



Programs and Policies to Improve Child Health

Healthier Choices and Increased Participation in a Middle School Lunch Program: Effects of Nutrition Policy Changes in San Francisco

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In order to address overall nutritional health, including increases in numbers of overweight children and adolescents, the San Francisco Unified School District implemented a progressive nutrition policy beginning in August 2003. We review this policy and focus on its impact on school and district revenues and students' participation in the federally subsidized school lunch program.

We examined changes in menu items and the consequent effects of these changes on student eating patterns and school revenues at Aptos Middle School in San Francisco. This case study and additional district data show that provision of healthy menu options led to increased student participation in the federal school lunch program. (*Am J Public Health*. 2006;96:1542–1547. doi: 10.2105/AJPH.2005.070946)

THE UNITED STATES IS FACING

a dramatic surge in the number of children and adolescents defined as either overweight (body mass index [BMI; calculated as weight in kilograms divided by height in meters squared] at the 95th per-

centile or above for their age and gender) or at risk for overweight (BMI between the 85th and 95th percentiles for their age and gender).¹ A recent study showed that, in addition to a range of adverse medical consequences, overweight and decreased fitness levels in childhood are associated with poorer academic achievement.^{2,3} In the United States, the escalating prevalence of overweight among school-aged children has been directly linked to declining levels of school-related physical activity, poor eating behaviors, proliferating consumption of fast foods and soda, and increased television viewing.^{4–6}

The Health Behavior in School-Aged Children Study surveyed more than 128 000 students aged 11, 13, and 15 years in 28 industrialized countries (including countries in Europe and North America) about their health behaviors and lifestyles.⁷ Of note, the United States ranked in the top 3 countries in the frequency at which schoolchildren consumed soft drinks, candy, and chocolates.⁷

In California, a state law eliminating soda sales at elementary

and middle schools went into effect on January 1, 2003 (SB 677, the California Childhood Obesity Prevention Act of 2003). To be in compliance with the law, elementary and middle schools had to remove all soft drinks during school hours. No restrictions were made for high schools because of logistic difficulties, including many students obtaining meals off campus. In addition, concern about losing revenues generated by the sale of these items, particularly in support of high school sports and other programs, led to lobbying and other negative influences, such as protests and letter writing, by school districts and the food industry.

Local school districts, however, have the opportunity to institute more comprehensive policies than states. Schools are an ideal setting to institute healthier diets because they are responsible for administering at least one third of a child's food intake during the school day and they can function as educational and role models for healthier food choices. At the beginning of the

2003–2004 school year, the San Francisco Unified School District (SFUSD) addressed problems associated with childhood overweight and responded to pressure from various parent groups by changing its nutrition standards to eliminate the sale of unhealthy foods, snacks, and beverages from all lunch line, snack bar, and vending machine locations in all public elementary, middle, and high schools.⁸

STUDENT NUTRITION STANDARDS IN SAN FRANCISCO

The SFUSD (approximate 2003–2004 enrollment: 59 000 students) and its community of parents, educators, and administrators have taken a progressive approach to developing and implementing nutrition standards for public schools in San Francisco. The city's nutrition policies represent an aggressive and enlightened approach to combating the epidemic of pediatric overweight.

The SFUSD has developed district-wide nutrition policies that extend beyond SB 677, requiring



elimination of foods not meeting the food minimal nutrition value, a federal nutrition standard that bans the sale of products such as artificially sweetened foods and foods that provide less than 5% of the recommended dietary intake of each of 8 specified nutrients per 418 J or per serving⁸ (see box on this page). According to the US Department of Agriculture, foods that do not meet this nutrition standard include chewing gum, soda water, and certain candies such as licorice, hard candies, and candy-coated popcorn.⁹

The SFUSD standards set maximum levels for the amount of fat and sugar per item sold and consumed. Regulations are also in place requiring a minimum level of nutrients in all snack foods and side dishes sold at every school (kindergarten through 12th grade). Main entrees sold in school cafeterias must contain no more than 30% total calories from fat, contain no more than 10% calories from saturated and trans fat, and be composed of no more than 35% sugar by weight. Snacks and all side dishes must meet the entree standards and, in addition, must contain specified levels of vitamins, minerals, protein, and fiber (see box on this page). Only those snacks and side dishes that are part of the updated district-approved food list can be sold in vending machines and at food sales, such as concessions during a sporting event, during or after school events.

