogether, leaving them hungry in the afternoon. Corner stores near the school offered inexpensive, convenient, and largely unhealthy food options for hungry students walking home from school. "Hot chips" were a particularly tempting food option, as students described them as cheap and "addicting," and indicated a peer-related influence, as they found hot chips more difficult to resist when they saw friends and classmates eating them. This peer influence, however, was also noted to have a temporarily positive effect during Detox Month, when teachers noticed students encouraging one another to avoid junk foods and beverages.³¹

Among all elementary school students, students consumed more calories per school day from low-nutrient, energy-dense food items even in schools without vending machines and snack bars, suggesting that elementary school children bring these items from home. The study authors did not report any association between ethnicity and SSB/unhealthy snack consumption among elementary school students.²⁴

Schools with a higher proportion of Latino students tend to have less effective policies regarding competitive foods in schools, and may be less likely to implement nutritional guidelines for competitive foods.

While most school districts have a policy that addresses competitive foods, results from several studies suggest that the policies at schools with more Latino students are generally less effective and many schools have not implemented them.³²⁻³⁴ For instance, a longitudinal analysis conducted between 2001 and 2008 examined the BMI of 6,300 racially and socioeconomically diverse students from 40 states that set standards for competitive foods.³³ Law strength and consistency were identified as two key factors affecting the law's positive influence on student BMI. States with a relatively high proportion of Latino students were more likely to have weak laws in 2003—laws that contained weak language or nonspecific standards—and, in turn, were less likely to have a positive impact on BMI than states with strong laws in 2003.³³

A cross-sectional study conducted by the same author and using student data from the same cohort found that students reported lower in-school SSB access and purchasing only when schools restrict all SSBs. Policies that restrict only soda, but allow sports drinks and other SSBs, had no impact on SSBs access or purchasing. According to this study, states with weaker policies that restrict only soda had higher proportions of Latino students (33%) than states that restrict all SSBs (11% Latino).³⁴

The Healthy Schools Program of the Alliance for a Healthier Generation provides support for schools making a variety of healthy changes, including providing healthier competitive foods. Based on survey data collected from a nationally representative sample of elementary schools between 2006 and 2010, awareness of the Alliance's food and beverage guidelines among school administrators significantly increased, and nearly one-third of the schools that sold competitive foods had implemented or were in the process of implementing the guidelines. However, schools with a majority of Latino students were less likely to implement the beverage guidelines.³²

Soft drinks have been marketed and available in U.S. schools for years. A study that examined the degree of penetration by soft drink bottlers into schools found that the majority of high-school students had soft drinks available to them in school vending machines (88%) and in the school cafeteria (59%); and that most students in middle and high school were in schools that had a contract with a bottler, although related revenues to schools are quite modest. The study also found that Latino youth were most likely to have soft drinks available to them throughout the day, and the socio-economic status of the students correlated negatively with whether advertising and promotion of soft drinks was allowed by their school.³⁵ These concerns may be mitigated as the USDA "Smart Snacks" initiative is extended to set standards for food and beverage marketing in schools. The Healthy, Hunger-Free Kids Act of 2010 requires the USDA to establish nutrition standards for all foods sold in schools, beyond the foods available through the federally supported school meals program.³⁶ More recently, the USDA proposed an additional regulation to ensure that any food

States with weak policies on SSBs had a higher proportion of Latino students (33%) than states that restricted sales of all SSBs in schools (11% Latino).

or beverage marketing in schools be consistent with nutrition standards for Smart Snacks under the Healthy, Hunger-Free Kids Act.⁷

Policies that reduce access to competitive foods in schools are likely to reduce Latino students' consumption of unhealthy foods and drinks during the school day, potentially lowering their intake of empty calories. However, such policies do not necessarily improve students' overall nutrient intake.

Two studies directly assessed the impact of California's statewide policies, effective since 2007, which established strict nutrition standards for competitive foods sold in schools.^{37,38} Approximately one-third of the California population is Latino. The first study measured pre- and post-legislation food and beverage availability, sales, and student consumption at 99 California schools. Overall, the study found that, after legislation: the availability of foods and beverages compliant with the standards increased; the availability of noncompliant items (e.g., SSBs, chips, candy) decreased; and, as measured by student survey responses, at-school consumption of some noncompliant foods dropped, while at-home consumption of selected noncompliant foods remained stable. This study did not include a Latino-only analysis.³⁸

However, a study of an ethnically diverse subpopulation of majority-Latino (65%) seventh- and ninth-graders across several schools noted a significant post-legislation decrease in the consumption of both soda and vegetables (not including French fries) at school, and significantly more students reported drinking water at school. While the regulation of competitive foods improved school environments, observed improvements in student nutritional intake were limited, likely because, while snacks that meet the new nutrition standards are lower in fat and sugar, they are not always more nutritionally dense. The authors suggested that decreased consumption of certain healthy foods, such as the reported decline in vegetable consumption, may indicate that schools are focused on complying with nutrition standards rather than providing fresh, healthy options that are appealing to students.³⁸

A 2012 study by Taber et al. used 24-hour recall data to analyze the nutrient intake of 680 high-school students and found that a majority-Latino (77%) population of California students consumed less fat and sugar, and an average of 158 fewer calories per day than students in 14 other states (in which 15% of students were Latino) that did not regulate competitive food nutrition content. These results remained consistent when the researchers restricted the analysis to only Latino students.³⁷

Another study involving a large, diverse population of public high-school students in Boston, where 39 percent of the study body is Latino, was the first to evaluate whether policies banning SSBs in schools would change adolescents' overall consumption of SSBs. Based on a total of 2,033 survey responses from 2004 and 2006, Boston high-school students reported a significant decrease in daily consumption of SSBs both in-school and out-of-school, from 1.71 servings in 2004 to 1.38 servings in 2006, equating to a reduction of 45 kcal per day. By comparison, national results, including approximately 12 percent Mexican-American adolescents,

When SSBs were removed, students from a 39% Latino high school in Boston consumed fewer SSB servings and calories.

indicated no significant change in adolescent consumption of SSBs during the same timeframe. Despite the lack of a Latino-only analysis, these findings support the trend that implementing policies that restrict the sale of SSBs in schools may be a promising strategy to reduce Latino adolescents' intake of unnecessary calories.^{39,40}

A retrospective study of data from the Monitoring the Future and Youth, Education, and Society studies aimed to determine how many middle- and high-school students attended schools with competitive food standards in place, whether these standards were linked to overweight and obesity, and whether individual standards could be linked to higher rates of overweight/obesity within specific sociodemographic groups. The study included 8th, 10th, and 12th grade students from the 2008-2009 school year to the 2011-2012 school year; these students attended schools with one or more of five nutritional standards in place. These standards included no SSBs, no whole milk or 2% milk, no candy or full-fat snacks, and no french fries (all of which are required under USDA standards), as well as policies to ensure the availability of fruits and vegetables (which is recommended but not required). The study found that, for Latino middle school students, the lack of SSBs in schools was associated with significantly reduced odds of overweight/obesity in both Latino-only models and models including White/no SSB interactions. Interestingly, this effect did not hold for White middle school students, thus supporting a disproportionate influence of access to SSBs on the BMI of Latino students.⁴¹

Strong policies for competitive foods in schools have the potential to improve the BMI status among Latino students.

Several cross-sectional studies have suggested that strong and comprehensive competitive food policies that are consistently enforced across grade levels and across venues may reduce overweight and obesity trends among Latino children and adolescents.^{4,33,42,43} According to these studies, “strong” policies are those that include language requiring competitive foods to meet specific nutrition standards, rather than including recommended standards or references to “healthy” foods, and “comprehensive” policies are those that include not only changes to food items offered, but also address other areas such as fundraisers, nutrition education, and physical activity.