Portion sizes are also now limited by standards formulated by the SFUSD's School Nutrition Services (SNS). Although state law mandates that soft drinks,

Details of Changes in Nutrition Standards, San Francisco Unified School District

Water

- Plain or carbonated
- No added sweeteners (natural or artificial, including sucralose and aspartame)
- No added vitamins, caffeine, or herbal supplements

Juice

- 100% fruit juice, plain or carbonated
- No added sweeteners (natural or artificial)
- No caffeine or herbal supplements
- Maximum size 12 fl oz (360 mL)

Juice/water blends

- No added sweeteners (natural or artificial)
- No caffeine or herbal supplements
- Maximum size 12 fl oz (360 mL)

Milk

- 1% or fat free
- Enriched rice, nut, or soymilk
- Flavored milk with no more than 1.4 oz (40 g) sugar per 12 fl oz (360 mL)
- No bovine growth hormone
- Maximum size 12 fl oz (360 mL)

General nutrition standards (for any individual food item)

- 30% or less of calories from fat
- 10% or less of calories from saturated plus trans fat
- No more than 35% sugar by weight
- Snack foods must meet US Department of Agriculture standards, including no less than 5% of the following 8 nutrients: protein, calcium, vitamin A, vitamin C, riboflavin, niacin, thiamin, and iron (excluding fruits, vegetables, seeds, and nuts)
- Portion size must be limited to the following:
 - 1.25 oz for chips, crackers, popcorn, cereal, or jerky
 - 2.5 oz for trail mix, nuts, seeds, or dried fruit
 - 2 oz for cookies or cereal bars
 - 3 oz for bakery items
 - 3 fl oz for frozen desserts, including ice cream
 - 8 fl oz for nonfrozen yogurt
 - 12 fl oz (360 mL) for beverages, excluding water
- Fruits and vegetables offered at school site where foods are sold
- Preference given to the following types of products:
 - Those containing 0 g trans fat
 - Those grown, processed, and packaged in California
 - Those certified as organic
- Products containing peanuts or peanut residue must carry a warning label

including soda, not be sold in middle (grades 6–8) or elementary (kindergarten through grade 5) schools at any time, the SFUSD has extended the limits on soft drink sales to include high schools. The SFUSD nutrition standards apply to the federal student lunch and breakfast programs, all school snack bars and vending machines, student stores, and fundraising sales, and they demonstrate San Francisco's serious commitment to providing healthier food options in schools and combating the increase in the number of overweight children.

Involvement of parents, community leaders, public health practitioners, and local physicians has been critical in developing and applying changes to the SFUSD food programs. Parental involvement grew out of a grass-roots campaign, initiated by a local organization (Parents for Public Schools in San Francisco), to implement changes in school menus. Concurrently, a group of concerned parents sought to change and improve the items sold on the snack bar menu at San Francisco's Aptos Middle School. The changes in à la carte/snack bar school lunch options at Aptos Middle School made in the 2002–2003 school year helped establish the basis for the overall district nutrition standards. The box on the following page presents details on community involvement and the sequence of events that led to the changes in the SFUSD nutrition standards.