A California-based study identified a potential correlation between strong policies limiting access to competitive foods and improvements in overall overweight trends among student populations with a high proportion of Latino children and adolescents. In the period before competitive food policies took effect (2001-2004), the childhood overweight rate was increasing, but after the policies took effect (2005-2008), the trend stabilized. After the policies took effect, significant population-level improvements in overweight trends were observed among fifth graders in the Los Angeles Unified School District (78% Latino) and fifth-grade boys and seventh graders in the rest of California (48% Latino). This study included more than 5 million observations over an 8-year period using a majority-Latino population of middle-school students. The analysis was restricted to fifth- and seventh-grade students attending public school for whom annual physical fitness data, including

height and weight measurements, had been recorded. According to the authors, the competitive food policies implemented in 2004 in California, and Los Angeles in particular, are among “the most rigorous and comprehensive” of such policies in the nation. However, due to study limitations, such as lack of randomization, the extent to which the new nutritional policies contributed to the change in BMI was unclear.⁴²

Another study attempted to determine whether student overweight/obesity was affected by state competitive food laws. The authors used the Classification of Laws Associated with School Students (CLASS) database to stratify schools into those with strong, weak, or no competitive food laws; student demographic and characteristic information was culled from the 2007 National Survey of Children’s Health for over 16,000 children ages 11-14. In 2005, 31 states did not have any state laws regulating competitive food and beverage in middle schools; of the remaining states, 11 were found to have weak competitive food laws, and 9 had strong laws. Results showed that children in states with weak competitive food laws had over 20% higher odds of being overweight/obese than those living in states with no laws or strong laws. The authors suggested that the smaller sample size for strong-law states may have contributed to these findings; they also noted that the effects of these laws are not immediate, and more time may be required before any effects are exacted. The study controlled for characteristics associated with childhood overweight/obesity, including being younger, being black or Latino, not coming from a two-parent family, and living in a poor household.⁴³

Latino children have few options for physical activity during the school day. Increasing opportunities for physical activity at school by implementing structured programs that engage children in physical activity may increase overall activity levels and improve obesity-related outcomes among Latino children. Currently, however, school compliance with physical activity policies is low.

Studies suggest that Latino children may have fewer opportunities to engage in physical activity at school than their White counterparts. In a study evaluating physical education and recess practices among U.S. public elementary schools,⁴⁴ elementary schools with primarily Latino students were less likely than those with primarily White students to offer 20 minutes of recess daily. Latino schools were also less likely than White schools to offer physical education for at least 150 minutes per week, although the difference did not reach statistical significance.

A study of 102 public elementary schools in Rhode Island revealed that schools with high minority enrollment ($\geq 10\%$ African American, $\geq 25\%$ Latino, or both) offered fewer programs supporting healthy eating and physical activity than schools with low minority enrollment.⁴⁵ Schools with high minority enrollment were less likely to offer physical activity ($P < .05$), and children at those schools were less likely to participate in 20 minutes or more of recess play per day ($P < .001$). Additionally, children in high-minority schools had less access to physical activity facilities, such as playing fields and tracks. No differences were found in access to physical education between low- and high-minority schools.

Schools with high minority enrollment were less likely to offer programs that support healthy eating and physical activity.

One study of majority Latino and majority overweight elementary school students in the southwest United States found that, after four days of unstructured recess and four days of semistructured recess, children overall had more minutes of moderate to vigorous physical activity (MVPA) during semistructured exercise, and both boys and girls had significant increases in activity time during semistructured exercise. The authors also noted that the children did not have a statistically significant preference between semistructured recess, in which children chose either jumping rope, walking, soccer, basketball, or tag games, and unstructured recess.⁴⁶

A study of 298 fifth grade children (39% Latino, 17% overweight, and 23% obese) evaluated the number of steps and amount of moderate to vigorous physical activity the students were able to achieve using four different physical activity models. The first model was a single 20 minute lunchtime recess; the second model was a 20 minute lunch recess with the addition of a second 15 minute recess; the third model was a 30 minute PE class with a 20 minute lunchtime recess; and the fourth model was a 30 minute PE class, a 20 minute lunch recess, and an extra 10 minute recess. As expected, the children logged the most steps and the highest amount of MVPA using model 4; compared to days with only one PA opportunity, children had a 58% increase in steps and a 115% increase in MVPA on days with three activities.⁴⁷

Even when states have policies for increasing physical activity, schools are often challenged to implement them due to competing priorities, lack of resources, insufficient knowledge about the policy among school administrators, and insufficient enforcement of policy.⁴⁸ Additionally, staff perceptions about the role and responsibility of schools in providing opportunities for physical activity may present challenges. A small study of Latino parents of first-graders and school staff found that staff members often believed that parents—not the school—had the greatest responsibility in ensuring that children were physically active.⁴⁹

In a survey of California students grades 1-12 (43% Latino), 66.7% of students in grades 1-6 reported having less than 200 minutes of in-school physical activity over 10 school days; of those students in grades 1-6 who had scheduled PE three times per week, 55% still reported less than the required 200 minutes/10 school days. Of the students in grades 7-12, 42.2% reported having less than 400 minutes of physical activity over 10 school days. Results of this survey suggest that twice weekly physical activity is not sufficient for most students to meet the recommended 200 minutes/10 days for grades 1-6 and 400 minutes/10 days for grades 7-12.⁵⁰

In a study evaluating the interim progress of 224 low-income and predominantly African American and Latino schools receiving technical training assistance from the Healthy Schools Program, Beam et al found that, overall, the training assistance improved the schools' policies and practices regarding obesity prevention. The goal of the Healthy Schools Program, a national school-based obesity prevention program, is to assist schools in implementing nutrition and physical activity policies. The results of the interim progress evaluation showed improvements to school meals and school employee wellness; improvements in physical activity, however, were

Structured physical activity programs and policies targeted at increasing physical activity may promote healthier behaviors. Younger children may benefit from such programs and policies, too.

lacking. This study helped identify the Healthy Schools Program technical training assistance as a valuable tool for assisting schools in the implementation of wellness policies in accordance with the Healthy, Hunger-Free Kids Act of 2010, and also identified areas that may require more effort.⁵¹

Educating school staff members about their role in providing physical activity, providing staff with sufficient support to allow time for physical activity (i.e., in-class activity breaks)⁵², and implementing consistent school policies and programs targeted at increasing physical activity may help to prevent childhood obesity.

Studies have shown that schools can help increase physical activity and promote healthy behaviors among Latino children by providing structured physical activity programs. In a study of 459 middle school girls (73% Latina) who participated in Get Moving!, a school-based intervention aimed at increasing physical activity and decreasing sedentary behaviors, girls who received the intervention were significantly less sedentary ($P < 0.05$) and more intrinsically motivated to engage in regular exercise ($P < 0.05$) compared with girls who received no intervention.⁵³ Participants in the Grand Canyon Trekkers program, a 16-week structured walking program among low-income Latino children, showed a 37.1-percent improvement in cardiorespiratory fitness compared with baseline.⁵⁴ Younger children may also benefit from structured physical activity programs. In a study of 423 primarily Mexican-American preschool children (90% Latino) in Head Start centers in San Antonio, Texas, the Miranos! program significantly increased active play levels ($P < 0.05$) among children who participated in treatment groups compared with those in the control group.⁵⁵

The advent of exergaming, which combines exercise and video gaming, provides another opportunity for schools to incorporate technology to promote physical activity during the school day. However, as one study found, exergaming may be more appropriate as an adjunct to other forms of aerobic exercise and should not be the sole modality of physical activity. The study involved 53 urban 4th-grade children (mean age: 10.3 years; 73% low socioeconomic status) who participated in the Dance Dance Revolution (DDR) program during their physical education classes.⁵⁶ The program lasted 9 months and included 30 minutes of physical activity three times per week, including DDR, aerobic dance, and other sports and fitness activities. During the data collection days, students were separated into two groups, each starting with either 15 minutes of DDR or 15 minutes of aerobic dance and switching to the other activity for the last 15 minutes. Moderate to vigorous physical activity (MVPA), self-efficacy, and enjoyment were measured for each activity. DDR significantly improved self-efficacy ($P < .001$) and enjoyment ($P < .001$) compared with aerobic dance, but aerobic dance significantly lengthened the time spent in MVPA ($P < .01$). More studies are needed to evaluate other forms of exergaming, but these findings suggest that DDR can be a useful supplement to traditional forms of physical activity in school-based physical education programs.