The SFUSD Nutrition Committee, the group of parents, educators, and community members who were active in changing and



Parent and Community Group Efforts Leading to Nutritional Policy Changes in San Francisco

- Formation of parent group interested in nutrition (parents included a registered dietitian and a pediatrician)
- Review and critique of school menus
- Determination of how food was provided to schools
- Meeting with Student Nutrition Services representatives, including the director and several other individuals involved in food distribution and school meal finances
 - Meeting with interested members of the SFUSD Board of Education to discuss the issue
- Formation of SFUSD task force on nutrition and physical activity in public schools
 - Parents, students, pediatricians, members of Board of Education, and members of San Francisco Board of Supervisors included on task force
 - Monthly meetings of task force for more than 1 year and development of policies to recommend to the San Francisco Board of Education to improve nutrition and physical activities in the public school system (implementation hindered by budgetary constraints)
- Formation by Board of Supervisors of San Francisco Childhood Nutrition and Physical Activity Task Force
 - Development of priorities for all children in San Francisco
 - Recommendations presented to Board of Supervisors and adopted for San Francisco

Note. SFUSD = San Francisco Unified School District.

implementing the SFUSD nutrition standards, has emphasized that changing the items available in school snack bars or student stores could encourage more students to go through the school lunch line. The options offered through the lunch line provide one third of the recommended dietary allowances for protein, vitamin A, vitamin C, iron, calcium, and calories,¹⁰ whereas the à la carte/snack bar's self-selected foods are not purchased or consumed under any specific regulations.

METHODS

To assess the effects of the changes in nutrition standards

made at Aptos Middle School (the first school to implement these changes) and other San Francisco public schools on SNS revenues and students' participation in school lunch programs, we retrospectively compared school revenue and lunch participation data from the 2002–2003 school year (before implementation of the nutritional changes) with data from the 2003–2004 school year (after implementation of the changes) for both Aptos Middle School and the district as a whole. The SNS routinely collects data on monthly revenues and lunch participation from each school. Compiled data on profits were not available from the SNS.

We also accessed information on student enrollment and students' eligibility for the free and reduced-price school lunch program from the SFUSD Web site so that we could compare revenue and participation changes with demographic shifts in the San Francisco public school student population. We did not use statistical tests in making these comparisons, and we present the data in tabular format only.

We also present data derived from a district-wide survey commissioned by the SFUSD Nutrition Committee to assess student eating practices. The survey was designed and administered by the SFUSD Research, Accountability and Planning Department. Surveys were given to all middle and high school principals for distribution in homeroom classes after implementation of the new SFUSD nutrition standards. In schools that did not have homeroom classes, principals were advised to select classes most representative of the entire school population at each grade level. Although we were not involved in the design or administration of the survey, we were participating members of the SFUSD Nutrition Committee and were therefore provided the results for review.

Surveys were completed in 1 class per grade level in schools with fewer than 500 students, 2 classes per grade level in schools with 500 to 1200 students, and 3 classes per grade level in schools with more than 1200 students. Surveys were analyzed by the SFUSD Research, Accountability and Planning Department both as a complete

group and disaggregated according to school level, gender, and ethnicity.¹¹

RESULTS

Healthy Choices in a Middle School

In the 2002–2003 school year, Aptos Middle School enrolled 859 students in grades 6 through 8. Approximately 21.2% of these students were African American, 34.9% were Asian American, and 24.3% were Latino.¹² Changes implemented within Aptos's snack bar included the removal of sodas, Twinkies, Slim Jims, and giant pizzas and their replacement with sushi, fresh soup, deli sandwiches, 100% fruit juice, and baked chicken with rice. Desserts included individual fruit cups and fresh fruit. Giant round pizzas were replaced by individual slices with a side salad, and extra large cheeseburgers were replaced by a modest-sized hamburger.

In addition to parent and community involvement, students were instrumental in the process of changing the menus in the snack bar at Aptos. Before the changes, students were informally polled on their food choices by teachers, and their input, which included the addition of fresh deli sandwiches, pasta, and ethnic-specific foods such as sushi, was relayed to the SFUSD Nutrition Committee. Student responses formed the basis for the new snack bar menus.

Concern for lost revenues led to initial reluctance by the SNS to implement any changes. However,



this concern quickly disappeared when, at worst, revenues did not change and profits at some schools increased. Although profit data were not available from the SNS, according to Dana Woldow, chair of the Aptos Nutrition Committee and co-chair of the SFUSD Student Nutrition and Physical Activity Committee, changes in the menus at Aptos resulted in greater profits from food sales at the school (oral communication, April 12, 2005). In fact, the success of this program led to major changes in nutrition standards throughout the district. Expanded incorporation of healthier meal choices in the revamped SFUSD nutrition standards further affected and improved the food choices in the snack bars as well as the federal school lunch program menus.

Specific Changes in Food Choices

During the final full month of food sales before changes were

introduced on the à la carte/snack bar menu, Aptos's food service lost nearly \$1000. During January and February 2003 sodas, chips, Hostess cakes, and similar foods were phased out, and in February 2003 traditional and long-established entrees were replaced with deli sandwiches, sushi, soup, fried rice, and chow mein. Portion sizes of pizzas and burgers were reduced in March 2003, and a side salad was added to the menu. Table 1 lists some of the items sold in the snack bar before and after implementation of the SFUSD nutrition standards.

Economics of the Aptos School Meal Changes

Two months later, in May 2003, Aptos generated more than \$2000 in revenue (taking into account revenues from à la carte/snack bar sales, reimbursements from federal and

state free and subsidized breakfasts and lunches, and operational and other expenses). In contrast, the district's largest middle school, A. P. Giannini, with 1280 students (approximately 50% more than at Aptos) to whom the school continued to offer sodas and fast food, made less than \$90 for the month. The increase in revenue can be explained by the increase in overall participation in the federally subsidized school lunch program (as described in the "Discussion" section).

DISCUSSION

Expanding the Program to Other Schools

Beginning in August 2003, in response to the success at Aptos and a general commitment to stemming the rising prevalence of overweight among school-aged children and adolescents in San Francisco, all SFUSD schools altered their snack bar menus to meet the revised district-wide nutrition standards. Consequently, during the 2003–2004 school year, all schools in the district began to gradually eliminate sales of on-campus food and beverages not meeting the nutrition standards (see box on page 1543). Changes in nutrition policies included altering vending machine content (to be consistent with SFUSD nutrition standards), modifying the composition of the school breakfast and lunch menus, and adjusting the foods approved for sale in the school snack bars.

Effects on Federally Subsidized School Meals

SNS data indicate that, during the 2003–2004 school year, overall participation in the federally subsidized free lunch program increased dramatically at both the middle and high school level. Among the 40 middle and high schools for which data on participation in the federally subsidized lunch program were available for both the 2002–2003 and 2003–2004 school years (there are 44 middle and high schools in the SFUSD, but 4 schools opened in the 2003–2004 school year and thus had no data for the 2002–2003 school year), 27 (67.5%) showed an increase in student participation, 6 (15.0%) showed a decrease, and 7 (17.5%) did not change in terms of participation (Table 2). Student participation increased by a mean of 640 individual lunch meals per school, although the range among schools was wide.

Participation in the federally subsidized reduced-price lunch program, in contrast to the free lunch program, decreased in the 2003–2004 school year. Thirteen schools (32.5%) demonstrated an increase in participation, whereas 20 (50.0%) exhibited a decrease; overall, there was a median loss of 15 individual lunches per school, and there was no change in 7 schools (17.5%; Table 2). Despite the decrease in reduced-price meal participation at these schools, the district experienced an overall increase in participation in the federally subsidized school lunch program (both free and reduced

TABLE 1—Examples of New and Old Menu Items in San Francisco Unified School District Snack Bars

	Portion Size, oz	kJ, No.	Total Fat, g	kJ From Fat, %	Saturated Fat, g
Old					
Megaburger	9.4 ^a	1904	20.5	41	7.6
Bean and beef burrito	6.89	1841	18	37	5.0
Chocolate chip cookie	3.0	1636	20.74	48	4.75
New					
Fiesta bean and cheese burrito	7.11	1799	15	31	4.0
Beef burger	4.2	1230	9.4	29	2.9
Low-fat chocolate chip cookie	1.33	628	4.5	27	1.5
Sushi/California roll	4.0	494	1.35	10	0.24

Note. Additional examples of old items can be found at http://members.tripod.com/sfUSD_foods/pdfs/beannut0203.pdf; additional examples of new items can be found at http://members.tripod.com/sfUSD_foods/pdfs/beannut0304.pdf.