Structured, school-based physical activity programs may help increase physical activity levels and improve obesity-related outcomes among Latino children.

Although many of the programs described above had some success increasing physical activity among Latino children, some showed no significant changes in weight or BMI, perhaps suggesting that more time would be needed to fully evaluate program impact. Additionally, school-based programs alone are not sufficient for reducing overweight and obesity. Interventions that increase intrinsic motivation and instill positive meanings about physical activity as a health-related behavior are needed to bridge the gap between the time spent in and out of school.⁵⁷

Latino students engage in less physical activity during school hours and are less likely to participate in team sports or after school activities at school than their peers.

A cross-sectional study of data from the 2007 National Survey of Children's Health found that Latino youths had the lowest participation in organized sports at school or school-based after school activities when compared to non-Latino children; girls, in general, also had lower rates of participation.⁵⁸ Another cross-sectional study, using information collected from students in grades 8-11 for a sports interest survey, found that Latino boys were significantly more likely to participate in sports than Latino girls. The survey also showed that, of all sports, Latino boys and girls were most likely to participate in soccer.⁵⁹ Kwon et al used accelerometry data from fifth and sixth graders from 14 schools in Suburban Cook County and found that girls in majority Latino schools (>70%) engaged in 10 fewer minutes of MVPA than students in majority white schools, and boys in Latino schools averaged 14 fewer minutes of MVPA than students in white schools ($p < 0.01$). More strikingly, the average MVPA time for Latino girls during school hours was 7 minutes.⁶⁰

A national study revealed that lower physical activity levels among Latina adolescent girls were attributable to differences in the schools that they attended.⁶¹ Latina females attended schools that were poorer and more racially segregated than those attended by White females, and activity levels at those schools were lower than higher-income and more ethnically-diverse schools. No differences were found in physical activity levels between Latina and White girls who attended the same schools, but interestingly, Latino males had higher levels of activity than White males who attended the same schools.

A survey of high school students in Connecticut found higher rates of obesity and lower levels of physical activity among Latinas compared to their peers. Latina teens were also more likely to fail physical education classes. The participants identified several barriers to participating in physical activity both in and out of school. In-school barriers included refusal or reluctance to change clothes, especially early in the day; worry about appearance; self-consciousness about exercising in front of boys; and lack of interest in activities. Out-of-school barriers included homework, after-school jobs, and caring for children, younger siblings, and family members.⁶²

Nearly 80 percent of Latino parents believe that afterschool programs provide opportunities for their children to be physically active, and 84 percent supported public funding for these programs, according to data from the America After 3PM

Students attending Latino majority schools in a suburban county engaged in fewer minutes of moderate to vigorous physical activity (MVPA) than those attending majority white schools.

survey.⁶³ Fitness-focused afterschool programs have been shown to increase fitness among Latino youth, but Latino children have few opportunities to participate in these types of programs due to a number of factors, such as a lack of time for outdoor play, unsafe neighborhoods, and lack of physical activity sites in their communities.^{62,64} Afterschool fitness programs that take place on school grounds directly after class have eliminated some of these barriers. For example, the SCORES program is an afterschool soccer and literacy program where students participate in soccer drills or games three days a week for up to 3 hours each day. On the other two days, students learn creative writing or performance skills, or participate in community service projects. A randomized trial involving six urban schools (42% Latino) compared three schools receiving the SCORES program with three schools receiving no intervention.⁶⁵ The SCORES program increased moderate to vigorous physical activity (MVPA) after school but only significantly so in youth whose BMI was above the 85th percentile at baseline. In these children, MVPA increased by 3.4 minutes after school (95% confidence interval [0.3, 6.5]) and 18.5 minutes on Saturdays (95% confidence interval [3.4, 33.6]), equating to an increase of 35 minutes per week. The success of this program is credited to a model in which the SCORE organization works with the school district to train afterschool staff in implementing the curriculum with the existing infrastructure.

Latino kids have lower participation in afterschool activities. Programs offered on school grounds have helped to eliminate barriers to physical activity.

Schools with larger minority populations, including Latino students, are often located near heavily-trafficked roads, leading to an increase in motor vehicle transportation to and from school.

Changes to the built environment, particularly increased motor vehicle traffic and the expansion of suburbia, have affected how children travel to school; often, the built environment does not include measures for increased walkability or bikability, which has contributed to the trend of increased motorized transportation to and from school. In urban areas, where home-school proximity may otherwise encourage children to travel by bike or on foot, traffic and travel safety are of concern. In particular, a study of California public schools showed that schools with larger Black and Latino populations were more likely to be located close to heavily trafficked roads.⁶⁶ Decreased rates of walking and biking to school have been linked to higher levels of childhood obesity.⁶⁷

The National Center for Safe Routes to School was established in 2006 and serves as a resource for local and state Safe Routes to Schools (SRTS) programs; in July 2012, the Moving Ahead for Progress in the 21st Century (MAP-21) Act was signed into law, which includes funding for SRTS under the Transportation Alternatives (TA) program.⁶⁸

A cross-sectional study investigated the relationship between SRTS improvement projects and the transportation habits of children attending schools along completed project routes. Parents of third through fifth grade children attending 10 elementary schools in California, 4 of which were majority Latino, were provided with surveys; the survey questioned whether the parents had noticed the improved route, whether the improvement was along the child's usual route to school, and if they would say

their child walks or bikes to school more frequently, less frequently, or the same amount as before the project was built. Students who attended the 4 majority Latino schools and for whom the completed project was along their normal route to school reported significant increases in walking and biking to school compared to all other schools.⁶⁹

Walking school buses have also shown some success among Latino school children, as mentioned previously in the case study of Maybury Elementary.⁷⁰ A randomized trial investigated the walking school bus in 149 4th-grade children (61% Latino) from eight low-income public elementary schools in the Houston Independent School District in Texas.⁷¹ Compared with the control group, children who participated in the walking school bus intervention significantly increased their active commuting ($P < .001$) and moderate to vigorous physical activity ($P = .029$). A study of 25 Latino elementary students (ages 5-11) in Albuquerque, N.M., reported slight increases in weekly physical activity compared with baseline, but the difference was not significant ($P = .08$).⁷² Challenges to implementing the walking school bus have been cited. In the Maybury case,⁷⁰ parent participation was the main barrier to widespread implementation. Work- and family-related demands often prevent parents from volunteering for the program. Rotating walking school bus leaders and coordinating with the nearby high school to recruit older students to help with the program may help to retain the current routes and expand to additional routes. Another goal of the program is to equip the school with areas for securing bikes to allow for biking school buses in the future.

Schools with walking school buses & Safe Routes to School programs reported increases in walking and biking to school.

Conclusions and Policy Implications

CONCLUSIONS

- When competitive foods are available, Latino students are more likely to purchase and consume these foods than their White peers. Access to competitive foods in schools associated with higher consumption of low-nutrient, energy-dense foods among Latino children and adolescents.
- While many school districts have a policy that addresses competitive foods, the policies influencing schools with a higher proportion of Latino students are generally weak, though this may decrease as districts comply with the national standards.
- Given initial evidence on the impact of restricting competitive foods during the school day on student consumption of foods of minimal nutritional value and obesity, Latino students may disproportionately benefit from specific nutrition standards for competitive foods in schools; such strong policies may positively influence BMI trends in this vulnerable population.
- Many of the findings in this paper apply to all students, but they are particularly relevant for the Latino population because of their high risk for overweight/obesity and low rates of physical activity.
- Although many of the above observations can be made in all children and adolescents without regard to race or ethnicity, these findings are particularly

relevant for Latinos, due to the rising percentage of the U.S. Latino student population and the high risk for weight-related health problems among Latino children and adolescents.