^a263 g.



TABLE 2—Lunch Participation and Enrollment Changes: San Francisco Unified School District, 2002–2003 and 2003–2004 School Years

	Total No. of Schools	Increase, No. ^a (%)	Decrease, No. ^a (%)	No Change, No. ^a (%)
Federal free lunch program	40	27 (67.5)	6 (15.0)	7 (17.5)
Federal reduced-price lunch program	40	13 (32.5)	20 (50.0)	7 (17.5)
Paid lunch program	39	19 (47.5)	11 (27.5)	9 (22.5)
Student lunch sales				
Total (free, reduced, and paid)	40	22 (55.0)	11 (27.5)	7 (17.5)
À la carte/snack bar	39	2 (5.0)	8 (20.5)	29 (74.4)
Eligibility for free lunch program	37	26 (70.3)	10 (27.0)	1 (2.7)
Eligibility for reduced-price lunch program	37	11 (29.7)	25 (67.6)	1 (2.7)
Total student enrollment ^b	36	17 (47.2)	19 (52.8)	0

^aNumber of schools.

^bSchools with available data.

price) because of the larger number of free student lunches provided to students in the 2003–2004 school year than in the 2002–2003 school year.

In middle and high schools, 864 549 individual free lunches were consumed in the 2003–2004 school year, as compared with 710 853 in the 2002–2003 school year. In addition, the overall number of reduced-price school lunches provided increased slightly from the 2002–2003 school year (231 877 lunches) to the 2003–2004 school year (232 803 lunches) in middle schools as well as high schools. Participation in the paid lunch line (which offered food also provided as part of the free and reduced-price lunch program) decreased from the 2002–2003 school year to the 2003–2004 school year. Nineteen of the 39 schools with available data on participation (47.5%) showed an

overall decrease in the number of individual meals served in the paid lunch program, 11 (27.5%) showed an increase, and 9 (22.5%) did not change in terms of the number of meals served (Table 2).

However, overall participation in the lunch program (paid lunches in combination with federally subsidized free and reduced-price lunches) increased, with 22 schools (55.0% of the total) demonstrating increases in sales. The total mean increase in sales of \$1706 (median=\$408) for the 40 schools in the SFUSD was directly related to the overall increase in students' participation in the federal lunch program (free, reduced price, and paid).

Effects on À La Carte Sales

Although changes in the à la carte menus and district nutrition standards were associated with a dramatic increase in participation

in the federally subsidized free school lunch program and a minimal decrease in participation in the federal reduced-price lunch program, overall these changes resulted in a decline in à la carte/snack bar sales and in the number of students participating in the à la carte/snack bar program. Only 2 of 39 (5.1%) schools with available data showed an increase in à la carte/snack bar sales, and schools lost an average of \$13 155 in such sales. At the time this article was written, profits had not been tabulated for the 2003–2004 school year, and thus the effects of the menu changes on overall profits were unclear.

The changes observed in free lunch program participation cannot be explained by changes in student enrollment. The total number of students enrolled in the district's middle schools decreased from 11 926 in the 2002–2003 school year to 11 853 in the 2003–2004 school year. In high schools, student enrollment increased marginally, from 18 854 in the 2002–2003 school year to 19 133 in the 2003–2004 school year. Overall district-wide enrollment increased marginally by 206 students (0.67%) between the 2002–2003 and 2003–2004 school years. However, more schools (19 schools, or 52.8% of the total) showed decreases in enrollment between these 2 school years. We were able to obtain SFUSD enrollment data on only 37 schools.