- Structured school-based programs that incorporate culturally relevant messages and activities have demonstrated some success in increasing physical activity among Latino children, though many majority Latino schools are still not compliant with physical activity requirements.
- Encouraging participation in and creating opportunities for participation in school sports among Latino/Latina students is also important, as this student population is less likely to participate in after-school sports and activities.
- Many majority Latino schools are located in highly-trafficked urban areas, which discourages children from walking or biking to school. Creating safer travel environments may allow for active transportation to school, providing students with additional opportunities for physical activity.

POLICY IMPLICATIONS

The findings of this review have several implications for legislators, policymakers, school administrators, and community members seeking to increase physical activity in Latino children:

- Current national nutrition standards for competitive foods should be consistently applied, in all schools, regardless of location or student demographics.
- Because many schools with a high proportion of Latino students have not historically had strong competitive food policies, policymakers should prioritize helping schools in Latino communities effectively implement the national standards.
- Public health initiatives (e.g., nutrition education programs) that consider the schools' surrounding food environment and familiar cultural factors, such as convenience stores and mobile food vendors, may be especially beneficial in Latino communities.
- State and local governments and school administrators should implement school-based programs that provide opportunities for physical education and activity during the school day, before and after school, and during the summer to ensure year round activity.
- National, state, and local governments should encourage active transportation, creating a safe environment for children to walk or bike to and from school.
- Health departments should collaborate with school and community stakeholders to develop culturally relevant interventions to help Latino children become more active and achieve the recommended 60 minutes of daily physical activity for all children.

FUTURE RESEARCH NEEDS

To effectively address the issue of overweight and obesity among Latino children and adolescents, additional research is needed to better discern the impact of the school food environment on Latino weight status. Future studies should directly

address the question of whether reducing access to competitive foods has long-term positive effects on BMI among Latino students. Additional studies should more firmly establish the contribution of competitive foods to Latino students' food choices and consumption patterns, as well as the extent to which the surrounding food environment in Latino communities contributes to overall dietary habits of Latino children and adolescents. Evaluation of efforts intended to enhance the school food environment will help identify areas with the greatest potential for further intervention. Additionally, most studies identified by this review were cross-sectional by design; more experimental studies on these topics are warranted.

Now that schools participating in the National School Lunch Program and School Breakfast Program are required to meet nutrition standards for competitive foods as well, future research should focus on the effects of this change on overweight and obesity among Latino children and adolescents. In addition, each school participating in the NSLP or SBP must implement a local school wellness policy as mandated by the Child Nutrition and WIC Reauthorization Act of 2004 and the HHFK Act of 2010; the wellness policy should include both nutrition and physical activity components. Current studies of local wellness policy show that, in general, schools are more compliant with the nutrition component than the physical activity component.

To increase opportunities for physical activity among Latino children, further research is needed to identify the factors that may support or interfere with physical activity. Studies should focus on determining the specific effects of family income, socioeconomic status, availability of resources in underserved communities and schools, and other social forces on physical activity levels. The efficacy of safe and active school zones that encourage active transportation, and the effect of active transportation on obesity prevention, should be studied in greater depth. School- and community-based physical activity programs, policies, and strategies that have shown some success should be investigated further or on a larger scale to assess their impact on long-term physical activity and obesity prevention, especially during out-of-school time when Latino youth are at the highest risk of inactivity. Interventions and strategies that have been highly successful in some Latino populations should be evaluated further to assess their generalizability and cost-effectiveness in other Latino populations.

Finally, more research on increasing physical activity among this population is needed. Results from low-income and whole-population studies informed conclusions when Latino-specific studies were not available. In those cases, some of the data presented may not be generalizable to Latino populations, but they may generate hypotheses for Latino-specific studies.

ABOUT THE PROGRAM

Salud America! The RWJF Research Network to Prevent Obesity Among Latino Children is a national program of the Robert Wood Johnson Foundation that develops multimedia communications to educate and motivate our national online network—kids and parents, teachers, academics, and community leaders—to take action to reduce Latino childhood obesity and build a culture of health. The network is directed by the Institute for Health Promotion Research at the University of Texas Health Science Center at San Antonio.

For more information, visit <http://www.communitycommons.org/salud-america>.

ABOUT THIS RESEARCH REVIEW

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