To some extent, the increase in participation in the school lunch program may be explained by

increased eligibility, given that 26 of 37 (70.3%) schools with available data on eligibility showed an increase in the percentage of students eligible for free lunches from the 2002–2003 school year to the 2003–2004 school year (mean increase: 7.2%; median: 5.2%; Table 2). Increases in the percentages of students eligible for reduced-price school lunches were observed in only 11 of 38 (29.7%) schools (mean increase: 2.7%; median: 1.5%); participation in the reduced-price lunch program did not increase in these schools.

Further studies are necessary to determine whether changes in the nutrient quality and types of foods provided by the SNS in the 2003–2004 school year led to the observed increases in participation in the overall program. A randomized controlled trial focusing on the introduction of nutritious foods and the removal of other less nutritious foods in selected schools in the SFUSD or another school district would offer important insights into determinants of student participation in school lunch programs.

Student Preferences

As the Aptos project demonstrates, schools can benefit by polling students on their food preferences. At a minimum, students should be asked to participate in the process of implementing specific changes in the school lunch and à la carte menus. In early 2004, after the revised district nutrition standards were implemented, the SFUSD conducted a survey of 4448 students (14% of the



middle and high school student population) in 16 of the 17 middle schools and 12 of the 15 high schools. The survey, commissioned by the SFUSD nutrition task force, asked questions about nutrition knowledge, food preferences, and eating practices, including frequency of eating in the school cafeteria.

Among the 1500 students who reported regularly eating in the school cafeteria (at least 3 times per week), 46% thought that the food offered in the cafeteria tasted better in the 2003–2004 school year than in previous years. Approximately 50% also thought that the cafeteria was serving more fresh fruits and vegetables than in previous years.¹¹ Many students (70%) cited the fact that the food offered in the cafeteria was free or inexpensive as their main reason for choosing to participate in the school lunch program.

Overall Role of Nutrition in Student Health

The success of the nutritional changes in the SFUSD intended to influence student health must be evaluated over a longer time period. In addition, a multifaceted approach must be taken in schools, communities, and homes to decrease pediatric overweight. Although changing and improving the foods offered and consumed in schools are important and healthy first steps, interventions at the community and household levels must also be initiated to discourage consumption of unhealthy fast foods and foods high in fat, sugar, and salt. Furthermore, interventions designed

to increase physical fitness participation as part of the school curriculum and within the community must also be partnered with nutritional or food-based interventions.

This illustrative case study of changes in the nutrition standards of the SFUSD—and, most important, the dramatic changes made to improve the à la carte/snack bar menus—suggests that students will choose healthier options without detrimental effects on the economics of student meal services. In the study district, revenues did not increase from à la carte/snack bar sales, but overall participation in the federally subsidized school lunch program did improve, perhaps in part because menu options became more attractive to middle and high school students or their parents.

Increased participation in school lunch programs is a desirable end result from both a nutritional and an overall health perspective. The effects of improving students' eating behaviors and schools' nutrition standards on overall student health, including overweight, should be investigated further. Other school districts should analyze and report any potential changes in student eating habits associated with changes in local nutrition standards. Data from other districts would provide additional insight into determinants of students' participation in school lunch programs. ■

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This article was accepted November 6, 2005.

Contributors

J.M. Wojcicki collected data, synthesized analyses, and led the writing of the article. M.B. Heyman originated the study and supervised all aspects of its implementation.

Acknowledgments

This research was supported in part by the National Institutes of Health (grant DK 060617) and the Robert Wood Johnson Foundation (grant 0458200).

We would like to acknowledge the tremendous effort put forth by the parents of Aptos Middle School, in particular Dana Woldow and Caroline Grannan, in implementing the programs described here and the assistance of the Student Nutrition Services of the San Francisco Unified School District, specifically Ed Wilkins and Patricia Saturnio, in collecting the data.

We would also like to thank members of the San Francisco Unified School District administration, including Arlene Ackerman (superintendent of schools), Trish Bascom (executive director, School Health Programs), and Daniel Kelly (San Francisco Board of Supervisors), for their support in improving nutrition in San Francisco's schools.

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